Waste Management Based on Wise Behavior in Japan and Indonesia

Mustofa Kamil and Indriyani Indriyani
Departemen Pendidikan Luar Sekolah, Universitas Pendidikan Indonesia, Bandung, Indonesia
mustofa.kamilun@upi.edu

Keywords: Household Waste Management Model, Wise Behavior, Society Empowerment.

Abstract: Environmental damage is not only caused by the lack of understanding of the environment as a result of low educational background, but it is often caused by many factors, especially about the fulfilment of life needs that are not based on wise knowledge, awareness, attitude and behavior about how to maintain and preserve environment due to greed, waste, and ignorance. Environmental issues, especially waste, are very easy to find in Indonesia. We often encounter rubbish strewn across the river, drainage, rice field, roadside, and other open areas, which are difficult to find in Japan especially in Kitakyushu City. This research was conducted for 6 months under qualitative case study approach, the location of this research was in Kitakyushu City of Japan and Bandung City Indonesia. The purpose of this research is to depict household waste management in Japan and Indonesia realized in the wisdom behavior by society in managing the waste. The research results show that the efforts made in building environmental wisdom in Kitakyushu Japan are realized by integrating "environment conservation" policy and "industry promotion" policy with the aim of building resource-recycling-based community. In fact, these efforts are conducted jointly between government, community and industry by optimizing the industrial infrastructures, as well as improving the community technology and knowledge capabilities. While in Indonesia, there are still non-synergistic policy issues, between regulations, facilities, environmental education and ineffective waste processing technology.

1 INTRODUCTION

Some developed countries behave wisely to the environment or nature, it is seen from their people daily behavior in managing waste, especially household waste; both wet and dry. Japan, Korea, Singapore and Malaysia are so attentive to the cleanliness of the community environment that their governments dare to spend a very large budget for the household waste management.

Garbage is often a problem for some people, but it is inevitable; used bottles, cigarette butts, plastic, cigarette packets, old newspapers, waste paper, and other unused items: TVs, refrigerators, computers, radio, scrap metal, as well as household waste in the form of food scraps piled on the roadside. All this becomes a separate problem for the community around the globe, especially in the developing countries where environmental management (especially garbage) is not as advanced as modern society.

The strong unpleasant smell in the temporary garbage dumps, both legal and illegal, (discarded carelessly) by the community is a daily sight that can be easily found in developing countries, especially Indonesia. Similarly, river water contamination caused by accumulated garbage alongside the river banks due to random disposal, factory waste, or household waste are easy to find in Indonesia. Along the same line, previous studies on the waste management in Indonesia states that waste management is still a major concern (Sulistyorini, 2005); (Wahyono, 2011).

What causes all this to happen is whether it is because of people who do not understand the environment (especially environmental hygiene), low public understanding of the rules, the absence of the regulation, or the lack of the environmental regulations socialization. A countless question about the problem will not be solved only in this paper, as it requires a very long thought and process, especially through an in-depth research using either qualitative or quantitative approaches or building an applicative model as what is done in Japan especially in Kitakyushu City with its Eco-Town concept. But the main question that often arises in every article about environmental management,

Kamil, M. and Indriyani, I.
Waste Management Based on Wise Behavior in Japan and Indonesia.
In *Proceedings of the 1st International Conference on Educational Sciences (ICES 2017) - Volume 2*, pages 200-207
ISBN: 978-989-758-314-8

especially waste management is what happens with people in developing countries, especially Indonesia, so that the waste problem is very difficult to overcome? (Maniatis et al., 1987); (Chaerul et al., 2007); (Ridhuanand, 2013); (Tahir, 2011).

Several other studies suggest that various approaches to waste management are done prudently and have result in satisfactory outcomes. But it needs a government follow-up, not only remains as a product of a research. These efforts include waste management into compost, conversion method of plastic waste into fuel, good waste paper management, socio-cultural based waste management, effective household waste management, community-based integrated waste management (Sulistyorini, 2005); (Surono, 2013); (Wahyono, 2011); (Wardi, 2011); (Riswan et al., 2011); (Ma'Rufi et al., 2005); (Budihardjo, 2006).

Jickling (1994) and Sauvé (1996) explains that in designing environmental education programs, it is necessary to look critically at the realities of education, the environment and social conditions. The typology of such conceptions can be a tool to run the theory of environmental education. Karyanto (2012) explains that the strengthening of environmental wisdom is done through integrated vertical affective orientation in formal and non-formal education and informally planting and habituating environmental values in developing environmentally wise society. While Halford and Sheehan (1991) explains further through his research that decisions on wise behavior are influenced by human responses to environmental change, one that influences decision making is scientific information (knowledge) disseminated through society and the media has an important role in this process. This research, thus, will show how the government, stakeholders support environmental wise behavior. In addition, this research leads to the form of community behavior in protecting the environment from damage.

2 RESEARCH METHOD

This study used qualitative approach. Qualitative study describe condition or behavior occurring in a social group or phenomena. The data collection process was carried out through interviews, documentation and observation. The study was carried out in Bandung, Indonesia and Kitakyushu Japan. The analysis was completed through: 1) Classifying and arranging data; 2) editing and coding the data; 3) confirming and verifying the data; and 4) analyzing the data. The main focus of this study was the waste management models in Japan and Indonesia through environmental wise behavior.

3 RESULTS OF THE STUDY

3.1 Kitakyushu Objective Condition

Kitakyushu city has a very interesting environmental history. It was named the dirtiest city in Japan, but it now becomes the most hygiene city in Japan. It is also known as the best environmental model for developing countries around the world, one of the cities with smart and eco-friendly society concept.

Figure 1: Kitakyushu Japan.

Kitakyushu City with Area: 485 km² was divided into 7 districts with GDP: 3.5 trillion JPY (2005) Population, 977,288 in 2011. Major industries like steel, chemical, machinery, ceramics, IT industry are in the north of the island of Kyushu bordering the strait that separates Kyushu from Honshu Island.

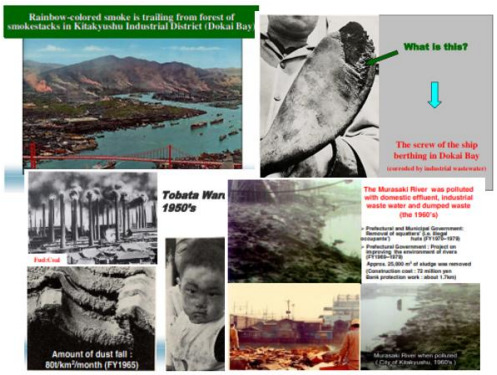

Figure 2: The condition of Kitakyushu City In the past.

Collaborative Anti-pollution movements done by stakeholders. The collaboration was done by some stakeholders: citizens, public administration and industries. They acted as company watching company watching, study with scholars, anti-pollution equipment, and sewage treatment and monitoring facility.

Figure 3: Anti-Pollution Movements by Stakeholders.

The development of Kitakyushu City as the cleanest city in Japan, has undergone many years of process. The condition shows its development from the 1960's to the 1990's.

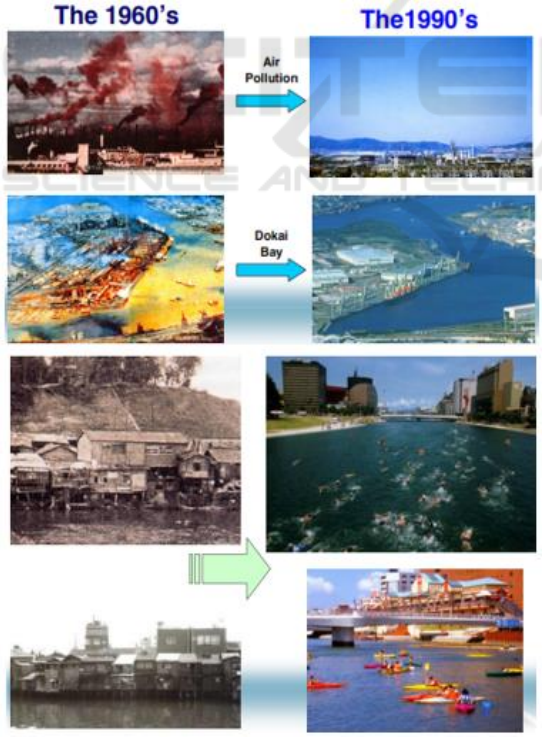

Figure 4: Kitakyushu environmental Development.

The socialization and environmental education process conducted by the government in Kitakyushu City were implemented with various facilities, such as: 1) Environment Museum, 2) Eco-Town Center, 3) Historical and Natural History Museum, 4) Recycle Plaza, 5) Environment Museum of Water, 6) Itouzu Forest Park, 7) Yamada Green Park, 8) Hidaodai Nature Village, 9) J-Power, 10) River Walk Mall (Energy Saving), 11) Wind Power, 12) Sone-Higashi Elementary School (Eco Reconstruction of School), 13) Sone Tideland, 14) Rice Terrace in Ouma, 15) National and Semi National Park.

Environmental education is a way to educate people. The importance of maintaining the natural surroundings from any damage, either from air pollution, waste problems, water problems or soil damage, because the environment is the smallest part of the earth, it is necessary to instill a healthy awareness of the environment as our responsibility.

The waste management is done systematically, among other 1) collection of household waste in accordance with the plastic (container that has been provided) which is priced 50 yen up to 500 yen, in accordance with categories of garbage collected i.e. plastic waste, aluminum or iron waste, paper waste, household waste and others. 2) Garbage collection by officers, every 2 times in 1 week, 3) Waste processing at factory location, 4) utilization of garbage to other goods, as the recycle result.

The utilization of waste processing is used for the manufacture of road asphalt, a landmass / a new land establishment, reselling the recycled products, utilization into alternative energy.

Figure 5: The utilization of Waste Ore into Asphalt Material.

Figure 6: The utilization of waste into land mass.

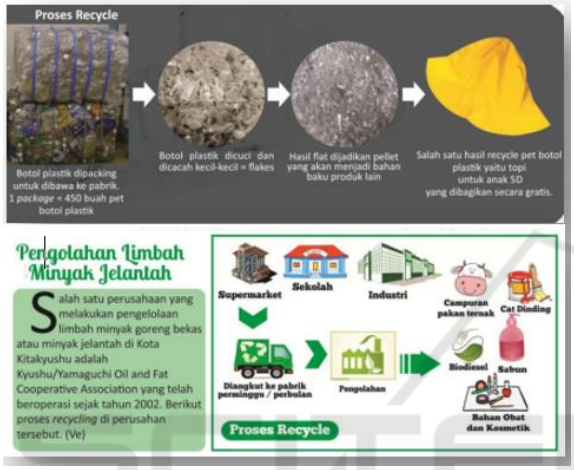

Figure 7: The utilization of waste into land mass.

3.2 Bandung City Objective Condition

Hygiene services in Bandung covers all areas of Bandung, which is 16,370 ha. To facilitate the operational arrangement of cleaning service, Bandung City area is divided into 4 (four) section of service operation area that is: 1) West Bandung Operational Area, 2) Central Bandung Operational Area, 3) East Bandung Operational Area 4) North Bandung Operational Area. The Increasing number of the population leads to an increasing amount of waste generation where the increase is followed by optimal management, so that the waste problem does not cause environmental damage and public health quality deterioration. The community waste generation is projected at 1,549 tons / day with the total population of 2014 of 2,748,732 and garbage transported to the final waste processing plant (TPA) of ± 1100 tons / day, with organic composition of organic waste of 57% and 43% (JICA Final Report in 2010).

The efforts made by the Government in managing waste, among other forms, are: 1) waste bank service, 2) cleaning service, 3) special services, 4) garbage dumping service, 5) sweeping service. The purpose of the establishment is to support 3R program (reduce, reuse, and recycle) in accordance with the Regulation of the Minister of Environment and to awaken the public to a healthy environment amongst other things: 1) create a cleaner environment, 2) awaken the public about the importance of cleanliness, 3) make garbage as economic goods, 4) increase public income.

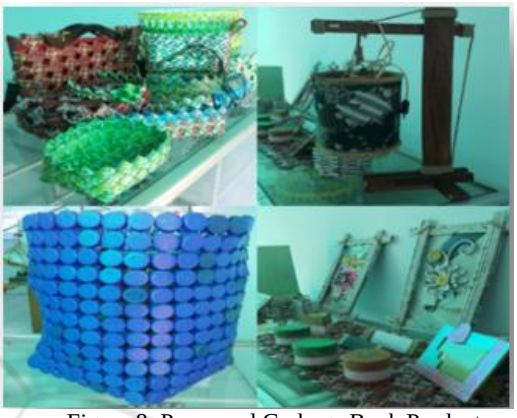

Figure 8: Processed Garbage Bank Product.

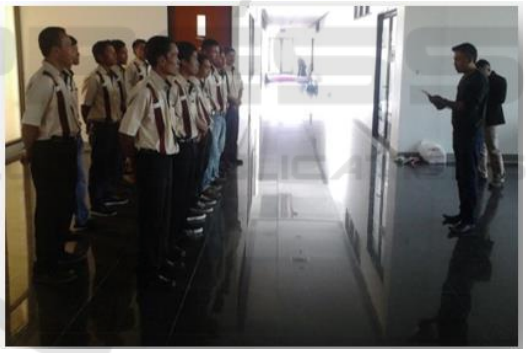

Figure 9: Cleaning Service Operators.

Special service is a unit that provides special hygiene services, covering: 1) direct transport to the location, 2) schedule that can be adjusted with consumer demand, 3) clean and closed vehicles 4) special discounts to garbage bank customers.

Figure 10: Dump Truck.

Garbage transportation is divided into two transportation services; residential trash and commercial and non-commercial garbage transport. Residential trash transportation is a transportation of residential waste done by dump truck into TPA. Similarly, it is applied to non-commercial such as government hospitals and education areas.

Street sweeping is done in the protocol streets carried out 3 shifts of work, i.e. shift 1 by the sweeper at 04.00-11.00 and shift 2 by outsourcers from 11:00 to 17:00 hours and shift 3 sweeps in a special lane. The means used are broom stick, dustpan, carangka, and 120 liters container.

Figure 10: Sweeping Service.

Some of the problems that often occur in Bandung, associated with waste processing, include:

a) Lack of community awareness, this can be seen from waste production indicators that continues to increase.
b) Limited local government services, the capacity of waste management is only 60%.
c) Organic waste is the largest composition in Bandung, the community does not separate between organic and non-organic waste, causing waste management becomes more difficult and inefficient.
d) Limited garbage dump area, so the waste collection process is done in cooperation with other neighboring local governments. Coordination issues are major issues, especially if there is a conflict in the community.
e) Uncompromising rules, i.e. sanctions for people who violate them.

Figure 11: Bandung Mayor Monitoring Garbage Blocking Sewers.

Figure 12: Bandung City Janitors Cleaning River Flow from Trash.

Figure 13: Temporary Garbage Dump.

4 RESULTS AND DISCUSSION

The success of environmental (environmental conservation) management in some developed countries especially Japan begins in the family environment, educational environment (school, non-formal education unit / kominkan / shimin center) and community environment and other institutions which are fully responsible on environmental management. (Naimah et al., 2012): (Siswati et al., 2009). They believe that education is the most appropriate place to change people's attitudes and behavior regarding to their environmental management and conservation. Some efforts made by the Japanese government include: integrating curriculum (school) with environmental preservation, teacher, principal and administrative personnel training in improving their knowledge, attitude and skills in environmental management. Provide a full role to kominkan/simi center in developing environmental management programs with community leaders (RT / RW), volunteers and families. So that schools and other educational institutions become the main pioneers in the environmental management and conservation.

What happens in Japan can be a very valuable lesson for the people of Indonesia, in Indonesia there are still many issues related to the environment management and preservation. So, the role of ESD will be more functional in all aspects of community life. Not only on the issue of maintaining, utilizing

and preserving the environment but on all other aspects including:

a) Acquiring new skills and competencies in the field of environmental conservation and maintenance
b) Encouraging economic growth and productivity
c) Encouraging continuous innovation in maintaining, preserving, utilizing and conserving the environment;
d) Accelerating efforts to alleviate poverty;

These four are the priorities of ESD in building today's society and its future. What the central and local governments have to do to answer that challenge, it is necessary to have fundamental thinking and strategic efforts in encouraging people to be able to make it happen quickly. Without real and strategic programs, the environmental problems in Indonesia will continue and will be more difficult to solve. As an example of waste management, garbage has been one of the scariest things in Indonesia ever since, it is common to see people (residents) who throw garbage into rivers, ditches, culverts or on roads that are not garbage dumps or TPS. It is something familiar in this country with the 246,533,673 population. Imagine if they throw garbage in the river as much as 0.76 kg / per day. It means that the Indonesian people produce as much as 187,366 tons MSW of waste in the area of 1,890,000 km2 distributed to 33 provinces. (Chaerul et al., 2006).

This condition is understandable regarding to the number of garbage dump and the operators. It is difficult to manage the waste if the society fails to understand how to sort the waste based on its nature. Only by scavengers who try sort according to the needs and still have the sale value or can be recycled, and even then, the percentage is very little. It is this issue that is growing every day and it is unthinkable how future generations live in a country full of waste. Several programs have been undertaken by the government that include developing waste banks, increasing participation and mutual cooperation, cleaning river channel, developing ESD in formal and family education, rewarding the clean city and other strategic programs such as; building incinerators, reproducing TPS in each RT / RW, adding more janitors in every town and village. However, those have yet to solve the waste problems. That is why a fundamental strategy that is started from the bottom (family and society) as what the city of Kitakyushu did in 1978.

The results of the study indicate that: increasing community participation in solid waste management known as MSW (solid waste management) with family (household) targets generated that: adults are highly unmotivated and take opportunities in environmental education compared to children. Environmental education given to children is more effective and easy to do; especially introducing environmental education through the school curriculum, so MSW is more easily introduced in Indonesia through formal education (school). (Chaerul et al., 2006)

Eco pedagogic development in community education and formal education required a clear and strategic planning, so that Eco pedagogic development program runs and succeeds in the designated direction and purpose. In addition, Eco pedagogic planning will clarify the process of preparing various decisions that will be implemented in the future. The function of planning in Eco pedagogic development includes the determination of; what to achieve, how to achieve it, how long it will take in development, how much power is needed and how much cost is needed in its development. Several dimensions of planning that need to be considered in the development:

a) Significance: the level of significance depends on the objectives of the proposed Eco pedagogic program and the significance can be determined based on the criteria built during the planning process.
b) Feasibility: Eco pedagogic planning should be structured on the basis of both reality considerations related to the cost and implementation of the Eco pedagogic program.
c) Relevance: the planning developed in the Eco pedagogic program is able to solve the problem more specifically at the right time in order to achieve optimal Eco pedagogic development goals.
d) Assurance: developed planning can reduce unforeseen events in the development of Eco pedagogic programs.
e) Accuracy: Eco pedagogic planning is arranged in a simple, and it pays attention to various factors that are directly related to the development of the program.
f) Adaptability: Eco pedagogic planning must be so dynamic that continuous information as a feedback are sought-after. In addition, flexible or adaptable planning can be designed to avoid unexpected things.
g) Timing: it is very much an indicator, as well as the involvement of Eco pedagogic planning in predicting the future, as well as the validation and reliability of the analysis used, as well as when to assess current Eco pedagogic needs and their developmental relevance in the future.
h) Monitoring: it is important to look at the extent to which the Eco pedagogic program and its

development process components are running effectively and efficiently.

Referring to the function of Eco pedagogic planning, this section will deliver some steps that will be pursued in Eco pedagogic development:

a) Developing a faithful and devoted human being towards God Almighty, noble character, possessing knowledge and skill, physical and spiritual health, solid and independent personality and sense of responsibility of society and nationality in managing and maintaining the environment.
b) Growing awareness of the environment through environmental awareness moves so that people are more critical, more developed and knowledgeable.
c) Build, manage, develop, maintain and socialize awareness movements to manage and preserve the environment.
d) Maintain and develop information resources in managing and maintaining a fast, precise and inexpensive environment for the community, through institutions such as: PKBM, Posyandu, Majlis Ta'lim and other similar facilities.

5 CONCLUSIONS

Changes in community behavior towards people who are aware and concerned about the quality and sustainability of the environment need to be done through real examples of role models and through education. The process of environmental education needs to be given from an early age, either through formal or informal, and non-formal education. In the process of education, the provision of knowledge is an early part of the formation of attitudes and behavioral changes so that learners are more concerned with the environment that is marked by the existence of: (a). Positive attitudes towards activities that support the realization of a cleaner, beautiful, comfortable environment through waste minimization efforts, waste utilization and recycling, (b). Utilization of natural resources in an efficient and sustainable and energy savings; and (c) environmental hygiene activities, healthy physics and mind, and harmony in society.

REFERENCES

Budihardjo, M. A., 2006. Studi potensi pengomposan sampah kota sebagai salah satu alternatif pengelolaan sampah di TPA dengan mengunakan aktivator EM4 (Effective Microorganism). *Jurnal Presipitasi: Media Komunikasi dan Pengembangan Teknik Lingkungan*, 1(1), 25-30.

Chaerul, M., Tanaka, M., Shekdar, A. V., 2006. A challenge for waste management from small health care establishments in Bandung city, Indonesia. *廃棄物学会研究発表会講演論文集*, 17, 94-96.

Chaerul, M., Tanaka, M., Shekdar, A. V., 2007. Municipal solid waste management in Indonesia: status and the strategic actions. *岡山大学環境理工学部研究報告*, 12(1), 41-49.

Halford, G. S., Sheehan, P. W., (1991. Human response to environmental changes. *International Journal of Psychology*, 26(5), 599-611.

Jickling, B., 1994. Studying sustainable development: Problems and possibilities. *Canadian Journal of Education*, 19(3), 231-240.

Karyanto, P., 2012. Membangun Perilaku Masyarakat Arif Lingkungan Hidup. *In Prosiding Seminar Biologi* (Vol. 9, No. 1).

Ma'Rufi, I., Keman, S., Notobroto, H. B., 2005. Faktor Sanitasi Lingkungan yang Berperan terhadap Prevalensi Penyakit Scabies Studi pada Santri di Pondok Pesantren Kabupaten Lamongan. *Jurnal kesehatan lingkungan*, 2(1).

Maniatis, K., Vanhille, S., Martawijaya, A., Buekens, A., Verstraete, W., 1987. Solid waste management in Indonesia: Status and potential. *Resources and conservation*, 15(4), 277-290.

Naimah, S., Nuraeni, C., Rumondang, I., Jati, B. N., Ermawati, R., 2012. Dekomposisi limbah plastik polypropylene dengan metode pirolisis. *Jurnal Sains Materi Indonesia (Indonesian Journal of Material Science)*, 13(3), 226-229.

Ridhuanand, K., 2013., Effect of Superficial Velocity of Pressure Difference on The Separation of Oil and Water by Using The T-Pipe Junction. *In International Conference on Engineering and Technology Development (ICETD)*.

Riswan, R., Sunoko, H. R., Hadiyarto, A., 2011. Pengelolaan sampah rumah tangga di Kecamatan Daha Selatan. *Jurnal Ilmu Lingkungan*, 9(1), 31-38.

Sauvé, L., 1996. Environmental education and sustainable development: A further appraisal. *Canadian Journal of Environmental Education*, 1, 7-34.

Siswati, N. D., Nanda, R., Anggraini, R., 2009. Pembuatan ekosemen dari sampah organik. *Jurnal Teknik Kimia*, 3(2), 227-231.

Sulistyorini, L., 2005., Pengelolaan sampah dengan cara menjadikannya kompos. *Jurnal Kesehatan Lingkungan*, 2(1).

Surono, U. B., 2013. Berbagai metode konversi sampah plastik menjadi bahan bakar minyak. *Jurnal Teknik*, 3(1), 2013.

Tahir, A., 吉田充夫, & 原科幸彦. 2011. インドネシア国スラバヤにおけるコミュニティ・ベース廃棄物管理の分析. 環境情報科学論文集, (0), 131-136.

Wahyono, S., 2011., Pengelolaan Sampah Kertas di Indonesia. *Jurnal Teknologi Lingkungan*, 2(3).

Wardi, I. N., 2011. Pengelolaan sampah berbasis sosial budaya: Upaya mengatasi masalah lingkungan di Bali. *Bumi Lestari*, 11(1), 167-177.