

The Role of Fruit Waste-Based Briquette Sales in Enhancing Income and Community Welfare in Babussalam Village

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ABSTRAK

Penelitian ini menganalisis peran penjualan briket dari limbah buah dalam meningkatkan pendapatan dan kesejahteraan masyarakat di Desa Babussalam. Limbah buah yang biasanya dibuang dapat diubah menjadi briket ramah lingkungan dengan nilai ekonomi. Penelitian menggunakan pendekatan kuantitatif deskriptif dengan studi kasus, melibatkan 30 responden yang terdiri dari produsen dan pelaku distribusi briket. Data dikumpulkan melalui observasi, wawancara, dan kuesioner, kemudian dianalisis dengan statistik deskriptif dan regresi sederhana. Hasil menunjukkan bahwa penjualan briket secara signifikan meningkatkan pendapatan rumah tangga rata-rata 35% dan memperbaiki indikator kesejahteraan seperti pendidikan, kesehatan, dan konsumsi rumah tangga. Studi ini menyimpulkan bahwa pemanfaatan dan komersialisasi briket limbah buah mendukung peningkatan ekonomi masyarakat pedesaan sekaligus pengelolaan lingkungan yang berkelanjutan. Disarankan penelitian lanjutan untuk memperluas akses pasar dan mengintegrasikan strategi pemasaran digital guna meningkatkan daya saing produk briket ramah lingkungan.

Keyword: Limbah Buah; Briket Ramah Lingkungan; Pemasaran Digital

ABSTRACT

This study analyzes the role of fruit waste briquette sales in increasing income and community welfare in Babussalam Village. Fruit waste, which is usually discarded, can be converted into environmentally friendly briquettes with economic value. The study used a descriptive quantitative approach with a case study, involving 30 respondents consisting of briquette producers and distributors. Data were collected through observation, interviews, and questionnaires, then analyzed using descriptive statistics and simple regression. The results show that briquette sales significantly increased household income by an average of 35% and improved welfare indicators such as education, health, and household consumption. The study concludes that the utilization and commercialization of fruit waste briquettes supports economic improvement in rural communities while simultaneously promoting sustainable environmental management. Further research is recommended to expand market access and integrate digital marketing strategies to increase the competitiveness of environmentally friendly briquette products.

Keyword: Fruit Waste; Eco-Friendly Briquettes; Digital Marketing

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1. INTRODUCTION

Waste management remains one of the most complex environmental and socioeconomic challenges in developing countries. In Indonesia, rural areas frequently face difficulties in handling organic waste,

particularly fruit waste generated from households, traditional markets, and small-scale agro-industries. In Babussalam Village, a significant amount of fruit waste is discarded daily, leading to odor problems, sanitation issues, and the attraction of pests. This condition indicates that waste management practices in the community are still limited and primarily focused on disposal rather than utilization. Yet, fruit waste actually holds great potential as a raw material for the production of renewable energy products such as briquettes, which can simultaneously address environmental and economic issues.

Several studies have previously investigated the utilization of biomass and agricultural residues for alternative fuel production. Research on coconut shell, rice husk, and corn cob briquettes, for example, has shown their potential to reduce dependence on fossil fuels while supporting energy security in rural regions. However, limited attention has been given to the use of fruit waste, which decomposes more rapidly and is abundant throughout the year. The use of fruit waste as briquette material introduces a novel approach to waste-to-energy innovation that is both eco-friendly and economically beneficial. It also supports the concept of a circular economy, emphasizing resource efficiency and the reintroduction of waste materials into productive use cycles.

The economic potential of fruit waste briquettes is particularly relevant for rural communities, where employment opportunities and sources of income are often limited. The transformation of waste into marketable briquettes provides not only an environmentally sound solution but also a livelihood strategy that empowers local residents. By engaging in briquette production and sales, villagers can develop entrepreneurial skills, increase their income, and strengthen local economic independence. Moreover, the initiative can foster community collaboration through group-based production systems and collective marketing strategies.

Despite its potential, the development of fruit waste briquettes in small rural areas still faces several challenges. These include limited access to appropriate technology, lack of marketing networks, low public awareness, and insufficient government or institutional support. Furthermore, previous studies have rarely assessed the direct socioeconomic impacts of briquette sales on household income and welfare, particularly within small-scale community-based initiatives. Therefore, it is crucial to conduct research that not only focuses on the technical aspects of briquette production but also on its socioeconomic contributions.

The main issue addressed in this study is how the sale of fruit waste-based briquettes contributes to improving income and welfare in Babussalam Village. While many environmental programs emphasize waste reduction, few have measured their tangible effects on the livelihoods of rural residents. Understanding these linkages is essential for developing sustainable strategies that integrate environmental preservation with community-based economic empowerment.

Based on this rationale, the purpose of this research is to analyze the role of briquette sales derived from fruit waste in increasing income and enhancing community welfare in Babussalam Village. This study seeks to answer several research questions: (1) How is fruit waste utilized and processed into briquettes? (2) What is the relationship between briquette sales and household income? and (3) How do these activities influence the overall welfare of the community? The findings are expected to provide empirical insights for policymakers, local entrepreneurs, and academics in developing sustainable rural-based economic models that align with environmental goals.

2. RESEARCH METHOD

This research adopts a descriptive quantitative approach combined with a case study design to analyze how fruit waste briquette sales contribute to improving income and welfare in Babussalam Village (Mawaddah Mawaddah et al., 2024). The method emphasizes identifying community-based solutions to economic and environmental challenges through the innovation of renewable energy products derived from organic waste (Ruth Prilica Trihar & Dwijayati Patrikha, 2024). The approach is designed not only to measure the economic outcomes of briquette sales but also to document the social changes resulting from community participation in waste utilization activities. The research process consists of several systematic stages (Airlangga et al., 2025):

1. Problem Identification: Observing the phenomenon of unmanaged fruit waste and the limited income-generating opportunities among rural residents.
2. Innovation Design: Introducing the concept of transforming fruit waste into briquettes as a dual-solution approach—reducing waste while creating new economic value.
3. Implementation and Data Collection: Conducting field observations, structured interviews, and distributing questionnaires to 30 participants, including briquette producers, sellers, and consumers within Babussalam Village.
4. Data Analysis: Using descriptive and comparative analysis to assess the change in household income before and after the introduction of briquette sales, as well as evaluating welfare indicators such as education, health, and household consumption.

5. Evaluation and Recommendation: Drawing conclusions from findings to propose sustainable strategies that can be replicated in similar rural settings.

The conceptual flow of this study can be illustrated in a diagram consisting of four main elements (Hakim et al., 2023):

1. Input: Fruit waste materials, community participation, and basic equipment for briquette production.
2. Process: Waste collection, drying, carbonization, mixing with binding materials, molding, and drying of briquettes.
3. Output: Marketable briquettes ready for sale and use as alternative fuel.
4. Outcome: Increased income, improved community welfare, and better environmental management.

This research contributes by demonstrating a community-based innovation model that integrates environmental management with local economic empowerment (Uswatul Fitroh et al., 2024). Unlike prior studies that mostly emphasize the technical efficiency of briquettes, this study focuses on the socioeconomic transformation triggered by the commercialization of fruit waste briquettes. The method also provides a replicable framework for other rural areas aiming to develop sustainable micro-enterprises based on waste utilization.

The development of renewable energy through waste utilization has become an important focus in the effort to achieve sustainable rural development. Organic waste, especially fruit waste, is a material that has long been overlooked despite its abundance and potential value. The conversion of this waste into briquettes represents not only a technical innovation but also a social and economic breakthrough for rural communities. Briquettes made from organic materials are known to be low-cost, easy to produce, and environmentally friendly (Mulyadi et al., 2024). They offer a solution to two pressing issues at once—reducing waste pollution and generating additional income for local residents (Darma et al., 2020).

The study of waste-to-energy transformation highlights a shift from a linear economic pattern, where waste is discarded after use, to a circular model, where waste materials are reused and regenerated. This perspective encourages communities to view waste as a resource rather than a problem. In the context of Babussalam Village, fruit waste briquette production can be seen as an embodiment of this concept, where villagers turn organic residue into an energy product that can be commercialized. The circular economy approach provides the foundation for strengthening rural economies by linking environmental management with entrepreneurship and livelihood enhancement (Gitama et al., 2023).

From an economic and social perspective, the production and sale of fruit waste briquettes can serve as an instrument of community empowerment (Dewi & Surya, 2023). When villagers are involved in collecting, processing, and marketing briquettes, they gain new knowledge, technical skills, and access to local and regional markets (Zakaria et al., 2022). This process can enhance financial independence and reduce economic vulnerability, especially for groups with limited income sources. Furthermore, it encourages collaboration among community members, fosters cooperative enterprises, and stimulates local innovation.

At the same time, the social impact of briquette sales extends beyond income (Linda, 2018). The presence of such economic activities can influence living standards through better household consumption, access to education, and improvement in health conditions. The positive cycle created by productive waste utilization supports the vision of sustainable development that balances environmental protection and economic growth. However, several challenges remain, such as the need for better marketing strategies, consistent product quality, and stronger institutional support (Miko et al., 2025).

In summary, the literature indicates that waste-based energy innovation offers multiple benefits when effectively managed and integrated into local economic systems (Tasia et al., 2025). Yet, there is still a lack of focused analysis on how the commercialization of fruit waste briquettes directly contributes to income generation and welfare improvement in specific rural contexts. Therefore, this research seeks to fill that gap by critically examining how briquette sales derived from fruit waste can strengthen economic resilience and support sustainable welfare among the people of Babussalam Village.

3. RESULTS AND DISCUSSION

The results of this study reveal a meaningful transformation in the economic and social conditions of the people of Babussalam Village after the introduction of fruit waste-based briquette production. Prior to this initiative, the majority of residents did not have a stable or permanent source of income. Most of them relied on irregular agricultural labor, domestic work, or occasional trade that could not meet their families' daily needs. This condition led to a low level of household welfare, with limited access to nutritious food, education, and healthcare (Gitama et al., 2023).

The introduction of fruit waste briquette production has become a new source of livelihood that helps reduce unemployment and improve the economic resilience of local families. Through training and community participation programs, villagers learned to utilize unused fruit waste—such as banana peels, coconut shells, and rambutan husks—into eco-friendly briquettes. These briquettes are not only more sustainable compared to

traditional charcoal but also have strong market demand at the local level. From the 30 respondents involved in this study, most stated that this activity became their first consistent source of income. The average monthly income achieved from the sale of briquettes reached approximately IDR 600,000 per household. Even though the amount is relatively small, it represents a significant change for families who previously had no earnings at all. The production process generally involves simple technology, allowing every household to participate without requiring large capital. Each household produces between 100–120 kilograms of briquettes per month, which are sold at an average price of IDR 5,000 per kilogram.

Table 1. Summary of Economic Results from Briquette Production in Babussalam Village

No	Indicator	Description / Result	Average Value
1	Number of respondents involved	Households participating in briquette production	30 households
2	Raw material used	Fruit waste (banana peel, coconut shell, rambutan husk)	–
3	Average production per household	Briquette output per month	100–120 kg
4	Selling price per kilogram	Local market average	IDR 5,000/kg
5	Average monthly income per household	Earnings from briquette sales	IDR 600,000
6	Percentage of women participants	Share of women in production and marketing	65%
7	Previous income condition	Before briquette program	No income
8	Marketing channel	Local markets, shops, neighborhood orders	–

The involvement of women is especially dominant, as 65% of producers are women who manage household-based production and handle packaging and marketing activities. This empowerment not only improves household income but also strengthens women's economic roles in the village.

In addition to economic improvements, there are also notable impacts on social welfare. Families reported better food security, as daily needs are now easier to fulfill. Several respondents mentioned that they can now provide school supplies and pay tuition fees for their children more regularly. The increased purchasing power also allows households to access basic healthcare services, such as midwife visits or purchasing vitamins for children. Moreover, environmental benefits are evident as the community now manages organic waste more efficiently, reducing the amount of decomposing fruit waste that previously caused unpleasant odors and sanitation issues. The results indicate that the fruit waste briquette program not only creates a new source of income but also builds community awareness about environmental conservation and sustainable entrepreneurship. The success of this initiative has encouraged cooperation among residents and opened up opportunities for future development, such as expanding production capacity or introducing digital marketing strategies to reach wider markets. These outcomes demonstrate that simple innovations based on local resources can play an essential role in improving both income and welfare at the village level.

The findings of this research demonstrate that the production and sale of fruit waste-based briquettes have become a new economic alternative capable of increasing the income and welfare of the Babussalam Village community. This transformation shows that when local resources are managed creatively, they can generate real financial benefits for households that were previously economically inactive. The emergence of this activity also supports the idea that rural economic growth can be achieved not only through large-scale industries but also through small-scale community-based innovations that utilize local potential.

The increase in income, averaging IDR 600,000 per month, may seem modest in numerical terms, yet its social and economic implications are substantial. For families who previously had no fixed income, this additional revenue represents a vital shift from economic vulnerability to relative stability (Yanto et al., 2023). The income gained from briquette production has allowed many families to fulfill basic household needs such as food, education, and health. This aligns with the broader concept of community empowerment, where access to livelihood opportunities leads to gradual improvements in quality of life and self-reliance.

Another important aspect highlighted in this study is the strong participation of women in briquette production. Their involvement not only contributes to household income but also enhances gender equality and family resilience. The ability of women to manage production, packaging, and sales independently demonstrates that local-scale innovation can simultaneously address economic and social dimensions of development. Furthermore, this empowerment process strengthens the role of women as key agents of sustainable economic change within rural communities.

From an environmental perspective, the utilization of fruit waste into briquettes reflects a significant step toward circular economy practices at the village level. By converting organic waste into a product of economic value, the community reduces the accumulation of biodegradable waste that previously contributed to pollution and unpleasant odors. This transformation also supports environmental sustainability goals by promoting renewable energy sources that are more efficient and environmentally friendly than conventional charcoal.

In addition, the success of briquette sales in Babussalam Village provides an example of how local innovation can become a foundation for rural entrepreneurship. The production process, though simple, has the potential to be scaled up through the improvement of production tools, packaging quality, and marketing strategies (Maharani & Musnaini, 2024). The challenge that remains is the limited market reach, as most sales still occur at the local level. Future efforts could focus on expanding market access through online sales platforms, establishing cooperatives, or partnering with small industries that require eco-friendly fuel.

Overall, the discussion highlights that the fruit waste briquette initiative has not only improved household income but also promoted environmental awareness, gender empowerment, and sustainable economic growth (Santika et al., 2023). The program proves that small-scale community innovations, when managed collectively and sustainably, can serve as effective tools for poverty reduction and rural development. The results of this study therefore provide a strong basis for policymakers and local governments to support similar programs in other rural areas that have abundant organic waste resources.

4. CONCLUSION

This study concludes that the production and sale of fruit waste-based briquettes have a significant positive impact on improving the income and welfare of the Babussalam Village community (Mulyadi et al., 2024). Before the introduction of the program, most residents did not have a stable income source. However, through briquette production, they were able to earn an average monthly income of around IDR 600,000. This new income has enabled families to meet their basic needs, including food, education, and healthcare, leading to better overall household welfare. The research also shows that the initiative encourages gender empowerment, as women play a central role in production and sales activities.

The utilization of fruit waste into briquettes not only provides economic benefits but also contributes to environmental management by reducing organic waste accumulation and promoting the use of renewable energy. The findings highlight the importance of community-based innovation as an effective approach for rural development and sustainable economic empowerment.

Nevertheless, this study has several limitations. The production scale remains small, and market reach is still limited to local areas (Sutalhis & Novaria, 2024). Furthermore, the availability of fruit waste varies seasonally, affecting production consistency. Future research should focus on exploring strategies for market expansion, product diversification, and the integration of digital marketing to strengthen competitiveness. It is also recommended that local governments and development agencies provide continuous training, technical support, and financial assistance to sustain and expand the briquette initiative.

In conclusion, the briquette program in Babussalam Village demonstrates that simple innovations utilizing local resources can generate real economic value, improve community welfare, and foster environmental sustainability. With proper support and development, this initiative has the potential to serve as a model for other rural areas facing similar economic and environmental challenges.

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