Community Empowerment in Waste Management Area for Sustainable Development

M Ahmad1, * U S Tri2, W Tri2 and R Novia2

1Economics Department, University of Muhammadiyah Yogyakarta INDONESIA
2Institute of Public Policy and Economic Studies INDONESIA

* email: macrov_jogja@yahoo.com

Abstract. A landfill is a place to manage and store wastes. Various problems have occurred due to the existence of landfill, either environmental, social, and economic issues. This study was associated with the effort of improving the prosperity of the local community around the landfill in Indonesia. The aims of this study were to discover the form and estimation of externality values of landfill towards the community, to determine the value chain pattern and the amount of added value of chemical waste derived from landfill which received by waste pickers and collectors. This study was designed with a mixed method by implementing descriptive statistics analysis, added value analysis, revenue analysis, Cost of Illness, and Replacement of Cost. The research results have indicated that the existence of landfill has brought positive and negative impacts on the community life the area around the landfill. The impacts which caused by the existence of landfill include economic, social, and environmental impacts in which the estimation of positive externality value was bigger than the estimation of negative externality value.

1. Introduction

Indonesia which inhabited by 256 million people as its population owns the policy which oriented to improve the consumption of low-income community in an aim to enhance the economic growth. The impact of the increasing activities of consumption and production is the increasing amount of waste [1]. The volume of waste is determined by the population. Waste has become a severe issue in Indonesia. In 2010, the volume of waste in Indonesia amounted to 200,000 thousand ton/day which has increased significantly into 490,000 ton/day in 2012 or increased to 179 ton per year in average [2]. The waste management system in Indonesia is still 69% concentrated in the landfill, 10% of waste is piled up, 7% of waste is composted and recycled, 5% of waste is incinerated, and 7% of waste is unmanaged [3]. In managing the waste issue, the government of Indonesia has established landfills in each province.

The existence of landfill as public facility could emerge either positive or negative externality for the community. The externality is one of the causes of market failure [4]. The location of the landfill which often close to the settlement of the community has caused them to receive externality due to the existence of the landfill. Therefore, the solution to minimize negative externality and optimize positive externality caused by the existence is required. The effort that can be conducted is better management of landfill. Development is not merely a responsibility of government; every person has a role in embodying social welfare and the improvement of life quality. As a method of social work, community development allows the provider and receiver of the service to be involved in the planning,
supervision, and evaluation processes. The community development program has three main characters; namely, community-based, local resources based, and sustainable. While the target to be achieved is the capacity and prosperity of the community through the empowerment of members.

According to the background above, thus, the focus of this study was the assessment of economic, social, and environmental impacts of landfill in Indonesia with a case study in the Piyungan landfill of Yogyakarta Province and Jatibarang landfill of Central Java Province. In general, this study aimed to acquire the information regarding the externality of landfill for the local community as well as the role of community development as a systematic effort to improve the community capacity especially the unfortunate groups in fulfilling their needs based on the entire accessible potentials of resources. In order to manifest that effort, thus, social capital is required. The social capital which used was referring to the individual and collective resources that can be mobilized through social relationship and applicable for community development field [5] [6] [7]. Social capital has positive impacts towards the community through economic development [8] [9] [10], governmental improvement [11] [12], environmental security [13] [14], the organizing of community [15] [16], and community health promotion [17].

2. Methodology
This study was conducted mixed method as the research approach which combines the qualitative and quantitative forms [18]. This research was conducted in a 1 km radius with a total of 200 respondents obtained from two landfills. The data used in this research were primary and secondary data through simple random sampling method as the sample collecting technique [19] supported by instrument quality test as well as validity and reliability tests for data examination. The analysis and discussion were divided into descriptive statistics analysis, added value analysis, revenue analysis, cost of illness, and replacement cost.

3. Result and Discussion

3.1. Externality Analysis
The existence of landfill has generated impacts for the local community which divided into three aspects, namely environmental, economic, and social impacts. The acquired impacts can be in the form of positive or negative externality as included in the table 1.

| Variable                                | Agree | Disagree |
|-----------------------------------------|-------|----------|
| The disruption of Health                | 16%   | 84%      |
| The degradation of environmental hygiene| 49%   | 51%      |
| The availability of new employment      | 93%   | 7%       |
| The improvement of development          | 80%   | 20%      |
| The change of behavior (good relationship)| 92% | 8%       |
| The occurrence of social conflict       | 15%   | 85%      |

According to the table 1, it can be known that most of the community around the landfill area have experienced more significant positive impacts from the existence of landfill compared to the negative impacts that occur. Such as in the statement regarding the disruption of health in which 84% of the community disagreed that the existence of landfill has emerged the disruption on their health and only 16% stated their agreement with the statement in which the existence of landfill has emerged disruption of health.

3.2. The estimation of the values of negative and positive externality of landfill
In positive externality, the only direct benefit received by the community from landfill which will be considered, namely the revenue obtained by working as a waste picker and what received from livestock. The value of positive externality acquired the local community in the landfill is around Rp
404,900,000.00 per year. By inspecting several positive impacts experienced by the community, the establishment of the landfill has increased their prosperity as well as improving the average revenue of community to Rp 22,292,000.00 for livestock farmers and Rp 11,450,000.00 per month for waste pickers. The estimation of positive externality value of landfill is show in table 2.

Table 2. The estimation of positive externality value of landfill

| No | Source of Revenue       | Revenue/Month | Revenue/Year   |
|----|-------------------------|---------------|----------------|
| 1  | Becoming waste pickers  | 11,450,000    | 137,400,000    |
| 2  | Livestock               | 22,292,000    | 267,500,000    |
|    | **Total (IDR)**         | **33,742,000**| **404,900,000**|

Table 3. The estimation of negative externality value of landfill

| No | Source of expenditure                  | Expenditure/month     | Expenditure/year       |
|----|----------------------------------------|-----------------------|------------------------|
| 1  | Replacement cost (insect repellent, fly glue, air freshener) | Rp 1,860,000.00 | Rp 22,320,000.00 |
| 2  | Cost of illness (cough, itch, flu, headache, diarrhea, fever, asthma) | Rp 1,295,000.00 | Rp 15,540,000.00 |
|    | **Total (IDR)**                        | **Rp 3,155,000.00**  | **Rp 37,860,000.00**   |

Negative externality received by the community due to the existence of landfill was estimated by implementing two methods, namely replacement cost and cost of illness. These are the replacement costs that have to be spent by the community due to the existence of the landfill. The estimation of negative externality value of landfill is show in table 3. Due to that matter, the total estimation of value of negative externality that has to be spent by the community due to the existence of landfill is about Rp 37,860,000.00 per year or Rp 3,155,000.00 per month as the sum of replacement cost and cost of illness.

3.3. Value chain and added value of chemical waste of landfill

In the process of waste utilization of landfill, there is a value chain that could provide added value for the entire parties involved in the activity of the value chain flow. According to the research results, thus, the supply chain pattern from the utilization of chemical waste for recycling has been acquired such as figure 1.

The wastes sent to landfill consist of organic and chemical wastes. The organic waste is used as the feed for livestock and compost fertilizer. The waste pickers use the chemical waste for the recycling process. The value of waste experiences changes on each selling terminal which in this research is the waste collectors. The change of waste value occurs due to the processing of the waste. The added value of chemical waste of landfill is one of the positive externality of landfill because it can increase the revenues for waste pickers and collectors. The availability of added value from chemical waste in the recycling of the waste has been able to increase the revenues of the local community in the landfill, especially for the waste pickers and collectors which as an output will improve the community prosperity.

The wastes stored at the landfill also include the chemical waste which until present are widely utilized by the community as the primary source of revenue. The utilization process of the chemical waste which originated from the landfill through recycling process has generated implication on the existence of an added value of the wastes; therefore, the selling price of wastes becomes higher compared to the condition where the wastes are left to become accumulated. In the utilization process of wastes originated from landfill, there is a value chain which able of providing added value for the entire parties involved in the activity of the value chain flow.
3.4. Community Development

The existence of landfill which brings positive and negative externalities for the community is requiring further attention. In the economic sector, the positive externality of the existence of landfill tends to be bigger than the negative externality which proved from the tests that conducted before. The availability of new business opportunity will be able to create a new job opportunity as well for the local community; therefore, the revenue is significantly increasing. In similar to the increasing social life of the community, the concern and cooperation between the immigrants and the local people. While the highest negative externality is on the environmental sector in which both air and water pollution become the problem that mostly experienced by the local community.

The better management of landfill is manifested by providing the required facilities and infrastructures as well as the development through counseling and training for the local community of landfill. The supervision of the implementation of the community development program to utilize strengths and opportunities, and the strategy in organizing coordination and formulation of the program, synchronization of program implementation, and control of the implementation is used in the effort of managing the issues or weaknesses and overcoming the challenges and threats.

In this study, it has been acquired that there was community empowerment conducted by Muhammadiyah in Piyungan Landfill of Yogyakarta. The empowerment conducted by Muhammadiyah in the form of various activities of community development was directed to expand the access of the community to achieve a better social and economic condition compared to the previous state. The community development program that is performed was positioning the local community of landfill especially the waste pickers as the subject. The implementation of the whole activities was conducted in a participative manner. The primary target to be achieved is the capacity and prosperity improvement of the community through the empowerment of local community of landfill from economic, social, and spiritual perspectives.

The management of the community with waste picking in the landfill as their profession has been performed by Muhammadiyah through a group approach. The waste pickers have formed a social group named as Mardiko. This group model has been successful in improving the social capital especially the cooperation and trust between the local community. Through the establishment of the
group, the advocacy process regarding the environmental condition of landfill can be conducted effectively. Various group activities have been routinely organized including social events such as group meeting, spiritual meeting (Qur'an recital) and health enhancement activity (medical examination).

The empowerment process of waste pickers in landfill conducted by Muhammadiyah has involved the other stakeholders including universities, charity and zakat agency, and hospitals. Each involved institution has a different role; however, the implementation was coordinated by Muhammadiyah. Universities provide volunteers from students and lecturers for the facilitation and the informants to present in various activities of waste pickers' group. Hospitals are contributing through routine health examination for the waste pickers while the charity and zakat agency which in this case is LazisMu also contributing as the intermediary/distributor of funds obtained from corporate social responsibility of numerous private and state companies as well as the individual. The results of evaluation of the collaborative empowerment model in landfill have indicated that the model is effective and capable of ensuring the sustainable empowerment process.

4. Conclusion
The analysis results of the externality have indicated that landfill conceives positive and negative externalities for the community from the economic, social, or environmental perspective. The forms of positive externality were a) improving the revenue of the community due to the labor absorption; b) improving the cooperation between the immigrants and the local people; c) improving the development of facilities and infrastructures around the area of the landfill. On the other side, negative externality has occurred as well in the forms of a) water and air pollutions; and b) degradation of environmental hygiene. The estimation of positive externality value received by the community in the form of revenue improvement was amounted to Rp 404,9 million per year, while the estimation of negative externality value in the form of the expenditures of replacement cost and cost of illness was Rp. 37,8 million per year. Therefore, the positive externality value of the existence of landfill was bigger than the negative externality value.

The positive and negative externalities that occur due to the existence of landfill for the local community can be organized through the community development program. The optimization of positive externality received by the community as well as minimizing the externality produced by landfill can be performed through a counseling program by conducting facilitation and training for the local community in the landfill. According to the conclusion, it is recommended for the government and the related parties to be able to utilize the available potentials of waste into more useful goods, one of them is by maximizing the production of compost and utilizing the methane gas produced by waste as the source of renewable energy for the community, thus, the positive externality value of the existence of landfill in Indonesia will increase. In addition, a further management regarding the occurrence of environmental pollution caused by the existence of landfill is required.

References
[1] Polzer, Veronica R, and Kenneth M.Person, 2015, “Environmental and Economical Asseessment of MSW Management in Europe: An Analysis between the landfill and WTE Impacts”. International Journal of Academic Research in Business and Social Sciences, June 2015, Vol. 5, No.6.
[2] Regulation of Ministry of Environment of Republic of Indonesia No.15/2012 regarding the Guideline of Economic Valuation of Forest Ecosystem, http://jdih.menlh.go.id/. Accessed on October 2nd 2018 at 11:00 pm.
[3] Environmental Agency of Yogyakarta Special Province, 2015, Kajian Timbulan dan Komposisi Sampah Perkotaan Studi di Kawasan Permukiman DIY 2015, Environmental Agency of Yogyakarta Special Province, Yogyakarta.
[4] Hifdziyah, Lisanatul, 2011, Analisis Penurunan Kualitas Lingkungan Di Sekitar Tempat Pembuangan Akhir Sampah Galuga Kabupaten Bogor Jawa Barat, Bachelor Thesis. Bogor:
Department of Economic Resources, and Environment. Faculty of Economics and Management, Bogor Agricultural University.

[5] Coleman, J. (1988). Social capital in the creation of human capital. American Journal of Sociology, 94, 95–120. https://doi.org/dhsnn8

[6] Portes, A. (1998). Social capital: Its origins and applications in modern sociology. Annual Review of Sociology, 24, 1–24. https://doi.org/cmmcsz

[7] Putnam, R. D. (2000). Bowling alone: The collapse and revival of American community. New York, NY: Simon and Schuster

[8] Engbers, T., Rubin, B., & Aubuchon, C. (2016). The currency of connections: An analysis of the urban economic impact of social capital. Economic Development Quarterly, 31, 37–49. https://doi.org/cd5c

[9] Makarem, N. P. (2016). Social networks and regional economic development: The Los Angeles and Bay Area metropolitan regions, 1980–2010. Environment & Planning C: Politics and Space, 34, 91–112. https://doi.org/cd5f

[10] Woolcock, M. (2002). Social capital in theory and practice: Where do we stand? In J. Isham, T. Kelly, & S. Ramaswamy (Eds.), Social capital and economic development (pp. 18–39). Northampton, MA: Elgar

[11] Aldrich, D. P., & Meyer, M. A. (2014). Social capital and community resilience. American Behavioral Scientist, 59, 254–269. https://doi.org/f6tr2d

[12] Birk, R. (2017). Infrastructuring the social: Local community work, urban policy and marginalized residential areas in Denmark. Environment & Planning A, 49, 767–783. https://doi.org/f95vcw

[13] Price, G. (2016). Broken windows and crime in development challenged urban areas: Evidence from Jackson, Mississippi USA. Journal of Developing Areas, 50, 209–220. https://doi.org/cd5g

[14] Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighbourhoods and violent crime: A multilevel study of collective efficacy. Science, 277, 918–924. https://doi.org/bg5rs9 [1] Sze SM 1969 Fisika Semiconductor Devices (New York: Wiley-Interscience)

[15] Foley, M. W., McCarthy, J. D., & Chaves, M. (2001). Social capital, religious institutions, and poor communities. In S. Saegert, J. P. Thompson, & M. R. Warren (Eds.), Social capital and poor communities (pp. 215–245). New York, NY: Sage.

[16] Johansson S., Leonard R., & Noonan K. (2012). Caring and the generation of social capital: Two models for a positive relationship. International Journal of Social Welfare, 21, 44–52. https://doi.org/e7wjst

[17] Berkman L. F., Kawachi I., & Glymour M. (2014). Social epidemiology. Oxford, UK: Oxford University Press.

[18] Creswell, J. (2009). Research Design Pendekatan Kualitatif, Kuantitatif, dan Mixed. Yogyakarta: Pustaka Pelajar

[19] Sugiyono, 2008, Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung : Alfabeta.