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Challenges in Household Solid Waste Management: A Case Study of Sokoni I Ward, Arusha City, Tanzania

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ABSTRACT

Management of household waste involve various stakeholders including the residents, where each encounter difference challenges which affects each differently. This study explored challenges that residents experienced in the management of household waste in their area. Qualitative and quantitative information collected from respondents in which household survey for 90 residents and interview for ward public officers employed as a methods of data collection. The qualitative content analysis approach and descriptive analysis called upon. This study reveals that poor involvement of residents in the area of study as major challenging issue on the management of household solid waste which can be noted on the irregular rescheduling of waste collection and waste collection fee increment. The paper suggests residents to employ friendly waste collection practice and use different existing alternatives to address their challenges while for the government, they have to enhance conducive operating environment between residents and waste collection vendor.

INTRODUCTION

Household solid waste refers to the daily residue generated by individuals as a result of consuming goods and services (Ouhssine *et al.*, 2020). The management of household solid waste is a significant global concern, impacting both developed and developing nations. Developed nations typically experience a higher annual growth rate of 3.2–4.5%, while the growth rate in developing countries ranges from 2–3% (Pheakdey *et al.*, 2022). The quantity and composition of solid waste are determined by the lifestyle and standard of living of individuals (Baroi *et al.*, 2020). Solid waste management presents challenges in urban and rural contexts, as all individuals contribute to waste generation. This issue is a global concern, impacting individuals, families, communities, and governments. Therefore, it is crucial to address it through sustainable strategies (Nyampundu *et al.*, 2020).

The generation of household solid waste correlates directly with population size and is rising alongside global population trends. In Pakistan, solid waste generation ranges from 0.283 to 0.612 kg per capita per day, with an annual growth rate of 2.4% (Ijaz *et al.*, 2021). The issue of managing solid waste become a tough activity on different situations including during the occurrence of pandemic in Wuhan city of China in 2019 since it shifted the trends of waste created by various sources such as households (Tripathi, *et al.*, 2020). However, the issue of satisfaction and engagement of residents is very important in management of solid waste in Asian countries like China (Wang *et al.*, 2020). The transportation system is frequently inadequate and informal, and residents from marginalized social groups face challenges due to the mixing of hazardous and household waste during handling and storage, as well as the fact that most waste is stored in outdated or badly maintained facilities like storage containers (Abubakar *et al.*, 2022).

The rapid increase in household solid waste generation is undoubtedly due to the accelerated population growth rate triggered by massive rural-to-urban migration where the scarcity of resources and equipment necessary for waste treatment is the major obstacles encountered residents in management of household solid waste especially in low-income communities (Kubanza, 2024). One of the most important factors in the successful execution of household solid waste management programs is cooperation and active public participation. The people of Athens, Greece, were open to taking part in future composting initiatives and had a favorable opinion of how green centers operated. Their hesitancy about how the programs (recycling, composting, and green centers) should be run is another barrier to their continued involvement (Drimili *et al.*, 2020).

Household solid waste management is one of the major challenges of municipalities in developing countries. In many large cities, private service providers deliver the service of household waste collection for a fee, but in smaller cities this service is not always available as it may not be profitable for private providers as a result majority of the waste remains uncollected (Kumar *et al.*, 2019). Among the difficulties residents face in managing household solid waste are their willingness to pay a charge for waste collection but their inability to do so, waste management laws and rules printed in English, and the subpar equipment employed for waste collection. (Butoto, 2013). Another issue with household solid waste management occurred during the COVID-19 lockdown, when obsessive use of masks and other personal protective equipment, as well as spending more time at home and purchasing and storing food in bulk, distorted the waste generation trend and increased the amount of waste generated every day (Dzawanda & Audrey, 2022). 60% of waste, including household waste, is improperly

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managed and typically dumped illegally in sewage canals, roadsides, and designated open spaces (Kamugisha *et al.*, 2019). Tanzania, home to some of the fastest-growing urban centers in East Africa, produces 12–17 million tons of solid waste every year where only 40 percent of this collected and sent to dumpsites (URT, 2020). Different strategies are used by Tanzania's government, through local government bodies, to control solid waste including household solid waste. Many cities in developing nations, like Tanzania, dispose of large amounts of municipal solid waste (MSW) in unregulated, informal or official dumpsites, endangering the environment and human health (Kazuya & Zhang, 2019). Furthermore, the main obstacles to Tanzanian households managing solid waste are insufficient dustbins and trash dump locations, unlawful dumping at unapproved locations, delays in garbage collection, and the high cost of services (Mushi, 2024).

According to the National Environment Statistics, 2,101,500 tons of garbage were produced in parts of the Tanzanian mainland, including Arusha, with homes accounting for 1,196,900 tons (57%) of the total waste produced there (Nyampundu *et al.*, 2020). The quality of waste management services provided is also a key factor that influences vendors' willingness and decision to pay for waste management services in Arusha (Kamuzora, 2024). The challenges faced by residents in managing household solid waste remain insufficiently explored, motivating the need for this research to better understand and address these issues.

MATERIALS AND METHODS

The household was the sample unit for this study, with a total of 90 residents from Sokoni I ward selected using Yamane's formula (1967). A mixed-methods approach was employed, incorporating both probability and non-probability sampling techniques. Simple random sampling was used to select respondents, while purposive sampling was applied to choose public officers from Sokoni I ward. These public officers served as key informants, providing valuable information to support the study. Data was collected through household surveys and interviews across six mitaa of Sokoni I ward in Arusha City Council. The collected data was then coded and processed using IBM SPSS Statistics 23. Descriptive analysis and content analysis were employed for data analysis.

RESULTS AND DISCUSSIONS

Demographic and Socioeconomic Characteristics of Respondents

Education level of the respondents

This study is intended to collect information regarding the level of education of the residents of Sokoni I. Therefore, in the process of identifying the education level of the residents, education levels were classified into four levels, namely, primary, secondary, tertiary, and never gone to school.

The result from table 1 indicates that 56.7 percent of the

Table 1: Education level of the respondents

Education level	Frequency	Percent
Primary level	51	56.7
Secondary level	26	28.9
Tertiary level	9	10.0
Never attend school	4	4.4
Total	90	100.0

residents attain primary level education, while only 4.4 percent of them never attend school. Now, this means that the majority of residents of Sokoni I ward attained only primary education, which is the basic level of literacy that enhances their understanding of various issues, including those associated with the management of solid waste in their household.

That finding aligns with a study conducted by Kibonde (2024) in Morogoro municipality, where it was discovered that the majority of respondents attained primary education (41%), followed by secondary education (39%). Thus, this indicates that level of education helps residents not to opt for environmentally damaging practices such as random dumping or burning. Also, the level of education of the residents has an effect on the generation and handling of solid waste at the household level (Mukena *et al.*, 2024).

Nature of the residence

This was also one of the important variables in the study to be traced in the sense that members of households are of two major categories, namely house owners and tenants. Thus, the nature of the residence for respondents is classified into those two major categories.

Table 2: Nature of residence

Nature of residence	Frequency	Percent
House owner	56	62.2
Tenant	34	37.8
Total	90	100.0

The study finding from Table 2 revealed that 62.2 percent of the respondents were house owners, while only 37.8 percent were tenants. Based on the nature of the residence, the majority of the respondents in this study were house owners, which allows them to have enough experience and commitment on various methods of solid waste management at their household.

The study conducted in Kisumu, Kenya, by Simiyu *et al.* (2019) identified two types of residences where it also noted landlords/house owners have to play a role in basic service provision, and tenants equally have a role to play in ensuring that they improve their living conditions. Though it found that those residences with the presence of landlords have improved living conditions settlements compared to those without them (Yeasmin *et al.*, 2020).

The findings conducted in Nigeria by Ebekoziem & Aigbavboa (2021) and Akinpelu *et al.* (2021) agreed with

the presence of tenants and house owners/landlords. Also, it found that house owners/landlords and tenants collaborated themselves as well as with other private waste collectors in managing solid wastes in their residences.

Categories of methods employed

Table 3: Categories of methods employed in solid waste management

Categories of methods employed	Frequency	Percent
Formal methods	58	64.4
Informal methods	32	35.6
Total	90	100.0

The results of table 3 shows that, 64.4 percent of respondents mentioned formal methods are employed in managing solid waste at households while 35.6 percent declared informal methods as active method in managing solid waste in the area. Now based on this results, formal methods found to be mostly employed by different parties involved in Sokoni I ward to manage solid waste at the household.

The findings is relevant to study focused on examining solid waste management (SWM) at household level and its impact on sustainable environmental protection, conducted in Moshi municipality by (Moswery, 2022) where it noted the existence of informal methods in management of solid waste at the household level.

Moreover the study of (Monella & Leyaro, 2017) implemented on Dar es Salaam targeted on the households willingness to participate in solid waste separation for reduce, reuse and recycle where it found the application of both formal and informal disposal practices by households and by waste collectors.

Residents service satisfaction

Table 4: Residents' service satisfaction

Service satisfaction	Frequency	Percent
Yes	59	66
No	31	34
Total	90	100.0

Table 4 reveals that 66% of residents are satisfied with the waste collection services in their area, while 34% express dissatisfaction. This indicates that, despite some concerns, the majority of residents in Sokoni I are content with the current waste collection services provided. The satisfaction rate suggests that the waste collection services meet the expectations of most residents, though the 34% dissatisfaction rate highlights areas for potential improvement. These findings emphasize the importance of continued engagement with the community to address any concerns and ensure that waste management services are effectively meeting the needs of all residents.

The findings is contrary to the study of Kubanza (2024)

in low-income communities in South Africa mainly Alexandra, Johannesburg when it revealed that over 50 percent of residents were dissatisfied with collection services in Alexandra. Only a few of the participants, who amount to 10 percent, were satisfied and 8 percent were fairly satisfied with the services for collecting and disposing of waste with waste collection and disposal services.

Though the supportive findings from study conducted in Dodoma city council by Mnguu (2021) which include sixty-five (65) respondents, discovered that members of the household satisfied with waste collection services at their area due to notable improvement on responsibilities taken by each parties involved.

Challenging seasons on household solid waste management

Table 5: Challenging seasons on household solid waste management

Challenging season	Frequency	Percent
Dry seasons	18	20
Rainy seasons	70.5	78.3
None	1.5	1.7
Total	90	100.0

Table 5 indicates that 78.3% of respondents experience difficulties managing household waste during the rainy season, while only 1.7% report facing challenges in managing waste regardless of the season. These results clearly show that the majority of residents in Sokoni I encounter significant challenges in managing household solid waste during the rainy season.

The study conducted in Gujrat city, Pakistann by (Ijaz, *et al.*, 2021) indicated that there is correlation between solid waste and flood in urban area such that the areas which have a waste dumping facility face more hurdles after rainfall. Now this implies that the rainfall reasons favors the availability of solid waste and discourage the management in the area.

Challenges residents encountered

Table 6: Challenges residents encountered in management of household solid waste

Challenging season	Frequency	Percent
Dry seasons	18	20
Rainy seasons	70.5	78.3
None	1.5	1.7
Total	90	100.0

The results illustrated in table 6 noted that 30.3 percent of the respondents mentioned poor involvement as the challenge experienced while 1.8 percent of the respondents confess no challenge experienced in management of household solid waste in the area. Thus, based on that

results it concluded that, poor involvement is the major challenge encounter residents of Sokoni I ward in the process of management of household solid waste.

In a book chapter of Nyika *et al.*, (2019) entitled “The drivers and state of SWM in RSA” it identified the alligned information, where the lack of an all-inclusive planning and management as a major challenge on the management of solid waste in Republic of South Africa. The results from this study encourage the involvement of the homeless and unemployed in the recycling and waste management process, thereby reducing the shortage of human resources and creating jobs.

Also the support obtained from study of Masood *et al.*, (2014) conducted in Lahore, a metropolitan city of Pakistan reported that, Inclusivity of users and providers of the waste management system is low in the city, as not all stakeholders are consulted in the decision making processes which could sometimes forces people to adopt unsustainable methods of solid waste disposal.

Interview

It was quoted from one administration staff of Sokoni I ward that;

“Members of the community at household in Sokoni I ward sometimes remained with waste for some times when waste collection vehicles failed to adhere the time table due to some inconveniences associated with rainy seasons and ware and tare of vehicles used in waste collection”.

That results is relevant to the findings of Dimoso (2024) when explored the factors influencing household adoption of Modern Waste Management Technologies, where noted that, irregular waste collection was one of the challenges experienced by household heads included in the study conducted in Ilala municipality.

Discussion

The achievement of household solid waste management is influenced by various factors, as well as initiatives aimed at addressing the challenges faced in the area. This study revealed that residents encounter several challenges, including poor involvement in the waste management process. Residents reported that the level of engagement in managing household waste is unsatisfactory. For instance, garbage collection vehicles often fail to adhere to the scheduled collection times without prior notice, forcing residents to keep waste for an indefinite period. This situation contributes to air pollution and the scattering of waste within residential areas.

Moreover, poor involvement is evident in the unilateral increase in waste collection fees. Residents expressed dissatisfaction with being required to pay higher fees without any form of discussion or consultation with the government or waste collection vendors. This lack of engagement prevents them from voicing their concerns about the validity of the price increases, particularly in relation to their income levels and quantity of wastes produced.

CONCLUSION

This study reveals a significant gap in the involvement of residents in the management of household solid waste within the area. This gap can be attributed to various factors that negatively impact the performance and sustainability of household solid waste management. To address this issue effectively, all relevant stakeholders must actively take responsibility and implement the following measures:-

1) Residents: As key stakeholders in the management of household solid waste, residents should adopt environmentally friendly waste management practices and work collaboratively with local government authorities and waste collection vendors. Additionally, residents should actively provide feedback on various issues related to household solid waste management in their area. This can be achieved through different channels, including community meetings, suggestion boxes, and mobile communication platforms.

2) Sokoni I Ward Office: As a key stakeholder in household solid waste management, the Sokoni I Ward Office plays a crucial role in fostering a conducive working relationship between residents and waste collection vendors. The local government authority of the Arusha City Council, through the Sokoni I Ward Office, should actively address the challenges faced by both residents and vendors in managing household solid waste. To achieve this, the ward office should explore and implement effective solutions to these challenges. Furthermore, the local government authority, particularly the Sokoni I Ward Office, should focus on fostering partnerships among all parties involved. This can be achieved by promoting a sense of shared responsibility and ownership, which is essential for ensuring the sustainability of household solid waste management.

Contribution of The Study

This study makes a significant contribution to the existing literature by exploring the challenges faced by residents in the solid waste management systems of city councils. Notably, it highlights critical issues and proposes several solutions that, if implemented, could promote and ensure sustainable environmental management, particularly in the context of household solid waste. By advocating for a holistic approach, this study aims to address these challenges effectively while advancing the public interest.

Limitations of The Study

The study focused exclusively on a single ward, Sokoni I, within the Arusha City Council. This limitation was primarily due to constraints in financial resources and time. As a result, the findings may not be fully generalizable to all city councils across Tanzania.

Further Study

This study examined the challenges faced by residents in managing household solid waste within their surroundings. It is now recommended that future research focuses on

the contribution of environmental health committees in the management of household solid waste.

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