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Community-Based Waste Management Strategy in Nagari Pungguang Kasiak Through Waste Bank Innovation

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Abstract

A paradigm shift in waste management needs to be carried out in a sustainable manner. Education regarding residents' awareness and skills in applying the principles of reduce, reuse, recycle, and replant (4R) is very important to deal with waste problems from the source. Waste banks that involve women's participation serve as social capital in community-based management. In Nagari Pungguang Kasiak, Padang Pariaman Regency, Indonesia, a waste bank is implemented by integrating the 4R principles through the collection and sorting of dry waste, managed with a banking-like system, where what is saved is waste, not money. Community empowerment is carried out through counseling, education, and training with emancipatory participation methods, as well as interactive dialog within the community. In addition, building partnerships and cooperation mechanisms between waste bank managers and stakeholders is very important. The Sehati Waste Bank in Nagari Pungguang Kasiak has provided tangible benefits to the community, such as reducing waste volume, improving environmental cleanliness, and increasing economic independence. The economic benefits obtained from waste savings also contribute to electricity payments and food purchases. This program plays a role in creating a cleaner, greener, and healthier environment. With integrated waste management, community creativity and innovation can be encouraged, thereby improving the overall welfare of residents.

INTRODUCTION

Educating the public about the complex environmental problems caused by waste generation is essential to raise collective awareness. Concern for the environment is influenced by individual mindset and behavior. Therefore, active participation of citizens is crucial in waste management efforts. Environmental conservation must start from small actions by individuals, which can then be 'transmitted' into habits within the family or community, thus encouraging greater change.

According to Singhirunnusorn et al. (2012), changes in people's perceptions of household waste management need to be integrated into community-based waste bank projects to reduce waste at source. The philosophy of waste management is in line with the provisions in Law No. 18/2008, which emphasizes the need to change the way people view waste, from something that is considered a waste to a source of value and benefit.

In accordance with Government Regulation No. 81/2012, the practice of waste processing and utilization should be a concrete step in management. People need to change their old habits that only focus on disposal, and start being taught to sort and value waste. This also supports the development

of a people's economy through waste banks (Tallei et al., 2013), especially in household waste management which should be done independently (Riswan et al., 2011).

Residents' knowledge, attitudes and skills in managing household waste for recycling are crucial (Akhtar and Soetjipto, 2014). Waste segregation, where organic waste is composted and inorganic waste is deposited in waste banks for recycling, provides economic value (Jumar et al., 2014). The successful adaptation of waste banks in communities is highly dependent on the participation of residents, which also determines the sustainability of the program (Kristina, 2014).

A waste bank is a concept of collecting and sorting dry waste that is managed with a banking-like management system, where what is saved is not money, but waste. Residents who hand over their waste become customers and have a savings book, while the waste is transported to a temporary disposal site (TPS) before being taken by the Department of Cleanliness and Parks (DKP) officers to the final disposal site (TPA). Customers also have the opportunity to borrow money, which will later be returned with waste equivalent to the value of the loan. The saved waste will be weighed and given a monetary value, then sold to factories that have established cooperation with waste banks. In addition, plastic packaging can be purchased by the local PKK committee to be recycled into handicraft items (Anonymous, 2012).

An approach that fits the context and needs of the community is key in driving change. Purba et al. (2014) explained that the development of waste banks can assist local governments in empowering communities to manage waste wisely, and reduce the volume of waste brought to landfill. Innovation in waste management through the waste bank program can increase the income of the poor in urban areas (Winarso and Larasati, 2011).

The novelty of this study lies in community-based community empowerment that is more gender-perspective, by highlighting the important role of female citizens as social capital. Female citizens have the ability to mobilize individuals and communities to actively participate in environmental management (Blocker and Eckberg, 1997). They can serve as agents of change in urban environmental management, even in resolving environmental conflicts (Asteria, 2013).

However, waste management still lacks the application of reduce, reuse, recycle, and replant (4R) methods from the source; previous studies only used the principles of reduce, reuse, and recycle (3R). Thus, the development of a self-managed waste bank in Kenagarian Pungguang Kasiak, Lubuk Alung is based on environmental problems in the community. The application of waste management is still carried out from the source (households) which is directly disposed of into the trash can, which is then picked up by officers, both from community participation and DKP.

Socially, the level of community awareness in Kenagarian Pungguang Kasiak towards waste management is still low. Although there are management efforts, these practices are still individual and not yet organized in an integrated manner, so the intensity of togetherness in the community is also minimal. From an economic perspective, there is no visible economic value from waste management, and the community still does not understand the potential economic value that can be generated through the application of the 4R principles. Many still consider waste as unwanted and worthless waste.

Related to the problem of waste generation, there are still people who litter, especially into rivers or channels, and burn, which causes a dirty environment, the emergence of various diseases, pollution, and damage to ecosystems. As an alternative solution to the urban waste problem, the development of waste banks can be seen as a social engineering effort (Ridley-Duff and Bull, 2011) that aims to teach people how to sort waste and increase awareness in its management. The establishment of waste banks should be integrated with the 4R program movement, so that residents can directly benefit, both economically and environmentally, by creating a clean, green, comfortable, and healthy community.

Waste banks also provide social benefits by strengthening cohesion among women's communities that have been marginalized in the socio-cultural structure. From an economic perspective, waste banks have the potential to provide additional income and help reduce the volume of waste in urban areas.

The purpose of this paper is to offer an alternative strategy in waste management through community education, by establishing a waste bank integrated with the 4R principles. It is hoped that this can build community awareness to be more familiar with waste, as well as obtain social, economic, and environmental benefits from sorting the waste saved in the waste bank. This finding is in line with the results of research by Mulasari et al. (2014) regarding the importance of implementing domestic waste management policies that require citizen independence in its management.

EXPERIMENTAL SECTION

Time and Location

The waste bank development education program has been implemented in Kenagarian Pungguang Kasiak, Lubuk Alung, since August 2024. The selection of this location was based on an environmental problem faced by the local community, namely the high amount of waste that is dumped into the river that runs through the area. This condition often triggers flooding, especially during the rainy season, due to the blockage of water flow by garbage.

The local community's awareness and participation in applying the 4R principles (Reduce, Reuse, Recycle and Replace) in waste management is still low. This can be seen from the high volume of garbage piled up around the road and the fact that most residents still throw garbage into the river. Information obtained from the local landfill indicates that this behavior is one of the main causes of waste accumulation in the area.

Materials

This activity is part of a community outreach and education program that focuses on the development of waste banks, implemented using a participatory-emancipatory approach. Education to the community is carried out through training that covers two main aspects, namely entrepreneurship training in waste bank management and training in recycling waste into products of economic value, such as compost, making ecoenzyme and crafts from recycled waste. The waste bank developed in Kenagarian Pungguang Kasiak focuses on coaching activities given to women's groups, especially local PKK administrators, who are expected to become role models for the community, especially other women. The dissemination of information and socialization is done using the door to door method through routine PKK activities, recitations, and other community meetings. This method allows for effective information transfer within the community.

In general, the application of methods in this activity involves a direct approach to residents and stakeholders. With residents, interaction is carried out through face-to-face dialogue and community meetings that are not limited to socialization and education activities. Meanwhile, with stakeholders, dialogue and cooperation are carried out, especially with the local government (at the village level, sub-district level, City Cleanliness and Parks Office), as well as other parties such as collectors, waste transporters, and waste pickers. In addition, the program developed multi-stakeholder cooperation with NGOs and the private sector at the local and regional levels to support the sustainability of the waste bank program.

Instrumentation

To support the implementation of waste bank development, coaching was provided to 15 PKK board members on basic financial management knowledge. This training aims to enable the administrators to record the waste deposited by the community and distribute savings books to them. The waste deposited comes from the domestic waste of the Kenagarian Pungguang Kasiak community with a total of 250 customers.

The waste drop-off and collection process is scheduled every Saturday starting at 08.00 until noon. In addition, local youth who are unemployed are involved in the weighing of waste, providing opportunities for participation for various levels of society in the community.

RESULT AND DISCUSSION

Waste banks play an important role in educating the public about the importance of sorting waste and raising awareness to manage waste wisely. This aims to reduce the volume of waste transported to landfills. In addition, people who deposit their waste also get additional income, which can support their economic independence. Funds collected from waste banks can be managed through a savings and loan system, similar to a cooperative, with low interest rates. This allows for financial turnover in the waste bank, so that it can expand further and contribute to improved environmental health.

Coaching of the community, especially women, has shown positive results, with their ability to mobilize the community to be active in waste management in their neighborhood. Women also play an important role in exercising social control in the community. The waste bank is integrated with education on the 4R principle (Reduce, Reuse, Recycle, Replace), which is the basis of knowledge for the community to manage waste from its source, namely household waste. This community empowerment provides knowledge and skills for them, so that they are able to sort organic and non-organic waste effectively.

The direct benefits derived from the community's ability to manage waste by applying the 4R principles and saving in waste banks are not only limited to economic aspects, but also include environmental health. Communities involved in waste bank management show significant changes, such as a cleaner, greener, more comfortable, and healthier environment. The positive changes that occurred in the community where the waste bank was developed can be seen in Table 1.

In the implementation of community education through waste bank development, intensive and continuous coordination with PKK administrators is needed to ensure that each activity implemented can optimally support community empowerment. This coordination aims to make the education program more effective and comprehensive, so that community involvement in waste management can be increased.

However, based on the observations in the assisted locations listed in Table 1, there are still piles of garbage in the corners of the alleys and piles of garbage in the river. This condition shows that the community's knowledge about the environment and waste management is still minimal, so further efforts are needed to increase community awareness and understanding of the importance of proper waste management.

In addition to efforts to maximize the ability and skills of the community in waste management, monitoring the development of waste prices in the market must also be carried out on an ongoing basis. This monitoring is a fundamental aspect to ensure the sustainability of waste bank operations. Therefore, coordination and cooperation with collectors, both large and small collectors around Kenagarian Pungguang Kasiak must be maintained and improved.

In addition, fostering partnerships with plastic waste processing factories located near Nagari Pungguang Kasiak is an important step in the waste management chain. Plastic waste, such as black plastic bags that are difficult to sell in the market, can be further processed at the factory. This partnership is expected to support the sustainability of the waste bank program and provide solutions for types of waste that have low selling value.



Figure 1. Processed organic waste into ecoenzyme solution



Figure 2. Processing non-organic waste into useful items

Providing education to the community has the potential to change their habits in waste management. The existence of waste banks is one of the solutions that can be used to overcome the waste problem in urban areas, which until now is still faced with various challenges due to its implementation that has not been fully integrated and is still localized. The development of a more integrated waste bank requires support from the local government as well as the active role of local entrepreneurs, which is crucial in ensuring the sustainability of the program. Local government intervention is needed to support the smooth implementation of this activity, while the contribution of local entrepreneurs will increase the economic value of waste management at the community level.

Table 1. Changes in conditions before and after the development of waste bank education.

No	Pre Condition	Activities	After Condition
1	Technically: Has not yet implemented the 4R principle and does not yet have waste processing technology	Problem mapping by conducting meetings and dialogues with the community regarding the impact of waste problems on the environment and health.	The community has knowledge about the impact of waste problems, so there has been a change in the habits of the community, especially women, who have begun to actively sort household waste, with the application of the 4R principles
2	Socially: Citizen participation is still low	Environmental awareness socialization meeting to the community, especially women, as well as direction and dialogue to provide knowledge about environmental awareness and distribution of plant seeds (which utilize plastic waste as a nursery bag or polyback), organic waste processing through making ecoenzyme, compost, mole or liquid fertilizer. plastic waste as a bag for nursery media or polyback), processing organic waste through making ecoenzyme, compost, mole or liquid fertilizer.	Growing awareness from the community with more and more people starting to deposit waste into the waste bank and actively contributing to it. and actively contributing, with the participation of female PKK members in the management of the waste bank.
3	Economically: Waste is considered to have no economic value and benefit	Data collection on the market price of plastic waste by observing and working with collectors. Cooperation with collectors has been carried out Cooperation with the owner of a factory that processes used plastic bags that are not sold or not taken by scavengers and junk dealers.	Changes in the physical environment have begun to appear with a decrease in the amount of garbage thrown into the river or thrown carelessly, and the environment looks cleaner.
4	Waste generation: 1500 cubic meters per day	Publication of activities in local and national newspaper media including Langgam.id newspaper,	Support from the korong and support from the local korong and nagari in dialog activities with the community and

		timeindonesia	the training provided
5	System-wise: Still collect-transport and limited land for waste disposal	Through dialog and training, the community has been able to sort waste and make recycled products.	The community is saving more and more to the waste bank and starting to make some processed handicraft products such as bags/maps and sandals.
6	Environmental conditions that still experience flooding problems due to culverts clogged with garbage, piles in the gutter.	Efforts to invite the community to care about cleaning the culverts and sorting plastic waste and then motivating the community to save money in the waste bank	Environmental conditions have become more clean and healthy*

Source*: Observation result

CONCLUSION

The existence of Bank Sampah Sehati has contributed to increasing community capacity through efforts to build community independence and self-reliance. This is achieved by increasing awareness, knowledge, and skills that encourage active participation in managing the environment in their community. In particular, for women's groups, knowledge and skills in waste management have stimulated creativity and innovation in making crafts from recycled materials.

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