

MUNICIPAL SOLID WASTE MANAGEMENT IN INDONESIA: LESSONS LEARNED FROM THE UNITED STATES

MASTER THESIS

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ABSTRACT

MUNICIPAL SOLID WASTE (MSW) MANAGEMENT IN INDONESIA: LESSONS LEARNED FROM THE UNITED STATES

There are several issues relating MSW management in Indonesia, although regulations of MSW management were promulgated in recent years. The issues relate to lower citizens awareness concerning appropriate MSW disposal, lower service coverage, and lower budgeting. Nevertheless, Indonesia has many informal stakeholders such as scavengers, junkmen, *lapaks*, and *bandars* who are probably beneficial when they are well organized. This study explores the MSW management in the United States and in Indonesia. It describes the similarities and the differences, and explains the proposed institutional designs based on lessons learned from the United States and the existing condition in Indonesia. Factors supporting MSW management and technical aspects in MSW management in the United States are compared with the conditions in Indonesia. To obtain broader lessons from the United States, the history of MSW management is also explored.

Keywords: municipal solid waste (MSW) management, citizens awareness, informal stakeholders, Indonesia, the United States

PREFACE

This thesis which studies about municipal solid waste management (MSW) conducted since February to August 2015 at Environmental and Infrastructure Planning Program, the Faculty of Spatial Science, Rijkuniversiteit Groningen. This research is to explore the possible improvements of MSW management after the promulgation of Law number 18 in 2008 by learning lessons from the United States. The lessons learned are explored from both current circumstances and the history of MSW management in the United States.

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CHAPTER 1

INTRODUCTION

This chapter describes the basics of study including the background underlying the study, research objectives, research questions arising based on the research objectives, framework delineating the study, and the methodology of study.

1.1 Background

Municipal solid waste (MSW) is undesired material produced by daily activities as the United States environmental protection agency (USEPA) defined that

“Municipal Solid Waste (MSW)—more commonly known as trash or garbage—consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. This comes from our homes, schools, hospitals, and businesses.” (USEPA, 2014)

Industrial and agriculture wastes are excluded (Tchobanoglous et al., 2002). However it has impacts on the environment, public health and social life. In developed countries the MSW management is considered better than in other countries. For instance, in the United States which implement modern MSW management (Louis, 2004) while Indonesia even though the regulations related to MSW management were promulgated in recent years, the actual condition has not been ideal in terms of low citizen awareness and MSW service coverage (Damanhuri and Padmi, 2012). MSW is still burned in some places in the country and found in some illegal dumping sites even in the drainages and rivers.

The stakeholders involved in MSW management in Indonesia are citizens, government, scavengers (waste pickers), junkmen, *lapaks*, *bandars*, metal scrap recyclers, and plastic recyclers (Damanhuri and Padmi, 2012). To achieve better MSW management, they need to be organized. The national government produces regulations to manage the MSW in the

whole country. Meanwhile, the local governments that regulate local area also have to implement MSW management (Government of Indonesia, 2008). It includes sweeping public areas, transporting MSW from temporary dump sites to landfills and providing facilities such as temporary dump sites, transport vehicles and landfill areas. In some cities especially in big cities, private sectors are involved in transporting MSW from temporary dump sites (*TPS/tempat pembuangan sementara*) to final dump areas (*TPA/tempat pembuangan akhir*). Scavengers pick certain waste from containers, *TPS*, and also from *TPA*. Afterwards they sell the selected waste to *lapaks* (intermediates). The *lapaks* buy certain waste from scavengers and also junkmen, afterwards they sell the waste to *bandars* or directly to recyclers. *Bandars* are larger waste buyers than *lapaks* who sell waste to recycle factories (recyclers). In addition, metal scrap recyclers and plastic recyclers have an important role in terms of producing the usable goods from undesired materials (Damanhuri and Padmi, 2012).

Besides many informal stakeholders involved in MSW management, the regulations related to MSW management in Indonesia were promulgated in recent years. In 2008, law number 18, a more comprehensive regulation regarding MSW management was promulgated. The law regulates the duties and authorities of government both national and local. It also regulates permits, financing, prohibitions and controlling system. It is stated in article 29 of Law number 18 (2008) that throwing waste not to the waste containers and burning waste without fulfilling technical requirements are prohibited. Law number 18 (2008) also allows cooperation among local governments and business entities in managing MSW. Furthermore in article 20, the law regulates reduce, reuse and recycle programs. Reduce, reuse and recycle programs are more specifically regulated in government regulation (*peraturan pemerintah*) number 81 (2012) regarding household solid waste and ministry of environment regulation (*Peraturan Menteri Lingkungan Hidup*) number 13 (2012) regarding reduce, reuse, recycle and bank of waste. However, in reality, some people are ignoring it. They throw the waste into the illegal dump sites, drainages and rivers causing several environmental problems. Therefore, a more appropriate MSW management is required.

The study will explore the possible institutional design of MSW management in Indonesia based on the United States experience. The lessons are learned from the United States to

improve MSW management in Indonesia. The proposed institutional designs are based on the lessons learned from the United States. This study chooses Indonesia and the United States because of some reasons. Firstly, the United States has been applying a modern system of MSW management for a long period (Louis, 2004). Secondly, the United States and Indonesia have multi ethnic citizens and a close population number (CIA, 2015). Thirdly, Indonesia has a tight relationship with the United States in terms of politics as Hudalah and Woltjer (2007) depict that neo-liberal ideas influencing Indonesia's planning culture. Lastly, author as an Indonesia citizen knows the existing condition of MSW management not only from articles but also from daily experience.

The core of this study is about MSW management therefore its concept are required to be described. MSW management is about how to manage MSW in each stage. Meanwhile, policy transfer is a process of using policies from the other countries or cities both voluntarily and coercively while lesson learning is a voluntary transfer (Dolowitz and Marsh, 1996). The study utilizes voluntary policy transfer or lesson learning. Institutional design refers to planning and realizing the regulations, procedures, and organizational form enabling and limiting behaviors and actions so as to conform to the values held, reaching desired destination (Alexander, 2005). In terms of MSW management, institutional design is to design the institutions concerning MSW management. The levels of institutional design are described to divide proposed institutional design for MSW management in Indonesia.

1.2 Research Objectives

This research means to explore the possibilities of institutional design for MSW management in Indonesia, while acknowledging that there are some regulations promulgated and many stakeholders involved MSW in the country which have experience in handling MSW. The objectives of this research are:

- To identify the concepts of MSW management, policy transfer, and institutional design;
- To identify the current ways of implementing MSW management in Indonesia and the United States including the regulations involved, and the history of MSW management in the United States;

- To discuss the differences and similarities of factors supporting MSW management and condition of MSW management between Indonesia and the United States;
- To discuss the lessons learned from the United States for improving the MSW management in Indonesia, and the proposed institutional design in micro-level, meso-level, and macro-level.

1.3 Research Questions

Based on the objectives, this research will answer the following questions:

- What are the concepts of MSW management, policy transfer, and institutional design?

It is important to explain such concepts because the study will attempt to explore the possible institutional design concerning MSW management based on the possible transferred policies from the United States. Through this question, the study will explain the concept of MSW management, policy transfer and institutional design.

- How do the United States and Indonesia manage their MSW?

Through this question, this study will explore the application of MSW management in the United States and Indonesia including the stakeholders involved, the regulations related to MSW management, and the history of MSW management in the United States which possibly inspires Indonesia.

- While focusing on MSW management, what are the similarities and the differences of factors supporting MSW management and condition of MSW management between Indonesia and the United States?

Through this question, the study will compare the United States and Indonesia in factors supporting MSW management and condition of MSW management both the similarities and the differences.

- What lessons learned from MSW management in the United States including its history can be incorporated in the institutional design of MSW management in Indonesia?

Through this question, the study attempts to describe the lessons could be learned from the United States for Indonesia in institutional design of MSW management by considering the existing condition in Indonesia.

1.4 Research Structure

This research will be reported in six chapters described as follows. The first chapter is introduction which consists of background, research objectives, research questions, methodology, and research framework which describe about the basics of the study. In the second chapter, the concept of MSW management, policy transfer, and institutional design will be explained. This chapter explains the concept of MSW management in terms of the stages of MSW management including MSW generation, handling, collection, transfer, transport, final processing, disposing and planning. Policy transfer consists of its definition, the types, and ways of policy transfer. Institutional design describes its levels including micro-level, macro-level, and meso-level which can be important to manage MSW. The research structure is shown as flow diagram in figure 1.1.

The third chapter explores the implementation of MSW management in the United States which comprises the geographic, socio-economic, governmental structure condition of the United States interfering MSW management in the country. This chapter also depicts the history of MSW management in the United States and the current condition of MSW management, which includes MSW generation, stakeholders involved, and policies applied. The fourth chapter explores the implementation of MSW management in Indonesia. This chapter explores the current condition of MSW management in Indonesia. Regulations recently promulgated, stakeholders involved particularly informal stakeholders, and citizen awareness concerning MSW management in Indonesia will be depicted. The fifth chapter describes the comparison analysis discussing the similarities and the differences between the United States and Indonesia in socio-economic, geographic aspects and MSW management in terms of stakeholders involved, and policies applied in the United States. The comparison is not only between the different countries but also the different time. The lessons learned from the United States will be tailored the existing condition in Indonesia, such as many informal stakeholders and limited citizen awareness concerning better MSW management.

Finally, the last chapter explains the research findings based on comparisons and the existing condition in Indonesia and recommendations that can possibly be implemented in an Indonesian context concerning MSW management.

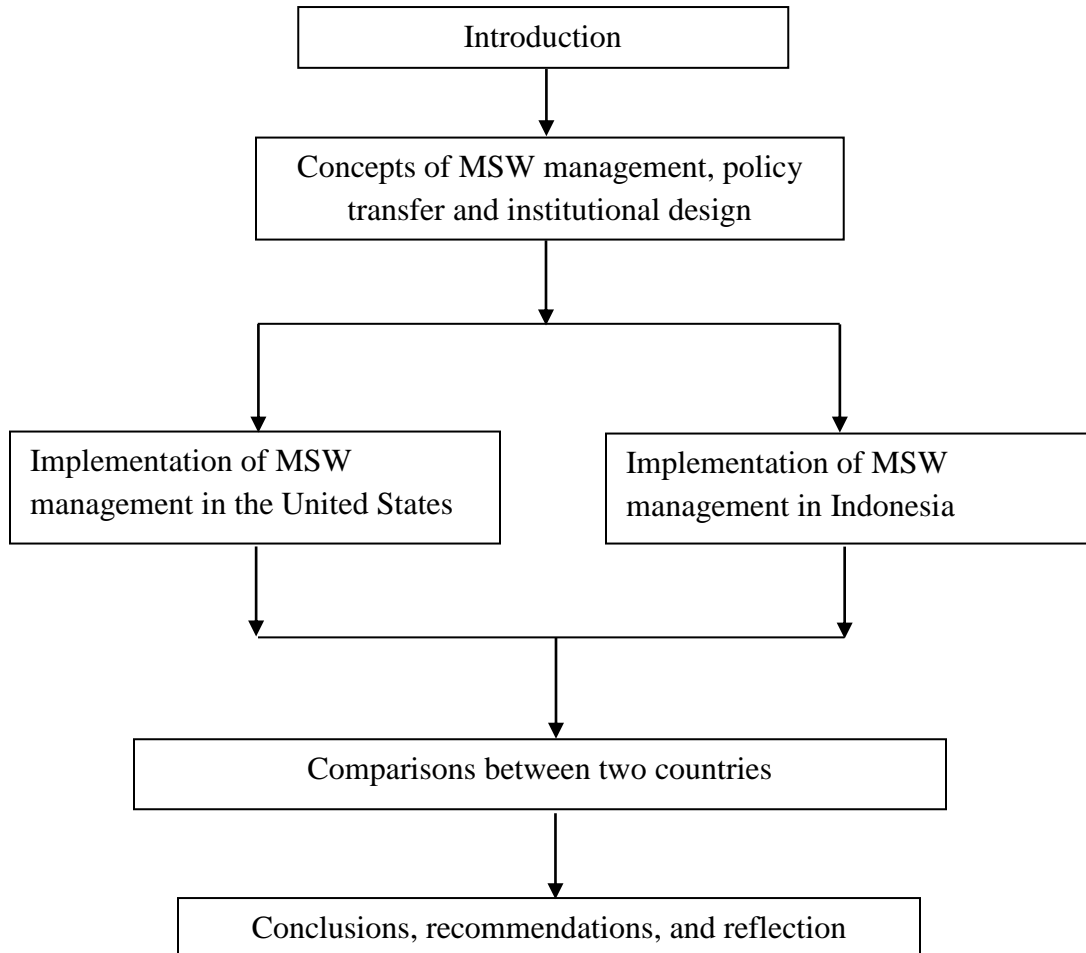


Figure 1.1 Research Structure

1.5 Research Methodology

This study explores generally non numerical data such as policies and experiences and therefore the study is rather qualitative (Babbie, 2013). It is important to understand the research methodology to develop ideas in reaching objectives of the study. This study is to explore the possible lessons learned from the United States and the existing condition in Indonesia to obtain possible institutional design of MSW management. The literature review

of MSW management, policy transfer including lesson learning, and institutional design is explained to give understanding the concepts of each theory. MSW management concepts are generally about the stages of MSW management based on the handbook written by Tchobanoglous (2002) and supported by recent information. This study utilizes the policy transfer mostly based on the concepts developed by Dolowitz and Marsh (1996) in their articles which explain the definition, dimensions, types, and ways of policy transfer. Finally, the concept of institutional design developed by Alexander (2012) underlies the institutional design of MSW management in Indonesia based on transferred policies from the United States and the existing condition in Indonesia.

Data collection is aimed to give inputs for this research. The data are collected from relevant books, journals from university database, internet articles including online newspaper, government reports and regulations which mostly are non quantifiable (Bitektine, 2008). The data collected are concerning the concepts used in this research, supporting conditions for MSW management such as climate condition, economic capability, and governmental system, regulations related to MSW management in the United States and in Indonesia, both current and historical MSW management. The concepts regarding MSW management, policy transfer, and institutional design are searched from books, university databases and related journals. Meanwhile, the information concerning supporting condition is collected from government databases available on its websites. In addition data regarding regulations are downloaded from government websites. The history and current condition of MSW management in the United States and Indonesia would be found in journals and newspapers.

This study utilizes secondary data because it can explore more information and ideas concerning MSW management which is available widely on articles, government reports, internet websites et cetera. However, to validate the proposed institutional designs made by comparison, interview with the practitioners is conducted via email. The interviewees are the practitioners/experts of MSW management in Indonesia. They are Dadan Wiadi, a head of environmental technology development in BPLH (environmental agency) and Yudi Mulyadi, a head of research and development division in Ampel waste bank (a MSW community). They deal with MSW management in each organization.

Moreover, the analysis is comparison between two countries and exploration the existing condition in Indonesia in terms of MSW management. Firstly, this study explores the supporting conditions for MSW management such as climate condition, economic capability, and governmental system. The study also describes current MSW management including regulations and stakeholders involved in both countries and also the history of MSW management in the United States to obtain more information concerning previous MSW in the United States. Secondly, the study describes the similarities and the differences based on the comparison between Indonesia and the United States in terms of climate condition, economic capability, and governmental system underlying MSW management. Furthermore, this study utilizes the other criteria developed from the ‘factors should be considered in MSW management’ as listed in following chapter. Such factors are developed into 11 factors provided in table 2.4. Thirdly, the study develops the proposed institutional design in micro-level, meso-level, and macro-level based on lessons learned from the United States in terms of MSW management by considering the existing condition in Indonesia. Lastly, the proposed institutional designs are consulted with practitioners of MSW management in Indonesia to obtain the information of implementation possibilities from them.

CHAPTER 2

CONCEPTS OF MSW MANAGEMENT, POLICY TRANSFER, AND INSTITUTIONAL DESIGN

This chapter describes the concepts of MSW management, policy transfer, and institutional design. The study is to search for a possible institutional design of MSW management in Indonesia based on possible transferred policies and the existing condition in Indonesia. Moreover, the possibilities for transferring policies are based on the comparison between Indonesia and the United States. Firstly, the general concept of MSW management will be described consisting stages of MSW management. Secondly, the types and ways of policy transfer are described. In addition, voluntary policy transfer is discussed which is called 'lesson learning' (Dolowitz and Marsh, 1996). The last part explains the concept of institutional design including definition, levels and materials.

2.1 MSW management

This study describes MSW management in Indonesia by learning lessons from the United States. Therefore, it is important to understand the general terms of MSW management. According to Tchobanoglous, et al. (2002), MSW management consists of several stages as follows, starting from generating, handling, collection, transferring, transport, final processing until disposing MSW into landfill areas. MSW management is aimed to protect environment and enhance public health (Schubeller et al., 1996) and in developing countries MSW management can create income for informal stakeholders.

MSW generation

It includes all activities to throw away useless materials whether they are thrown into suitable place or not. To achieve better MSW management, MSW reduction should be scrutinized because it is important to decrease the operational cost in next stages. MSW generation depends on factors such as culture of people, economic level or GDP, and geographic position. Based on united nation environment program (UNEP, 2011), MSW generation in low income countries which has GDP per capita per year below \$5000 is dominated by

organic materials as shown in figure 2.1 below. Moreover, the MSW generation affects the frequency of collection and disposal ways (Worldbank, 2015). Nowadays, governments in many countries attempt to reduce the MSW generation.

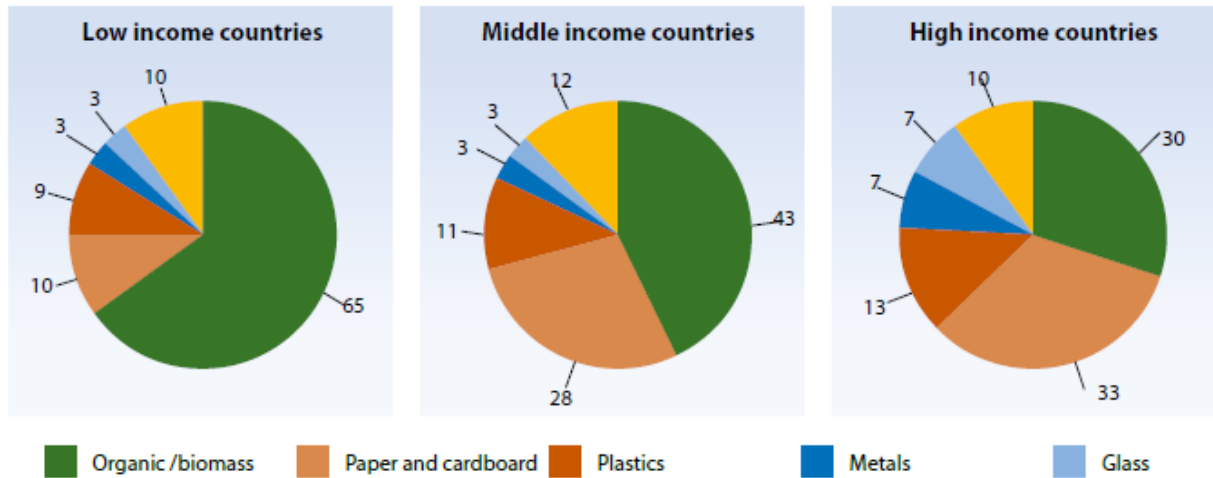


Figure 2.1 MSW generation by national income
(Source: UNEP, 2011)

MSW reduction is important in generation stage because it can decrease the transported MSW. Leverenz (2002) suggests several ways to reduce the MSW generated as provided in table 2.1 below. Furthermore, Tchobanoglous et al. (2002) states that to control the activity in MSW generation is very hard because it involves many people. In developed countries, the problem is how to reduce MSW generated while in developing countries the problem is not only how to reduce but also how to educate people to throw away MSW into appropriate places because in some countries, people are not aware to throw waste into proper place decreasing environmental amenity (Louis, 2004).

MSW handling and collection

MSW handling is to handle waste until placed at storage containers (Tchobanoglous et al., 2002). Separation is very important in this stage because it supports possibilities for MSW to be composted or recycled. Separation of MSW based on its characteristic, for example organic wastes are separated from inorganic wastes. Moreover, public health and aesthetic often be considered in the stage due to involving many inhabitants at MSW sources. In

addition, the collection stage is to collect MSW from storage container to transfer station or MSW processing facilities. In this stage, collection vehicles are usually emptied in these places (Tchobanoglous, 2002). It collects MSW from one home to another which takes more times and fuel for collection vehicles. Therefore the stage can spend 50 -70% of operational cost (Thiesen, 2002).

MSW Transfer and transport

In this stage, the role of the municipal government is important. In developed countries, the municipal government is responsible for transferring and transporting MSW while in the operational level private sectors are widely involved (Louis, 2004). Meanwhile, in developing countries, informal stakeholders particularly scavengers have a role to decrease the transferred and transported MSW. They pick up several kinds of wastes to recycle (Damanhuri and Padmi, 2012). Transferring and transporting MSW start from transferring MSW from containers to the trucks or carts and transferring MSW in from smaller vehicles to the bigger ones. The transfer occurs in transfer stations or temporary disposal sites. Transporting MSW means to carry out the MSW in the roads between transfer station or temporary disposal sites and disposal or processing areas to disposal or final processing areas.

MSW final processing

To meet the requirement in final processes particularly composting and recycling, MSW needs separation. The more MSW separated, the more recovery will be gained. In developed countries, material recovery facilities (MRFs) are utilized which separates MSW by mechanical system and finalized by manual intervention (Leverenz, et al., 2002). Meanwhile, in developing countries, separation often involves informal stakeholders such as scavengers, junkmen, and intermediates (Damanhuri and Padmi, 2012).

Composting can be considered a process MSW which is defined as biological process to decompose MSW (Diaz et al., 2002; p.12.3). Composting MSW is beneficial in the United States (especially North-East parts) due to the expensive landfilling system (Renkow and Rubin, 1998). Furthermore, Johari et al (2012) depict the possibilities of obtaining financial

benefits from composting MSW in Malaysia. MSW compost also can be an alternative for horticulture fertilizer in Spain (Martinez-Blanco et. al, 2008). Aye and Wijaya (2005) concludes that for an Indonesian context, it is suitable to compost organic materials because the vast majority of MSW are organic materials and the climate in Indonesia is humid and hot which will be beneficial for composting process.

Based on the final processing, MSW are compostable, recyclable, and the rest materials which can be incinerated or dumped. Compostable materials of MSW are food wastes coming from households, restaurants and hotels, and yard wastes, while recyclables materials consist of plastics, paper, glass and metal (USEPA, 2015). In developing countries, informal stakeholders in recycle of MSW already exist which can reduce processing cost. Meanwhile in developed countries, informal recycle of MSW is limited and they try to involve communities in handling MSW although formal stakeholders already established (Wilson, 2006).

MSW Disposal

This stage is the end of stages concerning MSW management. Non-processed MSW and residual from incineration, composting, production process are disposed into disposal areas. In many countries, open dump sites are still used while in the other countries, sanitary landfills particularly in developed countries are implemented. Sanitary landfill refers to the landfill which is equipped by some facilities such as leachate management, liquid, gases, and groundwater monitoring to lower the impacts for natural environment and public health such as cover to protect disease vectors and also green house gases spreading (O'leary and Tchobanoglous, 2002). However, open dumping system can generate air pollution and water contamination. Therefore, disposed MSW should be isolated to prevent public health hazards and maintain environmental amenities as shown in figure 2.3. Developing countries attempt to provide sanitary landfill in different rate (Oleary and Tchobanoglous, 2002).

MSW planning

In MSW management, several problems often occur such as the quantity of MSW which increases; there is no report for the whole country; MSW definition is not clear among

stakeholders; the MSW composition (quality) data is lacking; lack of clear task allocation for each governance level; lack of requirements of regulations enforcing stakeholders; lack of inter provincial and international coordination (Tchobanoglous, et al, 2002). However, in developing countries, the problems also relate to highly concentrated population in cities with low quality and limited number of infrastructure (Ezeah, 2012). For example, in Indonesia, the level of service of MSW management is still low (Meidiana and Gamse, 2010).

Kundell and Ruffer (2002) list the factors should be considered in MSW management as shown in Table 2.3 below. These factors are important to plan MSW management in a jurisdiction or area. The first factor, for instance, determines the location for dump site areas which should have less contamination for groundwater. Types of existing collection also should be considered if it is mechanical or manual collection.

Table 2.1 Factors should be considered in MSW management

Factors
1. Geologic, hydrologic, and climatic circumstances, and the protection of ground and surface waters
2. Collection, storage, processing, and disposal methods
3. Methods for closing dumps
4. Transportation
5. Profile of industries
6. Waste composition and quantity
7. Political, economic, organizational, financial, and management issues
8. Regulatory powers
9. Types of waste management systems
10. Markets for recovered materials and energy

(Source: Kundell and Ruffer, 2002)

These factors will be utilized and tailored as the basic for criteria in MSW management comparison between the United States and Indonesia particularly factor 1, 7, and 8. Such criteria/factors are developed become 11 criteria as provided in table 2.4 below which are tailored with the data in both countries.

Table 2.2 Factors for comparison of MSW management

FACTORS	
1	Climate related to composting process
2	Economical capability
3	Governmental system
4	MSW generation
5	Compostable materials in MSW
6	Separation at source
7	Citizen awareness
8	Service coverage
9	Private sectors involved
10	Informal stakeholders involved
11	Regulations related to MSW management

(Source: Ruffer and Kundell, 2002; developed by author)

2.2 Policy transfer

This study is to search possible lessons learned which is voluntary policy transfer concerning MSW management from the United States to Indonesia (Dolowitz and Marsh, 1996). Dolowitz and Marsh define that policy transfer is:

“a process in which knowledge about policies, administrative arrangements, institutions etc. in one time and/or place is used in the development of policies, administrative arrangements and institutions in another time and/or place.”
(Dolowitz and Marsh, p.344)

Based on this definition, it is clear that policy transfer refers to the process of adopting rules, organizational forms et cetera. Adoption processes are not just from one place to another but also from one time to another which can be applied in one country or current temporal context. Developing countries can learn lessons from developed countries in different time dimension how to start the development. Dolowitz and Marsh (1996) say that lesson learning is rather voluntary action to learn lessons from the other countries or cities. Meanwhile, policy transfer refers to both voluntary and coercive action concerning adopting policies or lessons from the other countries or cities. This study, indeed, utilizes lesson learning to catch on lessons of MSW management from the United States for Indonesia context voluntarily.

There are three types of policy transfer, namely voluntary, direct coercive and indirect coercive transfer Dolowitz and Marsh (1996). The first, voluntary transfer refers to transferring the policies without any direct or indirect coercion. Lesson learning is voluntary policy transfer utilized in this study. The process happens when the existing condition such as a strong centralized system in Indonesia before 1997 is not satisfying. It requires better condition, therefore search from the other places. For example in Indonesia after the end of 'new order', in 1997, new government attempted to adopt policies from the other countries because of their dissatisfaction of previous government system. In this case, the policy transfer is not enforced by the others but appears from inside. The second type of policy transfer is direct coercive transfer. It happened in colonialism era when the colonialists applied policies in colonized areas. Direct coercive also occurs when policies enforced by international monetary institution as a part of the requirements of loans for developing countries. The countries have to implement the policies if they want to get loan even though there are some disadvantages for the countries. For example, in 2000, Indonesia had to stop the operation of PTDI (Indonesia aerospace state-owned company), if want to obtain loan from IMF/ international monetary funding (*BUMN*, 2014). In addition, the European Union also enforces the members to implement the policies particularly economic policies. The last type is indirect coercive transfer. It is caused by the externalities and also the technologies that often make the countries should implement the suitable policies. For example, Canada drawing their policies concerning pollution by learning from the United States due to mostly of indirectly effect of the United States (Dolowitz and Marsh, 1996).

Besides the types of policy transfer or lesson learning, according to Rose in Dolowitz and Marsh (1996) there are five ways of transferring the policies or lessons from the other countries or cities. They are ‘copying’, ‘emulation’, ‘hybridization’, ‘synthesize’, and ‘inspiration’. ‘Copying’ is to adopt the entire policy without significant changes while emulation is to adopt some of the policy. Meanwhile, emulation refers to the lessons learned are modified to meet the existing condition. Emulation is positioned between copying and hybridization. Dolowitz and Marsh (1996) considered ‘hybridization’ and ‘synthesize’ as a similar pattern which merges the policies from more than one country to form the most suitable policies for the country. The last is to take the ‘inspiration’ from the other countries which the policies adopted are explicitly different. For example, when certain policies are failing to be implemented in one country, the other country which draws such policies will implement the opposite ways. This study utilizes one or more of the ways of transferring lessons named ‘copying’, ‘emulation’, and ‘hybridization’.

The objects which are transferred can be varied depend on the existing condition of countries or cities adopting them. Dolowitz and Marsh (1996) identified seven objects which are transferred from one country or city to another. They are ‘policy goals’, ‘structure and content’, ‘policy instruments or administrative techniques’, ‘institutions’, ‘ideology’, ‘ideas’, ‘attitudes and concepts’, and ‘negative lessons’. The transferred objects are not always the content of policies, but sometimes just ideas even the negative lessons which mean that a country or city implements the policies from the others in contrary. For example when the United States applied the standards of auto emission, Canada decided to not emulate such regulation in the country. This study mainly utilizes ‘ideas’ and ‘attitudes’.

2.3 Institutional design

To achieve better MSW management designing appropriate institutions is very important. Designing institutions in this study is based on possible lesson learning and the existing condition in Indonesia. However, according to North (1990) in Alexander (2012: p.164), an institution is:

“The rules of the game in society . . . the humanly devised constraints that shape human interaction . . . complexes of norms and technologies that persist over time by serving collectively valued purposes . . . some have an organizational form, others exist as pervasive influences on behavior.”

It means that institutional design not only constructs organizational structure of governmental institutions but also arranges the rules supporting actions the organizations to reach their goals or even establish such goals.

There are three levels of institutional design, named macro, meso and micro level (Alexander, 2012). In macro level, the institution is applied to whole citizens or societies for example US Constitution ruling the all citizens in the United States. To design such institutions, lawyers and politicians are involved. The second level is inter-organizational design. In this level, planners are involved to plan and arrange the policies or project, build networks among organization and implement the institutions. It includes designing institution in public services such as water management, MSW management, transportation, environmental planning et cetera. The third level is designing intra-organizational institution. It happens in small part of organization which is semi formal or informal to ensure that the plan progress is ‘played’ properly. In terms of MSW management, designing institution also should be done in three level of institutional design.

2.4 Conceptual model

This study utilizes the concepts of MSW management, policy transfer, and institutional design as following illustration in figure 2.4. MSW management consists of stages from MSW generation to MSW disposal. Several factors considered in MSW planning are explored in both countries such as geographic condition, government system, socio-economic et cetera. Policy transfer is based on the comparison between MSW management in the United States including its history and the existing condition of factors considered in MSW management in Indonesia. Policy transfer involves its types (voluntary), ways (copying, emulation, and synthesize), and objects (policy goals, ideas, structure, attitudes) which are determined by the condition of MSW management in the United States and Indonesia

including their climate, history in the United States, informal stakeholders involved and citizen awareness in Indonesia. Finally, the institutional design is suggested in micro-level, meso-level, and macro-level. It also considers the inputs from experts/practitioners of MSW management.

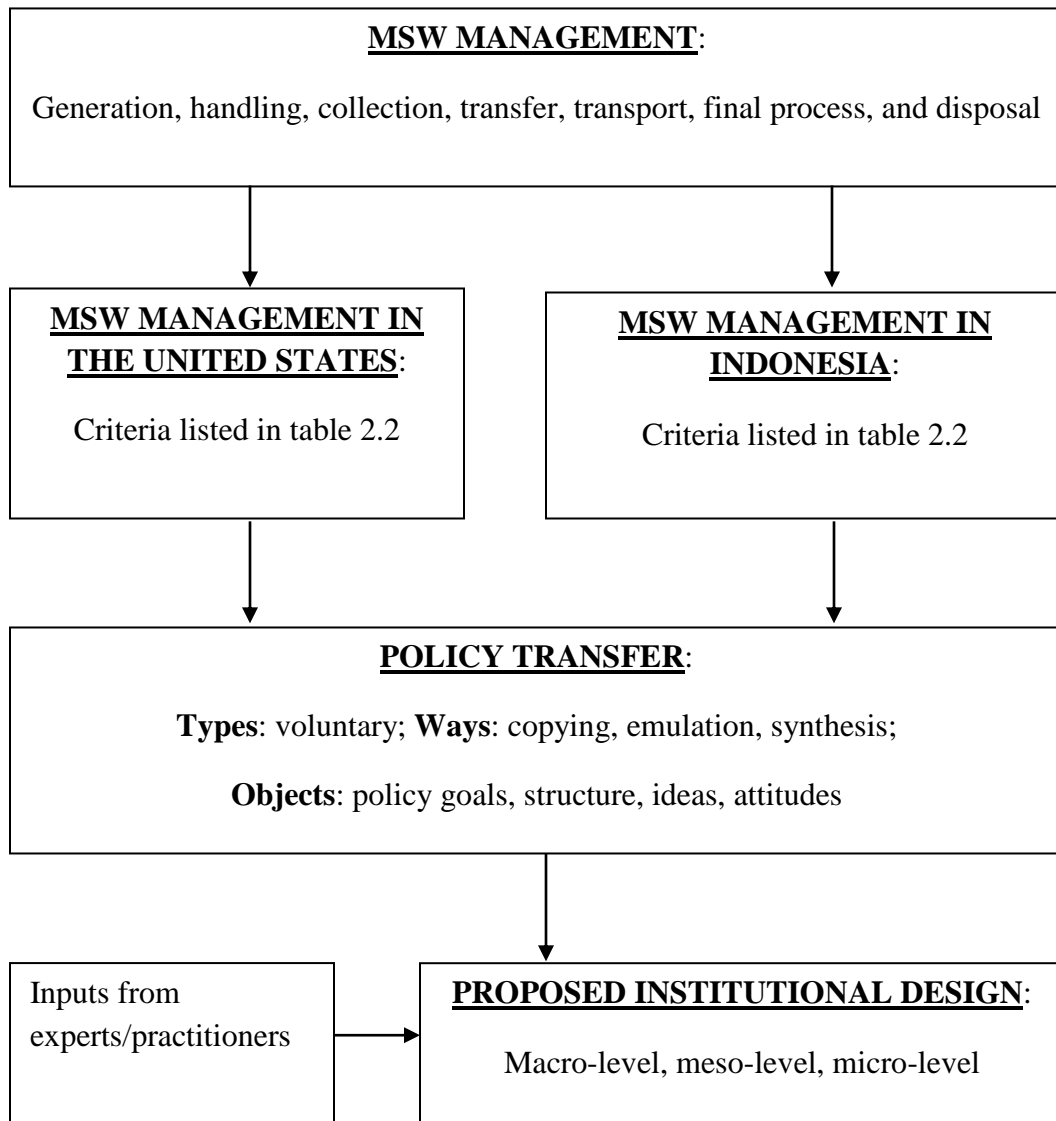


Figure 2.2 Conceptual model

IMPLEMENTATION OF MSW MANAGEMENT IN THE UNITED STATES

In MSW management, there are factors should be considered such as geographic and socio-economic conditions, governmental system, regulations et cetera. This chapter explores the factors supporting MSW management such as climate condition, economical capability, and governmental system in the United States. It also explains the current and historical of MSW management, which includes MSW generation, compostable materials in MSW, ‘separation at source’, citizens awareness et cetera. It is important to explore the historical context of MSW management due to the wide gaps between Indonesia and the United States in terms of economic level and citizen awareness regarding MSW in current circumstances. Exploring the history of MSW management possibly provides clearer illustration how the United States initiated implement modern MSW management. The United States started to apply modern MSW management at 1895 in the New York City Department (Louis, 2004).

3.1 Factors supporting MSW management

These conditions are climate condition, economic capability, and governmental system in the United States as follows.

Climate condition, Economical capability, and governmental system

The first is climate condition. To plan MSW management, geographic and climatic circumstances should be considered (Kundell and Ruffer, 2002). Based on the world factbook (CIA, 2015), the United States is part of North America which has modest temperature except in some parts such Florida and Hawaii with tropical climate and the northwest with lower temperature. The second is economic capability. The United States is the third largest GDP (power purchase parity/PPP-based) after China and European Union generating \$17.46 trillion in 2014 which services, industry and agriculture sectors contribute 77.7%, 20.7% and 1.6% respectively. The GDP per capita is \$54,800 (PPP-based) making the United States the 19th rank in the world (CIA, 2015). When using nominal GDP, the United States has higher GDP than China. This condition allows the United States is capable

to provide huge budget on MSW management. Meanwhile, the high GDP per capita allows the American citizens are able to pay high on MSW tipping fee. The last is governmental system. The United States is a federal republic country which has 50 states and 1 district (District of Columbia). In the United States, the president is chief of state and also head of government who is elected every four years by with the same ticket with the representatives. The cabinet is appointed by the president with senate approval. The United States has implemented decentralization with high citizen involvement in their policy (CIA, 2015).

3.2 MSW management

MSW management in the United States is to develop and implement appropriate MSW management effectively (Granholm and Chester, 2007).

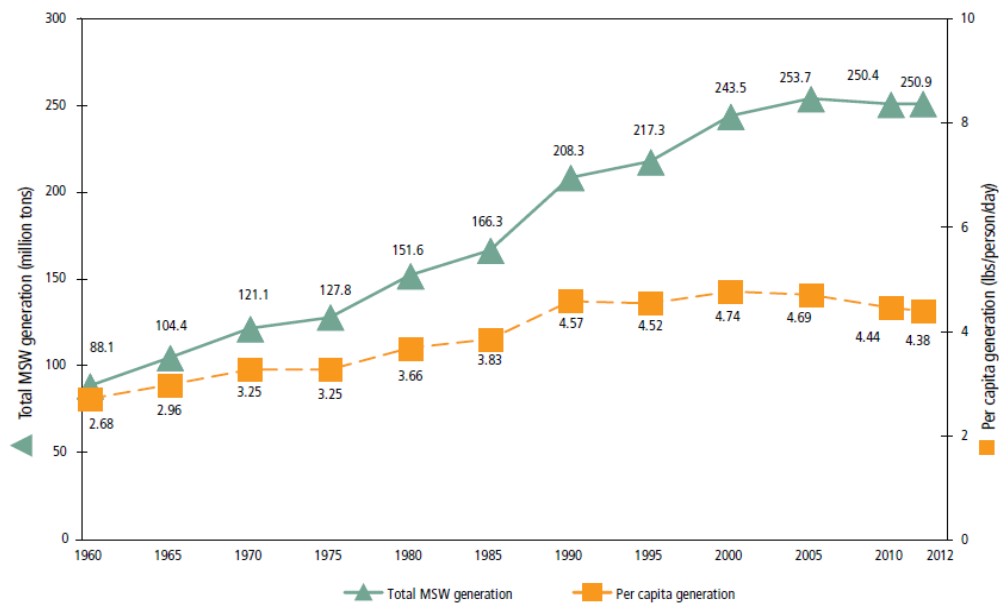


Figure 3.1 MSW generation from 1960 to 2012

(Source: USEPA, 2014)

MSW generation

The United States generated 250 million tons of MSW in 2012 or 4.38 pounds per capita per day. Moreover, 86.6 million tons of MSW generated are recycled which constitutes 34.5% of MSW generated. Figure 3.4 illustrates the MSW generation trend in the United States from 1960 until 2012 both total (million tons) and per capita (lb/person/day) generation. Between

1960 and 1985 the increase of total MSW generation was almost double. Then it went up sharply (around 30% in 5 years) until 1990 and increased moderately until 2012. However, MSW generation per capita increased fairly between 1960 and 1990. Afterwards, it remained stable until 2012. Furthermore, figure 3.5 depicts MSW recycling in the United States. Green curve shows the total recycling in million tons while the yellow curve shows percent of generation recycled. Both curves have almost the trend which increased slightly until 1985 and then went up drastically until 2012. In 2012, the total MSW recycled was 86.6 million tons or 34.5% of total generation. However, the landfilled MSW in the United States increased from 1960 until 1980s and decreased afterwards (Hill and Glenn, 2002).



Figure 3.2 MSW recycling in the United States

(Source: USEPA, 2014)

Meanwhile, ‘pay as you throw’ is paying more for MSW service when citizens throw away more MSW (Skumatz and Freeman, 2006). In general, the United States through USEPA (the United States environmental protection agency) encourages the practical efforts conducted by local governments, private sectors, and individuals to reduce MSW such as source reduction, recycling, and composting as shown in Table 3.2 below (USEPA, 2015).

MSW composition

Currently, MSW in the United States as in the other developed countries is dominated by paper which has a slight more than a quarter of the MSW generated as illustrated in figure 3.2 (USEPA, 2015).

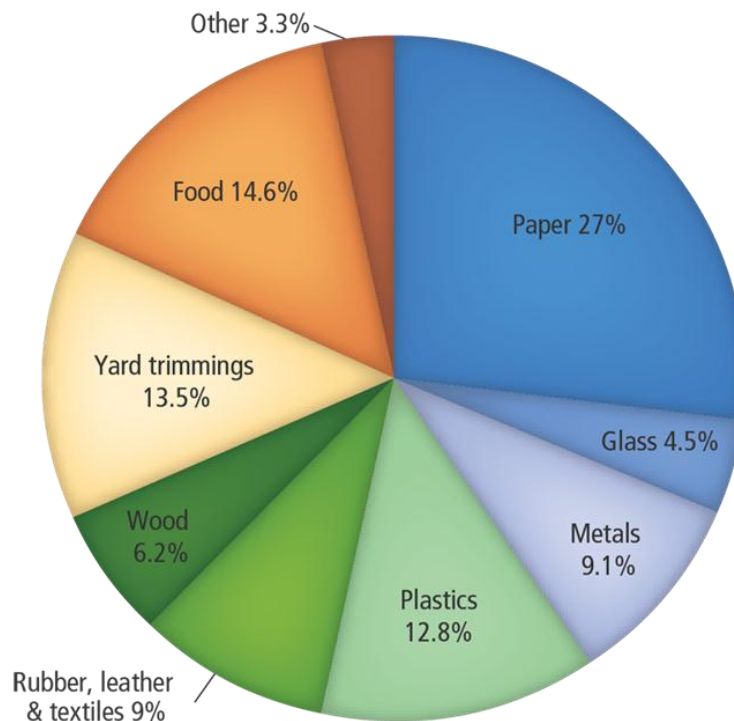


Figure 3.3 Composition of MSW in the United States, 2013
(Source: USEPA, 2015)

Separation at source

The United States implements ‘bottle bill’ program to reduce MSW generated and also separate recyclable materials of MSW. Bottle bill refers to a tax on producing bottle or container of food and beverages implemented in ten states namely California, Connecticut, Guam, Hawaii, Iowa, Maine, Massachusetts, Michigan, New York, Oregon, and Vermont (Container Recycling Institute, 2015).

Citizen awareness

Before 1790, MSW in the United States was organized by individuals. It was burned, buried and fed for animals (Louis, 2004). In that period, many wastes were on the streets, wells were contaminated and diseases scattered. The period of 1790 until 1920 is industrial revolution era in the United States. It caused the wastes generation increased and often found in waterways. Figure 3.2 illustrates the refuse dump in the United States in 1880. At that time, land application still dominated the type of MSW disposal. Furthermore, around 1895, Colonel George Waring, an ex-military officer who headed street cleaning agency in New York City attempted to remedy such circumstances. Waring applied discipline to the whole New York City residents regarding clean environment.

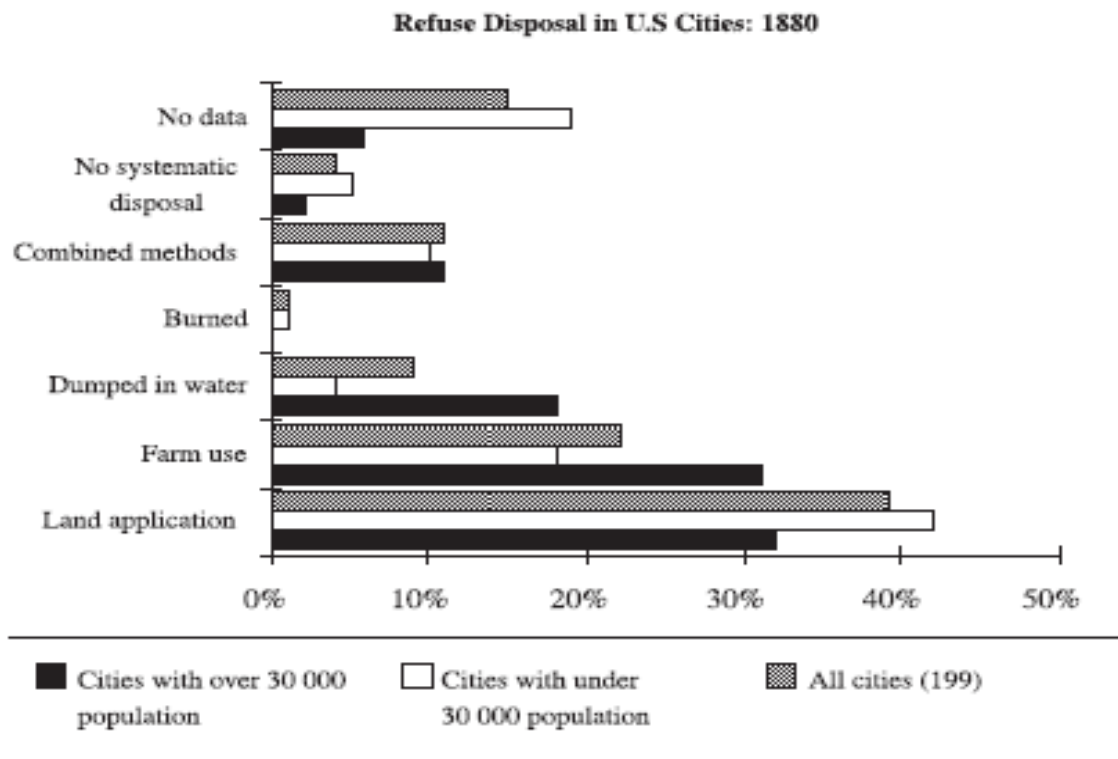


Figure 3.4 Municipal refuse disposal practices: 1880 census
(Source: Louis, 2004).

Informal sectors and private stakeholders involved

In general, stakeholders involved in MSW management in the United States are federal government, state governments, private sectors, and communities. Federal government gives

authority to USEPA to manage MSW. USEPA conducts research, assesses plans proposed by states, and provides report regarding MSW characterization (USEPA, 2015). However, MSW is managed by state governments with private sectors involved in the operational level such as collecting, transporting, recycling, composting, and landfilling (Louis, 2004). The local governments are responsible to manage MSW in each jurisdiction. Meanwhile, at operational level, private companies take a part as operator (Themelis, 2002).

In the United States, even though MSW management planning is a state domain, federal government also has important role by giving the United States Environmental Agency USEPA the authority to manage MSW in national level. However, USEPA provides some directives and incentives for state level regarding MSW management planning (Kundell and Ruffer, 2002). USEPA as the MSW authority in federal level considers the plan proposed by the states in the United States.

However, the United States experienced for a long time in MSW management. Previously, the MSW in the United States was handled by municipal government. Louis (2004) identify Waring efforts regarding MSW management in York City 1890s, he:

- paved streets in New York City
- revamped rules regarding cleaning environment
- built national recycling center
- implemented MSW separation at source
- introduced research related to MSW
- applied the military discipline in the cleaning agency of New York City
- designed operational procedure of MSW management

Regulations related to MSW management

In terms of MSW management, the federal government role is to direct municipalities regarding MSW management through regulations (Foster and Repa, 2002) such as

- Resource Conservation and Recovery Act (RCRA),
- Clean Air Act (CAA),
- Clean Water Act (CWA),

- Federal Aviation Administration (FAA) guidelines.

Table 3.1 Regulations related to MSW management in the US

Regulation	Year	MSW Impacts
Rivers and Harbors Act	1899	US Army Corps of Engineers controls dumping in waterways and on adjoining lands
Solid Waste Disposal Act (SWDA)	1965	Focus on sanitary disposal of MSW. R&D based
Resources Recovery Act (RRA)	1970	Shifts focus to material and energy recovery. Still R&D based.
Clean Air Act (CAA)	1970	Regulates emissions from MSW treatment/disposal facilities
Resource Conservation and Recovery Act (RCRA)	1976	Defines MSW, sets standards for landfills, sets guidelines for regional and state management plans
Comprehensive Environmental Response Compensation and Liability Act (CERCLA)	1980	Provides for clean-up of contaminated sites with costs recovered under strict, joint and several liabilities to responsible parties.
Superfund Amendment and Reauthorization Act (SARA)	1986	Increases funding for Superfund and strengthens EPA's power in seeking compensation settlements with PRPs.

(Source: Louis, 2004)

Resource Conservation and Recovery Act (RCRA) was promulgated on October 21, 1976. It experienced amendments several times, finally giving mandate to the United States Environmental Protection Agency (USEPA) to manage MSW at national level. RCRA also allows USEPA to produce technical regulations in federal level regarding MSW management (Foster and Repa, 2002). Moreover, USEPA also assess MSW management plans proposed by states. However, the goals of RCRA (USEPA, 2015) are

- To protect United States people from the impacts of disposing wastes;

- To maintain the sustainability of energy and natural resources by implementing recycling and recovery;
- To decrease or diminish waste generation; and
- To clean up waste in inappropriate places

The Clean Air Act (CAA) is to maintain clean air quality such as regulation of flaring gases generated in landfill areas. Clean Water Act (CWA) is to protect surface water to meet quality standard that relates to pollution generated by MSW. Moreover, Federal Aviation Administration (FAA) guidelines regulate the construction of MSW treatment near airport which would attract birds. However, the existence of birds is dangerous for aviation. The federal government also controls the flow (transportation among states) of MSW because it increases the fuel use and more air pollution (Foster and Repa, 2002).

3.3 Conclusion

The United States experienced in implementing modern MSW management for a long time period. The data about MSW management in the United States both the current and historical condition of MSW management such as MSW generation, compostable materials, MSW ‘separation at source’, et cetera and also the information supporting MSW management such as climate condition, economic capability, governmental system will be compared with the current condition in Indonesia to obtain possible lessons learned from the United States for MSW management Indonesia. From the explanation, several factors concerning MSW management in the United States can be concluded as listed in table 3.2.

Table 3.2 Factors supporting MSW management in the United States

FACTORS		CONDITION
1	Climate related to composting process	The climate in the United States is generally modest temperature
2	Economical capability	The United States has high budget which allows more money for MSW management
3	Governmental system	The United States has experienced implementing decentralization for a long time
4	MSW generation	As a developed country the United States has a high MSW generation per capita which around 4.5 lbs per person per day in recent years
5	Compostable materials in MSW	MSW in the United States is dominated by non-compostable materials such as paper, metals and glass
6	Separation at source	The United States implements modern MSW management since around 1890
7	Citizen awareness	Since 1890 when Waring implemented modern MSW management, the citizens generally thrown away the MSW into proper places
8	Service coverage	The United States implements modern MSW management in all states started in New York City in 1890
9	Private sectors involved	In general, MSW management in the United States involves private sectors in operational level although public sectors are responsible to manage MSW
10	Informal stakeholders involved	There are not scavengers in the United States who pick up recyclable materials of MSW in disposal areas
11	Regulations related to MSW management	The United States enacted the comprehensive regulations related to MSW management since 1965

(Source: compiled by author)

CHAPTER 4

IMPLEMENTATION OF MSW MANAGEMENT IN INDONESIA

This chapter explores the factors supporting MSW management in Indonesia. MSW management in Indonesia is still a big issue. MSW ‘separation at source’ is still low. Meanwhile, the MSW transported by municipal services is less than 60% of MSW generated as shown in table 4.4 (Damanhuri and Padmi, 2012). It means that the rest is dumped into illegal dump sites, burned in the back yard, and thrown away into the rivers or drainages (Aye and Widjaya, 2005). Moreover, there are many informal stakeholders involved in MSW management who need to be managed appropriately. Based on Damanhuri and Padmi (2012), the existence of informal stakeholders can decrease operational cost of handling MSW compared to formal stakeholder involvement mostly applied in developed countries. Besides it can give benefits in terms of lowering operational cost, the problem arose due to increased risks for their health who mostly do not equip themselves with standardized apparatus.

This chapter explores the factors supporting MSW management such as climate condition, economic capability, and governmental system in Indonesia. It also describes the MSW management condition as listed in table 2.4 such as MSW generation, compostable materials, MSW ‘separation at source’, citizen awareness et cetera.

4.1 Factors supporting MSW management

These factors probably influence the MSW management in Indonesia. Therefore, it is important to explore such factors.

Climate condition

Indonesia is located Southeastern Asia and coordinated in 5 00 S, 120 00 E (CIA, 2015). Its location on equator makes it a tropical country with hot and humid air. Based on (Diaz, et al., 2002) such conditions are beneficial for composting MSW which requires hot temperature and humid air for growing microbes.

Economical capability

Indonesia is the tenth world largest GDP (gross domestic product) as power purchase parity (PPP) generating \$2.55 trillion in 2014 which services, industry, agriculture sectors contribute 40.3%, 45.5%, and 14.2% of total GDP respectively. Moreover, the GDP per capita is \$10,200 (PPP-based) making Indonesia the 133th rank in the world (CIA, 2015). Low GDP per capita can influence the ‘willingness to pay’ of MSW service in Indonesia.

Governmental system

Indonesia is a republic country which has 33 provinces including 1 autonomous province (nanggroe Aceh Darussalam province), 1 special region (*daerah istimewa* Yogyakarta), and national capital (*daerah khusus ibukota* Jakarta). In Indonesia, the president is chief of state and also head of government who is elected every five years by direct vote. It is a multiparty country consisting of nine parties in parliament (CIA, 2015). However, decentralization system was implemented in Indonesia since 2001 which many public services became local government responsibility. This governmental system will influence the possibility of transferring policy.

4.2 MSW management

In Indonesia, the vast majority of MSW is organic materials (Zubair, et al., 2011; Chaerul, 2006). Meanwhile, separation at source and service coverage is still low. In addition, citizen awareness regarding throwing away MSW into appropriate containers is still low in some places in the country.

MSW generation and the compostable materials

In Indonesia, MSW generated is about 2.2 lbs per person per day (The Economist, 2012). In addition, organic (compostable) materials of MSW in Indonesia are about 67% as provided in table 4.5 below (Zubair et al., 2011; Chaerul, 2006). It is almost the same with the other developing countries that organic matters in MSW are about 65% (UNEP, 2011).

Table 4.1 MSW composition in Indonesia

MSW COMPONENT	COMPOSITION, % w/w
Organic	67.14
Paper	12.84
Wood	0.22
Textile	0.14
Rubber/leather	0.13
Plastic	14.09
Metals	0.13
Glass	4.98
Others	0.33

(Source: Zubair et al., 2011)

Table 4.2 Separated MSW by provinces, 2013

Province	Separated, %	Commingled, %	Province	Separated, %	Commingled, %
Aceh	18.79	81.21	Nusa Tenggara Barat	17.83	82.17
Sumatera Utara	19.61	80.39	Nusa Tenggara Timur	29.63	70.37
Sumatera Barat	17.47	82.53	Kalimantan Barat	15.8	84.2
Riau	20.87	79.13	Kalimantan Tengah	23.84	76.16
Jambi	16.1	83.9	Kalimantan Selatan	20.11	79.89
Sumatera Selatan	23.18	76.82	Kalimantan Timur	29.03	70.97
Bengkulu	18.9	81.1	Sulawesi Utara	34.95	65.05
Lampung	16.29	83.71	Sulawesi Tengah	29.95	70.05
Kep. Bangka Belitung	23.32	76.68	Sulawesi Selatan	28.58	71.42
Kepulauan Riau	20.01	79.99	Sulawesi Tenggara	26.78	73.22
DKI Jakarta	14.23	85.77	Gorontalo	22.25	77.75
Jawa Barat	30.52	69.48	Sulawesi Barat	20.52	79.48
Jawa Tengah	27.41	72.59	Maluku	15.59	84.41
DI Yogyakarta	31.26	68.74	Maluku Utara	16.59	83.41
Jawa Timur	19.93	80.07	Papua Barat	27.98	72.02
Banten	18.42	81.58	Papua	16.98	83.02
Bali	31.17	68.83			
Indonesia				23.69	76.31

(Source: Statistics Indonesia, 2015)

MSW 'separation at source'

MSW 'separation at source' which separates compostable and non-compostable MSW is 23.69% (Statistics Indonesia, 2015). It means that most of MSW is still commingled. In Indonesia, there are scavengers in dump sites picking up the recyclable materials. Less separated MSW at source makes scavengers harder to gain more recyclable materials. It is because the MSW still commingled. Therefore the total recovered materials will be less. In TPA Bantargebang, for example, scavengers can pick up recyclable materials only around 2.8 – 7.5% of total MSW transported (Sasaki and Araki, 2014).

Citizen awareness

Based on study of Damanhuri and Padmi (2012), MSW in Indonesia is mainly open-dumped which could generate several public health problems. Moreover, open dumping MSW generates green house gases (Kumar and Sharma, 2014). In some places, there is MSW still thrown away into rivers and drainages which constitutes 2.99% of MSW generated. It can generate problems such as clogged drainage, silted river, decreased environmental amenity, and public health. Table 4.3, lists the percentage of MSW handled.

Table 4.3 Handling on MSW

MSW HANDLING	PERCENTAGE, %
Open dumping	68.80
Landfilling	9.58
Composting	7.19
Discharging into river	2.99
Open burning	4.79
Small scale incineration	6.59

Source: Damanhuri and Padmi (2012)

Based on table 4.3, landfilled MSW does not exceed 10% while the vast majority is open dumped 68.8% of MSW generated. Meanwhile, the composted MSW is around 7% of MSW generated. TPA (*tempat pembuangan akhir*) refers to disposal sites without composting, recycling, and incineration facilities. Meanwhile TPST (*tepat pembuangan sampah terpadu/*

integrated solid waste handling site) is equipped with such facilities. In recent years, the existence of TPST is still limited and there is not significant development. In Indonesia, TPST Bantargebang uses composting process to generate electricity. It composts solid waste to generate methane, afterwards the methane burned in gas engine chamber to generate electricity. However, TPST Bantargebang is less beneficial in recent years (Hamludin, 2014).

Service coverage

MSW service mainly covers collection, transfer, and transport. In Indonesia, MSW service coverage is around 50% except in Sulawesi, Maluku and Papua islands which is almost 70% as shown in table 4.4 below. Accordingly, based on Aprilia et al (2012) study, the vast majority of residents in Indonesia perceive that MSW service is poor which enhances illegal dumping. Moreover, based on the study, many of citizens think that the more involvement of private sectors the better MSW management.

Table 4.4 Population served in MSW management by islands

ISLANDS	POPULATION (million)	POPULATION SERVED (million)	POPULATION SERVED (%)
Sumatera	49.3	23.5	48
Java	137.2	80.8	59
Bali and Nusa Tenggara islands	12.6	6.0	47
Kalimantan	12.9	6.0	46
Sulawesi, Maluku and Papua	20.8	14.2	68
TOTAL	232.7	130.3	56

Source: Damanhuri and Padmi (2012)

Private sectors involved

According to Law number 18 (2008) concerning waste management, private sectors are allowed to manage MSW. However, in Indonesia, private sectors involvement in managing MSW is still limited. They are only involved in big cities such as in Jakarta (Hamludin,

2014). In the other cities, MSW is managed by municipal governments starting from providing facilities such as TPS, containers, TPA, trucks, et cetera, and managing its operation. Nevertheless, generally, recyclers such as plastic and metal recyclers are private sectors (Damanhuri and Padmi, 2012).

4.3 Informal stakeholders involved

Many people in developing countries depend on picking up MSW (Wilson, 2006). For example, in Indonesia besides formal stakeholders, many informal stakeholders in MSW management are involved such as scavengers (waste pickers), waste collector crews, junkmen (waste traders), intermediates (*lapaks*), dealers (*bandars*), brokers, washers et cetera (Damanhuri and Padmi, 2012).

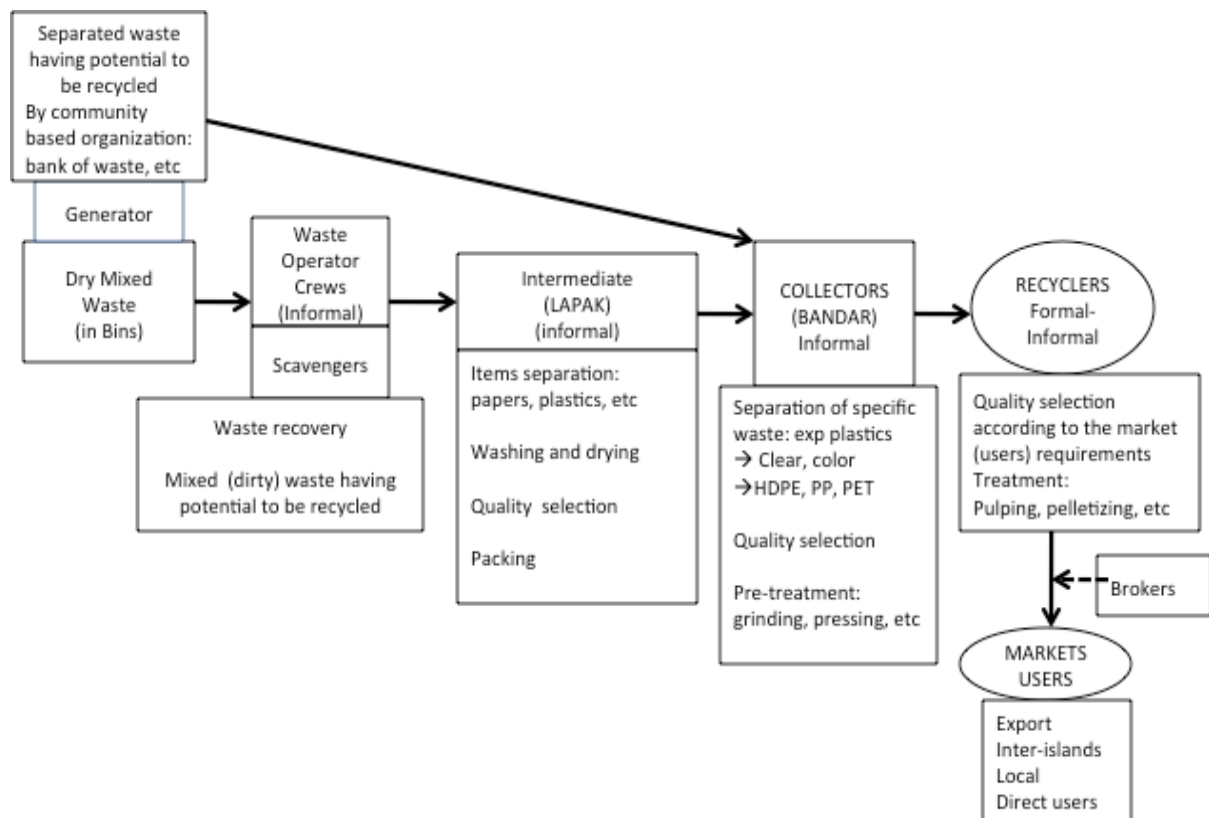


Figure 4.1 Recyclable materials flow in Indonesia
(Source: Damanhuri and Padmi, 2012)

Scavengers

Scavengers collect recyclable materials such as plastics and metals in the dump sites, houses, retail shops, and moments such as wedding parties or music concerts which generate MSW particularly plastic. Shops usually sell cardboard waste to scavengers. Intermediates (*lapaks*) lend money to scavengers for buying wastes from households and shops. In Indonesia, scavengers usually come from villages without certain capabilities (Damanhuri and Padmi, 2012).

Junkmen (waste traders)

They are like scavengers collecting recyclable materials but they buy unused materials from houses or retail shops such as plastic cups, cardboard, iron and aluminum scraps rather than just picking up recyclable materials from dump sites. Afterwards, they sell wastes to *lapaks* (Damanhuri and Padmi, 2012).

Waste collector crews

In some municipalities, there are groups of people collecting and processing MSW (Damanhuri and Padmi, 2012). Some are funded by local government promoting 3Rs (reduce, reuse, and recycle) programs, while the others use their capital to make compost from compostable wastes or to shred, wash and dry plastic wastes. Afterwards, they sell compost to consumers and dried plastics to recycle factory. After Ministry of Environment regulation number 13 in 2012 was promulgated, waste bank was known (Lestari, 2012). The crews receive recyclable materials from surrounding residents who have account.

Intermediates (lapaks)

They buy specified wastes from scavengers and junkmen (Damanhuri and Padmi, 2012). Some wastes are further classified, and stored until a sufficient amount is reached to transport to dealers or directly to recycle factories. Some *lapaks* have facility for shredding and washing plastic wastes. *Lapaks* are individuals who buy recyclable materials from scavengers and junkmen, and profit oriented, while waste bank are communities who buy recyclable materials directly from residents.

Waste Collectors (bandars)

Bandars usually do not buy directly from scavengers and junkmen instead they buy from *lapaks* which sell classified materials (Damanhuri and Padmi, 2012). However, they can buy more wastes from *lapaks* rather than directly from scavengers and junkmen. Afterwards, they sell further classified wastes such as plastics, glasses, metal scraps to recyclers.

Recyclers

They process prepared wastes as raw materials. Usually they are specific on one kind of raw materials, such as plastic recycler which process plastics as raw material to produce many kinds of plastic products (Damanhuri and Padmi, 2012). In the same way aluminum recyclers process aluminum scraps as raw material to produce aluminum wares. Their role is important to decrease the burden of MSW in dump sites besides they provide jobs.

4.4 Regulations related to MSW management

There are four regulations specifically concerning waste management in Indonesia in recent years. These regulations regulate the stages in MSW management including MSW generation, handling, collection, transfer, transport, final processing, and disposal. Based on regulation hierarchy, firstly, the highest position is Law number 18 in 2008 regarding waste management including household, household-like and specific waste. Secondly, *Peraturan Pemerintah* (Government Regulation) number 81 in 2012 regarding household and household-like waste management is below Law 18 in 2008. In third positions there are *Peraturan Menteri Dalam Negeri* (Ministry of Home Affairs) number 33 in 2010 regarding guidelines of waste management and *Peraturan Menteri Lingkungan Hidup* (Ministry of Environment regulation) number 13 in 2012 concerning guidance of reduce, reuse, and recycle program through waste bank. The hierarchy of regulations related to MSW management is listed in figure 4.2.

Law number 18 year 2008 regarding waste management

Before 2008, waste management was part of Law number 23 in 1997 regarding environment management. Afterwards, waste and environment management were regulated separately. In 2008, Law number 18 regarding waste management and in 2009, Law number 32 regarding

environment protections and management were promulgated. Law number 18 was introduced in 2008 which stated that the principle of MSW management is based on the principle of responsibility, sustainability, beneficial, justice, awareness, togetherness, safety, security, and economic value as stated in article 3. Based on the elucidation of the Law, the meaning for each principle is provided in table 4.5.

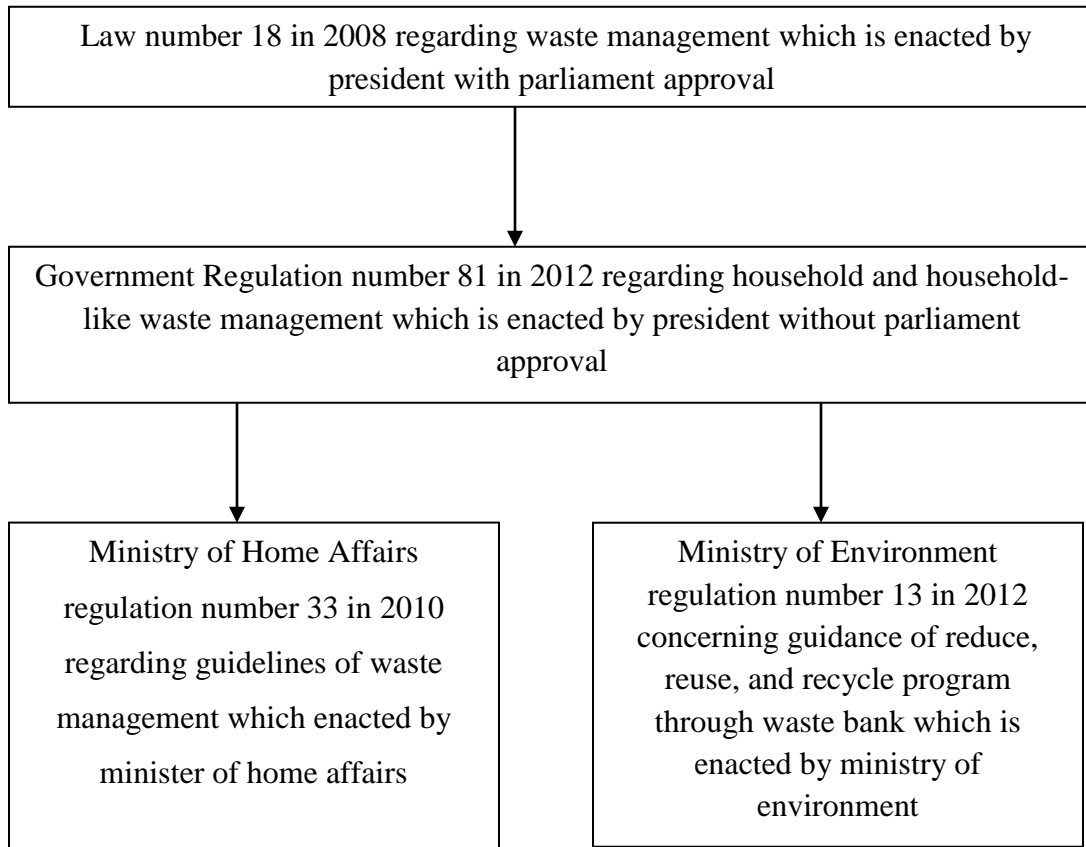


Figure 4.2 Hierarchy of regulations related to MSW management

(Source: Government of Indonesia, adapted, 2011)

The law is more comprehensive compared to previous regulation such as Government Regulation number 74 in 2001 which only regulates hazardous materials management. The government does not just have to handle MSW but also to encourage the other stakeholders to manage effectively. Furthermore, citizens have rights regarding MSW management such as getting valid information, getting compensation when affected by negative impact of MSW handling, participating in MSW management and having a good quality environment

as stated in article 11. Furthermore, this law stated that citizens are prohibited to import waste from abroad, meanwhile there are used goods importers such as second hand clothes (Kusuma, 2015). In addition, although burning MSW without standard procedures, and dispose wastes in illegal dump sites as stated in article 29 are prohibited, some citizens still burn their MSW in their backyard (Damanhuri and Padmi, 2012).

Table 4.5 Principles of MSW management

PRINCIPLES	MEANS
Responsibility	that the government and the local government have the responsibility for waste management to implement community right for good and healthy environment
Sustainable	that waste management is carried out with the environmental friendly methods and technique. So that It does not cause negative impact to the community's health and environment, both for present and future generation
Beneficial	that waste management need to apply the approach that consider waste as usable resource to fulfill the need of the community
Justice	that in waste management, the government and local government provide equal opportunity to the community and to the business entity to play the active role in the waste management
Awareness	that in waste management, the government and the local government supports every person to have attitude, attention, and awareness to reduce and to handle waste that is produced
Togetherness	that waste management is carried out involving all stakeholders
Safety	that waste management must insure the human safety
Security	that waste management should insure and protect community from various negative impacts

(Source: Elucidation of Law No. 18 year 2008)

Moreover, local governments are not merely collecting, transporting, and dumping MSW but they should do more in managing MSW. As stated in article 6, that such a law allows the government both local and national to:

- develop and raise societal awareness regarding waste management
- encourage and facilitate research and encourage local community involvement based on their knowledge;
- develop and provide facilities supporting the efforts to reduce waste generation and to process wastes;
- link government agencies, communities and business sectors;
- encourage partnership among local governments facilitate and develop co-operations

In practice, such regulation needs more efforts to implement because societal awareness appropriate MSW handling and organizing informal stakeholders are still low (Damanhuri and Padmi, 2012).

Peraturan pemerintah (Government regulation) number 81 in 2012

This regulation is regarding household and household-like waste management that describes MSW management in more detail than Law 18/2008. However, this government regulation number 81/2012 regulates MSW management in more technical such as requirements for MSW management. For example, it specifies the MSW management stages which consist of:

- separation which is the activity to classify and separate wastes according to the types
- collection which is the activity to take and dispose wastes from the sources into *tempat pembuangan sementara (TPS/ temporary disposal site)*
- transport which is the activity to take wastes from temporary disposal sites to *tempat pembuangan sampah terintegrasi (TPST/ integrated disposal site)* or *tempat pembuangan sampah akhir (TPA/ final disposal site)* using a motor vehicle or specifically designed motor or transporting wastes
- processing which is the activity to change characteristics, composition and the amount of wastes including compacting, composting, mass and energy recovery, and

- final MSW processing which is the activity to dispose safely waste residues of previous processing into the environment including controlled landfill, sanitary landfill and eco-friendly technology.

This regulation comprehensively regulates the technical aspects of MSW management. However, in reality, MSW is less separated and there are citizens who throw away MSW into prohibited areas (Statistics Indonesia, 2015).

Peraturan Menteri Dalam Negeri number 33 in 2010

Peraturan Menteri Dalam Negeri (Ministry of Home Affairs) number 33 in 2010 is regarding guidance of waste management based on the previous regulations. This regulation regulates the management aspects of MSW particularly for municipal governments. Moreover, the regulation describes the role of agencies to manage MSW including *rukun tetangga* (neighborhood association), districts, sub-districts and *badan layanan umum daerah* (public service agency) in municipality or regency level. It also regulates incentives-disincentive, cooperation among stakeholders, retribution applied, compensation, reporting, and financing.

Peraturan Menteri Lingkungan Hidup number 13 in 2012

Peraturan Menteri Lingkungan Hidup (Ministry of Environment Regulation) number 13 in 2012 concerns guidance of reduce, re-use, and re-cycle through waste bank. It regulates technical aspects such as waste bank requirements including construction specification, its working mechanism, implementation, and man power. Working mechanism consists of waste separation, delivering waste to waste bank, weighing, recording, revenue and dividend. Meanwhile, the implementation of waste bank is about working hours, withdrawal of savings, borrowing money, saving book, pickup services, types of savings, types of waste, pricing, waste condition, minimum weight, containers, profit-sharing, employee remuneration et cetera. However, in 2012, there are 886 waste banks in Indonesia which has 84,623 members (Ministry of Environment and Forestry, 2013).

In terms of regulations concerning MSW management, Indonesia has already had at least four regulations as described above. Law number 18 in 2008 consists of basic principles of MSW management including sanctions, rights, and obligations of citizens and government.

Meanwhile, Government regulation number 81 in 2012 regulates more detailed about MSW management and technical aspects. Moreover, ministry of home affairs number 33 in 2010 and ministry of environment regulation number 13 in 2012 regulate the management and technical aspects respectively. However, Indonesia still needs effort to implement the regulations because some the existing condition is challenging such as low citizen awareness, low in service coverage and separation at source. However, waste bank, a program which is regulated by *Peraturan Menteri Lingkungan Hidup* number 13 in 2012 gained many responses (Ministry of Environment and Forestry, 2013).

4.5 Conclusion

In recent years, Indonesia enacted regulations related to MSW management. The regulations comprehensively regulate MSW management including management in national level, municipal level, the requirements of management aspects and also technical aspects. However, in Indonesia, the service coverage, MSW separation, and citizen awareness are still low. This information concerning the condition of MSW management in Indonesia will be compared with the MSW management in the United States to obtain possible lessons learned from the United States to Indonesia in following chapter. The condition of criteria/factors of MSW management in Indonesia is summarized in table 4.6.

Table 4.6 Condition of factors supporting MSW management in Indonesia

FACTORS		CONDITION
1	Climate condition	The climate in Indonesia is hot and humid which is beneficial for composting process
2	Economical capability	Indonesia has low national budget which the capability of providing money for MSW management is low
3	Governmental system	Indonesia recently implements decentralization system in its governmental system
4	MSW generation per capita	As a developing country Indonesia has a low MSW generation per capita which around 1 lb per person per day in recent years
5	Compostable materials in MSW	Indonesia has a high percentage of organic materials in MSW
6	Separation at source	MSW separation at source in Indonesia is less than a quarter of MSW generated.
7	Citizen awareness	In Indonesia, the vast majority of MSW is open-dumped and around 3% is thrown away into rivers
8	Service coverage	In Indonesia, service coverage of MSW management is still low, less than 70% of MSW generated
9	Private sectors involved	In Indonesia, private sectors are involved in MSW management generally in big cities
10	Informal stakeholders involved	There are many informal stakeholders involved in MSW management in Indonesia such as scavengers, junkmen, <i>lapaks</i> , and <i>bandars</i>
11	Regulations related to MSW management	Indonesia enacted the comprehensive regulations concerning MSW management in recent years initiated by enacting Law number 18 in 2008

(Source: compiled by author)

CHAPTER 5

COMPARISONS BETWEEN TWO COUNTRIES

This chapter discusses the comparison of United States and Indonesia context based on factors supporting MSW management such as climate condition, economic capability, and governmental system. Indonesia could learn several ideas regarding MSW management from the United States, although some conditions are different which needs to adapt such ideas. In this study, the type of policy transfer is voluntary or specifically called lessons learned that means the lessons drawn voluntarily. Indonesia can learn lessons without any coercions coming from the other countries. The ways of policy transfer can be copying, emulation, or hybridization. Furthermore, the objects of policy transfer are goals, ideas, and attitudes. The lessons learned have the same goal to make better MSW management in Indonesia which contributes to maintain public health and environment amenity.

5.1 Comparison of factors supporting MSW management

This section explains the comparison of factors supporting MSW management such climate, economic capability, and governmental system.

Climate related to composting process

Indonesia has different conditions with the United States in terms of geographic and natural conditions. Furthermore, in terms of climate circumstances, Indonesia is different with the United States except in Florida and Hawaii which have a tropical climate. The rest parts of the United States are temperate and low temperature in winter in northwest part. Meanwhile, Indonesia is a tropical country lying on equator which has hot temperature and humid air. This condition will be suitable for producing compost (Diaz et al., 2002).

Economical capability

In terms of economy, Indonesia and the United States have a wide gap. For example, the national budget, the United States has almost 23 times higher than Indonesia while the number of population is quite close (CIA, 2015). Therefore, the United States can provide

much more money for MSW management than Indonesia. It implies the capability of Indonesia to provide MSW facilities for MSW management is lower than the United States. In addition, because GDP per capita in Indonesia is low, the ability of citizens to pay MSW services is also low.

Governmental system

Both Indonesia and the United States are republic countries which headed by a president. The president is also a government head. The United States has 50 states and 1 district which experienced strong democratic tradition while Indonesia has 31 provinces, 1 autonomous province, 1 special region, and 1 capital region. Since 2001, Indonesia implemented decentralization system in its administration which most of government services are provided by regencies and municipalities (CIA, 2015). Moreover, the development in Indonesia particularly after decentralization era adopts neoliberal ideas both copying and adapting (Hudalah and Woltjer, 2007).

5.2 Comparison of MSW management and lessons learned

In general MSW management in the United States is much better than in Indonesia in terms of service coverage and citizen awareness. In recent years, in Indonesia there are still MSW thrown away into rivers and illegal dump sites (Damanhuri and Padmi, 2012). Meanwhile, the United States implements modern system which means that almost the whole MSW are thrown away into proper containers (Louis, 2004).

MSW generation per capita

Figure 5.1 shows that Indonesia generates MSW less than 1 kg per person per day while the United States generates more than 2.5 kg per person per day. However, the United States reduces MSW generation by implementing programs such as ‘bottle bill’ and ‘pay as you throw’. Bottle bill is that the bottle can be resold to producers through stores. Meanwhile, ‘pay as you throw’ program is the payment of MSW service based on the amount of MSW generated. As the result, since 1990, the MSW generation per capita in the United States remained stable and dropped slightly in 2010.

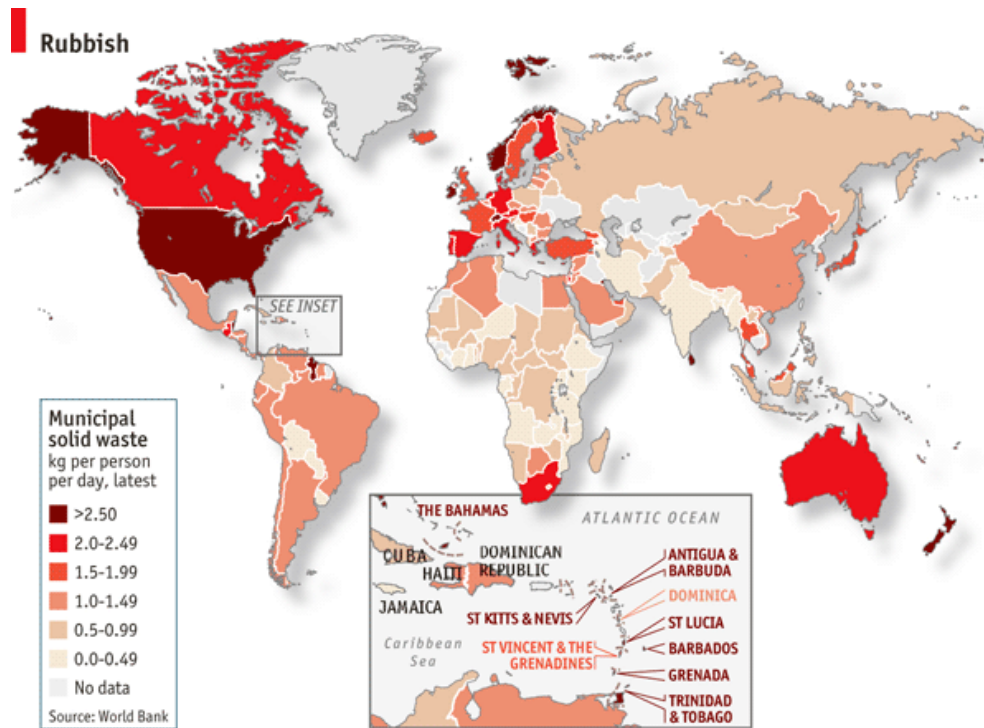


Figure 5.1 MSW generation by country
(Source: The Economist, 2012)

Organic materials in MSW, separation at source, and citizen awareness

In Indonesia, the vast majority of MSW generated are organic materials, around 67% of MSW generated. Meanwhile, in the United States, the vast majority of MSW generated is inorganic materials. Furthermore, MSW separation at source in Indonesia is less than a quarter of MSW generated. Meanwhile in the United States which implements modern system of MSW management separate their MSW at source. Although burning MSW in the backyard and throwing away MSW into illegal dump sites are prohibited as stated in article 29 of Law number 18 in 2008, there still citizens are not aware. It requires more efforts to implement such regulations properly. Furthermore, in Indonesia, MSW separation at source is still low with only 23.69% of MSW generated (Statistics Indonesia, 2015). However, separation at source is important to increase recovered materials in TPAs (final disposal sites). When the separated materials are more, the scavengers will obtain more recyclable materials in TPAs. In the other sides, the organic materials also will be more when the

separation at source is conducted. Therefore, educating citizens to separate MSW is important.

It might require some pioneers to initiate big changes of citizens behavior regarding better MSW management and learn lessons from the United States. The United States experienced the era of initiating modern MSW management when George Waring Jr started to implement modern MSW management in New York City around 1895. He implemented the military discipline firstly to the agency staffs and took the steps, as described in chapter 3, to improve the circumstances where the MSW was the big problem at that time in New York City. The attitudes of citizens can be learned to support public health and maintain environment amenity.

Modern system in the United States was started in New York City around 1890s particularly initiated by George E Waring Jr, as street cleaning commissioner in New York City in 1895 until 1898. As an ex-militer he applied the discipline with military in his department. Thus his ways were adopted in whole country. To enhance awareness of citizens in Indonesia, in my opinion, it is better to adopt such ideas that firstly implement military discipline in cleaning departments in one or more in local government level. Thus the department can influence the citizens to implement better MSW handling. The current condition in Indonesia is almost similar with the condition in the United States in 1895 where there are MSW thrown away into streets and rivers. Besides, in new order era, Indonesia experienced to implement co-working between citizens and military corps to build rural area facilities through ABRI masuk desa (AMD/ army in village) program. Nowadays, such a program is re-implemented in Indonesia through TMMD (TNI manunggal membangun desa/ army cooperation in development) program (Tuwo, 2015). Army naturally has military discipline in their thinking, hopefully will influence the citizens to handle MSW properly. Thus, I think will be better to implement the program in promoting better MSW management for Indonesian citizens because its experience.

Service coverage and private sectors involved

In Indonesia, service coverage of MSW management is still low, less than 70% of MSW generated. Meanwhile, in the United States which has high budget can provide more money for MSW management. In Indonesia, cleaning departments in every municipality operate transporting MSW from TPS/temporary dump site to TPA/final dump site (Hidayat, 2014). However, private sector involvement in Indonesia is still limited. They are involved particularly in big cities in collecting, transferring, and transporting MSW (Chaerul, et al., 2006). In general, private sectors can provide service at lower cost than public sectors (Coad, 2005). It is required for the other cities in Indonesia to involve private sectors in these stages because of the cities are growing and the MSW generated increases. The local governments can provide budget, regulate the amount of tipping fee for citizens and the tasks for private sectors in providing service.

In the United States, USEPA is responsible to manage MSW in national level which includes conducts research, assesses plans proposed by states, and provides report regarding MSW characterization (USEPA, 2005). Meanwhile, in Indonesia, directorate general of solid waste and hazardous materials is responsible to manage MSW in the country as a part of ministry of Environment and Forestry (Ministry of Environment and Forestry, 2015). Furthermore, although who responsible for MSW management are local governments, private sectors are involved in MSW management especially in transporting MSW to landfill areas or recycling factories. Their involvement includes transferring MSW from containers into trucks and cleaning street.

Informal stakeholders involved

In most cities, in Indonesia, there are scavengers and junkmen who pick the recyclable materials from containers, TPS, and also TPA. Junkmen do not only pick up recyclable materials but also buy recyclable materials such as cardboards and metal scraps from residents. Their involvement is important in terms of enhancing recycled materials from MSW and providing income. However, they are not well organized (Damanhuri, 2009). Compared to the condition in the United States, MRFs (material recovery facilities) are operated to separate commingled materials. MRFs are facilities to separate MSW using

mechanical system and finalized by manual operations (Leverenz, et al., 2002). To build MRFs requires more finance. Meanwhile, in Indonesia there are many scavengers particularly in TPAs in big cities. It is better for Indonesia to consider operating TPAs as MRFs by employing scavengers in terms of the facilities for separating recyclable materials. The equipment utilized by scavengers can be enhanced to obtain more recovered materials and also protect their health. For example, by equipping the scavengers with gloves, caps, masker can decrease the bad impacts of MSW to their health. The municipal governments by support of national government can provide budget for equipping scavengers lower than establishing MRFs which should provide buildings and the other facilities. In this case, the object of policy transfer is the idea of MRFs might be implemented in TPAs in Indonesia and the goal that can enhance recovered materials in MSW.

Regulations related to MSW management

In Indonesia, regulations related to MSW management were promulgated in a few years ago. Meanwhile the United States enacted its regulations since a long time. When compared, the United States has around 40 years longer than Indonesia in implementing regulations related to MSW management. Nowadays, the United States has applied better MSW management (Louis, 2004) in terms of citizen awareness and recycled materials of MSW.

Regulations concerning MSW management in Indonesia listed above cover many ideas of the regulations in the United States. For example, law number 18 in 2008 has the same ideas in several parts which regulate sanitary landfill and the closure of open dump sites. Moreover, Peraturan menteri lingkungan hidup (Ministry of Environment Regulation) number 13 year 2012 concerning guidance of reduce, reuse and recycle through waste bank also conform with the regulations in the United States enacted at around 1970's. However, Indonesia does not have regulations which specifically regulate the cleaning up contaminated sites while the United States enacted Comprehensive Environmental Response Compensation and Liability Act (CERCLA) concerning the provision of cleaning-up of polluted areas. Therefore, due to some regulations in Indonesia and in the United States are rather similar, 'copying' which adopts policies without major changes can be considered to clean up the contaminated sites in Indonesia. Besides, Indonesia has adopted the other regulations and procedures related to

waste water from the United States. For example, procedures concerning the examination of waste water, air ambient, and gas emission (SNI/ Indonesian national standard) mainly adopt the procedures from the United States EPA, AWWA (American waste water association), and APHA (American public health association). In addition, Indonesia adopts neoliberal ideas mainly from the United States that probably works in adopting the regulations and programs of cleaning-up the contaminated sites.

Table 5.1 Summary of comparison

FACTORS		INDONESIA	THE UNITED STATES
1	Climate related to composting process	++	+
2	Economical capability	-	++
3	Governmental system	+	+
4	MSW generation per capita	-	++
5	Organic materials in MSW	+	-
6	Separation at source	-	++
7	Citizen awareness	-	++
8	Service coverage	+	++
9	Private sectors involved	+	++
10	Informal stakeholders involved	++	+
11	Regulations related to MSW management	-	++

(Source: Kundell and Ruffer, 2002; developed by author)

Note:

-- = lack

- = lack of some part

+ = good; high

++ = very good; very high

Summary analysis

Based on comparison between Indonesia and the United States concerning MSW management, the analysis is summarized in table 5.1. Although, in many things the United

States better than Indonesia such as finance capability, private sectors involvement, recycled materials, service coverage et cetera, Indonesia is challenged to process organic materials. Meanwhile, processing recyclable materials in Indonesia has been established with the raw materials come from the informal stakeholders such as scavengers, junkmen, *lapaks* and *bandars*. In recent years waste banks contribute to supply the raw materials for recycle factories. However, in terms of sanitary landfill, Indonesia has difficulties to implement. Sanitary landfill requires more money, therefore Indonesia which has much less budget than the United will be difficult to implement. In addition, the presence of many scavengers in TPA allows the implementation of sanitary landfill will be difficult.

Table 5.2 Proposed ideas for institutional designs of MSW management

LEVEL	PROPOSED DESIGN
Micro-level	<ul style="list-style-type: none"> • Educating citizens to separate MSW at source to obtain higher recovery of recyclable materials with waste bank and TNI (The Indonesian Armed Forces) involvement • Educating citizens to prevent throwing away MSW into rivers, streets, illegal dump sites, and drainages; and burning in their backyards with waste bank and TNI involvement • Equipping scavengers with better equipment • Conducting cleaning-up contaminated programs with TNI involvement • Developing composting organic materials center
Meso-level	<ul style="list-style-type: none"> • Enacting regulations relating to cleaning up contaminated sites • Organizing informal stakeholders particularly scavengers, junkmen, <i>lapaks</i> and <i>bandars</i> and involving more private sectors in MSW management
Macro-level	<ul style="list-style-type: none"> • Enforcing the regulations related to MSW management on a national level

(Source: developed by author)

5.3 Proposed ideas for institutional design for MSW management in Indonesia

Based on the comparison between Indonesia and the United States summarized in table 5.1, the proposed institutional designs in macro-level, meso-level, and micro-level are listed in table 5.2. The institutional designs are not only based on the lessons learned from the United States, but also based on existing condition of MSW management in Indonesia. For example, informal stakeholders such as scavengers, junkmen, *lapaks* and *bandars* do not exist in the United States.

To obtain the possibility of implementation, these proposed institutional designs are consulted with the practitioners of MSW management in Indonesia via email. The result of consulted institutional designs is provided in appendices and summarized below.

1. Educating citizens to separate MSW at source to obtain higher recovery of recyclable materials with waste bank and TNI (The Indonesian Armed Forces) involvement.

Comments from the practitioners: It is a good idea. When the MSW is already separated at source, the separation at following stages of MSW will be easier for example at waste bank which collects the recyclable materials. The coordination with TNI should be communicated well.

2. Educating citizens to prevent throwing away MSW into rivers, streets, illegal dump sites, and drainages; and burning in their backyards with waste bank and TNI involvement

Comments from the practitioners: To prevent citizens throwing away MSW into inappropriate places, pricing the materials of MSW could be applied. It can stimulate the citizens collecting the MSW including organic materials such as yard trims. Afterwards, they sell them to waste bank or junkmen. The role of municipal government is very important to coordinate each stakeholder. Therefore, TNI, municipal government agencies, citizens should be coordinated well. The municipal government could act as coordinator in implementing such a program. The municipal government has a link with TNI and also with the citizens as it governs the citizens.

3. Equipping scavengers with better equipment.

Comments from the practitioners: It is a good idea. It is better that scavengers are coordinated by waste bank. The coordination inter governmental agencies is important because it involves public budget.

4. Conducting cleaning-up contaminated sites program.

Comments from the practitioners: It is a good idea. To stimulate citizens and the soldiers cleaning up such sites, the prize can be provided. The coordination with TNI is also important. Therefore, the interviewees consider that such a program could be conducted when well coordinated with TNI.

5. Developing composting organic materials center

Comment from the practitioners: Basically agree, the composting organic materials center should be under waste bank control. The government could help the waste bank in terms of marketing and technical aspects. The barriers of such idea are the lack coordination among governmental agencies and the lack of experts of composting organic materials. Therefore, the development of composting compostable materials will be hard today. The governmental agencies should be better coordinated and the lack of experts should be solved.

6. Enacting regulations relating to cleaning up contaminated sites.

Comments from practitioners: Although there are not regulations specifically regulate the cleaning up the contaminated areas, the regulations related to MSW management in general are already enacted in many municipalities in Indonesia. The socialization is very important to enhance the effectiveness of implementing such regulations.

7. Organizing informal stakeholders particularly scavengers, junkmen, *lapaks* and *bandars*

Comments from practitioners: The interviewees agree with this idea, but the different interests of each stakeholder will be the barriers for organizing them. However, there are waste banks in many municipalities. The waste banks could be the organizers of informal stakeholders which are already less coordinated. The waste banks could be the center of information concerning technical and managerial aspects of recyclable commodities.

8. Enforcing the regulations particularly law number 18 in 2008 related to MSW management in national level.

Comments from the practitioners: The socialization of such regulation is very important to reach the effectiveness of implementation. Furthermore, the barrier of enforcing such

regulations is the lack of staffs. In addition, based on their consideration, the criteria of prohibitions and obligations in Law number 18 in 2008 are very strict. Accordingly, the law enforcement will be hard.

The practitioners generally agree the ideas with some notes. Generally, the interviewees suggest that the well coordination with the TNI (The Indonesian Armed Forces) should be conducted to minimize the barriers of such programs.

CONCLUSION, RECOMMENDATIONS, AND REFLECTION

This chapter explains conclusion, recommendations, and reflection. The conclusion elaborates how the study answer the questions based on the explanation in previous chapters. The recommendations are based on the proposed institutional design while considering the inputs from the practitioners of MSW management in Indonesia. Finally, the reflection will explain the difficulties, benefits for planning practice and theory, and the related study might be conducted in the future.

6.1 Conclusion

Based on exploration of MSW management in the United States in current situation and the history, this study generally is able to answer the research questions. The questions are answered by the chapters. Basically the main question is the last question which requires the explanation of each chapter and comments from practitioners. However, three questions support the main question. The first question is about the basic concepts of MSW management, policy transfer, and institutional design. This study elaborates the stages in MSW management named MSW generation, handling, collection, transfer, transport, final processing, and disposing. Moreover, the concept of policy transfer including the types, objects, and ways is described in chapter 2. In addition, the levels of institutional design are also explained. The second is question about how the implementation of MSW management in Indonesia and in the United States including the history of MSW in the United States. The regulations enacted, the stakeholders, and the stages of MSW management are explored although the equivalent data between two countries are hard to find. The third question is to explore the similarities and the differences between two countries in terms of MSW management and also the condition supporting it. Some similarities are found particularly in the governmental system. Meanwhile the differences are in climate condition, economic capability, and practical issues in MSW management. These similarities and differences are explained in previous chapter and summarized in table 5.4. This study explains the lessons learned from the United States are not only from the current condition but also coming from

the history of MSW management in the United States particularly in New York City in 19th century.

However, based on the similarities and the differences, lessons can be learned which relates to the fourth question. The fourth question addresses the possibilities of lessons learned concerning MSW management from the United States for Indonesian context and proposed institutional design in micro-level, meso-level, and macro-level. These ideas of proposed institutional designs are consulted with the practitioners of MSW management in Indonesia who often deal with MSW management. It can be concluded that such ideas for institutional designs are possible to conduct for MSW management in Indonesia with some notes such as well coordination among stakeholders including TNI, governmental agencies and citizens.

6.2 Recommendations

Based on ideas for institutional design of MSW management in macro-, meso-, and micro-levels, some recommendations can be applied for obtaining better MSW management in Indonesia. Nevertheless, the recommendations are not fully guarantee to success. The recommendations are also consulted with the practitioners. Firstly, in micro-level, the institutional designs are possible to implement with well coordination among governmental agencies, TNI. Secondly, in meso-level, the regulation related to MSW management has been enacted, however to focus on cleaning up contaminated sites, such regulation need to be enacted. The socialization of regulations is very important to reach better implementation. Furthermore, to organize informal stakeholders, the characteristics and interest each stakeholder is very important to scrutinize. They have usually different interests which can be the barriers to organize the informal stakeholders. Lastly, in macro-level, the enforcement of regulations related to MSW management particularly Law number 18 in 2008 in national level, according to practitioners, is difficult because of lack of staffs to enforce and the very strict regulation to implement. The government could educate citizens regarding better MSW handling firstly in micro-level before enforcing such regulations.

6.3 Reflection

It is not easy to compare MSW management between two countries. The data often does not equal in each country. In some cases, the data of one country are found in governmental reports while another country found in journals or newspapers which have the different style. Due to the countries compared are different experience in MSW management particularly in data provision, to find out the data has different difficulties.

This study is aimed to find out the ideas for institutional design of MSW management in micro-level, meso-level, and macro-level for Indonesian context by exploring the MSW management in the United States both current and historical condition. In addition, it contributes to planning because of describing lessons learned in different time as Dolowitz and Marsh (1996) explained, particularly when developing countries learn lessons from developed countries. Lessons learned mainly about how the developed countries initiate to implement modern development. However, this study explores the MSW management in general. Next research, can study in more specific cases such as why there are people in Indonesia still throw away MSW in inappropriate places compared with the people in developed countries, to what extent the role of informal stakeholders in recycling MSW in developing countries particularly in Indonesia, et cetera.

REFERENCES

1. Alexander, E.R., (2005), Institutional transformation and planning: from institutionalization theory to institutional design. *Planning Theory* vol. 4: p.209
2. Alexander, E.R., (2012), Institutional Design for Value Capture and a Case: The Tel-Aviv Metropolitan Park, *International Planning Studies*, vol. 17:2, pp. 163-177
3. American association of Public work, (2015)
4. Aprilia, A, Tezuka, T., Spaargaren, G., (2012), Household Solid Waste Management in Jakarta, Indonesia: A Socio-Economic Evaluation, *Waste Management – An Integrated Vision*
5. Aye, L. and Widjaya, E.R., (2005), Environmental and economic analyses of waste disposal options for traditional markets in Indonesia
6. Babbie, E, (2013), *The Practice of Social Research*, vol. 13
7. *Badan Usaha Milik Negara (BUMN)*, (2014), *PT Dirgantara Indonesia, Sempat Mati Kini Terbang Kembali*, viewed on June 2015
<http://www.bumn.go.id/ptdi/berita/115/PT.Dirgantara.Indonesia.,Sempat.Mati.Kini.Terbang.Kembali>
8. Bitektine, A., (2008), Prospective Case Study Design Qualitative Method for Deductive Theory Testing, *Organizational Research Methods*, vol. 11 no. 1, pp. 160-180
9. Central Intelligence Agency (CIA), (2015), *The World Factbook*, viewed on 20 April 2015
<https://www.cia.gov/library/publications/the-world-factbook/geos/id.html>
10. Central Intelligence Agency (CIA), (2015), *The World Factbook*, viewed on 20 April 2015
<https://www.cia.gov/library/publications/the-world-factbook/geos/id.html>
11. Chaerul, M., Tanaka, M., Shekdar, A.V., (2007), Municipal solid waste management in Indonesia, status and strategic actions, *Journal of the Faculty of Environmental Science and Technology*, vol.12, no.1, pp.41- 49
12. Container Recycling Institute, (2015), *Bottle bills in the USA*, viewed on June 2015
<http://www.bottlebill.org/legislation/usa.htm>

13. Damanhuri, E. and Padmi, T., (2012), The role of informal collectors of Recyclable Waste and Used Goods in Indonesia, Post-Consumer Waste Recycling and Optimal Production
14. Diaz, L.F., Savage, G.M., and Golueke, C.G., (2002), Composting of municipal solid wastes, Handbook of solid waste management, vol. 2, pp. 12.1 – 12.70
15. Dolowitz, D., Marsh, D., (1996), Who learns what from whom: A review of the Policy transfer literature, Political Studies, vol. 54, pp. 343-357
16. Ezeah, C. and Roberts, C.L., (2012), Analysis of barriers and success factors affecting the adoption of sustainable management of municipal solid waste in Nigeria, Journal of Environmental Management vol. 103, pp. 9-14
17. Foster, B. and Repa, E.W., (2002), Federal role in municipal solid waste management, Handbook of solid waste management, vol. 2, pp.2.1-2.39
18. Government of Indonesia, (1997), Law number 23 year 1997 concerning Environment management
19. Government of Indonesia, (2008), Law number 18 year 2008 concerning Waste Management
20. Government of Indonesia, (2009), Law number 32 year 2009 concerning Environment protection and management
21. Government of Indonesia, (2012), *Peraturan Pemerintah nomor 81 tahun 2012 tentang Pengelolaan sampah rumah tangga dan sampah sejenis sampah rumah tangga*
22. Granholm, J.M. and Chester, S.E., (2007), Michigan solid waste policy, viewed on June 2015
http://www.michigan.gov/documents/deq/DEQ-WHM-STSW-MI_SW_POLICY_198170_7.pdf
23. Hamluddin, (2014), Proyek Listrik Sampah Bantargebang Rugi, viewed on May 2015
<http://metro.tempco.co/read/news/2014/09/13/083606605/Proyek-Listrik-Sampah-Bantargebang-Rugi>
24. Hidayat, R., (2014), *Evaluasi pengangkutan sampah Kabupaten Purwakarta*, viewed on June 2015
http://www.academia.edu/11156918/EVALUASI_PENGANGKUTAN_SAMPAH_KABUPATEN_PURWAKARTA

25. Hill, K and Glenn, J., (2002), Solid waste legislation, Handbook of municipal solid waste management, vol. 2, pp.3.1-3.30
26. Hudalah, D and Woltjer, J., (2007), Spatial Planning System in Transitional Indonesia, International Planning Studies, vol.12:3, pp. 291-303
27. Johari, A., Ahmed, S.I., Hashim, H., Alkali, H., Ramli, M., (2012) Economic and environmental benefits of landfill gas from municipal solid waste in Malaysia, Renewable and Sustainable Energy Reviews vol. 16; pp. 2907– 2912
28. Kumar, A., Sharma, M.P., (2014), Estimation of GHG emission and energy recovery potential from MSW landfill sites, Sustainable Energy Technologies and Assessments vol. 5, pp. 50–61
29. Kundell, J.E., Ruffer, D.L., (2002), Planning for municipal solid waste management programs, Handbook of municipal solid waste management, vol.2, pp. 4.1-4.14
30. Kusuma, D.R., (2015), Mulai 2016, Perdagangan Pakaian Bekas Impor Dilarang, viewed on June 2015
<http://finance.detik.com/read/2015/03/15/143713/2859115/4/mulai-2016-perdagangan-pakaian-bekas-impor-dilarang>
31. Lestari, S., (2012), Bank Sampah, ubah sampah jadi uang, viwed on June 2015
http://www.bbc.com/indonesia/majalah/2012/07/120710_trashbank
32. Leverenz, H., (2002), Source reduction: quantity and toxicity Part 6A quantity, Handbook of solid waste management, vol. 2, pp. 6.1 – 6.41
33. Leverenz, et al., (2002), Recycling, Handbook of solid waste management, vol.2, pp.8.1-8.77
34. Louis, G.E, (2004), A Historical Context of Municipal Solid Waste Management in the United States, Waste Manage Res: vol.22: pp.306–322
35. Mandelbaum, S.J, (2007), Designing Institutions and Other Crafts, Institution and Planning, pp.129-134
36. Manning, N, (2006), The Origins and Essence of US Social Policy On Taxonomies, Time and Transfers, Global Social Policy, vol. 6:no2: pp.155–172
37. Martinez-Blanco, J., Munoz, A., Anton, A., Rieradevall, J., (2008), Life Cycle Assessment of the application of compost from organic municipal solid waste in

- horticulture fertilization, 6th International Conference on LCA in the Agri-Food Sector, Zurich
38. Matland, R., (1995), Synthesizing the Implementation Literature: The Ambiguity-Conflict Model of Policy Implementation *Journal of Public Administration Research and Theory*
 39. Marcoux, C., (2009), Institutional Flexibility in the Design of Multilateral Environmental Agreements, *Conflict Management and Peace Science*
 40. Mégie, A., (2007), *Encyclopedia of Governance*. pp.706-707
 41. Meidiana, C and Gamse, T, (2010), Development of Waste Management Practices in Indonesia, *European Journal of Scientific Research*, vol.40: no.2, pp.199-210
 42. Meijerink, S., and Huitema, D., (2010), Policy Entrepreneurs and Change Strategies: Lessons from Sixteen Case Studies of Water Transitions around the Globe, *Ecology and Society*, vol. 15 no.2, p.21
 43. Ministry of Environment and Forestry, (2012), *Peraturan Menteri Lingkungan Hidup nomor 13 tahun 2012 tentang Pedoman pelaksanaan reduce, recycle melalui bank sampah*
 44. Ministry of Environment and Forestry, (2013), viewed on June 2015
<http://www.menlh.go.id/profil-bank-sampah-indonesia-2013/>
 45. Ministry of Environment and Forestry, (2015), *Organisasi kementerian lingkungan hidup*
<http://www.menlh.go.id/organisasi-kementerian-lingkungan-hidup/>
 46. Ministry of Home Affairs, (2010), *Peraturan menteri dalam negeri nomor 33 tahun 2010 tentang pelaksanaan pengelolaan sampah*
 47. Murphy, A., (2005), Managing the waste stream: a cooperative effort, viewed on June 2015
<http://www.apwa.net/Resources/Reporter/Articles/2005/3/Managing-the-waste-stream-a-cooperative-effort>
 48. Oleary, P.R. and Tchobanoglous, G., (2002), Landfilling, *Handbook of municipal solid waste management*, vol. 2, pp.14.1-14.93
 49. Page, E.C, (2000), Future Governance and the Literature on Policy Transfer and Lesson Drawing, the ESRC Future Governance Program Workshop on Policy Transfer

50. Prince, R (2012), Policy transfer, consultants and the geographies of governance, Progress in Human Geography, vol. 36:2, pp. 188–203
51. Renkow, M. and Rubin, A.R., (1998) Does municipal solid waste composting make economic sense? Journal of Environmental Management, vol. 53, pp. 339–347
52. Schübeler, P., Wehrle, K., and Christen, J., (1996), Conceptual framework for municipal solid waste management in low-income countries, Urban management and Infrastructure
53. Simpson, S.D., (2012), Top Agricultural Producing Countries, viewed on May 2015
<http://www.investopedia.com/financial-edge/0712/top-agricultural-producing-countries.aspx>
54. Sasaki, S., and Araki, T., (2014), Estimating the possible range of recycling rates achieved by dump waste pickers: The case of Bantar Gebang in Indonesia, Waste Management & Research, vol. 32 no.6; 474–481
55. Skumatz, L.A. and Freeman, D.J., (2006), Pay as you throw (PAYT) in the United States, final report
56. Statistics Indonesia, (2015), Percentage of Households by Province and Sorting Garbage Treatment, viewed on 16 May 2015
<http://www.bps.go.id/linkTabelStatis/view/id/1360>
57. Tchobanoglous, G., Kreith, F., and William, M.E., (2002), Introduction, Handbook of solid waste management, vol. 2, pp. 1.1 – 1.27
58. The Economist, (2012), A rubbish map: A global comparison of garbage, viewed on May 2015
<http://www.economist.com/blogs/graphicdetail/2012/06/daily-chart-3>
59. The United States Environmental Protection Agency (USEPA), (2014), Municipal solid waste generation, recycling and disposal in the United States: Facts and Figures for 2012
60. The United States Environmental Protection Agency (USEPA), (2014), Municipal Solid Waste, viewed on 25 November 2014
<http://www.epa.gov/epawaste/nonhaz/municipal/>
61. The United States Environmental Protection Agency (USEPA), (2015), Recyclable materials, viewed on 5 May 2015
<http://www.epa.gov/osw/conservesmm/wastewise/pubs/commonmats.pdf>

62. The United States Environmental Protection Agency (USEPA), (2015), Non hazardous materials, viewed on 5 June 2015
<http://www.epa.gov/solidwaste/nonhaz/municipal/>
63. Theisen, H., (2002), Collection of solid waste, handbook of solid waste management, vol.2, pp. 7.1 – 7.27
64. Themelis, N.J., (2002), Integrated management of solid wastes, American Society of Mechanical Engineers, p. 69-86
65. Tuwo, A.G., (2015), Program TMMD Bikin Menteri Agama Teringat 'ABRI Masuk Desa', viewed on June 2015
<http://news.liputan6.com/read/2210246/program-tmmd-bikin-menteri-agama-teringat-abri-masuk-desa>
66. United Nation Environmental Protection, (2011), Investing in Energy and resource efficiency, viewed on June 2015
http://www.unep.org/greeneconomy/Portals/88/documents/ger/GER_8_Waste.pdf
67. Walker, J.L., (1996), The diffusions and innovations among the American States, The American Political Science Review, vol.63, no.3, pp. 880-899
68. Wilson, D.C., Velis, C., Cheeseman, C., (2006), Role of informal sector recycling in waste management in developing countries, Habitat International, vol. 30; pp. 797–808
69. Worldbank, (2015), Waste composition, Urban development series- knowledge papers, viewed on June 2015
<http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1334852610766/Chap5.pdf>
70. [Zubair, A, Mahendra, N.S., Asrini, \(2011\), Studi karakteristik sampah rumah tangga di Kota Makassar dan prospek pengembangannya, Fakultas Teknik](#)

Appendix A: List of proposed institutional design

QUESTIONER

HAL-HAL YANG MUNGKIN DILAKUKAN DALAM PENGELOLAAN SAMPAH DI INDONESIA

Dalam beberapa tahun terakhir, Indonesia menerbitkan beberapa peraturan perundangan yang berkaitan dengan persampahan diantaranya UU 18 tahun 2008, PP 81 tahun 2012, dll. Namun demikian masih terdapat masyarakat yang membuang sampah bukan pada tempat yang tepat termasuk ke sungai dan dibakar di halaman rumah. Berikut adalah hal-hal yang sebaiknya dilakukan dalam pengelolaan sampah di Inonesia dewasa ini didasarkan pada studi literature, buku, artikel, laporan pemerintah, website, dan surat kabar tentang pengelolaan sampah di Indonesia dan Amerika Serikat. Mohon kiranya Bapak/ Ibu untuk memberikan saran/ komentar pada poin-poin di bawah ini.

Nama :
Organisasi :
Jabatan :

MICRO-LEVEL

- 1. Mengedukasi masyarakat untuk memisahkan sampah di masing-masing rumah sebelum dibuang ke TPS melalui program bank sampah dan jika perlu melibatkan TNI dengan pola seperti program ABRI Masuk Desa di era orde baru sebagai kerjasama antara TNI dan masyarakat

Saran/komentar:.....
.....
.....
.....

2. Mengedukasi masyarakat untuk tidak membuang sampah ke sembarang tempat termasuk ke sungai melalui program bank sampah dan jika perlu melibatkan tentara nasional Indonesia (TNI) dengan pola seperti program ABRI Masuk Desa (AMD) di era orde baru sebagai kerjasama TNI dan masyarakat

Saran/komentar:.....
.....
.....

3. Memperlengkapi pemulung dengan perlengkapan memilah sampah yang lebih baik termasuk pakaian yang lebih tepat digunakan di TPA

Saran/komentar:.....
.....
.....

4. Mengadakan program pembersihan tempat-tempat yang tercemar oleh sampah melalui program bank sampah dan jika perlu melibatkan tentara nasional Indonesia (TNI) dengan pola seperti program ABRI Masuk Desa (AMD) di era orde baru sebagai kerjasama TNI dan masyarakat

Saran/komentar:.....
.....
.....

5. Membuat sentra-sentra pembuatan kompos karena kondisi suhu yang panas memungkinkan proses pengomposan berjalan lebih efektif dan kondisi sampah di Indonesia yang masih banyak mengandung sampah organik

Saran/komentar:.....
.....
.....

MESO-LEVEL

- 6. Menerbitkan peraturan tentang pembersihan tempat-tempat yang tercemar sampah

Saran/komentar:.....
.....
.....

- 7. Mengorganisir / mengelola pemulung, tukang rongsok (orang yang membeli rongsokan), lapak (toko pembeli rongsokan), dan bandar untuk meningkatkan hasil sampah yang di-recycle

Saran/komentar:.....
.....
.....

MACRO-LEVEL

- 8. Meningkatkan penegakkan UU 18 tahun 2008 tentang persampahan

Saran/komentar:.....
.....
.....

Appendix B: The comments of practitioners concerning institutional design of MSW management in Indonesia

QUESTIONER

HAL-HAL YANG MUNGKIN DILAKUKAN DALAM PENGELOLAAN SAMPAH DI INDONESIA

Dalam beberapa tahun terakhir, Indonesia menerbitkan beberapa peraturan perundangan yang berkaitan dengan persampahan diantaranya UU 18 tahun 2008, PP 81 tahun 2012, dll. Namun demikian masih terdapat masyarakat yang membuang sampah bukan pada tempat yang tepat termasuk ke sungai dan dibakar di halaman rumah. Berikut adalah hal-hal yang sebaiknya dilakukan dalam pengelolaan sampah di Inonesia dewasa ini didasarkan pada studi literature, buku, artikel, laporan pemerintah, website, dan surat kabar tentang pengelolaan sampah di Indonesia dan Amerika Serikat. Mohon kiranya Bapak/ Ibu untuk memberikan saran/ komentar pada poin-poin di bawah ini.

Nama : DADAN WIADI

Organisasi : BPLH Kabupaten Ciamis

Jabatan : Kepala Sub Bidang Pengkajian Amdal dan Teknologi Lingkungan dan Direktur Bank Sampah

MICRO-LEVEL

1. Mengedukasi masyarakat untuk memisahkan sampah di masing-masing rumah sebelum dibuang ke TPS melalui program bank sampah dan jika perlu melibatkan TNI dengan pola seperti program ABRI Masuk Desa di era orde baru sebagai kerjasama antara TNI dan masyarakat

Saran/komentar: Setuju saja. Namun perlu kiranya koordinasi lebih kepada TNI.

2. Mengedukasi masyarakat untuk tidak membuang sampah ke sembarang tempat termasuk ke sungai melalui program bank sampah dan jika perlu melibatkan tentara nasional

Indonesia (TNI) dengan pola seperti program ABRI Masuk Desa (AMD) di era orde baru sebagai kerjasama TNI dan masyarakat

Saran/komentar: Setuju saja. Namun perlu kiranya koordinasi lebih kepada TNI. Daun-daun, rumput-rumputan. Semuanya harus dibeli oleh Bank Sampah untuk dijadikan bahan baku produksi komoditi bank sampah. Di sini diperlukan peran pemerintah untuk membina meningkatkan keterampilannya dan membantu dalam segi management dan pemasarannya. Dengan demikian akan terjalin kerjasama antara lini dalam hal pengelolaan lingkungan dan meningkatkan perekonomian masyarakat.

3. Memperlengkapi pemulung dengan perlengkapan memilah sampah yang lebih baik termasuk pakaian yang lebih tepat digunakan di TPA

Saran/komentar: setuju saja. Perlu koordinasi dengan instansi terkait karena menyangkut kewenangan dan anggaran.

4. Mengadakan program pembersihan tempat-tempat yang tercemar oleh sampah melalui program bank sampah dan jika perlu melibatkan tentara nasional Indonesia (TNI) dengan pola seperti program ABRI Masuk Desa (AMD) di era orde baru sebagai kerjasama TNI dan masyarakat

Saran/komentar: Setuju saja. Namun perlu kiranya koordinasi lebih kepada TNI.

5. Membuat sentra-sentra pembuatan kompos karena kondisi suhu yang panas memungkinkan proses pengomposan berjalan lebih efektif dan kondisi sampah di Indonesia yang masih banyak mengandung sampah organik.

Saran/komentar: Secara prinsip setuju saja. Bank sampah juga termasuk pengolahan sampah organik untuk menjadi kompos. Yang menjadi kendala atau perlu dimaksimalkan:

- Masih belum optimalnya kejasama dan koordinasi antara SOPD yang terkait terutama masalah pencemaran dan pemanfaatan hasil produksi kompos.
- Sumber daya manusia yang siap mengelola kompos.

MESO-LEVEL

6. Menerbitkan peraturan tentang pembersihan tempat-tempat yang tercemar sampah.

Saran/komentar: Peraturan Pemerintah Daerah Kabupaten Ciamis untuk hal tersebut sudah terbit tentang K3 (Kebersihan, Ketertiban dan Keamanan)

7. Mengorganisir / mengelola pemulung, tukang rongsok (orang yang membeli rongsokan), lapak (toko pembeli rongsokan), dan bandar untuk meningkatkan hasil sampah yang di-recycle.

Saran/komentar: : Setuju saja, yang perlu di perhatikan adalah karakteristik manusia yang berbeda, perlu pendekatan lebih terhadap stakeholder tersebut.

MACRO-LEVEL

8. Meningkatkan penegakkan UU 18 tahun 2008 tentang persampahan.

Saran/komentar: Setuju. Pelaksanaanya yang masih agak sulit, terutam petugas dan kriteria.

QUISIONER

HAL-HAL YANG MUNGKIN DILAKUKAN DALAM PENGELOLAAN SAMPAH DI INDONESIA

Dalam beberapa tahun terakhir, Indonesia menerbitkan beberapa peraturan perundangan yang berkaitan dengan persampahan diantaranya UU 18 tahun 2008, PP 81 tahun 2012, dll. Namun demikian masih terdapat masyarakat yang membuang sampah bukan pada tempat yang tepat termasuk ke sungai dan dibakar di halaman rumah. Berikut adalah hal-hal yang sebaiknya dilakukan dalam pengelolaan sampah di Inonesia dewasa ini didasarkan pada studi literature, buku, artikel, laporan pemerintah, website, dan surat kabar tentang pengelolaan sampah di Indonesia dan Amerika Serikat. Mohon kiranya Bapak/ Ibu untuk memberikan saran/ komentar pada poin-poin di bawah ini.

Nama : Yudi Mulyadi, SH

Organisasi : Bank Sampah Ampel

Jabatan : Penelitian dan Pengembangan (Seksi PDP)

MICRO-LEVEL

1. Mengedukasi masyarakat untuk memisahkan sampah di masing-masing rumah sebelum dibuang ke TPS melalui program bank sampah dan jika perlu melibatkan TNI dengan pola seperti program ABRI Masuk Desa di era orde baru sebagai kerjasama antara TNI dan masyarakat.

Saran/komentar: Methode seperti tersebut di atas sudah bagus. Sampah yang sudah terpilah mulai dari rumah yaitu sampah organik, limbah B3 dan sampah anorganik, Sampah organik diolah menjadi pupuk organic. Sampah anorganik diolah menjadi berbagai kerajinan dan limbah B3 dikubur di TPA. Semua Pengolahan Sampah ini dilaksanakan di 3R bank sampah.

2. Mengedukasi masyarakat untuk tidak membuang sampah ke sembarang tempat termasuk ke sungai melalui program bank sampah dan jika perlu melibatkan tentara nasional

Indonesia (TNI) dengan pola seperti program ABRI Masuk Desa (AMD) di era orde baru sebagai kerjasama TNI dan masyarakat.

Saran/komentar: Selain sampah rumah tangga/sampah dapur, masyarakat juga harus dirangsang untuk mau membersihkan lingkungan tempat tinggal dengan cara sampah-sampah tersebut harus bernilai rupiah. Daun-daun, rumput-rumputan, semuanya harus dibeli oleh bank sampah untuk dijadikan bahan baku produksi komoditi bank sampah. Di sini diperlukan peran pemerintah untuk membina meningkatkan keterampilannya dan membantu dalam segi manajemen dan pemasarannya. Dengan demikian akan terjalin kerjasama antara lini dalam hal pengelolaan lingkungan dan meningkatkan perekonomian masyarakat.

3. Memperlengkapi pemulung dengan perlengkapan memilah sampah yang lebih baik termasuk pakaian yang lebih tepat digunakan di TPA

Saran/komentar: Sebaiknya para pemulung diwadahi oleh bank sampah sehingga mereka mudah diarahkan, mudah dibina dan tidak dipermainkan harga oleh bandar sampah. Disini diperlukan peran pemerintah untuk membina dan membantu membesarkan bank sampah.

4. Mengadakan program pembersihan tempat-tempat yang tercemar oleh sampah melalui program bank sampah dan jika perlu melibatkan tentara nasional Indonesia (TNI) dengan pola seperti program ABRI Masuk Desa (AMD) di era orde baru sebagai kerjasama TNI dan masyarakat

Saran/komentar: Diseleksi dan diberi hadiah setiap menjelang Lebaran kepada siapa saja anggota bank sampah/masyarakat yang memiliki tabungan sampah terbanyak. Sehingga menambah rangsangan bagi mereka untuk berlomba mengumpulkan sampah.

5. Membuat sentra-sentra pembuatan kompos karena kondisi suhu yang panas memungkinkan proses pengomposan berjalan lebih efektif dan kondisi sampah di Indonesia yang masih banyak mengandung sampah organik.

Saran/komentar: Sentra kompos dialokasikan di pabrik 3R di bawah naungan bank sampah. Pemerintah harus aktif mengarahkan, membina dan membantu pemasaran hasil produksinya agar kegiatan ini tetap berjalan dan berkembang lebih maju lagi.

MESO-LEVEL

6. Menerbitkan peraturan tentang pembersihan tempat-tempat yang tercemar sampah

Saran/komentar: Peraturan-peraturan dan sanksi pengelolaan pencemaran lingkungan perlu disosialisasikan pada Masyarakat agar mereka memahami dan mau mentaatinya. Dan yang paling penting, semua kegiatan harus bernilai uang agar mereka merasa terbantu dengan mengerjakan kegiatan tersebut.

7. Mengorganisir / mengelola pemulung, tukang rongsok (orang yang membeli rongsokan), lapak (toko pembeli rongsokan), dan bandar untuk meningkatkan hasil sampah yang di-recycle

Saran/komentar: Sekarang di Ciamis sudah memiliki bank sampah tinggal peran pemerintah harus proaktif demi berjalannya program kebersihan, penghijauan dan peningkatan perekonomian masyarakat.

MACRO-LEVEL

8. Meningkatkan penegakkan UU 18 tahun 2008 tentang persampahan

Saran/komentar: Disosialisasikan pada masyarakat dan bimbing mereka dalam mentaati UU 18 Tahun 2008 itu kearah peningkatan Ekonomi agar mereka merasa butuh dengan UU tersebut.