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Economic Evaluation and Challenges of Waste Management and Recycling: A Case Study in Nisombalia District, Maros Regency

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Abstract

This study examines the challenges and solutions in waste management and recycling in Nisombalia District, Maros Regency. The main focus of the study is to identify the factors that affect public awareness and participation in recycling programs, as well as evaluate the effectiveness of the policies implemented. The study found that the lack of socialization and education, the lack of public perception, and the limited infrastructure are the main factors that affect low participation in recycling. The phenomenon of the gap between ideal policies and practices in the field is also a significant issue, showing that policy implementation needs to be adjusted to local needs and involve community participation. The results of the study show that to improve the effectiveness of waste management and recycling, a comprehensive and participatory approach is needed. Improving public education, building accessible recycling facilities, and adapting policies to local cultures are key steps. By overcoming these challenges and reducing the gap between policy and practice, it is hoped that the recycling program can achieve optimal results and provide significant benefits to the community and the environment in Nisombalia District.

Keywords: *Waste Management, Recycling, Community Participation.*

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INTRODUCTION

Coastal areas are areas that have a strategic role in the economic, social, and environmental context (Rustiarini et al., 2021). The existence of vast coastal areas and abundant natural resources is often the main focus for many local communities. However, many coastal areas in Indonesia face significant economic challenges, which require serious attention and efforts to improve the quality of life of the people there. Geographically, coastal areas offer great economic potential through various sectors, including fisheries, tourism, and marine aquaculture. Fisheries, as one of the main sectors in coastal areas, not only provide an important food source for local communities but also serve as the main livelihood for thousands of fishermen. In addition, the tourism sector that relies on the beauty of the coast and marine ecosystem also has great potential to increase regional income and create jobs (Alfansyah et al., 2024).

Despite this great potential, many people in coastal areas still live in inadequate economic conditions. Poverty and limited access to education, health, and technology are often major problems (Larrain et al., 2021). These factors hinder the development of local economies and make coastal communities vulnerable to environmental and global economic changes. The importance of improving the economy of communities in coastal areas lies in the ability to reduce social inequality and improve the quality of life. Sustainable economic development can provide a variety of immediate benefits to society, such as increased incomes, better access to basic services, and improved general welfare (Tomić & Schneider, 2020). Economic improvements can also help reduce people's reliance on environmentally damaging practices, such as overfishing, and encourage more sustainable resource management.

One of the approaches that can be applied to improve the economy of coastal communities is through community-based economic empowerment (Hossain et al., 2022). This approach involves skills training, access to capital, and support for small and medium-sized businesses. By empowering local communities to manage their resources effectively and innovate in creating economic opportunities, economic development can be carried out in an inclusive and sustainable manner (Salmenperä et al., 2021). The importance of the role of the government and the private sector cannot be ignored either. Investments in infrastructure, such as ports, transportation systems, and educational facilities, will support economic growth in coastal areas (Ma et al., 2020). In addition, cooperation between the government, the private sector, and non-governmental organizations in designing and implementing economic development programs can accelerate the improvement process and create greater synergies (Purchase et al., 2021).

Waste management has great potential to become an economic source through several innovative approaches. One of the main ways is recycling, where waste such as plastic, paper, metal, and glass is processed into new products (Browning et al., 2021). This process reduces the amount of waste in landfills and creates business opportunities, such as the plastic recycling industry that produces fibers for clothing or building materials. Additionally, waste can be used to generate energy through combustion, gasification, or anaerobic fermentation, which provides a renewable energy source and reduces reliance on conventional raw materials (Tejaswini et al., 2022). Organic waste can also be converted into compost or fertilizer, which is invaluable for agriculture and garden care, improving soil quality and supporting plant growth (Yousefloo & Babazadeh, 2020). By harnessing this potential, waste management not only addresses environmental problems but also opens up sustainable and innovative economic opportunities (Thompson et al., 2021).

The gap phenomenon that often occurs in waste management is the difference between the ideal waste management policy or plan and the implementation and acceptance of the community in the field. Although governments or organizations often establish policies and programs designed to improve recycling and waste management, their implementation often does not go as planned. One of the main causes of this gap is the lack of adequate socialization and education to the public about the policy. Without sufficient understanding of how the policy works or the benefits it offers, the public may not actively participate or even be aware

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of the existence of these programs. In addition, the mismatch between available facilities and local needs also contributes to this gap. For example, if the recycling facilities built are not in accordance with the dominant type of waste in an area, or if the facilities are difficult for the community to access, then the effectiveness of the recycling program will be reduced.

This gap demonstrates the importance of a holistic and participatory approach to the planning and implementation of waste management policies, ensuring that policies are not only well-formulated but also accepted and implemented effectively at the local level. The gap phenomenon in waste management often reflects the incompatibility between theory and practice that can be caused by various factors. One of the main causes of this gap is the inadequacy of socialization and education about waste management policies or programs implemented. Many waste management policies are well-designed and have great potential to improve recycling and waste management, but without being accompanied by effective information campaigns, people may not understand how or the importance of participating. For example, if there is no adequate effort to explain to residents how to properly separate waste or the benefits of recycling, then people may feel that the policy is irrelevant to their daily lives and less motivated to follow established procedures.

Mismatches between available facilities and local needs are often the cause of this gap. Each region has different characteristics of waste, for example the type and volume of waste that is dominant. If the recycling facilities built are not designed to handle the most generated types of waste or are not located in locations that are easily accessible to the community, then the effectiveness of these facilities becomes very limited. For example, recycling facilities located far from residential areas will reduce the likelihood of people using these facilities. This indicates the need for more thorough planning, involving an analysis of local needs and community participation in the policy design process.

METHODOLOGY

Research on waste management in Nisombalia District uses several types of research and analysis techniques that are adapted to the purpose of the research. Descriptive research can be used to describe current conditions, such as waste management practices and the challenges faced, by collecting data through observations, interviews, and surveys. Qualitative research, through in-depth interviews and focused group discussions, aims to understand people's perceptions and experiences regarding waste management and its economic potential.

Quantitative research uses surveys with questionnaires to collect numerical data on waste volume and recycling rates. Descriptive analysis techniques, such as frequency and percentage statistics, are used to provide an overview of waste management conditions. Qualitative analysis is carried out through thematic analysis to explore the meaning of people's responses, while quantitative analysis uses inferential statistical techniques such as t-test and regression to measure economic potential and relationships between variables. This approach ensures that the research can provide in-depth and practical insights into waste management and its economic potential in Nisombalia District.

RESULTS AND DISCUSSION

Public Awareness of Recycling

In-depth interviews with local residents show that many of them have a low awareness of the importance of recycling. This low awareness is rooted in a lack of information and education about waste management. Most respondents admitted that they did not fully understand the benefits of recycling, such as how the recycling process can reduce waste volume, save resources, and reduce environmental impact. They often see recycling as an unimportant thing or as an unnecessary addition to their daily routine.

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Figure 1. Garbage on the beach that enters the settlement

The lack of awareness campaigns on recycling and effective waste management contributes greatly to the low level of public awareness. Many regions, including Nisombalia District, do not have a sufficiently intensive and comprehensive education program. Without clear and easy-to-understand information about the ways and benefits of recycling, people may not feel motivated to change their habits. An effective awareness campaign should touch on various aspects, such as the personal benefits of recycling, the environmental impact that can be reduced, and the simple ways that can be done on a daily basis.

Formal education on waste management often does not cover the recycling aspect in depth. The school curriculum may not prioritize teaching about the importance of recycling or practical skills in waste separation. Informal education, such as through mass media or community programs, may also be absent or less effective in reaching all levels of society. Without adequate education, people tend to lack the knowledge needed to understand and implement recycling in their daily lives.

This limited knowledge is often caused by a lack of socialization and campaigns that explain how and how to manage waste effectively. Most residents feel that they do not have enough information on how to properly separate waste, the types of materials that can be recycled, and the positive impact of such actions. Therefore, increasing public knowledge and awareness about waste management is a crucial first step to increase the level of participation in recycling.

The old habit of littering is very difficult to change. If littering has become a daily habit, people may feel reluctant to change their routine even though they know the benefits of recycling. These habits are often internalized and require consistent time and effort to be replaced by better practices. In addition, this old habit can be reinforced by the lack of facilities and support for waste separation and recycling.

Economic and Social Factors

Recycling is often seen as an activity that requires additional costs, both for the community and the government. If the community or government does not see the immediate economic benefits of recycling, they may be less motivated to invest time, effort, and resources in the practice. For example, if waste treatment and recycling facilities are not yet available or expensive to build and operate, this can be a barrier for the community to be actively involved in recycling. Local culture and social norms have a major influence on the way people handle waste, which often affects the effectiveness of waste management and recycling. In many communities, waste management has not yet become a cultural priority because local norms and habits may focus more attention on other issues or familiar methods.

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For example, in some areas, littering may be considered a habit that does not require special attention, or there may be no tradition or encouragement to adopt better waste management practices. Without a push from social or cultural norms, people may be less motivated to change their behavior regarding waste. To address these challenges, a culturally sensitive approach is essential. Involving influential and respected community leaders in the community can be an effective strategy to drive change. Community leaders can act as agents of change, set a positive example, and educate the public about the benefits of better waste management. They can also help tailor waste management programs to local values and habits, making them more acceptable and adopted by the community. With an approach that takes into account local culture and the support of community leaders, waste management and recycling initiatives can become more effective and sustainable.

One of the main challenges in waste management and recycling is the high initial investment cost and sustainable operational costs. Building waste treatment and recycling facilities requires significant funds, ranging from infrastructure development to equipment purchases. For local governments on a budget, allocating funds for these projects is often a challenge, and the decision to invest in recycling facilities may not be a top priority when compared to other urgent needs. Additionally, operational costs such as facility maintenance, labor, and energy costs can weigh on the budget further. If these costs are not handled properly, recycling efforts can be hampered and less effective, so that the public does not see adequate results from the investment

While the initial costs for waste management and recycling can be high, the potential long-term economic benefits often outweigh the investment. Recycling not only reduces the volume of waste that must be managed but also creates new economic opportunities, such as the recycling industry and the manufacture of recycled products that can create jobs and contribute to the local economy. For example, recycled materials obtained from waste can be used to produce new items, reduce the need for new raw materials, and reduce production costs in the long run. Additionally, effective waste management can reduce the cost of final disposal and the environmental impact associated with poorly treated waste. Therefore, while the initial investment may be high, the long-term benefits of recycling can provide significant and sustainable economic value for society and governments.

Availability and Accessibility of Facilities

Limited availability and accessibility of recycling facilities is a significant problem in effective waste management, especially in areas that do not yet have adequate infrastructure. If people don't have easy access to recycling facilities, they are less likely to separate and manage their waste properly. This is due to the fact that without affordable and affordable recycling facilities, the recycling process becomes impractical and inefficient for the citizens. For example, if recycling facilities are far from where they live or are difficult to reach, residents may feel that the effort to collect and deliver recyclables is not worth the benefits. In addition, the lack of facilities can also lead to the accumulation of waste that is not properly managed, which ends up in landfills without a recycling process.

In an effort to overcome this problem, it is important to improve waste management infrastructure by providing easily accessible and affordable recycling facilities. This includes the construction of a strategic and easily accessible recycling waste collection center, as well as the provision of adequate processing facilities. Making it easier to access recycling facilities

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can encourage communities to be more actively involved in separating and recycling their waste. In addition, the government and related parties can consider innovative solutions such as regularly scheduled recycling waste collection programs and the provision of collection points in various strategic locations. By improving the infrastructure and accessibility of recycling facilities, communities will be more encouraged to implement better waste management practices, which in turn will contribute to the success of recycling programs and overall waste management.

CONCLUSIONS

The conclusion of the discussion on waste management and recycling in Nisombalia District highlights the importance of an in-depth understanding of the factors that affect the effectiveness of policies and programs. Factors such as lack of information and education, public perception, and limited infrastructure play an important role in determining the extent to which recycling policies can be successfully implemented. To address these challenges, there is a need for a comprehensive approach that includes improving public education, building accessible recycling facilities, and adapting programs to local needs and cultures.

The phenomenon of the gap between ideal waste management policies and practices on the ground shows that the success of recycling programs depends not only on good planning but also on effective and participatory implementation. Involving the community in the planning and implementation process, as well as ensuring that facilities are in place in accordance with local needs, are key steps to increase awareness and participation in recycling. With a holistic approach and responsiveness to local conditions, it is hoped that the waste management program can achieve optimal results and provide significant benefits to the community and the environment

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