Household waste management to improve the community economy via waste bank in Medan City

D Sriyanto¹ and T K Intan²

¹STIE Graha Kirana Medan, Indonesia
²Faculty of Universitas Sumatera Utara Medan, Indonesia

Email: kbse_darmawan@yahoo.com

Abstract. This study was aimed to identify the role of waste bank to reduce waste production and to provide economic value to the community, and also to increase the capacity of waste bank so that it will increase the economic value of the community. This research was conducted in waste bank in Medan. The data collected was primary and secondary data. The data collection techniques used were interviews and observations. The data analysis method used was descriptive method. The results of this study indicated that the role of waste banks in increasing the economic value for people in Medan is still low. So it was needed to increase the capacity of the role of waste banks to perform more leverage by receiving more waste in the community. In its operation, the management of waste bank is still constrained to the limitations of human resources competence, organizational and financial management. Finally, the role of government in accompanying the performance of waste bank in order to have synergy between waste bank, vendor, and financial institution is required.

1. Introduction

As the development of human civilization continues, the problem of waste so grows. The high number of population growth and development that is not balanced with the awareness of managing the right waste causes the rise of environmental problems. One of the factors causes pollution comes from the remnants of daily activities, which is commonly referred to garbage. Garbage is now an interesting issue around the world, especially in Indonesia because garbage is a real indicator of the contaminated environment and can cause various negative impacts for the community. Garbage issue arises because of its lack of management starts from disposal, transporting and reprocessing the waste. A good waste management should be able to create a quality environment as well as a healthy society, where waste is seen as a potential resource. Many facts show that a poor waste management has a bad impact on the environment, especially for society.

In addition to obstructing the landscape and aesthetics, the waste also plays role in the global warming issue that occurs currently. In fact, the lifestyle of most people in dealing with household waste by burning and throwing it into the final disposal site (landfills) that is eventually burned as well, will produce methane gas. Based on the explanation above, it can be said that poor waste management is the main element of the pollution occurrence. In order to overcome various problems of waste produced, various efforts are continued to be conducted. One of them is the waste bank program which is a program to empower the role of society that is expected to not only be able to reduce the volume of garbage, but also be able to empower the waste in order to increase the economic value and income of society.
Waste Banks are an effort to maximize the value of waste in order to create a healthy, clean, green and beautiful environment, and most importantly to reduce waste to landfill, to change people's behavior, to educate the community about the environment management, to increase creativity and to give benefit to the waste producers.

Nevertheless, the waste bank has not been implemented thoroughly and has not been able to operate optimally in overcoming the problem of waste in Indonesia, especially in Medan due to some obstacles in its implementation. Indonesian Environmental Ministry has targeted that every city must have 25 waste banks. Medan actually has reached the target by having 80 waste banks. However, with 80 waste banks, it can only supply 12 to 18 tons of rubbish to the main waste bank every month, while the estimated amount of waste produced is 2,000 tons per day. This became a concern to the authors for the study as the gap between the waste produced and the bank provided is so high. The concern also aligns with the concept that enhancing the utilization and existence of the waste bank in order to significantly reduce the production of waste disposed to the landfill is needed.

2. Research Methods
2.1. Type of research
The type of this research is qualitative. This research was conducted at waste bank in Medan, using primary data and secondary data. The data collection techniques used were interviews and observations. The method of analyzing the data used was descriptive method.

2.2. Research objectives
This research is focusing on the main issue that comes from the researcher's experience or through the knowledge gained from scientific literature. (Moleong, 2002). Specifically, the focus of this study is to understand:
1. Empowerment and Development of "Garbage Bank" in Medan, including:
   a. Product Policy as a regulation, socialization, communication and institution
   b. Resource Support
2. Government budget
3. Cooperation with PT Unilever
4. Implementation of waste Bank Program
5. Community participation in Medan in developing "waste bank", covering:
   a. Forms of community participation
   b. Conditions / level of participation
6. Factors that become obstacles and supporters in the development of "waste bank" as a form of community participation in Medan City, including:
   a. Supporting factors
   b. Obstacle factors

2.3. Data analysis
The analysis method used was a qualitative description, which was by using observations that occur in the field or in the location of research.

3. Result and Discussion
3.1. The Development of waste bank in Medan
a. Product Policy as Regulation, Socialization, Communication and Institution
The regulation in the development of Waste Bank in Medan " is provided in the Indonesian law Act No. 18 of 2008 on the Management of Waste. Also, The Government Regulation No. 81 of 2012 which mandates the needs of changing in fundamental paradigm in waste management is from the paradigm of collector-transport-waste into processing that falls on waste reduction and waste disposal. Garbage reduction activity means all levels of society, including government, business world and society in implementing waste restriction activities, recycling and reusing utilization or better known
as Reduce, Reuse and Recycle (3R) through smart efforts, efficient and programmed. Through this waste bank program in Medan City, it can be classified as a social engineering activity that teaches people to sort waste as well as to raise public awareness for wise waste management and reducing the waste transported to the landfills.

b. Resource support

1) Budget

Budget is one of the factors supporting the success of waste bank activities. Without the existence of budget support, the program may not run smoothly. The large number of activities undertaken by the waste bank in Medan such as socialization, training / guidance, operational management of garbage and etc require the public budget support from both the government and the private sector. In this research, The Sicanang Central Waste Bank in Medan received a funding support from Corporate Social Responsibility (CSR) of PT Unilever.

2) Forms of Community Participation

The people of Medan certainly desire to feel the clean, neat, and healthy area. Therefore, the form of community participation is not only up to the handling and reducing the garbage, but rather as the supervisor of the environment to keep it free from waste.

The form of participation the community in waste management which is done by the people of Medan City is in the form of sorting the garbage done by society itself and depositing it to the Trash Bank for the tube. This is a form of community participation to assist the development of waste bank as well as to consciousness of the community will be important to manage waste. Another form of community participation is to recycle organic waste into compost fertilizer takakura. Pupuk processed is partly sold and is partly for the plant manure. In addition, there are also making of biopori that serves for water absorption, it is useful to speed up the water absorption into the soil so as to avoid the flood.

3.2. Increasing The Role of waste bank in Medan City

The development conducted by Central Waste bank in Sicanang, Medan has changed the point of view and behavior of the people in Medan City on managing their household waste. Medan city has one main Waste bank, which then continues to form and develop more waste bank unit spread in Medan for 80 units, from the data in 2017 there are 8000 customers. The pattern applied by the main waste bank that it only receives the garbage deposit from the waste bank unit. The main waste bank does not receive waste directly from individuals, so that the waste bank units will keep operating. From the results of interview throughout waste bank in Medan, it can be seen that the average amount of inorganic waste received every week is as much as 200 kg - 600 kg. Not all waste bank units will deposit to the main waste bank, due to the constrained transportation, where the municipal waste bank has only 3 means of transportation with 1 truck and 2 pick up cars, which are insufficient to serve garbage collecting in every waste bank unit.

If the main waste bank can not collect due to the distance and time, the waste bank units will deposit their waste to the nearest vendor that is recommended by the main waste bank. From the calculation result, the amount of garbage received by waste bank in Medan is expected to be 64 ton - 192 ton / month.

Information obtained from the Office of Sanitation and Garden City of Medan, the waste produced is approximately 2000 tons / day. (DKP Medan city 2017) So, if it is assumed that the percentage of inorganic waste produced is 40% in a day, so it can be calculated that the amount of inorganic waste produced will be 36,000 tons / month. Then, based on this calculation, there is still a lot of inorganic waste that has not been received by the waste bank, which can actually become an opportunity for the waste bank to collect more inorganic waste, as well as to increase the economic value of society and reduce the amount of waste disposed in the landfills.
3.3. Community Participation for The Development of "Waste Bank in Medan"

Participation provided by the society is in the form of depositing the household waste that has been sorted into the waste bank. The obligation to sort the household waste in the form of organic or inorganic waste which is carried out by the community itself. This is as mandatory in the Ministerial Regulation Act No. 13 Year 2012 about Reduce, Reuse and Recycle (3R) Implementation Guidelines via waste bank.

3. Factors that Become Obstacles and Supporters in The Development of "Waste Bank in the city of Medan"

a. Supporting factors
The development of waste bank in Medan can not be separated from several supporting factors such as: the role of the Government, particularly in the Environment Office of North Sumatra Province. Support is provided in the form of technical guidance and government support. The other important thing towards the role of government to increase the role of waste bank is to provide and monitor a continuous guidance, so that the role of waste bank can continue to be improved.

Guidance and Monitoring

This program was aimed to educate the community instead of throwing away the garbage to the trenches and rivers, and to reduce the amount of waste disposed to landfills and to increase the economic value as well. Moreover, the role of government to accompany waste bank program is required.

Guidance

From several surveyed waste banks, it is found that they still do not have a professional behavior in terms of ability, skill, and way of doing things waste bank managers need to be provided with continuous coaching and mentoring to increase their professionality:

1. The desire to always display an ideal behavior
   Someone who has a high professionalism will always try to manifest his/her self in accordance with the expert who has been established. He/she will identify his/her self to someone who is seen to have such a gift. The meaning of "ideal" is a device of behavior that is considered to be the most perfect and can be used as a reference.

2. Improving and Maintaining Professional Image
   High professionalism is shown by the great desire to always improve and maintain professional image through the embodiment of professional behavior. Its manifestation is done through various ways such as appearance, way of conversation, use of language, body posture, attitude of daily life, relationship with other individuals.

3. The desire to always pursue the professional development opportunities that can improve and the quality of knowledge and skills.

4. Pursuing Quality and Ambitions in Profession
   Professionalism is identified by the quality of the proud sense of the profession held. In this case, it is expected that someone has a sense of pride and confidence in his profession.
   In addition to assisting, the waste banks management is also needed to be provided with knowledge of accounting, so that waste banks are able to present accurate calculations and financial statements to prevent the fellow member conflicts. Also, facilitating in order to obtain financial access from financial institutions. There are some waste banks which are surveyed, were obtaining loans from banking. However, they use it for other purposes, which does not relate to the development of the waste bank itself.

Monitoring and Evaluation

Monitoring and evaluation should be conducted to improve performance and improve the quality of waste banks. Monitoring and evaluation need to be done consistently for example monthly or quarterly. The measurements in monitoring and evaluation are number of customers, waste production and turnover.
Monitoring and evaluation are also implemented on technical administration to the waste bank managers. This is essential because customers will occasionally ask for the results of their savings. Savings results should be reported by the manager to clients independently in order to avoid misunderstanding and mutual harm between the parties.

Monitoring can be done by the parties who are concerned and involved in community empowerment activities, especially on environmental issues and management of garbage. For example, by the Municipal Government or NGOs and individuals involved in community empowerment, even universities need to be involved.

**Guidance and monitoring**

To be a program that aims to educate the community not to throw the garbage to the trenches and rivers, to reduce the amount of waste disposed to landfills and to increase the economic value as well. Moreover, the role of government to accompany waste bank program is required.

**b. Obstacle Factor**

**Social Factor**

The constraints that occur are caused by a perception of some people towards the concept of waste bank. They assume that with the waste bank is the same as to shape their minds as a scavenger, where the community must sort out the garbage then they must deposit it into the waste bank. This activities are considered to be less ethical. So, to maintain the spirit of the community to collect and sort the garbage, the low value (price) of the waste are the most important factors in this waste bank program. Sorting waste everyday is also an obstacle in managing the household waste.

Another inhibiting factor is the low value of waste so for the middle class economic society, garbage does not have value, and they are difficult to be asked to collect, sort and deposit the garbage into the Waste bank.

**Management of Waste Bank in Medan**

Waste banks in Medan are managed by private sectors, communities, and some are managed by schools and agencies. Each waste bank has 5 administrators, namely the chairman, secretary, treasurer, the weighing section and the sorting section. However, not all stewardship runs properly. In practice, the active members to work were commonly chairman and secretary, or chairman with treasurer, or a secretary with a weighing section only. The stewardship is often just to fulfill the obligation to submit a report to the Environment Agency. Also, there was waste bank which only involve family members, because it is considered that family members can be easier to cooperate and share profit with.

For the recording receipts and expenditures method, it is still very simple to only record how much garbage is received, the amount of waste that is deposited into the waste bank, the amount of money received from the sale, and the amount of money paid back to the customer. This listing is still very simple because it does not contain the percentage of the board, the use of warehouse facilities, the use of other facilities such as overhead costs, so that the waste bank managers can not be certain of their financial position, and often can not obtain the share of the results. Waste bank also can not provide a certain service hours, depending on the time possessed by the organizers to receive the garbage from the community. In addition, waste banks that do not have supporting facilities such as warehouses and transportation equipment as a means of collecting waste are frequently found. A house ware is commonly using space in the house like living room, kitchen room and terrace room. There is also a pile of garbage on the edge of the road.

The pattern of garbage collection still relies on garbage delivered by the surrounding community, but rarely, that the waste bank management performs activities to collect garbage from the community. From the interviews conducted, the waste bank's activity has not been fully become the main prominence of economic value. The waste bank is still a side activity, and the administrators have their own businesses or work in their daily lives. The waste bank is more as a means of socializing.

Another factor shows that education also plays an important role to activate the waste banks. Some waste banks are managed by higher education (high school or undergraduate) administrators.
that enable them to have good socialization and communication skills so they are able to educate and engage people to become waste bank customers.

4. Conclusion
1. The development of waste bank in Medan is conducted in accordance with Law Act no. 18 of 2008 on Waste Management, Government Regulation Act No. 81 of 2012 on Household Waste Management, Regulation of State Minister of Living Environment of the Republic of Indonesia Act Number 13 of the Year 2012 on Guidelines for Reduce, Reuse and Recycle Implementation through waste bank, and Malang City Regulation Act no. 10 Year 2010 about Waste Management as a legal force that changes point of view about waste management and waste bank existence.
2. The development of waste bank in Medan City needs the community participation so that the waste processing program can operate based on the principle of 3R. As mandated in the Ministerial Regulation of Life Circle Act No. 13 of Year 2012 about the Guidelines for Reduce, Reuse and Recycle (3R) implementation through waste bank. The participation provided by the community was in the form of the obligation to collect and sort the household waste for both organic and inorganic by society itself.
3. The implementation of the waste bank program in Medan is inseparable from some supporting and inhibiting factors. The supporting factor for the development of waste bank in Malang is the role of Local Government as a Supporter of this program. However, the support needs to be strengthened, especially concerning the development, monitoring and evaluation. Because not all waste bank managers have strong entrepreneurial spirit and the average of waste collecting capacity of the waste banks is still low and not able to provide high economic value.

While for the inhibiting factors, there are several points that are found:
- a. Lack of awareness of people to sort and deposit their waste to the waste bank
- b. The public image of the waste bank activities that is similar to scavengers,
- c. Low value of waste.

Suggestion
1. Waste banks need to be equipped with communication skills, fostering entrepreneurial spirit, leadership and administration.
2. The government needs to provide access to large business units (vendors) that can collect the inorganic waste from waste banks.
3. Waste banks also need to develop compost fertilizer for their members or customers, since composting is started to be forgotten. The role of government to collect the community compost for the city park needs. Incentives from the government to buy compost from the community will make the community eager to do composting.
   . If 60% organic waste is also empowered through household compost, the government can utilize it as a medium for the city park, as well as to improve the economic value of the community.

References
[1] Anonim, 2012. Profil Bank Sampah Indonesia 2012. Kementerian Lingkungan Hidup, Jakarta.
[2] Anonim, 2013. Statistik Kota Tasikmalaya. Badan Pusat Statistik, Tasikmalaya.
[3] Asteria, D., 2013. Model Komunikasi Lingkungan Berperspektif Gender dalam Menyelesaikan Konflik Lingkungan di Perkotaan: Peran Aktivis Perempuan dalam Pengelolaan Konflik Lingkungan Secara Berkelanjutan. PUPT BOPTN 2013. Universitas Indonesia, Depok.
[4] Akhtar, H., dan Soetjipto, H.P., 2014. Peran Sikap dalam Memediasi Pengaruh Pengetahuan Terhadap Perilaku Minimisasi Sampah Pada Masyarakat Terban, Yogyakarta. Jurnal Manusia dan Lingkungan, 21(3):386-392.
[5] Blocker, T.J., dan Eckberg, D.L., 1997. Gender and Environmentalism: Result from the 1993 General Social Survey. Social Science Quarterly, 78(4):841-858.

[6] Jumar, Fitriyah, N., dan Kalalinggie, R., 2014. Strategi Pengelolaan Sampah Rumah Tangga di Kelurahan Lok Bahu Kecamatan Sungai Kunjang Kota Samarinda. Journal Administrative Reform, 2(1):771-782.

[7] Kristina, H., 2014. Model Konseptual Untuk Mengukur Adaptabilitas Bank Sampah di Indonesia. Jurnal Teknik Industri, 9(1):19-28.

[8] Mulasari, S.A., Husodo, A.H., dan Muhadjir, N., 2014. Kebijakan pemerintah Dalam Pengelolaan Sampah Domestik. Jurnal Kesehatan Masyarakat Nasional, 8(8):404-410.

[9] Purba, H.D., Meidiana, C., dan Adrianto, D.W., 2014. Waste Management Scenario through Community Based Waste Bank: A Case Study of Kepanjen District, Malang Regency, Indonesia. International Journal of Environmental Science and Development, 5(2):212-216.

[10] Ridley-Duff, R.J., dan Bull, M., 2011. Understanding Social Enterprise: Theory and Practice, Sage Publication, London.

[11] Riswan, Sunoko, H.R., dan Hadiyarto, A., 2011. Pengelolaan Sampah Rumah Tangga di Kecamatan Daha Selatan. Jurnal Ilmu Lingkungan, 9(1):31-38.

[12] Singhirunnusorn, W., Donlakorn, K., dan Kaewhanin, W., 2012. Household Recycling Behaviours and Attitudes toward Waste Bank Project: Mahasarakham Municipality. Journal of Asia Behavioural Studies, 2(6):35-47.

[13] Trina, E., Tallei, T.E., Iskandar, J., Runtuwene, S., dan Filho, W.L., 2013. Local Community-based Initiatives of Waste Management Activities on Bunaken Island in North Sulawesi, Indonesia. Research Journal of Environmental and Earth Sciences, 5(12):737-743.

[14] Winarso, H., dan Larasati, A., 2011. Dari Sampah Menjadi Upah: Inovasi Pengolahan Sampah di Tingkat Akar Rumput Kasus Program Bank Sampah “Sendu” di Kelurahan Pasar Minggu Jakarta Selatan. Jurnal Manusia dan Lingkungan, 18(1):43-59.

[15] PENGELOLAAN SAMPAH KOTA, Pengelolaan Limbah 2013 Program Studi Kesehatan Masyarakat Universitas Airlangga
## Appendix 1
### INORGANIC WASTE SELLING VALUE

Inorganic waste has various selling values for each kind which are described in the table below:

| INORGANIC WASTE TYPE                          | PRICE FOR CUSTOMERS (Rp / kg) | PRICE FOR WASTE BANK (Rp / kg) |
|-----------------------------------------------|-------------------------------|--------------------------------|
| Dirty Colorless Plastic Bottle (labelled and sealed) | 1,000                        | 2,000                          |
| Clean Colorless Plastic Bottle (unlabelled and sealed) | 2,200                        | 2,500                          |
| Dirty Coloured Plastic Bottle (labelled dan sealed) | 500                          | 750                            |
| Clean Coloured Plastic Bottle (unlabelled and sealed) | 1,000                        | 1,200                          |
| Dirty Colorless Glass (labelled)              | 2,000                        | 2,500                          |
| Clean Colorless Glass (unlabelled)            | 4,000                        | 5,000                          |
| Coloured Glass (ale-ale, teh gelas etc.)      | 1,500                        | 2,000                          |
| Plastic Bottle (shampoo)                      | 2,000                        | 2,500                          |
| Soybean Bottle                                | 400                          | 500                            |
| Thin Aluminium                                | 7,000                        | 8,000                          |
| White HVS Paper                               | 1,000                        | 1,200                          |
| Mixed Paper/Coloured                          | 200                          | 400                            |
| Newspaper/Scrap Paper                         | 500                          | 700                            |
| Cardboard                                     | 1,000                        | 1,200                          |
| Styrofoam and Tissue                          | -                            | -                              |