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Policy of Waste Management for Supports Environmental Cleanliness and Implementation of a Green Economy in Jember Regency

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Abstract This study aims to analyse municipal (city) waste as a complex problem in Jember Regency. One of the factors is the increasing population, economic and business activities and the dynamics of people's lives. Jember Regency has issues regarding ineffective waste management. Every year, the Jember Regency government allocates funds for major waste problems. The Sanitation Department, the leading institution in controlling waste management in Jember Regency, is not running well, resulting in the ineffectiveness of waste management in the Jember Regency. The results of this study explain that the hierarchical structure shows the effects that the purpose of waste management planning, namely waste management operations, gets the highest score of 0.866. The hierarchical structure of Level II shows that the second planning instrument, namely: the container system, the temporary shelter system and the transportation system, gets the highest score of 0.781. Hierarchy III is an indicator of planning objectives. Group II indicators consist of (i). Trash/Plastic Waste and Waste Containers, (ii). Based on Garbage Depots and Regional Functions, and (iii). Garbage Trucks and Garbage Carts/Motorcycles also get the highest score of 0.714. The fourth hierarchical structure, namely the formulation of public policies, explains that the first policy level is Regulation and Institutional Waste Management, with a score of 0,453. The second level policy is the Waste Management System and Mechanism, with the highest score of 0.792. The third level policy is a policy that optimises Community Incentives and Participation with a score of 0.655. So, the policy model that supports waste management in Jember Regency that can create a clean and healthy city is the Waste Management System and Mechanism, with the highest score of 0.792.

Keywords Public Policy Formulation and Municipal Waste

1. Introduction

Garbage is waste that arises from human activities. The economy and consumption culture influence the volume of garbage. High economic capacity will increase the consumption level so that it impacts the greater volume of waste produced. Unmanaged waste will potentially cause various environmental disturbances. The waste management policy in Jember Regency aims to improve public health and environmental quality and make waste as a resource.

Waste is unwanted residual material after the end of a production/consumption process, but the term waste is not known in the natural process. Natural methods are related to each other in a cycle, where the output of one function becomes the input of another process. Waste is material with no value for common or primary purposes in manufacturing. Waste management has been going on so far based on the insight that waste is not a resource and relies on the approach of disposing of waste at the location of the final waste disposal site. All waste generated from people's daily lives is disposed of in the last landfill, which puts heavy pressure on the landfill because it takes a long time for the waste to be decomposed by natural processes. Funds, energy, time and space are needed during the natural decomposition process. Therefore, waste management needs to be formulated and designed into a system and mechanism in the form of a waste management policy. Waste management with a new paradigm aims to reduce the volume of waste disposed of in landfills through development efforts to treat waste by reducing, reusing and recycling.

The new paradigm views waste as a resource with economic value, such as for energy, compost, fertiliser or industrial raw materials. Waste management with the new paradigm can be carried out through waste management activities that apply the 3R concept (reduce, reuse and recycle) and waste management that uses the idea of community empowerment (empowerment). Waste management includes activities to reduce, reuse, and recycle, while community empowerment (empowerment), namely: activities of waste sorting, collection,

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transportation, processing, and final processing.

Direct waste management is part of public policy at the local government level because waste is a general problem that requires resolution. The solution to waste management requires an appropriate and directed public policy. Regarding policy implementation, Webster (1990) in Wahab (2000) suggests: "Policy implementation is a process of implementing policy decisions usually in the form of Local Government Regulations." Furthermore, Mazmanian and Sabatier (1983) in Wahab (2000) stated: "Policy implementation is events and activities that occur after the ratification of policy guidelines which include efforts to administer them as well as to have real consequences/impacts on the community or society events". So what is necessary for implementing public policy is the form of actions or implementing a plan with its designation. There are 4 factors that influence the implementation of public policy, as Edward III (1980) described, namely communication, resources, dispositions or attitudes and bureaucratic structure.

The issuance of Law Number 18 of 2008 concerning Waste Management is a new milestone for urban waste management policies in Jember Regency, which directs urban waste management policies on the concept of zero waste by emphasising the importance of the community's role in waste management. The city's waste management is inseparable from local government public policies.

Regarding resources, especially funding sources, the Jember Regency Government applies waste retribution as a source of PAD (Regional Original Income) and a source of funding in implementing waste management services. The phenomenon related to this funding is the existence of 2 (two) garbage collections that the community must pay. First, levies are in the form of monthly waste fees managed by the local RW in waste management in the form of waste collection activities from residents' homes to TPS. Meanwhile, the second levy is in the form of garbage retribution (at the time of payment for PLN electricity) which cleaning company (PD Kebersihan) collects in waste management by transporting waste from garbage dumps (TPS) to landfills (TPA).

Regarding disposition, the Jember Regency Government must have an agreement among implementers to implement urban waste management policies. On the bureaucratic aspect, the Jember Regency Government places cleaning company (PD Kebersihan) as a Regional Owned Enterprise that manages the waste in Jember Regency. However, urban waste management carried out by cleaning company (PD Kebersihan) only focuses on waste management in terms of transporting waste from garbage dumps (TPS) to landfills (TPA). The Regional Regulation on Waste Management in Jember Regency has not referred to Article 5 and Article 6 of Law Number 18 of 2008 concerning Waste Management which mandates local governments to develop community participation in waste management. Waste management, especially municipal waste, is a severe problem for the governance of a city that adheres to the green city concept, such as the Jember Regency. Therefore, the issue focused on is how to formulate public policies that support waste management in the Jember Regency that support the realisation of a green city in the long term.

2. Research Methods

AHP (Analytical Hierarchy Process) Method

Analytical Hierarchy Process (AHP) is a functional hierarchy whose primary input is human perception. Through the order, a complex and unstructured problem can be solved into groups which are then organised into a hierarchical form (Permadi, 1992). The working principle of AHP is simplifying complex, unstructured, strategic, and dynamic problems into parts and arranged in a hierarchy. The importance of each variable is given a numerical value, subjectively about the significance of the variable and relative to other variables. After that, from various considerations, a synthesis is then carried out to determine the variables that have a high priority and play a role in influencing the results of the system (Marimin & Maghfiroh, 2010).

Furthermore, Marimin and Maghfiroh (2010) describe that graphically the AHP decision problem can be constructed as a hierarchical diagram. AHP begins with a goal or objective, then the first level criteria, sub-criteria and finally alternatives. There are various decision hierarchies adapted to the substance and problems that can only be solved with AHP. Through AHP, users can give the relative weight of multiple criteria or multiple alternatives to a criterion. The weights are given by performing pairwise comparisons. Next, the pairwise comparison is converted into a set of numbers representing each criterion's relative priority and alternative. AHP can solve multi-objective and multi-criteria problems based on comparing preferences of each element in the hierarchy. Thus, this is a comprehensive decision-making model (Suryadi et al, 1998). In addition, AHP also tests the consistency of the assessment if there is a deviation that is too far from the perfect consistency value, this indicates that the assessment needs to be improved or the hierarchy must be restructured (Marimin and Maghfiroh, 2010). The following are the advantages possessed by AHP, namely: AHP also tests the consistency of the assessment if there is a deviation that is too far from the perfect consistency value, this indicates that the assessment needs to be improved or the hierarchy must be restructured (Marimin and Maghfiroh, 2010). The following are the advantages possessed by AHP, namely: AHP also tests the consistency of the assessment if there is a deviation that is too far from the perfect consistency value, this indicates that the assessment needs to be improved or the hierarchy must be restructured (Marimin and Maghfiroh, 2010). The following are the advantages possessed by AHP, namely:

1. Unity: AHP provides a single, easy-to-understand, flexible model for various unstructured problems.
2. Complexity: AHP combines deductive reasoning and a systems-based approach to solving complex problems.
3. Interdependence: AHP can handle the interdependence of elements in a system and does not impose linear

thinking.

4. Hierarchical arrangement: AHP reflects the mind's natural tendency to sort system elements into different levels and similar group elements at each level.
5. Measurement: AHP provides a scale for measuring things and a method for setting priorities.
6. Consistency: AHP tracks the logical consistency of the considerations used to set priorities.
7. Synthesis: AHP leads to an overall estimate of the merits of each alternative.
8. Bargaining: AHP considers the relative priorities of various system factors and allows organisations to choose the best alternative based on their goals.
9. Assessment and consensus: AHP does not enforce consensus but synthesises an expected outcome from different assessments.
10. Iterative process: AHP allows organisations to refine their definition of an issue and improve their judgment and understanding through repetition.

The following are several processes that must be carried out in the analysis with AHP, namely as follows (Ma'arif and Tanjung, 2003):

1. System identification is carried out to determine the problems to be solved in the form of goals to be achieved, factors/criteria to be used, actors involved in the system and their objectives, and alternative strategies.
2. Hierarchy arrangement is done by abstracting the components in the system. This abstraction must be interrelated, composed of the main objectives down to the factors, then to the actors (actors), the goals of the actors, then the strategies and finally to give a decision.

Table 1. Scale for Comparison Matrix Filling in Pairs

Intensity of Importance	Definition	Explanation
1	Both elements are equally important	Two elements are equally strong in their nature
3	One element is slightly more important than the other elements.	Experience and judgment are a little more in favor of one element over another.
5	One element is very important compared to the other elements.	Experience and judgment strongly favor one element over another.
7	One element is clearly more important than the other elements.	One element strongly advocated and dominated has been seen in practice.
9	One element is absolutely more important than the other elements.	Evidence supporting one element has the highest degree of corroboration.
2,4,6,8	Values between two considerations	A compromise is needed between two considerations.
opposite	If element *i* gets a value compared to element *j*, then element *j* has a value of 1/a when compared to element *i*.	

3. The preparation of the individual opinion matrix for each criterion and alternative is done through pairwise comparisons. Each element of the system with other elements at each level of the hierarchy is compared in pairs to obtain the value of the importance of the elements quantitatively. The rating scale used to quantify the qualitative opinion is shown in Table 1.
4. The comparison values that have been carried out must be obtained with a level of consistency with CR 10%.
5. Compilation of the combined opinion matrix, then vertical processing is carried out to determine the system priority vector.

3. Empirical Result

1. Public Policy Formulation of Waste Management in Jember Regency

The policy-making process is choosing an alternative strategy, in this case, a strategy to support waste management that can realise a clean and healthy Jember Regency. Every policy maker, in this case, the related Cleanliness and Parks/DKP officials, is often faced with the complexity in determining development policies. This results in many considerations and alternatives in decision-making. Many considerations in determining policy arise in the decision-making process with many complex alternatives. Meanwhile, the alternative policies that must be taken are not only one or two but include a series of policies, so it is difficult to determine priorities. Sometimes, the policies taken when linked to each other are less consistent. Within this framework, The method used in formulating policies that support Municipal Waste Management in Jember Regency is the Analytic Hierarchy Process (AHP) method.

AHP is a decision-making method using the leading equipment, namely a hierarchy. With this hierarchy, a complex and unstructured problem is broken down, grouped and organised into a hierarchical form (Jamli and Joesoef, 1999:17). The main data from this AHP is the perception of humans who are considered experts. The criteria from the expert here do not mean genius, smart or have a doctorate or professor, but rather lead to people who better understand the problems related to Municipal Waste Management in Jember Regency. Besides that, AHP is a flexible model that provides ideas and defines problems by making assumptions and obtaining the desired solution from them. This process also allows people to test the sensitivity of the results to changes in information. It is designed to accommodate human nature rather than force us into ways of thinking that may be contrary to our conscience. AHP is an appropriate process for tackling various complex political and socio-economic problems (Saaty, 1991:23). This process also allows people to test the sensitivity of the results to changes in information. It is designed to accommodate human nature rather than force us into ways of thinking that may be contrary to conscience. AHP is an appropriate process for tackling

various complex political and socio-economic problems (Saaty, 1991:23). This process also allows people to test the sensitivity of the results to changes in information. It is designed to accommodate human nature rather than force us into ways of thinking that may be contrary to conscience. AHP is an appropriate process for tackling various complex political and socio-economic problems (Saaty, 1991:23).

AHP is also a theory of measurement to find the ratio scale of discrete and continuous pair comparisons. These comparisons can be taken from actual measures or a basic scale that reflects the strength of feelings and relative preferences. AHP is concerned about deviations from consistency, measurement and dependability within and between groups of structural elements. AHP is often found in decision-making for many criteria, planning, prediction and resource allocation so AHP can be called a versatile method and many consider it controversial (Mulyono, 1989: 2). Thus, AHP can be considered as a model of multiobjective-multicriteria-multifactor decisions (Harker and Vargas, 1987:1383).

Saaty (1991:30) mentioned two kinds of hierarchies; structural hierarchy and functional hierarchies. Structural hierarchical pattern, a complex system, is arranged into main components in descending order based on the nature of their structure. According to Ramadhan (1998), the AHP application can be divided into two stages, namely: the hierarchical preparation stage and the hierarchical evaluation. Hierarchical arrangement, commonly known as decomposition, includes 3 (three) most related and sequential processes, namely: (1) identification of levels and elements, (2) definition of concepts and (3) formulation of questions. The first step is to identify the levels and elements within a level; then these elements are defined and used in the question formula. At the hierarchy evaluation stage, there are two things to do: assessment and synthesis of results. Assessment means the decision maker translates a pair of elements. The perception or assessment is stated on a scale of 1 to 9, and this result will form a pairwise comparison matrix. After all the matrix is filled, the priority of each element in one level is searched by finding its eigenvector which is known as local priority. The next step is priority synthesis by multiplying local priorities with elements at the level above. This matrix will produce a global priority which states the priority of each element at the previous level. The AHP model does not require strict conditions, but at the end it is still checked to see if the inconsistencies that have occurred are minimized.

The policy formulation to support Municipal Waste Management in Jember Regency is based on several empirical facts, including: (1). The findings in the field, (2). Empirical data related to the volume of waste, the number of waste transportation means, waste collection methods, supporting facilities and infrastructure and so on (3). The results of the workshop of the Jember Regency Cleanliness and Gardening Service at the Mayor's Office and (4). City Waste Management Discussion Group/FGD Forum. The first step in formulating policy formulations is the preparation of a hierarchy that must be carried out in a structured manner.

The hierarchical structure and appropriate and correct policy formulation to support Waste Management in Jember Regency are as follows:

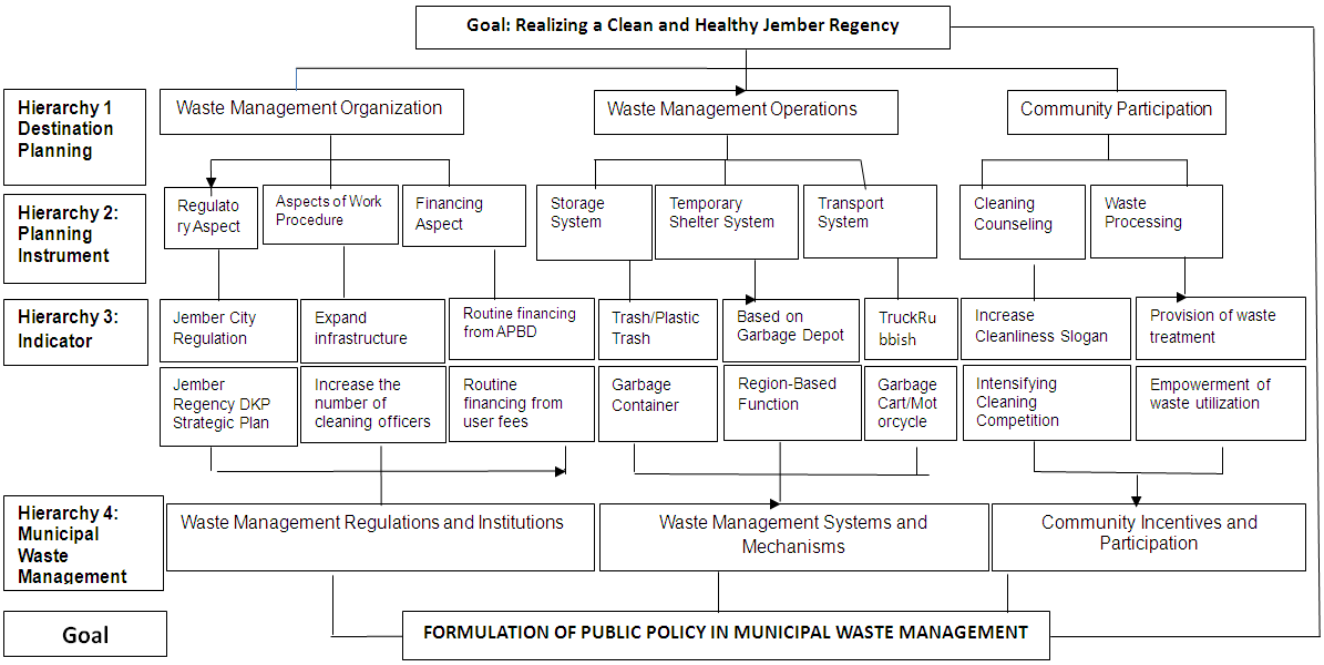

Figure 1. Structure of Municipal Waste Management AHP

Description of the diagram:

Goals: Realising a clean and healthy Jember Regency by Develop Public Policy Formulation that supports Municipal Waste Management.

Hierarchy Level 1: Objectives of Municipal Waste Management Planning in Jember

1. Municipal Waste Management Organization: The purpose of waste management planning that focuses on the organizations/institutions that are responsible for the problem of municipal waste.
2. Operational Waste Management: The purpose of waste management planning that focuses on operationalization at the field level related to city waste problems.
3. Community Participation: The purpose of waste management planning that focuses on community participation in solving municipal waste problems.

Hierarchy Level II: Waste Management Planning Instrument

1.a. Regulatory Aspect: Part of the waste management planning instrument that is based on the rule of law and the strategic plan of the Jember Regency Sanitation Service.

1.b. Aspects of Work Management: Part of the waste management planning instrument that is based on the work management aspects of the agency responsible for managing municipal waste in Jember namely the Sanitation Department.

1.c. Financing Aspect: Part of the planning instrument that is based on the aspect of financing sources on municipal waste management in Jember Regency.

2.a. Storage System: Part of a planning instrument that is based on a model system of storage in municipal solid waste management in Jember.

2.b. Temporary Shelter System: Part of a planning instrument that is based on a model system of temporary shelter in municipal solid waste management in Jember.

2.c. Transportation System: Part of the planning instrument that is based on the city waste transportation model system in Jember.

3.a. Hygiene Counseling: Part of a planning instrument that is based on community participation by increasing hygiene education and slogans in residential areas and offices throughout Jember Regency.

3.b. Waste Processing: Part of a planning instrument that is based on community participation by increasing and intensifying the processing of waste waste into goods/products that have economic value throughout Jember Regency.

Hierarchy Level III: Indicators of Waste Management Planning Instruments

1.a. Regulatory Aspects:

(i). Regional Regulation of Jember Regency: Indicators of regulatory aspects in the form of regulations related to municipal waste management in Jember.

(ii). Renstra DKP Jember Regency: Indicators from regulatory aspects in the form of work program plans within a certain period of time.

1.b. Aspects of Work Procedure:

(i). Expanding infrastructure: Indicators from aspects of work management in the form of supporting facilities and infrastructure for municipal solid waste management Jember.

(ii). Increasing the number of janitors: Indicators from the aspect of work management in the form of janitors in each area for municipal waste management in Jember.

1.c. Financing Aspect:

(i). Routine financing from the APBD: Indicators from the financing aspect aimed at legalization related to the source of funds for the management of municipal solid waste in Jember.

(ii). Routine financing of user fees: An indicator of the financing aspect that aims to regulate waste fees as a source of funds for municipal waste management in Jember.

2.a. Aspects of the Container System

(i). Trash or plastic waste: An indicator of the aspect of the container system in the form of trash cans or plastic as a medium for municipal waste management in Jember Regency.

(ii). Waste Containers: Indicators from the aspect of the container system in the form of garbage containers as a supporting facility for municipal waste management in Jember Regency.

2.b. Temporary Shelter System

(i). Garbage Depot-Based: Indicator of a temporary storage system based on a waste depot for municipal solid waste management in Jember.

(ii). Based on Regional Functions: Indicators of a temporary storage system based on regional functions for municipal waste management in Jember Regency.

2.c. Transport System

(i). Garbage trucks: Indicators of the waste transportation system in the form of garbage trucks for municipal waste management in Jember Regency.

(ii). Garbage carts/motorcycles: Indicators of the waste transportation system in the form of garbage carts/field motorbikes for municipal waste management in Jember Regency.

3.a. Cleaning Counseling

(i). Increase hygiene slogans: Indicators of hygiene education in the form of slogans, posters or advertisements to support the resolution of the waste problem.

(ii). Intensifying Cleaning Competitions: Indicators of hygiene counseling in the form of hygiene competitions to support the resolution of municipal waste problems.

3.b. Waste Processing

(i). Provision of Waste Waste Treatment Incentives: Indicators of waste processing in the form of providing

incentives for those who carry out municipal waste management in Jember Regency.

(ii). Community empowerment based on waste utilization: Indicators of waste processing in the form of community empowerment by processing waste products for municipal waste management in Jember Regency.

Hierarchy Level IV: Public Policy Formulation of Municipal Waste Management in Jember Regency.

Priority Scale of Public Policy Formulation that supports Waste Management so as to realize a clean and healthy Jember Regency:

1. Waste Management Regulations and Institutions.
2. Waste Management Systems and Mechanisms.
3. Community Incentives and Participation.

2. Analytic Hierarchy Process Analysis Results (AHP)

The application of the Analytic Hierarchy Process (AHP) model is different from survey research methods in general. The process of adopting opinions from respondents in AHP does not require a certain minimum number of respondents to represent a perception of the problem, but AHP only requires respondents who are competent and have comprehensive knowledge of the issues raised and significantly influence decision making.

There are 60 questionnaires distributed. Input related data about design Policy formulations that support waste management efforts that can realize Jember Regency to be Clean and Healthy are divided into three groups. The first group came from the Sanitation Department along with the staff and ranks of janitors from the aspect of the Municipal Waste Management System and Mechanism in Jember Regency. The second group from the community consists of community leaders, Family Welfare Empowerment (PKK) leaders and management at the RW/Kelurahan level, owners and the community who treat waste. The third group is those who belong to the Management Organization group which consists of the Head of Development Planning Agency at Sub-National Level (Bappeda) of Jember Regency, the Chair of the Regional People's Representative Assembly (DPRD) and the Chair of the Commission, the Head of the Dispenda and staff. The third group as an institution that is responsible as a regulator in the organization of municipal waste management in Jember Regency.

Table 2. Results of the Perception Hierarchy Regarding Public Policy Formulation that Supports Municipal Waste Management in Jember Regency

Policy Formulation on Municipal Waste Management	Cleaning Officer	Ex. Pem. Area	Community Ex.	NGO group/ Figure	Whole Group Final Synthesis
Hierarchy Level I: Planning Goals					
1. Waste Management Organization	0.150	0.053	0.068	0.108	0.667
2. Waste Management Operations	0.825	0.769	0.595	0.889	0.866
3. Community Participation	0.686	0.668	0.238	0.703	0.770
Hierarchy Level II: Planning Instruments					
1. Regulatory Aspects, Work Procedures and Financing Aspects	0.263	0.467	0.213	0.319	0.372
2. Container System, Temporary Shelter System and Transportation System	0.747	0.866	0.444	0.548	0.781
3. Counseling on Hygiene and Waste Processing	0.690	0.857	0.333	0.533	0.747
Hierarchy III: Indicators of Planning Goals					
1.a Regional Regulation of the City of Jember Regency and the Strategic Plan of the DK 1.b. Increase infrastructure and cleaning staff 1.c Routine financing from APBD and from user fees	0.209	0.319	0.226	0.442	0.466
2.a Plastic Trash and Trash Containers 2.b. Based on Garbage Depots and based on Regional Functions 2.c. Garbage Trucks and Garbage Carts/Motorcycles	0.720	0.551	0.873	0.655	0.714
3.a Increase Hygiene Slogans and Intensify Cleaning Competitions 3.b. Provision of incentives for waste treatment and empowerment of waste utilization	0.571	0.460	0.702	0.503	0.651
Hierarchy IV: Policy Formulation on Municipal Waste Management					
1. Waste Management Regulations and Institutions	0.441	0.228	0.369	0.316	0.453
2. Waste Management Systems and Mechanisms	0.726	0.618	0.791	0.618	0.792
3. Community Incentives and Participation	0.696	0.697	0.741	0.566	0.655
Inconsistency Index	0.746	0.7343	0.6809	0.0519	0.8662

Source: Calculated From Field Survey

Based on complex data and field conditions, a hierarchy is drawn up that sorts out the aspects in determining thepriority scale of policy formulations that support municipal waste management efforts that can realize Jember Regency to be Clean and Healthy. The hierarchies that were compiled were then responded to by the respondents so as to produce qualitative data that was quantified. The questionnaire obtained was used as a pairwise comparison matrix for each group of respondents. The results of the synthesis of each respondent are recapitulated and then geometrically averaged to determine the global priority of each of the criteria and alternatives to be sought. Respondents' perceptions were calculated using pairwise comparison so that the weight of each respondent's priority value could be known. The results of these calculations are geometrically averaged so that the total weight of each criterion and alternative priority to be studied is known.

Hierarchy IV structure is the lowest level hierarchy which is a Public Policy Formulation that supports Municipal Waste Management in Jember Regency as a policy model that is assessed based on the factors at the level above. In the end, the comparison question (pairwase comparison) will lead to determining the order of the most decisive factors in the implementation of policy formulations that support Municipal Waste Management in Jember Regency. Furthermore, they are compared according to the order of priority for level one and level two and their relationship to each other in order to obtain a priority order of policy formulations that support the efforts of City Waste Management in Jember Regency.

The calculation results obtained can be translated at each level of the hierarchy. Each number indicates the priority of several proposed options. Level one describes the assumption of planning objectives in the municipal solid waste management system as the determining factors that influence the formulation of policies that support Municipal Waste Management in Jember Regency.

The final synthesis on the hierarchical structure level I which is the purpose of planning the municipal solid waste management system in Jember Regency. The final result of the synthesis of the hierarchical structure I can be seen in the table below.

Table 3. Synthesis Results of Planning Objectives in the Formulation of Public Policy that Supports Municipal Solid Waste Management in Jember Regency

No	Planning Purpose	Weight	Priority
1	Waste Management Organization	0.667	3
2	Waste Management Operations	0.866	1
3	Community Participation	0.770	2

Source: Calculated From Field Survey

The results of data analysis based on perceptions from both groups of cleaners, local government groups, community groups as well as groups of leaders and NGOs show that*first*, the municipal waste management organization got a score of 0.667. Second, waste management operations got a score of 0.866. Third, community participation got a score of 0.667. The final result shows that there is a ranking of scores ranging from large to small, which means that waste management operations are ranked I (first). This shows that the planning objectives based on the operational factors of waste management are believed by respondents to groups of cleaners, local government groups, community groups as well as groups of leaders and NGOs to be the most dominant factor for a policy formulation that supports municipal waste management in Jember Regency.

The final synthesis on the level II hierarchical structure is an indicator of the purpose of planning a policy that supports municipal waste management that can create a clean and healthy Jember Regency. The final results of the synthesis of hierarchical structure II can be seen in the table below.

Table 4. Results of Synthesis of Instruments from Planning Objectives in the Formulation of Public Policy Formulations that Support Municipal Waste Management in Jember Regency

No	Planning Instrument	Weight	Priority
1	Regulatory Aspects, Work Procedures and Financing Aspects	0.372	3
2	Container System, Temporary Shelter System and Transportation System	0.781	1
3	Counseling on Hygiene and Waste Processing	0.747	2

Source: Calculated From Field Survey

Based on the existing scores, it can be concluded that the policy formulation planning instrument that supports Municipal Waste Management in Jember Regency, namely: First, Regulatory Aspects, Work Procedures and Financing a score of 0.372; Second, the Container System, Temporary Shelter System and Transportation System scored 0.781; Third, the planning instrument that focuses on Hygiene Counseling and Waste Processing has a score of 0.747. Based on the ranking of the scores above, it is explained that the planning instrument consisting of Regulatory Aspects, Work Procedures and Financing has a score of 0.372. The planning instrument is a determining factor for the success of the policy formulation that supports Municipal Waste Management in Jember Regency.

The final synthesis on the hierarchical structure level III is an indicator of the planning objectives of the policy formulation that supports Municipal Waste Management in Jember Regency. The final result of the synthesis of hierarchical structure III can be seen in the table below.

The third hierarchy is an indicator of planning objectives from policy formulations that support waste management in Jember Regency. The indicators used to determine planning objectives consist of 3, namely: group I, consisting of (i). Jember Regency Regional Regulation and the Sanitation Office's strategic plan, (ii). Increase infrastructure and cleaning staff and (iii). Routine financing from APBD and from user fees, Group II, consists of (i). Trash/Plastic Trash and Waste Containers, (ii). Based on Garbage Depots and based on Regional Functions and (iii). Garbage Trucks and Garbage Carts/Motorcycles and group III, consisting of (i).

Increasing the Hygiene Slogan and Intensifying the Cleaning Competition and (ii). Providing incentives for waste treatment and empowering the use of waste.

Table 5. Synthesis Results of Planning Objectives Indicators in the Formulation of Public Policies that Support Municipal Solid Waste Management in Jember Regency

No	Planning Objective Indicator	Weight	Priority
1	- Jember Regency Regional Regulation and the Sanitation Department's Strategic Plan - Increase infrastructure and cleaning staff - Routine financing from APBD and from user fees	0.466	3
2	- Trash Cans/Plastic Trash and Trash Containers - Based on Garbage Depots and based on Regional Functions - Garbage Trucks and Garbage Carts/Motorcycles	0.714	1
3	- Increase the Hygiene Slogan and Intensify the Cleaning Competition - Provision of incentives for waste treatment and empowerment of waste utilization	0.651	2

Source: Calculated From Field Survey

Based on the existing scores, it can be concluded that the indicators that need to be prioritized to support the formulation of policies that support waste management in Jember Regency are: First, Group II, consisting of (i). Trash/Plastic Waste and Waste Containers, (ii). Based on Garbage Depots and based on Regional Functions and (iii). Garbage Trucks and Garbage Carts/Motorcycles scored 0.466; Second, group I, consists of (i). Jember Regency Regional Regulation and the Sanitation Office's strategic plan, (ii). Increase infrastructure and cleaning staff and (iii). Routine financing from the APBD and from user fees got a score of 0.714; Third, group III, consists of (i). Expanding Hygiene Slogans and Intensifying Hygiene Contests and (ii). The provision of incentives for waste treatment and empowerment of waste utilization scored 0.466. Based on the ranking of the scores above, it is explained that the indicators consist of: (i). Trash/Plastic Trash and Waste Containers, (ii). Based on Garbage Depots and based on Regional Functions and (iii). Garbage Trucks and Garbage Carts/Motorcycles scored 0.466; is the main indicator needed for policies that support waste management in Jember Regency.

The final synthesis is on the level IV hierarchical structure which is the design of the policy formulation that supports waste management in Jember Regency. The final result of the synthesis of the IV hierarchical structure can be seen in the table below.

The synthesis of each level produces a priority order of formulations that support municipal waste management that can create a clean and healthy Jember Regency. There are 3 policy designs formulated to support waste management in Jember Regency based on 3 policy models, namely: Waste Management Regulations and Institutions, Waste Management Systems and Mechanisms and Community Incentives and Participation. Based on the existing values, the three policy models that support municipal waste management can create a clean and healthy Jember Regency with the following results: First, the first level policy is Waste Management Regulations and Institutions with a score of 0.453. The second level policy is the Waste Management System and Mechanism with the highest score of 0.792. The third level policy is a policy that optimizes Community Incentives and Participation with a score of 0.655.

Table 6. Formulation of Public Policies that Support Municipal Waste Management in Jember District

No	Education System Strategy Formulation	Weight	Priority
1	Waste Management Regulations and Institutions	0.453	3
2	Waste Management Systems and Mechanisms	0.792	1
3	Community Incentives and Participation	0.655	2

Source: Calculated From Field Survey

The Container System, Temporary Shelter System and Transportation System are substantial instruments from planning instruments that support supporting municipal waste management that can create a clean and healthy Jember Regency. The instruments of the storage system, temporary storage system and transportation system are related to the facts from the field results which explain that tFuture challenges in municipal solid waste management consist of four problems, namely (1). The increase in the amount of waste in urban areas is very fast/exponential in line with the rapid increase in population and is caused by unsustainable consumption and production patterns, (2). The public, namely the community, the business world and also the government, who have relatively low levels of awareness and knowledge in managing waste, (3). Problems where waste processing or disposal is not only limited but also creates social vulnerability and has an impact on environmental values and functions and (4). Management approach that tends to prioritize end of pipe (collect-transport-dispose).

Waste management is a systematic and continuous activity that includes waste reduction and handling (Ministry of Environment, 2007). Related to waste management in accordance with the regulations of the minister of the environment, the implementation of the policy formulation that supports municipal waste management in Jember Regency is Waste Management Systems and Mechanisms. The description of Waste Management Systems and Mechanisms includes, the following activities:

1. Waste reduction, namely activities to overcome the generation of waste from waste producers (households, markets, and others), reuse waste from the source and/or at the processing site, and recycle waste at the source and/or at the processing site. in reducing this waste are: a. Set waste reduction targets b. Developing

clean technology and product labeling c. Using production materials that can be recycled or reused d. Facilities for use or recycling activities e. Develop awareness of reuse or recycling programs.

2. Waste handling, namely a series of waste handling activities that include sorting (grouping and separating waste according to its type and nature), collection (moving waste from waste sources to TPS or integrated waste processing sites), transportation (activities to move waste from sources, TPS or processing sites). integrated waste, final product processing (changing the shape, composition, characteristics and amount of waste so that it is further processed, utilized or returned to nature and active processing of waste processing activities or residues resulting from previous processing so that they can be returned to environmental media.

Things that need to be considered in the implementation of waste management other than collection, transportation and disposal, including the provision of equipment used, management and administration implementation techniques. This is aimed at the successful implementation of waste management (Raharja, 1988). Management for waste management in developed countries is expressed by Tchobanoglous in Ananta (1989: 7), It is a combination of activities to control the amount of waste generated, collection, transfer, transportation, processing and landfilling of waste in a landfill that meets the principles of health, economy, engineering, conservation and environmental considerations that are also responsive to existing community conditions.

Ideal Urban Waste Management System

Integrated Waste Management is an effort to manage urban waste with the concept of developing a modern, reliable and efficient waste management system with environmentally friendly technology. The system must serve the entire population, improve public health standards and provide opportunities for the public and the private sector to actively participate. The approach used in the concept of this waste management plan is to improve the waste management system that can meet the demands of community participation -based waste management.

Aboejoewono (1999) stated that the need for urban waste management policies to be established in cities in Indonesia includes 5 (five) activities, namely:

1. Application of appropriate technology. The technology used to solve this waste problem is an effective combination which includes composting technology, plastic handling technology, recycled paper making technology, Integrated Waste Processing Technology towards "Zero Waste" must be an environmentally friendly technology. The technologies used in the advanced processes that are commonly used are:

(a). Combustion technology (Incinerator)
In this way, by-products are produced in the form of scrap metal and steam which can be converted into electrical energy. Other advantages of using this tool are: (a). can reduce the volume of waste ± 75%-80% from the source of the waste without sorting process and (b). The ash or slag from the combustion residue is quite dry and free from decay and can be transported directly to landfills on vacant land, swamps or low-lying areas as confinement material (pile).

(b). Composting technology that produces compost to be used as fertilizer or to strengthen soil structure.
Recycling technology that can produce potential waste, such as paper, plastic, metal and glass/glass.

2. Community participation in waste management. Community participation in waste management is the most important aspect to be considered in an integrated waste management system. Community involvement in waste management is one of the technical factors to overcome the problem of urban waste or residential environments that are increasingly complex from year to year. The community always participates in development processes if there are supporting factors, including: needs, expectations, motivations, rewards, needs for facilities and infrastructure, moral encouragement, and the existence of both informal and formal institutions.

3. The need for a profit mechanism in waste management. The solution in overcoming this waste problem can be done by increasing the efficiency of all waste management programs that are started on a wider scale. For example, through waste sorting activities starting from the source, which can be done by household scale or housing scale. From this system, the advantages of this system will be in the form of: transportation costs can be reduced because it can cut the chain of transporting waste, does not require large land for TPA, can generate added value from the use of waste into goods that have economic value, can improve the welfare of cleaning staff, is more efficient. economical and ecological, can further empower the community in managing the cleanliness of the city.

4. Optimization of landfill waste. Basically the pattern of waste disposal carried out with the Final Disposal Site (TPA) system is no longer relevant to the increasingly narrow city land and rapid population growth, because if this continues to be maintained, the city will be surrounded by "seas of garbage" as a result of the greed of this pattern. to land and the volume of waste continues to grow. Disposal carried out by dumping garbage openly and in open places also results in an increase in the intensity of pollution. The overall handling of the urban waste management model includes the elimination of the TPA model in the long term because in many ways the management of the TPA is still very poor, starting from the handling of waste water (leachet) to handling very bad odors. The ideal solution for dealing with waste in urban areas is to dispose of waste and at the same time use it so that apart from cleaning the environment, it also produces new uses. This will economically reduce the cost of handling (Murtado and Said, 1987).

5. Integrated waste management institutional system. In the ideal urban waste management, the waste management system developed must be a community-based management system starting from waste management at the household level. In the waste management plan, it is necessary to have

better waste processing methods, increase the participation of relevant institutions in increasing the efficiency and effectiveness of waste management, increasing community empowerment, improving the economic aspect which includes efforts to increase waste retribution and reduce the funding burden as well as increase aspects legal in waste management.

6. Final Waste Management Methods.According to Wahid Iqbal and Nurul C. (2009: 279-280) regarding the stages of waste management and destruction, there are 2 methods:

1. A satisfactory method consists of: (i). Mthe Sanitary Landfill method, namely the destruction of waste by making a hole in the ground then the waste is put in and filled with soil as a cover layer and then compacted. This method requires the availability of a large area, available land to stockpile it, and large equipment available, (ii). Inceneration (burned), which destroys waste by burning in a special furnace. The benefits of this system are that the volume of waste can be reduced by one third, it does not require a large space, the heat generated can be used as a source of steam, and management can be done centrally with a schedule of working hours. The consequences of applying this method are that it requires large costs, the location of factory disposal is difficult to obtain due to the presence of residents, and equipment used in incineration and (iii). Composting (used as fertilizer), namely managing waste into compost; especially for organic waste.
2. Unsatisfactory methods, consisting of: (i).The Open Dumping method is a waste disposal system that is carried out openly. This will be a problem if the waste produced is organic waste that decomposes because it causes odor and aesthetic disturbances and becomes a source of disease transmission, (ii). Dumping in Water method, namely dumping waste into water. This will disrupt the damage to the aquatic ecosystem. Water will become dirty, change color, and cause water borne disease sources and (iii). Burning on premises (individual incineration) method is burning waste in households.

Meanwhile, according to SNI 19-2454-2002 concerning Operational Techniques for Urban Waste Management, in general, waste processing technology is divided into 3 methods, namely the Open Dumping method and the Sanitary Landfill method as stated above and the Controlled Landfill method.

Controlled Landfill is an improved open dumping system which is a diversion system for open dumping and sanitary landfill, namely by covering the waste with a layer of soil after the full landfill has been compacted or after a certain period has been reached.

4. Conclusions

The results of the research conducted provide empirical and theoretical solutions based on the results of data analysis that has been obtained in the field. The results of the empirical conclusions as follows:

1. In general, waste management in Jember Regency still uses the 3P system, namely: collection (pengumpulan), transportation (pengangkutan) and disposal (pembuangan). By only using this model, it still leaves a problem that is related to the very limited capacity of the landfill. Because this 3P mechanism still does not pay attention to the process of destruction and recycling which may still have economic value for both the community and Jember Regency itself.
2. The work area of the Sanitation Service officer is still at the level of the face of the city, namely the main roads, the city centre, and the city's economic centre. Public awareness of cleanliness and waste management in each village and area is still not evenly distributed. Like the awareness of sorting organic and inorganic waste before being dumped into the TPS.
3. The old system management strategy that relied on the transportation, disposal and processing system into fill material needed to be changed because it was considered very uneconomical (cost centre). The most appropriate approach for the future in waste management is through an integrated system that can change the paradigm from a cost centre to a profit centre by maximising community participation and utilising waste into valuable materials.
4. It is necessary to involve the community in managing municipal waste, from the disposal, sorting, utilisation, and processing to funding. It is hoped that the community's involvement can add economic value for those who use it and increase the level of cleanliness and comfort for Jember Regency.

The theoretical conclusions can be explained as follows: Waste management is an effort to deal The theoretical conclusions can be explained as follows: Waste management is an effort to deal with waste in a systematic and planned manner. Moreover, in its implementation, there are technical and implementation instructions. However, in its operations in Jember Regency, the mechanism carried out by the city government is still very simple. This means that the Sanitation Department focuses on the cleanliness of specific areas that are the face of the city or are the centre of the city's economy. Meanwhile, the cleanliness of the village level is left to the government to manage as a whole. Judging from the Participatory Rural Appraisal (PRA) theory, community participation in waste management has material seized. The lack of community participation in the municipal waste management process in the Jember Regency is due to the weakness of local regulations and laws governing the community's obligation to be directly involved in the municipal waste management process. The excellent synergy between the government of Jember Regency and various sectors of society has not yet been realised. So that what happens is a misunderstanding from the community that

waste management matters are the government's business and responsibility. The participation referred to here is how the community, as the primary producer of municipal waste, can be directly involved in the management of municipal waste from the earliest stage to the final stage.

The research results that have been carried out can provide suggestions so that municipal waste management in Jember Regency can create a beautiful and clean city. The suggestions are as follows:

1. There needs to be good coordination and synergy between various societal elements and the Jember Regency government in managing municipal waste. Each party needs to regulate its rights and responsibilities in municipal waste management. It is hoped that the division or arrangement of positions, rights, and responsibilities in general and fundamentally can clarify and control the performance of each sector or element.
2. Improving the quality of waste management services by putting waste management under one roof. By appointing one institution as the centre for coordinating and controlling waste management from the city to the household level. Moreover, starting from the management of retribution to the distribution of honorarium for waste officers.
3. It is necessary to apply strict sanctions for anyone who intentionally or unintentionally violates the rules that have been applied in managing municipal waste. So, it will raise society's awareness and responsibility against waste management.

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