Evaluation Of Waste Management Policy In Talumelito Landfill In Gorontalo Province

ABSTRACT

This study aims to determine and describe the effectiveness, efficiency, adequacy, equity, responsiveness and accuracy of waste management in Talumelito Landfill, Gorontalo Province. This research uses qualitative research methods and for data collection researchers combine interviews, documentation and observation. To analyse the data, researchers used Miles and Huberman's opinion, namely data reduction, data display and conclusions. The results showed that (1) Effectiveness shows that waste management in Talumelito landfill has not been effective because although there are policies and SOPs, there are several obstacles such as the lack of waste sorting, fuel, maintenance and repair of heavy equipment, personnel and supervision that hinder the achievement of goals, (2) Efficiency shows that Talumelito landfill has contributed to increasing the PAD of Gorontalo Province, but there is an imbalance between budget allocations, the amount of community waste production and waste management *output*, (3) Adequacy shows that challenges in terms of budget constraints have forced Talumelito *Landfill* to reduce the frequency of *sanitary landfill* waste management procedures which can have a negative impact in the long run, (4) Equity shows that waste management at Talumelito *Landfill* has tried to realise community welfare by providing employment and waste management education, although there are still complaints related to environmental impacts that cannot be resolved, (5) Responsiveness shows that Talumelito Landfill has been responsive in responding to community complaints by following up on every complaint and facilitating community complaints and suggestions (6) Appropriateness shows that the waste management policy at Talumelito Landfill is not optimal because the existing policies have not been able to encourage community participation and the results of waste management at Talumelito Landfill as a whole have not provided significant benefits to the community.

Keywords: [Evaluation, Policy, Waste Management, Landfill.}

1. INTRODUCTION

[Waste management plays an important role in realizing a safe and healthy environment. The increase in population and the consumptive behavior of people who always make disposable goods transactions have resulted in the volume of waste becoming uncontrollable and becoming one of the causes of environmental problems in almost all regions. Currently, waste management in Indonesia is an actual problem due to the increasing population growth rate and the increasing amount of waste produced [1]. Law Number 18 of 2008 concerning Waste Management states that waste has become a national problem so that its management needs to be carried out comprehensively from upstream to downstream in order to provide economic benefits, be healthy for the community, and safe for the environment, and can change people's behavior.

Waste management techniques to date are considered not in accordance with applicable policies and are not environmentally sound and even have a negative impact on environmental and public health. Gorontalo Province is one of the areas that is not free from waste problems. In 2007, the Gorontalo Provincial Government built waste management facilities and infrastructure for the Talumelito Regional Landfill, located in Talumelito Village, Telaga Biru District, Gorontalo Regency. Talumelito *landfill* began to be operated in 2010 and continues to develop until now using the

Sanitary Landfill System . In terms of policy, Gorontalo Province has regulated waste management in Gorontalo Province Regional Regulation Number 3 of 2013 concerning Waste Management and Governor Regulation Number 22 of 2016 concerning Operational UPT Talumelito Waste Final Processing Site, Operational Cost Charges and Environmental Impacts.

Table 1. Target and Realisation of the Amount of Waste Processed at Talumelito Landfill from 2019 to 2023

Year	In 2019	In 2020	In 2021	In2022	In 2023
Target Waste processed	22.800 Ton	23.880 Ton	24.880 Ton	25.880 Ton	30.000 Ton
Realisation	33.144 Ton	35.668 Ton	35.198 Ton	37.016 Ton	34.865 Ton

Source: PUPR Agency Work Plan 2023 and PUPR-PKP Agency Work Plan 2024.

The volume of waste in Talumelito landfill continues to increase every year and is uncontrollable. One of the reasons why the volume of waste entering the landfill continues to increase is because the incoming waste is not residual waste. Waste management will fail when there is too much waste or not enough recycling [2]. In addition, the increase in waste production has an impact on the budget that must be provided by the government for processing, especially if the processing is not carried out in accordance with applicable policies, the government must provide an extra budget beyond the set target. For this reason, the government, both the central government and local governments must pay attention to this waste management problem properly, with waste management management according to predetermined standards [3]. Waste management that is not optimal gradually makes people restless due to environmental pollution both soil, water and air polluted by waste waste.

Based on the conditions that have been described, the purpose of this study is to determine and describe the effectiveness, efficiency, adequacy, equity, responsiveness and accuracy of waste management at the Talumelito Landfill, Gorontalo Province.]

2. MATERIAL AND METHODS

[To find data about waste management at the Talumelito landfill, researchers used a qualitative research approach. The qualitative research approach emphasises the importance of understanding behaviour according to the patterns of thinking and acting of the subject of study, therefore the natural paradigm colours this approach [3}[]. While the method used is descriptive qualitative research method seeks to describe an event on the object of research that is analysed so as to produce a solution to a problem [4]. In this case the researcher tries to reveal the problem of Waste Management Policy Evaluation at the Talumelito Landfill, Gorontalo Province. To obtain data, the technique used in data collection uses interview, observation and documentation study methods [5]. Observations were made by going directly and making observations to the Talumelito Landfill, interviews were conducted by preparing interview guidelines and asking questions to informants and documentation studies were carried out by reviewing documents, references and waste management policies. The data analysis technique used in this research uses the Miles and Huberman Model, namely data reduction, data presentation and conclusion drawing [6].]

3. RESULTS AND DISCUSSION

[**Waste Management**

Waste management is not a new problem and is almost a problem in all regions. Landfill is one of the important facilities that can overcome waste problems from many other facilities. Waste final processing site (TPA), based on Law Number 18 of 2008 concerning Waste Management, is a place to process and return waste to environmental media in a safe manner for humans and the environment [7] . Landfill is often considered as the only solution in handling waste. Whereas basically disposing of waste in landfills is not a solution to handling waste if in a waste emergency [8]. If landfill is used as the only solution to waste management, the problem of waste management and handling will gradually become uncontrollable.

Evaluation of Waste Management Policy

1.Effectiveness

Talumelito landfill functions to solve waste problems in 3 regencies/cities, namely Gorontalo City, Gorontalo Regency and Bone Bolango Regency. The operation of Talumelito landfill is carried out based on the Planning and Operational SOPs prepared based on Law No. 18/2018 on Waste Management and Gorontalo Governor Regulation No. 22/2016 on the Operation of the Talumelito Waste Final Processing Site Technical Implementation Unit, Charges for Operational Costs and Environmental Impacts. Waste management at the Talumelito landfill faces various operational challenges, despite basically following the applicable Standard Operating Procedures (SOPs).

The first and most frequent problem at Talumelito Landfill is the lack of fuel oil for the daily operation of heavy equipment such as *excavators* and *dozers* for landfilling and compaction of waste. *Landfilling* and compaction that is not in accordance with the SOP can cause waste to accumulate irregularly, the volume of waste space in the *landfill* increases faster and has an impact on environmental pollution. Waste is a contributor to GHG emissions after deforestation, transport and energy. Open piles of waste have the potential to increase greenhouse gas emissions and methane gas from organic decomposition{9] . Large piles of waste have the potential to produce gases that are harmful to health and the environment [10].

High rainfall has been a major challenge in waste management at Talumelito landfill. Water-saturated soil is prone to erosion and increases the likelihood of empty spaces forming between waste piles, which risks accelerating leachate production. Leachate from the landfill is difficult to control even with strong protection. Worse impacts are found in poorly managed landfills, which greatly influence the movement of leachate into surrounding areas[11] .

Talumelito Landfill is supposed to function as a landfill that specifically accepts residual waste, which is waste that cannot be recycled or cannot be reprocessed as such. But in reality, there is still a lot of non-residual waste that goes to Talumelito landfill. Non-residual waste entering Talumelito landfill can affect the performance of Talumelito landfill and environmental health.

In addition to the external problems described above, an internal finding faced by Talumelito Landfill in waste segregation is the lack of waste segregation personnel. Based on the barriers above, the biggest problem currently facing Talumelito Landfill is that the RPJPN 2025-2045 Planning Document has confirmed that there are no more plans to build Waste Processing sites such as landfills. This brings a major change in the paradigm of waste management in Gorontalo Province, from relying on*landfilling* to a more sustainable and modern approach. An increase in the amount of waste production that is inversely proportional to the availability of waste management facilities will have an impact on the emergence of disturbances to the existing environment [12][22].

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Based on how effectiveness is measured, various obstacles in waste management at the Talumelito landfill indicate that waste management has not been effective because overall it does not achieve the success of achieving goals, objectives, programmes[13] . Effectiveness can be interpreted as the level of success that achieves goals or objectives. Target in the sense that it is aimed at the desired condition or state [14].

2. Efficiency

Production efficiency in waste management at Talumelito landfill is closely related to how optimal the budget allocated each year is to produce adequate *output*. There needs to be a balance between the costs required to achieve a certain *output*[15][25]. The budget allocated to waste management is considered not proportional to the amount of waste that continues to increase every year. As well as budget increases and decreases, the gap between the budget spent and the results of waste management levies results in low production efficiency.

The budget allocation for Talumelito landfill tends to be unstable as there are drastic increases and decreases from year to year. These changes have an impact on the consistency of waste management programs implementation for Talumelito landfill operations.

To increase the production efficiency of waste management in Talumelito landfill, there is a need for innovation and application of renewable technology. Innovation and technology are expected to be able to optimise the waste management process so that it can produce better *output* than the current one such as Waste Power Plant (PLTSa), Leachate water management, Waste recycling using more sophisticated technology, Waste management reform, RDF technology and *Landfill Mining.* Efforts to improve the efficiency of waste management policies at the Talumelito landfill are largely hampered by the limited budget of the Gorontalo Provincial Government.

Efforts to improve the efficiency of waste management policies at the Talumelito landfill are largely hampered by the limited budget of the Gorontalo Provincial Government. In the future, the Gorontalo Provincial Government needs to review the current waste management problems and include them in the regional development planning document. Development planning is a collection of policies and development programs to stimulate the public and private sector to use available resources more productively[16] .

In terms of fiscal efficiency, Talumelito Landfill is one of the Regional Technical Implementation Units (UPTD) that plays a role in increasing the Regional Original Revenue (PAD) of Gorontalo Province through waste retribution. However, it was found that the budget required for waste management, ranging from financing for employee wages, operation and maintenance of heavy equipment, provision of facilities and infrastructure of Talumelito Landfill, exceeds the PAD obtained. Therefore, with the current condition of waste management in Talumelito landfill, it would be better if the amount of waste entering Talumelito landfill can be reduced rather than continuing to increase despite its effect on the PAD of Gorontalo Province.

Table 2 List of Waste Volume in Gorontalo City Region that Goes to Talumelito Landfill from January to September 2024

NO	Moun	VOLUME (TON)	TARIFF (Rp)		Summary (Rp)		TOTAL
			KJP	KDN	KJP	KDN	
1	Januari	2.219,020	47.511	7.127	105.427.859	15.814.956	Rp121.242.814.760
2	Februari	1.927,681	47.511	7.127	91.586.052	13.738.582	Rp105.324.634.480
3	Maret	2.281,808	47.511	7.127	108.410.980	16.262.446	Rp124.673.425.500
4	April	2.094,715	47.511	7.127	99.522.004	14.929.034	Rp114.451.038.170
5	Mei	2.115,535	47.511	7.127	100.511.183	15.077.418	Rp115.588.601.330
6	Juni	2.112,143	47.511	7.127	100.350.026	15.053.243	Rp115.403.269.230
7	Juli	2.698,450	47.511	7.127	128.206.058	19.231.853	Rp147.437.911.100
8	Agustus	2.214,681	47.511	7.127	105.221.709	15.784.031	Rp121.005.740.480
9	September	1.148,079	47.511	7.127	54.546.381	8.182.359	Rp62.728.740.400
TOTAL		**18.812,11**			**893.782.253**	**134.073.922**	**Rp1.027.856.175.460**

Source: Waste Recap UPTD TPA Talumelito, 2024

Table 2 shows that the volume of waste from Gorontalo City every month tends to be stable with an average of 2000 tonnes per month, except in February which has fewer days than other months and September which has not been fully recapitulated by researchers. Meanwhile, the highest waste volume was in July, which reached 2,698.450 tonnes with a total retribution of Rp 147,437,911,100. The increase in waste volume and waste retribution in July was the result of floods that hit Gorontalo Province.

Based on the findings presented by the researcher, waste management in Talumelito landfill faces several challenges related to production, allocation, and fiscal efficiency. Although the budget for waste management fluctuates from year to year, the costs required are often not proportional to the amount of waste managed. Innovations such as Waste Power Plant (PLTSa), leachate management technology, recycling technology and waste segregation can support the economy to improve operational efficiency, but until now it is still hampered by budget constraints. Regarding fiscal efficiency, revenue from waste retribution is still low compared to operational costs, and there is a plan to revise the retribution rate to be in accordance with applicable regulations. However, the success of waste management in Talumelito landfill is highly dependent on proper budget allocation and innovative technology utilisation.

3. Sufficiency

Waste management at Talumelito Landfill faces major challenges, especially when the budget allocation received by the UPTD TPA Talumelito does not meet the ideal operational needs. Nevertheless, TPA Talumelito is committed to providing maximum performance. Budget limitations require UPTD TPA Talumelito to be able to adapt to budget availability.

Budget limitations affect various operational aspects, including the implementation of the *sanitary landfill* SOP. In the last two years, the problem of fuel shortages for heavy equipment has been successfully overcome, although the*sanitary landfill* SOP is not fully implemented. Backfilling and compaction of waste is not done with the frequency it should be to reduce the operational burden of heavy equipment. Although this adjustment did not cause any adverse impacts in the short term, waste management should still be guided by procedures that are carried out regularly and in accordance with the *sanitary landfill* system in order to avoid negative impacts in the future. Therefore, the budget is one of the supporting factors for the success of the activity, without the support of the budget the programme cannot run smoothly[17].

Waste management at Talumelito Landfill continues to provide the best performance with a relatively fixed and even declining budget. The lack of budget greatly affects waste management at Talumelito Landfill and has a negative impact in the long term if not addressed quickly. However, increasing the budget is also not fully able to improve performance if it is not carried out in accordance with applicable policies.

4. Equalisation

Equity according to Dunn (2003) requires consideration of the extent to which a policy can have an impact on the level of social welfare. It aims to create inclusive and sustainable policies that provide more equitable access to the community. One of the impacts of waste management in the Talumelito landfill on community welfare can be seen from the existence of employment opportunities for local residents. Waste can reduce unemployment and poverty alleviation because it can provide economic value without requiring large capital and is easily implemented by the community[18].

Talumelito Landfill in this case also seeks to maximise redistributive welfare to increase benefits for certain groups through resource or income redistribution policies. The main focus of this approach is to ensure that groups that are considered disadvantaged, vulnerable, or marginalised receive a greater allocation of available resources. This policy aims to reduce economic and social inequality. In addition to increasing the income of the surrounding community, waste pickers also play a role in waste segregation at the Talumelito landfill although they do not have a major impact. This is supported by the statement that waste management in landfills in developing countries, especially Indonesia, scavengers play a major role in reducing the amount of waste in the landfill and extending the service life of the landfill itself [19].

Talumelito landfill in waste management uses a sanitary landfill system. The sanitary landfill system is designed to minimize negative impacts on the environment by separating waste types, compacting waste, and daily closure [20]. Although the *sanitary landfill* system implemented today is better than the previous management system in the form of an open dumping system, it cannot be denied that this system still has the potential to cause environmental pollution through air, soil and water pollution. To minimize the risk of water and soil pollution due to leachate, the UPTD TPA Talumelito routinely tests leachate water at least twice a year. This testing also includes the groundwater of residential neighborhoods closest to the leachate reservoir, giving a clearer picture of the potential pollution that may occur.

Figure 1 Leachate Sampling for Quality Standard Testing

Talumelito Landfill not only plays a role in waste management, but also actively supports the improvement of community understanding. Through various education and training programmes, the following is the implementation of waste recycling socialisation and education in Gorontalo Regency.

Figure 2 Waste Recycling Socialisation and Education

In a year, TPA Talumelito holds socialisation and education 2 to 3 times at village offices. With the socialisation and education, UPTD TPA Talumelito tries to provide a better understanding of the importance of sustainable waste management in the community.

5. Responsiveness

The presence or absence of complaints from service users is a significant indicator of responsiveness in assessing the quality of service provided by service providers[21]. Complaints from users reflect dissatisfaction with certain aspects of the service, such as timeliness, quality or attitude of service. The presence of complaints indicates that there is a need for improvement and a thorough evaluation of operational processes and interactions with service users. Conversely, the absence of complaints may indicate that users are satisfied with the service received. This process is important to ensure that the services provided continue to meet the expectations and needs of users, so that customer satisfaction can be well maintained.

To measure the satisfaction of service users and the community, Talumelito Landfill provides correspondence and a Community Satisfaction Survey to assess the satisfaction of waste management services at Talumelito Landfill. To make improvements in the public service process, it is necessary to organise a survey of public perceptions of satisfaction with the services provided[22].

Although the service at Talumelito Landfill is generally considered good, there are still some complaints that are often conveyed by waste fleet drivers. According to the waste fleet drivers, during the rainy season the access to the *landfill*, which is uphill, is difficult for the waste fleet due to muddy and slippery roads. This situation results in queues of waste fleets entering the Talumelito landfill. This long queue, if not handled properly, will affect waste transportation, especially

for Gorontalo Regency which has limited waste fleets. In addition, service users also submitted suggestions regarding the operating hours of the landfill, specifically a request to extend the service time. The current service time of Talumelito Landfill is considered not optimal because waste transportation in the Regency/City starts earlier and ends later. This is considered to severely limit the transport of waste from the Regency/City to Talumelito Landfill which is quite far away.

6.Accuracy

Accuracy, according to Dunn, refers to the content or substance of the objectives to be achieved, not to the methods or tools used to achieve them. Substance emphasises the clarity and relevance of the goal itself, so it is important to ensure that the goals set truly reflect the needs and problems to be addressed. Substance will ensure that the efforts made will have a significant and valuable impact.

The Standard Operating Procedure for waste management at Talumelito Landfill is based on Law Number 18 of 2018 concerning waste management and Governor Regulation Number 22 of 2016 concerning the Operations of the Talumelito Waste Final Processing Site Technical Implementation Unit, Charges for Operational Costs and Environmental Impacts. Although waste management has been carried out based on the applicable SOPs, several problems in the field cause suboptimal implementation and hinder the achievement of goals.

The following finding is that there are differences related to waste retribution rates according to the central and local government policies. The Governor Regulation applicable in the region sets the retribution rate at only 50% of the rate regulated by the Minister of Home Affairs Regulation No. 7 of 2021 on the Procedure for Calculating Retribution Rates. Therefore, the Gorontalo Provincial Government needs to provide an alternative by reviewing the retribution rate considering that waste retribution is an important element in supporting the financing of waste management and plays a role in increasing regional fiscal capacity in the future.

The following discrepancy between policies is that the current policy governing the operation of the Talumelito *Landfill* only focuses on waste management using the Sanitary *landfill* system, while in the Regional Long-Term Development Plan (RPJPD) document of Gorontalo Province for 2025-2045, the target of building Temporary Shelters (TPS) and Final Processing Sites (TPA) has been eliminated. This indicates that in the future there will be no new *landfill* construction at the Talumelito *landfill*. This condition emphasizes the need for alternative policies in accordance with the needs and challenges so that waste management can provide useful and valuable results.

In the context of waste management at Talumelito Landfill, until now the existing policy has never been opposed by the community. However, the location of Talumelito Landfill is close to community settlements. There are concerns from some communities about the potential pollution that could occur in the settlements around the landfill. The proximity of settlements to the landfill raises the issue of water consumption, where rainwater contamination absorbed through the waste heap zone can be physically, chemically, and biologically polluted so that it can pose a health threat to the people who consume it [23]. However, basically the placement of landfill sites has been regulated in the Regional Spatial Plan through various analyses and feasibility studies.

In the view and implementation of waste management, generally people in Gorontalo City, Gorontalo Regency and Bone Bolango Regency do not sort and reuse waste from the source. This is caused by many factors such as ignorance and indifference.

Based on the discussion above, waste management policy implementers have attempted to formulate and implement waste management policies in Talumelito landfill. However, several alternative policies are needed such as the policy of determining retribution rates and the policy of building a sustainable waste management site. The location of Talumelito Landfill is quite close to residential areas, but basically the placement of landfill sites has been regulated in the Regional Spatial Plan through various analyses and feasibility studies. In addition, it was found that the behavior of people who do not sort waste indicates that there is a lack of community support in supporting the implementation of waste management policies. If left unchecked, waste management in the Talumelito landfill will not only provide no benefits but will also have a negative impact on the community.]

4. CONCLUSION

[ThBased on the results of the research and discussion, the researchers formulated the following conclusions:

1. Effectiveness shows that Talumelito Landfill has owned and implemented a waste management policy, but its implementation can be said to be ineffective because there are several obstacles such as not optimizing waste

sorting, limited fuel oil (BBM), lack of maintenance and repair of heavy equipment, weather factors, lack of personnel and lack of supervision that hinder the process of achieving programs, goals and objectives of Talumelito Landfill in waste management.

2. Efficiency shows that the UPTD TPA Talumelito is one of the producers of Regional Original Revenue (PAD) for Gorontalo Province through waste retribution. This shows that Talumelito Landfill has fulfilled Fiscal Efficiency in financing government expenditure. However, the limited budget of Talumelito Landfill in managing waste affects the achievement of waste management *outputs*, especially in realizing waste management innovation. In addition, there is a mismatch between waste management expenditure at Talumelito landfill and the tendency of the community to produce waste.
3. Adequacy shows that Talumelito Landfill faces several challenges, mainly related to budget limitations that affect waste management operations. The ever-increasing waste production and a relatively fixed budget, forces Talumelito *Landfill* to adapt in maintaining operational performance even though it requires Talumelito *Landfill* to not implement all *sanitary landfill* procedures. This can certainly have a negative impact in the long run if not addressed with more planned management and sufficient budget allocations.
4. Equity in Waste Management Policy at Talumelito Landfill has been optimal overall because waste management has attempted to maximize community welfare such as providing employment and providing education to the community. However, the value of Talumelito Landfill's equalization efforts for the community does not rule out the possibility of community complaints about environmental impacts that cannot be controlled due to budget constraints for processing.
5. In terms of responsiveness, Talumelito Landfill continues to strive to maintain and improve service user satisfaction by providing correspondents, responding to any complaints and facilitating community complaints and suggestions services. In addition, Talumelito Landfill has also provided retribution payment relief to service users who experience an increase in waste volume due to unexpected events such as natural disasters.
6. Accuracy shows that waste management policy implementers have attempted to implement the applicable waste management policy. However, waste management at the Talumelito landfill has not been able to provide significant benefits and results for the community. This is evidenced by segregation from the source of waste that has not been optimal due to the behavior of people who have not acted actively to support waste segregation and there is no solution regarding the Talumelito *landfill* which is almost full in the future. To optimize waste management in Talumelito landfill, alternative policies are needed, such as a policy for determining waste retribution rates, a policy for building sustainable waste management sites.

COMPETING INTERESTS

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