TRANSFER OF POSSIBLE AND ADAPTABLE POLICIES IN MUNICIPAL SOLID WASTE MANAGEMENT: LESSON LEARN FROM DUTCH/EUROPEAN EXPERIENCES FOR INDONESIA

THESIS

A thesis submitted in partial fulfillment of the requirements for Double Degree Master Program from The Rijksuniversiteit of Groningen (RuG) and The Institute Teknologi Bandung (ITB)

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Acknowledgement

Take good look our environment for awhile. Bare insight for our nature is no longer pure as it was. Various environmental degradations occur everywhere with twisted reason, mostly pointed to physical/infrastructure development for human need. Human activity is unavoidable towards waste accumulation problem. On the other hand, waste maintenance is generally put asides from primary list of human concern. In addition to that, poor maintenance in mostly waste management creates such damage for human life. This reciprocal condition between protection and development has interested me utmost.

Seeing recent accident happening in several urban areas because of waste dispute and explosion had inspired me to do this study. In detail, due to the fact that waste management receive minor attention among other infrastructure development, my interest to evaluate it is getting stronger. Being foreign student here in The Netherlands, has been an advantage for me. I have the opportunity to see other countries experience. Taking international courses on Environmental Planning and International Planning Practice encourage me to conduct comparative approach between two countries. Through better planning in waste management, I considerably fulfil my desire to donate my thoughts in creating better place to live in.

The scope of study within this study show that applicable planning document in particular area are not always succeed in other area. Similar level in the theoretical insight could not guarantee the same results. As we can learn from the lesson between Indonesia and the Netherlands, although these two countries share similar historical background, various aspects have affected different outcomes. In my opinion, this thesis is one of puzzling thoughts of mine which try to implement planning theory into practice. Here, my personal background as geographer has affecting my perception that each area conceives its uniqueness. Thus, different outcome of planning practice in both countries are not new issue for me. However, creating such solution based on the uniqueness of each area stimulates perception that policy transfer will be hard to be done. Other interesting challenge for me here is to find which part of policy paramount to be implemented in other area. Difficulties during research are range from limitation of time and data.

I am grateful to Allah Almighty, to been able to finish my study in the Netherlands and complete my thesis right on time. It is my honour here to work this study with such support from my supervisors. Therefore, I would like to address my special thanks to Dr. Ir. Paul Ike (RuG), Prof. Dr. Ir. Gerald Linden (RuG), Dr. Widiarto (ITB) and Prof. Dr. Tommy Firman (ITB) for guiding me in writing my thesis. Also for Dutch Government that is willing to give me financial support during my study in the Netherlands through Stuned Program. Respectively, I would also show my thanks to all my lectures in ITB and RuG, staff member in ITB and RuG, staff member in my institution in Yogyakarta. Last but not least, this study has been one of my work with full encouragement and support from my family, my classmates and colleagues, thus I would like to share my thorough appreciation to them.

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Abstract : *As most people pay attention to commercial and mass production, consumerism behavior has urged high amount of waste compilation in this planet. Preference to get rid of waste is not as easy as it can be. This study underpins on how to improve municipal solid waste management (MSWM) in Indonesian context using policy transfer. Expected result from the research is recommendation for better MSWM. Analysis of the research conducted using comparison of two countries to observe whether there are possible and adaptable policies to be transferred. Indicator to be compared involves regulatory (plan, policy and program) and non-regulatory (institutions, stakeholders, market, technology, geographical, etc) instruments. This study come up with two proposals, first transferring adaptable policy which is constructed from analysis of possible policy transfer compared to existing constraint and potential resources. According to this study, policies that conceive general/strategic ideas are easier to be transferred for Indonesian case rather than policies that conceive detail/technical ideas. Although it is easier to transfer, policies that contain general idea conceive broader goals, which in turn are difficult to be implemented. Second, since Indonesian MSWM are lacking from environmental approach, thus national government should provide better solution to accommodate this changing trend. With unstable political condition, Indonesia should strive hard to keep pace with environmentally oriented planning, although it has to be done in step-by-step method. Basic question for further research is how Indonesian government effectively performs in infrastructure development, which is transform from anthropocentrism into eco-centrism approach?*

Keywords : *Municipal solid waste management, plan or policy transfer, Indonesia, The Netherlands*

Chapter 1

Introduction

1.1 Background

As we all know, environmental protection are somehow contradictory to physical development activity. There is no way for us to deny our necessity toward natural resource, while in the other hand necessity towards physical development is also significant. According to Alvin L. Alm[1], environmental concern was shifted from time to time and continuously increasing. Environmental degradation is getting out of hand recently. At the beginning of 1980s environmental concerns was increasing rapidly, especially in regards with local issues, such as public health issues and safety from natural hazards. At the beginning of 1990, environmental concern was spreading into global concern, such as global warming issues and limitation of natural resources. Before environmental issues taken into global concern, most of physical development project (infrastructure and supra-structure) in developed countries consumed huge amount of investment. Let us take example from The Dutch context, in term of its dam construction. These infrastructures were built based on the consideration to protect their area from natural hazards. Although it called for huge amount of money, infrastructure development was considerably worthwhile to protect other investment that The Dutch had put up in other sectors. Ever since the success The Dutch brought to light in previous environmental perspective, their action in to pursue both local and global concern were remarkably noticeable. In recent practice, infrastructure development in The Dutch context always set up based on strict rules and regulation that covers environmental interest (Doopenberg and Oorthuys, 2005).

In contrast with efforts conducted by The Dutch context, let us portray the condition in Indonesian context. Although, environmental concern had shift to global concern, environmental protection in Indonesian context is still not yet improve. Obvious reasons are financial limitation and lack of technological skills. In particular, case such as municipal solid waste management (MSWM), Indonesia employs traditional methods, collect-transfer-dispose using traditional tools, such as cart and open dumping system. Without proper maintenance, latest dispute in Jakarta (Bantar Gebang final disposal site) and explosion in Bandung (Leuwi Gajah final disposal site) had cause human casualties (Damanhuri, 2005). Even to catch up with effort in protecting local environment, Indonesian effort are not yet able to deal with it and various task to catch up with latest perspective are remain undone. As globalization cannot be avoided, planning under uncertain situation is prevailing these days (Daniels, 1998). Especially call for environmental protection which considerably increasing rapidly. This propelling issues need to be solved by Indonesian government despite all constraint they have.

[1] This comment was taken based on oral interview of Alfin B. Alf by United State of Environmental Protection Agency about "Generational differentiation of environmental concern" (http://www.epa.gov/history/publications/alm/04.htm) last updated in July 17th, 2006.

As illustrated above, there are two significant issues in infrastructure development between those two countries. First, environmental points of view in Indonesia are not as much as it has developed in The Dutch context. Second, constraints in two countries are different which lead to different reactions. Within this study, the main idea is to bring up wider perspective that has been implemented in other countries especially The Dutch context to improve better environmental protection in infrastructure development in Indonesia. MSWM is chosen as the sector to be compared between those two countries.

MSWM is considerably interesting as subject of research because urban population tends to increase from time to time, thus waste accumulation are unavoidably enlarged. Other phenomena shows that along with rapid population growth, service and industrial activities are getting complex in urban area, thus waste accumulation are necessarily to be maintained. As the most significant reason for taking MSWM as research subject is that MSWM receive least attention from the government and the community, thus more research is needed to enhance community awareness and amplify government perspective in MSWM not only in terms of its economic consideration but also in environmental perspective.

Related to changing view in environmental perspective in general, approach in dealing with municipal waste also changing smoothly. Predominant studies in MSWM are directed to examine effectiveness of technical/operational methods. Scientist and decision maker in developed or developing countries who have been dealing with this issue, have gain great deal of criticism in every alternative they proposed. For example, open dumping method, landfill, incinerator, and the latest proposal reuse, recycle and reduce waste (3R Program) had always been in fierce debate. Application of each method influence the condition for community health; create such odor or water pollution; and able to trigger new social phenomenon such as scavenger existences in developing countries. This issue had become limelight that need to be thoroughly studied because each condition in each different location is unique. The uniqueness of geographical, demographical, socio economic condition and other characteristic are definitely bear certain maintenance. In fact, success story of one method application in particular country does not guarantee another success story in another country, because of the difference of resources and uniqueness (Diaz, Savage and Eggerth, 2005)[2].

Each case in each different location required different maintenance and methods. Example can be derived from various case such as, case of Ankara municipal solid waste management using Life Cycle Assessment (LCA) aiming at provide alternative for the most environmentally friendly method (O¨zeler, Yetis U¨ and Demirer, 2005). Different from that proposal, Asansol municipality, India, was proposed to use transportation routing modeling using Geographic Information System (GIS) to ascertain the minimum cost by efficient distance or collection path for transporting solid waste to its final disposal site (Ghose, Dikshit and Sharma, 2005). Typically, European countries are represented by Barcelona metropolitan area case, in which using computational algorithm in deciding the best location for solid waste disposal (Bautista and Pereira, 2005). Case in Ontario, Canada shows that to quantify the economic-of-scale (EOS) towards environmental system, waste

[2] Their article "*Solid waste management in economically developing country*" was taken from Doppenberg and Oorthuys, 2005, *Afvalstoffenbeheer – Solid Waste Management*, p. 533-567, Sdu Uitgever.

management alternative was defined using an Interval Non Linier Programming/INLP (Wu, Huang, Liu and Li, 2005).

Shifting from the previous proposal, which are likely focus on technical, economic and location preference, other solution proposed in City of Cairo. The focus is on how to privatize and urge more multi national interference to deal with its solid waste problem. This solution aimed at rehabilitating the urban area and responding to the sustainability concept (Fahmi and Sutton, 2005). About a decade ago, in United State a new perspective in solving municipal solid waste was proposed under theme of "*community based solid waste strategy*". This alternative applied in Cote d'Ivoire, USA using new product of policy, plan and program. The tool was aim to strengthen or institutionalized household waste collection and consolidate the relationship of public and private sector in getting rid of waste (Doan, 1998).

Throughout those varied alternative solution, an important hypothetical conclusion could be derived that every urban area have different type of problem, which will lead to different type of solution. Even under the same national government it can be notified that problems in each municipality usually different in detail, thus it need different type of maintenance. However, in practice, there is no such type of implementation. Hitherto, national policy towards solid waste handling is applied for all type of condition. Still, chance to do policy transfer are amenable, especially transfer of idea which is economically and socially feasible.

The role of adequate waste management infrastructure is important either for rural or urban area. As we all know, urban population is growing rapidly these days, changing in consumption and life style in some other way affecting type of waste, quantity and its quality. Supporting facilities, such as truck, garbage can, temporal disposal site and final disposal site generally not enough in solving waste management. In regard with recent issue in waste management, technical preference is not the only way in solving waste problem in urban area. There are other factors call for solution, such as community behavior in separating waste, local government ability in providing proper method in handling waste that not endangering the environment, private sector ability to contribute in this subject as they also donate large amount of waste that sometimes also become public nuisance. Thus, maintaining waste is an important activity that has to be done not only using *end of pipe solution* but applying *open planning process* that allow involvement from all actors that involved in this sector (EU Commission, 2003; JICA, 2003). Open planning here meant to the process of planning, which give more chance to all stakeholder (community, non-government organization, businesses) to been able to give their overview, insight and more involve in early stage discussion of conceptual work or formulation of new plan. Their involvement are needed due to the fact that these actors have the closest relation with the existing condition which going to be object of planning. Open planning process aims to create various alternative solutions and empower community acceptance toward particular planning idea (Ministry of Housing, Spatial Planning and Environment of The Netherlands)[3].

[3] Taken from Ministry of Housing, Spatial Planning and Environment of The Netherlands (VROM) website http://www.sharedspaces.nl/pagina.html?id=9395 (May, 2006)

Since Indonesian case in considerably poor in community involvement within planning formulation, thus this study aim to know whether The Dutch experience are also applicable for Indonesian context. As recognized that there was economic crisis in 1997, Indonesia experiencing major political change from strong top down type to decentralization that aim to divide locus of power to lower level of government so that in future sake local areas are not fully depending on central decision. Various constraint face by local and national government in relatively new type of political system, which in some ways affecting their performance in budgeting, allocation of knowledge, personnel and expert in solid waste handling. Still, this major change and constraints hindered community involvement in planning process. Indonesia still had not yet gain enough support for conducting open planning process as suggested beforehand. The Netherlands (The Dutch) context is preferable due to strong connection between those two countries in the past and similarities of ones political background (Cowherd, 2002).

In relation to the statement above, expected result of this study is trying to elaborate possible/applicable policy transfer to improve the efficiency of strategic planning towards better living environment. Although solid waste management is varied from one local area to the other, this study takes Indonesia as one unity to provide recommendation towards its strategic planning. Policy to be transferred mainly focused on new idea or concepts of better MSWM. Various practical solutions had been illustrated above however those could not be easily implemented in particular area. There are exact rules, norms and cultural value that may hinder and constraint the effectiveness of each solution (Dolowitz and Marsh, 1996).

For the following sub chapter, this study presents the overview of what is good planning municipal solid waste and the changing trends in MSWM. Afterwards, this study shall review various problems that exist in Indonesian urban area; review the condition based on its political, social and institutional context; elaborate its alternative solution that already applied and difficulties that foremost hindered effective and efficient maintenance of municipal solid waste as well as give description in The Dutch context.

1.2 Research Objectives and Research Question

Since there are too many problem that need to be solved, especially for those in developing countries, such as Indonesia, this study shall elaborate further the mechanism of municipal solid waste management in its daily practice, and try to seek possible recommendation for better implementation. To attain the understanding of what shall we refer to better waste management, this study directly presents experiences from various countries. In short, the objectives of this study are:

1. To obtain clear insight of better municipal solid waste management process for Indonesian case by examining experiences in another country.
2. To construct recommendation of better planning approach in municipal solid waste management for Indonesia.

Moreover, to attain objectives, this study shall elaborate the following research question:

- What is the most adaptable theoretical approach for waste management in Indonesia?
- How is municipal solid waste operated in Indonesian urban area?
- How are the plan, policy and program related to this sector being implemented?
- How is the performance of each stakeholder involved in this sector?
- What are the possible potential resources available to be maximized to support better performance of solid waste management in Indonesia?
- How is the experience of municipal solid waste management in other country in terms of its daily operation and stakeholder involvement?
- What kind of problems and potential resource exist in other country's experience?
- How do they solve their problem with their potential resources?
- What lesson can be learned from those countries if we reflect it to existing problem and potential resources in Indonesian cases?

1.3 Methodology of Research

General idea of this study is to get new lesson from other country to improve government performance in delivering better infrastructure service, in this case, solid waste management for urban area. Main idea for this study is comparing the condition of MSWM in Indonesia and European/The Netherlands. Selected indicators are underpinning the importance of policy review rather than technical review. However, technological/operational review is analyzed to give brief illustration about existing situation in Indonesia. Comparison analysis is conducted based on availability of secondary data and qualitative review. Expected result from comparison analysis is list of possible/transferable policies and adaptable policies. In view of the fact that condition in Indonesia not yet supportive for all possible/transferable policies, this study also analyze whether those possible/transferable policies are adaptable for Indonesian case. By doing so, list of transferable policies are reduced into list of adaptable policies for Indonesian context.

1.3.1 Research Data

This study is conducted based on the availability of secondary data provided by National Statistic Board of Indonesia, National Development Planning Agency and other related institution. All data gained through relevant reference such as journal, books, article, and national report, working paper, seminar, national document (act, government regulation, policy) and so forth.

1.3.2 Research Analysis

The nature of this study is exploratory and qualitative. Two research strategies are applied for analysis of this study. First, as to compare basic condition, context, process and content analysis is adopted; second, as for comparing problem, resource and implementation, comparison analysis is applied. In selecting countries as role model, this study directs the research to explore The Netherlands, due to several reasons:

1. It has strong relations with Indonesia from historical review, and political influence, thus more or less effecting in many ways (Cowherd, 2002; Sanyal, 2005).
2. It has similar administrative system, although it has difference in terms of economic level.
3. It has very different community behavior in responding their government regulation, thus it may give new perspective and positive lesson learned for Indonesian community.
4. It has a very integrated and well-managed urban waste management system, although requires high technology and high investment however it could give an illustration how significant waste management is for maintaining environment.

1.3.3 Research Scope

To limit the scope of the research, description towards rules and regulation in The Netherlands shall not be conducted in detail. General illustration about waste management will be limited to supporting regulation and general description of technical method in waste management.

In assessing government performance, this study directed to review its historical sequence of legal basis (act, regulation, program and project) of urban solid waste management. There are many differences among these countries, but in these matters, variable to be compared limited only in its political support, community behavior, general economic condition and geographical characteristic.

1.4 Structure of Research

This study consists of four chapters with typical sequence as follow (see figure 1 below):

- Introduction (Chapter 1) consists of the general idea of the research with its problem definition, objective, questions and methodology. It explores the importance of the issue; provide illustration toward whole thesis description.
- Theoretical framework for Municipal Solid Waste Management (Chapter 2) describe the normative scientific studies about context, process and content in managing solid waste in urban area.
- Applied strategies of MSW management in Indonesian and Netherlands context (Chapter 3) comprises description of exact existing condition about municipal solid waste generation, waste stream, daily operation; existing plan, policy, program and institution supporting this sector; actor involvement; financing and taxes; other

possible resource for Indonesia to catch up with lack of maintenance. The Netherlands condition shall be explained in more simple terms.

- Research Analysis (Chapter 4) comprise list of important remarks to be compared. Afterwards, there are explanation for list of possible/transferable policies and adaptable policies.
- Conclusion and Recommendation, is the last chapter within this study (Chapter 5) which comprise of conclusion of this study as well as recommendation for future action.

For clear sequence, see figure 1 below:

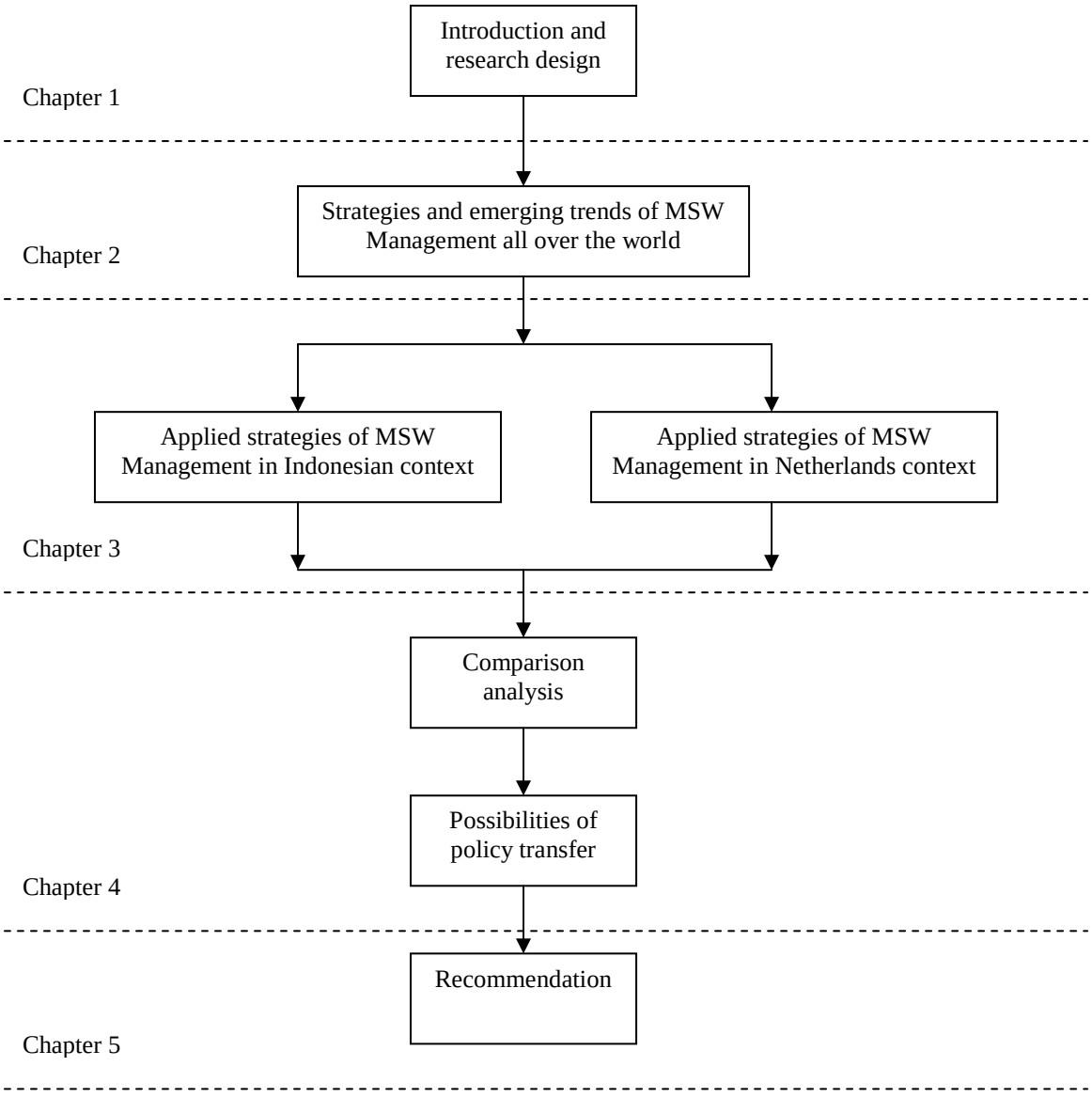

Figure 1 Research structure

Chapter 2

Municipal Solid Waste Management (MSWM) and Possible Policy Transfer Method

This chapter provides an overview of environmentally oriented planning for better municipal solid waste management (MSWM). Overview is depicted from various experiences of other countries especially from The Netherlands. As one of planning study document, this study underpinning the importance of reviewing existing regulatory (plan, policy and program) and non-regulatory instrument (institution, political, social and geographical), which support planning practice in MSWM. Proposed solution is prior to improvement of strategic plan rather than to the technical/operational plan. After all, technical/operational plan is attached in every strategic plan.

2.1 Definition of Municipal Solid Waste Management (MSWM)

To start with, this study shall give brief overview on "*what municipal solid waste disposal (MSWM) is"*. MSWM is described as compilation of either domestic refuses generate from households or non-hazardous solid waste from industrial, commercial, business and institutional site area including hospitals market waste, tourism area, school, yard waste, street sweeping as well as other urban function (UNEP, 2002; Schubeler et. al, 1996; World Bank, 1996). Different type of activity produced different type of waste, either durable or non-durable one. Concrete examples are organic waste from traditional market or households; papers, clothing, boxes, plastics, household's appliance, and wood from other type of activity. Exclusion from these categories directed to sludge, automobile bodies, ashes, constructions and demolition debris (EPA, 1996)[4]. MSWM system comprises from several basic activities such as collection, transfer, composting, combusting, recycling and disposal. There is fundamental distinction in MSWM definition between developing and developed country (Cointreu, 1982; Hasan, 1998). Developed countries exclude industrial refuse in municipal solid waste management while developing countries include it.

Why MSWM is needed? As depicted from The Brundtland Report on sustainable development published in 1987, the importance of delivering economically, environmentally and socially effective mechanism in each infrastructure development that involving resource are necessary to be highlighted in each national agenda (White, Frank, Hindle, 1995). As noted by Ali, et al (2005)[5] projection towards waste accumulation in 2010 will reach 2.5 billion tones per year, with almost 50% contributed by developing

[4] Taken from an e-article published by Environmental Protection Agency of United State of America, 1996, *Characterization of Municipal Solid Waste In The United States*, http://www.epa.gov/epaoswer/non-hw/muncpl/pubs/msw95.pdf (June, 2006)

[5]The data is taken from an article written by Mansoor Ali, Andrew Cotton and Ken Westlake, 2005, *Waste Disposal in Developing Countries*, published in a research centre of water, sanitation and environmental health (WELL) website [http://www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-htm/waste.htm]

countries. With limited skills and capability in handling waste, developing countries, especially those with low income, are facing severe environmental threats due to waste accumulation. Recent phenomena shows that our community is very demanding to get better place to live in but in the other hand, they live with notoriously consumerism behavior. Different waste types such as non-durable and non-organic waste, such as electronic tools (television, refrigerator, air condition, computer hardware, etc) are not easily to maintain, most of them are not well managed by its original industry and just compiled in a dumpsite without proper maintenance. Shortcuts to get rid of this kind of waste are combustion, which lead to air pollution. Pollution and other environmental impact have urged various protest from grass roots towards unprofitable situation surrounds their daily life. As an illustration, those who live in surrounding final disposal site suffer from odor pollution, natural hazards (gas explosion as the cause of inappropriate waste maintenance, air pollution as the results of waste combustion, etc). To fulfill demanding shout from the community, such as assurance of environmental standard, minimum toxic emission due to waste maintenance, regular household waste collection, and sufficient commitment from the public authority, more effort in managing waste is truly important.

2.2 Stakeholders in Municipal Solid Waste Management

Who are involved in MSWM? According to Ljunggren (1998), there are many potential stakeholders can be effectively involves in MSWM, such as:

1. Government agencies, expertise in creating regulatory product
2. Industrial sectors, expertise in assisting government in operational/technical support or conduct primary survey towards possible negative consequences
3. Producers of waste technologies, provide technological innovation for MSWM
4. Trade association, involve in accelerating re-cycling product within market arenas
5. Funding institution, for financial support
6. Academics, provides adequate theoretical overview in MSWM

In fact, these potential stakeholders are not yet all effectively took part in MSWM process. World Bank report and EU Commission asserts that eventually most of community, Non Governmental Organizations (NGO), Community Based Organizations (CBO), local government, national government, private sectors and informal sectors who are initially involved in MSWM. Each of them normatively carries specific roles and responsibilities.

As an illustration, let us review the responsibilities of government in MSWM. The review is compiled from EU Commission, Solid Waste Management of North America (SWANA)[6] and Japan International Cooperation Agency (JICA, 2003). Herein with are the lists of government roles and responsibilities to deal with MSWM sector.

[6] Depicted from an electronic article from SWANA organization entitled *Solid waste management of North American Countries' Technical Policy: Ownership of Municipal Solid Waste Management Systems*, 1994, http://www.swana.org/pdf/swana_pdf_125.pdf#search='policy%20transfer%20in%20municipal%20waste%20management' (June, 2006)

- Formulate goals and priorities of community need (national government), such as setting up target for waste reduction or prioritizing certain methods in handling waste.
- Determine role of each jurisdiction, either employing single system approach or multiple system approach within a regional MSWM.
- Develop strategy plan for all area, usually related to scale of the system, either going to apply large-scale maintenance or small-scale maintenance within an area.
- Establishment of legal and regulatory framework, such as formulates rules and regulation for this sector. Rules and regulation are varied, either going to apply integrated MSWM or sectoral approach in conducting MSWM.
- Determine who will be involved within the system of MSWM, either fully controlled by public, involving private or quasi-public and private type.
- Distributed formal personnel for handling waste (local government)
- Oversee and guide the implementation of plan
- Ensure adequate facilities in handling waste by conducting research, survey and analyzing primary data collection
- Responsible for daily operation of waste pick-up, collection, transportation and disposal
- Possessing control towards waste flow
- Collect user charges
- Create other revenue to support local waste handling
- Monitoring all process

Despite government roles, to get private involvement, generally some requirements are needed such as existence of competitive bidding, adequacy of technical, organizational capacity, clear specification of private partnership management and effective regulation of partnership arrangement (World Bank, 1996)

As noted in the report from EU Commission (2003), participants in MSWM in developed countries generally comprise of government department, regional authorities, municipalities, waste experts, representative from each stage of waste management process (those who involved directly or indirectly in collection, transportation, recycling, composting, and final disposal maintenance), industry and business organization, consumer council, non-governmental organization (NGO) and end user. Among those who already mention above, developing countries involves less parties in this sector, but in some way there is unique characteristics in it. Most of them, such as Indonesia, Philippine and Mexico endowed with abundance human resources that initiate the phenomena of manual separation of waste and illegal market for recycle product. Those who separate waste but not having legal protection generally called as waste picker (scavenger). Their performance are not yet supported by government but fully taking care by nomadic or stationary waste buyers, community based organization (CBO), middleman in waste marketing and micro enterprises (Ahmed and Ali, 2003; Damanhuri, 2005).

Since most of governments in developing countries are loaded with task and duty, it is quite understandable that waste pickers are generally not included in their agenda. Considering the importance of waste picker in MSWM, it is necessary to start to evaluate and analyze their existence by giving legal protection. In summary, stakeholders within

MSWM are widening these days. Due to the facts that this sector eventually affects every element of urban area, more actors should be involved to create solution of better MSWM practice. It is quite important to make a list of who are actually contribute to such waste accumulation.

Moreover, from the description above, various question arouse such as "What exactly MSWM normative objective?" and "How to achieve it?" This chapter shall review various scientific researches to answer this question. Departed from an understanding that waste management are in transitional stage these days, this study tries to give overview that transition in system boundary, approaches, methods and principles of MSWM are not yet guarantee better MSWM practice. Afterwards, proposed solution derives from other country's experience are drawn. Lastly, this chapter presents an overview on how to conduct policy transfer.

2.3 Shifting paradigm in planning municipal solid waste management (MSWM)

2.3.1 Transition in concept of waste

It was explained above, that MSWM experiencing transition in its management triggered by transitional concept in waste concept itself. It was supported by an argument from Dijkema et.al (2000), who asserted on their writing that nowadays, waste concept is pictured as one of subjective concept. It is fully dependent of how people conceptualize it, tend to be annoying issue need to be handled or deem it as potential resource to be converted to energy. Staniskis (2005) in his article noted that definition of waste is important to acknowledge measurement toward it. For common people, waste is an object that contains no value and origin to dumpsite. This conception dominates in 1960s and tremendously starts changing at the beginning of 1990. In 1960s, prevailing jargons for waste is "*out of sight out of mind*", and most people did not care on how waste are going to be maintained as long as they could get rid of it from their area. Thus, dumpsite and open dumping were dominating (Daniels, 2003). While in 1990s where series of international conference were held, notion to give more attention to environmental sake is increasing rapidly. During that time, people awareness to save natural resource had place an assumption that waste is not always contain zero value, it may already been used, but restrain value that can be maximized again although it should be changed into another form. This concept means that waste should not be seen as only problem, but in some way conceives potential resources, such as biomass, energy, generate recyclable product that lead to resource savings.

Changing waste conception also followed by changing context in planning MSWM. It has been marked with changing trend of approach, methods and principles in maintaining waste during last few decades. Transitional context in almost large cities in the world are marked with changing view such as *disposal to reduction* (Davoudi and Massam, 2000). Other similar arguments are noted by van Geel, 2005[7] that mention shifting paradigm of *end of pipe solution to alternative solution at source. Action to get of rid*

[7] Speech given by Van Geel, 2005, International Seminar of : The integrated approach to solid waste treatment and management, VROM, Netherland, www.vrom.nl/pagina.html?id=22226, June (2006)

waste to shrinking waste stream (Cunningham, 2000) consolidates transition in MSWM. Spiegelman and Sheehan (2005) asserted that MSWM are no longer local concern but initially shift to national issue and cause global impact related to liberalization of product flow within our world. Finally but importantly Ljunggren (1998) asserted that MSWM experiencing changing context from a sector that consist primary action to getting rid of waste into a sector that conceive *potential value* either in environmental and economic points of view.

Most people questioning would this transitional thoughts in MSWM create better performance in this sector. Let us examine first, what is the reason behind this transition. Most research reveals that transition in waste management is driven by: 1) increasing attention towards public health; 2) awareness to space scarcity, which lead to sustainable concept; 3) unequal urban service delivery especially for the poor and remote area; 4) importance of good governance and commitment to the society (Schubeler, 1996; EU Commission, 2003). Most of ideas infused to new conception of waste are related to other broader concept. Thus, implementation in such imaginary better MSWM is rather difficult to do. Thereafter, most country accommodate it with giving broad conception of waste maintenance using national/strategic guidance and complete it with detail technical/operational instruction using local planning document.

2.3.2 System boundary in MSWM

Move on from waste conception, examining system boundary of MSWM are important stage in order to figure out better solution in MSWM. Elaboration towards system boundary of MSWM within this sub chapter divided into two fold. First, overview of core element within MSWM, such as source of generation, location of temporal/final disposal sites, transportation of waste, temporal/final treatment, temporal/stationary plant (Fabbricino, 2001). Accommodating dynamic environmental change and different type of waste, it is advisable that to come up with better waste management, there should be an integration among those elements and do not put too much stress on one particular element. Second, overview towards supporting element of MSWM, such as political, societal and economical condition is in line with recent methodology in handling waste (Schubeler, 1996).

Let us examine whether transition in system boundary of MSWM are able to create better performance of MSWM. Depicted from an idea of Sundberg (1994, in Ljunggren, 1998), that solid waste management supposedly create an open system, whereas input are originated from products from markets. Afterwards, within the system, those secondary material (consider as other word for waste) are carefully processed into other form of product (recyclable one) or in form of energy as an output of the system. Obviously, this kind of understanding is not developed at the beginning of MSWM being formulated. At the first place, MSWM was formulated to accommodate health protection to the community (Spiegelman and Sheehan, 2005). Thus, main attention is how to provide better solid waste management as long as it did not give negative impact to the community. This anthropocentrism thought in MSWM are modified to eco-centrism lately, thus, various

adaptation within the system are necessary to be reviewed in order to accomplish better MSWM.

It was explained by Beigl, et al (2005) that in the previous decades, MSWM prevailed in concerning one subsystem within the whole process. This assumption is exactly proven in daily operation of waste management. Most of MSWM in various countries put too much concern in prevalent issues such routing vehicles, sitting location for temporal/final disposal site, inadequacy of supporting facilities. Generally, partial elements within MSWM are modified for cost effectiveness. Cost effectiveness are often put above all other element such as environment quality and social acceptance. However, recent trend has shown that the decision support system for MSWM has broader system boundary, which involves qualitative and quantitative consideration from sustainable concept (see figure 2). Recent condition especially those in developed countries are showing an increasing level of integration between social, economic and environmental aspects through the whole process of waste generation, collection, transportation, sorting, treatment and disposal (Björklund, 2000)[8]. Recent practice in maintaining MSWM should add consideration of time, geographical and socio-economic integrity. System boundary meant to be a framework of thinking in planning sustainable waste management.

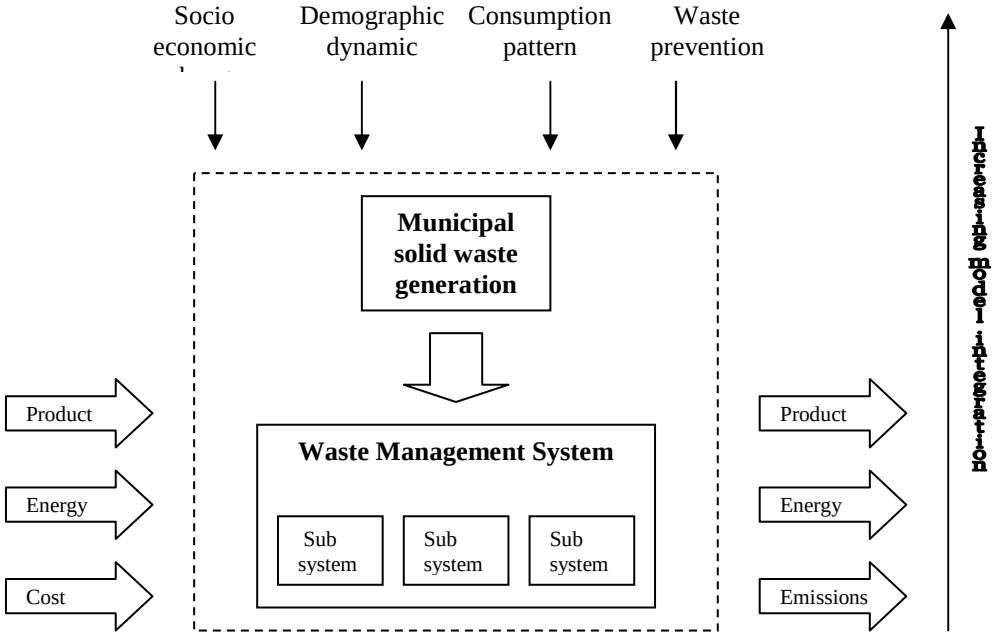

Figure 2 System boundary of integrated model of waste management (source: Beigl, Wassermann, Schneider and Salhofer, 2005)

Essentially, transition in MSWM system boundary marked with changes of national policy content. National governments who formulate strategic planning for MSWM are capable to shift direction of MSWM practice. Taking for examples, European and American countries, which in latest practice shifted their direction from too much concern

[8] In Beigl, Wassermann, Schneider and Salhofer, 2005, Forecasting Municipal Solid Waste Generation in Major European Cities [http://www.iemss.org/iemss2004/pdf/regional/beigfore.pdf]

of landfill sitting into integrated sustainable waste management (Daniels, 2003 and European Commission, 2003). Shifting in MSWM system boundary was initially started with broadening overview of stakeholder involvement and environmentally friendly technical preference. Nowadays, preferences of waste handling are not only object to cost effectiveness but consider to environmental protection as well. As reported by Spiegelman and Sheehan (2005) that product wastes are increasing rapidly than those organic waste. Since waste types are also in transition stage, thus MSWM should be modified to be more adaptable to the situation.

In previous practice, input parameter in projecting waste generation only relied on the condition of socio economic and demographic condition. Hence, since globalization and liberalization occurs, it cannot be avoided that product, energy and cost that being consumed by the community also increasing in terms of weight and moisture. Thus, to predict accurate waste generation for future sake, planners and scientist have to take changing characteristics of life style or consumption pattern into consideration.

World Bank report as presented by Schubeler (1996) showed a slightly different framework of thinking in viewing MSWM (see figure 3). According to this framework of thinking, planners should delineate who are involved in waste sectors. Generally, questionnaires are provided to seize clear explanation and elaboration of each actor's involvement. For example: from political context: "How is the administrative performance in supporting MSWM?; from socio cultural context: " How is people attitudes in waste handling? ; from environmental context: " How is the physical condition to be matched with design? How do they do the analysis? ; And from economic context: "How is the level of economic development and willingness to pay from the community? The examples above are not strict to be guidance, it could be other types of question as long as it could give description on how the baseline conditions.

To been able to delineate clear system boundary of waste both framework of thinking are important to be analyzed. Identification of how core element are integrated and how supporting element are performed could have been completed the analysis for this sector. Transition in system boundary of waste management is not easy to be done. Wider perspective and increasing supporting element need to be accommodated. To do so, most of planners need mature political system and advance planning methods, so that each stakeholder could be involved and contributed extensively. From both frameworks, this study aim to combine hybrid analysis over problematic situation in Indonesian MSWM. Without giving too much credit on the latest framework mentioned above, it is quite clear that unstable political condition and lacking of participation within planning arena in Indonesian MSWM requires more efforts and improvement in each detail element.

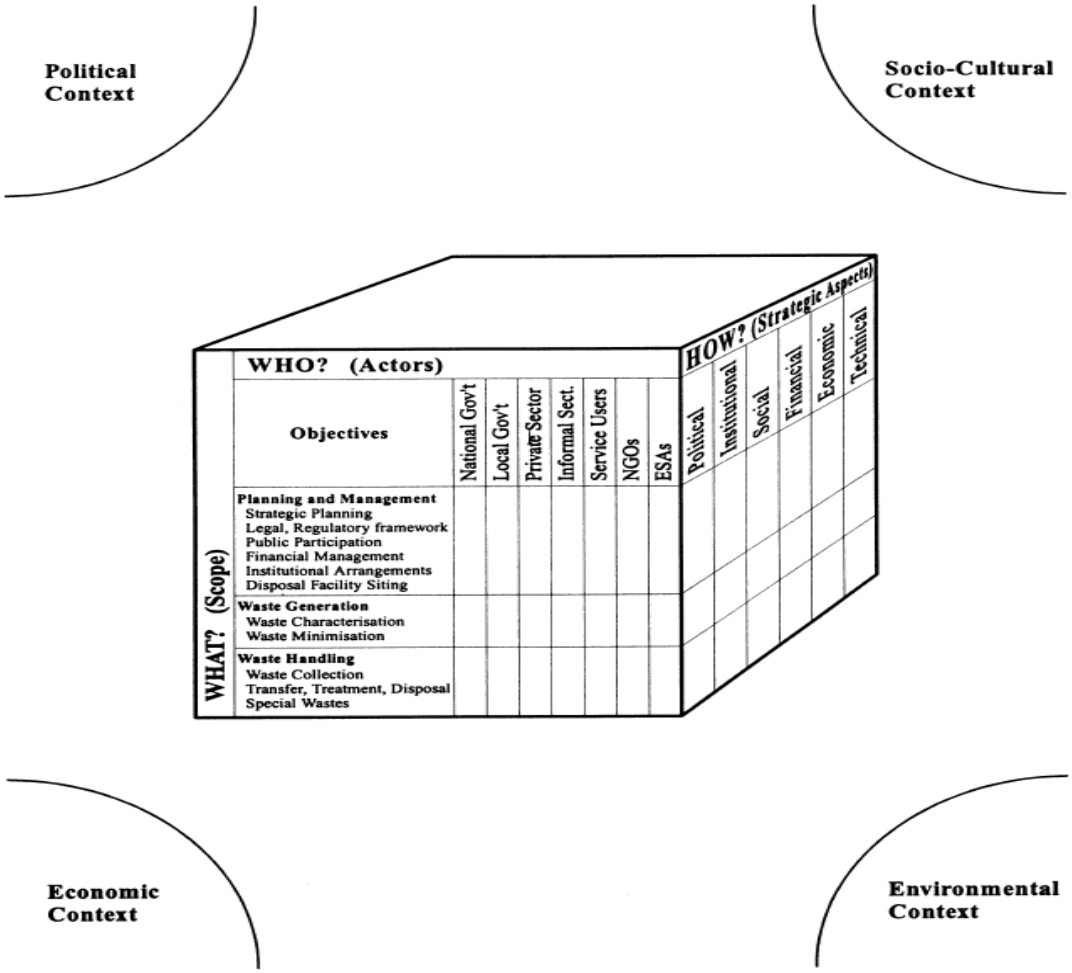

Figure 3 Framework thinking on MSWM (Source: Schubeler, 1996).

2.3.3 Approaches in MSWM

Various consensus and world treaty upon environmental protection has extensively encouraged each country in the world to strive in achieving their committed goals. Global phenomena, such population growth, low service in public health especially in developing countries has urged more programs and planning effort in MSWM. Extensive studies in planning process of municipal solid waste management evidently have shown two major approaches that have been applied in various large cities in the world (see table 1).

To accomplish better MSWM, planners and decision makers have to shift their approach from seeing it as urban problem into resource recognition. Approach in MSWM directly affects set up plan, policy and program, either sectorally or comprehensively. According to the figure, classic approach is thinking through conception that waste is one of urban planning problem that surely will become bigger issue along with growing urban area and its population. Therefore, scientist and decision maker focus their solution only in a technical way (sectoraly) on "*how to get rid of waste*". Classic approach generally applied by developing countries with low ability in budgeting and adequate human

resource endowment. In the other way around, alternative approach was proposed after experiencing several failures due to classic approach. With new approach, people start to think *"how to doing it properly?"*, and seeing waste not merely as problem, but also as a resource that contain economic value (comprehensive review). Waste conceives value if it were managed properly. Thus, waste is contributed less negative impact to the natural resource and in the same time delivered positive impact to the community. Alternative approach is more or less prevails in developed countries with adequate budget.

Table 1 Approaches in municipal solid waste management

Characteristics	Classic Approach	Alternative Approach
Fundamental thought	Urban planning problem	Resource recognition
Main actors involved	Municipal authorities	Community involvement
Main concept in planning	How are we going to solve accumulation of urban waste?	How are we going to reduce waste at source of generation?
Focus of solution	Organization aspect Technological aspect	Organization, technical, social and ecological aspect
Exponent	World Bank	European Union
Critique	Lack of consideration of socio economic externalities of urban waste management	Distinction of roles and responsibilities between formal authorities and informal actors within the sector

Source: Baud and Schenk, 1994

Deduced from the explanation stated above, classic approach is not traditionally wrong; it was just no longer suit with dynamic condition in urban area. Therefore, with adequate knowledge based, developing countries MSWM may shift to alternative approach without endangering their resource and put more trouble to their environment.

2.3.4 Principles in MSWM Process

Transition in waste management was illuminated by various proposed principles, such as polluter-pays principles, proximity principle, precautionary principle and latest principle in form of waste hierarchy (European Commission, 2003; World Health Organization, 2005[9]). This study examines on how these principles affect better waste management.

First, it is important to understand fundamental principles applied in waste management. According to World Health Organization (2005) and EU Commission (2003), waste principles are as follow:

[9] Taken from an article published by World Health Organization (n.d) about *Health care waste management*, in http://www.healthcarewaste.org/en/130_hcw_intagreemts.html , (May, 2006)

- *Prevention principles,* it covers minimization and avoidance over possible pile up of waste generation; reuse product in order to acquire cleaner and conserve natural resources.
- *Precautionary principles*, pointed to the importance of insurance for human health over waste impact; thus, securing our environment from hazardous and pollution from waste is an important thing to do before getting worse.
- *Polluter pays principles*, directly aimed at asking for responsible behavior of those who produce or generate waste so that it will not endangering others. Waste producers obligated to pay under certain legal rules and regulation to compensate environmental degradation caused by their action. Daniels (2003) assumed that this principle is one of the most appropriate example for environmental jargon "*think globally, act locally*".
- *Proximity and self-sufficiency principles,* aimed at providing adequate resource for MSW, such as disposal technique, vehicles and human resources; providing treatment and disposal site located nearby source of waste generation. Herein, transport cost of waste could be minimized and reducing "non-in-my-background" (NIMBY) effect.

Process in handling waste was bolstered by Wolsink and De Jong (2000) in their article. They mentioned that there are three hierarchies in handling waste, those are:

1. Avoidance and minimization (at source reduction)
2. Recycling and composting (at stationary processing)
3. Incineration and land-filling (at very final disposal area)

These principles illuminate modification in handling waste. In the previous practice of waste management, final treatment generally relied on off site dumping ground, whilst in recent practice, on site dumping are implemented as well.

Latest principles applied in waste management are not well integrated yet. Thereafter, planners and decision makers proposed new solution in maintaining waste using waste hierarchy. Waste hierarchy is a tool comprise of systemic thought on how to maintain waste according to sustainable principles. Essentially, waste hierarchy is similar from one to another, but in some way comprise different element. There are fundamental differences between waste hierarchy in developed and developing countries. Because waste principle generally infused in national policies, thus, local operation should obey this. Across developed countries, conception on waste is step ahead from developing countries. In 1975, European Framework Directive No. 442/EEC on MSW endorsed new guidance in waste handling called Waste Hierarchy. The hierarchy incessantly formalized strategic decision in European countries and begun to shove previous procedure of *"collect and dispose"*. In principle, waste hierarchy proposes minimization of waste generation by reduce, reuse and recover waste (3R), then followed by unavoidable disposal (Eduljee, 2004). Preference are laid to waste reduction first then followed by the next step, wherein disposal is the last preferable principle in handling waste (see figure 4).

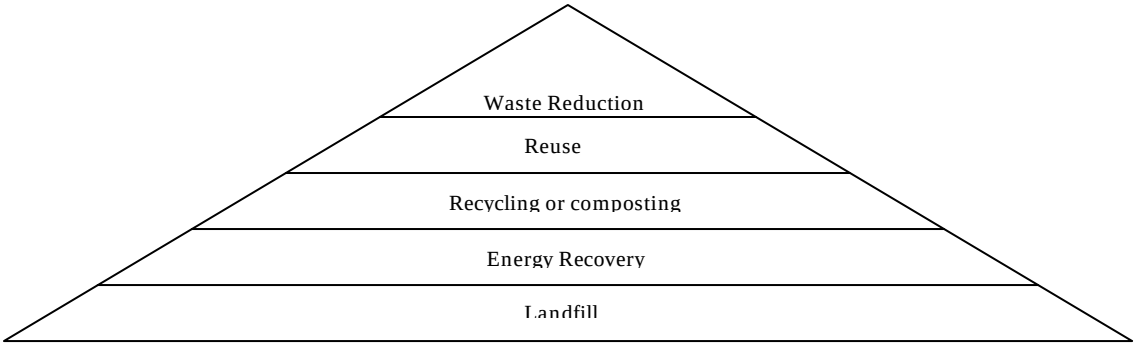

Figure 4 Waste Hierarchy (source: European Union Year 1975 No. 442/EEC)[10]

With different background, developing countries pictures other hierarchy as noted by Japan International Cooperation Agency (JICA, 2003). It showed slightly different principles in planning process of MSW that applied in developing countries (see figure 5). Those are as follow:

1. Reduce and minimize waste from its source
2. Resource utilization, recycle and reuse
3. Adequate collection and transfer to final or temporal site
4. Maintenance and reuse of junk in final disposal

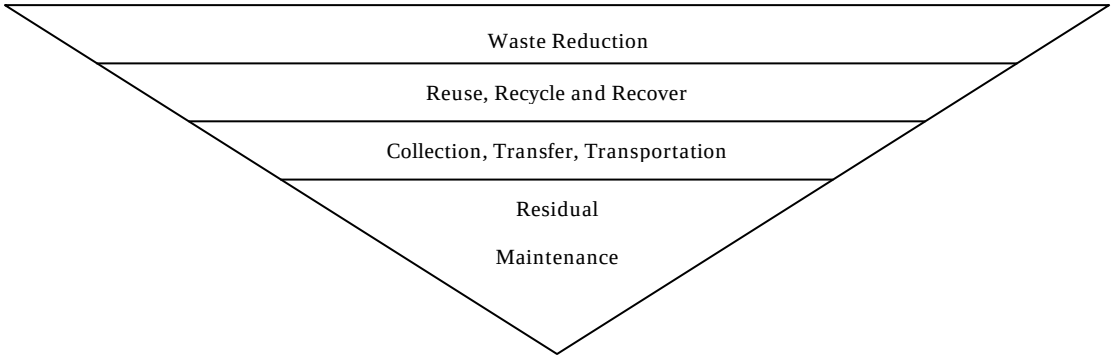

Figure 5 Waste Hierarchy (source: Japan International Cooperation Agency)[11]

From the illustration above, differences between developed and developing countries laid in third and fourth principles. Polluters pays principle and self-sufficient principle are absent in developing countries. Most of them favor to deal with optimize of final disposal maintenance and effective transport or collection. Collection and transportation method in developing countries generally adopt simple method with lesser amount of facilities, while in developed countries, it is more sophisticated with adequate

[10] Taken from http://www.sita.co.uk/assets/PP_WH.pdf and http://www.egeneration.co.uk/centre/modules/waste_min/intro/driving_principles/waste_hierarchy/waste_hierarchy.asp

[11] In JICA, 2003, Draft of Act Waste Management for Indonesia

facilities. Sense of hierarchy is less in developing countries rather than in developed countries. Herein, there is no ladder of preference over final maintenance, which is dominated by landfill system.

Based on the explanation, it is quite clear that transition in waste principles is not yet enough to support better management. New proposed principle requires advanced technological solution and various supporting resources. As mention above, developed countries with their principles choose to recycle waste, by in site and off site treatment especially for market product. Whilst, developing countries fully rely on off site treatment with ineffective collection and transport cost. Normatively, principle in developed countries is cleaner, healthier, sustain and preferable rather than one that applied in developing countries. However, with portion of constraint endowed in developing countries it may seem ridiculous to implement it without good and adequate planning knowledge. Although waste hierarchy proposed in European Commission is widely recognized and accepted all over the world, it has significant critiques, which lead to heated debates on environmentally oriented solution for waste management. For the time being, these hierarchies are not well implemented in all countries across universe.

2.3.5 Methods in MSWM

In relation with changing context in general approach of MSW, methodologies in managing waste are also changing (US EPA, 1996). It is divided into two categories, *site-specific methods* and *material flow methods*. Site specific methods was apply before 1960s, it was a method that constructed from prediction over careful sampling methods of waste generation and waste streams based on its seasonal change, sorted it out and weighed it to came up with extrapolation. Sampling error and misinterpretation might encounter the process and lead to inaccurate results. During 1970s, new method proposed, it was a method that basically relied on *waste stream data* especially in its material characteristics to come up with weighing over adjustment that consider to be taken later on the recycling process. It was proposed in order to fulfill world awareness upon public health and environmental protection. Moreover, attention to product lifecycle, ability to be recycled and its contentious affect to the environment is more or less became significant ground in seeing waste these days. It was criticized that this method is complicated as well in analyzing how a product may be categorized. If we would like to get rid of particular material from production process, it means related material are also involved, either going to be increasing or lessen in its usage. Although analysis in methodology of MSW has both negative and positive impact, it may be concluded that second methods is prevailing in US since it has so much helpful in identifying projection of waste to be recycle and how to prepare for its maintenance.

Researches of waste management provide ample information about technical alternative. According to Cunningham, et.al (2003), waste treatment have shifting concurrently within the past few decades, starts from open dump, ocean dump, landfill, exporting waste, incineration, resource recovery, reduction, reuse and recycle (3R). Most countries generally ever experienced with open dumping or landfill methods. Each type of waste also received different type of treatment (see figure 6). However, shifting method apparently foremost occurs in developed countries and turn into on site incinerator and off

site dumping. Whilst, developing countries tranquilly apply off site dumping and temporal on site storage. Before period of 1970s, incineration became one of the most preferable waste maintenance in developed countries due to its ability to create waste into energy. Over expectation to incineration are shattered along with increasing awareness to environmental protection started in 1970s. Although MSWM reckoned in a *linier thinking*, which only focused on how to get rid of it, recent practice in MSWM showed that *systemic thinking* was illuminating (Dijkema, et.al, 2000). Systemic thinking refers to on how to generate value from unused material and to distribute it once more in the market product (Alter, 1991; US EPA, 1996; EU Commission, 2003). In summary, each alternative solution configures negative and positive consequences. Here are the details (Cunningham, 2003; Daniels, 2003)

- Off site storage/treatment or landfill system
  Landfill system prevails in developing countries because in short term, this kind of treatment considerably cheaper rather than incinerator, while in negative side, this treatment posed higher threat to environment. For example, groundwater pollution, odour pollution, unhealthy environment for surrounding sites, risk of gas explosion. Long term application of this method may pose more environmental burden and inefficient cost.
- On site plant using incinerator
  According to various researches this type of treatment is most preferable in developing countries among other solution. Although it cost huge investment, provoke ashes during its process and produce dioxin (contribute in global warming), this treatment is completed with (1) receiving facility; (2) supply facility; (3) combustion facility; (4) cooler facility; (5) emission maintenance facility; (6) electricity generator facility; (7) heat maintenance facility; (8) ashes deposit facility and (9) residual water facility. Incinerator turn waste into energy and able to reduce more than 60% compacted waste and amplifying effort of maximizing waste as potential resources[12].
- On site treatment using recycle process
  As it was described above, certain type of waste could be re-processed into another product form that valuable for consumption. However, difficulties in recyclable product marketing mostly hindered implementation of this treatment. In most countries, limitation over waste separation budget and unpredictable market competition with virgin material are foremost prevails. To accommodate this treatment into practice, national government should interfere using price regulation and give more support to secondary material production so that this sector able to compete fairly with virgin material production.

MSWM consist of various types of waste, whatsoever, at the end of its final treatment, identification of waste types is necessary, in order to conduct proper treatment (see figure 6). From the following figure, different type of municipal waste encloses assorted type of end process and emission production. By assorting each type of waste into different maintenance, it supposedly cover environmental hazard posed by waste accumulation.

[12] Taken from Menteri Negara Lingkungan Hidup Indonesia, 2005, *Background Paper of Act Draft on Waste Management (Indonesian version)*, http://www.menlh.go.id/i/art/pdf_1130481720.pdf (June, 2006)

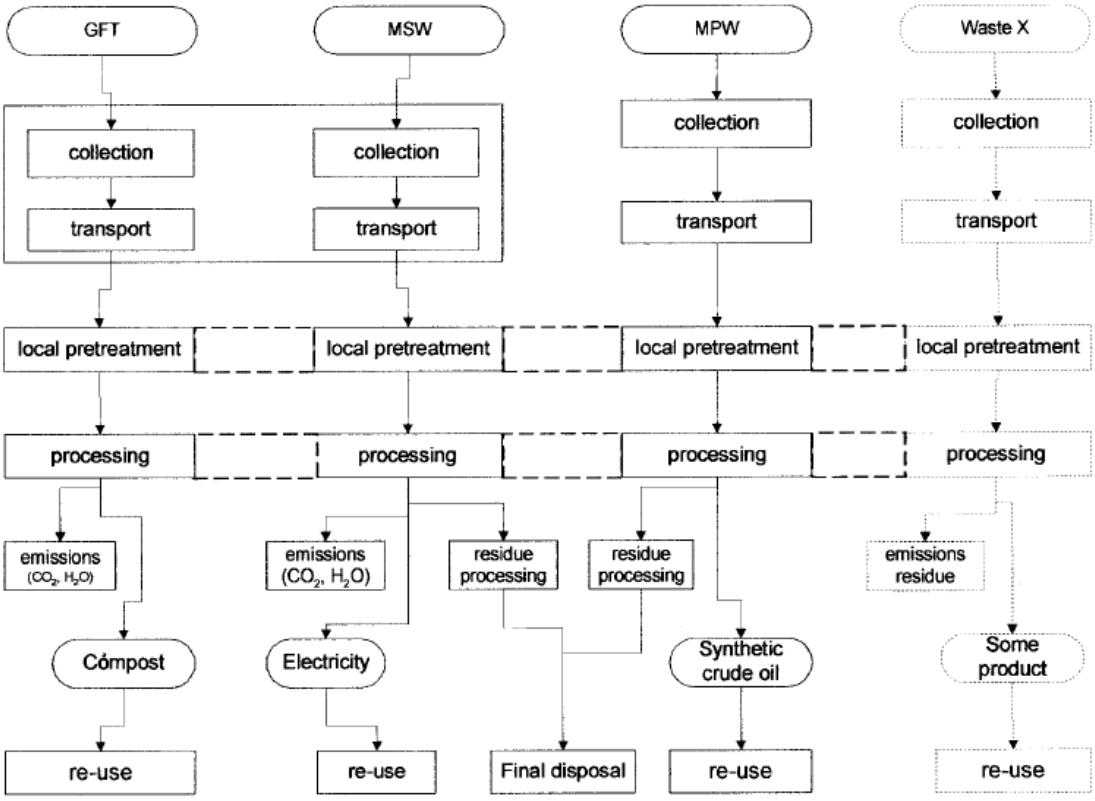

Figure 6 Type of waste management system towards organic waste (GFT), municipal waste (MSW), plastic waste (MPW) and other type of waste (Dijkema, et. al 2000)

According to its practice, waste methods application arguably, as "*recycle is better than incinerator, incinerator is better than landfill*" regardless the financial investment needed. Others may think that the latest method of waste management is rather difficult to be implemented. Instead of taking too much concern over problems and constraints, planning good waste management in developed countries are suits to maximization of resource endowment that exist in the area with sustainable manner. In other words, it may conclude, "*waste actually can be seen as an economically-driven urban asset instead of an assault*" (Ackerman and Mirza, 2000).

2.4 Planning process for municipal solid waste management (MSWM)

Our nature is dynamic, therefore review toward transition in waste management are important to do. Description of system boundaries, approaches, principles and methods of waste management express that these indicators are dependent on how waste are being formalized. In practice, waste conception are formalized by national government, thus most of the processes in handling MSWM are typified by full domination of public

authorities with less interference from private sector. To reduce domination, scholars tried to elaborate various new systems in planning MSWM, so that it attract private sector to join within this sector. By commencing open planning process, all parties are invited to join the discussion over handling waste.

At first, to come up with good planning practice of municipal solid waste management, there are some aspects need to be developed, such as objective formulation, finite definition, express responsibilities of waste producer, exact roles of public authorities, identification of resource for waste management, data collection and its management (P.E.Rushbrook, et.al, 1988). Beforehand, it is necessary to analyze opportunities, risks and adaptability tests toward new system applied confronted with baseline condition. By doing so, decision making in planning municipal solid waste shall integrate with other urban issue and no longer sectoral (Fahmi and Sutton, 2005).

Barlishen and Baetz (1996) notes that public authority need to provide a decision support system that refers to availability of methods, model or simulation tool based on knowledge based. Knowledge based pointing to the ability of planner and decision maker to come up with solution that derived from mathematical model, economic efficiency or social analysis. Remarked in their article, that it would be difficult to optimize all element in municipal solid waste because they have non-linier optimization nature, however, invest in knowledge based deem as one of the way that able to solve this problem. Yet, public authority seems do not have adequate skill and knowledge. Later on, more is merrier, which means that more people involved in the planning system surely help to enrich knowledge based. This will go along with other solution proposed, that to come up with effective decision is that public authority should minimize negative impact of proposed scenario towards, economic, environment and social aspect (Yeoman, 2005).

2.4.1 Open planning process for MSWM

In accordance to recent trend and approach, Dijkema et.al (2000) stated that main parameter in MSWM context is public awareness and attitude. European Commission and Environment Directorate General (2003) proposed new planning process for waste management that responds to the changing situation (see figure 7). In each step of planning process, there should be consultation or review process by public, end-user and other stakeholder that involved. General consideration and background comprise of the scope of the plan, such as geographical coverage of the plan (national, regional or local); waste streams that need particular maintenance (hazardous waste, municipal waste, packaging waste or other); sector that will be involved in maintaining waste (public or private sector) and time horizon of the plan (3, 5 or 20 year period).

Status part is similar to existing condition identification. It is a process to define base line condition related to three important criteria, such as waste quantity, waste stream and waste management. Planning part is the most critical process among other because there are many aspects supposed to be fulfilled in this stage, such as:

- Projection of waste generation, in which involving several parameters, such: population growth, changes in economic condition, changes in demand of goods, and changes in manufacture method.

- Identification towards option of waste management, attached closely to those new waste treatment methods, or effect that might occurs toward policy change.
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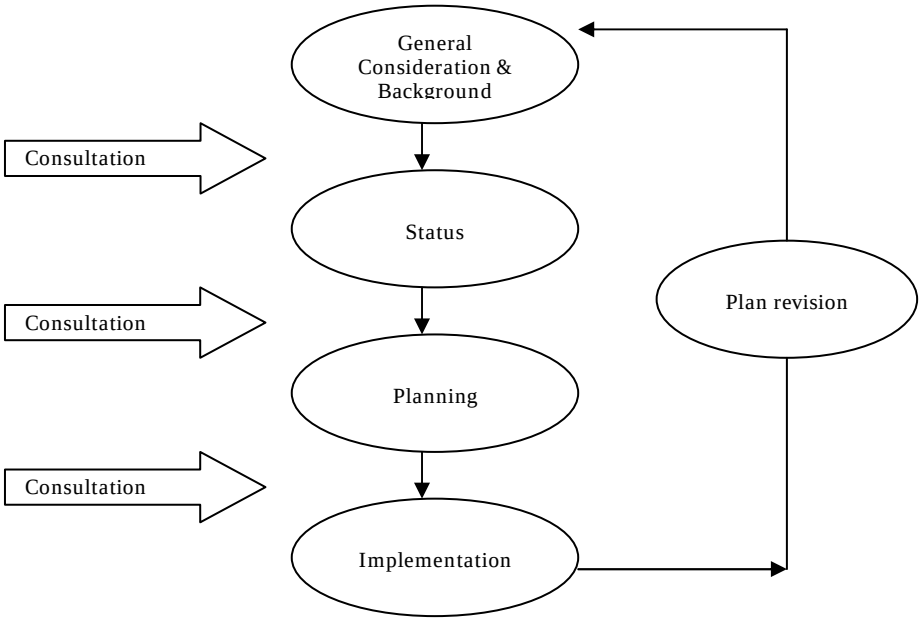

Figure 7 Planning process (European Commission and Environment Directorate, 2003)

Determination of plan objective, corresponds to existing problematic situation, objective shall directly link to necessity to prevent, recycle, recover or development of safe disposal site. In the other hand, objective supposed to indicate what kind of activity that need to be band or restricted due to its excessive waste generation. The most important thing is that objective of plan recommended to conceive long-term development concept and contain sustainability concept.

2.4.2 Definite scale of MSWM

Based on system boundary of MSWM, stakeholder and technical system overview are no longer suitable to accommodate dynamic change in our nature. Without adequate planning practice, MSWM are questionable to achieve its success. Therefore, national government and local government should hand in hand create synergetic vertical and horizontal relationship. This relationship is important to accelerate and to support better MSWM planning practice. According to Ljunggren (1998) to improve better MSWM according to the latest perspective, it is important to divide scale of operation. Her argument illustrated that the alternative are divided into three folds. First is *municipal system with single specific approach*, where each municipality should provide at least one type of waste treatment, either on site or off site. This model was based on assumption that input of waste within one municipality should goes back into another form of output for that municipality too. Second alternative are actually distinguished into two categories, *regional system with single specific approach* and *regional system with multiple approach.*

Regional system with single specific approach refer to provision of single treatment for all municipalities within region, and all input and output of waste are circulation within this region. While, regional system with multiple approaches refers to application of various treatment types for particular waste type representing waste accumulation within region. Thus, interaction between municipalities within a region is frequently occurs. Third is national waste with generalized approach, which refers to integration of waste treatment among region or among municipalities.

In order to create better performance in MSWM, planning of this sector should delineate exact scale. Preferences over scale are influenced by availability of resources. The simplest method, municipal system with single specific approach, is the most preferable for those countries, which suffer from inadequate facilities and lack from technological skill. While national approach generally applied for those countries with adequate facilities and knowledge as well as better planning implementation experiences.

2.4.3 Institutional development for MSWM

Previous solutions in MSWM are directed to general proposal of planning and operational alternatives. These alternatives are not yet enough to be backbone of better performance in MSWM (Ackerman, 2001). To accelerate recycle, as the latest paradigm in MSWM, recyclable wastes need to be marketed. In the company of other type of product, which originated from virgin material, recyclable waste is not well competed and less promoted. Thus, this sector rarely interest private sectors to join in. It is quite difficult to market these products since most of people yet put trust in that paradigm. Ackerman advocate the creation of market in MSW as one important task to do by the government. Private involvement is needed for certain material flow. Industrial waste generally own self-recycle, which construct flow of material to be once more processes, while household waste could not create their self-recycle program. Market orientation aim to accelerate recycling process fully depends on household behavior in collecting and separating their waste. However, with the existence of scavenger, separating of waste becomes their full responsibility as well as their source of living. After sorting it out, waste are usually sell to some intermediary, the one who responsible for selling junk material and usually has full right to determine price. Price level of waste believe as scavenger source of living. Most of the time, we find out that scavenger wage are below standard. With full respect to what have they done, it may seem unfair if they are not properly appreciated. Thus, market of waste in MSWM need public procurement policy that shall protect equal share and fair rules in MSWM process.

From previous case, it is quite clear that recyclable waste marketing and scavenger existence need legal protection to been able to fairly compete with other products and other tools; either in terms of incentives or tax reduction. Wolsink and de Jong (2000) questioning whether government is able to accommodate arising issue due to shifting paradigm in MSWM, thus institutional development review deem as an important tool in supporting success in MSWM.

Most ideas in solving MSWM problem are directed to privatization. At the same time, as argued by Wolsink and de Jong (2000) that to implement privatization, one country should experiencing effective regulation and efficient functional separation. To handle MSWM, there is functional institution, which relates to each other. Regional scale of MSWM apparently able to illustrate that there should be strong coordination among functional department in handling waste. Separation among vertical and horizontal department need to be clearly defined, otherwise there will be overlapping task and duty. By doing so, formal institution could be another potential resource in supporting better performance of MSWM. As argued by Ackerman and Mirza (2001) which stated that the next question appears, *"if there is a chance in maximizing resource, then, how to do it"*. Along with that argument, Nas and Jaffe (2003) advocate new approach in seeing informal sector of waste management also as a potential resource instead of focusing on the problem.

2.4.4 Alternative solution for MSWM

As our world has come to a point where shortage of energy creates chaos and turmoil condition, the latest innovation to convert waste into another form of energy is exist. Technically, municipal solid waste types are dominated with organic material from household. Through high technological solution, waste could be transformed into energy, known as biomass. Biomass can be defined as renewable resource originated from waste, contain less carbon dioxide, which in turn will lessen green house effect[13]. In addition to that definition, biomass is defined as new source of energy derived mostly from unused plantation material (such as woods, leaves, etc), which can be used to replace fuel.

In developing countries such as Indonesia, organic waste generally reprocessed to be fertilizer, whilst form of biomass such as briquette, or electrical power is not familiar yet. While in developed countries, where ability to provide latest invention in technology is abundant, biomass generally processed through an incineration. This method is prevailing plantation used to convert waste into energy through combustion methods. In line with assumption that waste are supposed to be reduced, so that in will not burden our environment, this methods has in some way useful to initiate this latest idea. As an illustration, if we put 0.5 Kilograms dry waste (tissue, paper, and other combustible waste) into incinerator, it will produce proximity 1900 Kcal of heat. This amount is almost equivalent with energy produced from heating up 0.25 Kilograms of coal[14]. Various research has come up with conclusion that waste are compacted and could be reduced up to 80% with incinerator to create energy as source of electricity. Mostly, this type of electricity is economical for heating in industrial process. Although there are methane gas and dioxin produced along combustion process, it is reducible if there are strict rules and regulation of how technology should be regulated (EPA, 1996).

From this alternative, this study try to give illustration that waste accumulation is not always seen as problematic issue of urban area. If we had enough managerial skill and supporting facilities, waste can be turned into potential resources.

[13] Information on biomass is derived from http://edugreen.teri.res.in/explore/renew/biomass.htm (June, 2006)
[14] Ibid

2.4.5 Adequate information for MSWM

European Commission and Environment Directorate General (2003) stated that to observe waste management problem accurately, data input supposed to be complete. There are three elements need to be identified and accurately projected, such as generation source, waste stream and waste management process that had already been applied. Identification to source of waste surely pilots the prevention methods in the area surrounding particular activities that generate exceeding waste; whilst, identification to waste stream actually important to confer authorities with reasonable background in selecting alternative management. Last but no least, waste management process, such collection and transportation always need to be characterized in an efficient and effective manner. Related to waste stream, it will also direct to sorting process and treatment in disposal site. All process exist in waste management should be described in terms of physical condition, economic/financial and organization that involved.

The quantity and characteristic of solid waste is different from one area to other (Beede, et.al, 1995). Rathi (2005) noted that *waste generation quantity and complexity always attach along the economic development, urbanization and improving living standards in cities.* According to Baldisimo (1988) and Cointreau (1984), the quantity of waste is influenced by several factors, such as:

1. *Average level of income*
   According to its logical thinking, if Gross National Product (GNP) of country A is higher than country B, it means that in country A more solid waste is produced per capita than country B. As economic affluence occurs, more people tend to spend their income for product and it leads to more piled-up waste.
2. *Sources of generation*
   Different types of activities in urban area will produce different type of solid waste.
3. *Population growth in an area*
   In line with increasing number of population, solid waste generation is increasing.
4. Soci*al behavior*
   Social behavior or social life style contributes in determining types of waste being produced. People these days tend to utilize technological gadget that difficult to be disposed and recycled. This phenomenon affects to technological preferences.
5. *Climate and* season
   Climatic condition influences directly to the chemical and biological process that happened to the piled up solid waste. Type of waste from traditional market will be easily respond to these climatic condition, but not applied for those solid waste generated by industrial activities.
6. *Industrial production and market for waste materials*
   Types of industrial production in providing proportional material for product packaging affect solid waste generation.

Information about waste quantity is important because in policymaking there always been forecasting method to predict future circumstances and scenario development. However, forecasting is not always match with the real condition. Thus, it is usual that plan and policy are not always suitable in its implementation.

2.5 Possible policy transfer methods

After we summarized the changing trend in MSWM, it is quite important for the sake of environment and efficiency matters, that traditional MSWM planning practice in Indonesia need to be thoroughly reviewed. The review in this thesis will be conducted using policy transfer and comparing important element. The most fundamental question is *why would we take policy transfer as one of possible tool to improve our condition?* Policy transfer is "*…either voluntarily or forced action in adopting knowledge about policies, administrative arrangement, institution etc. in one time and/or place to be used in the development of policy, administrative arrangement and institution in another time and/or place"* (Marsh and Dollowitz,1996 and 2000). In order to fulfill global commitment, most countries, which has problem, strive hard to adjust their policy, plan and program to come up with new ones. As argued by Friendman (in Sanyal, 2005) planning is not a universal subject because each country speaks different language, constructed from different institutional and cultural background. These three variables build up unique characteristic on planning system in which construct very different planning culture and planning practice. To transfer a policy, one particular process should be done is identifying the constraints. In transferring policies, there are two major constraints related to policies and context matters. With respect to policy, complexity of the policy shall influence to the degree of the transfer. To avoid difficult transfer process, one should (Ibid):

- Avoid program that contained too much goals and objective
- Transfer for simple kind of problem solution
- Look up for direct relation upon problem and solution
- Check up on the perceived side-effect and try to adopt the least complex effect
- Gain more information about program's operation system
- Predict outcome to be achieved from the program

Related to level of policy, constitution is harder to be transferred rather than are policy or operational policy. While past dependencies of one country could not be neglected and supposed to be in line in one another especially in its ideology. With respect to context matter, one should prepare equal institutional capability, financial resources, physical circumstances, bureaucratic capacity and technological abilities. General condition occurs in MSWM are subject to technical transfer, however this study shall not produce recommendation on its technological preference, it will focus on transferring possible idea and concepts which is suitable to the condition in Indonesia.

According to UNEP & WMO[15], basic ideas of transfer are mainly focus on the deployment of locally appropriate technology and minimizing the development of

[15] Derived from an article of Solid Waste Management and Wastewater Treatment published in website http://www.grida.no/climate/ipcc/tectran/528.htm

conventional, ineffective, complicated large waste management in which involving large amount of space, human resources and facilities investment. By doing so, several key issue arise and need to be maintained immediately.

2.5.1 Policy and regulatory development

In MSWM, each local area generates different type of issue, which means it requires different type of operational handling. Thus, practical solutions in MSWM are one difficult outline to construct because it is normally guided by national policy and translated into local regulations. Policy and regulatory development may occurs in two ways, either developing broad idea in a national framework as strategic planning guidance or developing simple and operational document as regulatory framework. *What is to be compared in policy and regulatory development?* Uncoordinated policy from national to local generally triggers inefficient practice. Thus, by comparing national strategy between two countries, it may be possible to derived better MSWM practice.

2.5.2 Innovative financing approach and incentive provision

Second key issue in MSWM policy transfer is innovative financing approach, which is predominantly inefficient. To improve the efficiency of funding in this sector, more investment is not the only solution. To grasp the idea of novel participation of private in MSWM is an easy task to do. On the other hand, it is complicated to implement it. Not only private willingness to join, but also maturity of planning system also determined the success of adopting private involvement (UNEP & WMO). *What is to be compared between host and donor country in terms of innovative financing approach?* As mention above, success story of financing could not be easily, adopt only with more investment. Thus, in terms of financing, comparison are drawn from public investment, private fund, and willingness to pay from the community to pay taxes.

2.5.3 Capacity Building

Capacity building[16] is needed to develop equal societal, political and intellectual sharing knowledge among all stakeholders involved. In MSWM, public responds toward waste has not yet responsive. Most of them pay less attention to the importance of waste and has single perspective that wastes are necessary to be disposed immediately. This attitude getting complex with “not in my back ground (NIMBY)” sense are declining community involvement in MSW management (Ehrenfeld *et al.*, 1989; Rabe, 1991; Lober, 1993; Petts, 1992, 1994a, 1995; Wolsink, 1994 in Petts 1995). In order to pursue novel idea of ideal sharing knowledge, there are a lot of thing to be done. Such as increasing the capability of planners (Louis Albrecht, 1998) or strengthening technical and collective

[16]Capacity building could be define as a process of *collective self-reflection which utilizes skill building, academic study, on site learning and hands on advocacy to empower emerging leaders to address pressing human rights concerns* (Report on Roundtable, Centre of Human Right Study at Columbia University and Banyan Tree Foundation, 2002, http://www.columbia.edu/cu/humanrights/publications/capacity/capacity_03.htm)

activities (UNEP& WMO, n.d). Albrecht asserted that to improve the efficacy of new policy application, planner holds important role and responsibility as a catalyst. In political context, plan document, is means "*more than plan*". It means that plan document is not merely a product but also as one of systemic procedure that need involvement from related stakeholders. To improve sense of collectivity, planners need to do their job by mediation, give assistance, lobbying, informing and listening to public need. By approaching the public, it means than more open process are available for them, thus more support are gained. UNEP and WMO notified that to improve capacity building, more community based program are necessary, assistance and guidance are worthwhile rather than giving too much pressure by lecturing the propaganda of clear and environmentally sound technique. It can be also achieve by approaching the community and giving assistance through various program related to goal achievement.

What is to be compared between host and donor country in terms capacity building? The performances of each stakeholder are necessary to explain capacity building. In particular, each action are supported and legitimated by government rules and regulation. Thus, to reflect capacity building in host and donor country, program and project that exist to support better MSWM are going to be thoroughly reviewed.

In summary, there are important key instruments in implementation of the plan (NEPP, 1989). Those key instruments are divided into two fold, key instrument for analyzing whether general idea implemented in the Netherlands context are suitable for Indonesian case (table 2), and whether technical preferences chosen by the Netherlands is suitable for Indonesian context (table 3). By doing so, expecting output of study is going to direct which is the most applicable policy transfer for Indonesian context, transfer in general idea, or transfer of technical/operational methods.

Table 2 Key instrument in policy implementation

No	Key instrument	Instrument
1.	Direct regulation	General policy guidance Permit system for various activities Environmental assessment Environmental quality standard
2.	Voluntary agreement	Target group approach Action plans or covenant Codes of conduct
3.	Environmental reporting	Public information Requirement reporting from various sectors Self-regulation (for private) Corporate environmental management system Enforcement
4.	Environmental technology	Knowledge and skill of technology Research development fund Application of project
5.	Financial instrument	Waste taxes Environmental taxes Product taxes Price signals Government incentives Private incentives
6.	Social instrument	Subsidies from society Environmental education Intensive campaign for public share knowledge Provision of facilities

Source: Ministry of Housing, Spatial Planning and Environment/VROM (1997)

Table 3 Key instruments in technical comparison

Key Instrument	**Instrument**
Geographical	Adequacy of space Humidity Relief
Financial	Taxes Willingness to pay Public fund
Knowledge	Skill on technology Understanding of waste as resource Sense to environmental protection
Actors	Skilled technician Skilled formal authority Community involvement Private involvement International support Informal sectors

Key Instrument	**Instrument**
Facilities	Incinerator Separate bins Separate temporal site Market for waste Technology for recycling
Regulation	National framework Precautionary principle Prevention principle Polluter pays principle Packaging regulation Sectoral waste review Applicable plan Operational schedule
Institution	Sectoral department Local department Regional department Functional department

Source: Ministry of Housing, Spatial Planning and Environment/VROM (1997)

2.6 Concluding remarks

Theoretical framework of this study divided into three fold. First, it elaborates how waste management is in transitional stage whereas it is followed with changing trend of system boundary, approach, principle and method. According to the latest concept, waste should be re-processed to avoid environmental burden. Since waste should be reprocessed, system boundary of this system is enlarged and involved wider scope. Approaches in waste management are changing from sectoral thought into comprehensive and integrated approach. Principle in waste management transforms into integration of various element into waste hierarchy. While methodology in waste treatment are also varies these days. This changing element within MSWM occurs for environmental calls. From environmental context, latest conception in MSWM is better than previous one. However, environmentally friendly management is not easy to be done. There are many constraints faced by each country to keep pace with world's latest view of better MSWM. Especially for low-income countries, where there are no technology and lacking of managerial skill/knowledge, etc. Thereafter, various alternative solutions proposed to initiate better MSWM. Since changing or waste definition requires changes in maintaining waste, whilst it involves broader scope, thus to change MSWM into better practice, then we should start from reviewing its national/strategic guidance then followed through with detail/operational policies.

Within this study, first proposal is conducting planning process, to give chance for every stakeholder to get involved within an arena for creative solution. Normatively, this type of solution is simple, but in reality there are various element need to be developed to create such relationship. Second alternative solution is defining scale of MSWM to grasp exact service area for each system. To support implementation, development of institutional capacity is necessary in this matter. By doing so, managerial task and duty of government as single provider for waste management is defined clearly. Other proposed solution is supporting action towards conversion of waste into energy with plantation of certain treatment. Although this proposal requires large amount of investment, this solution is effective from environmental perspective. Lastly but yet importantly, is proposal of creating information database for sufficient input data in planning MSWM.

System of MSWM is very broad, therefore, this study delineate its review only in plan, policy, program and daily operation. Indonesia as the study case are going to be analyzed thoroughly compared with the Netherland case using policy transfer method. This method is effective to see whether general idea or operational system from the Netherland could be infused in Indonesian context or not. For further and complete understanding towards theoretical framework of this study, see figure below (Figure 8):

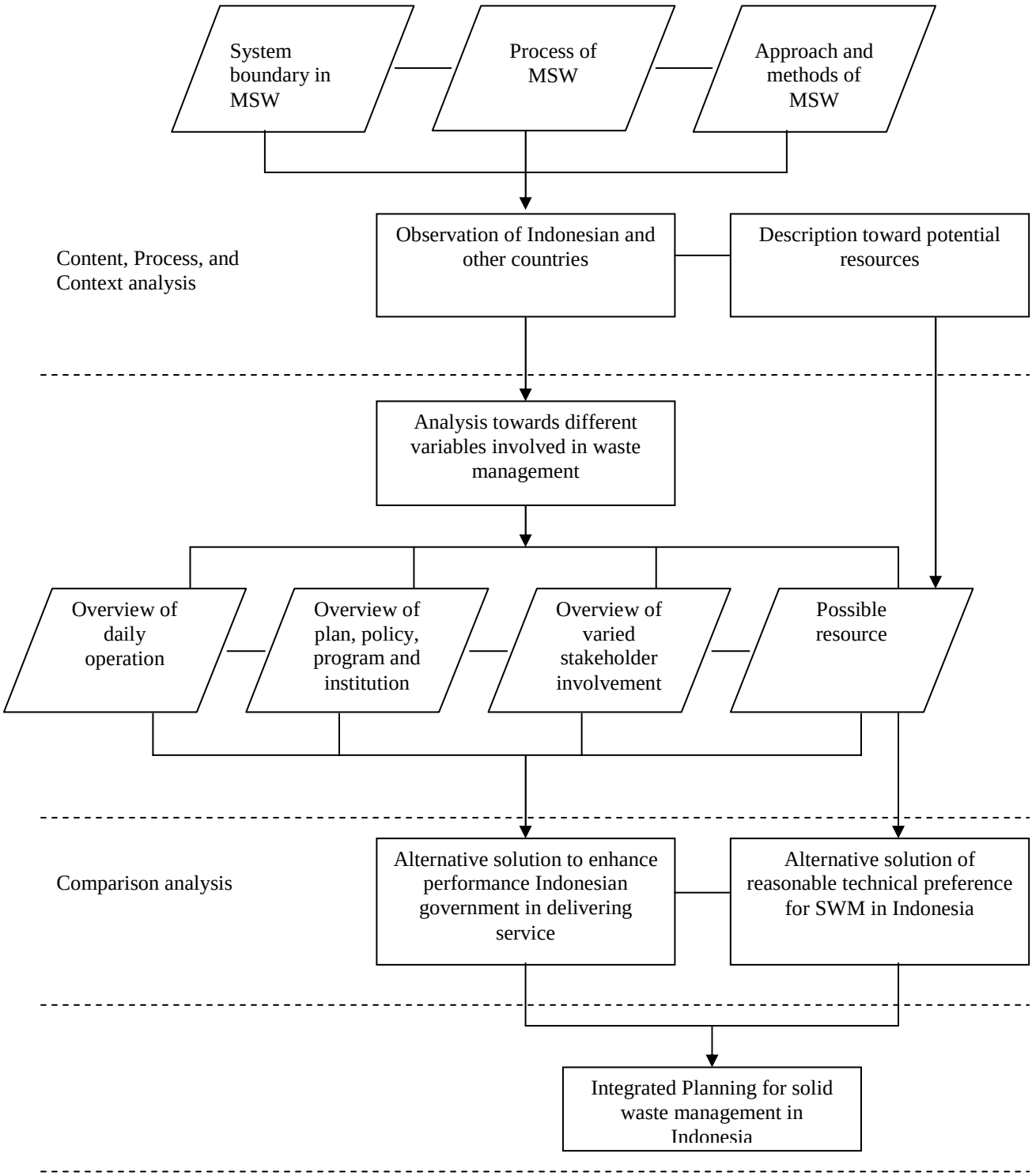

Figure 8 Theoretical framework of MSWM

For more, let us examine first what is the existing condition between these two countries in the following chapter.

Chapter 3

Municipal Solid Waste Management in Indonesia and Netherlands

In previous chapter, an explanation about good waste management is presented. Hence, in this chapter, an elaboration of existing condition in Indonesia and Netherlands shall give wider scope of explanation. At the end, problem reformulation shall be drawn.

3.1 Indonesian Case

As an illustration, there are various event related to waste management occurs and disputable in several areas in Indonesia. At the beginning of 20th century, there are two events, which considerably increased community and government awareness towards municipal solid waste management. It was started in 2001, when final disposal site for Jakarta Metropolitan Area being shut down due to over capacity. According to the data from Faculty of Environmental Engineering, Institute Technology Bandung[17], municipal solid waste production of Jakarta Metropolitan Area is approaching 6,000 tones per day, while capacity of final disposal is limited to 2,000 tones per day. In addition to that, the location of final disposal is outside regional boundary of Jakarta Metropolitan, it was situated in Bogor Regency, an area located next to Jakarta Metropolitan. Dispute over this matter was originated from regional jealousy, which in turn illuminated social movement to reject any further proposal of better treatment in the final disposal site. Local communities reject their area to be developed as new final disposal sites due to unhealthy environment reason and unpleasant odor. After all local community assumed that Bogor Regency do not have the obligation to jeopardize their environment quality due to waste accumulation from Jakarta. From this illustration, it is quite important to notice that waste accumulation in an urban area is no longer a sectoral matter. There are stringent connection with other sector, such as community empowerment and regional coordination.

At the beginning of February 2005, gas explosion emerged in Leuwi Gadjah final disposal site for Bandung Area. Proximity of 30 meters height of solid waste accumulation exploded. The accident affected 140 people died and fifties were missing. Within 1 kilometers range, most of houses in its surrounding area were torn down and covered by solid waste. The inspection toward the accident come up with a conclusion that maintenance in final disposal was not proper, thereafter the explosion happened[18]. From this case, Indonesian government should learn that minimum investment in municipal solid waste management will not lead to security of human health.

[17] The data was taken from http://www/tlitb.org/data.php?jenis=42&id=9
[18] Derived from an article published in http://www.tlitb.org/artikel.php?id=13&jenis=2

Municipal solid waste management (MSWM) is an example of least prioritized infrastructure planning in developing countries. Frankly, it is quite uneven to compare the condition in developed and developing countries if we seeing it from the root and resource background they have. However, let us also examine the resource and potential that exist in developing countries such as Indonesia and try to maximize it by drawing a positive lesson learned from developed countries. Although it might come up with different type of solution, at least, this study will present broader sight for Indonesian planner.

3.1.1 Data of Waste Generation, Waste Streams and Projection

In Indonesia area, more than 60% inhabitant lived in urban areas by 2010, since it has important role for human's activity and able to attract migrant to come (Rudito, et al, 2005). Urban area consists of various demographic characteristic and creates various economic sectors, which often put everything upon environment interest.

Latest document notes that Indonesia with tropical climate consists of 238 million inhabitants[19] concentrated in Java and spread unequally in other four main islands, Sumatera, Kalimantan, Sulawesi and Papua. Based on National Statistic Bureau or BPS 2000, from 384 cities, they generated more than 80.235, 87 tons of waste per day[20]. Projection of waste generation in the next five years reaches $7m^3$/cap/day from present condition of 2-3 m^3/cap/day. More than 60 % - 70% from total waste generation are originated from households and generally organic-waste type[21].

To accelerate recycle program, waste streams identification is important. According to National Planning Agency or BAPPENAS, in 2001, urban area produced proximity 25% dry-waste type, and around 30-40% wet-waste type. The Ministry of Public Works estimated that 70% of the municipal solid waste in Indonesia (1999) comprised of organic waste, 28% inorganic waste, and 2% is in the hazardous waste category. Out of the 70% of organic waste, around 54% (or 38% of the total waste) is easily degradable and has the potential for composting. Furthermore, out of the 28% inorganic waste, and around of 71% (or 20% of the total waste) have the potentials for reuse as material for recycling. Consequently, the estimated potential of municipal solid waste for recycling is reaching 58%. Based on this fact and backed up with climatic condition in Indonesia, which is tropic and high humidity, it is proper enough to be directed to recycling program as solution to MSWM problem.

In Indonesia, projection of urban waste (Lohani, 1985) conducted by means of *sampling analysis*. The methodology of this analysis is by dividing source of generation into seven categories, such as residential, theatre, restaurant, street, office, store and market. Weaknesses of those analysis are as follow, *first*, industrial area are not included; *second*, other activities which may generate waste are also neglected, such as stadium,

[19] The data was taken from this website http://id.wikipedia.org/wiki/Daftar_negara_menurut_jumlah_penduduk (Indonesian version)
[20] The data was taken from this website http://kkppi.go.id/papbook/Penanganan%20sampah%20perkotaan%20terpadu.pdf (Indonesian version)
[21]The data was taken from this website http://www.keluargasehat.com/sekitar-lingkunganisi.php?news_id=804 (Indonesian version)

school, etc; *third,* sampling are sometimes loose in location preference, thus inaccurate measurement lead to mismatch projection.

According to Damanhuri (2005) refuse are not well recapitulated, due to the fact that lack of understanding towards its importance. Number of facilities, such as trucks, personnel, up to date waste generation and source of generation are not well documented. In general, there are two streams of information, first, from government official and second, those researched by academic. Official report, published by government official generally overstated their success in managing waste while their poor performance are researched and stated in non-government and academic journals. Based on this circumstance, planner and decision maker have difficulties in directing development and management.

In summary, related data of waste management presents in Indonesian context, yet sufficient back up data for more advance analysis. In conducting projection over waste capacity, Indonesia still rely on simple methodology. Thus, mismatch projection prevails in this sector. In addition to that, remaining facilities are not adequate to accommodate increasing municipal waste, thus, waste accumulation is unavoidable sights in urban areas in Indonesia.

3.1.2 Plan, policies and programs of MSWM

Within this sub chapter, there will be three major identification, first, conception of environmental planning in Indonesia; second, existing urban management in Indonesia; and third, conceptualization of waste management into planning documents.

Indonesia has built an understanding upon environment terms among development process since 1980s; following decade of sustainable development being discussed globally. Here are the reviews upon environmental management. Firstly, in Act No. 4 Year 1982 about Environment Management, *environment is defined as a whole system consist of human being, non-human entities, man-made entities and social nature which considerably affected the sustainability of human life and wealth include other beings.* Secondly, Act No. 13 Year 1997 about Environment Preservation that replaced the previous act, *Indonesian government has put notation in environment interest since the independence declaration by stating in the Undang-Undang Dasar 1945, section 33 that natural resource exist to accommodate public necessity*. From these two fundamental acts, we can conclude that environmentally oriented planning in Indonesian context is strongly recommended for human benefit (anthropocentrism). Indonesia significantly applies for anthropocentrism planning orientation instead of ecological orientation.

During the 1990s, various policy related to environmental protection are published, such as Act of Republic of Indonesia No 23/1997, about Environmental Management and Environmental Pollution. These acts are starting point in dealing with environmental health and quality of life improvement. Related to MSWM, national level set a standard of service and local level should derived the guidance into operational policy based on each region characteristic. Thus, the national level only give guidance and the detail technical and

operational municipal solid waste handling are in the regional or local level. This top down type was dominating up to economic reformation in 1998. In the late 1990s, Act No. 22 year 1999 was published. It was a mark over the shifting political mainstream in Indonesia from centralized to decentralized system.

Conceptualization towards urban management in Indonesia is not yet as advanced as other countries. Urban management in Indonesia can be described from Keynes (1999) argument about *demand management policies*, where government should set a program to accommodate population growth in urban area. To accommodate community demand over their daily needs, Indonesian government fully intervenes in managing urban resources, including in provision of services. These interventions are full economic interest, but less environmental approach implementation.

With low appreciation to environmental protection and strong anthropocentrism in managing their urban area, Indonesia could not provide better waste management than it should. In Indonesian case, MSWM principles are still relied on *linier thinking* and less awareness toward environmental protection. MSWM are not specifically represented by one policy, it is attached in various acts and standardized by National Standardization Board. The following list shows that these acts also dealt with MSWM.

1.	Act No. 9 Year 1960	:	Fundamental Act of Health
2.	Act No. 2 Year 1966	:	Act of Hygiene
3.	Act No. 11 Year 1967	:	Fundamental Rules of Mining
4.	Act No. 4 Year 1984	:	Act of Contagion Epidemic
5.	Act No. 5 Year 1984	:	Act of Industrial Sector
6.	Act No. 16 Year 1985	:	Act of Mansions
7.	Act No. 9 Year 1990	:	Act of Tourism
8.	Act No. 4 Year 1992	:	Act of Settlement and Housing
9.	Act No. 23 Year 1992	:	Act of Health
10	Act No. 24 Year 1992	:	Act of Spatial Arrangement
11.	Act No. 23 Year 1997	:	Act of Environmental Management
12.	PP No. 18 Year 1999	:	Government Regulation on how to maintain hazardous and toxic waste
13.	PP No. 85 Year 1999	:	Amendment on Government Regulation on maintenance of hazardous and toxic waste
14.	PP No. 74 Year 2001	:	Government Regulation on hazardous and toxic waste
15.	SK-SNI S-04-1991-03	:	Decree of waste generation specification for urban classification in Indonesia
16.	SNI 19-2454-1991	:	Decree of technical maintenance for waste based on urban classifications
17.	SNI 03-3241-1994		Decree of technical method in location preference for final disposal sites

18.	SNI 19-3964-1994	Decree of sampling method and measurement of waste generation and its composition

Focus of attention in waste management generally attached to the effort of creating aesthetical urban area and not underpinning the importance of healthy living environment. Recent focus in waste management is shifting to prioritize environmentally sound management within urban agglomeration and eliminate environmental pollution (Design Report of Public Works Department, 1994). Forecasting and identification of waste streams are conducted in each local level in order to plan operational maintenance. Plan document contain several identification of waste streams, its projection over four-year period. Each local area is competent to develop local plan and design report of final disposal sites.

Local areas are free to create their method in MSWM as long as it has coherence with national guidance. Local area carries responsibility to create institutional organization that deals with waste management and still have to find a way to upgrade retribution and regulate citizen role in participating within this subject. All of these issues are regulated in Local Regulation or Governor Decree. However, most of all local regulation never mentioned any cross administration cooperation, which in practice are definitely occurs. As we all know, final disposal are generally located outside urban area and lied down in a suburban area that generally had different level of administrative jurisdiction. Inequalities and social jealousy are increasing due to the impact posed to suburban area, this surely need more attention and institutional support so that there will not be any further conflict. At the end, Indonesia could not provide enough institutional support and focused guidance of MSWM handling, either in its national or local institution.

From the illustration above, we may draw an assumption that Indonesian MSWM plans and policies are not directed to recycle program or not oriented to minimize waste from its resources. Waste generator are not subjected to minimize or sort their waste; and there are no fine explanation which shown on how to educate the community about the importance of waste sorting or recycle process or zero waste program. Although waste management are handled in a cross sectoral methods, most of policy published shown that Indonesia focus on how to get rid of waste, without further consideration of the inefficiency of transporting, collection and haphazard maintenance in disposal sites.

Despite government regulation and national standard, there are a lot of program being carried out in Indonesia to support clean environment action. Most of the programs are funded by international corporations or directly gain international fund from other countries. According to the table shown below (see table 4), most of areas in Indonesia received international fund in order to accelerate program on maintaining urban area from waste accumulation and further environmental deterioration. Compare to amount of money invested by government, these programs generally received larger amount. Programs to be implemented are varied from education, training, working group on recycling, local environmental committee, and others. However, more than one international fund is more interested to invest in metropolitan area (Jakarta, Jabotabek and West Java).

Table 4 International aids on waste management for Indonesia

No	Program	Loan (Billion Rp)	Assistance Fund	Total
1	Asian Development Bank			
	EJ-UDP	5,595	9,867	15,462
	Sumatera-UDSP	65,618	14,536	80,154
	West Java-UDSP	5.432	6,970	12,402
	Metrobatabek-UDP	22,840	33,878	56,718
	Metromedan-UDP	28,875	2,639	31,514
2	IBRD			
	SSUDP	12,782	15,906	28,688
	Kalimantan-UDP	7,841	31,713	39,194
	2nd East Java-UDP	18,548	40,643	59,191
	Sulawesi-UDP	34,725	3,108	67,833
	Bali-UIP	17,028	70,810	87,838
3	OECP/JBIC			
	Jakarta-SWM	54,545	12	54,557
	Surabaya-UDP	4,198	413	4,160
	Sector Program	182,806	0	182,806
Total		551,037	452,674	1,003,710

Source: Departemen Permukiman dan Prasarana Wilayah (Department of Public Works), 2002 in Suyono Dikun, 2003 pg: 508

Dikun (2003) and Damanhuri (2005) mentioned in line arguments about insignificant result of those programs. Because waste management is not an interesting and beneficial sector, it may seem neglected and less important to other project being carried out by the government. Fund allocation and program existence are often disputable and give less assurance especially in transparency. More involvement from private sectors are also fail due to lack of interest. In short, large amount of financial aid given by international organization are not giving much help to provide adequate MSW service to Indonesia.

Other international fund such as UNESCO also creates programs PKLH (Program Kependudukan dan Lingkungan Hidup) or Demographic and Environment Program and PLKJ (Program Lingkungan Kehidupan Jakarta) or Jakarta Living Environment Program to help government to promote community involvement in achieving healthy environment goals since 1999 in Jakarta area. These programs focus on educating teachers and assistance in education environment from all over Indonesian local area to introduce the importance of healthy living environment. They are trained to been able to assist student and community to be more aware to their environment by simply throw garbage into garbage bin and sort it out based on organic and an-organic refuse type; or save the river from waste accumulation. Different types of program generally sectoral, in particular deal with certain activity especially for traditional market such as PROPASIH (Program Pasar Bersih) or Clean Market Program.

In Bali, MSW involved such unlimited stakeholders starting from homemakers, students, and pilot by non-profit organization IDEP supported by UNDP[22]. Their constraints are limited infrastructure and pollution along seashore due to waste accumulation. Thus, programs are directed to sort waste from households, emphasize on education of zero waste importance and recycle procedure, and create seashore protection from waste dumping.

Campaign to minimize waste also conducted by WALHI, one of the biggest NGO in Indonesia that concern on environmental protection[23]. Their focus is directed to the relation of changing life style and waste accumulation. WALHI shout that changing consumption and live with more humble and simple way is better than being consumptive. It is quite difficult to change one's life style, thus their aim are encourage government to create act or policy related to packaging and polluter pays principles.

Although, there is huge amount of money invested by international agencies to help Indonesia to create better MSWM through various programs, in practice, programs are also not well implemented due to lack of national encouragement and low community awareness towards the importance of clean environment. Adipura, as one of the most prestigious award for cities in Indonesian area, that fulfill the criteria as an aesthetically clean and healthy are only work out as bribery arena. Local area who would like to get the award may easily bribe their superior and provide clean area for only a week of so at the judgment time. Other program such as education and assistance are more or less working out slowly with full responsibility from non-governmental organization (NGO) or community-based organization (CBO). Thus, more programs are better handed over to NGO or CBO instead of local authority. It may argue that Indonesian context could not easily transfer it within short duration of time, it may need longer period of time.

Summarize from the explanation above, government's will to provide better service in MSWM are not adequate yet. Their efforts were less environmental friendly, inefficient and lack of consideration to sustainable management of MSW. Most of their focuses are hampered by limited human resources, facilities and funding. Insufficient national support to local level in operating system hindered local level. Every local area suffers from specific issues and could not easily categorize. This condition surely requires particular maintenance and without any doubt need enough sharing knowledge and resources. Guidance in MSWM is not enough; not to mention immediate change in administration system (from centralization to decentralization) had more or less impacted local area in preparing their instrument.

Lacking of institutional support in MSWM is not the only constraint. Although Indonesia receive abundant international fund, this condition are not guarantee better performance in MSWM services. All stakeholders are needed to cooperate and take responsibilities in this matter. Without cooperation and coordination, community in general and informal partners that fully dependent on this sector shall lack of support and may gain difficulties in future.

[22] Taken from an article published in this website http://www.idepfoundation.org/indonesia/idep_waste.html
[23] Taken from this website (Indonesian version
http://www.walhi.or.id/kampanye/cemar/sampah/peng_sampah_info/

3.1.3 Daily Operation of MSWM

After reviewing on how Indonesian government portrait their stance in MSWM, let us review the daily operation. Actual expression of MSWM planning document and its practice is currently different. Although government are responsible for delivering service, in its implementation non-formal sectors contributes better. The following table indicate on how government performance in maintaining municipal solid waste. There two type of waste management information, the one published by government, and the other is the result of academic research (see table 5 for information published by government and by academic research). From both table we can derived an assumption that information provided by government contains better story in MSMW handling, while worsen performance of government is presented in the next table.

Table 5 Waste Handling in Indonesian urban area

Source	Transported to final disposal (%)	Not properly transported to final disposal (%)				
	Collected	Buried	Burnt	Composted	Riverside	Others
BPS, 1999	11.25	63.35	*	6.35	19.05	*
Bappenas, 2000	42	*	37.6	*	4.9	15.5
Bappenas, 2003	40	7.5	35	1.6	*	15.9

Source: Damanhuri, 2005; JICA, 2003; Wibowo and Djajawinata, 2000; and research analysis
* data not avalaible

Bappenas claimed that 40% waste could be transported to final disposal in 2005, while BPS claimed only 11,25%. Both department are government authority, still provide different information which lead to confusion. Percentage of waste, which is not properly transported, is approaching 64% (according to BPS) but in contradiction, Bappenas stated that there only 35% waste being burnt down. In addition to that, this study provides information about MSWM collection system from academic research conducted by Wibowo and Djajawinata (2000)[24]. They asserts that amount of municipal waste transported to final disposal in 2000 is only 42%, burnt down reach 37.6%, threw to riverbanks 4.9% and improper treatment up to 53.3%. While in recent research, more than 35% waste generated in urban area are handled by local community by burning (35%), burying (7.5%), composting (1,6%) and approximately 40% waste could be transported to final disposal (Damanhuri, 2005).

[24] http://kkppi.go.id/papbook/Penanganan%20sampah%20perkotaan%20terpadu.pdf

From total 384 cities in Indonesia, only 32% from total urban area have access to proper waste management (Wibowo and Djajawinata, 2000). Most of waste management especially those located outside Java is not well managed (Dikun, 2003) (see table 6). Generally, assumption toward availability of space still dominated in community perspective. It may be assumed that as long as there is vacant land it still be able to dump their waste everywhere freely. Low percentage of service in MSWM handling impact directly to health and environmental issues, such as source of disease, contagious virus, sedimentation in river side due to accumulated waste and drainage stoppage which in turn may lead to flooding.

Table 6 Modes of MSWM handling in Indonesia 2001

Region	% Collected by System to FD	% Mode of handling by community			
		Dumping	Composting	Burning	Others
Sumatera	28.47	2.79	0.66	50.28	17.80
Java and Bali	43.13	8.90	2.01	32.78	13.19
Kalimantan	32.81	4.96	0.22	38.49	23.51
Sulawesi	40.44	5.47	0.22	31.18	22.69
Others	29.76	3.24	0.45	33.94	32.61
TOTAL INDONESIA	**40.09**	**7.54**	**1.61**	**35.49**	**15.27**
West Indonesia	40.77	7.91	1.79	35.59	13.93
East Indonesia	34.95	4.74	0.28	34.68	25.36

Source: Damanhuri, 2005; JICA, 2003 and research analysis

From the table, information availability in Indonesia is not enough. It may absurd, but this fact lead to confusion of planner and decision maker. Most of final disposal sites in Indonesia are open dumping, where none of them completed with human health or environment protection. According to World Bank Report on "Pemantauan Lingkungan 2003" (Environmental Watch 2003), more than 85% of small cities in Indonesia and 53% average cities applies open dumping (off site treatment) as final treatment for municipal waste[25]. Final disposal generally representing regional boundary (*regional system with single specific approach)*, thus synchronization of managerial municipal solid waste are needed among these departments.

Measurement towards capability in transporting waste was contained to plastic bag (0.6 m wide and 0.9 m long), temporary disposal tank made of steel (1m deep, 1 m long and 0.5m wide) and trucks with capacity of 4 m^3 up to 8 m^3 with compacted waste. With amount of waste projection 7m^3/cap/day in the future year and truck capacity capability in transporting waste, Indonesia might need to supply equal amount of waste facilities as much as their population amount. It may be absurd and illogic, thus, Indonesia need to have good MSWM system with less expectation over transporting waste to be maintained in final disposal, otherwise, Indonesia shall need to invest large amount of fund to supply adequate facilities.

[25] Taken from this website (Indonesian version)
http://siteresources.worldbank.org/INTEASTASIAPACIFIC/Resources/Indonesia-03-(Bahasa).pdf

In addition to that is inexistency of data about scavenger. With prominent roles of non-formal sector to separate waste, Indonesia did not put slightly attention over this sector, not even concern to identify their existence. Generally, data over scavenger was merged with data of social welfare, where local government identify those who had live in improper condition, such as scavenger, unemployment, homeless people, etc. Only few of local government identify their community, for example Yogyakarta, which identify that in 2003 there are almost 1,200 people working as scavenger, and in 2004 there are improvement over 18% (1,400 people) working in the same field. With this limitation of scavenger, their role and efficiency in sorting out of waste accumulation had been categorized better than formal actors, which supported with government facilities (Recapitulation of potency and social welfare source)[26].

According to government standard (SNI 19-2454-1991) criteria to assess MSWM operational service are based on the following factors: tools usage, number of isolated waste from the environment, service frequency, sweeping frequency, esthetic, urban type, spatial variation of service, retribution and income; and periodic waste accumulation. Selection towards final disposal area are guided based on second government standard on MSWM (SIN 03-3241-1994), which mainly discussed that the criteria are divided based on regional and detail assortment. Most of all technical guidance are involving geographical condition and distance from urban centre.

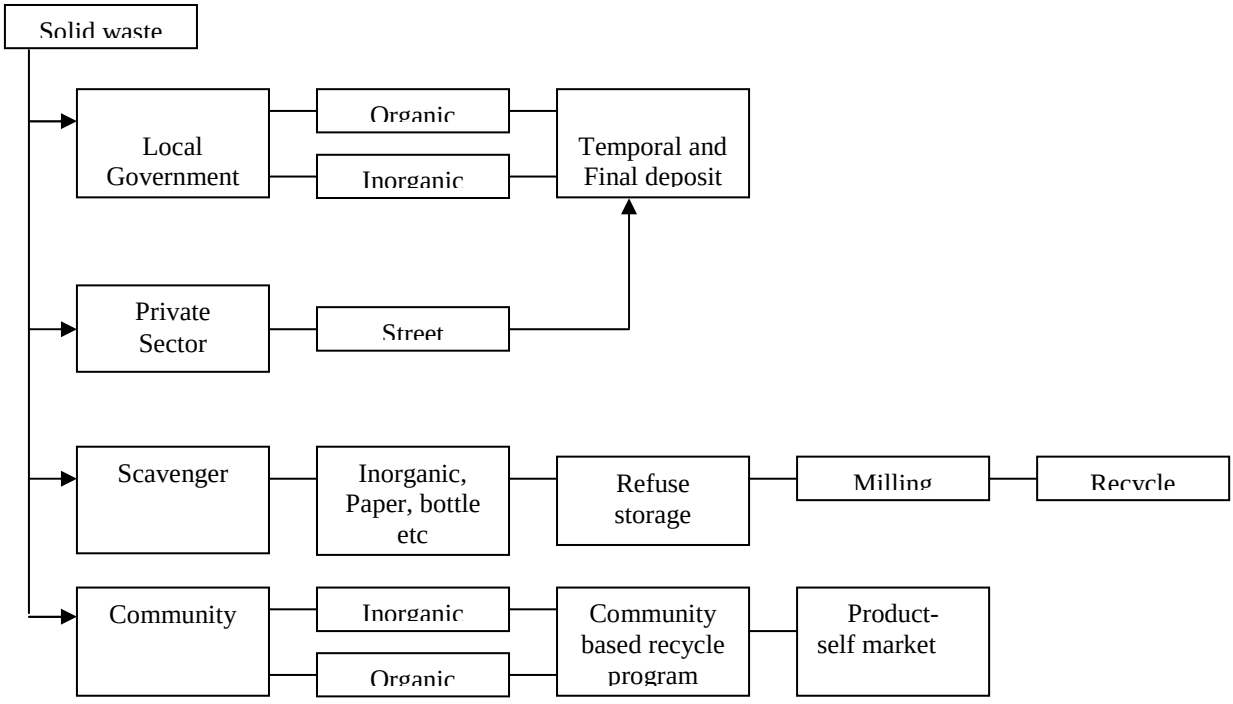

Figure 9 Waste handling according to stakeholder involvement (source UNESCO, 2000)

[26] The data was taken on Indonesian version of Recapitulation of Potency and social welfare source in Yogyakarta, 2004, http://64.233.183.104/search?q=cache:3FlqSZ1Wv0cJ:www.bapeda.pemda-diy.go.id/uploads/artikel/9/85_Data%2520PMKS%2520%2520Tahun%25202003%2520dan%2520potensi%2520Sos-tampil.doc%3FPHPSESSID%3D1df91ecdd3e85d264a1d227a23011608+data+pemulung&hl=nl&gl=nl&ct=clnk&cd=3&client=firefox-a, (June, 2006)

In previous figure, each stakeholder place different handling method towards different kind of waste. However, at the end of the process, most of all end up with similar action, that is in temporal or final deposit or riverside. Each activity also had different method of waste collection. Household waste collected in different way with those in waste from traditional market, or street waste.

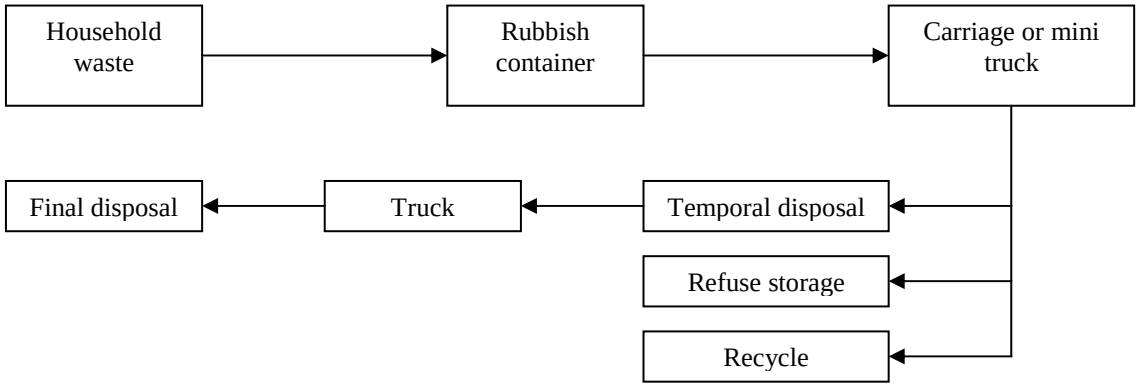

Figure 10 Household waste handling (source UNESCO, 2000)

Normally, households store their refuse without sort out in a rubbish container outside their house (see figure 10). Every once or twice a week, waste picker collect it into a mini truck or carriage. Waste picker generally not those who work for City Cleanliness Department, but an informal waste picker who sort out waste to sell it out to "*lapak*" (refuse storage) and intermediary. For street in residential area, each household are responsible for removal of any solid waste, while in major road, formal actors are responsible to sweep the street everyday.

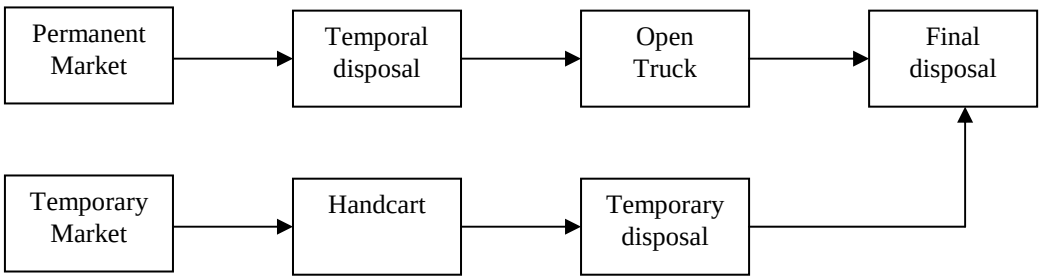

Figure 11 Traditional market waste handling (source UNESCO, 2000)

Traditional market in Indonesia generally creates pile-up waste in a great amount each day. This phenomenon urged the government to create an institution that shall deal with this issue. There are two type of market, permanent and temporary. It is distinct based on its scale of service. Waste accumulation is greater than in temporary market. Permanent market has specific formal institution that regulates the circulation of waste, namely Market Authority.

Generally, permanent market provides a temporal disposal to pilling up waste. They provide direct transportation to final disposal using open truck. At the same time temporary market are also picked up, but in a little bit different way, because these facilities are not completed with temporal disposal. Cleaning department support waste handling by providing formal personnel using handcart to carry waste to nearest temporary disposal and at that area, open truck pick it up to final disposal. These types of maintenance are generally similar with other commercial or business areas, in which level of service determines type of waste handling.

In reality, traditional market has created too much nuisances with its waste accumulation. Let us look at the case of Bandung City and Jakarta Metropolitan Area. Most of metropolitan area in Indonesia suffers from poor waste handling, due to the fact that transportation to final disposal, which is not on time. This delay has worsened the condition, either because of lack of truck capacity, lack of formal personnel or inefficient transportation routes. This inefficiency has lead to more complicated condition of MSWM since the government had low budget for this sector and the community still could not afford proper waste tax.

From this point of view, we can derive an understanding that municipal solid waste handling in Indonesia is poorly managed if we define it from new waste handling paradigm, and still hold on tight to traditional system. It is clearly seen from the table that recycle are only in low percentage. MSWM in Indonesia still applied traditional approach, where focus of attention is in transporting waste into dumping system (off site treatment). Local household waste was collected in temporal site by the community and wait for turn to be transported to final disposal site by municipal authority. Most of all final disposal sites are located outside jurisdictional boundary of urban area, thus maintenance of disposal site requisite an intra-institutional integration among jurisdiction area.

3.1.4 Performance of MSWM Stakeholders

According to the data above and report from UNESCO (2000), most of waste handling is conducted by the community itself. In Indonesia, dominant actors are local government represented by City Cleanliness Department. City Cleanliness Department exists in each municipality or local area. Primary responsibility of this department is creating a clean, well-regulated and healthy living environment in urban areas. Other task and duty of this department are as follow:

a. Set up technical solution and program for municipal cleanliness
b. Provide solid waste management system and sewerage especially in isolated area
c. Provide supporting facilities
d. Set up program in approaching the community through technical assistance, campaign and socialization
e. Monitoring waste streams
f. Publish recommendation and permit towards industrial or economic activities that contribute to more waste accumulation
g. Ensure that the community pay taxes and retribution of waste management
h. Community empowerment by education

Despite the existence of City Cleanliness Department in each local level, national institution (Ministry of Environment) also exists and has responsibility to set up strategic plan and guidance with less binding power for MSWM. Other official who involved are Department of Public Works, National Standardization Board and Market Authority. Department of Public works set up regulation related of waste handling in other facilities development. National Standardization Board set up national standard for waste handling. Both Department of Public Works and National Standardization Board are in national level. Market Authority in local level is responsible for waste management in traditional market, commercial and business areas. Those represent the government generally called formal actors, while those who had no institution or organizational group such as scavenger generally called informal actors.

The rest of the actors are the community, non-governmental organization (NGO), community based organization (CBO) and private sector. NGO put fierce efforts in building community understanding about healthy environment. Prominent NGO in Indonesia eventually gain international fund to accelerate the process of creating healthy environment to live in by separating waste from its source. Programs that supporting recycle generally set out by NGO and CBO, whilst the government seems have less intention in doing so. Other efforts are creating a community-based organization with full assistance in recycling and composting project. This project generally absorbs funding from World Bank, UN, or other international fund.

Despite full responsibility from the government and assistance by NGO and CBO, the community also hold significant task in MSWM. Some of them create an environment committee to address their local waste issue (in municipal level, neighborhood or smaller unit). The role of the scavenger who collect and help the society and the government in separating waste are important to be noted and consider as potential resource. These informal actors generally create their linkages with middleman who will bought their sort out waste and directly hand in to *lapak* (refuse storage) or those who accept second hands stuff.

Number of available human resource within MSWM is often unavailable. Instead of effort on national compilation, each local area compiled their resources only in terms of formal data with no updates. Number of scavenger are also not being noticed, since survey towards those groups of community sometimes left aside their source of occupation and only categorized as poor family. Informal sectors (scavenger) have enormous effort in helping the community in sorting out waste. Based on an article, Leuwi Gadjah final disposal site comprises more than 600 scavengers per day working together to sort waste[27]. Although, numbers of scavenger are enormous, only small amount of recyclable refuse are processed into compost or collect it to temporal disposal. Their difficulties are how to market either their product, those made into compost or other product. Other difficulties are quality constraint, which still lack of competence with other brand new product in free market. Marketing constraint is definitely faced by those who had the intention to do business in recycling without further support from the government. Continuity and availability of funding are also major constraint in post-recycling process.

[27] Taken from an article from http://www.pikiran-rakyat.com/cetak/0504/25/0106.htm

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Existing condition of MSWM in Indonesia is fully prepared by formal sector (public service) with less participation from the community and even private sector (UNESCO, 2000). Wilson, Whiteman, and Tormin (2001) asserts that waste management is a public good[28], thus government institution has the responsibility to assure that service are delivered to the public, well-managed and cope service area. In fact, international organization such as UNESCO, World Bank, IMF, Japan International and other international group also play significant role in investing their fund in program and project of MSWM in Indonesia to promote healthy environment. However, failure in delivering proper service in MSWM has not been able come up with solution yet. To describe failure of privatization in Indonesian case, this study shall give an example of a case.

According to data from Badan Pembinaan Koordinasi dan Investasi (Coordination and Investment Board), City Cleanliness Department of Jakarta Metropolitan Area had once sign up a contract with international private sector to sell waste to be proceed into energy and fertilizer/compost. Due to inexistency of technology, the international private sector willing to provide it and buy Jakarta's waste to be input of this process. Afterwards, international private sector that produces energy/power of electricity has the right to offer electricity to those who need source of power. Due to political reasons, this contract was aborted. Abortion of the contract was indirectly link to protest from Perusahaan Listrik Nasional/PLN (National Company for Electricity), that unwilling to compete with future electricity provider from private sector. According to PLN, it is only right if provider for energy/power is originated from the government. Therefore, with strong sense of this type domination, privatization of waste management is yet succeeded.

Derived from an explanation in previous chapter is that private involvement may become possible solution, if only there were adequate institutional and political support. Private sectors are generally able to provide effective and efficient waste collection and transportation at lower cost. However, from policy instrument and political support that related to MSWM there are not enough support in private involvement.

3.1.5 Political Condition in Indonesia

According to the theoretical framework argued by Schubeler (1996), to grasp understanding over MSWM, political overview is important. Apparently, major political changing occurred in Indonesia since 1998. Since economical crisis stroked Indonesia in 1997, sense of government transparency was illuminating. For almost four decades, Soeharto, the former president, ruled in Indonesia with strong sense of centralization. National welfares were totally controlled by politician and there were no transparency at all. Sense of corruption and clientilism was prevailing during Soeharto era. With strong command and control type from central government, which is located in Jakarta, as the

[28] Common (or Public) Goods are defined as commodities or services whose benefits are *not depleted* by additional users and for which it is generally *difficult,* if not impossible, *to exclude* people from its benefits even if they are unwilling to pay for it. People who use public goods without paying for them are called *free-riders.*

capitol of Indonesia, most of infrastructure developments were compacted for beneficiary of Jakarta and its surrounding area, within Java Island. Due to the circumstances, inequality to access infrastructure development in outside Java, were very limited and environmental degradation in Java were decreasing vastly. In previous practice, most planning document were formulating on how to maximize natural resource for human sake. Anthropocentrism were prevailing in environmental planning in Indonesia, whilst at the same time, world attention to sustainable development has been illuminating.

After Soeharto resigns, Indonesia committed to change its governmental system into better practice, with full expectation that there will be good government. Strict monitoring from international organization towards Indonesian condition has caused this country to accelerate better practice in its governmental system. In 1999, the government decides to transform centralization into decentralization type. Most of infrastructures management is handed over to local jurisdiction. Local jurisdiction has more power to determine what resources should be maximized and what should be least prioritized. Nevertheless, central government still monitors the performances of local government by giving national guidance. Normally, local government are obedient towards what national government aimed to achieved, otherwise central incentives to infrastructure development in local area are cut, and probability to be included in national agenda are limited.

Until now, after almost six years struggling with transformation of political system, Indonesia still not yet succeed in implementing decentralization. Local government is not yet bear with local constraint such as managerial skill, human resources, and financial aids. On the bright side, non-governmental organizations are more than once took place in helping out government in initiating program and empowering community in planning process. In summary, due to instability of political condition, shifting in MSWM is possible to be conducted, although it requires lengthy process and consume more time.

3.1.6 Possible potential resources

1. Technically, potential resources of MSW in Indonesia are affected by humidity and its climatic condition, which is supportive for recycling process and composting.
2. Financially, potential international fund in Indonesian area are abundance and supposed to be encouragement to provide and encourage national government to create more support to minimization of waste accumulation
3. Socially, human resources in Indonesia especially informal partner (scavenger) are one of the potential resources to expedite recycle program and waste minimization. NGOs and CBOs are other potential tools to accelerate community-sharing knowledge in seeing the importance of healthy environment.
4. Politically, local authority are free to determine their operational system in MSW, thus they should come up with creative solution which is not fully relying to national incentive and supposed to be ready to empowered their community for their environmental sake.
5. Instrumentally, although policies in MSW are not created solely, the inter-sectoral policies are potential as an input to create sustainable MSWM guidance.

3.2 Netherlands Case

The Netherlands is one of the most outstanding countries in planning realm. The limelight of planning practice directed to this country because this country had striving hard to overcome their physical condition. In the Netherlands, municipal solid waste disposal had been reviewed with national or local policies, plan and program; and committed to various international treaties on environmental protection. Elaboration within this sub chapter is mainly focus on the operational and supporting rules and regulation exist in the Netherlands.

3.2.1 Plan and Policies in the Netherlands

Over the last thirty years, substantial changes over waste management profound in the Netherlands. In addition to overwhelming support towards sustainability concept and significant influence of EU Regulation, tension over public participation, open planning process and availability of regulatory and non-regulatory instrument is highly prioritized in the Netherlands. Rising attention of environmental protection challenges national government to provide integrated and collective action in development process. Within this subchapter, there will be an explanation about changing policy in Dutch context. The explanation is divided into three eras, 1960s-1980s, 1990s and recent condition.

Recent condition in the Netherlands presenting recycle and incinerator as dominant methods while it goes in the opposite direction for landfill method, which is declining in its usage (VROM, 2001)[29]. Incineration is preferable rather than landfill, although incineration also put stress to the environment with its polluting fumes. Presumably, this method is highly expected to produce recovery energy. Ouwerkerk (1999) asserted in his speech, that trend in waste management at this era were directed to achieve target for waste prevention and waste recycle and securing sufficient capacity for disposal of the remaining waste. These goals are derived from unbearable task, which is still in process from three decades ago.

At the beginning of the 1960s up to 1980s, national authority set up sectoral plan to deal with environmental problems (VROM, 2001)[30]. During this time, approach in waste management policy in the Netherland still held tight towards traditional "*end of pipe*" solution (ibid). Ultimate goals are maintaining the quantification of waste confronted with carrying capacity of final sites (landfill). To accommodate goal, there are two important policy documents on waste management at this era, first, Chemical Waste Act (1976) and second, Waste Substance Act (1977). Focus of issues within those two documents are the importance of delivering clean and healthy living environment especially from hazardous waste and prohibit application towards land-filling system. A general review from VROM (2001) asserted that sectoral approach were not succeed and less effective. The Netherlands urge for another regulatory-non regulatory instrument to support their goals.

[29] Ministry of Housing, Spatial Planning and Environment (VROM), 2001, Fact Sheet of Incineration: Waste in the Netherlands, [http://international.vrom.nl/docs/internationaal/04incineration.pdf]
[30] Ministry of Housing, Spatial Planning and Environment (VROM), 2001, Fact Sheet of Legislation: Waste in the Netherlands, [http://international.vrom.nl/Docs/internationaal/02Legislation.pdf]

Thereafter, at the beginning of 1980s planning on waste management were directed to more integration with other environmental issue by publishing national guidance Environmental Protection Act (EPA). Waste problem were maintained with consideration towards other environmental problem. Ouwerkerk (1999)[31] underlined that the situation at the end of 1980s, encouragement to reduce land-filling system are still in poor condition, hence there are no adequate planning tool that support the idea of recycle. To prove inefficient practice of landfill system, national government creates projection over disposal infrastructure and space needed in the forthcoming years. Forecasting method proved that space availability in the Netherlands is limited and disposal infrastructure are only sufficient for short time. Thus, large amount of investment are needed, as well as space requirement.

Therefore, national government decided to review their planning direction. In doing so, waste management is also being extensively reviewed through 1st National Environmental Policy Plan or NEPP (1989) and 2nd NEPP (1993). Waste management in 1st NEPP was derived from these following principles (Second Chamber of State General, 1988; VROM 1997)[32]:

1. Stand still principle or baseline principle (assumption that the environmental quality may not deteriorate unless there are particular effort to avoid it)
2. Abatement at source principle or source oriented principles and utilize effect-oriented quality standards. Source oriented principle are divided into three fold. First, emission oriented measure (directed to technological provision to reduce emission without changing the process of production and consumption); second, volume oriented measure (legal and organizational measure to reduce raw material and product without changing the process of production and consumption); and third, structure oriented measure (structural change to help change of process production and consumption). While effect oriented quality principle aim to provide assumption that although environmental quality had been deteriorate, still mitigation are important tool to save the environment, however, the result shall not appears in short period of time, it need long term period. Although, long-term period is needed, on the bright side is that this principle may lower social cost.
3. Polluter pays principle
4. Prevent unnecessary pollution principle
5. Application towards best practicable mean principles
6. Isolate management and monitor non-treatable waste disposal principles

To implement these principles, national government was adopting integrated approach, internationalization and self regulate target group within framework act and provide long term planning.

[31] In European Commission's Directorate General for Environmental, 1999, European Conference on Waste Management Planning [http://ec.europa.eu/environment/waste/plans/conference.htm and http://ec.europa.eu/environment/waste/plans/pdf/conference_en.pdf]

[32] Second Chamber of State General, 1988, National Environmental Policy Plan: To Choose or To Lose, Minister of Housing, Physical Planning and Environment, The Hague, Netherlands

Ministry of Housing, Spatial Planning and Environment (VROM), 1997, Environmental Policy of the Netherlands: An Introduction, The Hague, Netherlands.

In 1993, 2nd NEPP assert that all environmental objectives stated in the 1st document are attainable, but lacking of measurement, unclear task and duty division among stakeholders, lacking from supporting infrastructure and less community involvement (VROM, 1997)[33]. Thus, EPA as the product of integrated environmental policy are yet completed with measurement and detailed regulation. Thus, to implement one of the principles to monitor and applied towards best practice, EPA was amended into Environmental Management Act (EMA) in early 1990s (ibid, 2001)[34]. Based on 2nd NEPP, to intensify implementation, there are three aspects need to be fulfilled, such as willingness to achieve target, investment to provide information and facilities, and empowerment to target groups.

EMA (1993) as the result of planning process comprise of various principles as stated above and supported with adequate regulation and measurement. In waste management section, it is explained how to approach waste management based on Lansink's Ladder. Lansink's Ladder, similar to waste hierarchy, comprise of in-order-principle such as, prevention, design for prevention and beneficial use, product recycling (re-use), recovery for use as fuel, disposal by incineration and disposal to landfill. Based on the ladder, the Netherlands had shifted their approach from traditionally "end of pipe" solution into innovative approach. This ladder actually had been acknowledged in 1985 however this ladder could not be easily implemented. National government slowly introduced to the community by legalized it through EMA in 1993 and put the ladder into practice. Despite application to Lansink's ladder, EMA also noted few important themes such as:

1. Strengthening support towards prohibiting landfill/dumping and using it only for those discarded material which could not be easily recycled
2. Directing community behavior by giving responsibility to transfer waste in a specified manner
3. Directing private sectors, such as company and industry to separate different type of waste streams, transfer them separately or process them in an "in-situ" manner.

As one of the framework act, Environmental Management Act contain regulation and measurement that need to be translated into detailed regulation so that the idea could be easily implemented in provincial or municipal waste ordinance. There are few decrees supporting the implementation of EMA, such as (VROM, 2001)[35]:

1. Decree of Designation of Hazardous Waste
2. Decree of Air Emission
3. Decree of Waste Substance
4. Decree of Batteries Disposal
5. Decree of Car Tire Disposal
6. Decree of Waste Oil Collection

[33] Ministry of Housing, Spatial Planning and Environment (VROM), 1997, Towards A Sustainable Netherlands, The Hague, Netherlands.
[34] In VROM, 2001, Fact Sheet of General Policy on Waste in the Netherlands, [http://international.vrom.nl/docs/internationaal/01GenPolonWaste.pdf]
[35] In VROM, 2001, Fact Sheet of Legislation: Waste in the Netherlands, [http://international.vrom.nl/Docs/internationaal/02Legislation.pdf]

7. Decree of Landfill
8. Packaging Covenant II

Other supporting regulation are directed to provincial authority, in which each provincial government should provide general operational guidance for collection, decline or ban export of hazardous waste material from other province and monitoring private sector in maintaining their hazardous waste.

3.2.2 European Union Plan, Policy and Program on MSWM

Despite national regulation, the Netherlands experiencing two significant events as an impetus in determining their environmental policy sequence (VROM, 2000)[36]. First of all, United Nation World Environmental Conference 1972, in which global impact to the environment became the main issue. Second of all, Brundtland Commission Report 1987, in which recognizing the importance of sustaining natural resource for longer term of period. At the end of 1980s, common sense towards sustainability was rapidly growing and requirement to provide integrated approach are also become fundamental ground in developed countries. According to the explanation above, at 1980s the Netherland committed to these international treaties by changing national policy from sectoral into integrated.

EU published a directive in 1991 (European Commission Directive 91/156). Through this directive, EU proposed to all member states to compile national waste management plan to assure self-sufficiency (Ouwerkerk, 1999). To attain self-sufficiency, member states were supposed to ensure that there should be enough incinerator capacity for existing waste generation. Ensuring waste incinerator capacity requires large amount of investment, thus, not all of member state able to fulfill that condition. In order to fulfill EU Direction, the Netherlands published Best Available Technology (similar to best practice or national guidance). Furthermore, stated in BAT that the Netherlands committed to EU Directive although national government had difficulties to ensure long term self-sufficiency due to lack of funding, however, this EU Directive are prepared based on the stakeholder responsibility. Public sectors are responsible for municipal waste and producers are responsible for commercial and industrial waste. At the end of 1990s, European Commission published EU Landfill Directive in 1999 (Davoudi, Evans, 2005). According to Davoudi and Evans, European Union rejects/bans landfill system and indirectly forces its member to set up target of recycling waste percentage. With respect to waste management issue, European Commission also published these following legislative frameworks:

- Directives on waste (EEC/74/442)
- Municipal waste incineration (EEC/89/429 and EEC/89/369)
- Supervision and control of waste shipment (Regulation 93/259)
- Packaging waste (EC/94/62)
- End of life vehicles (EC/2000/53)

[36] Ministry of Housing, Spatial Planning and Environment, 2000, *Summary of 4th National Environmental Policy Plan Where there's a will there's a world*: Working on sustainability, The Hague, Netherland.

- Waste electrical and electronic equipment (EC/2000/95)
- Incinerator of waste (EEC/2000/76)

To fulfill further goals stated in the latest EU Directive, each member state prerequisite to achieve previous goals. Debate on how to attain self sufficiency in Dutch context had been reviewed using national guidance of Environmental Management Act, National Environmental Policy Plan and supporting province and local regulation on the detail operation. To accelerate plan implementation, Waste Council provided detail measurement comprises targets and methods in form of programs. In the Netherlands, programs to support plan are as follow (VROM 1989; ibid, 1999):

- Contribution Program for Derelict Auto Policy (1989)
- Ten-Year Waste Management Program (1992-2002)
- Multi-Year Plan on Hazardous Waste (1993)
- Source Separate Organic Waste Program (1993)
- Action Program of Waste Prevention in Industry (1994)
- Separate Collection of Households Waste Program (1995)
- Ten-Year Waste Management Program (1995-2005)
- Multi-Year Plan Hazardous Waste II (1997)
- Separate Collection of Commercial and Industrial Waste Program (1997)
- First Adaptation Ten-Year Waste Management Program (1997)
- Second Adaptation Ten-Year Waste Management Program (1999)
- Third Adaptation Ten-Year Waste Management Program (still in progress)

Set up program are no longer in provincial level, because infrastructure development to attain self-sufficiency are national obligation. Those programs are mostly contains target to achieve ratio of 3:1 for recyclable towards disposed waste, reasonable waste management cost and 60% composting capacity.

3.2.3 Daily Operation of MSWM

Strong encouragement towards environmentally oriented planning in the Netherlands leads to better planning practice. Daily operation of MSWM in the Netherlands portrait almost all principles and embrace most of system boundary of MSWM. This sub chapter shall elaborate general condition of municipal solid waste management in the Netherlands. As depicted in international handbook[37] and National Environmental Policy Plan (1997), the Netherlands is one of the most promising European countries in term of its economic activities, especially chemical and metal processing industrial sectors. This fast growing country had limitation in its environment or supporting resource, especially space. With limitation of space, Netherlands should find better solution for MSWM.

[37] The data are taken from this website http://www.cia.gov/cia/publications/factbook/geos/nl.html

Daily operation of MSWM in the Netherlands is relied on the separation at source (Ministry of Housing, Spatial Planning and Environment, 2001). Collection towards waste accumulation is divided based on the type of waste [see figure 12 below]:

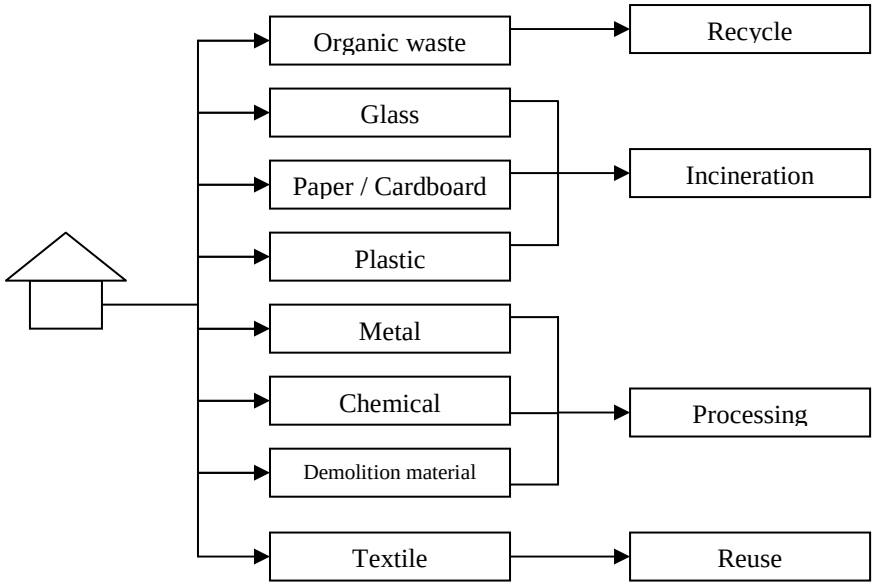

Figure 12 Municipal solid waste disposal (Source: Ministry of Housing, Spatial Planning and Environmental fact sheet on Household waste, 2001)

Ministry of Housing, Spatial Planning and Environmental fact sheet on Household waste[38] (VROM, 2001) explain that waste from households is separated into several categories. The organic waste or backyard waste are collected in a green container outside each households and surely picked up by local authority every once a week or more in particular circumstances. It stated in section 10.12 Waste Chapter within Environmental Management Act (VROM, 2001)[39] that this type of waste is directly processed into compost. Market for compost are supported by local authority to fertilize public utilities, sold to private consumer and some of it is exported. To improve the quality of compost, the Netherlands create certification system, which is applied to ensure the standard of organic fertilizer so that the consumer also have guarantee towards fertilizer quality.

Other methods applied to glass, paper/cardboard, plastic which is generally collected in particular point near each neighborhood and also picked up by local authority every twice a week. For metal and chemical waste, each household are responsible to the collection and transportation. Most of household waste, such as electronic, metal, even Christmas tree generally delivers to the municipal pool yard. Each households has maximum rights to dump their waste three times per years, if they need to dump more than that, they should pay some amount of money to the government. For discarded textile, most of them are re-used or re-sold to certain institution and the money goes to social charity. Until recently, plastic could not be easily separated from organic waste, thus, during compost processing, plastic are managed as fuel for incineration methods.

[38] Information derived from http://international.vrom.nl/docs/internationaal/14273_174Householdwaste.pdf
[39] Derived from http://international.vrom.nl/Docs/internationaal/14277_174kien_garden%20was.pdf

Paper/cardboard, magazine, newspaper generally collected to certain point of collection. The local authority is responsible for the cost of collection from this point to municipal pool yard. From the pool yard, each of this type of waste becomes the responsibility of the industry (Paper fiber Covenant, VROM, 2001)[40]. The same regulation also applied for other packaging-related waste. It was stated in the Packaging Covenant (VROM, 2001) that collection of product packaging (plastics, glass, paper) became the responsibilities of local authority but with certain requirements, such as:

1. Local authority shall bear transport cost of this type of discarded material
2. Each discarded material should be reprocess
3. Private or industry also involve and take responsibility (based on polluter pays principles) by taking all reprocessing cost operation
4. If there are positive market value from the reprocess-material, then local authority gain profit, on the other hand, if there are negative market value, then the material allow to be transferred to the its original source without any charge.

Those discarded material collected by local authority are in tight scheduled. Each neighborhood receives flyers monthly consist exact collection date for each discarded material. Therefore, those who would like to throw away certain type of waste should conform to the schedule, otherwise, their waste are not properly collected.

Most of planning of MSWM in developed countries heavily relied on technical preference prior to landfill site, while in developing countries debate on MSW planning are directed to improve efficiency and beneficial for environment and community. (Gandy, 1994; Davoudi, 1999; Davoudi and Evans, 2005, Wilson, Velis and Cheeseman, 2005). Preference over final treatment affects by natural characteristics, demographic and financial ability (Department of Community and Local Government UK, 2006; Department of Environment US, 2006)[41]. Gandy (1994, in Davoudi and Evans, 2005) asserted that in most practice, plan of MSWM generally regarded as "*managing waste disposal*" with landfill as prevailing methods among others. Although Davoudi (1999) argued that landfill, is relatively cheaper option among others. Within Dutch context, these considerations are not main concerns in decision-making. The Netherlands, could avoid full reliance towards landfill by applying incinerator which is reducing waste up to 80%. In fact, more than 200% of improvement occurs in incinerator capacity during 1989-1999 in Dutch context (Wolsink and de Jong, 2000).

In summary, operational method of MSWM in the Netherlands is strongly put government as service provider in waste collection and service enabler for waste treatment. Each local government provides off-site treatment for recyclable waste, coordinated with private sectors. The Netherlands employed *regional system with multiple approaches*. Polluters pay principles defines clearly within MSWM system, thus the community also pay attention in throwing out their garbage.

[40] Information from http://international.vrom.nl/Docs/internationaal/14280_174papandcardboar.pdf

[41] Derived the information from an article published in http://www.communities.gov.uk/pub/751/PlanningforSustainableWasteManagementACompanionGuidetoPlanningPolicyStatement10_id1500751.pdf
http://www.michigan.gov/deq/0,1607,7-135-3312_4123-9884--,00.html

3.2.4 Institutional support for MSWM in Netherlands

The Netherlands put so much effort in maintaining waste, instead of regulation, information publication, setting up programs, non-regulatory instrument also established. To come up with recent practice, the Netherland had in some way follow through fierce decision-making process. Common planning problem are laid down in its implementation, therefore, the Netherlands assemble functional institution to uphold implementation of the plan. The Auto Demolition Interest Group (1989) was established to make sure that the derelict auto sectors were funded. Other institutions, Waste Management Council/Afval Overleg Orgaan or AOO were established in 1990, it carries four main tasks, such as (ibid, 1999):

- Set up waste management plan for non hazardous waste (urban waste)
- Set up programs to support waste separation
- Monitoring waste streams and transport cost
- Provide consultation and prepare solutions regarding future waste projections

Waste producer are attached to two type of responsibility, either voluntarily or by regulation. Each of discarded material were maintained by particular institution which deliberately formed by national regulation. Each of institution dealt with particular type of responsibility (VROM, 2001)[42] such as:

1. Local authority, responsible for household waste, paper, card board and other type or recyclable goods.
2. Auto recycling Nederland (ARN), responsible for recycling all end of life vehicle
3. Batteries Association (STIBAT), responsible for collecting and recycling of used batteries
4. Producers and importers, responsible for recycling used-product-package

Almost all of stakeholders are involved in maintaining waste, including private sectors and the community. For those who intend to be “free-rider”, national government and European Directive have encountered it using covenant and agreement. Producers and importers are obliged to invest in covering disposal cost.

In summary, the Netherlands had been succeeded in delivering command and control towards waste management issue. Active support towards integration of environmental issue, commitment towards sustainability concept and protection toward healthy living environment had in some way determined willingness of national government in creating solution and recommendation towards new approach.

[42] Ministry of Housing, Spatial Planning and Environment, 2001, Fact Sheet of Producer Responsibility on Waste in the Netherlands, http://international.vrom.nl/Docs/internationaal/06procer%20responsib.pdf

3.3 Concluding Remarks

This chapter aimed at giving illustration on how Indonesian context deals with municipal solid waste management. Reviewed from five indicators, herein the condition of Indonesia:

- Suffer from adequate data, which lead to limitation of methodological preferences in projection of waste facilities.
- Application towards traditional system in managing municipal waste demonstrates that environmentally oriented planning did not infuse yet within its operational methods. Due to the application of *regional system with single specific approach*, conflict among regions are frequently happens especially for metropolitan areas.
- In line with its operational methods, review of policies and plan illustrated yet in either national strategy or local guidance. Plan and policies in MSWM strongly appointed that anthropocentrism instead of eco-centrism. According to its plan and policy, waste management in Indonesia are reviewed comprehensively with other infrastructure planning document, but in practice this sector are conducted in separated way and treated as least prioritized infrastructure to be concerned. From policy review, there is no legal protection over scavenger involvement within this system, although their performances are much better than formal actors are. By reviewing programs related to MSWM, we can derive a conclusion that sense of recycling is already implemented in a very small scope in Indonesia. Programs initiated/funded by non-governmental organization and international donor are prevails rather than the one that being encouraged by government. Most of pro's in recycling methods are assisted from very small scale of community, such as education and assistance in creating compost or other type of fertilizer from biodegradable waste.
- In Indonesian case, only scavenger, as non-formal actors, who actively involved in MSWM. Private sectors are not yet ready and give enough encouragement to handle MSWM in order to help government. So forth, Indonesia may categorized as those one of the countries which not let privatization in MSWM due to political reasons.
- Political condition in Indonesia, which yet stable from transition over centralization in to decentralization, actually gives positive impact for changing system, which is aimed for by large communities.

Compared to Indonesian case, the Netherlands could be role model in handling better MSWM. With strong command and control type at the beginning of its implementation, the Netherlands follow through environmentally oriented planning completed with polluter pays principle and create better output by re-processed waste into other form.

The following chapter shall analyze differences and similarities of Indonesian and Dutch planning direction in waste management issue. As mention in the previous chapter, there will be comparison between general condition, operational system, regulatory and non-regulatory system and community involvement. Derived from that comparison, a possible policy transfer may be drawn.

Chapter 4

Policy Transfer in Municipal Solid Waste Management

4.1 Comparison Analysis

This chapter shall analyze the condition of the Indonesian context compares to the Netherlands context using few key characteristics. The following table provides an illustration of the differences between Indonesia and the Netherlands in MSWM according to its theoretical ground from environmental perspective.

Table 7 MSWM Characteristics

No	CHARACTERISTICS OF MSWM	INDONESIA	NETHERLANDS
A	**MSWM PRINCIPLE**		
1	Basic thinking	Linier thought	Cyclic-systemic thought
2	Operational	Collect and dispose concept No separation at source	Reduce, Recycle, Reuse Separation at source
3	Policy concept	Relied heavily on final disposal site Get rid of waste principle Disposal maintenance principle Effective transport or collection principle Resource utilization principle Projection principle	Relied heavily on separation of waste Prevention principles Precautionary principle Polluter pays principles Abatement at resource Monitoring principle
B	**MSW APPROACH**		
1	Problem approach	Classic approach	Alternative approach
2	Solution approach	Technical and economical feasibility Organizational aspects	Integrate with sustainability concept Organizational aspect
3	Justification upon waste	Waste as source of problem	Waste could be an asset
4	Actors involved	Municipal authority and scavenger	Community involvement
C	**MSWM METHODS** Methodology	Site specific methods	Material flow methods

The following analysis demonstrate different technical application, supporting plan/policy and institutional support of both countries

4.1.1 Technical Comparison

Under European Union support, concern in decision making in the Netherlands context may be categorized put aside economic analysis and stress the environmental analysis along with other consideration such as human health, and equal service of MSW with longer term of maintenance (EU Commission, 2000; Doe, 1995). Differs from Dutch context, Indonesian case are relatively depend fully on economic approach (Damanhuri, 2005). Once, an analysis by Aye and Widjaya (2005) was conducted to compare the most applicable methods such as Life Cycle Analysis, Centralized Plants for Composting, Biogas Production and Landfill for Electricity Generation. Result of analysis recommends that the most potential methods for success in maintaining rising waste accumulation in Indonesia is composting method in a centralized plant. It has the most preferable benefit, such as moderate environmental impact and equal benefit cost ratio (Aye and Widjaya, 2005). However, in its practice, waste management method was applied based on the consideration of Indonesian spacious area, and therefore landfill is taken as solely MSW management method. Although landfill is the cheapest method to dump waste, it may counter very problematic situation in times of shortage land (Nas and Jaffe, 2004).

From technical comparison, lesson could be learnt from the Netherlands are:

1. **Provision of adequate information such as : type and characteristics of waste streams in order to :**
    a. conduct precise projection of waste accumulation
    b. measure exact environmental impact in the future
    c. plan for efficient facility investment
2. **Applying incinerator instead of landfill system**
3. **Conducting at source reduction**
4. **Applying polluter pays principle**
5. **Approaching final treatment with regional system with multiple approach**
6. **Partnership with private sector in providing technology in recycling**

4.1.2 Geographical Comparison

Consideration to deliver good MSWM is not solely lied down on the performance of government or infrastructure completeness. Instead, it is also important to pay attention to geographical condition of service area. Geographical condition indicates natural processes in which became evidence for maintenance of discarded material. Comparing physical condition between Indonesia and Netherlands lead to hypothetical statement that maintenance in both country are not meant to be similar one to another. Distinct condition surely led different maintenance. High humidity, tropic climate, mountainous and spacious area in Indonesia encouraged public authority to choose landfill and open dumping (see table 8). Whilst, the Netherlands are less spacious and tend to utilize space effectively, thus preference to maintain waste is directed to incineration.

From table below, natural disaster occurrence prevails in Indonesia, thus location of landfill are important to be determined in MSW management as regard to environmental protection and human health's sake. Since geographical conditions are unique, national policy tool are not enough in directing landfill sitting. Thus, Public Works Department and Ministry of Environment advocate each local area to compile detail engineering design on waste management.

Table 8 Geographical comparison

PHYSICAL CIRCUMSTANCES	INDONESIA	NETHERLANDS
Location:	South east Asia	Western Europe
Map references:	Attached	Attached
Land Area:	1,826,440 sq km (95,10%)	33,883 sq km (81,6%)
Water Area:	93,000 sq km (4,90%)	7,643 sq km (18,4%)
Total Area:	1,919,440 sq km	41,526 sq km
Climate:	2 season, tropical, hot, high humidity, moderate temperature in highlands	4 season, temperate; marine; cool summers and mild winters
Terrain:	coastal lowland, mountainous, hilly, large islands	coastal lowland and reclaimed land (polder)
Elevation extremes:	lowest point up to 0 masl and highest point up to 5,030 masl	lowest point up to -7masl and highest point up to 322 masl
Natural resources:	fertile soil, petroleum, mining, natural gas, woods	sand and gravel, arable land, natural gas, limestone
Land use:	modern activity 81,93 % ; crops 18,07%	modern activity 77,27% ; crops 22,73%
Natural hazards:	flooding, drought, earthquake, volcano, tsunami, forest fires	flooding

Source: World Fact book, USA, 2005[43]

Geographical background in both countries are different, thus policy transfer in detail for technical operation is not preferable, thus specific solution for Indonesia should come up with different solution.

4.1.3 Socio-Economic Comparison

According to the latest system boundary of integrated municipal solid waste management, this sector cannot be apart from socio-economic condition. Waste accumulation in municipal area reflects consumer behavior, which leads to level of economic. Number of population in urban area in Indonesia approaching ten times

[43] The information taken from http://www.cia.gov/cia/publications/factbook/geos/nl.html

compare to Netherlands, in the other hand, GDP level are less almost ten time as well (see table 9). Along with this circumstance, it is quite difficult to equalize Indonesia and Netherlands in its economic capacity. Although GDP level in Indonesia less almost ten times than Netherlands, waste accumulation is not less than Netherlands. In the other hands, because number of population is ten times bigger, thus waste accumulation become problem in Indonesia.

Table 9 Socio-economic comparison

SOCIO-ECONOMIC CHARACTERISTICS	INDONESIA	NETHERLANDS
Population	245,452,739	16,491,461
Population growth	1.41%	0.49%
Labor force	Agriculture 46.5% Industry 30.6% Services 54.6%	Agriculture 2% Industry 19% Services 79%
Unemployment	10.90%	6.50%
GDP Per Capita	$3,600	$30,500
National Budget	Revenue $54.3 billion Expenditure $57.7 billion National budget --> deficit	Revenue $291.8 billion Expenditure $303.7 billion National budget --> deficit
Investment	21.50%	19.3% of GDP
Public debt	52.6% of GDP	55% of GDP
International fund	$43 billion by 2005	$4 billion by 2003

Source: World Factbook, USA, 2005)[44]

Waste accumulation in urban area that become problem in Indonesia are driven by financial constraint. This argument lead to hypothetical statement that economic level is presumably affecting MSWM preference (Damanhuri, 2005). This sort of argument is not applied in Dutch context. Dutch ability applied incinerator is differ from traditional and simple method applied in Indonesia. Thus, changing from traditional method to application of incineration is not yet economically feasible for Indonesian context.

Other social context difference is relied on its demographical characteristics. Indonesia has more human resource than Netherlands. Without abundant human resource, MSWM in the Netherlands may improve its efficacy using technology. Thus, it is logic conclude that Indonesia may succeed as well by maximizing its abundance human resource.

In summary, adoption of low cost waste management and end-of pipe solution in Indonesian case was understandable, if we review it from geographical and financial

[44] Ibid;

condition. However, to keep this traditional method into future practice is perfectly undesirable especially for human health and protection over other natural resources. Thus, national government should come up with other solution, which is different from previous experience but not burden the environment and the community as well.

4.1.4 Plan, Policy and Program Comparison

General illustration in Indonesian context presents assumption that MSWM in Indonesian context were not perfectly and specifically reviewed, in other hand it only deem as attached facility for other infrastructure development. Perspective of MSWM in Indonesia relatively affected by linier thought, thus operational and policy concepts are not following through recent trends. Unexpected results of waste explosion had in some way wakened up Indonesian government in maintaining municipal solid waste problems. This condition may be explained due to (AKJ. Tan, 2002; Nas, 2003; JICA, 2003; Damanhuri, 2005, Wilson, 2005):

- Lack of financial resource
- Lack of human resources skill and knowledge
- Lack of information
- Minimum support of community
- Uncoordinated institutional structure
- Ineffective usage of resource

From policy review, there are many differences, such as:

1. *Indonesia did not apply the most recent approach in MSWM*
   Most of all plan and program in the Netherlands are set to accommodate separation of waste from its source, while in Indonesian context, focus of attention still remain in waste disposal management. According to EU Commission (2003) the Netherlands already imply for prevention principle, precautionary, pollutant pays principle, and proximity-self sufficiency principle. It also follows through waste hierarchy to come up solution of reducing waste from its source, conducting at stationary processing and at final disposal for remaining waste. Indonesian plan, policy and program did not employ reduction at source, precautionary principle, and polluter pays principle. Most of policy and other planning document in Indonesian context only apply for proximity-self sufficiency and neglecting prevention, precautionary and pollutant pays principle.

2. *Indonesia did not put integration of environmental, economic and social perspective into their policy.*
   The importance of MSWM is not growing as quickly as in the Netherlands context, in which provides integrated system boundary for policy arrangement for MSWM. In Indonesian context, MSWM usually least prioritized sectors either in national or local agenda. In addition, most planning practice are conducted only if it economically feasible.

3. *Indonesia could not yet implement all plan and policy practice, thus there are distance between goals and implementation.*

The Netherlands able to implement better plan document into practice because European Union (as international organization) has give strong empowerment to create environmentally oriented planning. While in Indonesia, international support from ASEAN is limited and restricted to environmental protection without concern in detail of MSWM. Policy implementation is not well guided as in EU member state due to the fact that ASEAN member generally face several characteristics (Stevenson, 2002):

- Unbalance spreading information and eventual impact
- Lack of funding for primary data collection support
- No national awareness to identify and built up to date system information base towards its environmental condition
- No mechanism built into favorable design
- Difficulties in effective measurement towards institution performance
- Inexistence of national policy frameworks and strategies
- Intuitive program design instead of well planned and well managed ones
- Facing traditional strong resistances

Other reasons for better plan implementation is the implementation of strong command and control at the beginning of MSWM application, then follow with application of open planning system. Although Indonesia is a former country of strong centralistic type, it did not succeed in commencing strong command and control governing system due to lack understanding in the importance of environmentally oriented planning. Stevenson (2002) argued that in most ASEAN member including Indonesia, there is no mechanism built into favorable design in which benefit to environmental sake.

4. *Indonesian government is single provider in MSWM, while in the Netherlands, coordination and partnership with private are exist in its planning document.*

5. *Indonesian plan document in MSWM employ regional approach with single treatment system, it is often for Indonesia to face conflict between municipalities.*
   Related to this statement, Indonesia should pay attention to coordination of their department, which deals with this sector. Although the Netherlands also apply regional approach, but to reduce conflict they apply multiple treatment system. By doing so, they reduce possibility of people who will suffer from negative impact of waste disposal.

6. *Indonesian plan on MSWM mentioned about monitoring of planning implementation, but in reality, there are no monitoring at all.*
   Systemic approach in planning context is reflected in the existence of evaluation and monitoring, while in Indonesia, MSWM is operated under the conception that it was one of urban issue among other prevailing issue such as housing provision, water infrastructure or transportation infrastructure. Thus in Indonesian context, MSWM is not conducted based on systemic approach, but in the other hand, Indonesia employ linier approach.

In summary, most of MSWM plan, policy and program in Netherlands are much better compare to Indonesia. Reviewing plan, policy and program in the Netherlands, there are new insight could be learnt for Indonesian context, such as:

1. **Change direction from tradition approach towards alternative approach, such as:**
    a. Consideration towards sustainability concept, precautionary principle and polluter pays principles and packaging regulation.
    b. Developing plan and policy which is reliable to waste hierarchy
    c. Adopting comprehensive approach
    d. Integrate broader system boundary to accurately measure who will be involved in this sector
    e. Avoid end-of-pipe solution and move towards strategic solution

2. **Integrate policy into national framework to strengthen its regulatory power. Supporting argument for this lesson are:**
    a. Build up stronger empowerment towards regulatory implementation by developing stronger command and control type for planning implementation.
    b. Develop more open and transparent planning process to confirm government performance
3. **Formulate more applicable plan, policy and program to reduce gap between goals and implementation. To formulate more alternative solution toward applicable plan, we can derived from the Netherlands' experiences, such as:**
    a. Give more chance to NGOs and CBOs to be more involved
    b. Give more opportunity to private sector to contribute in this sector
    c. Create regular review in order to refresh implementation monitoring
    d. Employ open discussion with community at large
4. **To reduce conflict among region, thus coordination with other sectors and inter-jurisdiction department need to be strengthened.**
5. **Strongly motivate evaluation and monitoring of plan, policy and program**
6. **Maximization towards possible resource, such as human resources or financial aids**

4.1.5 Institutional and Stakeholder Comparison

As described in the previous chapter, Indonesia context are similar in terms of its institutional layer to the Netherlands. The differences are:

1. MSW in Netherlands held by mix government and public authority, while Indonesian context, full responsible of MSWM lied down in public authority.
2. Netherlands construct sectoral department to deal with MSWM, which is focus on this issue, while Indonesian case is slightly different. MSWM were dealt by Ministry of Environment that dealt with wider scope of environmental issue, thus MSWM is not reviewed specifically.
3. Strong informal sector (with scavenger existence) in Indonesian context are not comparable to Netherlands.
4. Community involvement in Netherlands set up in an integrated management entitled "target group management" in which give support to MSWM according to

its roles and responsibilities, whilst, in Indonesian context regulation toward community involvement is not exist.

5. Community and government communication are well managed in Netherland which come out with two way communication, while in Indonesian context, the communication of community and government is one way, so it is not a very good for supporting open planning process as proposed to improve MSWM management.
6. Non-governmental organization (NGO) and community-based organization (CBO) are important for Indonesian context, due to their enormous effort in developing sharing knowledge on recent approach of MSWM.

Despite differences that exist between Indonesia and Netherland, task and duty of formal institution in each level government are similar. As a matter affect, Indonesian government has more complex task and duty. Unfortunately, implementation of institutional task and duty are not comparable one to another. There is no strong empowerment in Indonesian context to improve government performance in delivering their task and duty to the community. Most of government officer are taking for granted all responsibility lied in their custody. This condition is not easily wiped away since it has rooted in its culture. For solution, strong command and control from national government are necessary to be conducted. The question is whether national government has strong commitment or not in changing the condition. Related to MSW management, most of local authority is not willing to construct complete information system to support better planning practice. Monitoring and evaluation only limited in terms of operational assessment, and there is no review of regulation during the past two decades.

Poor condition of waste management provided by public authority encourages eagerness to adopt of privatization from other country. Let us examine how things working out in the Netherlands [table 4.4]

Table 10 Shareholder function in MSW management

Function of shareholders	Indonesia	Netherlands
Collection		
Household waste	Public	Public/Private
Industrial waste	Public	Private
Processing		
Recycling	Public	Private
Composting	Public	Public
Disposal		
Open dumping	Public	*
Landfill	Public	Public
Incinerator	*	Public

Source: Wolsink, de Jong, 2000; analysis, 2006

Eberg (1997, in Wolsink and de Jong, 2000) asserts that alteration of MSWM approach in the Netherlands was fully caused by institutional factors. Wolsink and de Jong

(2000) also substantiate that most of studies in European and American countries emphasize on institutional establishment to accommodate shifting direction in MSW management. There is strong emphasizes in Indonesian context to privatize MSW management as other countries experiences.

Strong emphasize of privatization both in Netherland and Indonesian context was driven by increasing liberalization these days. However, as argued by Wolsink and de Jong (ibid), privatization should not be seen as only solution in delivering better service of MSW to the community. Applying privatization meant to change market structure, vertical and horizontal administration structure or change ownership of utilities. Since privatization prerequisite major change in administration structure, it may be concluded that Indonesia are not able yet to fulfill it. As major change has occurs in Indonesian context from centralization to decentralization type, it is assumed that structure of administration in Indonesia still in transition and not yet ready to apply privatization. Although adopting privatization in MSW management is in minor percentage, it does not mean it can be implemented in future time. Thorough research and analysis are needed to see possibility of privatization for Indonesia.

Let us see other possible lessons may draw from the Netherlands. The Netherlands is able to maximize its limited natural and human resource using target group management. All possible shareholders are having their opportunity to be involved in planning practice. Adopted open planning process does not easily transferred to Indonesian context. Thus, involvement of community and private sectors requires strong encouragement and relatively take longer time. Strong root of planning and consensus building became an advantage for Dutch context. At similar stake, Indonesia, which is endeavored with abundance informal sectors, "musyawarah" and richer natural resource should probably start to maximize these resources.

Why does informal actor matters in Indonesian MSWM context? Grasping experience in Dutch context to maximizing potential resource, this thesis inspired to come up with an idea, that Indonesia should do the same. While seeing waste pickers or informal sector or scavenger as potential resources instead of problematic situation within MSW sector (Nas and Rifke, 2004), it may seem important to acknowledge that this informal sectors also valuable to adjust with new alternative approach, which is not yet implemented in Indonesian context. Along with growing concern towards environmental protection, public health and provision of better infrastructure, thus alternative approach in MSW to reduce waste from its source (precautionary principle) are significant in Indonesian planning agenda. Novel experience in Cairo (Iskandar, 2003 in Wilson, 2005) asserted that more than 80% of waste accumulation is recoverable thanks to work of informal sectors. Thus, it is comparable to what Dutch results with its incinerator performance. Therefore, informal sector existence in Indonesia became one of the most valuable resources in helping out MSW management. Various types of informal sectors activities all over the world are exist in Indonesian context, such as itinerant waste buyers[45], street waste picking and or waste picking in dumping sites (Wilson, Velis and Cheeseman, 2005). Informal sector indirectly benefit for MSW management due to several reasons:

[45] Itinerant waste buyers are waste collector who come door to door, pick waste, sort it out and deliver it to recycling shop (Li, 2002).

- Informal sectors deliberately characterized by low-technology manufacturing, small group of people with no written arrangement, labor intensive, unregistered, sort out waste as their source of income (Wilson, Whiteman and Tormin, 2001)
- Directly provide service for isolated area (Coad, 2003, Haan et.al, 1998, Scheiberg, 2001b)
- Informal sectors pose to sort out waste; therefore, they hold better skill in identifying waste that has potential value (Wilson, 2005).

Despite the benefit that imposed by informal sectors, they gain little advantage in its daily life. Due to inexistence of formal network that support and protect them from legal market, their low income do not support come to standard level of societal income. As argued by Wilson (2005) that less organized the informal sector is, the less those people may gain added value from secondary raw material, furthermore the more vulnerable they are from exploitation from intermediate buyers.

Inspired by Dutch policy in MSW management, it is important to note here that Indonesian government still have left working agenda to institutionalized the existence of scavenger by giving them enough support and protection towards unequal bargaining power in the market, provide secure and health insurance due to the fact that their working ground is totally different from others. Regarding to privatization that mention beforehand, it may seem necessary to put priority of legal framework to scavenger first in government agenda and followed with privatization regulation.

4.1.6 Political Comparison

To acknowledge whether policy transfer are applicable or not in Indonesian context let us examine political, national, physical and professional culture of key players in policy making arena in Indonesia (see table 12). According to the table below, relations among government and society, type of political, administrational and governmental type, national characteristics, key player in planning and professional characteristics between Indonesian and Netherland are different. In the other hands, governmental system and national symbol are slightly similar to one another. There are various characteristics in Indonesia that retrospectively unavailable to accommodate planning atmosphere as in Dutch context. Too much difference in political characteristics hinders policy transfer.

Therefore, not all lesson from Dutch context could easily transferred to Indonesian context. In short, operational methods are also transferable, but to receive such advance methodology, Indonesian context should be ready first. Anyhow, strategic idea such as open planning practice is not also an easy task for Indonesian authority. Unlike regulatory adoption, which already accommodate with administrational similarities, strategic idea such as open planning process required longer period. Indonesian authority need more time to adjust with changing scope of attention in MSWM either in its community involvement or in institutional development.

Table 11 Political characteristics in Indonesia

No	POLITICAL CHARACTERISTICS	INDONESIA	NETHERLANDS
1	**Poltics-administration-society**		
	Government-society	Distrust to government	Trust in Government
	Politics-administrations	Political (Discretionary)	Bureaucratic
	Government system	Three tiers (Central-Regional-Local)	Three tiers (Central-Regional-Local)
	Government type	Republic	Constitutional Monarchy
2	**National culture**		
	Social relation	Tend to adopt liberalism recently	Rooted from democratic socialism
		Hierarchic and monopoly	Egalitarian and cooperative
	National symbol	"Musyawarah"; clientilism;patronage	Consensus;
3	**Key players**		
	Drivers behind env.protection	NGO with international fund	Government
	Drivers behind political process	Executive (President and Cabinet)	Monarch type (Prime Minister and council
		Legislative (House of Representative)	of Ministers); Coalition Cabinet
	Institutional existance	Functional institution	General and functional institution
4	**Physical context**		
	Relation with physical circumstance	Natural hazards require to be legalized	Natural hazard has been the fundamental consideration in national plan
	Chance of natural disaster	Risk of various natural disaster	Risk of flood
5	**Professional Culture**	Predominantly economist and politician	Predominantly politician and scientist

Table 12 Planning system in Indonesia

No	PLANNING SYSTEM CHARACTERISTICS	INDONESIA	NETHERLANDS
1	Locus of power	Central (National) recently change to Decentralization	Decentralized
2	Scope of system	Fragmented	Integrated
3	Extent and type of plan document	Spatial national plan; sectoral policies	Spatial national plan; sectoral policies
4	Public-private relationship	Market-led	Plan-led
5	Legal framework	Roman-Dutch Law; modified by local principle Pancasila	Civil law system; constitution not allowing judicial review
6	Maturity of the system	less public acceptance, no up to date policy instrument; lack of vertical integration; lack of gov. transparency	more public support, vertical and horizontal integration
7	Expressed object	Moderately-distance from plan	Closely-distance from plan

Although locus of power in Indonesian context has been changed into decentralization type, recent condition remains the same with previous circumstances (see table 13). Differences lied down on the existence of press freedom to spread out news and

information. This condition may support the adoption of system information development. The most important to be transferred is the acknowledgement towards the need of protection of environment and human health, understanding that waste are not only seen as burden but could also be resource and have to be maintained properly for future sake. Hold back with incompatible planning system and political characteristics, it may conclude that policy transfer of MSWM from the Netherlands context to Indonesian context has to be simplified. Open planning process for better MSWM is not the only solution.

In summary, Indonesian context in MSWM still relied on traditional approach, while in the Netherlands, the latest approach in maintaining MSWM already employed. As argued in the previous chapter, changing conception in defining waste are should be started with reviewing its strategic/national idea, thus this study shall start to review possibility of adoption national strategy from the Netherlands for Indonesian context. Afterwards, some review on possibility of adoption detail/operational strategy will be added. Beforehand, let us compare possible policy to be transferred with existing condition in Indonesia that hindered the implementation.

4.2 Policy Transfer Analysis

According to comparison analysis above, there are several key points that could be learnt from the Netherlands. There two possible proposals could be drawn, first, policy transfer from daily operation/technical and second, policy transfer in general planning idea. Subject to that matter, this study shall analyze, whether these policies are adaptable for Indonesian case. Method of analysis is relied on description of constraint, because these transferable policies doubtfully easy to be implemented. Thus, this analysis is aimed at reducing possible policy to be transferred into category of adaptable policy transfer.

For Indonesia, to change direction from tradition approach towards alternative approach, there are two possible ways:

1. **By adoption of national legal framework according to MSWM applied in the Netherlands**
2. **By adoption of new methods in its daily operation as experienced by the Netherlands**

In order to see whether Indonesian context are ready to receive concept and ideas of policy transferred from Dutch context let us examine from several key element (table 14 and 15). Table 14 shows several key instruments that supposed to be exist in order to keep pace with recent practice in the Netherlands especially in its regulatory system. Table 15 shows technical key instrument that need to be provided by Indonesian context, in order to implement recent operational method as in the Netherlands. Here are the details:

Table 13 Key elements to accelerate transfer of strategic idea in MSWM in Indonesian context

No	Key elements	Details Elements	Indonesia	Netherlands
1	Direct regulation	General policy guidance	+	+ +
		Permit system for various activities	+	+ +
		Environmental assessment	+	+ +
		Environmental quality standard	+	+ +
2	Voluntary agreement	Target group approach	--	+ +
		Action plans or covenant	--	+ +
		Codes of conduct	+	+ +
3	Environmental reporting	Public information	--	+ +
		Requirement reporting from various sectors	--	+ +
		Self-regulation (for private)	--	+ +
		Corporate environmental management system	--	+ +
		Enforcement	--	+ +
4	Environmental technology	Knowledge and skill of technology	--	+ +
		Research development fund	+	+
		Application of project	--	+ +
5	Financial instrument	Waste taxes	+	+ +
		Environmental taxes	--	+ +
		Product taxes	--	+ +
		Price signals	--	+
		Government incentives	+	+ +
		Private incentives	--	+ +
6	Social instrument	Subsidies from society	+	+
		Environmental education	+	+ +
		Intensive campaign for public share knowledge	--	+
		Provision of facilities	+	+ +

Source: Ministry of Housing, Spatial Planning and Environment/VROM (1997)[46]

According to theoretical framework stated in the previous chapter, we may derive conclusion from analysis of key instrument above. Regulatory instrument are easily to be transferred than other proposal since it already been support with similar supporting regulation. As reminder, historical review of Indonesian fundamental law and regulation are fully affected by colonial system applied by Netherlands. This similar regulation streams, may advantage in this transfer action. Ranging from six instruments (see table 12), only environment and financial instrument seems to be not yet ready. By percentage, 44% requirements to adopt policy transfer in regulatory system are already fulfilled by Indonesian government. However, most of actions to support improvement of regulatory

[46] The key instruments are derived from VROM, but most of the assumption is taken based on personal assumption according to current situation in Indonesian case.

system in Indonesia are hindered by financial resource. Financial consideration deem as factors that hinder preference towards better protection to environment and limit community education. **Thus, focuses of attention to Indonesian authority in supporting MSWM are supposedly concentrates on improvement of environmental education and increasing financial investment.**

Table 14 Key elements to accelerate transfer of technical idea in MSWM in Indonesian context

Key Elements	Details elements	Indonesia	Netherlands
Geographical	Adequacy of space	+ +	-
	Humidity	+ +	-
	Relief	+ +	-
Financial	Taxes	+	+ +
	Willingness to pay	-	+ +
	Public fund	-	+ +
Knowledge	Skill on technology	-	+ +
	Understanding of waste as resource	-	+ +
	Sense to environmental protection	-	+ +
Facilities	Incinerator	+	+ +
	Separate bins	-	+ +
	Separate temporal site	-	+ +
	Market for waste	-	+
	Technology for recycling	+	+
Regulation	National framework	-	+ +
	Precautionary principle	+	+ +
	Prevention principle	+	+ +
	Polluter pays principle	-	+ +
	Packaging regulation	-	+ +
	Sectoral waste review	-	+ +
	Applicable plan	-	+ +
	Operational schedule	-	+ +
Institution	Sectoral department	-	+ +
	Local department	+	+ +
	Regional department	-	+ +
	Functional department	-	+ +
Actors	Skilled technician	+	+ +
	Skilled formal authority	+	+ +
	Community involvement	-	+ +
	Private involvement	-	+ +
	International support	+ +	+ +
	Informal sectors	+ +	

Source: Ministry of Housing, Spatial Planning and Environment/VROM (1997)[47]

[47] Ibid;

To implement operational methods as in the Netherlands, Indonesia should fill in those inadequacies over several key elements. **According to the list above, Indonesia suffers from inadequacies of financial, knowledge, facilities, regulation, and institution support.** Ranging from the key elements, only 38% of the requirements are fulfilled.

According to the promptness of Indonesian condition in receiving policy transfer, media to receive general idea infused to regulatory system is more ready rather than media to receive transfer of policy contains operational methods. In policy transfer theory, it was argued that transfer of general/strategic idea is more difficult to be conducted rather than transfer of detail/operational idea. However, within Indonesian context, this argument is arguable. **Based on the result of the study, transfer of general/strategic idea to Indonesia is easier to be conducted rather than transfer of detail/operational idea.** Adaptable policies to be transferred for Indonesia, after being contrasted with Indonesian potential resources, here are the proposals:

1. **Change policy direction from "how to dispose waste?" into "how to maximize waste?", by encouragement towards composting process.**
   This preference is supported with the arguments that:
   - Type of waste in Indonesia is dominated with organic waste
   - Climatic condition is supportive towards composting organic waste
   - Introducing financial benefit over this process, which in turn revokes community willingness to recycle their waste
   - Compost product could be source of financial aids in MSWM, thus lacking of financial aid could be solved.

   To support composting process, national government should provide marketing of this product, by:
   - Provide assurance that product of homemade compost (small-scale program of composting) or hi-tech compost (large-scale program of composting) shall receive equal chance to be transferred for other sector such agriculture.
   - In order to reduce conflict between regions, product marketing should prioritized self-sufficiency principle (compost product marketing should distribute within regional scope, if there are more product should be distributed, inter-jurisdictional coordination should be developed.
   - To promote compost from waste, national strategy should banned imported fertilizer for temporal time.
2. **Create wider involvement in MSWM for improvement of social knowledge by:**
   - Empowering local involvement through more programs that support waste separation
   - Develop new institutional support or give legal protection for scavenger
3. **Improvement of MSWM service, by:**
   - Creating basic information system of waste generation, waste facilities, waste type/streams
   - Regular waste collection through formal or informal sector (scavenger)
   - Separate waste from households through non-governmental assistance
   - Development of small scale program to accommodate homemade composting

Chapter 5

Conclusion and Recommendation

5.1 Conclusion

It is clear that municipal solid waste management (MSWM) has been changing in the last several decades due to dynamic change of our environment. Although waste conception these days is tremendously fair enough in the sight of environmental interest, it has some way difficult in its actualization. Various researches are conducted to apprehend latest waste management which hindered by many constraints, such as financial constraints, less technological/facilities support, suffer from limited knowledge and managerial skill. Some people deem that, if we want to develop new type of environmentally oriented planning for particular sector, it means that we are ready to sacrifice more, either in more financial aid or consume less resource. This thought is not a new paradigm among our society; therefore, it is important for scientist to break this conception into better prejudice.

Within MSWM sectors, scientists are been able to invent latest innovation such as turn waste from problem into waste as resource. Daniels (2003) once said that if we would like to stop having problem in municipal waste, then we should stop calling it waste, otherwise we will feel burdened. Waste production is unavoidable; the most fundamental question is that whether there is enough resource to re-process these waste compilations. It is important to notice that space availability in urban area is competing harshly with housing necessity. Thus, MSWM need to find good alternative solution besides applying dumping ground as final treatment for waste. Logically, other resources such as institutional and human resource are looked up as potential supporter for applying better alternative solution for MSWM.

This study aimed at giving broader insight for Indonesian context for better MSWM practice. According to recent condition municipal solid waste management in Indonesian context are not managed properly. Most of final treatments in almost all municipalities in Indonesia are still relying on open dumping method, which is economically feasible for short term, but least environmentally orientation for long term. Although there is more than enough space in Indonesian context, open dumping preference does not guarantee any further for human health and pollute the environment. As if Indonesia did not attached to any international treaty on environmental protection, maybe Indonesian urban area prefers to choose this kind of treatment. As if there are no such gas explosion, which cause hundreds of people died and material loss due to improper waste treatment; as if there are no such dispute over privatization of waste management, maybe Indonesia bears with its traditional thought in MSWM. Thus, through this study, broader insight in maintaining waste are presented by analyzing opportunity of application new concept or new method derived from other countries experience.

For summary, the following substances are presented to answer research question of this study:

The most suitable theoretical approach for MSWM in Indonesian cases should not directly aim at environmental protection at once. To keep pace with other countries in the sense of environmental protection, Indonesia should start it step by step. From the analysis, combination of economic, environmental and social orientation in MSWM planning is the preferable for Indonesia. Although, it remains questionable on how the implementation are, but in fact if there are strong commitment from the authority to implement command and control type of government at the beginning of the process, it might be slightly chance for Indonesia to keep pace with better MSWM implementation. Integration of various elements in MSWM such as socio economic consideration, dynamic demographic condition, consumption pattern and community behaviour are not yet well-mapped in MSWM. Thus, for further action, it is advisable for Indonesia to develop system information that is representing recent condition for the up coming projection in planning of MSWM. New principles should be added if Indonesia tends to shift their focus of anthropocentrism into eco-centrism approach. Bridging present implementation with new approach, Indonesian government should change strategic planning in MSWM and infuse it with prevention principle; precautionary principle; polluter pays principle; or self sufficiency principle. To put waste hierarchy into practice, Indonesian government better to improve programs in assisting local community about waste reduction, recycle and re-use (3R).

According to previous chapter, condition of daily operation MSWM in Indonesia is not yet completed with high technology compliant. For economical reason, traditional method such open dumping and manual collection are exist. To preserve abundant human resource (scavenger), Indonesian government is suggested to construct legal protection and institutional support for this grass roots activity. Thereafter, low-income class that greatly contribute in waste separation could be assured. In the mean time, Indonesian government shall gain benefit of not investing too much money in technology to separate waste. Thus, environmental, economical and social orientation is achievable.

Major constrain in Indonesia is implementation of plan, which generally relied on government performance. Reviewed from its plan, policy and program, ideas in MSWM is considerably fair for human sake, but still with such goals, Indonesia not yet capable in giving better MSWM especially for urban areas and those in remote area as well. For urban area, problem is noticed in waste accumulation that caused pollution, while for remote areas, problem is noticed in its scope of service area. MSWM generally covers urban core, and neglected poor/slum area. Thus, for urban area which is quite clean, it does not clean at all at the edge of the riverbanks. If the riverbanks gets flood thus, urban area are suffer as well. Thus, coverage of service in MSWM should be equal and balance.

Possible potential resources for Indonesia are divided into five characteristics, ranging from technical, financial, social, institutional and instrumental support. Potential resources of MSWM in Indonesia are as follow:

a. Affected by humidity and its climatic condition, composting and recycling process with natural process are achievable.
b. Potential international fund in Indonesian area are abundance and supposed to be encouragement to provide and encourage national government to create more support to minimization of waste accumulation.

c. Human resources in Indonesia especially scavenger is potential resources to expedite recycle program and waste minimization.
d. Instrumentally, although plan and policies in MSWM are exist, but the most applicable methods to create more involvement is through program development. With creative involvement from non-governmental organization (NGO) and community-based organization (CBO), sharing knowledge to local community is quite effective. The inter-sectoral policies are potential as an input to create more sustainable MSWM guidance.

From the analysis, there are two important findings. First, comparison study between Indonesia and the Netherlands has confirmed that transfer of general idea from the Netherlands context to Indonesian context are achievable rather than transferring daily operation methods. Second, for some reasons, partial experience in the Netherlands are not easily to be implemented, thus proposed solution for Indonesian context are somewhat differs with the Netherlands.

Marsh and Dolowitz (1996) argued that in policy transfer, degree of transfer depends on scope of the idea. If there are two kinds of policy to be transfer, one of them contains simpler idea and the other contains more than one objective, thus the previous mentioned is easier to be transferred. Confronted to finding of this study, the statement above is arguable. For Indonesian context, transfer of general idea (concept of better waste management) in strategic level is easier rather than transfer of detail idea (application of technology/daily operation. According to current condition in Indonesia, capability to create appropriate scheme for MSWM is prominent rather than its implementation. After reviewing existing plan, policy, and program in Indonesian context, apparently sense of conceptualizing waste into potential resource are not yet exist, all plans and policies are directed to landfill system. Hindered with abundant financial constraints and limitation of capacity building, Indonesia cannot easily implement better waste management according to the latest perspective. However, chances to keep pace with present view that waste also potential, is still there. Conceptual thinking over political condition, social phenomena and financial constraint lead to this argument. Preference to change from traditional concept into better management is possible from these points of view.

1. Political condition

With existing political condition, which is unstable, Indonesia has an advantage. Current political transformation from centrally oriented into decentralization, has in some way urge grass roots to demand their need profoundly than before. Instability of political situation sensitive towards changes; indication to change recent concept of MSWM are prominent. Although from the previous chapter has been described that the Netherlands applied for open planning process, but in the beginning of implementation of MSWM they applied strong type of command and control government system (which is similar to centralized system). Since Indonesia are not yet firm in decentralization practice, sense of centralization is still remains the same. Although some of national government task and duty are divided to local and regional scale, their dependency over national government is still exist. Thus, with this condition, national government still have the change to apply strong command

and control type to guide local and regional level in maintaining better MSWM using national guidance (strategic planning).

2. *Social phenomena*
Portrait of Indonesian demography is unique, with large part of community with low income level, caused social incentive in MSWM are low from time to time. Although this condition is not preferable to conduct changes in MSWM, but the social impact (such as complaints over unpleasant odour, unhealthy living environment in surrounding area of final/temporal disposal sites) as feedback of improper treatment to waste accumulation had change social prejudice that waste are should not be neglected. There are two important social phenomena in Indonesian context which support transfer of policy for better MSWM practice. First, the existence of abundant human resource (non formal actors) in waste management known as scavengers; and second, intensive support from non governmental organization or community based organization within this sector.

3. *Financial capacities*
In addition to the explanation above, Indonesian government annually confirmed that budget for MSWM in each local area is low. However, if we review on amount of money invested by international parties in form of programs held by non-governmental organization, it may seem possible to change MSWM into better practice especially for human health, social benefit and natural preservation. In practice, Indonesia may not been able to develop institutional support to organize better distribution of international investment. Thus, non-governmental organization is significant in this matter.

The main difficulty in Indonesian context is implementation of regulation. This condition is different from the Netherlands context. With European Union encouragement both in regulation and financial support, the Netherlands gain double advantages, such in sense of obligation to conduct better planning rather than just gain more international investment. On the other hand, in Indonesian context implementation of regulation slowly turned into bulk of issues. Although financial aid is abundance in Indonesian context, it may be concluded that it is not enough to help Indonesia to revive its planning practice. Encouragement and stronger law implication may help Indonesia to be more discipline in providing better planning practice in MSWM.

In summary, there are possible policy transfer for Indonesia from two major point of view, such as:

From technical comparison

1. Provision of adequate information such as :
   a. conduct precise projection of waste accumulation
   b. measure exact environmental impact in the future
   c. plan for efficient facility investment
2. Applying incinerator instead of landfill system
3. Conducting at source reduction
4. Applying polluter pays principle
5. Approaching final treatment with regional system with multiple approach
6. Partnership with private sector in providing technology in recycling

From regulatory comparison

7. Change direction from tradition approach towards alternative approach, such as:
   a. Consideration towards sustainability concept, precautionary principle and polluter pays principles and packaging regulation.
   b. Developing plan and policy which is reliable to waste hierarchy
   c. Adopting comprehensive approach
   d. Integrate broader system boundary to accurately measure who will be involved in this sector
   e. Avoid end-of-pipe solution and move towards strategic solution

8. Integrate policy into national framework to strengthen its regulatory power. Supporting argument for this lesson are:
   a. Build up stronger empowerment towards regulatory implementation by developing stronger command and control type for planning implementation.
   b. Develop more open and transparent planning process to confirm government performance
9. Formulate more applicable plan, policy and program to reduce gap between goals and implementation. To formulate more alternative solution toward applicable plan, we can derived from the Netherlands' experiences, such as:
   a. Give more chance to NGOs and CBOs to be more involved
   b. Give more opportunity to private sector to contribute in this sector
   c. Create regular review in order to refresh implementation monitoring
   d. Employ open discussion with community at large
10. To reduce conflict among region, thus coordination with other sectors and inter-jurisdiction department need to be strengthened.
11. Strongly motivate evaluation and monitoring of plan, policy and program
12. Maximization towards possible resource, such as human resources or financial aids

Based on crosscheck analysis with potential resource and constraint in Indonesian context, those possible policy transfers are reduced into applicable policy transfer, such as:

Adaptable policy transfer

1. Change policy direction from "how to dispose waste?" into "how to maximize waste?", by encouragement towards composting process.
   To support composting process, national government should provide marketing of this product, by:
   - Provide assurance that product of homemade compost (small-scale program of composting) or hi-tech compost (large-scale program of composting) shall receive equal chance to be transferred for other sector such agriculture.
   - In order to reduce conflict between regions, product marketing should prioritized self-sufficiency principle (compost product marketing should distribute within regional scope, if there are more product should be distributed, inter-jurisdictional coordination should be developed.
   - To promote compost from waste, national strategy should banned imported fertilizer for temporal time.

2. Create wider involvement in MSWM for improvement of social knowledge by:
   a. Empowering local involvement through more programs that support waste separation
   b. Develop new institutional support or give legal protection for scavenger

3. Improvement of MSWM service, by:
   a. Creating basic information system of waste generation, waste facilities, waste type/streams
   b. Regular waste collection through formal or informal sector (scavenger)
   c. Separate waste from households through non-governmental assistance
   d. Development of small scale program to accommodate homemade composting

Preferences of applicable policy transfer are directed to composting due to these following arguments:

- Type of waste in Indonesia is dominated with organic waste
- Climatic condition is supportive towards composting organic waste
- Introducing financial benefit over this process, which in turn revokes community willingness to recycle their waste
- Compost product could be source of financial aids in MSWM, thus lacking of financial aid could be solved.
- Abundance of human resources may save investment toward waste technology, thus waste separation and small scale recycling is an important steppingstone for Indonesia to change into better maintenance of MSWM

From "policy transfer" point of view, this study has concluded that in MSWM sector, transfer of operational/detailed ideas is harder to be conducted compare to absorb to general ideas. This result confronted to previous statement is contradictory. Let us extract

the meaning of this transfer from implementation point of view. Although general ideas are easier to be transferred, it does not mean it is easier to be implemented. Still, general idea conceived broader insight, thus it has more difficulties during implementation process compare to detail/operational ideas.

5.2 Recommendation

Considering the condition in Indonesian context which is not yet ready for bigger and ambitious achievement in MSWM, hence recommendation are divided into three phase. Although in theory, operational policy transfer is considerably easier than other broad policy idea, it is not yet applied in Indonesian context. Geographical, community behavior and financial ability hinder transfer of operational idea. In addition to the reason, assessment toward promptness of Indonesian condition to receive operational method from the Netherlands context is considerably poor. Hence, supporting system are supposedly build up first through development of basic information system, development of applicable plan or program in MSW management and creation of monitoring and evaluation using open planning process and community involvement. In other words, operational methods are not priority to be transferred compare to regulatory transfer.

Review towards experience in the Netherlands context is quite inspiring for Indonesia. There are two major element highlighted in this study. *First,* notion towards adoption of strategic idea in MSWM in which underpinning the importance to move from traditional approach to alternative approach. *Second*, to accommodate alternative approach, there is reviving need towards better service performance in MSWM. Both highlighted element are supported by fulfillment of regulatory instrument in Indonesia. Thus, there is possibility to transfer policy idea. However, not all policy idea can be easily transferred; the more general the idea is, the more time we need. Due to the fact that policy transfer are hindered by political condition, financial and lack of community involvement, thus not all of policy transfer could be conducted in short period of time. According to priority of issue and extent of policy ideas, this thesis categorized type of policy transfer into three categories, such as:

1. Policy adoption in short period of time (1-5 years)
   To fulfill better MSWM, first scenario is **developing system information for MSWM**. This institutional development is actually been done in Indonesia case, but not fully accurate and complete. Each City Cleanliness Department has actually identified source of generation and waste streams, but the research are not conducted regularly and accurately. Thus, more research should be conducted and accuracy should be added. In details each information system should at least been able to identify these following characteristics of waste:
   - Type and characteristics of waste streams
   - Precise projection of waste accumulation
   - Possible environmental impact
   - Feasibility study on environment, economical and social point of view
   - Measurement towards land capacity, construction and other facilities
   - Measurement towards other type of methods, such as recycling, landfill for electricity and composting

System of information is important tool to reduce inter-jurisdiction conflict. If each local area able to map their waste accumulation, it will be easier to locate which area suffers from the most unbearable waste accumulation. Thus, each local area able to positioned on site treatment such as creating small scale composting group or improve sorting out of waste in the area by full contribution of scavenger. Therefore, transportation cost for waste is reduced, and could be effectively transferred to other stage of MSWM. By doing so, at once national government is directing traditional approach into better MSWM practice. System information for MSWM indirectly build conception that inappropriate MSWM may give negative feedback for human, thus by providing system information, the government also develop sharing knowledge in our society to appreciate this sector.

2. Policy adoption in moderate period of time (within 5 - 10 years)
   Technically, adoption of developing better system information should be followed with **change direction from tradition approach towards alternative approach within regulatory system in step-by-step method.** First thing Indonesian government should do is make sure that information system is implemented as an input for future projection of municipal solid waste trend and infrastructure capacity. Monitoring and regular evaluation toward MSWM practice should be encountered with strong commitment from the government. If national and local government agrees to take strong action to implement sustainable approach for MSWM, then within 5 years period Indonesian government should start to change its planning orientation by:
   - Integrate demographic, social, environmental orientation into its plan and policy. The integration of this policy is better in form of strategic planning document, which should be strongly implemented by command and control government type. Therefore, Indonesia finally able to develop new insight in its national framework and local area shall plan operational method, which is similar to national insight.
   - There are various new idea should be infused in the strategic planning, but it is difficult in its implementation. To avoid the same faults, Indonesian government should create more adaptable plan rather than to adopt imaginary principle that difficult to be achieved. For example, in the first five years, strong implementation toward composting should be encouraged. Thus, in the next four years new principles are added, such as adopting polluter pays principles and packaging regulation into policy review. For the next four years, plan and policy should be reviewed to monitor and evaluate the implementation. After getting separation of waste into practice and maximization of waste into potential resource and infusing polluter pays principles, national strategies should be directed to implementation of waste hierarchy with supporting programs that involved grass roots activity. By doing so, review towards contribution of non-governmental organization (NGO) and community-based organization (CBO) is continuously held.
   - In order to empower community knowledge, local and national government should provide more assistance program to educate our society that MSWM may contribute negative impact to our daily life. Education over environment protection could not be done at once. First, small-scale program should be

conducted and being reviewed regularly. Small-scale program means assistance to small group of community as in neighborhood scale, which is sensitive to waste generation (such as surrounding traditional market), or in school (create conception to children that waste may posed environmental burden; show them how to recycle waste into other form of product). If small-scale program is effective, then national government and local government may continue to create larger-scale program and apply for annual monitoring and evaluation.

- In order to reduce conflict between local authorities it is important to underpin application of on site treatment. If composting program is successful, then empowerment within regional and local framework should be directed to equal product distribution. To assure equal distribution, each local area should identified capacity of waste that is available for composting process, and recollection of waste accumulation

3. Policy adoption in longer period of time (within 10-30 years)
   To motivate implementation of sustainable MSWM thus evaluation and monitoring of plan, policy and program in Indonesian context should be encouraged. In longer time, government provides tolerance time to revoke community conception towards waste conception. By that time community assumption that environmental protection is as important as protecting human sake, thus more detail policy transfer could be applied. For example, try to open up to private involvement with full control of the government that assures community benefit. As argued above, to implement privatization, many requirements are supposed to be fulfilled. By 10 or 30 years from now, it is projected that Indonesian government already imply for better performance and does not dominate energy source, thus, privatization of Indonesian MSWM are available for implementation. This suggestion needs to be discussed further for future sake in following research.

In short term period, national government are ready to accommodate system information base thanks to condition of political in Indonesia these days which is tend to absorb liberalization. Public awareness starts growing rapidly since reformation era, demand towards transparency and better planning implementation also increasing. Furthermore, national government also starts to realize the importance of giving clear and transparent report of their performance to public. This condition may support recommendation to form basic information system related to MSW management such as compilation of waste streams, waste accumulation, projection and facilities capacity.

Instead of having enough financial support to adopt high-tech operational method, Indonesia could possibly take advantage from its abundance resource of scavenger, which in turn may help in sorting out waste, which is synchronized to recent approach in waste management, reducing waste from its source. Forming regulation to protect scavenger right and give them legal networking is one of the best solution for Indonesian case. Recalling one of Indonesian task in Millennium Development Goals (Wilson, 2005) to eliminate poverty, then this proposal are suits more since scavenger are characterized with poor living condition. By giving legal protection and provide networking for scavenger, their bargaining power are secure and may contribute more in separating waste.

In the other hand, priority of privatization are set up in long term due to the fact that Indonesian political background and community involvement are not yet ready to conducts such proposal. As a matter affect, privatization also need to unbundled administration structure and ownership of facilities. Thus, it may need more than ten or twenty years to adopt with such proposal. To support policy transfer, Indonesian authority supposedly start to initiate program in which prior to waste reduction at source and reduce the notion towards waste disposal management within its policy context.

The categorization above represents recommendation to Indonesian government in doing policy transfers. In order to keep pace with other country, Indonesia should strive hard by maximizing their resource and thinking strategically towards recent circumstances. The most important thing above all, is willingness from the government to change and commitment to construct better planning process either in least prioritized infrastructure development, Municipal Solid Waste Management. By development of adaptable plan, policy and program Indonesia shall easily adapt with dynamic environmental change. Other issue such financial and tax regulation are not discuss thoroughly within this study because Indonesian financial condition are not comparable to the Netherlands context which already been away too advance. Further research is necessary to evaluate this issue.

Epilogue

Introduction

Planning practice in Indonesia is not as advanced as in other countries. Various regulatory instruments to support planning practice are sometimes neatly put above dusty bookshelf. Many researches in Indonesia show that MSWM suffers from poor maintenance, adequate with traditional system facilities, not yet been able cover service area and continuously adding up environmental burden. End of pipe strategy which guide operational/technical maintenance in MSWM was considerably lacking in giving support of better planning practice in this sector. Existing condition in Indonesia is worsened due to the facts that government commitment in delivering better place to live in for their community is rather low, lacking financial and human resource support and lack of institutional role in projection of future capacity. In fact, Indonesia conceives potential resource for this sector, the existence of scavenger, which donates utmost support in separating waste. Scavengers are closely attached to recent approach in MSWM, recycling. Their performances are indirectly helps our nature to save resources by involve in re-cycle process more often than others. However, it is not enough to create better MSWM using such grass root action; it is an exact estimation that they are powerless without legal guidance and protection from the government. As predicted, Indonesia has not yet creates such comprehensive and strategic scenario based on their potential resource to create better MSWM. According to the illustration above, we can put some notes that there is a need to improve better MSWM in Indonesian context.

Drawn from the experience from European/the Netherlands context, most of them are already applied new approach in MSWM, which is tend to Re-cycle, Re-Use and Reduce (3R) and applied incinerator as final disposal option to create heat, energy and electricity. MSWM in the Netherlands are involving private sectors, thus government task and duty are lesser than in Indonesian context. Before come to recent level of good relationship between public and private, the Netherlands experiencing strong command and control type of planning then shift to open planning type. Most of planning practices in European/the Netherlands were conducted based on open planning process and performed based on strong compilation of information system. Too much gap lied between planning practice of MSWM in both countries. The most fundamental lesson need to be learnt from the Netherlands is that the approach in proposing solution for MSWM. According to European context, most experiences are no longer relied on problem definition orientation but put stress on potentiality. Rather than creating vicious circle in problematic condition of MSWM, the Netherlands create and maximize their potential resource (such as strong sense of regulation implementation, privatization involvement and community support). From Indonesian context, it requires fierce efforts and long run to catch up with the Netherlands. In summary, to create better MSWM is possible to conduct it using policy transfer.

Existing condition of Indonesian Municipal Solid Waste Management (MSWM)

Orientated to framework of thinking in waste management, the following figure shows the implementation stage in most developing countries (see figure 13). A.K.J Tan (2002) asserts an in line argument on his report that most challenging issues in environmental protection faced by almost all regions around the world especially Southeast Asia, is the institutional structure for governance. Lack of financial aid leads to minimum support of waste management tools and property; lack of institutional awareness leads to inefficient performance and affect to community behavior. Zurbrugg (1999) concluded that basic problem in solid waste management in developing countries are mainly caused by poor policy related to delivering proper service, lack of legislation, political will, commitment, awareness and insufficient financial and technical support as well as lack on providing suitable land for waste disposal sites. Wilson, et.al (2005) brought to light that one of the challenges in solid waste management in developing countries is maintaining informal sector. This informal sector in waste management are experiencing a low quality of life, poor working condition and force down to excessive working hour.

Sense of sectoral development in urban area is resilient; hence, sense of integration among is not yet assembled. This condition hindered open planning practice, because necessity towards one sector is exclusive and need no interference from informal actors. Municipal authorities become sole actors in waste service provision, without any possibility to the involvement from private sector.

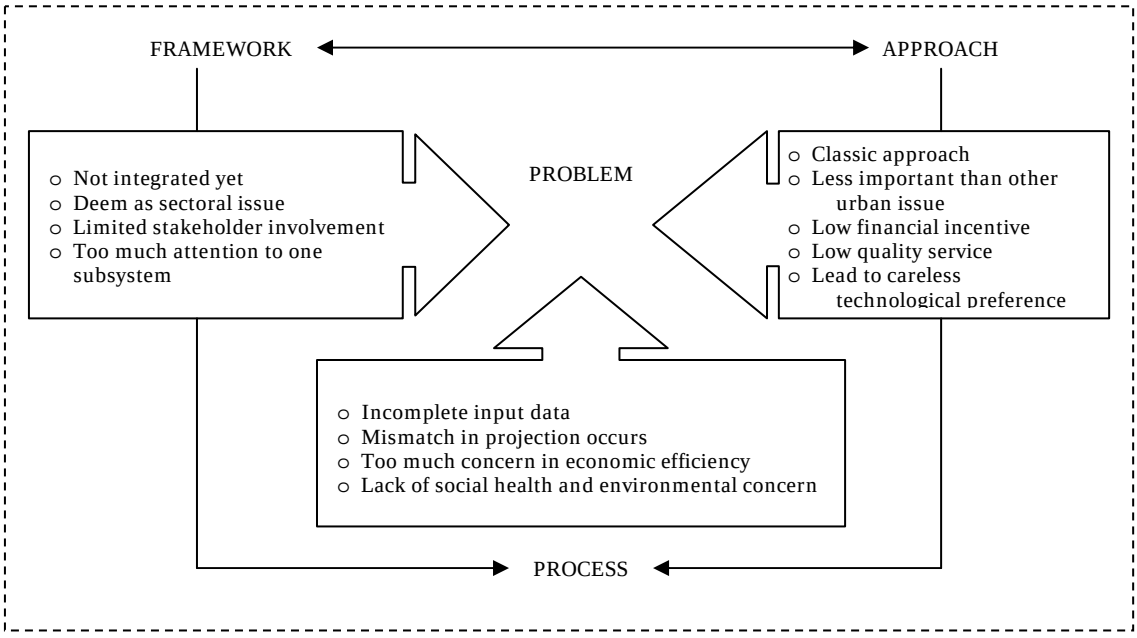

Figure 13 Problematic situation in municipal waste management in developing countries (source: research analysis)

Deduced from illustration above, problem in municipal solid waste planning in developing countries are complex and complicated. The complexity of problem is actually

seen from new approach. The most fundamental question is “do developing countries really need to apply new approach proposed by developed countries?” There is growing need to improve service of MSWM in Indonesian context, either in its performance, environmental protection and socially benefited argument. Thus, it is important to applied new alternative approach, otherwise cost-effectiveness of MSW management are not last longer and tax being paid are not in maximum usage.

Summarize previous explanation on MSWM condition in Indonesia, there are several concluded statement that:

1. Indonesia is suffered from poor basic primary data of waste stream; waste accumulation; and waste actors (data about scavenger or community behavior). Inexistence of basic information system for waste projection and facility sufficiency worsened the condition. Due to lack of information, planning process was difficult to be carried out.
2. Indonesia could not provide sustainable legal framework for MSWM; direction of existing waste management remains in the hand of traditional approach.
3. In addition to the statement above, JICA (2003) concluded that problem overview in Indonesian context are also in terms of limited knowledge and skill on technical operation [see figure 14]. Therefore, it is necessary to increase capacity building of the community as in Dutch context.

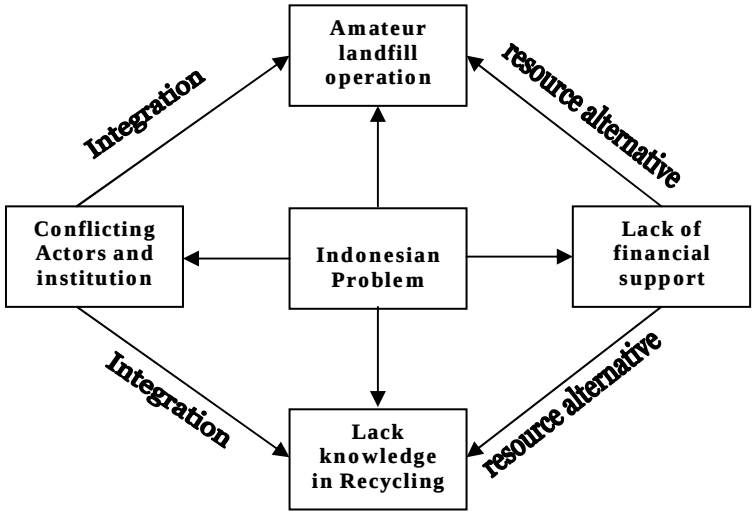

Figure 14 Problem in Indonesia and proposed solution (JICA, 2003 and research analysis)

This condition are obviously occurs in urban area, where projected pulled more population concentration. Mostly in urban context, preferences towards technology in municipal solid waste management (MSWM) are changing from time to time and generally generate greater environmental burden. Take for example, open dumping creates insecure community health and problems in sitting location of final disposal; incinerator creates dioxin and ashes, which lead to air pollution and global warming. None of these preferences provides lesser impacts to the environment. However, paramount considerations to choose preferences are not only environmental impact but also heavily relied on economical feasibility and resource availability. To plan better municipal solid

waste most government should give equal consideration toward three sustainable pillar, ecology, economy and social matters.

Future action

Environmental issue may cost enormous lost, if the maintenance is not well developed. The results of those lost are not in recent years, but probably in the next couple of year. Thus, development process supposed to accommodate environmental preservation. Urban area in Indonesia is an important area to manage. This area has attracts migrant to come, cause faster environmental degradation due to community consumption upon goods and services. The preservation in urban area requires several types of planning, such as environmentally oriented planning and communicative and participatory planning. Therefore, sustainability concept able to employ in our country, since our government lack of human resource quality, thus resulted to imperfect governance and policy implementation. The persistency of the government act is important in urban management because environmental issue correspond to community welfare and able to result disparity and inequality. Afterwards, those types of planning are urgently required to put into operation to accommodate the susceptibility of the natural resources.

From the study, we may derive conclusion that infrastructure development in Indonesia, especially MSWM, is not yet conducted based on environmental orientation. Indonesia should been able to come up with creative solution to combine community perspective to prioritize economical with ecological analysis. Thus, for future action Indonesia should apply sustainable approach. To start with, Indonesian government should be directed to better governance, with strong commitment to command and control regulation, which contain environmentally orientation at first. During its process, governance type should open to discussion and review by application of communicative planning. This conceptual action could be translated into practice in each infrastructure development. For MSWM, government should provide adaptable plan, policy and program that corresponds and correlates with dynamic change of our environment.

More research to follow up this idea is supposedly directed to evaluate efficacy of government performance in infrastructure development. Are they give enough institutional support; provide adequate plan, policy and program; support community with enough legal protection and detail guidance. These questions are reflection of government ability in delivering service. Thus, for better infrastructure development in general, and specifically for those that posed environmental threat, this research is an important input for future review.

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