

# The Concept of Strategy for Garbage Management in the Kupang City, Indonesian

Jefirstson Richset Riwukore<sup>1\*</sup>, Fellyanus Habaora<sup>2</sup>

<sup>1</sup>Lecturer of Management Graduate Program of Indo Global Mandiri University, Jl. Jend. Sudirman KM.4 No.629, 20 Ilir D. IV, Kec. Ilir Tim. I, Kota Palembang, Sumatera Selatan 30129, Indonesia

<sup>2</sup>Post Graduate Programe Animal Production and Technology, Faculty of Animal Sciences, Bogor Agricultural University, Bogor, Indonesia

\*Corresponding author: Jefirstson Richset Riwukore | Received: 02.06.2019 | Accepted: 12.06.2019 | Published: 22.06.2019  
DOI: [10.21276/sjhss.2019.4.6.1](https://doi.org/10.21276/sjhss.2019.4.6.1)

## Abstract

The city of Kupang was assigned as the dirtiest city of number one by the Ministry of Environment and Forestry in the East Nusa Tenggara Province-Indonesia in the assessment of the Adipura award in 2018. This assessment was a further impact of the cleaning management program by the Mayor of Kupang for the period of 2012 to 2017, namely Jonas Salean, because can not to finish process garbage problems in Kupang City. Therefore, a research with literature study techniques was conducted to find the concept of garbage management strategies in the city of Kupang that can be offered to Kupang City leaders for the new period of 2017 to 2022 to resolve existing garbage problems. The results of this research indicate that the concept of garbage management strategy in Kupang City can be done with the concept of zero garbage from upstream to downstream, the concept of zero garbage as extracurricular education, the concept of green community, the concept of management conventional garbage, and the economic concept of zero garbage.

**Keywords:** The concept of strategy, garbage management, Kupang City.

**Copyright @ 2019:** This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

## INTRODUCTION

The garbage problem in Kupang City is the main problem since this area is assign by the Ministry of Environment and Forestry as "Dirtiest City Order of Number 1" in the East Nusa Tenggara Province-Indonesia in the Adipura award in 2018. This assessment is a follow-up of the cleaning management program carried out by The Mayor of Kupang for the period of 2012 to 2017, namely Jonas Salean who was considered unable to process garbage problems in the Kupang City. This negative award became a benchmark for the leadership of Jeriko-Herman Man (Fir-Manmu) who was newly inaugurated as Mayor and Deputy Mayor on August 18, 2017, but received negative values from the previous Mayor's leadership. Garbage problems in the Kupang City have not been resolved because they still use previous leadership patterns, namely: gathering, transporting, and disposing. Likewise, garbage management at landfills has not applied environmentally friendly rules.

Report from the Kupang City Environment and Cleanliness Office in 2019 that garbage problems occur due to factor the people's perspective is still less about garbage of so that they have not properly utilized the available dump, as well as the ability of garbage transportation equipment that has not compatible with

the garbage volume, and handling landfills that is not yet good. Garbage problems should not only be a affairs from just government services but also society affairs. Should the garbage management problem be the responsibility of all parties, and also as a sharing of the burden of public problems to society, and the private sector.

This literature review was conducted to determine the extent to which the concept of garbage management that can be recommended and applied in garbage management policies in Kupang City Government.

## RESEARCH METHODS

This research uses qualitative description research methods to analyze previous research on garbage treatment strategies in urban areas. The research uses reliable reference sources, which can be traced at the Google Scholar Index, for identification of relevant academic literature. In addition, this research analyzes various perceptions of garbage management strategies used by researchers.

## RESULTS AND DISCUSSION

### The Concept of Zero Garbage from Upstream to Downstream

The concept of zero garbage is garbage avoidance as a top priority, then followed by recycling and material engineering to minimize the amount of garbage that is discharged into landfills or burned in incinerators. The concept of zero garbage is also a mandate of Constitution Number 18 Year 2008 About Garbage.

The challenge of the zero garbage concept has not been done well because the increase in heap of garbage from upstream to downstream has not been well resolved. The factor of heap of garbage is caused by low public awareness, population growth, and economic activities [1]. Households must be the main pillar in solving garbage problems because of the source of the main garbage problem from the household. According to SNI 19-3983-1995 that every person in a household produces 0,7-0,8 kg/person/day of garbage, so that with 412.708 people in the Kupang City in 2017 it produces 288.895,6 kg/person/day. This will further aggravate heap of garbage if it is not managed properly.

The problem solving garbage early on household (upstream) is able to reduce garbage at household by 60-65%, while the rest 35-40% is transported to Landfills [2]. The results of Mayangkara research in Tuban district are quite effective in integrated garbage management because the management involves all household from the beginning, where households have to sort garbage into three parts, namely wet organic garbage (food scraps, vegetables), dry (paper, boxes, bottles), and hazardous garbage such as used accu and batteries, sprayers, insecticides, and sanitary pad. Dwiyanto [3] reports that society-based household garbage processing in Sambiroto Semarang has been successfully implemented with the 3R principle (reduce, reuse, recycle) through the process of sorting garbage, and is able to reduce the volume of garbage disposed up to 70%.

The zero garbage household concept carried out in the Padang City through processing trash into compost capable of reducing garbage arriving at Landfills is only 21,56% [4]. Nizar *et al.*, [5] stated that strengthening composting in households would have a high percentage of trash diversification reaching 82%. Diversification of garbage can be processed into something that is beneficial to the economy, such as accessories. Garbage if considered as a useless item is a wrong view, when humans understand and realize that trash has a price and can also be an environmental destroyer.

The government's role in the success of the upstream zero garbage concept can be done by strengthening facilities, economic benefits, local

institutions, knowledge, and attitudes for household residents. Posmaningsih [6] reports that facilities are the most dominant factor contributing to society participation in trash management because 90,5% of the society is willing to sort garbage when given appropriate trash bins, and 26,67% of the people do not do garbage management because don't have a tool. Fisher *et al.*, [7] op.cit. Posmaningsih [6] reported that the presence of trash bins reduces littering by as much as 15% in urban areas, and 30% on highways. Colorful trash bins can reduce garbage dumping by as much as 14,9%, while ordinary trash cans are only 3,15%. Trash bins that are increasingly unique with striking colors are more effective than ordinary trash cans. The reason for the low behavior of social awareness participation in garbage management is because the people have not managed it to manage trash from the garbage source to the trash provided.

### The Concept of Zero Garbage as Extracurricular Education

Social awareness can be developed through the world of education in extracurricular activities every Friday or Saturday. Garbage utilization activities must be accustomed because every the type of garbage has the potential to be crafts item and art that has an impact on students' creative and innovative abilities. This must be accustomed early to create cultural wisdom.

Extracurricular education in the world of education in early childhood and up to the next education sequence can begin with an introduction to the type of garbage and sort it out. This activity can be carried out by placing organic and inorganic trash cans in each class. Then the garbage on Friday or Saturday is sorted into making handicrafts or arts. The capacity of art and craft teachers needs to be considered. Likewise, the government can cooperate with NGOs / private companies that have a focus on environmental issues.

Posmaningsih [6] gave an example of SMU 34 Cilandak-South Jakarta which has carried out garbage management activities and teaches students about the importance of saving the environment. The teacher at Senior High School very supportive the activity because appropriate with the education provided at school. Paper trash originating from teaching and learning activities is recycled into recycled paper and art paper. Organic trash from flower plants, ornament and shade on the school yard is processed into compost by vermicomposting. Compost products are used as fertilizer for medicinal plants in the school's medicinal gardens. While plastic trash is addressed by the principle of reduce and reuse.

Assahary [4] reported that the concept of zero garbage in the Padang City, from 40% of Primary school through high school, has implemented a trash reduction program starting from the world of education, and has an impact on transmission to homes and

neighborhoods. Ninggarwati and Latianingsih [8] reported the results of a research in 15 schools in Depok City that the school had carried out garbage management by 20% answering as fertilizer, 40% answering made craft, and 20% answering given to Depok City government trash banks, and the rest prefer to pay garbage collection fees. The introduction of garbage management in the world of education can change bad behavior since the start against trash.

### The Concept of Green Community

Green community is a green city development instrument in managing garbage by re-exploring the local wisdom of the local area. This is important because no matter how modern the technology management of garbage, if it is not accompanied by social participation, it will not work well.

The Family Welfare Development Team (TP. PKK) in urban villages is the green community's main pillar in their respective regions. TP. PKK has an environmental conservation program with the aim of making the home environment healthy, including how to manage the trash around it to be beneficial. Weak perceptions and awareness from society about trash can be changed by the TP. PKK because it becomes an environmental cadre who provides social education for city residents by campaigning or advocating for garbage management that can change people's bad behavior.

Green community can be applied starting from each Regional Device Organization (RDO) according to its duty responsibilities to socialize the problem of trash as a shared problem. This needs to be considered because the perception of trash in the State Civil Apparatus in RDOs is the responsibility of cleaning services or tasks from the Environment and Cleanliness Office.

Green communities can also be carried out with garbage-free safari (blusukan) to the villages and urban villages by government officials in collaboration with other environmental groups on certain days with the surrounding society, such as "Friday Clean or Saturday Clean". This safari activity is known to increase the spirit of "gotong royong" among residents to clean up the environment that is still maintained until now. Parmoningsih [6] reported that participation in gotong royong activities around the home environment can reach 91,7%. Suyanto *et al.*, [9] reported that the spirit of local wisdom in gotong royong with the "kerigan pattern (communal collaboration carried out by the Banyumas community)" was able to make Purwokerto City get an award from WHO because it succeeded in freeing the area from the attacks of Dengue Hemorrhagic Fever (DHF). At that time, the community performed the local wisdom with Kerigan patterns in the form of pickets together to eradicate mosquito nests.

Another green community activity is to do a "dawn attack", where every first week of each month with the surrounding society, the RDOs, the National Police, the Indonesian Armed Forces, religious communities collectively clean up the trash in the rivers, sewers and markets. This activity continues until public awareness to make biopori as infiltration. Likewise, the green community succeeded in inviting stakeholders and the seller vendors to prepare trash bins. This activity succeeded in making the face of Semarang City beautiful [10].

Recommend an alternative model of regional government policy in garbage management, namely: to prioritize the participation of green communities in an integrated manner between various relevant stakeholders. In the green community, there is a mental revolution that can be carried out through a religious approach, ecoliteration, ecodesign in garbage management and revitalization of the form of local wisdom towards a green city. Green community activities can be carried out through posyandu activities, cleaning festivals, garbage health insurance or garbage deposits, involvement of places of worship as garbage banks, Friday clean, green Saturday, healthy Sunday. Green community is quite effective in the cities of Bandung, Purwokerto, and Balikpapan [9].

Green community is a passably approach because it is based on participation. Handono [11] *op.cit.* Suyanto *et al.*, [9] states that the best participation approach is Elzioni's model 1964 where his theory examines community participation in 2 aspects, namely: type 1 community involvement, and type 2 is the acceleration of influence. The involvement of all stakeholders and the community in a chain of garbage management activities at certain time with the local wisdom approach is able to reduce heap of garbage. Suyanto *et al.*, [9] reported that the involvement of Surabaya Mayor Tri Rismaharani in the green community in trash management was able to reduce the volume of heap of garbage in a very significant amount reaching 30%.

Green community is needed to reduce the amount of trash in large quantities due to lack of public awareness. If it is not managed good and properly, it will cause environmental, physical components of water and air chemistry, biology, socio-economic, culture and health to be disturbances. Green community is needed because according to the Riskesdas [12], only 24,9% of households that manage trash of transported by officers, and most households manage trash by burning (50,1%), be heaped up (3,9%), composted (0,9%), dumped into rivers, ditches, or the sea (10,4%), and disposed of carelessly (9,7%).

Parmoningsih [6] states that there is a significant contribution given by the green community participation in managing trash as an information

provider to the community and as a facilitator in behavior change. The existence of a green community can reduce the amount of garbage that reaches the landfills. Green communities need to be considered by regional governments because remembering the government is always lagging behind in solving trash problems because limited budgets and resources impact [13]. Widiyanto *et al.*, [14] states that trash problems will occur along with the increase in population. Garbage management activities experience constraints in terms of disposal that is not at place, and inadequate of facilities and infrastructure which are available.

The study results of Setiadi [15] show that the green community can improve the participatory approach of the society, where through this method, the society is able to identify, analyze and map themselves problems, potentials, threats and obstacles to the situation, and in this way they can be offering and working on the best solution for them. In managing garbage, the society is marked by the ability to organize themselves into a joint activity to solve garbage problems. Society organizing by the community itself is a form of high awareness from the community to respond to garbage problems and act on the basis of shared interests as well. The concept of a green community has the value of economic benefits if managed properly.

#### **The Concept of Management Conventional Garbage**

This concept seeks to maximize conventional garbage management. In general, this management concept is known with several systems, namely: container systems, door to door systems, depo transfer systems, and temporary trash disposal systems (TPSS).

The container system is carried out by placing containers in strategic locations. The full container is taken, then taken to the landfills, and replaced with an empty container. The door to door system is carried out using a garbage truck that travels around the environment accompanied by three to four workers to raise garbage from the shelter to the truck. The depot transfer system is carried out in two stages of transportation, where trash in the location is collected by local collection personnel using a trash motorbike or mobile garbage to be taken to the depot transfer, then trash from the transfer of depots (garbage of several carts) transported to trucks that have been waiting to be taken to landfills. The TPSS system is carried out by providing temporary trash bins, and in certain periods of time the garbage truck will come to collect the garbage collected at this TPSS and then taken to the landfills.

The concept of conventional garbage management in order to provide maximum results, the operational pattern of applied garbage management is adjusted to existing trash sources, needing to consider the conditions of each source. The operational

conditions in meaning are considerations of the time of trash disposal operations to the TPSS and the operation of transporting trash from TPSS, the condition of the trash, the condition of infrastructure, etc., including the role of scavengers.

The concept of management conventional garbage, scavengers become the main spearhead in the process of handling trash because in this method, the trash after leaving the household will end up with a heap in the landfills. Scavengers play a big role in the process of recycling garbage of this.

The presence of scavenger groups in the garbage management system can provide opportunities for unemployed people to working in this sector, and will also help reduce trash that must be transported [15]. The garbage produced in the upstream will decrease in weight in accordance with the travel of the garbage downstream. Separation of trash by scavengers is relatively small, estimated to be less than 2% of the amount of trash collected in TPSS, while scavengers in landfills have a percentage of 5% of the trash that arrives at the landfills. Scavenger activities are highly dependent on the demand for the type of trash needed by collectors, so that government intervention to bring in many collectors in the regions is very much needed. However, organizing scavengers by the government needs to be considered.

#### **The Economic Concept of Zero Garbage**

The economic concept of zero garbage is an economic perspective on trash as a commodity that is able to bring profit values. Some examples of the economic concepts of zero garbage are BLUDs / Private Companies and garbage banks.

All this time still garbage management has been structural bureaucracy oriented handled by the Environment and Cleaning Office or the like so that the perspective of handling trash only conventional so. Some regions such as in Malang City and Gianyar Regency have initiated garbage to have economic benefits so that management is given to third parties (BLUD / Private Companies). Regional Offices only act as regulators or policy makers about garbage, and BLUDs as policy implementers (operators). Qodriyatun [16] states the benefits when BLUDs act the garbage operator, the source of income can be of various kinds, such as aside from the local budgets, can receive income from levies, and grants, investments from the private sector, and other business from recycling garbage, utilization garbage methane gas, and so on. Garbage management by third parties also impacts on the efficient use of the Local Budget. Wijayanti [10] reported that the existence of a third party intervention (PT. Narpati) in the management of trash in the Jatibarang Landfills at Semarang was able to reduce the volume of trash dumped at landfills by 20,90% which

resulted in a decrease CH<sub>4</sub> gas emission value of 35,27%/year, and CO<sub>2</sub> gas by 31,91%/year.

The economic concept of zero garbage can also consider the formation of garbage banks in zone-based areas (vilages / urban villages). Garbage banks as a third party can be a factor in increasing society motivation in minimizing trash because there was an incentives. Posmaningsih [6] reported that the economic benefit variable contributed significantly to community participation by 35,9%. The economic concept of zero garbage needs to consider a policy of punishment for the poor management of trash in the society such as fines or penalties, so that people's behavior will be oriented to economic values rather than getting fines if the environment around the house is very dirty. Gardner [17] states that society participation will increase very significantly when financial incentives are provided for community-based programs that are already running. Giving incentives in the form of money or gifts or the like is a reinforcement method, which is positive reinforcement. While negative reinforcement is a negative stimulus, such as a fine if doing something wrong.

Suyanto *et al.*, [9] reported that the involvement of garbage banks in an effort to empower the society independently in garbage management was able to process as many as 161.729,60 m<sup>3</sup> with number of workers 2.917 people. Then there was government intervention through dissemination, counseling and management training on garbage banks capable of increasing the amount of trash processed as many as 303.321,90 m<sup>3</sup> with number of workers 8.188 members. The garbage bank as an internalization of the economic concept of zero garbage can be a new job field for reducing the large number of unemployed people in the city.

The economic concept of zero garbage has been carried out by several cities in the world, one of which is Canberra. Canberra became the first city in the world to implement the zero garbage concept, that "the Government does not produce garbage starting in 2010". In 2004, the city of Canberra had reached 70% of diversification of trash through a program to managed by a third party called "Resource Recovery Park" in an effort to help industries (providers of raw materials from garden waste and debris of buildings) make products from materials separate and they can market items that can be reused. The paradigm of the economic concept of zero garbage is based on the theory that urban areas cover only 2% of the world's surface, but consume more than 75% of the world's natural resources and produce 70% of global trash [18, 20].

Third-party intervention can be useful give in profit of garbage management programs in cities. These profits can be added to the Local Budget

Revenue (PAD) for the purchase of other trash processing equipment such as the purchase of an incinerator. Regions and cities have difficulties in procuring incinerators because the prices are expensive and local and city budgetary sources are limited. Incinerators necessary to be held, especially in the landfills because this machine is able to reduce 84% of the total trash by burned until it becomes ashes. The results of combustion can be used as materials for making brick [20].

The economic concept of zero garbage can reduce unemployment because trash has a high economic value for garbage management actors. Nugraha *et al.*, [21] reported that the diversification of trash in the Magelang City, scavengers can generate four times the income from daily income with a total economic potential of Rp37.000.000,00 per day. Dwioktovanny *et al.*, [22] reported that the application of the concept of reduce, reuse, recycle (3R) in garbage management in Kudus City was able to increase collector income from Rp2.428.881,00 per day to Rp8.052.679,00 per day. The economic concept of zero garbage needs to consider the development of economies based on the types of trash to develop their potential. Widiyanto *et al.*, [14] reported that the types of trash that had the highest potential based on the composition of garbage were food scraps (26,43%), then paper (18,55%), residues (16,83%), and organic trash (15,36%). While the most composition of trash based on volume is paper garbage (38,46%), plastic bottles (15,88%), residues (14,64%) and organic trash (10,93%).

## CONCLUSION

The strategy for reduction and countermeasures garbage can be reached with several concepts. Trash reduction activities must start upstream as a source of garbage problems. The concept of management conventional garbage through container systems, door to door, depo transfers, and TPSS requires strict regulation because it is more oriented towards providers of the services and service recipients including households. The concept of green community has more role in efforts to reduce garbage and tackling trash because it is more oriented to the values of local wisdom. The economic concept of zero garbage will accelerate the resolution of the trash problem because it will increase society participation and be more efficient as a welfare value. Public awareness is still very low to implement a system of reduce, reuse, and recycle so that heap of garbage increases as the population grows. For mid-term and short-term programs, the concept of zero garbage in the world of education is very necessary to change the bad behavior of the community from an early age to become human beings who are creative and innovative and aware of the environment.

## REFERENCE

1. Mustofa, M. U. (2016). Pseudo Deradikalisasi: Derutinisasi strategy Waste Handling, Analysis of Structuration on issue the management of trash in the city of Bandung by Mayor 2013-2018 Period. *Jurnal Wacana Politik*, 1(2):152-165.
2. Mayangkara, A. P. (2016). Evaluation of waste management Policy in the landfills Mountain Panggung at Tuban district. *Jurnal Penelitian Administrasi Publik*, 2(2):427-444.
3. Dwiyanto, B. M. (2011). Models increasing society participation and strengthening of synergies in the management of Urban Waste. *Jurnal Ekonomi Pembangunan*, 12(2):239-256.
4. Assahary, S. (2014). Model of social awareness of the community-based waste management local cultural wisdom based (Adat Basandi Syarak, Syarak Basandi Kitabullah) in Padang City. Prosiding SNSTL 2014. Padang, 37-46.
5. Nizar, M., Munir, E., Munawar, E., & Irvan, I. (2017). City trash management based on the concept of zero waste: A literature review.
6. Posmaningsih, D. A. G. (2016). Factors that influence community participation in solid waste management in East Denpasar. *Jurnal Skala Husada*, 13(1):59-71.
7. Fisher, R., & Sime, D. G. (1984). Solar activity cycle variation of the K corona. *The Astrophysical Journal*, 285, 354-358.
8. Ninggarwati., & Latianingsih, N. (2014). Urban waste management model in education sector at Depok City. *Jurnal IPI*, 109-115.
9. Suyanto, E., Soetarto, E., Sumardjo, S., & Hardjomidjojo, H. S. (2015). Model Kebijakan Pengelolaan Sampah Berbasis Partisipasi "Green Community" Mendukung Kota Hijau. *MIMBAR, Jurnal Sosial dan Pembangunan*, 31(1), 143-152.
10. Wijayanti, W., & Tanoue, K. I. (2013). Char formation and gas products of woody biomass pyrolysis. *Energy Procedia*, 32, 145-152.
11. Handono, K., Hasanah, D., Kalim, H., & Mawarti, H. (2013). The association among serum levels of vitamin D, TGF- $\beta$ /IL-6 balance and Treg/Th17 balance in systemic lupus erythematosus patients in Indonesia. *International Journal of Biochemistry and Biotechnology*, 2, 490-496.
12. Dasar, R. K. (2013). *Riskesmas 2013. Jakarta: Badan Litbang Kesehatan.*
13. Risal, A. (2011). Common mental disorders. *Kathmandu University Medical Journal*, 9(3), 213-217.
14. Widiyanto, A. F., Pratiwi, O. C., & Yuniarno, S. (2017). A model the management of household trash in Banyumas district. Prosiding Seminar Nasional dan Call for Papers: Pengembangan Sumberdaya Perdesaan dan Kearifan Lokal Berkelanjutan VII, Purwokerto, 488-499.
15. Setiadi, A. (2014). Community-based solid waste management study in urban village areas in Yogyakarta. Konferensi Nasional Teknik Sipil 8. Institut Teknologi Nasional-Bandung, 1-16.
16. Qodriyatun, S. N. (2015). An idea institution of waste management in the region (study in Malang City and Gianyar District). *Jurnal Aspirasi*, 6(1):13-26.
17. Gardner, G. T., & Stern, P. C. (1996). *Environmental problems and human behavior*. Allyn & Bacon.
18. Zaman, A. U., & Lehmann, S. (2013). The zero waste index: a performance measurement tool for waste management systems in a 'zero waste city'. *Journal of Cleaner Production*, 50, 123-132.
19. Eshliki, S. A., & Kaboudi, M. (2012). Community perception of tourism impacts and their participation in tourism planning: a case study of Ramsar, Iran. *Procedia-Social and Behavioral Sciences*, 36, 333-341.
20. Surjandari, I., Hidayatno, A., & Supriatna, A. (2009). Dynamic Model of Waste Management To Reduce Stacking Expenses. *Journal of Industrial Engineering*, 11(2), 134-147.
21. Nugraha, W. D., Suri, D. A., & Syafrudin. (2007). Study of the potential use of the economic value of inorganic waste through the concept of recycling in order to optimize waste management (Case study: Magelang City). *Jurnal Teknik*, 28(1):9-21.
22. Dwioktovanny, Y., Syafrudin., & Rezagama, A. (2017). Study of the potential for increased economic value of inorganic waste through recycling concept in order to optimize waste management sub district Kudus City (Case study: Kudus City Subdistrict, Central Java). *Jurnal Teknik Lingkungan*, 6(2):1-11.