

Improving Economic Efficiency Through Waste Recycling And Modernizing Waste Bank Management

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Abstract.

Efficient waste bank management is essential for handling the growing waste volumes in landfills. Waste banks play a crucial role in local and national waste management. This program aims to boost the capacity and productivity of waste bank institutions by supporting the development of human resources in waste recycling management and implementing digital management systems. Program results demonstrate that KSM Bais, Tarakan, our partner waste bank institution, has improved its knowledge and skills in waste bank management. They have expanded their range of recyclable products, including marketable items like plastic flower jewelry, trash bins, stationery organizers, ecobricks, and other aesthetic products. Furthermore, they have created and implemented a website-based waste bank application system to streamline administrative tasks. Additionally, partners have enhanced waste bank marketing performance through website-based and online social media channels.

Keywords: Waste Bank Management, Recycling, Digital Management Systems and Marketing Optimization.

I. INTRODUCTION

The increasing volume of household waste, especially plastic and cardboard (including food and beverage packaging, consumer goods packaging, shopping bags, and other packaging materials), poses a significant environmental challenge when left uncontrolled (Sukrorini et al., 2014). Based on data from Tarakan City, North Kalimantan, as the population grows, the amount of waste at the final disposal site (TPA) is also on the rise. According to the Technical Implementation Unit (UPT) of TPA, the average waste volume as of January 2022 had already reached 130 tons per day (Sahida, 2022). This not only poses a capacity issue at the final disposal site (TPA) but also has negative impacts on the urban environment. Efforts to reduce waste through recycling are still very low, accounting for only about 5% of total waste production. As one strategy to mitigate the negative environmental effects of waste, the implementation of a circular economy through waste bank management is crucial. Waste banks are community-based social organizations specializing in household waste management (Sanusi and Istanti, 2020). The presence of waste banks is expected to reduce the negative environmental impacts of waste and utilize it through recycling into economically valuable products (Auliani, 2020).

Therefore, waste banks can also serve as an alternative source of income for the community. With the increasing population and high waste production, there is a need for more productive waste banks capable of handling household waste. One active waste bank in Tarakan City, North Kalimantan, is KSM Bais Waste Bank, established in 2021, located in the Karang Balik sub-district of Tarakan, North Kalimantan. KSM Bais Waste Bank is managed by the Community Self-Help Group (KSM) Bais and supervised by the Karang Balik sub-district. The organizational structure of KSM Bais Waste Bank is led by a chairman, assisted by a secretary and treasurer, with three sections below, namely the Recording Section, Weighing Section, and Documentation Section. The activities of Bais Waste Bank include the collection and sorting of inorganic waste. KSM Bais has not yet fully processed recyclable waste into sellable products, and its waste bank management is still manual. Currently, customers of Bais Waste Bank include the general public (individuals), community organizations, and government or office institutions.

As for the Waste Bank Savings products, only two types of waste, namely plastic and paper, are accepted for deposit. The deposit operation is open every Tuesday and Thursday.

After analyzing the situation, several issues are identified in KSM Bais Waste Bank:

1. **Low Recycling Production:** The waste bank primarily collects and resells waste to collectors, resulting in a low conversion of recyclable waste into economically valuable and useful products. There is a need to enhance knowledge and skills in waste bank management and recycling programs to create value-added products. Research by Wahyudi et al. (2018) indicates that plastic recycling can reduce greenhouse gas emissions by up to 40%.
2. **Manual Administrative Management:** The bank relies on manual administrative processes, leading to inefficiencies such as potential recording errors, longer report generation times, difficulties managing growing data, and dependence on one person. To improve administrative effectiveness and reduce human errors, an automated or digital administrative management system is required (Astitiani and Widnyani, 2022).
3. **Limited Marketing System:** The marketing system is limited and dependent on orders from collectors. To attract more waste contributors and consumers of recycled products, an effective promotional system is needed. This includes extensive promotion through websites and online social media to increase the number of waste depositors and product consumers (Ma'rufah et al., 2022, Utomo, 2019).

To address these challenges, this community-based empowerment program aims to enhance the capacity and productivity of the waste bank. It involves providing support to improve human resource capabilities in waste recycling management and enhancing digital management skills in administration and marketing.

II. METHODS

The implementation methods of this program can be outlined based on the areas of concern as follows:

a. **Production Area:** To enhance the capabilities of waste bank operators in producing recycled products, the program will provide training in proper waste processing techniques, including composting, and the creation of value-added products such as ecobricks, aesthetically appealing bags, shopping bags, wallets, mats, and more.

b. **Administrative Management Area:** For the adoption of digital-based waste bank administrative management, necessary hardware such as computers/laptops and printers will be provided by the partner. The program will also include the installation of a website-based Waste Bank Application. Training workshops will be conducted for waste bank operators on the use of this application to ensure more effective administrative management.

c. **Marketing Area:** In the marketing domain, assistance will be provided through the development of a digital marketing platform, including the creation of a website and online social media presence for the waste bank. Additionally, training on effective digital marketing strategies will be offered to waste bank operators to increase the number of waste depositors and product consumers.

Upon the completion of these activities, the program will conclude with a monitoring and evaluation phase to assess the achievement of program objectives and identify the sustainability of the program. Evaluations will recommend improvements and adjustments to further enhance the waste bank's performance and garner support from the community and government for the program's continuity.

III. RESULT AND DISCUSSION

The assistance program encompassed several key initiatives:

3.1. Waste Recycling Program:

One of the primary goals of this program was to enhance the productivity of the waste bank, particularly in the recycling of waste received from the community into economically valuable and beneficial products. Recycling involves the transformation of inorganic waste into new items, which reduces the use of new raw materials and environmental pollution (Nasution et al., 2018). To achieve this, the waste bank operators were provided with training and expertise in waste recycling techniques. These training sessions

were facilitated by waste management experts and equipped the operators with the knowledge and skills needed to convert plastic and paper waste into marketable products. As a result of this training, waste bank operators gained the ability to produce various recycled products, including trash bins, decorative items (plastic flowers), stationery organizers, ecobricks, and other aesthetic products from plastic or paper waste. Consequently, KSM Bais saw an expansion in its range of recycled products, which are expected to increase the waste bank's revenue due to their higher market value compared to selling the materials in their raw waste form.



Fig 1. Waste Recycling Training activities

3.2. Digital Administrative Management Program:

In the area of administrative management, the program aimed to transition waste bank management to a digital platform using a website-based waste bank application. The application consists of three main components. First, a public homepage provides general information about the waste bank, including the total amount of waste received, waste bank activities, articles related to the waste bank, awards received by the waste bank, waste bank partners, and additional information such as address, phone number, and email. Second, a customer dashboard allows savings account holders to view their current balance, transaction history, and the latest waste prices. Third, an admin dashboard serves as a comprehensive tool for managing customer transactions, including waste deposits and withdrawals. Additionally, the program included workshops on operating the waste bank application, enabling waste bank operators to implement automated and effective administrative management (Senja and Indarwati, 2021). The results of this program showed that waste bank operators were able to reduce paper-based activities, improve customer service, and manage customer savings transparently, efficiently, and website-supported.



Fig 2. Waste Bank Digital Application Workshop Activities

3.3. Digital Marketing Program:

Initial assessments indicated that waste bank operators relied on a system of marketing based on orders from waste collectors. The digital marketing program aimed to improve the waste bank operators' knowledge of how to promote the waste bank through digital media. The program assisted by optimizing the use of online social media platforms such as Facebook, TikTok, and Instagram to rapidly and widely disseminate information about the waste bank's activities to the public. Workshops on digital marketing were also conducted, covering the benefits of digital marketing, marketing strategies, and optimizing digital marketing through social media. The digital marketing program's outcomes included an increase in the number of savings account holders and sales of waste products, although not significantly. It was

demonstrated that the program effectively improved the waste bank's marketing performance (Ma'rufah et al., 2022).



Fig 3. Marketing Digital Training Activities

IV. CONCLUSION

This community engagement program was initiated in response to the observed low productivity of the partnered organization, KSM Bais Waste Bank in Tarakan. A situational analysis revealed several challenges faced by the waste bank, including manual administrative management, limited marketing systems, low production of recycled products, and suboptimal community participation in waste management. The activities carried out as part of this community engagement program aimed to enhance the knowledge and skills of the waste bank operators. The program resulted in significant improvements, including the ability to diversify the range of recyclable products with higher market value, such as plastic flower jewelry, trash bins, stationery organizers, ecobricks, and other aesthetic products. The waste bank operators also successfully implemented a website-based waste bank application system, improving the efficiency of waste bank administration. Additionally, optimizing digital marketing efforts through online social media platforms proved effective in boosting the marketing performance of KSM Bais Waste Bank in Tarakan.

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