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Improving Waste Management Sustainability: The Role of Institutional Capacity and Program Objectives

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ABSTRACT

This research aims to analyze 1) waste management in terms of the institutional capacity aspect involved in waste management, and 2) analyze the objectives of the waste management program to overcome problems that occur in the sustainability of waste management. A qualitative approach was used by conducting a Focus Group Discussion with seven selected respondents and then analyzed using a quantitative approach using Interpretive Structural Modeling. The results show that the key factor from the relevant agencies, or the most crucial in determining the sustainability of waste management in Kambu District, Kendari City, is the Kendari City Cleanliness and Parks Service, which is assisted by government involvement in Kendari City. Therefore, waste management requires good institutional synergy to ensure the sustainability of waste management by conducting activities based on program objectives in the environmental cleanliness improvement program as the key factor. This can increase community involvement by reducing the volume of waste, utilizing waste recycling, and reusing waste, which can increase people's incomes. Another important element to ensure sustainable waste management is the improvement and maintenance of waste management facilities and infrastructure.

Introduction

The trend of increasing population in an area is followed by an increasing area of residential land [1,2]. However, activities in increasingly developing urban areas have resulted in increasing and varying waste trends [3,4]. An increase in the number and growth rate of the urban population will result in an increasingly inadequate infrastructure system [5]. This is because of the lower rate of infrastructure provision compared to the rate of population development [6]; thus, the city becomes an uncomfortable place to live [7,8]. This is because the various negative impacts that can arise from the presence of waste that is not managed properly will ultimately be felt by the community [9,10]. Thus, the waste problem should be managed by the community together with government officials as holders of government authority.

Suyanto [9] and Wu et al. [11] suggested several aspects of waste management activities, namely storage, collision, transfer, transportation, processing, and final disposal. Large volumes of waste and various types, if not managed properly, have the potential to cause various complex environmental problems [12], such as: 1) water pollution by "leachate" that comes out of the pile of garbage and flows into water bodies or seeps into the ground; 2) air pollution due to the presence of methane gas (CH_4), which is a type of greenhouse gas that comes out of the final landfill due to the anaerobic decomposition of organic matter; 3) soil pollution due to landfill waste, which is a habitat for the development of certain pathogenic bacteria, such as

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Salmonella typhosa, *Entamoeba coli*, *Escherichia coli*, *Vibrio cholera*, *Shigella dysentriae*, and *Entamoeba histolytica*, which can cause diseases in humans; 4) reduced aesthetic value of the environment; and 5) reduced environmental comfort. These variables are directly related to the city's waste management system and consist of several aspects: institutional, sustainable operational techniques, adequate financing, application of legal regulations, and support for community participation [13,14]. If the average waste generation is 2.5 L person^{-1} day^{-2} or 900 L year^{-1}, and if the city population is 100,000 people, then the annual waste generation is 900,000 m^3. When stacked on an area of 5,000 m^2, this reaches a height of 450 m, or the equivalent height of a 150-story building [15].

Operational techniques for municipal waste management include planning waste collisions, transfusion, transportation, processing, and final waste disposal [16]. Selection and recycling activities are conducted to the maximum possible extent, from the collision of waste to its final disposal [17]. The operational techniques of urban waste management, which include activities ranging from storage to the final disposal of waste, must be integrated by selecting the sources [18]. Household B3 waste was managed in accordance with the applicable regulations [19,20]. Selling activities can also be conducted in collaboration with transfusions. The selection and recycling activities were prioritized at the location of the waste source [21,22]. If the dominant waste comes from an urban environment, it is called municipal solid waste [23,24]. Based on the above, in the management of municipal waste in Indonesia, sources of municipal waste are divided based on settlements or households, markets, commercial activities such as shops, office activities, hotels, and restaurants, and activities from institutions such as industry, hospitals, and waste, which is a type of residential waste, road sweeping, and gardens [25,26]. Sometimes, garbage from rivers or rainwater drainage is also included, which is commonly observed. Waste from each source can be said to have distinctive characteristics, according to the amount and variety of activities. Likewise, the gelation of waste from the each of these sources varies from one another [27].

Garbage, a waste that readily decomposes due to microbial activity, requires prompt collection, disposal, and transportation [28]. If not managed efficiently, it can emit unpleasant odors [29] such as ammonia and other volatile acids. In addition, decomposition products such as methane gas [30,31] are produced [32], which can endanger safety if not handled appropriately [33]. Accumulation of fast-rotating garbage fields to avoid avoidance [34]. This group of wastes is sometimes known as waste or organic waste [35,36]. This group has the potential to be processed with the help of microorganisms, such as composting or gasification. Garbage that does not decompose or refuse generally consists of paper, metal, plastic, glass, and other materials. Dry waste (refuse) should be recycled; otherwise, a thin anode product such as burning is required to destroy it. However, the burning of this refuse requires additional handling and can become a significant source of air pollution, particularly if it contains polyvinyl chloride (PVC) plastic. This group of wastes is also known as dry or inorganic wastes.

Kendari City, with a population of 359,371 in 2016, had 28,541 houses [37]. A large volume of waste is produced, with a population density of 54 people km^{-2}. Using a theoretical approach factor of 763,326 m^3 day^{-1} with a welfare of IDR 150,000, it produced waste of 15 kg day^{-1}, which is equal to 150 tons day^{-1}; approximately 50–75% of the waste heap is organic waste (wet waste), and the rest is inorganic waste (dry waste), which, if managed promptly, can be recycled or reused. Lambe et al. [38] stated that if half of the organic waste is recycled individually, then the reduction in the volume of waste reaches 32.5% of the total volume of waste. Of course, for reuse, an appropriate targeted, planned, and integrated technical mechanism is needed to avoid interference with waste problems (cleanliness, health, pollution, and beauty).

To anticipate waste problems, especially hygiene and environmental problems, it is necessary to organize and foster waste management from the household and environmental levels to the final disposal site/*tempat pembuangan sampah akhir* (TPA). Based on Ministry data Environment and Forestry/*Kementerian Lingkungan Hidup dan Kehutanan* (KLHK) regarding the amount of waste from 2017-2018 specifically Kendari City area reached 229.46 tonnes, not well managed [39]. Approximately 70% of this figure can be transported to landfills and 30% is not transported [39,40]. It is not totally transported because the waste transportation fleet is very limited: 24 trucks and eight motorbikes, while the object or area of operation is very wide. Data on waste production were obtained from a number of markets in Kendari City; for example, the Wua-wua New Market produced 30 m^3 day^{-1} of waste, while only transporting 12 m^3 day^{-1}. The City Central Market produces 35 m^3 day^{-1}, and 17 m^3 day^{-1} of waste is transported, whereas 18 m^3 day^{-1} of waste is not transported. Anduonohu Market produces 15 m^3 day^{-1} transported 8 m^3 day^{-1} and Lapulu Market 8 m^3 day^{-1} transported in total.

The number of city residents that are not comparable to the waste disposal site/*tempat pembuangan sampah sementara* (TPS) available in each residential and industrial area results in waste being disposed of haphazardly without considering the consequences. From day to day, these conditions cause discomfort in several corners of Kendari. The population growth rate has continued to increase sharply. In 2003, the population was 222,000; 2005 was 241,000; and 2016 was 359,371. A garbage car can serve only 1,000 people as well as the existing 2,000 TPS. Current waste management financing generally covers only the operational and maintenance costs. However, this is insufficient to provide minimal services. Policies related to the financing system should include system financing, decisions on service tariffs, and financing orientation (cost recovery).

In Kendari City, the waste redistribution rate is determined by the City Government through Kendari City Regional Regulation No. 5/2008 and the Kendari City Regional Regulation on Hygiene No. 12/2014. Regarding the determination of the tariff for cleaning retribution, the public, as the object affected by the policy, has not been asked for their opinion on how much the actual retribution rate is willing to pay to support waste processing activities, one of which is related to sustainable waste management [41,42]. Given the existence of institutions, the application of norms and cultural rules is necessary in society [42]. This is because norms are based on community agreements to create an orderly and disciplined life [43]. In everyday life, various norms apply, including religious norms, decency, politeness, and law [44]. Institutional strengthening urgently needs to be implemented in a comprehensive policy for integrated waste management [45].

Sustainability refers to a series of events in the past, present, and future that cannot be separated, including development, continuity of repetition, and change. Problems arising from waste management are thought to be due to the lack of public awareness in supporting good waste management in Kambu Sub-district, Kendari City. Therefore, it is necessary to analyze the sustainability of waste management in Kendari City. Institutional analysis can be used to evaluate the sustainability of waste-management systems. The results of this analysis of waste management institutions need to be applied to evaluate the sustainability of waste management so that the problems that hinder the sustainability of waste management in Southeast Sulawesi Province, Kendari City, and Kambu Sub-district can be addressed quickly and precisely. Thus, it is necessary to conduct a study on institutional improvements in waste management in Kambu Sub-district, Kendari City. The objectives of this study were 1) to analyze waste management in terms of the capacity of the institutions and actors involved in waste management in Kambu Sub-district, Kendari City, and 2) to analyze a waste management program to overcome problems that occur in the sustainable management of waste in Kambu Sub-district, Kendari City.

Methods

Study Area

This study was conducted in Kambu Sub-district, Kambu District, Kendari City, from July to December 2021. This location was chosen because of serious problems related to waste management, such as poor infrastructure, low public awareness, and weaknesses in waste management policies and implementation, as shown in Figure 1. The research location has experienced significant population growth and urbanization. This adds to the challenges of waste management and provides a relevant context for conducting research.

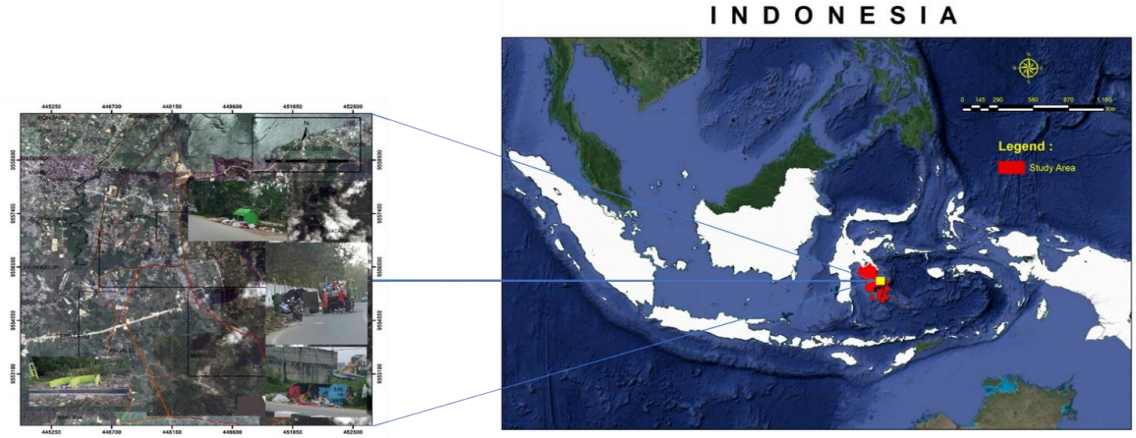

Figure 1. Study area.

Data Collection

Primary and secondary data were used in this study. Primary data were obtained by conducting interviews and focus group discussions (FGD) with as many as seven respondents. According to Hora [46], the limit of expert expertise in system analysis with high precision ranges from three to seven experts. Secondary data, such as population, waste management data, and other general descriptions of the area, were obtained from the Central Bureau of Statistics Kendari City, Office of Hygiene and Parks in Kendari City, and the Office of the Mayor of Kendari.

Data Analysis

The analytical method is used with interpretative structural Modeling (ISM), which broadly includes three steps: 1) determining the important elements that must be studied in conducting research, 2) describing the selected elements into more detailed sub-elements, and 3) performing matrix processing and continuing with sub-element grouping based on driven power (DP) and dependence (D) value. Several stakeholders must be involved in a more iterative and systematic system model to solve complex waste generation problems. The ISM method was used in this study to develop an in-situ management structural model of the system [29,47]. The complexity of handling waste in a better manner than systematic steps using the ISM technique is because it is more adaptable and versatile. According to Table 1, the ISM analysis steps in this study can be summarized as follows:

Table 1. Transformation of contextual relations between sub-elements (SSIM) into mathematical relations (RM).

Forms of contextual relations between elements i and j (eij)	Forms of mathematical relationships between elements i and j (eij)
V	If eij = 1 and eij = 0
A	If eij = 0 and eij = 1
X	If eij = 1 and eij = 1
O	If eij = 0 and eij = 0

Source: Munawir et al. [48].

A structural interaction matrix, also known as a structural self interaction matrix (SSIM), organizes pairwise comparisons. Comparisons were made using symbols V, A, X, and O. If eij = 1 and eij = 0, symbols V, A, X, and O are used. If eij = 0 and eij = 0, symbols O and X are used. Sub-elements i and j have a contextual relationship when symbol 1 is present. However, when the symbol 0 is present, no such relationship exists.

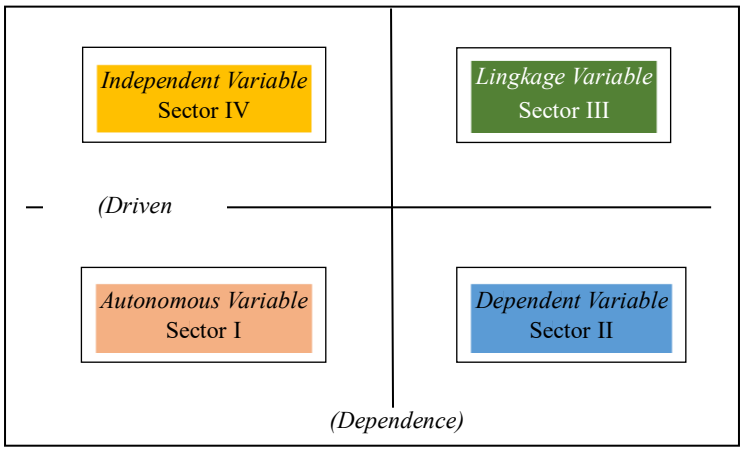

Figure 2. Influence and dependence between sub-elements.

Figure 2 shows the influence and dependence between the sub-elements in the four sectors. Sector 1 is a weak driver-weak dependent variable (autonomous). The sub-elements included in this sector are generally unrelated to the system and may have little relationship, even though the relationship can be strong. Sub-elements enter sector 1 if DP ≤ 0.5 X and D ≤ 0.5 X, where X is the number of sub-elements. Sector 2 is a weak driver-strongly dependent variable (dependent). In general, the sub-elements included in this sector are pendent sub-elements. Sub-elements enter sector 2 if DP ≤ 0.5 X and D > 0.5 X, where X is the number of sub-elements. Sector 3 is a strong driver-strong dependent variable (linkages). The sub-elements included in this

sector must be studied carefully, because the relationship between the elements is unstable. Every action on a sub-element will have an impact on the other sub-elements, and the feedback effect can increase this impact. Sub-elements enter sector 3 if DP > 0.5 X and D > 0.5 X, where X is the number of sub-elements. Sector 4 is a strong driver-weak dependent variable (independent). The sub-elements included in this sector are the remaining parts of the system and are called independent variables. Sub-elements enter sector 4 if DP > 0.5 X and D ≤ 0.5 X, where X is the number of sub-elements.

Results and Discussion

Thel Actor-Institution Elements

The elements chosen to conduct the analysis of sustainable waste management in Kambu Sub-district, Kendari City, played a dominant role in determining the success of waste management. Of the nine elements developed by Saxena et al. [49], based on the results of discussions with experts, two elements that have a dominant influence were selected: 1) the actor or institution element that is most related to sustainable waste management and 2) the objectives of the Sustainable Waste Management Program. Based on the FGD conducted together with respondents from related parties, especially those who best understand the research area (experts) and research surveys in the field, the elements of actors or institutions involved in improving sustainable waste management in Kambu Sub-district, Kendari City, can be classified into seven sub-elements: the Hygiene and Parks Office (A1), NGOs/community institutions (A2), village governments (A3), district governments (A4), state/private universities (A5), regional environment agency (A6), and regional revenue services (A7). Management institutions, users, and institutions related to sustainable waste management in Kambu Sub-district, Kendari City are very important, and this is related to the authority for sustainable waste management. The management and utilization of waste in the Kambu Sub-district are very important, where the elements of the institution become a common reference for all actors and institutions that play a role in the sustainable use and management of waste. The results of the SSIM analysis of the objective sub-elements are presented in Table 2.

Table 2. SSIM institutional actors.

Sub-element	A1	A2	A3	A4	A5	A6	A7
A1		V	X	V	V	X	V
A2			X	X	V	X	V
A3				X	V	X	V
A4					X	X	V
A5						V	V
A6							V
A7							

The results of the analysis of seven sub-elements of actors or institutions that are closely related and must be involved in waste management in Kambu District, Kendari City, show that the key sub-element (independence) of the actor or institutional element involved in sustainable waste management is the City Sanitation and Parks Office Kendari (A1) and the village government (A3). This indicates that sustainable waste management efforts cannot be separated from the role of the Sanitation and Parks Office, especially the support from the local government, namely the Village Government, because it has a very strong role in handling municipal waste, meaning that this sub-element has the power (the ability to manage waste) to influence other sub-elements.

Table 3. Reachability matrix (RM), driven power (DP), and dependency (D) rate determination of institutional actors related to waste management.

Sub-element	A1	A2	A3	A4	A5	A6	A7	DP	Ranking
A1	1	1	1	1	1	1	1	7	1
A2	0	1	1	1	1	1	1	6	2
A3	1	1	1	1	1	1	1	7	1
A4	0	1	1	1	1	1	1	6	2
A5	0	0	0	1	1	1	1	4	3
A6	0	0	0	0	0	1	1	2	4
A7	0	0	0	0	0	0	1	2	4
D	2	4	4	5	5	6	7		
Ranking	4	3	3	2	2	1	1		

In Table 3, on the day of the determination of the dependency rate, the sub-element of the Regional Revenue Service (A7) is ranked 1st, so that the sub-element of the Regional Revenue Service (A7) is the most easily influenced sub-element of the institutional actor. Meanwhile, the sub-element of the Department of Hygiene and Parks (A1) has the lowest dependency rate, indicating that the sub-element of the institutional actor is least easily influenced by the sub-elements of other goals. As shown in Figure 3, DP and D are related to the actors or institutions involved in waste management.

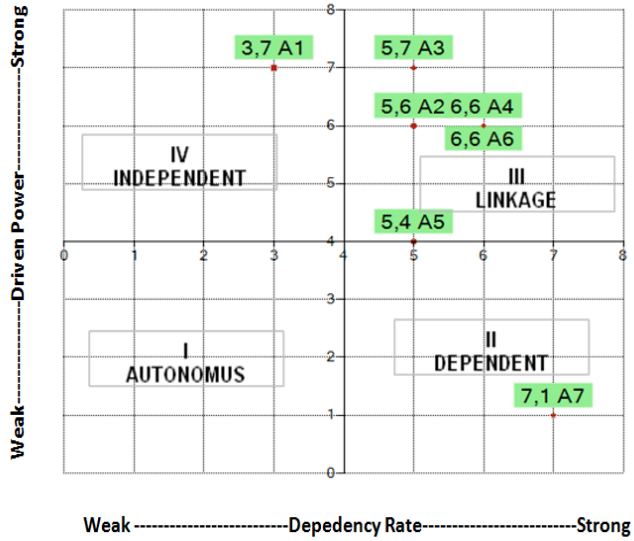

Figure 3. Driven power (DP) and dependency (D) rates of institutional actors.

The key sub-elements as presented in Figure 3 above show that the key sub-element is the Department of Hygiene (Health) and Parks (A1) meaning that these key sub-elements have a high role and low dependency. In other words, the key sub-elements play a very important role in the utilization and management of waste and are not influenced by other objective sub-elements. Figure 3 shows hierarchically (levels) the relationship between DP, D, and the elements of institutional actors related to waste management.

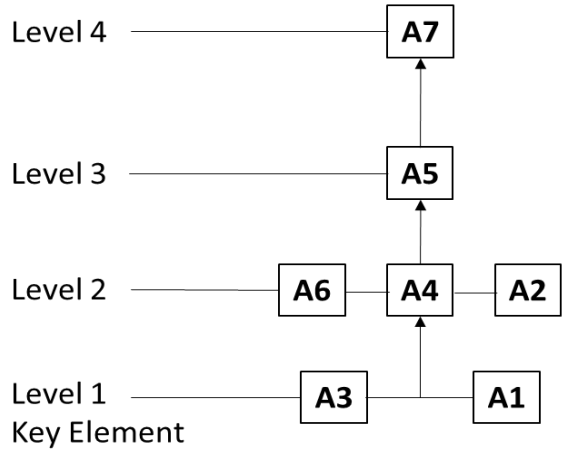

Figure 4. Key elements of institutional actors.

The seven sub-elements were grouped into four levels based on the DP and D values. In Figure 4, it can be seen that the A1 sub-element/actor (Department of Hygiene and Parks) and the A3-agent/actor sub-element (village government) are key sub-elements or are at level 1 in sustainable waste management. The sub-elements of institutions/actors A2 (NGOs/community institutions), A6 (regional environmental agency), and A4 (sub-district government) are at level 2, which means they have an important role in sustainable waste management but do not have a strong influence in determining the success of sustainable waste

management because it still depends on the highest level, meaning that the highest sub-element from level one has a strong influence on lower levels. While the sub-elements of institutions/actors A5 are at level 3 and the sub-elements of institutional actors are at level four, this shows that the sub-elements of higher educational institutions and the regional revenue office have little influence in determining the sustainability of sustainable waste management.

The results of the above analysis are in line with several opinions, including [49,50], which state the effectiveness of focusing on the goals of an organization or institution in providing services, one measure of which is the level of management. So, if the level of waste management is as expected, for the results of waste management, it means that the waste management is running effectively. By looking at the results of the performance of waste management in Kambu District, Kendari City, most of which are still not good, showing that the performance results do not fully meet expectations, the role of the Kendari City Environment and Forestry Service is needed to provide more waste management roles and support institutional sub-elements/other actors to support sustainable waste management in Kambu District, Kendari City. In line with this, to achieve the success of a sustainable waste management policy program, it is necessary to have integrated coordination between stakeholders and related Regional Government Work Units/*Satuan Kerja Perangkat Daerah* (SKPD) [36,50,51].

Based on the results of the above analysis, the level of waste management is expected with respect to the results of waste management, which means that waste management is running effectively. The results of the performance of waste management in Kambu Sub-district, Kendari City, most of which are still not good, show that the performance results are not fully in line with expectations, so the role of the Kendari City Sanitation and Parks Office is needed to provide more role to waste management and support the sub-elements of institutional actors, while others are moving to support sustainable waste management in Kambu Sub-district, Kendari City. In line with this, to achieve the success of a sustainable waste management policy program, it is necessary to have integrated coordination between stakeholders and related Regional Government Work Units.

Elements of Sustainable Waste Management Program Objectives

The results of discussions with related parties and researchers from one university in accordance with expertise in waste management, especially those who best understand the research area (experts) and surveys in the field, and the objective elements of a sustainable waste management program in Kambu Sub-district, Kendari City, can be broken down into eight sub-elements: increasing environmental hygiene programs (G1), increasing community involvement (G2), reducing total waste volume (G3), reusing waste (G4), recycling waste (G5), improving and maintaining facilities and infrastructure (G6), supervision of waste management (G7), and increasing people's income (G8). The purpose of the sustainable waste management program in Kambu Sub-district, Kendari City, is very important, as this goal becomes a common reference for all institutional actors that play a role in the sustainable waste management of city trashes. The results of the SSIM analysis of the sub-element objectives of the waste management programme are presented in Table 4.

Table 4. SSIM waste management program objectives.

Sub-element	G1	G2	G3	G4	G5	G6	G7	G8
G1		V	V	V	V	X	V	V
G2			X	X	X	X	V	X
G3				X	X	V	V	X
G4					X	V	V	A
G5						V	V	X
G6							X	V
G7								O
G8								

The SSIM is an aggregate value from the assessment of experts based on the FGD results of several selected respondents who understand the importance of sustainable waste management in Kambu Sub-district, Kendari City. The aggregate value was then calculated using the RM to convert the V-A-X-O value into a numerical value (number 1 or 0). The results of converting the V-A-X-O values into the RM table of the objective sub-elements are presented in Table 5. In Table 5, the goal of sustainable waste management in the improvement of the environmental cleanliness program (G1) is the program goal with the highest level of driving power in efforts to manage sustainable waste in Kambu District, Kendari City. The sub-elements of waste recycling (G5), reducing the total volume of waste (G3), increasing community involvement (G2) in the

RM, and determining driving power and dependency rate are ranked second, which means that the three sub-elements still have a strong influence in determining sustainable waste management plans but can still be influenced by the interaction of other sub-elements in sustainable waste management. The results of the dependency rate analysis in Table 5 show that the sub-element objectives of sustainable waste management–improving and maintaining facilities and infrastructure (G6), supervising waste management (G7), and increasing community involvement (G2)–are actors and institutions that are easily influenced by sustainable waste management plans.

Table 5. Reachability matrix (RM), driven power (DP), and dependency (D) rate determination of sustainable waste management programs.

Sub-element	G1	G2	G3	G4	G5	G6	G7	G8	DP	Ranking
G1	1	1	1	1	1	1	1	1	8	1
G2	0	1	1	1	1	1	1	1	7	2
G3	0	1	1	1	1	1	1	1	7	2
G4	0	1	1	1	1	1	1	0	6	3
G5	0	1	1	1	1	1	1	1	7	2
G6	1	1	0	0	0	1	1	1	5	4
G7	0	0	0	0	0	1	1	0	2	5
G8	0	1	1	1	1	0	0	1	5	4
D	7	7	6	6	6	7	7	6		
Ranking	3	1	2	2	2	1	1	2		

Based on the results of the analysis of the program objectives, the results show that the sub-element in sector four (Independent) is a sub-element of the goal of the environmental hygiene improvement program (G1), which means that the sub-element has a strong driving force, indicating that the sub-element of the goal has great power to move other sub-elements. In addition, based on DP and D values, the sub-element objectives of sustainable waste management programs are increasing community involvement (G2), recycling waste (G5), reusing waste (G4), increasing community income (G8), and improving and maintaining facilities and infrastructure (G6) in sector three (linkage). This means that these sub-elements also have a strong driving force for sustainable waste management, but their interactions can still affect the success of the program in sustainable waste management efforts.

Based on the DP matrix and the dependent variable, the key sub-elements for sustainable waste management objectives in the improvement of environmental hygiene programs (G1 sub-elements) were in quadrant IV (independent). These key sub-elements have a high role and low dependency. In other words, the key sub-elements play a very important role in the utilization and management of waste and are not influenced by other objective sub-elements. The iteration results and matrix analysis of the DP and D sub-element objectives are shown in Figure 5.

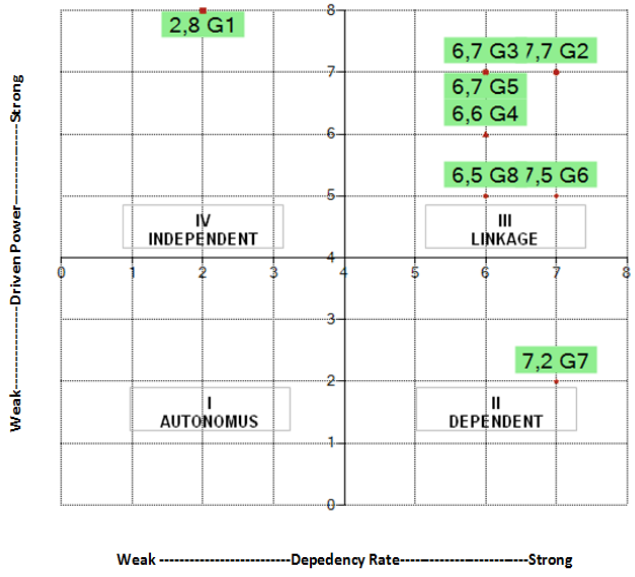

Figure 5. Driven power (DP) waste management program objectives.

The sub-elements, based on the DP and D relationships of the objective elements related to sustainable waste management, are presented in Figure 6. The seven sub-elements were grouped into five levels based on the DP and D values. Figure 5 shows that the sub-element of the G1 program goal (improvement of environmental hygiene programs) is a key sub-element or is at level 1 in sustainable waste management. The sub-element objectives of increasing community involvement (G2), reducing the volume of waste (G3), and recycling waste (G5) are at level 2, which means that they play an important role in sustainable waste management. Therefore, real program objectives are needed from key elements to move elements at the second level (2). This can determine the success of sustainable waste management because it still depends on the highest level, meaning that the highest sub-element from level one has a strong influence on lower levels. Meanwhile, the sub-element of the goal of reusing waste (G4) is at level 3, meaning that this sub-element plays an important role and is strongly influenced by important elements and the second-level sub-element in determining the sustainability of waste management.

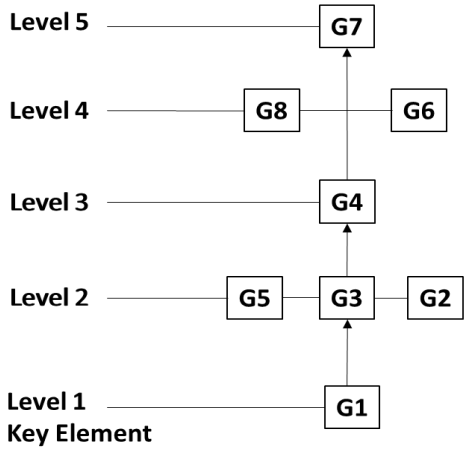

Figure 6. Key elements of institutional program objectives.

The sub-element objectives at the fourth level were increasing community income (G8) and improving and maintaining facilities and infrastructure (G6). waste management by prioritizing the success of the structure of the key elements, the second level sub-elements and the third level sub-elements to ensure the success of the sustainable waste management program objectives, and finally the fifth level sub-element objectives, namely the sub-element objectives of waste management supervision (G7) which means that the sub-element is not a priority in implementing the program objectives because it does not have an influence in determining the sustainability of sustainable waste management. The results of the sustainable waste management analysis using the ISM method are presented in Table 6.

Table 6. Summary of the analysis results for sustainable waste management.

Hierarchy (levels)	Institutional actors	Waste management program objectives
I	- Department of Environment and Forestry - NGOs/Community Institutions	- Improvement of Environmental Cleanliness Program
II	- Municipal government - District government	- Increased community engagement - Reduction in the amount of waste volume - Recycle - Waste reuse - Increasing community income - Improving and maintaining facilities and infrastructure
III	- Universities/Private	- Waste reuse
IV	- Regional Revenue Service/*Dinas Pendapatan Daerah* (Dispenda)	- Improving and maintaining facilities and infrastructure - Increasing community income
V		- Supervision of waste management

The results of the analysis of the sub-elements of the institutional actors involved and the implementation of program objectives at level 1 show that the collaborative role of the Environmental Service and Community Institutions is the driving force because they play a decisive role in the sustainability of waste management so that they can realize the goal of improving environmental hygiene programs. The institutional actor sub-elements involved and the objectives of the sustainable waste management program at levels 2, 3, 4, and 5 are highly dependent on and influenced by inter-agency cooperation and the implementation of program objectives at level 1 because the relationship is very strong in determining the success of sustainable waste management. According to Kapucu et al. [52], government waste management policies have paid little attention to the environmental aspects and local potential (local wisdom) of the community. Even though community support is needed, both goodwill and political will are needed [53–55]. This statement is consistent with the findings of Garni et al. [56], Sherman and Ford [57], and UNEP [58], that the involvement of all stakeholders in the development and strengthening of local institutions is key to success.

Conclusion

From the results of the research and discussion related to the analysis of sustainability of waste management in Kambu Sub-district, Kendari City, the conclusions drawn from waste management in Kambu Sub-district based on the aspect of the institution or actor involved require a big role from the Kendari City Sanitation and Parks Office as a key element to support other actors or institutions to ensure the sustainability of waste management. The purpose of the waste management program in Kambu Sub-district must be oriented to key elements by implementing an improvement in environmental hygiene programs so that they can move to other elements of the program objectives to ensure the sustainability of waste management in Kendari City. The ideal waste management in Kambu Sub-district, Kendari City, involves all elements of stakeholders to improve environmental hygiene programs.

Author Contributions

AM: Conceptualization, Methodology; **ER**: Investigation, Writing; **SUNM**: Conceptualization, Writing; **Y**: Investigation, Writing; **FA**: Review & Editing; **MI**: Investigation, Data Analysis.

Conflicts of Interest

There are no conflicts to declare.

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