

Harmony of urban microcommunal-based domestic waste management

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Abstract. This paper examines utilizing compost from household organic waste on green space in a scale of micro-community, Rukun Tetangga. Harmony of urban microcommunal-based domestic solid waste management is designed through its social psychology variables are encouraging degree of cultural harmony in the microcommunal of domestic waste management, degree of physical harmony in the microcommunal of domestic waste management, degree of phsycological harmony in the microcommunal of domestic waste management. Since its implementation in urban, Sub-District Suka Asih, Tangerang City, Banten will impact reduction of illegal disposal of domestic waste into canal, reduction of CO₂(eq) emission, and reduction of landfill area. The research uses quantitative analysis by questionnaire with Likert scale method to elaborate individual attitude and social system. Uses quantitative analysis by using CBA to measure total cost-benefit impacts arising, and LCA to measure of CO₂(eq) emission as pollutant impacts, and arithmetic models for modeling the impacts of land use. These findings contribute to the literature by emphasizing how individual attitudes, environmental problems, and settlements play an important role in the success of a harmonious solid waste management system.

1 Introduction

Integrating solid waste management initiatives in cities in Indonesia is a concern that has received greater attention from government agencies, private organizations and the general public for almost a decade now, especially with increasing funding allocations for municipal solid waste management. Moreover, creating access to proper sanitation, addressing climate change, and conserving terrestrial ecosystems are the Sustainable Development Goals (SDG) that have been agreed upon by the Government of the Republic of Indonesia in 2015. One of the follow-up actions is the launch of national targets in sustainable conservation programs in 2015-2019 by the Directorate General of Human Settlements, Ministry of Public Works and Public Housing, the Republic of Indonesia focused on 100% sanitation access. Solid waste management is included in sanitation access.

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2 Methods

The study was carried out through a historical literature study of urban solid waste management and quantitative method of geometric analysis on measurement of Landfill (TPA) area reduction, arithmetic on measurement for reduction amount of domestic waste illegal disposal into canal, and Life Cycle Assessment (LCA) on measurement for the emission reduction of municipal solid waste management [7].

2.1 Mapping and defining solid waste management programmes

The launch of 100% sanitation access on national target in sustainable settlement program in 2015-2019 is a manifesto of the others intensification of national target (Paris Agreement) CO₂ equivalent (eq) emission reductions of 29%. Specifically for solid waste management, the government promotes the solid waste management community-based, sustainable solid waste management, and integrated sustainable solid waste management.

Program of solid waste management community based has been applied in Indonesia as a solution to solve solid waste problems since the source of generation itself [1]. Indonesia government developed the program into sustainable solid waste management through economic, social, and environmental components [2], and upgraded into integrated sustainable solid waste management, which includes five components: operational, financing, institutional/organizational, regulatory, and role and society [5].

In summary, Table 1 shows the transformation related policies and programs by the government.

Table 1. The transformation related policies and programs of solid waste management.

Year	Policies/ Programs
Local:	
1991	Solid waste management community based
2000	Sustainable solid waste management - 3 components: social, economy, environmental
2006-now	Integrated sustainable solid waste management - 5 components: operational, financing, institutional / organizational, regulatory, and community participation
Future :	Harmony solid waste management
Global:	
1990	Ineffective community participation and community demand and driven approach to meet development goal.
2008- now	Rejuvenating citizen engagement approach.

Referring to the table, the community based solid waste management has been applied in Indonesia, but the increase in population causes disharmony between individuals and the social, which individual attitudes do not segregate organic and inorganic waste. The amount of garbage accumulates and is not distributed in settlements so that illegal disposal of solid waste into the canal is inevitable. Canal is one of the water bodies as a source of availability of clean water and barriers to its flow can cause flooding in urban and suburban areas.

The development of the waste management system was developed into a sustainable solid waste management system, which was expanded with economic aspects through increasing the number of garbage fleets as a solution to the explosion in the amount of solid waste. This implementation has implications for social disharmony with its environment, through increasing air pollution emissions that have an impact on global warming

The solid waste management system is updated into integrated sustainable solid waste management. The technical aspects are integrated into the management of solid waste through the construction of waste banks in the sub-district scale, but the dominant organic waste from household solid waste still cannot be handled properly because of their low commercial value [4]. Individual disharmony with the environment occurs when large amounts of organic waste cannot be directly transported to landfill because of the limited area for landfill in urban areas and urban fairies do not want to be burdened by urban waste.

Problem analyzed using a harmony approach in solid waste management especially organic domestic waste through the utilization of compost at green space in micro scale, Rukun Tetangga in which the number of residents is less or equal to 50 households as a product by processing organic household waste. Management of green space in the peri-urban settlement has been regulated by the regulation of the Minister of Public Works of the Republic of Indonesia NO. 5/ PRT/ M/ 2008 as the basis for the utilization of compost from processed organic household waste. This concept has been implemented and succeeds at Sub-District of Sukasih, Tangerang City, Banten. Similar research had been conducted in the United States of America through the individual aspects of the community in waste management, but the utilization is still macro, cross-regional, or regional [3]. Environmental harmony models have also been studied to be applied to the management of flats in Indonesia, but have not yet been applied to waste management [6].

Generally, there are two objectives can be elaborated. First objective is building the harmony concept of integrating solid waste management especially organic domestic waste based on microcommunal through its variables degree of cultural harmony in the microcommunal of domestic waste management, degree of physical harmony in the microcommunal of domestic waste management, degree of phsycological harmony in the microcommunal of domestic waste management. This objective analyzed by quantitative method with Likert Scale. Second objective is measuring the success of the harmony concept of integrating solid waste management especially organic domestic waste based on microcommunal between urban and peri-urban through its variables (1) percentage reduction amount of domestic waste illegal disposal into canal which analysed by arithmetic models, (2) percent reduction of area of landfill area which analyzed by geometric models to measure land-use of landfill, and (3) percentage reduction of CO₂ (eq) pollutant emission which analysed by LCA to measure of CO₂ (eq) emission as pollutant impact.

3 Result and discussion

The general conclusion obtained is that urban urban waste management does not end in the process of sanitary waste disposal, but ends on composting in Temporary Processing Site (TPS) with the canal which utilized in urban green spaces.

3.1 Result

With the problems and objectives mentioned above, it can be concluded that the management of solid waste through social systems starts and is built by each pillar: the existence of affective, understanding (cognitive), and consistent simulation of the behavior of individuals involved in solid waste management. Management of solid waste through the microcommunal social system has been successfully implemented because of limited resources in case managing individually and providing benefits to the environment (CO₂ emissions, landfill, and clean water) which in case the management is macrocomunal actually gets environmental losses. Harmony concept of urban microcommunal-based domestic waste management can be seen in Figure 1

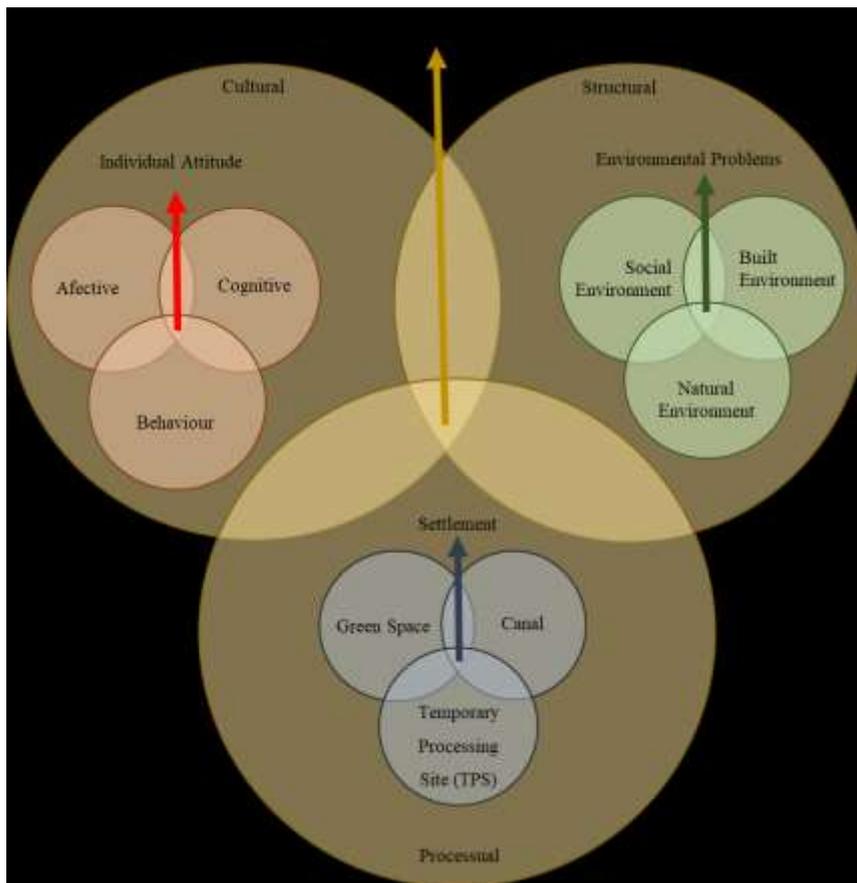


Fig. 1. Harmony concept of urban microcommunal-based domestic waste management.

3.2 Discussion

Stakeholders in Indonesia must provide knowledge, awareness and behavior to individual domestic waste management like a housewife. The next challenge is household composting. Affordability, effectiveness, efficiency, and ecology must be evaluated in a measurable manner against the impact of the micro environment. Figure 2. shows that some households can compost their organic waste on a household scale. It is also hoped that Indonesia can lead to the implementation of comprehensive regulations that adhere to the value of harmony in environmental management through strong support from all stakeholders to achieve national targets and better environmental quality.



Fig. 2. Composting of each household and its use for green spaces with water channels in settlements and city.

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