

Evaluation of Household Waste Management in Otomona Village, Mimika Baru District, Timika City

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Abstract: This study aims to evaluate community expectations and the performance of the Otomona Village government in managing household waste in Otomona Village, Mimika Baru District, Timika City, by looking at the variables of waste storage, waste collection and waste segregation. The method used is descriptive method. Data collection techniques used in this study are observation, questionnaires, and documentation. To evaluate household waste management, the data analysis instrument used is Importance Performance Analysis (IPA), so that the Otomona Village needs to evaluate the existence of large, large volume, and strong waste containers and placed in strategic places. Apart from that, it is necessary to distinguish between organic and inorganic waste containers for waste storage, and the Otomona Village also needs to hold a routine cooperation schedule in every area. The results depict a high-level awareness about waste management among the community dwellers in the village.

Keywords: evaluation of household waste management; container; collection; sorting

Abstrak: Penelitian ini bertujuan untuk mengevaluasi harapan masyarakat dan kinerja pemerintah Desa Otomona dalam mengelola sampah di Desa Otomona, Kecamatan Mimika Baru, Kota Timika, dengan melihat variabel penyimpanan sampah, pengumpulan sampah, dan pemilahan sampah. Metode yang digunakan adalah metode deskriptif. Teknik pengumpulan data yang digunakan dalam penelitian ini adalah observasi, survei, dan dokumentasi. Untuk mengevaluasi pengelolaan sampah, instrumen analisis data yang digunakan adalah Importance Performance Analysis (IPA), sehingga Desa Otomona perlu mengevaluasi keberadaan wadah sampah yang besar, volume besar dan kuat, serta ditempatkan di lokasi strategis. Selain itu, perlu dibedakan antara wadah sampah organik dan anorganik untuk tempat penyimpanan sampah, dan Desa Otomona juga perlu mengadakan jadwal kerjasama rutin di setiap wilayah. Hasilnya menggambarkan kesadaran tingkat tinggi tentang pengelolaan sampah di kalangan masyarakat di desa.

Kata Kunci: evaluasi pengelolaan sampah; wadah; pemungutan; penyortiran

INTRODUCTION

Evaluation is a process of providing information about the extent to which a particular activity has been achieved, how the achievement differs from a certain standard to find out whether there is a difference between the two, and how the benefits that have been carried out are compared to the expectations to be obtained (Umar, 2002).

Evaluation is an activity to assess the level of performance of a policy. Evaluation can only be done if a policy has been running for a sufficient amount of time. Indeed, there is no definite time limit when a policy must be evaluated. To be able to know the outcome and impact of a policy, it certainly takes a certain time, for example five years since the policy was implemented. Because if the evaluation is done too early, the outcome and impact of a policy will not be visible. The more strategic a policy is,

the longer the timeframe needed to evaluate it. Conversely, the more technical the nature of a policy or program, the evaluation can be carried out in a relatively shorter period of time since the implementation of the relevant policy (Hapsari, 2010).

The core of the evaluation activity is the activity of assessing an activity by comparing the initial stages of the activity (which have been planned) with the final stage (the results of the activity) (Nindy, 2014). Evaluation requires study/research design, evaluation sometimes requires a control group or comparison group, evaluation involves measurement over time, and evaluation involves special studies/research.

The notion that program evaluation is an activity to obtain an overview of the state of an object which is carried out in a planned, systematic manner with clear directions and objectives (Nindy, 2014). The main elements that must be present in the evaluation activity are the object being assessed, the purpose of the evaluation, the evaluation tool, the evaluation process, the evaluation results, the standard against which to compare, and the process of comparing the evaluation with the standard. The results of the evaluation are used as material for decision making. In the evaluation of the program, there are three objectives obtained: to know the extent of the level of success or achievement when compared with a predetermined plan, to know the supporting and inhibiting factors of the program being carried out, and as input material for the implementation of the next program.

The term evaluation refers to a process for determining the value of a particular activity. Evaluation means determining to what extent something is of good quality, or worth. In a broad sense, evaluation is a process of planning, obtaining, and providing information that is needed to make alternative decisions. In accordance with this understanding, each evaluation or assessment activity is a process that is deliberately planned to obtain information or data based on this data and then try to make a decision (Zainuri et al., 2021).

LITERATURE REVIEW

Definition of Waste

Waste, in general, can be interpreted as waste material that people do not like and do not want, where most of it is material or residue that is no longer used and will cause disruption to public health and the environment (Rohim, 2020). Waste is solid waste, consisting of organic and inorganic substances which are still useful and must be managed (Susilowati et al., 2013). Waste as a result of human activities does not have to be disposed of but can be managed so that it does not interfere with environmental health, and functions as an economic resource.

Waste can be defined as a material that is wasted or disposed of from sources resulting from human and natural activities that do not yet have economic value (Swadaya, 2008). The form of waste can be in every phase of matter, namely solid, liquid, and gas. According to the Law of the Republic of Indonesia Number 18 of 2008 concerning Waste Management, waste is the residue of human daily activities and/or natural processes in solid form. Meanwhile, the Indonesian National Standardization Agency for Operational Engineering Procedures for Urban Waste Management defines waste as solid waste consisting of organic and inorganic materials which are considered useless and must be managed so as not to endanger the environment and protect development investment.

Based on some of the definitions of waste above, it can be concluded that waste is the result of useless daily human activities and has no economic value. The remnants that are commonly referred to as up to now are biodegradable and non-biodegradable and must be managed so as not to endanger humans and the environment.

Definition of Household Waste

Government Regulation of the Republic of Indonesia Number 81 of 2012 concerning Management of Household Waste and Household-like Waste, the definition of household waste is waste that comes from daily activities in the household that does not include feces and specific waste. Household waste cannot be avoided but can be reduced and controlled (minimized). A simple effort that can be done to minimize household waste is to sort organic waste and inorganic waste. Organic waste can be used as compost, while inorganic waste can be used as various recycling creations (Tamyiz et al., 2018).

Household waste that is not handled will increasingly accumulate, resulting in reduced environmental beauty followed by a foul odor (Marleni et al., 2012). If the environment is such that it will reduce life resources in the tourism sector. On the other hand, waste can be an important resource in uplifting the community's economy. This condition will occur if the waste can be managed professionally.

Waste Classification

According to Ferronato and Torretta (2019), every day humans produce waste whose types depend on their activities. Each type has a different processing method. Mixed waste causes processing costs to be expensive. Therefore, the key to waste management is sorting, or separating one type of waste from another. Types of waste are classified as follows:

- a. Organic trash. Organic waste, or often called wet waste, is a type of waste that comes from living bodies so it decomposes easily and can be destroyed naturally. Examples are vegetables, meat, fish, rice, and grass clippings/dry leaves/twigs. Human life cannot be separated from organic waste every day. The decomposition of organic waste occurs due to biochemical processes due to the decomposition of the organic waste material itself by microorganisms (very small living things) with the support of other factors found in the environment. The most appropriate method of processing organic waste is of course through controlled decomposition, which is known as composting or composting.
- b. Non-organic waste. Non-organic waste or dry waste or non-perishable waste is waste composed of non-organic compounds originating from non-renewable natural resources such as minerals and petroleum, or from industrial processes. Examples are glass bottles, plastic, plastic bags, cans and metal. Some non-organic waste cannot be decomposed by nature at all, and some can be decomposed in a very long time. Processing non-organic waste is closely related to saving natural resources used to make these materials and reducing pollution due to the production process in factories.
- c. B3 waste (hazardous and toxic materials). B3 waste is waste that contains hazardous and toxic materials. B3 waste that is often found in households, for example, is batteries, pesticides (insecticides), aerosol bottles, cleaning fluids (carbolic acid), and fluorescent lamps. If dumped into the environment or burned, these wastes can contaminate the soil and pose a health hazard. This B3 waste processing is carried out specifically in special locations that require strict supervision from the government.

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According to Soemarwoto (Marleni et al., 2012), household waste that is not handled will increasingly accumulate, resulting in reduced environmental beauty followed by a foul odor. If the environment is such that it will reduce life resources in the tourism sector. On the other hand, waste can be an important resource in uplifting the community's economy. This condition will occur if the waste can be managed professionally.

Recycling is the reuse of used paper which can be used primarily for external purposes, used plastic is reprocessed to be made into plastic for various household appliances such as buckets and others, used electronic equipment is separated for each component of its use (metal, plastic/cable, batteries, etc.) and selection is made for each component that can be reused, glass/glass bottles are separated by glass color (white, green, and dark) are crushed, and other environmental waste in the form of leaves. Compost includes demonstration facilities, counseling, training and environmental scale composting managed by the community. To raise awareness that household waste must be managed at the source.

Waste Container

Containers based on the Indonesian National Standardization Agency for Operational Engineering Procedures for Urban Waste Management, are activities for collecting waste in individual or communal containers. Containers in study locations use containers level 1 and 2, where the containers are plastic bags, used buckets and waste baskets. Placement of trash containers in study locations is usually in front of the house and some are also hung on the fence, this is to facilitate access for cleaning workers when collecting garbage. The container system at the study site can be developed to meet the government's targets regarding reduction and handling, namely by adding trash containers to make it easier for people to sort waste (Arsyandi et al., 2019).

The planned container pattern is an individual pattern, in which each family provides a container. The container is placed in the front yard of the house or on the side of the road so that it makes collection and transportation easier. The purpose of this waste container is to separate inorganic waste according to type/material, in order to facilitate further processing. Container which is a way of storing waste temporarily before being separated into a temporary disposal site (TPS) or final disposal site (TPA). In order to prevent leakage or odors that can interfere with the environment and breathing, all waste must be stored in containers that meet the following requirements: (1) closed, (2) non-perishable and watertight, (3) easy and fast to empty and transport, (4) economical and easy to obtain (Sunarsih, 2014).

Garbage Collection

The collection pattern in the study locations is an indirect individual pattern, in which cleaning workers collect waste from homes using a collection device which is then transferred to TPS. The collection tools used are garbage motorbikes and garbage carts. Garbage collection is carried out every three days a week with one cycle. The number of iterations will increase if the number of spawns increases. Waste management from the source is necessary for handling when waste generation increases, so that the burden of waste collection is reduced, and all waste can be collected. Another treatment that can be done is to provide a partition on the collection tool which separates organic and inorganic waste, this is intended so that waste does not mix during the collection and transfer process (Arsyandi et al., 2019).

To deal with the problem of household-sourced waste, the recommended collection pattern is an indirect individual pattern, in which waste is collected by sanitation workers who visit each waste source (house to house) and transport it to a temporary disposal site (TPS). Another collection pattern that is an alternative is the direct communal pattern, which is the activity of collecting waste from each communal point and transporting it directly to the final disposal site without going through any transfer activities (Sunarsih, 2014).

Garbage Sorting

Waste segregation has not been carried out in the study locations but has the potential to be carried out by grouping based on waste categories. The dominant categories of waste in the study area are organic waste and inorganic waste which can be recycled and can be reused. The sorting of waste can produce benefits for the community, such as inorganic waste which has economic value can be saved through a waste bank. Sorting organic waste can be processed by composting (Arsyandi et al., 2019).

Waste management can be done by segregating wet (organic) waste and dry (inorganic) waste by each household. For households who own land, they can process wet waste into compost, which is useful for plants, while dry waste such as paper, bottles, plastics and cans should be sorted before disposal, because some of the waste can be recycled or reused. can also be given to scavengers who cannot be reused and can be thrown away (Sunarsih, 2014).

3R Waste Management Concept

Reducing waste at this source is carried out through the 3R mechanism (Reduce, Reuse, Recycle) (Susanti et al., 2017). Community-based waste management by implementing the 3R program is expected to be able to reduce environmental pollution, provide benefits to the community and can change people's behavior towards waste. The 3R program is actually very simple but difficult to implement because it is largely determined by community participation through changes in behavior

which are generally influenced by the social, cultural and economic characteristics that characterize people's lives.

The 3R stands for Reduce, Reuse and Recycle (Peprah et al., 2015), and it is the main principle of managing waste starting from the source, through various steps that can reduce the amount of waste that is disposed of in the TPA (Final Disposal Site):

- a. Reduce means reduce. Reduce the amount of waste and save on the use of goods. For example, by bringing shopping bags to the market, you can reduce plastic waste and prevent the use of styrofoam.
- b. Reuse means reuse. Items that can still be used should not be thrown away immediately, but as much as possible reuse them as many times as possible. For example, writing on both sides of the paper and using refill bottles.
- c. Recycle means recycling. Paper waste can be made into masterpieces, as well as plastic packaging waste for instant noodles, soap, oil, and others. Organic waste can be composted and used as fertilizer for plants and greenery.

Benefits of Waste Management

According to Aminah and Rinasusanti (2009), in general, the benefits of waste management are as follows:

- a. Reducing the volume of waste disposed of in landfills. Garbage is composted in the place where the compost is taken, by itself the volume of waste transported to the TPA will be reduced.
- b. Save resources. Reducing the volume of waste transported to TPA also has other implications, for example reducing the required transport fleet, required manpower, and fuel. All of this will save the costs required for waste management.
- c. Increased added value of waste. Making organic waste into compost will provide added value to the waste.
- d. Benefits for the environment. Many people accuse that one of the causes of environmental damage is due to poor waste handling.

The Negative Impact of Poorly Managed Waste

Garbage that is not handled and managed properly will cause various problems. According to Susilowati et al. (2013), some of the negative impacts of waste if waste is not managed properly are:

- a. Air pollution. Garbage that is not managed immediately will give rise to foul odors, methane gas, carbon disulfide, and other toxic compounds. These hazardous compounds will spread more widely and cause more harmful effects due to the smoke produced when waste is burned.
- b. Water pollution. Garbage can also cause contamination of surface water and ground water. This pollution is expanded by rainwater splashing that sweeps away decaying waste. Garbage that cannot be decomposed can clog drains and culverts, which can cause flooding.
- c. Soil pollution. Inorganic waste such as rubber, glass, metal, is very difficult to decompose by microorganisms. If this waste is piled up or dumped into the ground, it can cause the soil to lose its friability and become infertile.
- d. Decreased level of population health. Garbage can become nests or breeding grounds for flies, rats, cockroaches and other microorganisms that can carry diseases, such as cholera and diarrhea.
- e. Accident. Demolition or construction waste, such as broken glass and nails that are not managed properly, can cause accidents. Garbage that is burned creates smoke which can disrupt and endanger traffic flow.
- f. Decrease in aesthetic value. Waste that is scattered and not managed makes the environment dirty, smelly, and disturbs beauty so that it is no longer comfortable to live in.

RESEARCH METHODOLOGY

The method used in this research is descriptive method. According to Sugiyono (2017), descriptive research is a research method that seeks to guide researchers to explore and or photograph social situations that will be thoroughly, broadly and in-depth examined. The reason for the researchers using

this method is to find out the expectations of the community and the performance of the Otomona Village government regarding the evaluation of household waste management in the Otomona Village, Mimika Baru District, Timika City.

Place and Research Object

The place of this research is in the Otomona Village, Mimika Baru District, Timika City. The object of this research is the community's expectations and the performance of the Otomona Village government regarding the evaluation of household waste management.

Data Collection Technique

Data collection techniques used in this study are as follows:

a. Observation. Observation is a technique of observation, attention, or supervision (Silolongan & Apriyono, 2019). The method of collecting data by observation means collecting data by making observations from researchers on the subject or object of research carefully (carefully and thoroughly) and systematically.

b. Questionnaire. Questionnaires are data collection techniques that are carried out by giving a set of questions or written statements to respondents to answer. In this study a questionnaire was conducted to get an overview of the proper evaluation of household waste management in the Otomona Village.

c. Documentation. Documentation is a technique used to find and obtain data or information in the form of books, articles and documents. Documentation techniques are also useful for completing deficiencies obtained from primary data through pictures/photos, recordings, and writing.

Table 1. Calculation of the Conformity Level of Dimensional Evaluation of Containers

No	Item	Mean Importance		Mean Performance		Conformity Level	
		Per-Item	Dimensi on	Per-Item	Dimensi	Per-Item	Dimensi on
1	Trash cans are placed in strategic places and easy to reach	4.43	4.22	2.21	2.64	50%	64%
2	The number of trash cans is sufficient to accommodate waste from the community in the Otomona Village	4.17		2.11			
3	The trash can is big enough to hold the trash	4.19		2.45			
4	Every household has a private trash can in front of the house	3.61		3.77			
5	Trash containers are strong and durable, so they are not easily damaged	4.68		2.66			

Data Analysis Instruments

The data analysis technique used in this research is Importance Performance Analysis (IPA) with a qualitative approach. Importance Performance Analysis is described in the form of a Cartesian diagram, which is a figure that is divided into four quadrants bounded by two lines that intersect

perpendicularly at the point (X, Y) where X is the average score of perceived performance or service ratings and Y is the average score. -average assessment of interests/expectations that meet community satisfaction. This is used to determine the position of each item or measure of service quality with the level of importance of the quality of service provided. The formula used is the equation:

$$Tki = \frac{Xi}{Yi} \times 100\% \dots\dots\dots (1)$$

Tki = Level of conformity of respondents

Xi = Performance appraisal score

Yi = Community importance score

RESULTS AND DISCUSSION

Data Analysis

To measure the evaluation performance of household waste management in Otomona Village, researchers used IPA (Importance Performance Analysis) analysis with several variables including container variables, collection variables, and sorting variables. The IPA analysis technique is a way to show the level of importance expected by the community and the level of performance in household waste management that is felt by the community.

Table 2. Calculation of the Conformity Level of Collection Evaluation Dimensions

No	Item	Mean Importance		Mean Performance		Conformity Level	
		Per-Item	Dimension	Per-Item	Dimension	Per-Item	Dimension
1	Garbage collection carried out in the otomona sub-district has been carried out well	4.63	4,1	4.02	3.43	87%	83%
2	Garbage collection in the Otomona sub-district is carried out every day at a predetermined hour	4.26		3.89			
3	The number of fleets in transporting garbage is sufficient	4.09		3.49			
4	Routine schedule of <i>gotong royong</i> in every area to clean up the environment	3.36		2.40			
5	The number of waste cleaning personnel is sufficient	4.15		3.38			

Analysis of Conformance Level of Importance and Performance Variables

The suitability level analysis carried out is a form of knowing the achievement of evaluating household waste management in the Otomona Village, Mimika Baru District, Mimika Regency based on the community’s assessment. This assessment is done by calculating the comparison between the performance of the evaluation received with the expectations of the desired evaluation.

The shape of the level of conformity obtained from consideration between the performance of the evaluation obtained against the expectations of the community shows the quality of the performance of the evaluation which is assessed in the form of percent conformity. The following is a calculation of

the degree of conformity between the evaluation of household waste management in the Otomona Village for each dimension of evaluation of household waste management.

In the waste container dimension, the average percent overall conformity rate is 64%, this indicates that the quality of this dimension is not in accordance with the expectations of the Otomona Village community, the lowest item is in the trash can placed in a strategic and easily accessible place, with a level 50% conformity so that the item needs to be repaired and improved.

Gathering Dimension Conformance Level

The value of the level of conformity in the evaluation dimensions of the collection can be seen in Table 2. In waste collection, the average percentage of overall conformity is 83%, this indicates that the quality of this dimension is in line with the expectations of the Otomona Village community, the lowest item is the existence of a routine mutual cooperation schedule in each RT to clean up the environment, with a level 71% conformity so that the item needs to be repaired and improved.

Table 3. Calculation of the Conformity Level of the Evaluation of Sorting Dimensions

No	Item	Mean Importance		Mean Performance		Conformity Level	
		Per-Item	Dimension	Per-Item	Dimension	Per-Item	Dimension
1	Before the waste is disposed of, it must first be sorted according to the type of waste	3.67	3.92	3.11	2.73	85%	70%
2	There are special bins that can distinguish between organic and inorganic waste	4.21		2.59		62%	
3	The community receives education from the Kelurahan in sorting waste	4.09		2.78		68%	
4	Communities can already recycle waste to reduce the amount of waste	3.81		2.36		62%	
5	Economically valuable waste is sorted before being disposed of	3.83		2.82		74%	

In waste sorting, the average percentage of the overall conformity rate is 70%, this indicates that the quality of this dimension is quite in line with the expectations of the Otomona Village community, the waste sorting items that have the lowest level of conformity are in the presence of special bins that can distinguish waste organic and inorganic, and the community can recycle waste to reduce the amount of waste with a suitability level of 62% so that these items need to be improved and improved.

Table 4. Average Overall Compliance Level Calculation From Evaluation of Household Waste Management

Dimension	Mean Importance	Mean Performance	Conformity Level
Container	4.22	2.64	64%
Collection	4.10	3.43	83%
Sorting	3.92	2.73	70%
Average	4.08	2.93	72.33%

It can be seen in Table 4 that the overall average for the suitability value of the three dimensions of household waste management evaluation is 72.33%. This is determined based on the value of the performance score (Performance) compared to the expected score (Importance) in the form of a percentage, therefore the results of this calculation show that the percentage of conformity levels of all dimensions is 72.33%. It can be concluded that the Otomona Village, Mimika Baru District, Mimika Regency has not met the community's expectations and there are several items that need to be improved and improved.

Table 5. Container Evaluation Dimensions

No	Item	Mean Importance		Mean Performance		Gap (P-I)	
		Per-Item	Dimension	Per-Item	Dimension	Per-Item	Dimension
1	Trash cans are placed in strategic places and easy to reach	4.43	4,22	2.21	2.64	-2.23	-1.57
2	The number of trash cans is sufficient to accommodate waste from the community in the Otomona Village	4.17		2.11		-2.05	
3	The trash can is big enough to hold the trash	4.19		2.45		-1.75	
4	Every household has a private trash can in front of the house	3.61		3.77		0.16	
5	Trash containers are strong and durable, so they are not easily damaged	4.68		2.66		-2.02	

GAP Performance-Importance Analysis (GAP P-I)

This analysis is used to determine the score gap between community expectations and the performance of several evaluations of household waste management that have been obtained and felt when the waste management process occurs in Otomona Village. This gap analysis was carried out using Microsoft Excel. GAP analysis in this study was carried out in three ways, namely analysis per evaluation item, analysis per evaluation dimension, and overall average analysis.

In the evaluation dimension of the container, based on Table 5, it can be seen that for the GAP analysis per item there are several negative and positive values, with a positive GAP value with the item that each household has a personal trash can in front of the house, namely (0.16), this shows that the performance perceived by the community exceeds their expectations. And the highest negative GAP is found in the trash bin item which is placed in a strategic and easily accessible place, namely (-2.23), this indicates that the item must be repaired and improved.

In the collection evaluation dimension, based on Table 6, it can be seen that all GAP items are negative, with the highest GAP value found in the item having a mutual cooperation schedule in each RT to clean up the environment (-0.96). This indicates that the item must be repaired and improved.

In the evaluation dimension of sorting in Table 7, it can be seen that all GAP items are negative, with the highest GAP value being the item where there is a special trash bin that can distinguish between organic and inorganic waste, namely (-1.62). This indicates that the item must be repaired and improved.

Table 6. Collection Evaluation Dimensions

No	Item	Mean Importance		Mean Performance		GAP (P-I)	
		Per-Item	Dimensi on	Per-Item	Dimen sion	Per-Item	Dimen sion
1	Garbage collection carried out in the otomona sub-district has been carried out well	4.63	4.10	4.02	3.43	-0.61	-0.66
2	Garbage collection in the Otomona sub-district is carried out every day at a predetermined hour	4.26		3.89		-0.37	
3	The number of fleets in transporting garbage is sufficient	4.09		3.49		-0.60	
4	There is a routine schedule of <i>gotong royong</i> in every area to clean up the environment	3.36		2.40		-0.96	
5	The number of waste cleaning personnel is sufficient	4.15		3.38		-0.77	

Based on Table 8, it can be seen that the overall average value of GAP per dimension has a negative value with the highest GAP in the waste container dimension of -1.57, and the lowest GAP in the waste collection dimension of -0.66.

Table 7. Disaggregation Evaluation Dimensions

No	Item	Mean Importance		Mean Performance		GAP(P-I)	
		Per-Item	Dimen sion	Per-Item	Dimen sion	Per-Item	Dimen sion
1	Before the waste is disposed of, it must first be sorted according to the type of waste	3.67	3.92	3.11	2.73	-0.56	-1.19
2	There are special bins that can distinguish between organic and inorganic waste	4.21		2.59		-1.62	
3	The community receives education from the Kelurahan in sorting waste	4.09		2.78		-1.31	
4	Communities can already recycle waste to reduce the amount of waste	3.81		2.36		-1.45	
5	Economically valuable waste is sorted before being disposed of	3.83		2.82		-1.01	

After knowing the assessment of the suitability level and GAP P-I value, then this research will use Importance Performance Analysis (IPA) analysis to find out the priority mapping of waste management evaluation, the Cartesian diagram is an image that is included in quadrants A, B, C, and D.

Table 8. Overall Average GAP Performance-Importance (GAP P-I): Evaluation of Household Waste Management

Dimension	Mean Importance	Mean Performance	GAP P-I
Container	4.22	2.64	-1.57
Collection	4.10	3.43	-0.66
Sorting	3.92	2.73	-1.19
Average	4.08	2.93	-3.42

IPA Analysis (Importance Performance Analysis)

Importance Performance Analysis (IPA) is done by calculating the mean or average value of each statement item from expectations and performance. Service items are considered by the community to be important, but the results of the measurement according to the community still perform poorly and require more attention from the Otomona Village compared to service items that are considered less important by the community.

The existence of a large GAP from Performance-Importance can be used as a guide for the Otomona Kelurahan to focus its resources and prioritize improvements to evaluation items that require corrective action. Priority alignment analysis in this study was conducted on all respondents (community). From processing the data using SPSS 22, it was obtained a cartesian diagram of IPA for all community respondents on the evaluation of household waste management in the Otomona Village, Mimika Baru District, Timika City. To describe it on a Cartesian diagram, the level of performance (Performance) is denoted on the horizontal axis (X), while the level of importance (Importance) is denoted on the vertical axis (Y) in Figure 1.

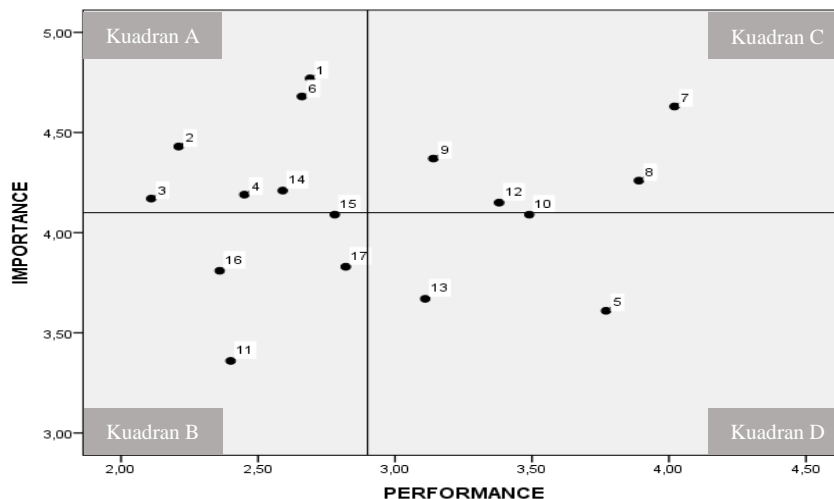


Figure 1. Cartesian Diagram

Based on the Cartesian diagram in Figure 1, the Cartesian diagram is divided into four quadrants which proves that there are six items in Quadrant A, four items in Quadrant B, four items in Quadrant C, and three items in Quadrant D. For more details about the Cartesian diagram above, see Table 9.

Quadrant A is an observation in which the community as a respondent considers that the items in this quadrant are very important and have high expectations but have not experienced maximum

performance. From quadrant A it is known that there are five items from the evaluation dimensions of waste containers, and one item from waste segregation. It can be seen that in this item the community's expectations are higher than its performance, so it needs to be repaired and improved.

Table 9. Cartesian Diagram Explanation

No.	Statement	Quadrant	Remarks	Recommendations
1.	Trash cans are placed in strategic places and easy to reach	A	Main priority	Items that are the priority for repair
2.	The number of trash cans is sufficient to accommodate waste from the community in the Otomona Village	A	Main priority	Items that are the priority for repair
3.	The trash can is big enough to hold the trash	A	Main priority	Items that are the priority for repair
4.	Every household has a private trash can in front of the house	D	Excessive	Allocation of resources for top priority
5.	Trash containers are strong and durable so they are not easily damaged	A	Main priority	Items that are the priority for repair
6.	Garbage collection carried out in the Otomona Village has been carried out well	B	Maintain Achievement	Keep the Items
7.	Garbage collection in the Otomona sub-district is carried out every day at a predetermined time	B	Maintain Achievement	Keep the Items
8.	The number of fleets in transporting garbage is sufficient	D	Excessive	Allocation of resources for top priority
9.	There is a routine schedule of mutual cooperation in every RT to clean up the environment	C	Low Priority	Items can be ignored / have a priority scale for improvement
10.	The number of waste cleaning personnel is sufficient	B	Maintain Achievement	Keep the Items
11.	Before the waste is disposed of, it must first be sorted according to the type of waste	D	Excessive	Allocation of resources for top priority
12.	There are special bins that can distinguish between organic and inorganic waste	A	Main priority	Items that are the priority for repair
13.	The community receives education from the Kelurahan in sorting waste	C	Low Priority	Items can be ignored / have a priority scale for improvement
14.	Communities can already recycle waste to reduce the amount of waste	C	Low Priority	Items can be ignored / have a priority scale for improvement
15.	Economically valuable waste is sorted before being disposed of	C	Low Priority	Items can be ignored / have a priority scale for improvement

Quadrant B is an achievement that must be maintained by the Otomona Village, Mimika Baru District, Timika City, based on community assessment as the research target. The existence of this item indicates that quadrant B is considered important by the community and its performance is considered good by the community. Therefore, the Otomona Village, Mimika Baru District, Timika City, should maintain the performance of this item so that it can continue to get better. From quadrant B it can be seen that these four items are in the waste collection dimension, and it can be concluded that the performance in quadrant B is considered good by the people of Otomona Village.

Quadrant C is a low priority where community expectations and the performance provided are low, so the Otomona Village, Mimika Baru District, Timika City needs to consider focusing on improving this quadrant item. From quadrant C it can be seen that there is one item in the waste collection dimension and three items in the waste sorting dimension. It can be concluded that the evaluation of dimension C is good, although people's expectations are low and need to be improved.

Quadrant D is an exaggeration, this shows that the performance that is considered good by the community even exceeds their expectations. Therefore, there is no need to focus too much on this quadrant. From quadrant D it can be seen that each of the three items above is in the dimensions of

waste container, waste collection, and waste sorting. It can be concluded that the items in quadrant D have been perceived well and even exceeded the expectations of the Otomona Village community.

From the analysis that has been carried out in this study including analysis of the suitability level of Importance and Performance, GAP P-I analysis, and IPA analysis, it can be concluded that the community is not satisfied with the performance provided by Kelurahan Otomona. GAP or gap analysis shows a negative value of the average performance and importance, and the results of the gap from the average per dimension > -1 so that it can be said that the community's expectations for the performance of the Otomona Kelurahan still need to be improved.

Waste Container Evaluation

One of the evaluations in household waste management activities is containers. Containers are the initial stage of a series of waste management which will later affect the quality of the stages of household waste management. Containers include individual containers provided at the household level by providing 2 units of waste collection consisting of organic and inorganic waste, communal containers (Containers or TPS) specifically to accommodate various types of waste, both organic and inorganic.

Otomona Village, Mimika Baru District, Timika City has carried out one of the household waste management activities that has been considered good by the community, namely that there are some households that have a private trash can in front of the house. However, the trash that the community has is only small plastic ones. Therefore, the community needs a garbage container prepared by the Otomona Village.

Evaluation of containers is the hope of the community and is a top priority that must be carried out by the Otomona Village, Mimika Baru District, Timika City, namely placing trash cans in strategic and easy-to-reach places is important and must be done. Otomona Village needs to place trash cans according to the distance of people's homes, if this is implemented then it will be easier for people to dispose of garbage and if it is not implemented the community will put garbage everywhere, because people will find it difficult to dispose of garbage far from their homes.

The number of trash cans that are sufficient must be considered with the large number of residents. Seeing this, the Otomona Village must provide sufficient trash cans to accommodate the large amount of waste generated by the community. In addition, there are still some things that need to be improved, namely in terms of volume and strength, the trash can must be large in size so that it can accommodate more waste and also must be strong so that it is not easily damaged.

Waste Collection Evaluation

Garbage collection is a method or process of collecting waste starting from a container or waste collection site from the source of waste generation to a temporary collection point or at the same time to a final disposal site (TPA). The collection is generally carried out by cleaning officers from the Environmental Service (DLH), however, it has been taken by experts from the Otomona Village, Mimika Baru District, Timika City. Garbage collection activities carried out by cleaning staff in the Otomona Village are carried out every day and at the same time that has been determined. So that the public can find out the routine schedule for waste transportation, besides that the number of fleets and the number of personnel have fulfilled the waste transportation so that waste collection will be felt to be effective if it is carried out properly. The next evaluation that must be carried out by the community in the Otomona Village is the need for a routine schedule for mutual cooperation in each RT to clean up the surrounding environment. The impact of the gotong royong system is to create a harmonious environment, work will be completed faster, and of course the environment will be cleaner.

Waste Sorting Evaluation

Waste sorting is the activity of grouping and separating waste according to its type. Segregation of waste at home can be grouped into two, namely organic waste and inorganic waste. The purpose of segregating waste is to facilitate waste management. In addition to facilitating waste management, sorting organic and inorganic waste can reduce air pollution caused by the accumulation of waste that is still mixed between organic and inorganic waste. The people in the Otomona Village are already able to sort waste between organic and inorganic waste, so that it can make it easier for cleaning workers.

However, to improve waste management, the Otomona Village still needs to carry out several evaluations, namely the need to facilitate special trash bins to distinguish between organic and inorganic waste. And the impact felt by cleaners will be easier in transporting garbage and can be sorted back which waste can still be recycled and has economic value. Apart from that, the Otomona Kelurahan has to educate the people in Otomona more often so they refrain from littering.

CONCLUSION

In the dimensions of the waste container, the average value of the overall conformity level is 64% with the lowest level of conformity being the item where the trash is placed in a strategic and easily accessible place and for the gap analysis the overall average value is -1.57 with a value The highest gap is that the trash can is placed in a strategic and easily accessible place. In the Cartesian diagram, there are four items in the container dimension which are the top priority: trash bins to be placed in strategic places and easy to reach, the sufficient number of trash cans to accommodate waste from the community, the capacity of trash cans to accommodate the trash, and the strength and durability of the trash containers. In the dimension of garbage collection, the average value of the overall conformity level is 83% with the lowest level of conformity in the item, there is a routine mutual cooperation schedule in each RT to clean up the environment and for the GAP analysis, the overall average value is -0.66 with a value The highest GAP is the existence of a routine mutual cooperation schedule in every RT to clean up the environment. In the Cartesian diagram, there are 4 items on the collection dimension that are used to maintain performance: proper garbage collection carried out in the Otomona Village, schedule of garbage collection at a predetermined time, and sufficient number of waste cleaning personnel is sufficient. In the waste sorting dimension, the average value of the overall conformity level is 70% with the lowest level of conformity in the item where there is a special bin that can distinguish between organic and inorganic waste and for GAP analysis the overall average value is -1.19 with the highest gap value is that there is a special trash bin that can distinguish organic and inorganic waste. In the Cartesian diagram, there is 1 item in the collection dimensions, which is the top priority; a special trash bin that can distinguish between organic and inorganic waste.

Implications

In the evaluation of waste containers, the local government must provide trash containers that are sufficient in numbers, strong, and larger in volume so that they can accommodate waste effectively and care needs to be taken in placing these containers by placing the trash containers in strategic places and not far from residents' settlements so that the community it can be easier to reach it so that good household waste management can be created. In the evaluation of waste collection, the local government must carry out cleanliness every day and at predetermined hours, besides that the number of fleets and personnel needs to be maintained so that waste collection can run well, and it is also necessary to carry out a routine mutual cooperation schedule in each area in order to create a harmonious environment so as to form an effective household waste management. In the evaluation of waste segregation to implement good household waste management, the local government must facilitate trash cans that can distinguish between organic waste and inorganic waste and also need to educate the surrounding community not to litter.

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