

Exploring the Solid Waste Social Entrepreneurial Activities Using the Sustainable Solid Waste Management Hierarchy in Lusaka Zambia. The case of Kamwala Area

Musonda Martin Kalale Bulwani ^{1,*} and Kumari Nilanjana ²

¹ PhD Student, Graduate School of Business, University of Zambia.

² Academic Assistant Director, AstriaLearning, Zambia.

International Journal of Biological and Pharmaceutical Sciences Archive, 2025, 10(01), 001-007

Publication history: Received on 25 April 2025; revised on 26 June 2025; accepted on 29 June 2025

Article DOI: <https://doi.org/10.53771/ijbpsa.2025.10.1.0054>

Abstract

This study explored the social entrepreneurship activities in sustainable solid waste management in Lusaka's Kamwala area in Zambia. The study used the sustainable solid waste management hierarchy model to highlight various types of entrepreneurial involvement in sustainable waste management. The study found that social entrepreneurs are involved in all the stages of sustainable waste management hierarchy except the involvement in waste to energy recovery activity. The study noted that lack of social entrepreneur's engagement in waste to energy activities has resulted in accumulated unrecyclable waste in the area, posing an environmental and public health risk. To manage this potential risk, the study recommended that the Lusaka city council public health department should start monitoring and controlling the waste trade in the Kamwala area. Further, there is need for government to deliberately engage in empowerment schemes for entrepreneurs who can invest in technologically advanced waste to energy business ventures in Kamwala area.

Keywords: Sustainable; Waste; Management; Activities; Social entrepreneurship; Lusaka; Kamwala; Recyclable

1. Introduction

In order to protect the water bodies from contamination and keeping the environment free from pollution, countries are rising to the global challenge of implementing practical sustainable waste management policies (Obaideen et al., 2022). The Zambian government has not lagged behind with this global call and has since enacted the solid waste management and regulation act of 2018 which commercializes waste management in a bid to encourage sustainable waste management by both informal and formal sector players.

Not only does the call for sustainable waste management promote the green environment and improve public health, it also promotes economic growth through various circular economy activities. Waste recycling and energy recovery from waste are seen as drivers of an environmentally friendly industrial processes whose raw materials and energy demands does not threaten the existence of natural resources (Kurniawan et al., 2023). The call is on social entrepreneurial skills at different community levels that are creative and innovative enough to come up with cash-for-waste programs that answers to both domestic poverty alleviation and to the global need for a sustainable waste management system (Kurniawan et al., 2023; Fatimah et al., 2020).

Although the ultimate responsibility of collecting and disposing of waste in metropolitan areas falls on local government authorities, the effective social entrepreneurs' reaction to participation in sustainable solid waste management activities provides resource relief to the authorities (Benito et al., 2021). As a relatively new phenomenon in developing countries like Zambia, effective sustainable waste management calls for a mindset change that promotes a variety of

* Corresponding author: Musonda Martin Kalale Bulwani

creative solutions. Positive attitude is key to developing a society that is mindful to the needs of the environment and the benefits that comes with good public health (Tobin & Zaman 2022).

1.1. Sustainable Solid Waste Management Hierarchy

The waste management hierarchy is a conceptual framework designed to help prioritize and guide waste management decisions. The five criteria based hierarchy is presented in the order that is most beneficial to the environment and public health. The order of priority is given as follows; waste prevention or reduction, reuse, recycling, recovery and disposal (Awino & Apitz 2024; Ahmed et al., 2023)

- **Prevention or Reduce:** Governments, private sector organizations and communities are encouraged to take measures that prevent waste generation from processes, use long lasting products and build internal capacities that promote reusable of products. The objective is to reduce waste generation in the first place while innovatively extending the economic use of products by applying them in other areas and processes that drive economic benefits to societies and the environment at large. (Ali et al., 2021).
- **Reuse:** Products and materials are to be kept in their original condition for reuse in the production of goods and services. By implication, less virgin materials are used in production processes resulting in preservation of the natural environment and its resources. The planet is made eco-friendlier, natural inhabitants enriched and public health is enhanced. Product reuse results in less waste generation and reduced waste disposal cost allowing municipalities and business houses to channel resources to other needy areas (Zhang et al., 2022).
- **Recycling:** Waste recycling is an innovative way of creating new products from waste rather than disposing it in the landfills thereby preventing the emission of environmentally harmful gasses. Waste recycling does not only answer to sustainable waste management but it also creates both formal and informal employment, alleviate poverty and adds to economic growth at different levels. Waste recycling creates entrepreneurial activities at different levels including waste sorting, cleaning and manufacturing potentially making the waste recycling industry an economic growth vehicle in developing countries (Bui et al., 2023; Zhang et al., 2022).
- **Recovery:** As opposed to disposing of unrecyclable waste, governments and the private sector can utilize this waste in waste to energy recovery processes such as pyrolysis, gasification, incineration, and oxygen-free digestion. The recovered energy can be used for organizations internal processes or wheeled into the national energy power grid where it is distributed to power different economic activities (Ali et al., 2021; Bui et al., 2023).
- **Disposal:** Landfill waste disposal is the last option when all other environmentally friendly waste management possibilities are exhausted. This is not considered as a sustainable waste management method as takes away valuable land space. Landfilling results in continuous environmental degradation (Bui et al., 2023). The emission of harmful gasses and liquids from the untreated landfills pollutes the air and water bodies with catastrophic impact on the environment and human health (Economou et al., 2024).

1.2. Theoretical Framework

This study was founded on planned behavior and circular economy theories.

- **The Theory of Planned Behavior:** While a person's intention to act is influenced by their attitude toward the behavior, their perception of societal pressures and expectations, and their perception of their ability to control their behavior, their behavior is influenced by their intention to act and their perception of their control over their behavior (Worthington 2021). People will be more inclined to engage in a behavior if they have positive attitude about it, believe that they are capable of engaging in it, believe that there are more social pressures and expectations to engage in it, and believe that it is simple and convenient to do (Hagger et al., 2022; Mason, et al., 2022).

In the context of sustainable waste management, the theory is applied using its three fundamental elements;

- **Attitude:** An individual's attitude describes how they feel about a certain waste management practice, such as recycling or waste reduction. People are more likely to have a positive attitude and plan to recycle or reduce waste if they believe it is easy and useful for them (La Barbera & Ajzen 2021).
- **Subjective Norms:** Perceptions of social pressure from friends or family to engage in a particular waste management behavior. An individual will be more inclined to recycle if they think that their friends or family support recycling (La Barbera & Ajzen 2021).

- **Perceived Behavioral Control:** Perceptions of people's capacity to control their own waste management behavior. People are more likely to plan to recycle if they think that they have the tools, know-how, and financial abilities to do so with ease (La Barbera & Ajzen 2021).

1.2.1. Circular economy theory

This is a sustainable economic model that seeks to restore natural systems, reduce waste and pollution while keeping goods and materials in economic use for a longer period. The theory encourages reuse, refurbishing, remanufacturing, recycling and composting of the allegedly waste materials (Arruda et al., 2021; Arijeniwa et al., 2024). The theory works on the tenet that materials should never be wasted but preserved in a continuous production value chain. Further, it stands to protect society and ecosystems by preventing natural resource depletion in a system which sees natural resources as a source of raw materials. In contrast with the conventional linear economy, which operates on a "take, make, dispose" basis, the circular economy theory aims to establish a closed-loop system that is advantageous to the environment and the economy (Tambovceva et al., 2021; Espuny et al., 2025).

2. Material and methods

This qualitative case study was conducted in Lusaka's Kamwala area in Zambia. The study used the Sustainable Solid Waste Management Hierarchy paradigm to explore the waste management social entrepreneurial activities practiced in the area. This methodological approach provides a hierarchical approach that allowed grouping and visualizing data for content analysis on the exploitable sustainable waste management entrepreneurial activities in Lusaka's Kamwala area.

Primary data was gathered through in-depth interviews, focus group discussion and researchers' observation. Using purposive and uninformed sampling, the 47 study subjects brought in a cross sectional view of participation in sustainable waste management in Lusaka's Kamwala area. Focus group interactions were intended to foster group insights while the in-depth interviews provided a closer look at each participant's experiences and viewpoints on the practiced sustainable waste management activities. The point of data saturation in sample selection ensured that comments were not unnecessarily repeated resulting in a comprehensively compiled data. Information gathered from observations assisted the researcher in characterizing the waste management activities seen as practiced on the ground.

The data collected was grouped in line with the sustainable waste management hierarchy model for content analysis. This approach made it possible to find and analyze important themes and trends pertaining to the Kamwala area's social entrepreneurship efforts toward sustainable waste management. Pictorials were employed to visually and highlight the entrepreneurial activities carried out in Lusaka's Kamwala area towards sustainable waste management.

3. Results and discussion

The Sustainable Solid Waste Management Hierarchy model anchored the themes that pointed to the noteworthy social entrepreneurial waste management practices carried out in the Lusaka's Kamwala area:

- **Waste Prevention:** Businesses especially food restaurants that support the trading community in Lusaka's Kamwala area take ownership of waste prevention and are mindful of the possibility of waste generation. This is particularly credited to the keep Zambia clean campaign that is aimed at preventing outbreaks of waterborne diseases such as cholera. The study observed that the local restaurants in the densely populated trading area were adhering to good hygiene standards for them to keep attracting customers. Despite been so many, restaurant operators indicated that other than few walk ins, the majority of customers are on pre-order basis allowing the restaurants to estimate the quantity of meals to prepare thereby preventing the unnecessary generation of food waste.
- **Reuse:** There is a significant social entrepreneurial activity in waste reuse in Lusaka's kamwala area. Individuals and groups from the less privileged communities engage in waste metal fabrication activities and earn a living from this sustainable waste management practice. The activities are less capital intensive and only requires a right skill and working space for an entrepreneur to get established. The entrepreneurs fabricate blazers, braai stands, metal pots, basins and wheelbarrows, products commonly used in households, local restaurants and inroad transportation of goods. Figures 1 and 2 below shows collected metal waste and fabricated products.



Figure 1 Collected metal waste used in metal fabrication activities



Figure 2 Blazers, wheelbarrows and metal basins fabricated from metal waste

- Recycling:** Although there is no waste recycling plant in the Lusaka's Kamwala area, entrepreneurial participation in recyclable waste is dominant with multiple sites manned by individuals and groups collecting different recyclable waste materials. The recyclable waste is sorted and sold to waste recycling plants within and outside the city of Lusaka. Recycling plants make an upfront payment to individuals and groups who are involved in waste scavenging in the area. The accumulated recyclable waste is picked up at different week days. Waste scavenging requires no special skill but knowledge about different recyclable materials and the right buyers. Figures 3 and 4 shows waste collection, sorting, baling and transporting of recyclable waste to recycling factories.



Figure 3 Various types of waste collection and sorting



Figure 4 Baling and transportation of recyclable post-consumer waste bottles to recycling facilities

- Energy recovery:** Energy recovery from waste is a sustainable waste management practice that turns waste into usable energy using various processes such as: Gasification which is a process that produces high-value products from low-value waste feed-stocks; Pyrolysis which is a process of using heat to turn waste into energy. When waste is burned, heat is released, which causes water in a boiler to transform into high pressure steam that turns the turbine in electricity generation and Gas recovery which is a process of gathering and using landfill gas to produce power. Despite of the abundance of the accumulated unrecyclable waste in Lusaka's Kamwala area, the study observed that there is no one engaged in the waste to energy potential that the area offers. Lack of waste to energy entrepreneurial activity in the area has resulted in multiple sites of accumulated unrecyclable waste, posing an environmental risk and threatened public health. Figure 5 below shows accumulated unrecyclable waste that can be used in energy generation.



Figure 5 Accumulated unrecyclable waste that can be used in energy recovery currently posing an environmental risk and threatening public health in Lusaka's Kamwala area

- Waste disposal:** Entrepreneurs are engaged in picking domestic waste at a fee. This waste is purportedly destined for the landfill but it gets intercepted by other entrepreneurs for the purposes of sorting recyclable materials. Entrepreneurs who are involved in waste sorting and trading in recyclable waste are concentrated along the main power-line and the rail-line that passes in the area. It is along these lines that the unrecyclable waste is left to accumulate in small unregulated dumpsites providing a rich source for waste to energy recovery activities. Figure 6 shows entrepreneurs picking up domestic waste and trade it with waste sorters.



Figure 6 Picking up waste in residential areas at a fee and trading it to waste sorters within the Kamwala area

4. Conclusions and recommendations

The findings of this study points to how social entrepreneurial involvement in sustainable waste management hierarchy in Lusaka's Kamwala area is contributing to Zambia's economic growth, environmental sustainability, improved public health, and the reduction of household poverty while addressing the challenges posed by global climate change. Social entrepreneurship has prevented waste from ending up in landfills, which has greatly decreased the release of dangerous gasses and other pollutants that could cause fatal waterborne illnesses. Additionally, this waste-for-cash social entrepreneurship offers communities an affordable money earning alternative that also lessens the local government authorities financial strain on public waste management resources.

The study recommended that the city council of Lusaka should step in to monitor and control the waste management activities in the Kamwala area to avoid the accumulation of non-recyclable waste in the area which pose an environmental risk if not addressed in good time. The Zambian government has increased private sector participation in solid waste management since the Solid Waste Management Regulation Act of 2018 was passed, and entrepreneurs are still being urged to invest in energy recovery from the waste that is plentiful in the Lusaka's Kamwala area. To fully actualize its keep Zambia clean campaign through sustainable development, the government need to take a deliberate step in empowering entrepreneurs who can take up technologically advanced waste to energy projects in Lusaka's Kamwala area.

Compliance with ethical standards

Acknowledgments

Dr. Abubaker Qutieshat

Associate Professor and Research Lead, ODC, Oman

Disclosure of conflict of interest

There is no conflict of interest to disclose.

References

- [1] Ahmed, F., Hasan, S., Rana, M. S., & Sharmin, N. (2023). A conceptual framework for zero waste management in Bangladesh. *International Journal of Environmental Science and Technology*, 20(2), 1887-1904.
- [2] Ali, N. E. H., Talmizi, N. M., Wahab, S. N. A., Rijal, N. S., Abd Rased, A. N. N. W., & Saleh, A. A. (2021, August). Solid waste management hierarchy: an empirical investigation. In *International, Invention, Innovative & Creative (InIIC) Conference* (p. 8).
- [3] Arijeniwa, V. F., Akinsemolu, A. A., Chukwugozie, D. C., Onawo, U. G., Ochulor, C. E., Nwauzoma, U. M., ... & Onyeaka, H. (2024). Closing the loop: A framework for tackling single-use plastic waste in the food and beverage industry through circular economy-a review. *Journal of Environmental Management*, 359, 120816.

- [4] Arruda, E. H., Melatto, R. A. P. B., Levy, W., & de Melo Conti, D. (2021). Circular economy: A brief literature review (2015–2020). *Sustainable Operations and Computers*, 2, 79-86.
- [5] Awino, F. B., & Apitz, S. E. (2024). Solid waste management in the context of the waste hierarchy and circular economy frameworks: An international critical review. *Integrated Environmental Assessment and Management*, 20(1), 9-35.
- [6] Benito, B., Guillamón, M. D., Martínez-Córdoba, P. J., & Ríos, A. M. (2021). Influence of selected aspects of local governance on the efficiency of waste collection and street cleaning services. *Waste Management*, 126, 800-809.
- [7] Bui, T. D., Tseng, J. W., Tseng, M. L., Wu, K. J., & Lim, M. K. (2023). Municipal solid waste management technological barriers: A hierarchical structure approach in Taiwan. *Resources, Conservation and Recycling*, 190, 106842.
- [8] Economou, F., Voukkali, I., Papamichael, I., Phinikettou, V., Loizia, P., Naddeo, V., ... & Zorpas, A. A. (2024). Turning food loss and food waste into Watts: A review of food waste as an energy source. *Energies*, 17(13), 3191.
- [9] Espuny, M., Reis, J. S. D. M., Giupponi, E. C. B., Rocha, A. B. T., Costa, A. C. F., Poltronieri, C. F., & Oliveira, O. J. D. (2025). The Role of the Triple Helix Model in Promoting the Circular Economy: Government-Led Integration Strategies and Practical Application. *Recycling*, 10(2), 50.
- [10] Fatimah, Y. A., Govindan, K., Murniningsih, R., & Setiawan, A. (2020). Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: A case study of Indonesia. *Journal of cleaner production*, 269, 122263.
- [11] Hagger, M. S., Cheung, M. W. L., Ajzen, I., & Hamilton, K. (2022). Perceived behavioral control moderating effects in the theory of planned behavior: A meta-analysis. *Health Psychology*, 41(2), 155.
- [12] Kurniawan, T. A., Meidiana, C., Othman, M. H. D., Goh, H. H., & Chew, K. W. (2023). Strengthening waste recycling industry in Malang (Indonesia): Lessons from waste management in the era of Industry 4.0. *Journal of Cleaner Production*, 382, 135296.
- [13] La Barbera, F., & Ajzen, I. (2021). Moderating role of perceived behavioral control in the theory of planned behavior: A preregistered study. *Journal of Theoretical Social Psychology*, 5(1), 35-45.
- [14] Mason, M. C., Pauluzzo, R., & Umar, R. M. (2022). Recycling habits and environmental responses to fast-fashion consumption: Enhancing the theory of planned behavior to predict Generation Y consumers' purchase decisions. *Waste Management*, 139, 146-157.
- [15] Obaideen, K., Shehata, N., Sayed, E. T., Abdelkareem, M. A., Mahmoud, M. S., & Olabi, A. G. (2022). The role of wastewater treatment in achieving sustainable development goals (SDGs) and sustainability guideline. *Energy Nexus*, 7, 100112.
- [16] Tambovceva, T. T., Melnyk, L. H., Dehtyarova, I. B., & Nikolaev, S. O. (2021). Circular economy: Tendencies and development perspectives.
- [17] Tobin, S., & Zaman, A. (2022). Regional cooperation in waste management: examining Australia's experience with inter-municipal cooperative partnerships. *Sustainability*, 14(3), 1578.
- [18] Worthington, A. K. (2021). Theory of planned behavior. *Persuasion theory in action: An open educational resource*.
- [19] Zhang, C., Hu, M., Di Maio, F., Sprecher, B., Yang, X., & Tukker, A. (2022). An overview of the waste hierarchy framework for analyzing the circularity in construction and demolition waste management in Europe. *Science of the Total Environment*, 803, 149892.