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## Implementation of Municipal Solid Waste Management in Indonesia

<sup>1\*</sup>Lia Muliawaty

<sup>1,2</sup>Public Policy Department, Master of Science Administration, Universitas Pasundan, Indonesia

\*lia.muliawaty@unpas.ac.id

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The aim of this study is to implement the Municipal Solid Waste Management (MSWM) to help Regional Cleaning Company (in this case in Bandung City, Indonesia) in managing waste and maintain the cleanliness of urban cities in Indonesia like Bandung City. Methodology used in this study are qualitative method and Focus Group Interviewing to collect the data for qualitative method. This study finds that from three types of waste management such as centralization, decentralization, and decentralization-centralization, the most appropriate waste management in Bandung is decentralization-centralization because most people in Bandung do not have a place for processing waste. MSWM that implemented in Bandung still have not optimal yet because the infrastructure and human resources are limited. Another factor is that public awareness of waste is still low among the society. Bandung as one of the big and modern cities in Indonesia can become a benchmark, if even big cities are not optimal in managing sprouts, what about smaller cities in Indonesia. Therefore, the Indonesian government needs to be aware and optimize MSWM to improve the lives of its people in terms of cleanliness, beauty, and health.

**Keywords:** *Implementation; MSWM; Policy; Regional Cleaning Company; Waste Management*

### INTRODUCTION

A city is the center of economic activity with high productivity and its more complete infrastructure has become one of the attractions for the sub-urban and residents of other cities to find employment in the hope of achieving a better standard of living. This encourages urbanization and creates an urban city. The increasing urban population has resulted in increased municipal waste production. The volume of municipal solid waste in Bandung City is 1.500 tons /day (<http://www.pikiran-rakyat.com/foto/2017/10/10/dalam-sehari-total;-sampah-di-kota-Bandung-sekitar-1500-ton-411223>). While on the weekend there is an increase in the volume of waste around 20 %. It consists of 57 percent organic and 43 percent non-organic solid wastes which are difficult to recycle. In the face of increasing waste, the Bandung City Government implements Municipal Solid Waste Management (MSWM). Since 2017, regional company *Perusahaan Daerah Kebersihan*/Regional Cleaning Company (PDK) has switched to implementing the policy on waste. Previously PDK was a regional company that was given subsidies by the Bandung City government. Due to PDK's infrastructure and human resources are limited, PDK works with private companies such as PT. Kasih Guna Mulia (KGM) to do cleanliness in several locations in Bandung City. The PDK service operational area covers the entire area of Bandung City covering an area of 16,729 Ha. During this time PDK can serve ± 90% of the area of Bandung City (Bandung PDK Performance Report in 2016).

### LITERATURE REVIEW

#### Municipal Solid Waste Management (MSWM)

Generally solid waste is a problem in many cities in developing countries, including in Bandung City. Yeboah-Assimah explains: "The phenomenon of Municipal Solid Waste Management (MSWM) has become a major developmental challenge to most cities in developing countries. This is more problematic in developing countries as a result of the rapid increase in solid waste (SW) generation caused by rapid population growth, unregulated urbanization, presence or manufacturing activities, and economic development." (2015:p.78); the MSWM system consists <sup>4</sup> only four activities, namely generation, collection, transportation and disposal of garbage."(Sharma et al., 2013, p.155); Municipal solid waste (MSW) is open to administrative interpretation which may vary widely between countries, agencies and even local jurisdictions, however, the MSW that is mentioned in this study refers to the solid waste generated at residence, commercial establishments (i.e. offices, retail shops, restaurants), and institutions (i.e. hospitals and school) but does not include construction/demolition debris, automobile scrap or medical/pathological waste" (Ak and Braidia, 1997: 909); "It is generally recognized that a modern MSWM system should include four fundamental options (recycling, biological treatment, thermal treatment, and landfilling); all are necessary but alone not sufficient to guarantee an efficient and sustainable management" (Sefouhi et al., 2014: 502); "A solid waste management (SWM) system includes the generation of waste, storage, collection, transportation, treatment, processing, recycling and final disposal of garbage, sewage and other waste products" (Elsaid and Aghezaf, 2015: 1086); "The state of the economy influences waste generation, i.e. greater economic prosperity and larger urban populations result in a larger amount of solid waste generation; a common feature in developing countries. The collection, transport, and disposal of solid waste are important aspects of waste management for public health, aesthetic, and environmental reasons" (Sefouhi et al., 2014: 493); "The problem of MSWM is more in many undeveloped African countries due to lack of



awareness, education, resources, technology and finance which resulted into open dumping, low collection and incineration of wastes. In Ethiopia, municipality of respective cities and towns are responsible for MSW but inadequate management resulted in dumping, scattering and accumulation of wastes across the roadsides, market places, river/stream banks, empty plots "(Sharma, et al :2013,p.155); "A solid waste management (SWM) system includes the generation of waste, storage, collection, transportation, treatment, processing, recycling and final disposal of garbage, sewage and other waste products" (Elsaid and Aghezzaf, 2015:p.1086); "Municipal solid wastes (MSW) are unwanted materials or wastes primarily generated from households and municipal services" (Laor, 2018:128; "The waste management process is mostly defined by waste management hierarchy." (Singh and Sushil, 2016:786); In developing countries, including Malaysia, they are faced with low quality of environment, especially in urban areas, with respect to the solid waste management sector (Ayob, et al.,2017:696).

### Implementation

M.S Grindle (1980) noted that the success of policy implementation depends on the content of the policy and its implementation context, which are entitled as the degree of implement-ability (Nugroho, 2012:188); Different kind of policy needs a different mode of implementation. Policy implementation is the most critical issue fo the developing countries (Nugroho, 2012:196); Purwanto and Sulistyastuti stated that the core implementation is the activity to deliver policy outputs carried out by the implementers to the target group (2012: 21); Implementation is a very complex activity, involving many actors with their various interests (Purwanto and Sulistyastuti, 2012:12); Policy implementation is a crucial matter in public policy studies. According to Edward III (1980) that policy implementation is the stage of policymaking between the establishment of a policy (Santosa,2012:41); Pressman and Wildavsky stated that policy implementation is the complexity of joint actions (Santosa,2012:43); According to Implementation failure can be caused by the following factors: "1) target beneficiary is not involved in program implementation, (2) such implemented programs does not consider environmental, social, economic, and politic conditions, (3) the existence of corruption, (4) low capacity human resources, and (5) absence of coordination and monitoring" (Purwanto, 2009: 85); Indiahono pointed out programs and policies scheme must translate in simple and detailed ways concerning on logic of policy about its economic and social advantages and disadvantage (2009: 90). "Basically, form public policy is not only the executive but also the legislative, judicial and administration" (Santosa, 2012:p. 37); Mazmanian and Sabatier defined implementation is the carrying out of a basic policy decision, usually incorporated in a statute but which can also take the form of important executive orders of court decisions (Hill and Hupe, 2002: 7); For Pressman and Wildavsky, implementation is clearly defined in terms of a relationship to policy as laid down in official documents." (Hill and Hupe, 2002: 44).

Van Meter and Van Horn argue that it is vital that the study of implementation be conducted longitudinally; relationships identified at the point in time must not be extended causally to other time periods". The model called a 'top-down' approach (Hill and Hupe, 2002: 46);

### Public Policy

Anderson, for instance, gives the following definition of policy: "A purposive course of action followed by an actor or set of actors in dealing with a problem or matter of concern. Public policies are those policies developed by governmental bodies and officials" (Hill and Hupe, 2002: 5); Definition of public policy: "...the public policy stressed under here concerns with problems, necessity, and aspiration of community that must be served. The frequently important issue coming into the surface is that has a public policy already well respond aspiration, necessity, and problems are being faced by a community?" (Keban, 2008: 57);

### Public Service

Ramaswamy (1996: 3) states service as 'business transactions that take place between a donor (service provider) and receiver (customer) in order to produce an outcome that satisfies the customer' (Yeboah-Akinboade et al., 2012: 185); Whereas characteristics of services as follows: some authors believe that service is intangible. This implies that they cannot be seen, touched, held, or stored. Zeithaml et al. (1990) believe that services are not all intangible, but, rather, are placed on a continuum of intangibility (Yeboah-Akinboade et al., 2012: 185). In many cases, the lack of implementation and absorptive capacity of government agencies and citizens, respectively, are problem that hamper efficient service delivery (Yeboah-Akinboade et al., 2012: 188). According to Burell and Morgan (1979) that public services are, from systems theory and open system model point of view, the outputs of public administration and of the policy process (Virtanen and Stenvall, 2014: 94).

### Customer Satisfaction and Service Quality

In conclusion, Rojek, Clemente, and Summers (1975) suggest that satisfaction with a particular environment is dependent on two key assessments: (1) the manner in which the attributes are perceived and (2) the standard of reference against which



the attribute is measured (Potter and Cantarero, 2014:p.22); It also shows customer satisfaction is being used as a key tool for understanding customer needs, behavior, and motivations and as a basis for improving customer experience” (Queensland Council of Social Service, 2014:P.12); One of the key considerations in the customer satisfaction literature is identifying aspects of a service which are most important in determining a customer’s overall satisfaction. Because customer satisfaction is defined by the questions used in the survey it is important to ensure that these reflect what customers think is most important. If not it is likely the data will not give an accurate indication of satisfaction. The identification of the key drivers or determinants of customer satisfaction enables organizations to focus on what is most important when assessing customer satisfaction from the perspective of the customer.

Levesque and Mc Dougall (1996) state that satisfaction is an ‘overall customer attitude towards service provider’ (Bellou, 2007: 510); There are a number of different ‘definition’ as to what is meant by service quality. Organizations operating in the public sector have also come to realize that they must ensure their service are soundly based on the needs and expectations of their stakeholder – community, citizens, and customer – and that they are seen as providing service quality (Wisniewski, 2001: 380); The measurement of service quality in the public sector should take into account customer expectations of service as well as perceptions of service (Wisniewski, 2001: 381); SERVQUAL model developed by Parasuraman et al. can be adapted to any service organization (Wisniewski, 2001: 381-382); According to Ajzen and Fishbein (1980) that customer satisfaction is an abstract and rather ambiguous concept.”(Munteanu et al., 2010:p. 125).

## METHODOLOGY

The selection of appropriate research methods is very important in all studies including public policy research. The definition of research design is denoted both a process and a product aimed at facilitating the construction of sound arguments. This study used qualitative methods because it is adapted to the topic of research and the object of research. Berg (1998) and Creswell (2009) define qualitative research as a collection of methods that can be used to understand human meanings (concepts, metaphors, symbols, descriptions, etc.) in their historical context, and point to the flexible and emergent nature of qualitative research design; In addition, the aim of qualitative methods is not to test hypotheses as stated by (McLeod 2001) but to analyze and interpret the constructive aspects of the social world (Tavallaei and Talib, 2010); Qualitative researchers are concerned primarily with process, rather than outcomes or products, qualitative researchers are interested in meaning how people make sense of their lives, experiences, and their structures of the world, the qualitative researcher is the primary instrument for data collection and analysis, qualitative research involves fieldwork (Atieno, 2009). According to Yin (2011) qualitative research as follows:” It can be used to examine topics such as contextual conditions, social, institutional and environmental conditions” (Yin, 2011: 8); Sharon pointed out that qualitative research is an inductive process that builds concepts, hypotheses, or theories rather than testing hypotheses. One of the uses of the research method describes the process (not the results or products) of making meaning (Sharon, 2009:); Tracy defined that qualitative research focuses on the emergence of a situation (Tracy, 2013).

This study uses a type of descriptive case study described by Yin as follows: "exploratory (as pilots to other studies or research questions); descriptive (providing narrative accounts); explanatory (testing theories)" (Cohen et al., 2007: 254-255). Cohen et al. stated that the characteristics of case studies were: "In-depth, detailed data from wide data source" (2007: 85).

Primary data collection was carried out by Focus Group Interviewing (FGI), which is a model for collecting qualitative data. Yin (2011) states that data collection techniques from various qualitative methods do not only rely on sources. He explained that most qualitative research is an inductive approach (Yin, 2011). Secondary data is obtained from reports, literature, previous research, and the like.

## DISCUSSION / ANALYSIS

### Types of Solid Waste Management in the City of Bandung: Decentralized Centralization

Bandung is the capital city of West Java Province. The city relatively small area but populated quite dense. According to the Central Bureau of Statistics (*Badan Pusat Statistik*/BPS) in 2017 the population of Bandung City amounts to 2.5 million. The amount does not include temporary residents, migrants from other cities such as students and merchants, workers from outside the city which is quite a lot. Every individual in the city of Bandung produces waste every day because an individual is a waste producer. It is estimated that each family produces about 2-5 kg of waste/ day or 800-1000 g/day/capita with a composition of about 60% -75% is an organic waste. There are many factors that lead to an increase in the volume of waste such as: "Increase in population and living standards accelerates the waste generation in a developing country. The generation of wastes is also affected by family size, educational level, household habits, and financial income" (Elsaid and Aghezzaf, 2015: 1094).

So far, most of the people dispose of garbage by mixing, between wet household waste and dry waste. This method of disposal can make it difficult for garbage workers and the 3R process. There are many factors that cause difficulties in waste management in the city of Bandung, namely: 1) the community does not realize the importance of sorting household waste;



2) facilities for organic and non-organic containers are not owned by the community, especially the lower class. The Bandung City Government provides plastic trash bins for organic and organic waste with yellow and green color differences. However, these facilities are generally provided in the city center such as public spaces but the numbers are minimal. Though the need for these facilities is very large, especially in residential areas as the main source of household garbage.

There are three types of waste management in the City of Bandung, namely: 1) centralization; 2) decentralization and 3) decentralization-centralization. So far, the most appropriate type of waste management in Bandung is decentralization-centralization. The reason is that most people in the city of Bandung do not have a place for processing waste.

### **Regional Cleaning Company (PDK) as Executor of Waste Policy in Bandung City**

In 2017 the authority of waste management is in the Environment and Hygiene Department (*Dinas Lingkungan Hidup dan Kebersihan*/DLHK). This change in authority refers to Regional Government Regulations Number 8 of 2016 concerning the Establishment and Composition of the Bandung City Regional Apparatus and Regional Regulation Number 9 of 2011 concerning Waste Management and Regional Regulation Number 14 of 2011 concerning the Hygiene Region of Bandung City. With this new regulation, there has been a fundamental change in the waste management system that is considered more focused and professional. Since 2017 the role of PDK is a professional partner of the Bandung City Government who is given the task of managing waste. With the new policy, the role of PDK is public service and profit-oriented. Previously, the Bandung City Government gave a subsidy to PDK as one of the regional companies in the City of Bandung in charge of transporting and processing waste.

PDK has 160 Temporary Disposal Sites (*Tempat Penampungan Sementara*/TPS) among which 10 TPS can process Reduce, Reuse, Recycle (3 R). It also has 1 Integrated Temporary Disposal Site (*Tempat Penampungan Sementara Terpadu*, abbreviated/TPST) at Babakan Sari, Kiaracandong Sub-district, which can process 3R and biodigester that can process organic household solid waste into gas. Production capacity is still small that is 300 kilograms/day. PDK has operational vehicle facilities 105 trucks, 12 pickup trucks, 50 tricycles and 203 containers. The total number of employees is 1,679 people including 648 street sweepers, outsourced road sweepers 95 people and transport officials 219 people. However, infrastructure is still minimal when compared with increasing the volume of solid waste. In addition, since 2014 MSWM in the City of Bandung involves the private sector, PT. Kasih Guna Mulia (KGM) which is in charge of cleaning and sweeping some main roads and tourist areas. The KGM work area consists of 26 road lines and 3 areas. A KGM's sweeper can sweep rubbish on average 31.07 kg/day. The number of KGM's sweepers is 81 people who collect sweep of 70,859 trash bags (1 trash bag = 40 liters of garbage).

### **Community Empowerment on Garbage Disposal Model**

One example of a partnership program with the community is a waste pilot project in Batu Nunggal District. The pilot project is collaborating with a city in Japan. The transportation of garbage in the Batu Nunggal Subdistrict starts from the residents' houses, adjusted to the theme, namely organic and non-organic waste. Garbage collection uses the schedule so as not to mix organic waste with non-organic. If the garbage does not match the theme, the janitor will not transport it. The selection of the waste pilot project in Batu Nunggal District is based on the consideration that most people are middle to the upper class. They realize the need to do waste selection to facilitate the 3R process. Whereas most of the community, especially the lower classes of people who live in slums or urbanization communities who live in densely populated villages, have not yet realized the need to separate these types of waste. In general, they combine all kinds of garbage in the trash or put it in plastic.

Generally, waste collected only from various places (households, markets, industries, etc.) and then stacked on a site known as Temporary Disposal Site (TPS) without proper management namely by way of open dumping. Currently, TPA Sarimukti, Bandung Regency, could not accommodate garbage whose volume continues to increase. Another problem is the capacity of the TPA Sarimukti can only accommodate around 1,100tons/day. In this way can cause various problems such as environment, social and health. Open dumping management techniques can cause adverse impacts on people's lives, especially for public health around landfill sites. There are various impacts of the above techniques, namely air pollution, water pollution, aesthetics or other social problems. Another factor is the perspective and lifestyle of people in waste disposal. The subject of this study focuses on the activities of aspects related to the implementation of hygiene management policies with community satisfaction.

Currently, the location of TPA Sarimukti, Bandung Regency, is a temporary landfill. Actually, open dumping management techniques can cause adverse impacts on people's lives, especially for public health around the landfill site. There are various other impacts of the above techniques, namely air pollution, water pollution and social problems. Another factor is the perspective and lifestyle of people in waste disposal. Most people do not realize the need to dispose of waste properly and in place.



## CONCLUSION

Municipal Solid Waste Management (MSWM) implementation in Bandung City was carried out by Regional Cleaning Company (PDK) in collaboration with a private company, namely Kasih Guna Mulia (KGM) company as its partner. The main reason is that PDK is a regional company whose infrastructure and human resources are limited.

PDK's appointment as an effort of the Bandung City government in carrying out public services in the cleanliness or waste sector in Bandung City. So far, the volume of garbage in the City of Bandung continues to increase due to various factors, mainly as a result of an increase in population and urbanization. Bandung City is known as a creative city that has encouraged an increase in the number of local tourists and the economic activities of the citizens. The negative impact of the tourism industry is an increase in waste volume, especially on holidays or weekends. Another factor is that public awareness of waste is still low, especially among the lower-class society. In addition, the number of garbage disposal facilities is minimal and the number of garbage collection officials is limited. There is a lot of garbage in every place in the city of Bandung.

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