



WASTE MANAGEMENT EVALUATION IN ARORO IRORO MARKET SERUI YAPEN ISLANDS AREAS

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Abstract

The market is one of the public places that is the center of public transactions as well as economic activities that have the potential to generate waste. The purpose of this research is to evaluate the implementation of waste management which consists of institutional, financial, operational, legal and regulatory aspects, as well as community participation in waste management in Aror Iroro Serui Market. The research was

conducted using qualitative quantitative descriptive method with cross sectional approach. Data collection techniques used observation and measurement sheets, questionnaires, and in-depth interviews. The object of research was a waste management system starting with observation, then data collection was carried out through questionnaires to traders and data synchronization was carried out with in-depth interviews with market managers then narrated and carried out SWOT analysis (Strength, Opportunities, Weakness, Threats). The results show that the average waste generation reaches 98.1 m³. SWOT analysis shows that the existing strategy is included in quadrant II or a diversification strategy with a value of X, Y (0.91; -0.8). Based on the SWOT analysis, a solid waste management program strategy is obtained in the form of diversification or diversification of waste management regulations, programs to increase obedience of officers in carrying out their obligations, procurement of adequate infrastructure, and forms of effective approaches for the community.

Keywords: *Waste Generation, Waste Management, SWOT Analysis*

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INTRODUCTION

The waste problem in Indonesia is a very serious problem and also a social, economic and cultural problem. Data from the Ministry of Environment and Forestry states that Indonesia produced up to 65 million tons of waste in 2016 and has increased every year. According to the Director General of Waste, Waste and B3 Management of the Ministry of Environment and Forestry, in 2019 the volume of waste in Indonesia is estimated to reach 68 million tons / year. This amount is obtained from the amount of waste 175,000 tons / day with a population of 327 million people. (Budiman, 2007) The amount of waste generation will increase with increasing human activity. (Daniel D, 2009) There is waste generation due to ineffective waste management. .

Waste management is one of the development programs to maintain environmental health. Based on SWI (Sustainable Waste Indonesia) data, Indonesia has not been effective in processing waste because most of the waste or 69% of the waste ends up in landfills, while 24% of Indonesian waste is not managed, and 7% of waste is successfully recycled. (Arif, 2015)

Every place that has the potential to produce waste requires management efforts, as in the market. The market as one of the economic platforms for the majority of society and a commercial center that can certainly produce both organic and inorganic waste. (George R, 2009) The regulations governing the implementation of waste management are contained in the Regulation of the Minister of Health of the Republic of Indonesia Number 17 of 2020 concerning Healthy Markets, that every kiosk / booth / aisle has a sorted trash can (made of waterproof material, not easy to rust, strong, has a cover, and easy to clean. Meanwhile, temporary shelters must also be separated, waterproof, strong, easy to clean, easy to clean. reachable by garbage collectors, not a breeding place for disease-transmitting vectors, the location of the Temporary Storage is not on the main market route and is at least 10 m from the market, waste is transported at least 1 x 24 hours and uses the 3R (reduce, reuse, recycle) method. (Minister of Health Regulation, 2020)

Data from the Environmental Agency shows that the Aroro Iroro Market produced 18,565 m3 of waste in 2016 or produced 50.86 m3 of waste per day. The number continues to increase every year and in 2019 the Aroro Iroro market produces 25,722 m3 of waste with 70.47 m3 of waste per day. The waste generation is located at two points of Temporary Shelters in the East, close to the merchant's kiosk and behind the market, but less than 10 m from the merchant's kiosk. The existence of the main garbage dump that is too close to the buying and selling activity causes the presence of disease-carrying flies to land on the merchandise or food that is traded around it so that the food condition becomes unhealthy (Rahmadani, 2017)

Waste management activities require duties and responsibilities for the roles of managers and traders to implement good management in waste management, so to find out more clearly



the problems in waste management at Aroro Iroto Market, researchers will look at institutional aspects, financing aspects, legal and regulatory aspects, and aspects of merchant participation.

METHOD

This research is a descriptive quantitative qualitative research. The research was conducted to see, and describe in sentences and numbers about the object under study with the aim of drawing conclusions according to what was seen. (Juli S, 2013) This study used a cross-sectional study design for the time of the study, where all subjects and variables were only observed. one time at a predetermined time. (Minister of Trade of the Republic of Indonesia, 2008) The method used in this study is an evaluative method, which is a series of scientific processes carried out to measure the success of program results or the effectiveness of a program. In this case the program in question is waste management at Aroro Iroto Market using SWOT and the IFAS-EFAS matrix. (Matthew, 2014)

RESEARCH RESULT

1. Research Location Overview

Aroro Iroto Market is the largest public market in Papua's Yapen Islands Regency. Aroro Iroto Market is located in the city center, precisely on Jalan Pangeran Diponegoro, Serui City Village, Yapen Selatan District, Serui City. Aroro Iroto Serui Market has a land area of 20,000 m². Aroro Iroto Serui Market consists of four buildings with 2 floors. Trading Arrangement (Zoning) Aroro Iroto Serui Market 1st floor contains 4 Los and 2nd floor with 1 special booth for clothes.

2. Observation and Measurement Results

Table 4.2 Results of Waste Management Observation Sheet

No	Indicator	percentage Category	
		es(%)	No (%)
	Provision of trash bins	54,5	45,5
	Garbage collection	54,5	45,5
	Transport to a landfill		100%

The results of these observations indicate the number of items that have not been fulfilled in waste management at Aroro Iroto Serui Market. In the indicator for providing trash bins, there are 6 points (54.5%) implemented out of a total of 11 items, as well as the indicator for garbage collection. Meanwhile, in transporting the waste to the Final Disposal Site, all points have not been implemented.



Table 4.3 Results of the Officer Action Observation Sheet

No	Statement	Answer	
		Done	Are not done
	Carry out the trash can in every kiosk or booth.		V
	Carrying out garbage transportation at every kiosk or booth.		
	Separating wet and dry waste at temporary waste disposal		V
	Clean up trash in the Temporary Disposal Site every 1x24 hours		V
	Carry out temporary disposal of garbage in its place or at a Temporary Disposal Site		

The results of these observations indicate that there are many items that have not been carried out by management officers in efforts to manage waste at Aroro Iroto Serui Market. From the table above it can be seen from the 5 statement items, there are 2 items that have been done (40%) and there are 3 items that are not done (60%)

Table 4. 4 Data of Aroro Iroto Market Waste Generation in May 2021

No.	Day	Date	Daily Volume (m ³)	Number of daily rites (times)	The volume of waste generation (m ³)
	Monday	3/5/2021	90	3	6
	Tuesday	4/5/2021	90	3	6
	Wednesday	5/5/2021	95	3	11
	Thursday	6/5/2021	95	3	11
	Friday	7/5/2021	95	3	11
	Saturday	8/5/2021	133	3	49
	Sunday	9/5/2021	90	3	6
	Total		688		100

Based on the table above, it can be seen that the average generation / volume of waste produced at Aroro Iroto Market every day is 98.19 m³. The measurement results obtained by measuring the land / building of the Temporary Shelters. The number of daily rituals is 3 times a day with 4 transportation fleets in use. The types of transportation fleet are 1 dump truck with



a capacity of 10m³, 1 dumptruck with a capacity of 6 m³, and 2 aramroll trucks with a capacity of 6 m³. So the maximum total of transportation in a day is around 28 m³ at once and 84 m³ in a day, so it still leaves waste generation.

Table 4.5 Data on the Results of Measurement of Fly Density

No	Location / point	Measurement results					amount (tail)	Average
		1	2	3	4	5		
1	Point 1	17	22	14	16	20	89	18
2	Point 2	13	23	15	18	22	91	19
3	Point 3	25	21	13	15	12	86	18

The results showed that the average density of flies in Aroro Iroto Serui Market was 18 individuals.

Table 4. 6. Aesthetic Measurements

No	Aesthetic Elements	Condition		Information
		There	not	
1	Shed the waste generation	v	-	Leachate drips from between the garbage containers
2	Vector (flies, mice, cockroaches)	v	-	There were flies, mice, cockroaches and pigs
3	Strong scent	v	-	The smell of garbage is pungent up to about 10m from the existing Temporary Disposal Site
4	Garbage scattered about	v	-	Garbage is scattered around the container because of the full container load and around the Temporary Disposal Site
5	Sewage	v	-	Turbid water, mixed with scattered trash

The results show that the aesthetics of Psar Aroro Iroto Serui has decreased due to the discovery of these elements. From the table above, it can be seen from the 5 items of aesthetic



elements, all items are (100%) which include leachate from waste generation, the presence of vectors, strong odors, scattered garbage, sewage water.

3. Results of SWOT Analysis and IFAS-EFAS Matrix

The results of the SWOT analysis have formulated thirteen waste management program strategies at Aroro Iroro Serui Market, namely:

Strategy	Program
S-O strategy	1. Improving the quality of waste management services in order to improve waste management better 2. Increasing market retribution costs to support waste management operations
W-O strategy	1. Provide organic and inorganic waste bins and carry out waste sorting 2. Adding competent human resources and improving the quality of human resources by taking part in technical training and solid waste management at the regional level 3. Optimize the commitment of the central government and provincial governments to realize financial assistance for market waste management to help finance market waste management 4. Increase the regional revenue budget and increase the cost of market waste retribution to encourage an increase in the market waste management budget so that it can improve market cleanliness facilities, renovate temporary waste disposal sites and implement the 3R waste management program 5. Increase the budget to increase the salary for garbage collection cleaners so that they can work more actively
S-T strategy	1. Strengthening law enforcement and outreach to traders so that the rules set can run optimally 2. Optimize Human Resources for socialization of community participation in the waste sector 2. Optimize Human Resources to be more active in socialization / counseling and guidance so that people are more concerned with the health of the market environment
W-T strategy	1. Optimizing law enforcement so that the waste management system can run optimally 2. Optimizing cost sources for waste management in order to support better market waste management 3. Optimizing the quantity and quality of Human Resources to consistently increase outreach to the public



Based on the SWOT results, it can be seen that the internal position (IFE) gets a total of 2.65. The total strength value is 1.78 and the total value for weakness is 0.87. So if the difference to determine the X axis is 0.91. While the external position (EFE) got a total value of 2.84. The total opportunity value is 1.02, while the total threat value is 1.82. So if the difference is used to determine the Y axis, it is -0.8. So that the right strategy is in the diversification strategy. This situation is found to be an external threat, but the company or related institutions can use strength as an added value.

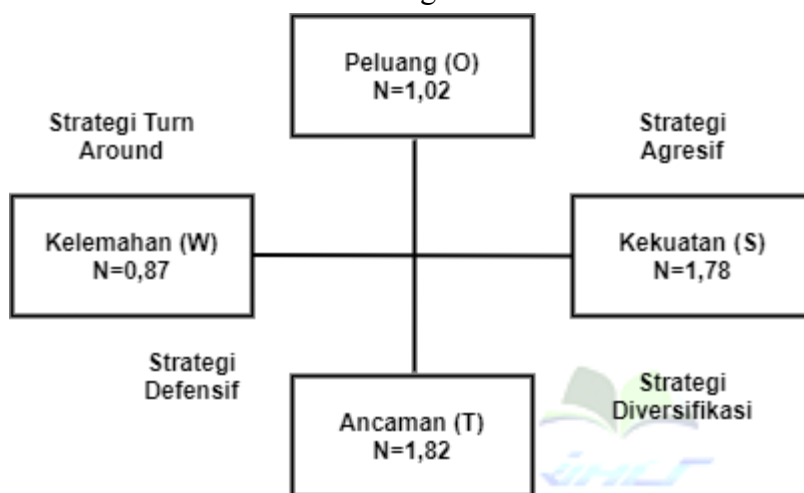


Diagram 1 SWOT Diagram Analysis Results

DISCUSSION

1. Waste Management Conditions and Environmental Health Indicators in Aroror Iroto Serui Market, Yapen Islands Regency, Papua

Humans carry out various activities to fulfill their welfare by producing food and beverages and other goods from natural resources. This activity also produces waste material called garbage. (Budiman, 2007) Garbage is something that is not used, unused, disliked, or something that is discarded that comes from human activities and does not happen by itself. Poor waste management can have a negative impact on health (Metthew, 2014)

Traditional markets are markets that are built and managed by the Government, Regional Governments, Private Companies, State-Owned Enterprises and Regional-Owned Enterprises, including cooperation with the private sector with business premises in the form of shops, kiosks, stalls and tents owned / managed by small, medium-sized traders, non-governmental organizations or cooperatives with small-scale businesses, small capital and with the process of buying and selling merchandise through bargaining (Daniel D, 2009)

Aroro Iroto Serui Market is the largest traditional market in South Yapen District, Yapen Islands district. Aroro Iroto Serui Market is managed by the Department of Environment and the Office of Industry, Trade and Cooperatives (PERINDAGKOP & UKM). Aroro Iroto



Market has two Temporary Shelters. In the temporary shelter there is no differentiation of organic and inorganic waste, and also the location of the temporary shelter is less than 10 m from the market, and the transportation of waste from the temporary shelter at the Aroro Iroto Serui market to the final disposal site is not done 1 x 24 hours. The distance between the Temporary Shelter and Final Disposal Sites is 7 km. The location of the final disposal site is in Aromaraea Village. Because the temporary shelter in the west is only placed on top of the building without using a container, causing a large amount of garbage scattered around the Temporary Shelters because the trash cans are still open so they are easy to enter by animals such as pigs, rats and many green flies scattered around the Temporary Shelters and cause disturbing bad smell, and also for the Temporary Shelter in the east because the container has limited capacity and the garbage is not routinely transported 1 x 24 hours so when the garbage is full in the Temporary Shelter, the cleaning officer places the trash next to the Temporary Shelter container. This condition causes environmental pollution, such as a disturbing stench, lots of green flies scattered around the Temporary Shelters, rats, and pigs around the Temporary Shelters.

The open dumping method is used at the final disposal site. Open Dumping is a garbage disposal system by simply throwing garbage in an open field of landfill without any follow-up so that it is considered to have a wider negative impact. The government itself has issued Law Number 18 of 2008 concerning Waste Management which regulates waste management related to changes in the paradigm of waste management, division of authority and its implementation. This Law mandates that all City / Regency Governments that are still using TPA in the Open Dumping method must plan their closure at the latest one year since the enactment of the Law and must close these types of Final Disposal Sites and replace them with better landfills, namely those known as Sanitary Landfill, no later than the time this Law was enacted. The open dumping method is used at the final dumpsite due to limited funds.

2. Efforts to subscribe to generated waste through waste management evaluation

According to SNI 19-2454-2002 the generation of market waste determines the operational quality of market waste management. Aroro Iroto Serui market waste generated from trading activities in a week reached 98.19 m³ / day or 2,752m³ / month. This amount has increased from the previous year which was equal to 50.86 m³ / day. The composition of the waste produced is mostly in the form of organic waste, namely vegetable, fruit and food scraps. On Saturdays the waste generation reaches the highest volume because it is a holiday (weekend) so that the number of visitors and transactions increases as well.

The increase in economic activity has had an impact on increasing the population growth rate as well as the rate of waste generation in the Aroro Iroto Serui Market. In the future, this will certainly increase the amount of waste generated into landfills. The increase in the amount of waste generated which is not matched by the increase in land area of landfills will certainly cause waste to quickly accumulate in landfills and the useful life of landfills will be shorter.



When the useful life of the Final Disposal Site has expired, the solution is to find a new landfill or make an effort to expand the land at the Final Disposal Site. Yapen and due to the existence of an open dumping system that is not in accordance with government criteria.

Therefore, it is very important to know and update data on waste generation to determine the facilities and capacity for waste management at Aroro Iroto Serui Market, for example equipment facilities, transportation vehicles and transportation routes, recycling facilities, area and type of landfill. The projection of waste generation is used to estimate the volume of waste produced in Yapen Regency in the next 10 years due to one of the remaining waste production at Aroro Iroto Serui Market. This projection is also useful for determining the number of facilities and the amount of waste transportation in the sanitation sector that should be available at the time of the projection year (Madani, 2011).

Discussion of Waste Management Aspects from the Results of Quantitative and Qualitative Data Processing

a. Institutional

In the results of the assessment with the questionnaire, there were 4 items lacking the score, including market items that have a waste management system that meets technical requirements, available wet and dry bins made of watertight materials that are not easy to rust, are strong, have a cover, and are easy to use. cleaned, an organizational structure supported by adequate capacity (quantity and quality of Human Resources) in accordance with their respective authorities, and supervision of the operation of the market waste management system. This institutional aspect is closely related to the main stakeholders, namely the Environmental Agency and related agencies. Research conducted by Muhlis Madani in connection with the Agenda Setting Market Waste Management in Makassar City states that the partnership between these agencies can be a solution in anticipating the generation of waste in the Aroro Iroto Serui Market (Damanhuri, 2010)

b. Financing

In the results of the assessment with the questionnaire, it was found that there were 2 items lacking a score, including the availability of adequate government budgets from central, provincial and district governments, the existence of waste management financing from government budgets and adequate service fees / fees. Financing for market waste management includes several components, namely investment, operational and maintenance costs, management, development, counseling and community development which are then calculated ideally and the amount of fees that traders must pay for waste management is obtained (Andriani, 2018).

c. Laws and Regulations

In the results of the assessment with the questionnaire, there were 3 items lacking a score, including the existence of regulatory rules and waste sorting that requires everyone to sort waste, the existence of regulatory rules and sanctions have been applied to traders for public



order for violations in the waste sector, the existence of rules, regulations and local regulations have been applied that specifically determine the tariff structure and basic tariff for waste management to finance reinvestment, operation and maintenance. The majority of the results of this questionnaire stated that regulations or regulations related to waste management at Aroro Iroto Serui Market were insufficient and inadequate. This can be due to the lack of counseling or coaching so that management practices and implementation have not been running in an orderly and disciplined manner (Rahmaniah, 2014)

d. Operational Waste Management

In the results of the assessment with a questionnaire, the results obtained were less than 6 items, including cleaning officers carrying out waste sorting / separating waste, cleaning officers routinely transporting trash from each stalls / merchant stalls, available facilities such as Temporary Storage Sites, Final Disposal Sites, trucks, garbage transporters, trash cans, trash bins, carts, brooms), garbage collection places in the market are not used as a place to live or or nest for flies and other animals to enter, there is a schedule for collecting and transporting garbage and it is carried out 1 x 24 hours, based on waste management. 3R (Reduce, Reuse, Recycle) has been well organized. The number of waste management operational items can illustrate the lack of compliance with operational standards that refer to SNI 19-2454-2002. (Syafudin, 2006)

e. Trader Participation

In the results of the assessment with the questionnaire, the results obtained were less than 4 items, including traders providing trash cans that are waterproof, not easy to rust, strong, closed, and easy to clean, traders do waste separation / sorting, traders throw garbage in its place and do not litter. In the market, local governments / market managers have developed public awareness of the health responsibilities of the market environment through guidance and socialization / counseling on solid waste. The participation of traders in Aroro Iroto Serui Market still needs to be increased on the awareness of traders to play an active role in its implementation, such as providing trash bins, sorting efforts and placing trash bins in the places provided. For this reason, a better approach is needed in order to increase the active participation of traders (Rahmadiani, 2017)

3. Discussion of the SWOT and IFAS-EFAS Matrix

The results of the resulting program analysis in the form of 13 strategic programs for increasing waste management in Aroro Iroto Serui Market can be prioritized with diagram 1. The diagram shows that the SWOT analysis can be determined to be in quadrant II, which supports the diversification strategy (Rangkuti, 2015). From the analysis of external factors and analysis of internal factors combined in the SWOT matrix, to create a strategy, alternative waste management strategies are obtained according to the internal and external environmental conditions of waste management as follows:



- a. Diversify policies / regulations / SOPs in waste management at Aroro Iroro Serui Market as technical, retribution, roles and responsibilities of all parties involved
- b. Making programs that can increase the obedience of officers in carrying out their obligations in waste management, such as giving rewards and punishments
- c. Provision of diverse and adequate infrastructure in order to expedite the market waste management system
- d. Diversification of approaches to the community or visitors and traders in order to create an orderly and good waste management environment.

CONCLUSION

Based on the research that has been done, the following conclusions can be drawn:

1. The amount of waste generated from transaction activities at the Aroro Iroro Serui Market is an average of 98.1 m³ / day.
2. Environmental health indicators in the form of waste generation are still found with an average of 100 m³ / week of unsuccessful generation that is not transported. Also found was the density of flies with a fairly high number of 18 flies and a decrease in environmental aesthetics such as scattered trash, leachate, and the color of cloudy and thick sewer water.
3. The results of the assessment of waste management at Aroro Iroro Serui Market on the institutional aspect of 57% are not good, financing is 67% not good, laws and regulations are 75% lacking, operational 67% are lacking and on the aspect of merchant participation 80% are less based on the results of the questionnaire.
4. Evaluation of waste management at Aroro Iroro Market using a SWOT analysis. The results of the study with the IFAS matrix show that the X axis is 0.91 and the EFAS matrix shows the Y axis is -0.8. After the analysis, it can be determined that quadrant II supports the diversification strategy in the form of diversifying regulations or waste management regulations, programs to increase obedience of officers in carrying out their obligations, procurement of adequate infrastructure, and forms of effective approaches for the community.



REFERENCES

- Andriani, T., 2018. Peran pedagang pasar dalam pengelolaan sampah di lingkungan Pasar Ciputat (Bachelor's thesis, UIN Syarif Hidayatullah Jakarta: Fakultas Ilmu Tarbiyah dan Keguruan, 2018).
- Chandra, Budiman. 2007. Pengantar Kesehatan Lingkungan. Jakarta: EGC.
- Chiras, Daniel D. 2009. Environmental Science. 8th Edition, Sudbury, Massachuttes: Jones and Bartlett Publisher.
- Damanhuri, E. and Padmi, T., 2010. Pengelolaan sampah. Diktat kuliah TL, 3104, pp.5-10.
- Kodoati, R., J., 2003. Introduction of Infrastructure Management. Pustaka. Yogyakarta
- Madani, M., 2011. Agenda setting pengelolaan sampah pasar di kota makassar. Otoritas: Jurnal Ilmu Pemerintahan, 1(1).
- Menteri Perdagangan Republik Indonesia. 2008. Peraturan Menteri Perdagangan Republik Indonesia Nomor : 53/M-DAG/PER/12/2008 tentang Pedoman Penataan dan Pembinaan Pasar Tradisional, Pusat Perbelanjaan, dan Toko Modern.23. Undang-undang Republik Indonesia Nomor 7 Tahun 2014 tentang Perdagangan.
- Miles,Matthew.B, Huberman,A.M, dan Saldana,J. 2014. Qualitative Data Analysis, A Methods Sourcebook, Edition 3. USA: Sage Publications. Terjemahan Tjetjep Rohindi Rohidi, UI-Press.
- Peraturan Menteri Kesehatan Nomor 17 Tahun 2020 Tentang Pasar Sehat
- Rahmadani, E. and Padang, P.K.K.K., 2017. Hubungan Pengetahuan, Sikap dan Ketersediaan Sarana Pengelolaan Sampah dengan Partisipasi Pedagang dalam Pengelolaan Sampah di Pasar Raya Solok Tahun 2017. Skripsi sarjana. Poltekkes Kemenkes Padang Jurusan Kesehatan Lingkungan, Padang.
- Rahmaniah, R., Meidiana, C. and Ari, I.R.D., 2014. Potensi Reduksi Sampah Melalui Pengelolaan Sampah Perkotaan Di Tps Kecamatan Mataram. Jurnal Tata Kota dan Daerah, 5(2), pp.119-128.
- Slamet, Juli.S. 2013. Kesehatan Lingkungan. Gadjah Mada University Press, Yogyakarta.
- Sumantri Arif. 2015. Kesehatan Lingkungan. Jakarta: Kencana Prenada Media Group.
- Syafrudin. 2006. Buku ajar Pengelolaan Limbah Padat (Sampah) Perkotaan, Program Studi Teknik Lingkungan, Fakultas Teknik Undip, Semarang
- Terry, George R & Leslie W. Rue. 2009. Dasar-Dasar Manajemen. Jakarta: Bumi Aksara