

Social Activity Analysis on Public Participation Around the Location of Sumompo Landfill in Manado City

Dr. Zetly E. Tamod¹, Dr. Festus Evly R.I. Liow², Dr. Evelin J.R. Kawung³

¹Department of Soil Sciences, Faculty of Agriculture, University of Sam Ratulangi, Indonesia;

²Department of Industrial Engineering, Faculty of Technology Industry, Institute Technology of Minaesa, Indonesia;

³Laboratory of Sosiology, Faculty of Agriculture, University of Sam Ratulangi, Indonesia

Corresponding Author:

Zetly E. Tamod; Phone : +62 81340144098; e-mail: zetly1809@yahoo.com

Abstract: *The participation of local communities in the use of waste in the landfill is highly prized for aesthetic environment and public health. Therefore the social activities in the community around the landfill in utilizing the garbage are very important to be traced in order to assist the local government programs. This study aimed to analyze the role of the community around the Sumompo landfill in Manado to the utilization and the management of waste. The research method used survey approach. Data collection based on questionnaires, observation and in-depth interviews. The analysis of community participation around the landfill applied a stratified random sampling of Slovin formula with 88 respondents by Importance of Performance Analysis (IPA) program. The result of the analysis on the participation of community around the landfill and scavenger community was on the negative assessment or in the low category of 4.76% - 12.60%. However, the positive assessment or at high category of the surrounding community and sanitation management was in the range of 11.21% - 27.78%. While the medium or neutral assessment category was neutral in the range of 67.46- 87.39%. Negative impact on the health state of the environment was an ecological balance between people and their environment. This is to ensure the health and a good environment for the community around the landfill. This community approach will help the effort of the government program to the cleanliness around the landfill, e.g. by changing the public perception of the utilization and good waste management.*

Keywords: *Participation, Community Around landfill, Scavenger, Management*

I. Introduction

The landfill (TPA) as a city facility needs to get attention and assessment from the public, as they relate to environmental health. Environmental problems are always seen from the standpoint of human interest in meeting, maintaining and developing the culture of life. Social activities of the community around the landfill can give an impact on social life. Surrounding community and scavenger community are the people who pick used goods or specific bins for recycling although this work is often considered to have a negative connotation. However, informal sector activity which is quite interesting at the moment is working as scavenger. Scavenger activity arises from the economic value of the garbage and the amount of trash produced by the community. Some communities may consider waste as disgusting and useless things, but the scavengers have different point of view. Furthermore, an incomprehensive waste management is going to lead to social problems, such as riots, and clashes between citizens, blocking the landfill facility (Hadi, 2004)

Almost all types of inorganic waste ($\pm 90\%$) are valuable in the eyes of the scavenger who operate in the landfill (Iswanto, 2005). Paper, plastic, bottles, cans, iron, aluminum, glass, rubber, tires, batteries, lights and many other types of waste can be sold to collectors. Scavenger existence has a major contribution in reducing the waste dumped into the environment, and can be employment for many people, so it could have an impact on reducing unemployment. On the other hand, along with the amount of waste that keep increasing, limited land and the development of technology, then as the consequence the landfill management system needs to be improved to be more efficient, effective, friendly to environment and useful. The existence of the landfill in Indonesia, especially in the cities can not be separated from the existence of scavengers. Therefore, every changes in landfill management systems and technologies must consider the social aspects of landfill scavengers. Based on this, it is very important to do social studies on the role of the community around the landfill.

The common environmental problem in urban areas is deficient urban waste management. Residual waste that is part of human activity needs to be managed properly so as not to cause a variety of problems to human life or disturbance to the environment such as environmental pollution, the spread of disease, decreased aesthetic and as carriers of disease. Waste management in cities in Indonesia has not achieved optimal result yet. Various obstacles were encountered in implementing the waste management such as economic, social,

cultural and technological application constraints (Nuryani, 2003). In addition, the aspect of community participation in waste management prospects seen from public perception is very good to the aesthetic environment and involvement to socialize it to the public (Saribanon, et al., 2009). According to Wibowo and Djajawinata, (2004) programmed or planned waste management will be useless if there is no public participation. Participation of the communities around the landfill (Tuminting, Sumompo, Mahawu, and Buha) and scavenger community can assist government program to take advantage of existing waste, so it can change public opinion, and social, structure and culture components can be preserved and maintained its presence in the midst of people's lives. In the framework of social interaction, communities around the landfill would consider a greater advantage than the costs incurred (Damsar, 2009)

The purpose of this study was to analyze the role of the social activities in the community to make use of waste in Sumompo landfill in Manado.

II. Reserch Method

II.1. Research Variable

1. Behavior / Participation to environmental activities of Tuminting community
2. Behavior / Participation to environmental activities of Sumompo community
3. Behavior / Participation to environmental activities of Mahawu community
4. Behavior / Participation to environmental activities of Buha community
5. Waste treatment and surveillance infrastructure by Tuminting community
6. Waste treatment and infrastructure surveillance by Sumompo community
7. Waste treatment and infrastructure surveillance by Mahawu community
8. Waste treatment and infrastructure surveillance by buha community
9. The concern tosort waste and the treatment on waste by Scavenger
10. Participating in education and supervision activities on landfill infrastructure by scavengers
11. Availability Facilities and Transport Waste by the management
12. Waste Treatment and educating the scavengers by the management
13. Supervision and Waste Management Financing by the management

II.2. Data Collection Instrument

The numbers of respondents in this study were 553 people around the landfill and 119 scavengers, so the total populationswere672 respondents. The sample was determined based on stratified random sampling method with a confidence level of 90% and the error rate by 10%. The spread of the sample applied incidental sampling technique, which was visiting the respondent.

The sample size used Slovin formula (Sevilla in Umar, 2003) as follows:

$$n = \frac{N}{Nd^2 + 1} = \frac{672}{(672 \times (0,1)^2) + 1} = 87,05 \text{ rounded} = 88 \text{ samples}$$

n = sample size, N = population size, and d = degree of accuracy determined 10%.

Primary data were obtained by questionnaires. Data were obtained from a questionnaire survey with the question format is expressed in the form of Ordinal scale tabulation.

II.3. Data Analysis Method

This study used survey method focused on Scavengers who were operating in Sumompo landfill, namely in the Sumompo village Manado. Sumompo landfill is the only landfill in the city of Manado which is used for landfills.

The study of scavenger social activities involves the collection of data and information from related parties as communities around the landfill, garbage collectors, supervisors, managers, and TPA employees under the Sanitation Agency of Manado City, and others who have studied scavengers in Sumompo landfill.

Analysis of the role of the social activities of the community and scavengers used Importance of Performance Analysis (IPA) techniques by selecting the desired attribute or the undesired at the level of Importance on the participation of surrounding community and scavengers. Application of this analysis was in a number of settings that have been modified (Kitcharoen, 2004). This analysis is an evaluation tool to find out which attributes are good or which attributes need to be increased again (Wong, et al 2009), even as a service factor to the participation that needs to be improved because the current conditions are not satisfactory (Supranto, 2006).

The formula used is:

$$TK_i = \frac{X_i}{Y_i} \times 100\%$$

Tki = respondent suitability level, Xi = performance assessment score, Yi = interest assessment score. The X axis is implementation level score, and the Y axis is importance level score. This is simplified formula:

$$\bar{X} = \frac{\sum X_i}{n} \quad \bar{Y} = \frac{\sum Y_i}{n}$$

X = performance average score, Y = importance average score, n = number of respondents (88)

Cartesian diagram is built on four parts limited by two intersecting lines that are perpendicular to the x and y axis, with 13 factors or attributes. The next formula:

$$\bar{X} = \frac{\sum_{i=1}^N \bar{X}}{K} \quad \bar{Y} = \frac{\sum_{i=1}^N \bar{Y}}{K}$$

K = number of attributes / facts that can affect scavenger social activity (K = 13). These elements are described into four sections in Cartesian diagram as shown in figure 1.

<p>QUADRANT I Concentrate Here <i>High Importance</i> <i>Low Performance</i></p>	<p>QUADRANT II Keep Up the Good Work <i>High Importance</i> <i>High Performance</i></p>
<p>QUADRANT III Low Priority <i>Low Importance</i> <i>Low Performance</i></p>	<p>QUADRANT IV Possible Overkill <i>Low Importance</i> <i>High Performance</i></p>

Figure 1. Quadrant Distribution of Importance-Performance Analysis. Source : Joseph, (2008)

The data analysis used statistical analysis program support SPSS version 17, wherein the graph analysis used simple scatter to form a Cartesian diagram.

III. Results and Discussion

III.1. The Response of Respondents About Community Engagement

The analysis of distributed questionnaires was for the purpose of evaluating the role of the community elements around the landfill, scavengers and public sanitation management (the Sanitation Agency of Manado City). In this study, the participation was the mental consciousness, mind and emotions of a person or the communities around the landfill to do the job that deals with the garbage. Operationally, public participation around the landfill was measured using four scale-shaped instruments as much as 10 grains. Participation Score was obtained from the total of grain scores which responded by communities around the landfill with a range of theoretical score 11 - 55. The participation of scavenger community was measured by four scale-shaped instruments as much as 10 grains.

Participation score was obtained from the total grain score which responded by scavengers at the landfill with a range of theoretical score of 10-50. For an institution it was mental awareness, thoughts and emotions of a person in an organization to do the work that deals with the trash, along with the target achievement in waste management. Operationally, participation is measured using four instruments tend to form as much as a 21-point scale. Participation score as obtained from the total grain score that were responded by the agencies in the landfill with theoretical score range of 21-105.

The assessment participation level was specified based on these criterion: (1) Tuminting 9130 with $\Sigma Y = 5963$, participation rate was 65.5% of defined criteria; (2) Sumompo 7975 with $\Sigma Y = 5070$, participation rate was 63.6% of defined criteria; (3) Mahawu 6930 with $\Sigma Y = 4746$, participation rate was 68.5% of defined criteria; (4) Buha 6380 with $\Sigma Y = 3851$, participation rate was 60.4% of defined criteria; (5) Scavengers 5950 with $\Sigma Y = 3528$, participation rate was 59.3% of defined criteria; (6) Institutions 4830 with $\Sigma Y = 3136$, participation rate was 64.9% of defined criteria. Descriptive overview of the role of the community around the landfill and scavenger and institution that manages public sanitation showed the respondents were in the range (60.4 to 68.5%), scavenger respondents (59.3%) and sanitation management agency respondents (64.9%). Descriptive assessment scale is presented in Figure 2.

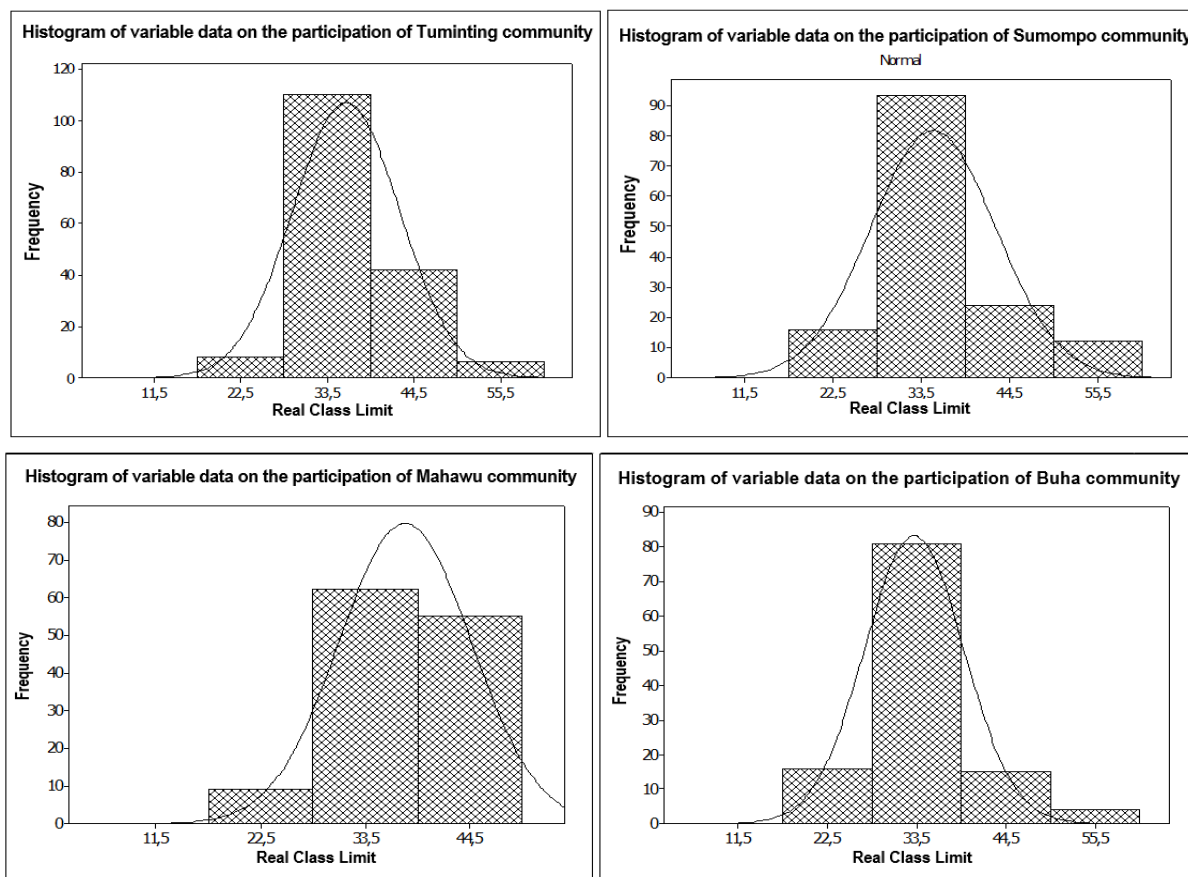


Figure 2. Variable Data On The Participation of The Communities Around the Landfill, Scavengers and City Sanitation Institution

In Figure 2 it can be seen that the assessment on participation from the respondents of the communities around Sumompo landfill and scavengers were dominated by Mahawu and Tuminting (50.6 to 52.4%) that have higher category, whereas Sumompo, buha and scavenger were in the category of medium (50.3 - 71.4%). The assessment of community participation was calculated from the total value obtained by making the interval participation as exposed in Table 1.

Table 1. Public and Institutional Assessment To The Participation in Waste Management

Interval Value	Percentage Community Response						Response Level
	Tuminting	Sumompo	Mahawu	Buha	Scavenger	Institution	
11-26	5.42	11.03	4.76	9.48	12.60	0.00	Negative
27-41	74.09	71.03	67.46	79.31	87.39	78.26	Neutral
42-56	20.48	17.93	27.78	11.21	0.00	21.74	Positive
Total	100.00	100.00	100.00	100.00	100.00	100.00	

Based on Table 1 it can be explained that there were respondents from the communities around the landfill and scavengers who gave negative ratings (low category) of the role of waste management from 4.76% - 12.60%. There was also a positive assessment (high category) by the surrounding communities and the sanitation management in the range (11.21 to 27.78%). But generally they gave medium assessment category (neutral in the range of 67.46 to 87.39%). In the assessment of concern indicators and their treatment to garbage, the dominant respondents were negative (lower category). They were scavengers (97.48%) and Sumompo (55, 17%). Tuminting and Mahawu had better response to neutral (medium category), from 62.65 to 66.67%, while Buha tend to spread from negative to neutral (from 41.38 to 43.96%). The detailed indicators of participation can be illustrated in Figure 2 for the care / treatment of garbage, indicators of behavior / habit and community supervision around the landfill and scavengers. In Figure 3 shows the suitability of shelter provision and treatment of garbage and solid waste including waste separation for public activities in Sumompo, buha and low scavengers. This is in accordance with the conditions of the area surrounding the landfill.

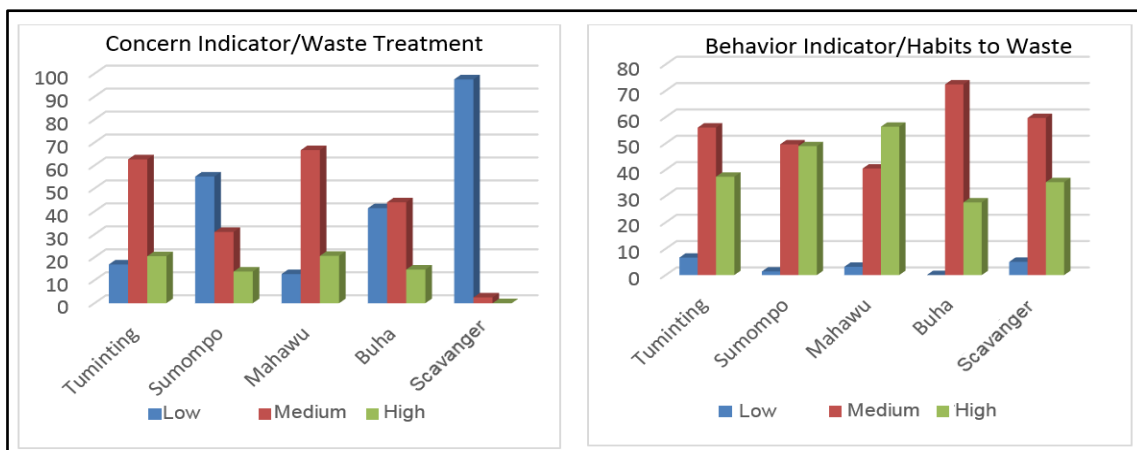
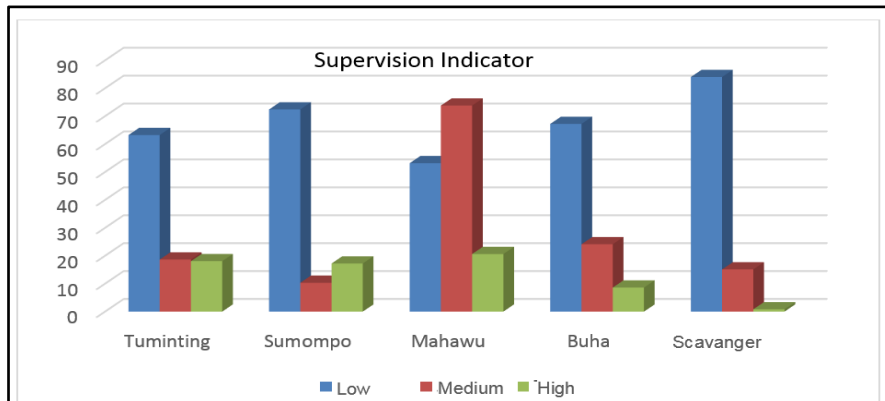


Figure 3. Histogram of Concern Indicator / Waste Treatment, Behavior / Habits in the waste and Supervision from the Variable Participation of the communities around Sumompo landfill

While waste management agency (Figure 3) stated that 95.65% had a concern for transported waste, 82.61% concerned about the availability of waste management facilities and infrastructure. For the indicator of behavior/habit which is a collection of items, a habit of throwing garbage, often making use of waste, yard cleaning frequency, the willingness to pay the levy, participate in any counseling and mutual assistance activities showed the percentage that tends to be neutral (40.48 to 72, 41) to positive (27.59 to 56.35%) as presented in Figure 4. While the level of waste management agency (Figure 4) showed 73.91% performed garbage in the treatment of waste segregation frequency items, often making use of waste, composting, recycling and solid waste treatment.

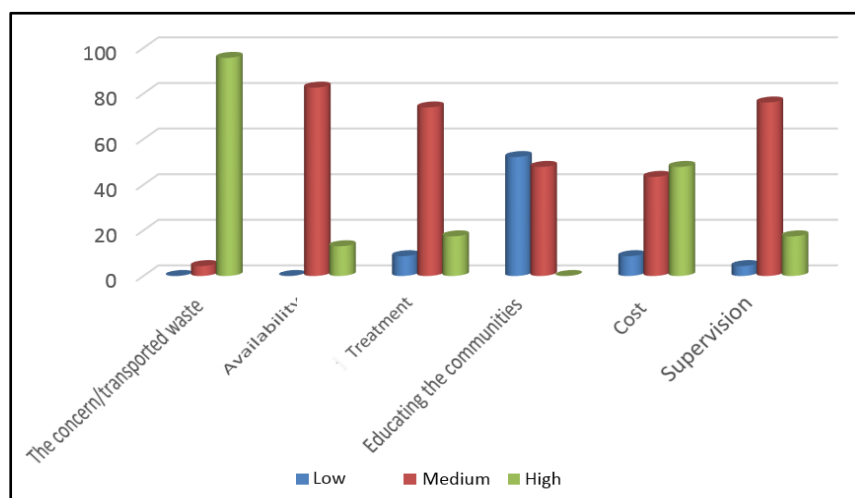


Figure 4. Histogram of some Variable Indicators of the Participation of Sanitation Agency in Manado City

In surveillance activity indicators, generally people around the landfill and scavengers stated that they were low (negative) which is in the range of 53.17 to 84.03% and only 0.84 to 20.63% which is positive (higher category) in supervision and maintenance of waste management facilities and infrastructure as well as with the government supervise the fund of sanitation management (Figure 4). On the other hand waste management agency stated that 76.09% had participation supervision by watching the transport and management of garbage, monitoring and conservation efforts, together with the people supervise the fund of sanitation management. As for the source item and the cost of waste management costs in financing indicators of institutional elements expressed moderate - high (neutral - positive) range from 43.47 to 47.83%.

Dwiyanto, (2011) said that the waste management plan that was designed very well is not a guarantee that it can provide satisfactory results in the absence of a positive assessment of the community. Positive response is expected from the community in waste management and understand the consequences of some aspects of their lives. The thing that affects the understanding is the level of knowledge or education of the community, so for the understanding and awareness needs to be developed through a variety of means of education in society. But be aware, the onset of the response or the response of the community will be affected by the attitude (Handono, 2010). Attitudes can not be separated from the perception, experience, and the establishment or feelings in relation to other people or objects outside itself which then manifested in the form of behavior. This study would also see the relationship between participation (attitude) and taking into account the perception of the health condition.

III.2. Preventive-Recommendation of Community Participation around the landfill and City Sanitation Agency

Recommended order of priority reform based on descriptive study on social planning mitigation measures for public participation around the landfill and sanitation management agency were applied Importance-Performance Analysis techniques as presented in Table 2.

Table 2. Analysis of Performance-Importance of Community Participation

No.	Sub Variable Participation	Performance (x)		Importance (Y)		The level of compliance
		Σx	Σx	ΣY	ΣY	
1.	Behaviour/Participation of Tuminting Community to environmental activity	10.31	3.25	11.27	3.76	86.44
2.	Behavior/Participation of Sumompo Community to environmental activity	10.94	3.65	11.92	3.97	91.94
3.	Behavior/Participation of Mahawu Community to environmental activity	14.25	4.75	12.19	4.06	116.99
4.	Behavior/Participation of Buha Community to environmental activity	9.68	3.23	11.3	3.77	85.68
5.	Waste treatment and infrastructure supervision by Tuminting Community	4.57	3.25	9.76	3.25	100.00
6.	Waste treatment and infrastructure supervision by Sumompo Community	5.03	2.51	9.69	3.23	77.71
7.	Waste treatment and infrastructure supervision by Mahawu Community	4.03	2.01	8.18	2.73	73.63
8.	Waste treatment and infrastructure supervision by Buha Community	7.48	2.49	15.27	3.82	65.18
9.	The concern of waste sorting and waste treatment by Scavenger	2.66	1.33	4.13	4.13	32.20
10.	Participation of scavenger to the activity of educating and supervision of TPA infrastructure	6.30	3.15	9.09	4.54	69.38
11.	Facility availability and the concern to transported waste By the institution	6.30	3.15	9.09	4.54	69.38
12.	Waste Treatment and Scavenger educating by the institution	10.48	2.62	18.17	3.03	86.47
13.	Supervision and financing waste management by Institution	17.00	3.40	7,13	3.56	95.51
The Amount		100.84	37.84	135.79	46.41	1067.07
Average		7.76	2.90	10.44	3.57	82.08

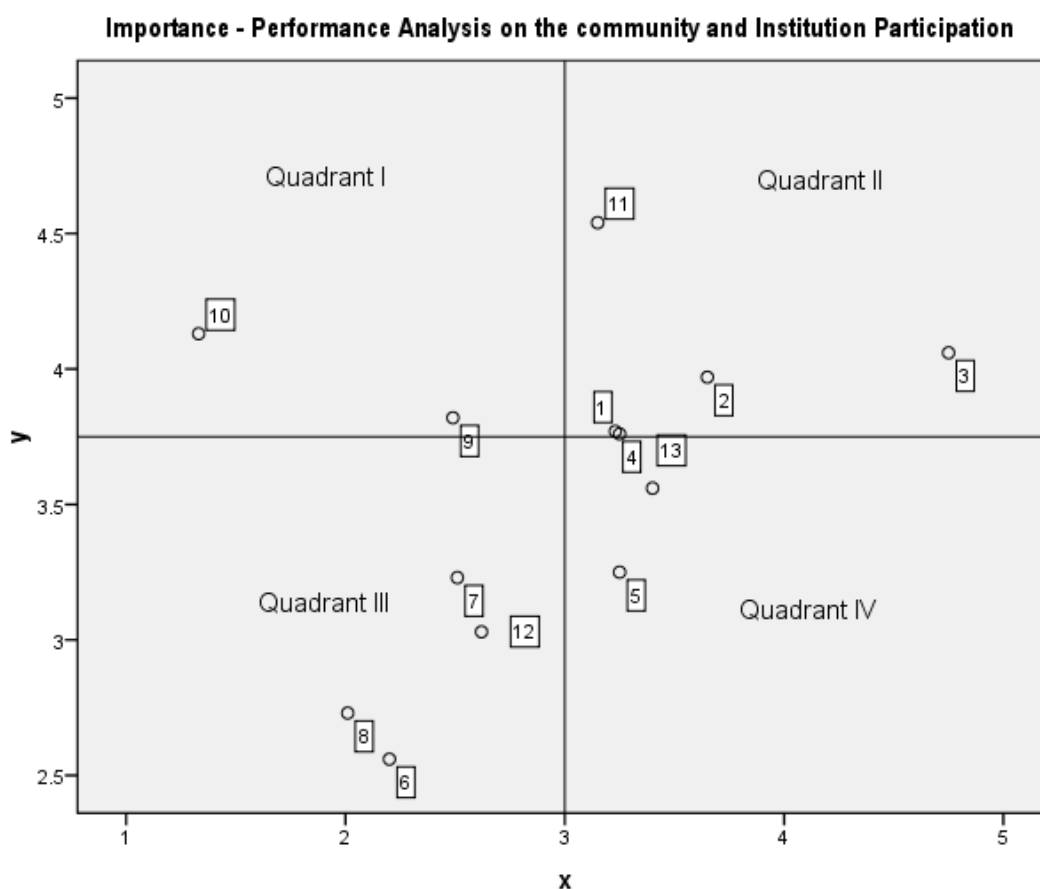


Figure 5. Performance-Importance Analysis on the Participation of the Communities Around the landfill

Based on Table 2 the level of conformity on the participation of the community around the landfill and sanitation management institution showed the range of 32.20% - 116.99%. The performance objective limit values 3.0 and 3.75 and the importance objective limits described in the Cartesian diagram (Figure 5). In Figure 20 the position of sub-variables known to be a priority that is entering the third quadrant (sub variable 6, 7, 8, and 12) garbage treatment and supervision by public infrastructure in Sumompo, Mahawu and Buha. In quadrant IV sub variable 5 (waste treatment and infrastructure supervision by Tuminting community), sub-variables 5 and 13 (waste treatment and scavenger educating by sanitation management institution, financingsupervision to waste management by the institution). In quadrant II priority to note that (behavior /involvement activities of Sumompo, Mahawu and buha communities while maintaining the availability of facilities and trash hauling concern by the management can be maintained to be improved (sub variables 1,2,3,4, and 11) . While the scavengers to be noted is the concern of waste sorting and waste treatment by scavengers to participate in the development and supervision activities to infrastructure of landfill (sub variables 9 and 10 in quadrant I). In general, the results of the analysis of the role of the surrounding communities of the landfill and scavengers gave negative assessment (lower category) on the role of waste management of 4.76% - 12.60%. However, assessment is positive (higher category) by the surrounding communities and sanitation management which is in the range of (11.21 to 27.78%). They generally give assessment medium (neutral in the range of 67.46 to 87.39%).

The results of measurement of the elements of public and scavengers participation on the level of importance and performance allows the government in this case Manado City Sanitation Agency, in order to focus efforts on the improvement of the attributes that are really important, in order to conform to the desires of the public or to the public perception (Liow, et al. 2013). The role of the community is very important in waste management. It is associated with human health and the environment. Since the human existed physical environment has received waste material and suffered the side effects of human activities. To a certain extent the physical environment can accept all kinds of wastes and side effects of human activities. If the limit is exceeded, the carrying capacity of the human environment will be less, resulting in environmental pollution as the negative impact on the health state of the environment. So there must exist an ecological balance between

man and his environment in order to ensure good health environment and the human. The approach to the community that can assist the efforts of the government program to cleanliness around the landfill, that is the changing of people's perception of good waste management. It can change people's habits in poor waste management and social, structure and culture factors (Purnaini, 2011).

IV. Conclusion

1. The scavengers of Sumompo landfill prefer to work independently and do not like to set up, but they have a certain earning targets. They can work very hard without knowing the time in order to earn income as targeted. The Scavengers are already aware that the environmental conditions in which they scavenged is not healthy but they are willing to risk their health for the sake of earning money.
2. In general, the results of the analysis of the participation of the surrounding communities of the landfill and scavenger community gave negative assessment (low category) of the role of the waste management of 4.76% - 12.60%. But the assessment is positive (higher category) by the surrounding communities and sanitation management in the range (11.21 to 27.78%). Generally, they give medium assessment (neutral in the range of 67.46 to 87.39%).

Acknowledgements

Author expresses great gratitude to the World Bank that has supported financially to social studies of the scavengers in Sumompo landfill in Manado.

References

- [1]. Damsar. 2009. Pengantar Sosiologi Ekonomi. Penerbit Kencana. Jakarta.
- [2]. Dwiyanto, B.M. 2011. Model Peningkatan Partisipasi Masyarakat Dan Penguatan Sinergi Dalam Pengelolaan Sampah Perkotaan. *Jurnal Ekonomi Pembangunan*. Volume 12(2), pp. 239-256. <https://publikasiilmiah.ums.ac.id>.
- [3]. Hadi, S. 2004. *Manusia dan Lingkungan*. Badan Penerbit Universitas Diponegoro, Semarang.
- [4]. Handono, M. 2010. Disertasi: Model Pengelolaan Tempat Pemrosesan Akhir (TPA) Sampah Secara Berkelanjutan di TPA Cipayung Kota Depok-Jawa Barat, Sekolah Pascasarjana Institut Pertanian Bogor.
- [5]. Iswanto, 2005, Sistem Pengelolaan Sampah Produktif Berbasis Masyarakat ala Sukunan, Poltekkes Depkes, Jurusan Kesehatan Lingkungan Yogyakarta.
- [6]. Joseph H.K.Lai, Francis W.H.Yik, 2008, Perception of importance and performance of the indoor environmental quality of high-rise residential buildings.
- [7]. Kitcharoen, K. 2004. The Importance-Performance Analysis Of Service Quality In Administrative Departments Of Private Universities In Thailand. *ABAC Journal* Vol. 24(3). pp. 20-46. <http://www.journal.au.edu>
- [8]. Liow, F.E.R.I., A. Wicaksono, Z.E. Tamod, and Soemarno. 2013. Importance and Performance Analysis of the Solid Waste Management System in Tomohon City, Indonesia. *IOSR Journal Of Environmental Science, Toxicology And Food Technology (IOSR-JESTFT)*. Vol.5(2), PP 12-21. www.iosrjournals.org
- [9]. Nuryani S., A. Maas, N.W. Yuwono, S. Karibun, and R.E. Kusumo. 2003. Kondisi Tanah dan Prediksi Umur Tempat Pembuangan Akhir Sampah TPA Bantar Gebang, Bekasi. *Jurnal Ilmu Tanah dan Lingkungan* 4. pp. 55-63. <http://i-lib.ugm.ac.id>.
- [10]. Purnaini, R. 2011. Perencanaan Pengelolaan Sampah di Kawasan Selatan Universitas Tanjungpura. *Jurnal Teknik Sipil Untan*, Vol. 11(1), pp. 1-18. <http://jurnal.untan.ac.id>.
- [11]. Saribanon N., E. Soetarto, S.H. Sutjahjo, E.G. Sa'id, dan Sumardjo. 2009. Planning of social participation in the community based domestic wastes management (Case Study : Jakarta Timur City). *Jurnal Forum Pascasarjana*, Vol. 32(2), pp. 145-154. <http://repository.ipb.ac.id>
- [12]. Supranto, J. 2006. Measurement of the level of consumer satisfaction. (Pengukuran Tingkat Kepuasan Pelanggan). Rineka Cipta Co.Ltd., Jakarta.
- [13]. Umar H., 2003. Research method of services consumer behavior. Penerbit Ghalia Indonesia, Jakarta.
- [14]. Wibowo, A. dan D.T. Djajawinata. 2004. Integrated Management of Urban Solid Wastes. www.kkpi.go.id.
- [15]. Wong, M. S., C. Fearon, and G. Philip, 2009. Evaluating E-government in Malaysia: An importance-performance grid analysis (IPA) of citizens and service providers, *International Journal of Electronic Business*, vol. 7(2), pp. 105-129.