Formulate a Waste Bank Management Model in Pekanbaru City by Recycling the Material for Environmental Hygiene

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Abstract

Background and objectives: With various policies and systems at each waste bank, the effectiveness of waste banks in attracting people to manage their waste has not been running well, so they have not been able to provide solutions to the waste problem in Pekanbaru City and have not been integrated. This research aims to formulate a waste bank management model in Pekanbaru City. Method: This research uses quantitative and qualitative research methods with a descriptive approach. This research was conducted using questionnaires, interviews, and observations. Interviews were conducted using Google form with the Director of the Main Waste Bank (BSI), Chair of the Waste Bank Unit (BSU), Business Actors, NGOs, Academics, Head of the Sumatra Ecoregion Development Control Center (P3ES), Environmental and Hygiene Service Officials, Subdistrict Heads and Village Heads. Results: The characteristics of the waste bank in Pekanbaru City regarding planning are inadequate. In terms of organization, it is well structured, but most of the members have multiple jobs. In terms of direction, it has been implemented, but not evenly. In terms of control, it is still manual and has not utilized technology. The dominant factor in waste bank management in Pekanbaru City is economic factors, with a p-value <0.001. Conclusion: The waste bank management model in Pekanbaru City is to control the higher prices given to BSU and customers, so BSI must carry out integrated processing of segregated waste that has been collected at BSI by recycling the material.

Keywords: *Waste Bank Management Model, Planning, Organizing, Directing, Controlling, Economic, Social, Environmental.*

Introduction

Waste management continues to increase, originating from waste, the remaining part of human activity [1]. The increase in the amount of waste is in line with the increase in population [2]. The amount of waste continues to increase due to environmental quality, which will negatively impact social life and public health, such as spreading disease, destroying the city's beauty, and polluting the environment [3]. Waste reduction ensures that all levels of society, including the Government, the business world, and the wider community [4]. Waste reduction activities aim to provide for all levels of the organization, including the Government, the business world, and the wider community [5]. The Waste Bank is a facility for managing waste using the 3R principles (reduce, reuse, recycle) as a means of education, changing behavior in waste management, and implementing a circular economy [6].

Urban waste management activities in Indonesia include five actions determined in cities in Indonesia, including the application of appropriate technology, community participation in waste management, the need for profit mechanisms in waste management, optimization of waste landfills, and an integrated waste management institutional system [7]. A waste bank is a collective dry waste management system that encourages the community to participate actively [8].

Studied the relationship between increasing the amount of landfilled waste, types of waste, and the diversity of other waste characteristics with a growing population, changes in people's consumption patterns, and people's lifestyles in Denpasar City [9]. Discusses BSI dimension planning, priority factors in waste bank management, and problems [10]. Waste bank management must be considered starting from the planning, organizing, directing, and controlling stages [11]. The waste bank management process is a social activity of the community, and there must be social interaction between the waste bank and the community,

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partners, and Government [12]. The development of the Pekanbaru City waste bank is still slow, even though the Government has facilitated it. The concept of sorting waste and saving in waste banks has not yet become attractive to the public [13]. Pekanbaru City's waste generation is experiencing very rapid development with new settlements, market developments, expansion of industrial areas, and the addition of shopping centers [14].

Literature

Waste Bank is a facility for managing waste using the 3R principles (Reduce, Reuse, and Recycle), as a means of education, behavior change in waste management, and implementation of a circular economy, which is formed and managed by the community, business entities, and local Government. Waste Banks must meet the requirements [15].

A model represents an object, object, or idea in a simplified form of a natural condition or phenomenon [16]. A model can imitate a thing, system or event that only contains information necessary to study [17].

Waste management in Pekanbaru City has been implemented. The amount of compost waste reduction in Pekanbaru City based on research by the Pekanbaru City Research and Development Agency in 2021 consists of 31.81% food waste, 24.54% fruit peels, 14.19% plastic, 10.89% wood/twigs/leaves, 9% styrofoam, 3.51% cloth, 2.78% paper/cardboard, 1.16% rubber, 1.13% glass [18].

According to the World Health Organization (WHO), waste is something that is not used, is not used, is not liked, or is something that is discarded, which originates from human activities and does not occur by itself [19]. The waste consists of stair waste, similar types of stairs, and specific waste [12].

Difference sorting rubbish method long with system bankrubbish served in Table 1.

Table 1. Differences between the Old Way of Waste Sorting and the Waste Bank System

No	Description	Sorting Rubbish Method Long	System Bank Rubbish
1	Method sort rubbish	Just sorted between types of dry and wet waste.	Between rubbish dry And wet is still sorted. Rubbish dry sorted Again according to the type (since from home).
2	Data heavy (kg) And mark Money (Rp) rubbish	Only recorded globally, No is knownmagnitude (kg And Rp) for each type. _	Recorded quantity details (kg And Rp) for each type.
3	Recording results sale	Sales administration is carried out collectively	The monetary Value (Rp) is recorded individually, according to the amount of waste deposited.
4	Efficiency power	Managers emit Lots of energy To sort all the rubbish deposited by society.	Power issued administrator relatively little Because The waste has been sorted type by customers accordingly since from home. _
5	Efficiency time	Need more Lots time.	Time, Which needed to be relatively more fast.
6	Benefit economical individual	The customer didn't feel economic benefits straight away.	Economic benefit can be Because each customer's Value of money (mer is returned to customers from savings.
7	Benefit development	Generally, use _ you for activity-specific, And No	Turnover bank rubbish potential For developing units banking

bank rubbish	can be developed.	business trash.

Litter consists of daily activities in the stairwell, excluding feces and specific waste [20]. Defines waste as waste material from human and animal activities that are generally in solid form and is no longer used or needed [21].

Method

This research uses a combined quantitative and qualitative research method with a descriptive approach. The location of this research was carried out at the Pekanbaru City Main Waste Bank (BSI). Based on data from the Pekanbaru City Environment and Hygiene Service, in 2021 BSI will have 4 waste banks and the number of waste bank units will be 277 waste banks. The research was carried out within 12 months, from February 2022 to January 2023. The primary resources were related to the characteristics of the waste bank; the secondary taken was the amount of waste reduction in Pekanbaru City. Data collection techniques are interviews, observations and surveys. The research variables are, characteristics of waste banks, economic, social, environmental and management of waste banks.

Descriptive statistical analysis is statistical analysis that functions to describe or provide an overview of research objects through sample or population data, without carrying out general analysis and conclusions. Descriptive statistics are used to describe the variables in this research, Ghozali (2013). Analysis is used to describe the data in this research which consists of: waste bank characteristics (X1), economic aspects (X2), social aspects (X3), environmental aspects (X4), waste bank management (Y). Nugroho (2005), the steps taken in using multiple linear regression analysis techniques are:

1. Create a distribution table for questionnaire answers X1, X2, X3, X4 and Y.

2. Determine the score of the respondent's answer using the predetermined score conditions.

3. Add up the answer scores obtained from each respondent.

Descriptive analysis is a part of statistics used to make data obtained from filling out questionnaires by respondents easier to understand and process. The process for data transformation can be carried out by measuring variables using the Method of Successive Interval (MSI) as follows:

Results and Discussion

From the description of each waste bank management model from all aspects, namely the characteristic aspects consisting of planning, organizing, directing and controlling, economic aspects, social aspects and environmental aspects, from the results of processed data for each of these aspects there are dominant factors in compiling waste bank management model. Thus, a waste bank management model has been prepared from the characteristics, social economic and environmental aspects as in Table 1.

Table 1. Waste Bank Management Model from Characteristic, Economic, Social and Environmental Aspects

No	Indicator	Unit/BSU Waste Bank	Main Waste Bank / BSI
I. A.	Characteristics Planning		
1.	Waste bank operating hours	Adapted to the customer's situation and conditions by agreeing with the customer and the BSU management. If there are changes to	BSI is open on weekdays from Monday-Saturday from 08.00 to 16.00 WIB. Garbage pickup at BSU is carried out every day.

		operating hours, please inform us clearly in advance.	Garbage pickup times at BSU are arranged according to the schedule and adjusted if there are changes from BSU.
2.	Sale of junk savings	Customers/community will save segregated waste at BSU. BSU re-invests customer savings from the community into BSI	BSI processes waste before selling the resulting waste savings to waste collection industries, waste recycling users, or waste collectors
B.	Organizing		
1	Work discipline	Work discipline at BSU is based on an agreement between the customer and the management regarding the schedule for opening a waste bank.	At BSI, work discipline is tied to the assigned part of each task. Arranged with working hours, operational schedules for each section
C.	Briefing		
1	Briefing	BSU received direction from the parent waste bank and the Government	BSI received advice from the Government
2	Technical guidance or quick training for waste bank administrators	BSU receives training from BSI, city, provincial, and central governments with funding sources from APBD, APBN, and CSR of private companies.	BSI receives technical guidance regarding waste bank management regularly from various funding sources, APBD, APBN, and CSR of private companies
D.	Control		
1	Recording the type and volume of waste	the recording is recorded in the customer's savings book and the waste bank master book.	Data on the type and volume of waste is stored digitally on BSI computer devices. Data on the type and volume of customer waste is manually recorded in the customer's savings book and recorded during waste savings transactions.
2	In and out of trash savings	are recorded in the waste bank master book and the customer's savings book every time a transaction is made.	Every transaction is recorded. The waste bank data system records transactions in and out of waste savings.
II.	Economy		
1	Prices for plastic and paper waste are separated from customers.	determined by BSI	Determined by BSI with the assumption of profit for BSU
2	Prices for segregated plastic and paper waste from customers at waste banks are	BSI sets the price of waste at BSU, and this price is higher than the price for collectors or other waste business actors	The price of waste at BSI is higher than at collectors.

	compared with prices at collectors.		
III.	Social		
1	Socialization	BSU carried out socialization about waste banks to the community	BSI Accompanying BSU in conducting outreach to the community. BSI also receives outreach from the Government and the private sector
2	BSU outreach to the community	Carried out through WA group media, community level meetings, recital prayers, community gatherings, and during waste savings transactions	Accompanying BSU in socialization
IV	Environment		
1	The influence of waste banks on environmental cleanliness	Reducing the volume of ecological waste	Reducing the volume of waste generation in the environment. Increased environmental cleanliness.
2	Community behavior toward waste	He is more concerned about his waste	Changes for the better in treating waste

From the processed research data described previously, waste bank management is influenced by characteristic, economic, social, and environmental variables, and economic factors are the dominant factors in the waste bank management model that affect people's interest in saving waste at waste banks. The chief economic factor is that the price of segregated plastic and paper waste from customers is lower at the waste bank than the price to collectors, and the cost of cleaned plastic waste, compiled from customers, is also lower at the waste bank than the price to collectors. This happens because the waste bank only carries out the waste collection process with a savings mechanism so that there is no increase or creation of high waste prices at the waste bank. For this reason, efforts are needed to make the price of segregated plastic and paper waste from customers higher at the waste bank than the price at collectors or other waste entrepreneurs and that the cost of cleaned plastic waste, compiled from customers, is also higher at the waste bank than the price to collectors or other waste entrepreneurs, using the central waste bank, must carry out the process of processing waste into other forms.

Conclusion

Based on the results of the research that has been carried out, several conclusions can be drawn as follows:

1. The characteristics of waste banks in the city of Pekanbaru, seen from the general description of the existing conditions of waste banks and the parts of waste banks from the aspects of planning, organizing, directing, and controlling, show that the waste bank program in Pekanbaru city has not had a significant influence on efforts to reduce waste generation and changes in community behavior. Regarding concern for waste.

2. The waste bank management model is influenced by characteristic, economic, social, and environmental variables, where all these variables are broken down into several indicators to build a waste bank system so that the waste bank can run well.

3. Factors influencing waste bank management were found in the characteristic aspects, which include planning, organizing, directing, and controlling, and economic, social, and environmental elements. And

the dominant factor is the financial aspect.

4. The Pekanbaru City waste bank management model is designed based on characteristic, economic, social, and environmental aspects, with economic factors being the dominant factor. So, the waste bank management model requires the waste bank to process waste to control the best and highest prices.

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