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Assessing the Environmental Consequences of unregulated Household Waste Disposal in Urban Slums of Dangorayo, Somalia

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ABSTRACT

Unregulated household waste disposal presents serious environmental and health challenges in urban slums globally. This study aimed to evaluate the environmental impacts of disposal practices, focusing on community awareness, waste volume and composition, as well as coping mechanisms in Urban Slums of Dangorayo, Somalia. Employing a descriptive research design, the study collected data through surveys and interviews with 388 residents, local authorities, and environmentalists in Dangorayo. Key findings revealed a low level of community awareness regarding the risks associated with improper waste disposal and existing regulations, leading many households to resort to open dumping and burning due to limited access to formal waste management services. Organic waste was identified as the largest component of household waste. Furthermore, a significant proportion of households lacked regular waste collection services, resulting in frequent waste accumulation in public spaces. Analysis of coping mechanisms indicated that community strategies, such as informal waste storage and periodic clean-ups, were inadequate in addressing the waste crisis. The study concluded that unregulated waste disposal has considerable implications for public health and environmental quality. It recommended enhancing waste management infrastructure, increasing community awareness through targeted educational initiatives, and strengthening regulatory frameworks to promote sustainable waste practices and mitigate health risks. The findings presented in tables and figures throughout the study underscore the urgent need for intervention and provide a foundation for informed policy decisions.

Keywords: Unregulated waste disposal; Environmental consequences; Urban slums; Waste Management; Dangorayo, Somalia

1. INTRODUCTION

Globally, the issue of unregulated household waste disposal is particularly prevalent in rapidly urbanizing areas and informal settlements. As cities expand, the generation of waste tends to outpace the development of effective waste management systems. Without accessible waste collection services or disposal infrastructure, residents often resort to dumping waste in vacant lots, open dumps, waterways, and other unsafe locations [1]. This practice creates serious health and environmental concerns. Historically, urban slums in developing countries like Somalia often lack proper waste management systems leading to the uncontrolled dumping of garbage in public spaces. This issue has persisted for decades in the slums of Dangorayo [2]. As early as the 1990s, aid organizations identified poor sanitation from unregulated waste disposal as a major health hazard for residents. Without coordinated municipal trash collection, individuals discard waste wherever convenient - on roadsides, in empty plots between crowded housing units, or directly into canals and rivers. One study found nearly three-quarters of household waste in Dangorayo ending up in public spaces and waterways. Over time, this accumulating waste contributes to flooding, breeding of disease vectors like mosquitoes, and contamination of water used for washing and drinking [3]. The impact on public health in these communities is particularly severe for children [4]. Addressing unregulated waste disposal remains an urgent priority [5]. The historical perspective emphasizes the pressing need to change waste

management practices. It highlights the requirement of adopting modern, sustainable waste management techniques by underscoring the negative consequences of traditional methods on the environment and public health. By drawing lessons from these past problems, new policies, methods, and infrastructures tailored to the unique needs of Dangoroyo District in managing illegal garbage dumping may be developed [6].

Somalia's protracted conflict and governance challenges have significantly hindered the establishment of municipal waste management systems. Rapid urbanization driven by internal displacement has led to the uncontrolled growth of informal settlements that lack basic urban services. Uncollected waste accumulates in public spaces or is illegally dumped on the outskirts [7].

Dangorayo exemplifies these challenges. With a population of over 750,000 internally displaced persons clustered in dense, unplanned settlements, the Dangorayo slums face an extreme waste burden. In the absence of a formal waste collection system, the widespread dumping and burning of waste throughout residential areas and adjacent farmland exposes residents, especially children, to significant health risks from smoke inhalation, communicable diseases, and water source contamination. Structuration theory, developed by sociologist Anthony Giddens, 1984 [8]. provides a useful analytical framework to understand the interplay between social structures and individual agency in this context [9]. The lack of governance structures for waste management constrains residents and compels them to engage in unsafe dumping behaviors, while their participation in these actions perpetuates the system. Structuration theory highlights the potential for empowering actors to drive structural changes. Improving waste management in Dangorayo requires supporting internally displaced persons and communities to organize collection efforts, leverage traditional governance mechanisms, and pressure authorities to fulfill their obligations [10]. From a conceptual standpoint, the lack of organized waste collection services in Dangorayo's informal settlements has allowed dumping practices to accumulate over time without intervention. With municipal authorities prioritizing more affluent neighborhoods, there are no convenient disposal options for residents of crowded informal areas beyond simply discarding refuse into surrounding alleys, vacant plots, or drainage canals [11]. This normalized practice of uncontrolled dumping has transformed many slum neighborhoods into obstacle courses strewn with food scraps, plastics, medical waste, and broken electronics along pathways. The resulting landscape contradicts principles of healthy urban living conditions, as clear public hygiene and sanitation concepts are disregarded [12]. Over time, the accumulating waste also undermines water management systems and ecological integrity. Blocked drainage pathways contribute to flooding during rains, disrupting livelihoods and spreading contaminants. The breeding of disease vectors in dumping sites also impacts transmission dynamics [13]. For example, the sheer density of flies, rats, and cockroaches supported by decaying organic waste sustains periodic diarrhea and malaria outbreaks. Conceptually, the uncontrolled waste dumping in Dangorayo's informal settlements stems from governance neglect of entire districts, contravenes basic standards of healthy habitation, and degrades ecological buffers - with severe repercussions for impoverished residents [14]. This study was guided by the following objectives; assessment of the level of awareness within the community regarding the risks associated with unregulated household waste disposal; analysis of the current types and volume of household solid waste generated, as well as current collection and disposal methods, using surveys; and investigation of the coping mechanisms and adaptive strategies by the community members in response to unregulated household waste disposal

2. METHODOLOGY

2.1 Study area description

The study was conducted in Somalia's Dangorayo District, an urban area with a number of environmental challenges, including waste disposal. the District of Dangorayo is located in Somalia's northeastern Nugal region. It serves as the Dangorayo District's capital. The geographic coordinates of Dangorayo City are **8°43′40″N 49°20′30″E.**

Figure 1: A map of Dangorayo City [15].

There were 20,331 people living in Dangorayo [16]. 400 respondents were selected as the target group for this study, using Slovene's Formula [17]. Data was collected between Aug 2023 and Sep 2024

2.2 Research design

The study used a descriptive research design for its cost-effectiveness, time efficiency, and snapshot capability, alongside a mixed methodology combining quantitative and qualitative approaches to gather data from diverse respondents [18]. The study collected data through questionnaire survey and interviews administered to 388 local residents, 25 local authorities, and 25 environmentalists in Dangorayo. The study focused on key issues such as current waste disposal practices, environmental impacts, challenges faced, and potential solutions. A mix of purposive and random sampling methods was employed. To guarantee table Random sampling was utilized to select residents, while purposive sampling was used to identify key informants from environmentalists and municipal authorities. The quantitative data collected through these methods were analyzed using descriptive statistics to identify solid waste composition, generation rates, collection rates, and disposal practices in Dangorayo [19]. The statistical programs for social scientists (SPSS) Version: 20 was used to examine the data that was gathered from the respondents. Thematic analysis was applied to qualitative data to identify and interpret patterns and themes within the responses gathered from interviews. Triangulation of these data sources, facilitated a deeper understanding of the community's perspectives and experiences regarding unregulated waste disposal, enriching the overall findings of the study. The study was carried out according to the guidelines of the Kampala International University Research Ethics Committee.

2.3 Data Collection Instruments

The objective of the data collection instruments (interviews) was to gather comprehensive and firsthand perspectives from residents of the urban slums in Dangorayo, Somalia, regarding the current waste disposal practices, environmental impacts, challenges faced, and potential solutions. The interviews aimed to capture qualitative data that could provide an in-depth understanding of the lived experiences and observations of the community members who were directly affected by the issue of unregulated waste disposal. This rich data informed the analysis of the environmental challenges posed by improper waste management and helped identify practical and community-driven strategies to address these challenges effectively.

2.4 Method of Data Analysis

Data analysis was the process of bringing order, structure, and meaning to the mass of information gathered. After collecting all the necessary data, it was coded, edited, and analyzed to eliminate errors and ensure consistency. The Statistical Package for the Social Sciences (SPSS) Version 20 was utilized to examine the gathered quantitative data, which helped summarize the coded information and expedite the analysis process. Descriptive statistics were employed to thoroughly examine, summarize, and interpret the data obtained from the surveys. This included calculating standard deviations, averages, valid percentages, and frequencies, which provided an overview of the respondents' demographic traits related to unregulated waste disposal in urban slums. The impact of unregulated waste disposal in Dangorayo's urban slums was analyzed through the examination of frequencies and percentages of unregulated waste disposal practices within the community. For qualitative data, thematic analysis was applied.

This approach allowed for the identification and interpretation of patterns and themes within the responses gathered from interviews and open-ended survey questions. Thematic analysis involved coding the qualitative data, grouping similar codes into themes, and interpreting these themes to address the complex research inquiries related to waste management challenges in Dangorayo. This method facilitated a deeper understanding of the community's perspectives and experiences regarding unregulated waste disposal, enriching the overall findings of the study.

3. PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

3.1 Demographic characteristics of respondents

According to the study, the respondents' gender, age, marital status, level of education, kind of work, and number of household members regarding the respondents of Dangorayo district are presented in the Table 1.

Findings from Table 1 on the gender of respondents reveals a significant gender imbalance among the participants. Males constitute the majority, representing 68.8% (267) of the respondents, while females account for 31.2% (121) of the sample. This disparity in gender representation was considered when interpreting the overall results of the study. The age demographics of the participants showed a skew towards younger individuals. The largest age group was 20-29 years old, comprising 41.0% (159) of the respondents. This is followed by the 30-39 age bracket at 30.4% (118), then 40-49 at 20.1% (78), and finally, those 50 and above representing 8.5% (33) of the sample (Table 1). This age distribution suggests that the study's findings may be more representative of younger adults' perspectives and experiences.

Table 1: Demographic traits of Respondents

Gender	Percent (%)
Male	68.8
Female	31.2
Age	
20-29 Years	41.0
30-39 Years	30.4
40-49 Years	20.1
50+	8.5
Academic qualification	
Certificate	13.9
Diploma	18.0
Degree	39.7
Post Graduate	28.4
Marital Status	
Single	47.2
Married	32.7
Separated/divorced	16.0
Widowed/widower	4.1
Occupation	
businessman/women	25.5
civil servant	28.4
Farmer	22.4
None	23.7
H/Number of the individuals	
1-3	16.5
4-6	42.3
7-9	31.4
10 and above	9.8
Total	**100.0**

The educational background of the participants is diverse, with a largest group, 39.7% (154), holdings a degree, followed by 28.4% (110) with postgraduate qualifications. Diploma holders make up 18.0% (70) of the sample, while those with certificates represent 13.9% (54). This distribution indicates a well-educated sample, which may influence the nature of the responses and perspectives gathered in the study. The marital status of the respondents shows a

plurality of single individuals. Nearly half, 47.2% (183), of the participants ware single, while 32.7% (127) ware married. Separated or divorced individuals make up 16.0% (62) of the sample, and widowed respondents account for 4.1% (16). This distribution provides insights into the relationship dynamics of the study population and may be relevant to understanding their responses in relation to family or personal life questions. The occupational breakdown of the participants was relatively balanced across different sectors. Civil servants formed the largest group at 28.4% (110), closely followed by businesspeople at 25.5% (99). Those without a specific occupation comprise 23.7% (92) of the sample, while farmers represent 22.4% (87). This diverse occupational mix suggests that the study captures perspectives from various professional backgrounds, potentially providing a well-rounded view of the topics under investigation. Additionally, many respondents belonged to households with 4-6 individuals (42.3%).

3.2 Disposal of household waste

A survey showed that the most common method was using designated waste collection points, with 38.4% of respondents (149 people) choosing this option (Figure 2). The second most common method is open dumping or burning, practiced by 34.0% of respondents (132 people). Burying waste in the backyard is the third most common method, used by 16.8% of respondents (65 people). Additionally, 10.8% of respondents (42 people) reported using other unspecified methods for waste disposal.

This data suggests that while a significant portion of the surveyed population uses designated waste collection points, a considerable number still resort to potentially harmful practices such as open dumping, burning, or burying waste. The dominant aspect of these findings is that over 60% of respondents engage in less sustainable and potentially harmful waste disposal methods, highlighting an urgent need for intervention to promote safer practices.

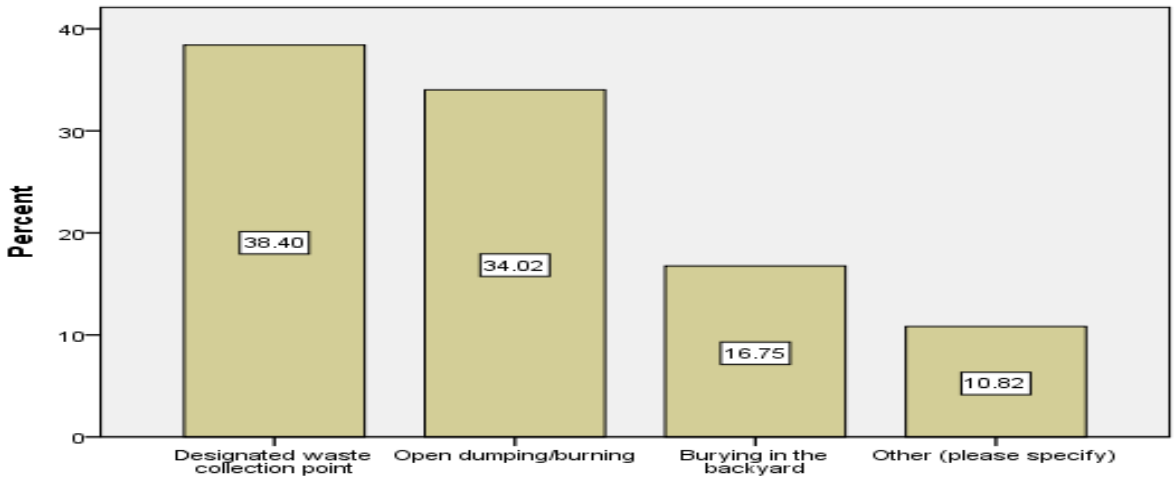

Figure 2: The typical dispose of household waste

3.3 The primary source of drinking water

The survey was showed that surface water, such as rivers and lakes, was the most common source of drinking water, used by 50.3% of respondents (195 people) (Figure 3). Private wells are the second most common source, utilized by 22.9% of respondents (89 people). Municipal water supply is used by 12.9% of respondents (50 people) as their primary drinking water source. Additionally, 13.9% of respondents (54 people) reported using other unspecified sources for their drinking water. This data suggests that a majority of the surveyed population relies on potentially untreated or less regulated water sources, such as surface water and private wells, for their drinking water. Only a small portion of the population has access to municipal water supply, which is typically treated and regulated.

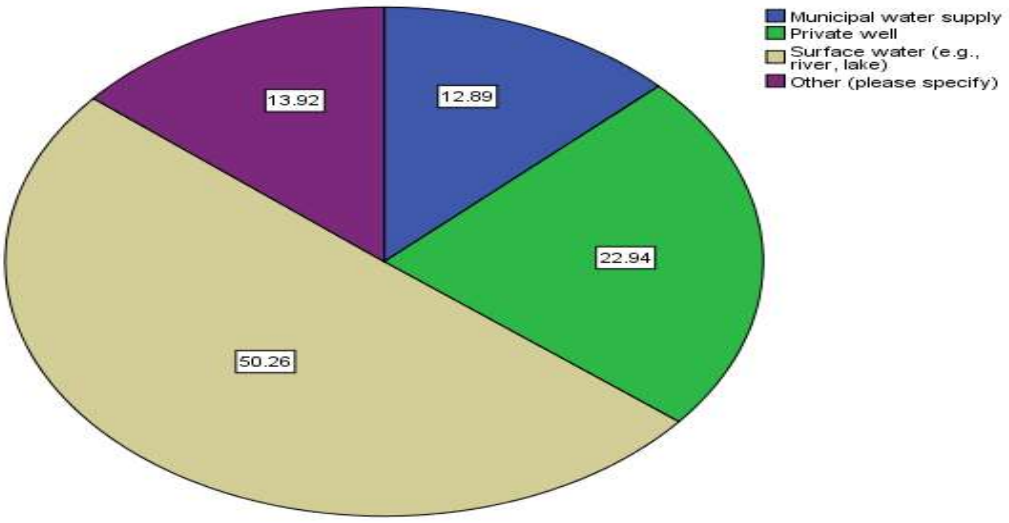

Figure 3: The primary source of drinking water

3.4 Perception of litter or waste accumulation in their neighborhood

The survey on the residents' perception of litter or waste accumulation in their neighborhood revealed that 74% of residents (287 out of 388) reported no noticeable issues, while 26% (101 residents) observed litter or waste problems in their area (Figure 4). This indicates that although the majority perceives their neighborhood as clean, a significant minority has concerns about local environmental cleanliness, suggesting potential areas for improvement in community waste management. The findings demonstrate a clear divide in residents' perceptions, with nearly three-quarters of the surveyed population considering their surroundings free from visible litter or waste accumulation, while about one-quarter noted environmental cleanliness issues, highlighting a need for targeted waste management strategies to address these concerns and improve overall neighborhood cleanliness.

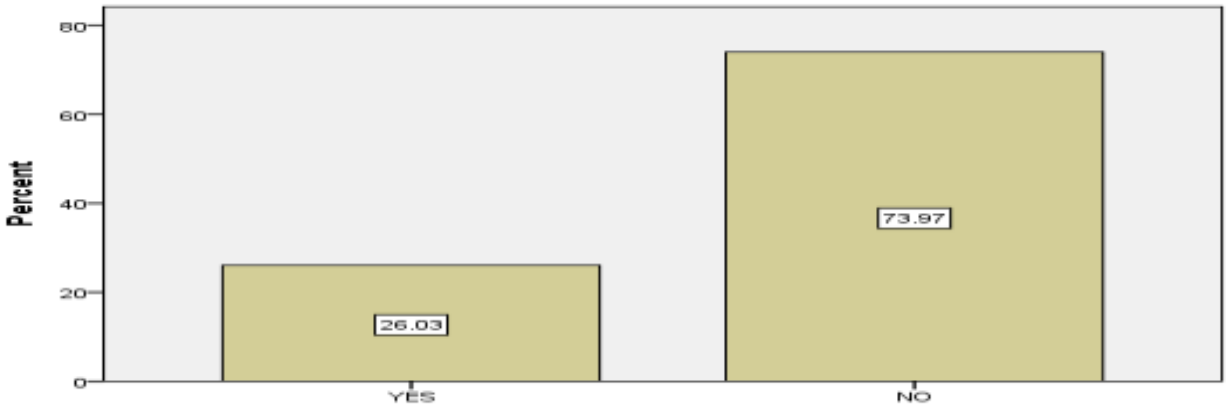

Figure 4: Perception of litter or waste accumulation in their neighborhood

3.5 Existing regulations or guidelines for waste disposal

The survey conducted on residents' awareness of waste disposal regulations or guidelines in their area reveals a significant knowledge gap. Out of 388 respondents, only 22.9% (89 individuals) reported being aware of existing waste disposal regulations or guidelines, while a substantial 77.1% (299 residents) indicated they were not aware of such measures (Figure 5). These findings highlight a considerable lack of awareness among the majority of residents regarding local waste management policies. The dominant aspect of these findings is the alarming 77.1% of

respondents who are unaware of waste disposal regulations, indicating a critical need for educational initiatives to inform the community about local waste management practices and promote compliance.

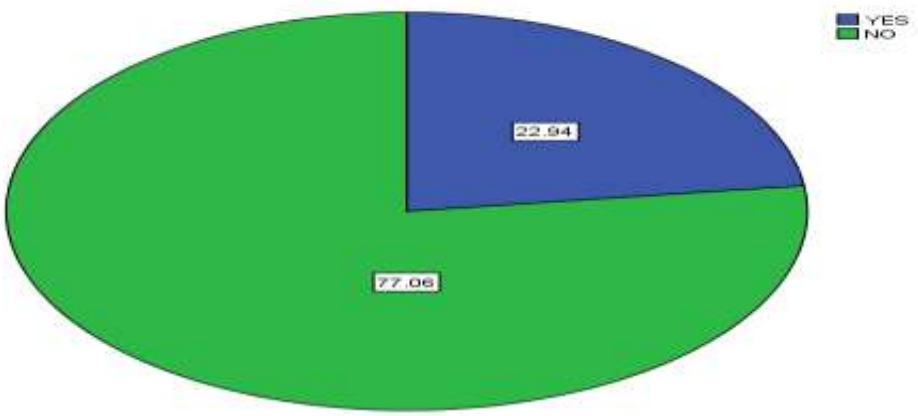

Figure 5: The existing regulations or guidelines for waste disposal in your area

3.6 Correlation's analysis of the relationship between education and awareness programs related to waste management

The table 2 presents a Pearson correlation matrix examining the relationship between education and awareness programs related to waste management and the implementation of effective waste management practices. The analysis reveals a strong, positive, and statistically significant correlation ($r = .689$, $p < .01$, $N = 388$) between these two variables, suggesting that increased investment in education and awareness initiatives is associated with improved waste management outcomes.

Table 2: Correlation's analysis of the relationship between education and awareness programs related to waste management

Correlations

		Education and awareness programs	waste management practices
Education and awareness programs	Pearson Correlation	1	.689**
	Sig. (2-tailed)		.000
	N	388	388
waste management practices	Pearson Correlation	.689**	1
	Sig. (2-tailed)	.000	
	N	388	388

**. Correlation is significant at the 0.01 level (2-tailed).

3.7 Willingness to engage in waste management initiatives or contribute financially to improved waste collection services

A survey gauging residents' willingness to engage in waste management initiatives or contribute financially to improved waste collection services reveals a community nearly evenly split on the issue. Of the 388 respondents, 52.1% (202 individuals) expressed willingness to participate or pay for enhanced waste management services, while 47.9% (186 residents) were not inclined to do so (Figure 6). This narrow majority in favor of involvement or financial contribution indicates a moderate level of community support for improving waste management practices. The dominant aspect of these findings is the close split in community sentiment, with 52.1% expressing willingness to engage in waste management initiatives (Figure 1). This suggests a potential for mobilizing community action, but also highlights the need to address the concerns of the nearly half of respondents who are hesitant to participate.

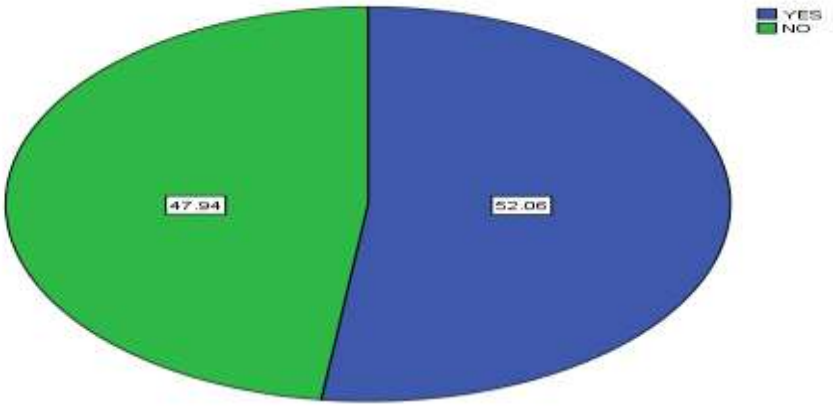

Figure 6: Willingness to engage in waste management initiatives or contribute financially to improved waste collection services

3.8 Primary health risks related to un- regulated waste disposal

Results of Table 3 show that the main primary health risks associated with unregulated waste disposal in Dangorayo District was health hazards such as disease transmission, reported by 39.18% (152 respondents). (Table 3). Other identified risks included Environmental pollution was cited by 25.77% (100 respondents), while 20.62% (80 respondents) reported issues related to bad odors and nuisance. Economic impacts, such as reduced property values, were noted by 14.43% (56 respondents). These findings indicate that the community is particularly concerned about health hazards, highlighting the urgent need for effective waste management solutions to mitigate these risks.

Table 3: Primary health risks related to un- regulated waste disposal

Responses	Percentage
Health hazards (e.g., disease transmission)	39.18
Environmental pollution	25.77
Bad odors and nuisance	20.62
Economic impacts (e.g., reduced property values)	14.43
Total	**100**

3.9 The types of Selected household solid waste in Dangorayo's urban slums

A survey was conducted to determine the composition of household solid waste in Dangorayo's urban slums. The results show that organic waste constitutes the largest proportion of household solid waste, accounting for 41.2% (160 respondents) as figure 7 shows). Metal waste is the second most common type, making up 26.8% (104 respondents). Plastic waste represents 18.8% (73 respondents), while paper and cardboard account for 13.1% (51 respondents). This data indicates that biodegradable organic waste forms the majority of household solid waste, with significant amounts of recyclable materials such as metal, plastic, and paper/cardboard present in the waste stream.

The dominant aspect of these findings is the predominance of organic waste, which constitutes 41.2% of the total waste (Figure 7). This highlights not only the need for effective organic waste management strategies but also the potential for recycling initiatives targeting the substantial quantities of metal, plastic, and paper/cardboard present in the waste stream.

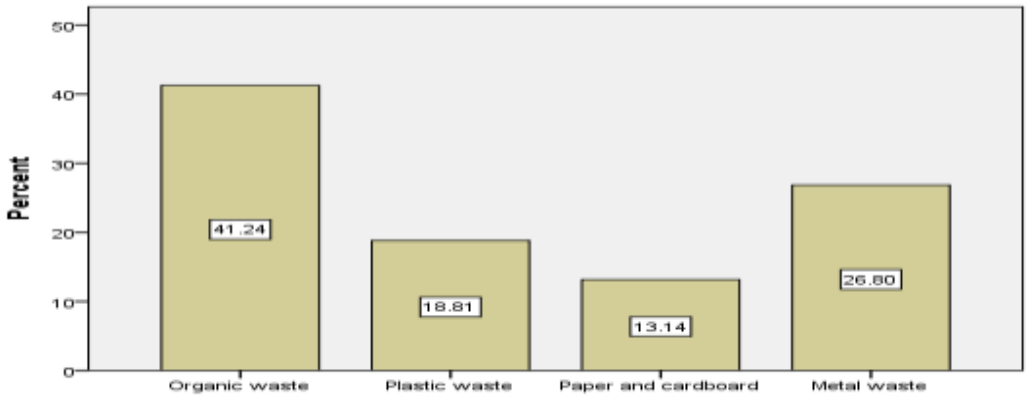

Figure 7: The types of household solid waste in Dangorayo's urban slums

3.10 The frequency of household waste collection in the urban slums of Dangorayo

A survey was conducted to determine the frequency of household waste collection in the urban slums of Dangorayo. The results of figure 8 shows that the most common frequency of waste collection is twice a week, reported by 34.5% (134 people) of respondents. However, a significant portion of the population, 31.2% (121 people), reported having no regular collection service at all. Daily waste collection is available to 17.3% (67 people), while 17.0% (66 people) reported having their waste collected once a week. This data indicates that waste collection services in Dangorayo's urban slums are inconsistent and inadequate for a large portion of the population. While about half of the respondents (51.8%) have waste collected at least once a week, nearly a third of the residents lack any regular waste collection service. The dominant aspect of these findings is the 31.2% of residents who lack any regular waste collection service, underscoring a critical gap in waste management that affects community health and sanitation (Figure 8). While about half of the respondents (51.8%) have waste collected at least once a week, the significant number of households without regular services highlights the urgent need for improvements in waste collection infrastructure.

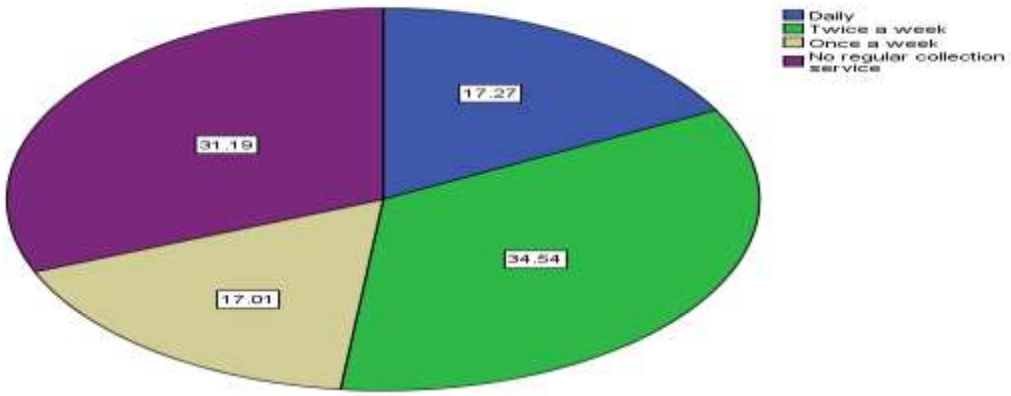

Figure 8: The frequency of household waste collection in the urban slums of Dangorayo

3.11 The primary method of waste disposal used by households in Dangorayo's urban slums

The data from Dangorayo's urban slums reveals a stark reliance on informal waste disposal methods. Open dumping is the predominant choice for nearly half (49.7%) of households, followed by burning (34.5%) and burying (11.9%) as shown in figure 9. Municipal collection serves only a small fraction (3.9%) of the community, highlighting a critical lack of formal waste services. This heavy dependence on potentially harmful disposal practices, accounting for 96.1% of waste management, raises significant environmental and public health concerns. The prevalence of these methods suggests limited resources and infrastructure in the area, pointing to broader socioeconomic challenges. With a sample size of 388 households surveyed, the findings underscore the urgent need for improved

waste management strategies and increased access to municipal services. The dominant aspect of these findings is the overwhelming reliance on informal disposal methods, which exposes the community to serious health risks and underscores the urgent need for improved waste management strategies. The limited access to municipal services reflects broader socioeconomic challenges in the area, emphasizing the necessity for enhanced infrastructure and resources to address these issues effectively.

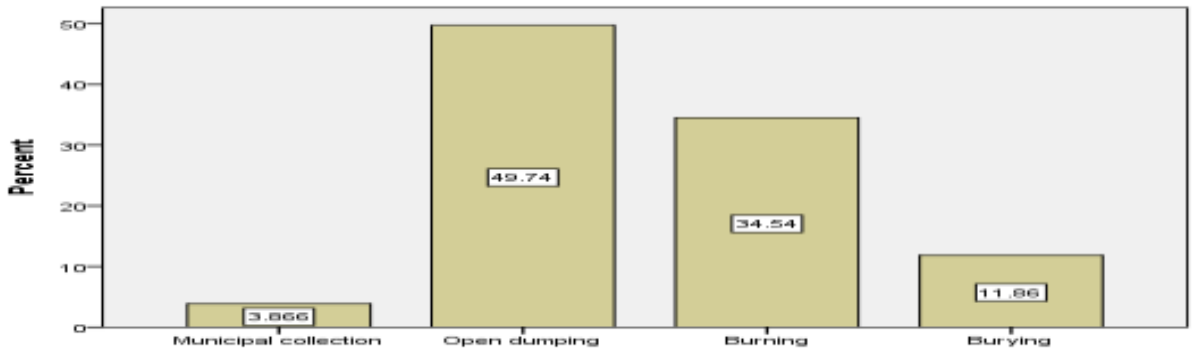

Figure 9: The primary method of waste disposal used by households in Dangorayo's urban slums

3.12 Common pre-disposal waste storage method used by households

The survey of waste storage methods in households reveals that metal or plastic bins are the predominant choice, used by 42.3% of respondents, followed by open piles (31.4%), plastic bags (16.5%), and makeshift containers (9.8%) (Figure 10). This distribution indicates a mix of structured and unstructured waste storage practices, with over half (58.8%) of households using more formalized methods like bins or bags. However, the significant proportion using open piles (nearly one-third) suggests widespread inadequate containment practices. The variety of storage methods employed likely reflects differences in resources, awareness, and possibly local waste management policies among households. The presence of makeshift containers, while the least common, points to resourcefulness in some households facing limited options. These findings highlight the need for improved waste storage solutions and education on proper waste management practices to address potential health and environmental risks associated with inadequate storage, particularly given the prevalence of open piles and makeshift solutions used by 41.2% of the surveyed population.

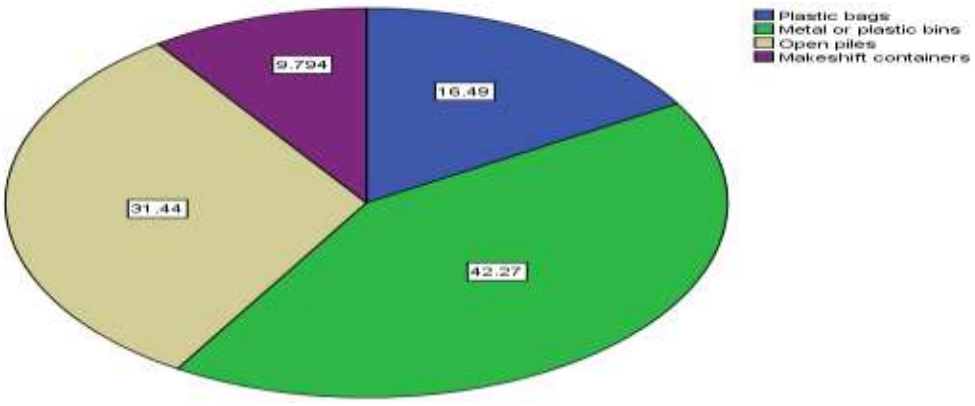

Figure 10: Common pre-disposal waste storage method used by households

3.13 Challenges in waste collection in Dangorayo's urban slums

The survey results from Dangorayo's urban slums reveal that insufficient collection vehicles are overwhelmingly perceived as the most significant challenge in waste collection, cited by 56.4% of respondents. (Figure 11) This primary issue is compounded by low community participation (21.4%), absence of waste collection points (17.3%), and lack of proper roads (4.9%). The dominance of vehicle insufficiency highlights a critical infrastructure gap, while

the secondary factors of community engagement and inadequate collection points underscore the multifaceted nature of the waste management problem. The relatively low concern about road conditions suggests that, while present, it is not seen as a major impediment compared to other issues. The dominant aspect of these findings is the overwhelming emphasis on insufficient collection vehicles as the primary challenge, indicating a pressing need for investment in waste collection infrastructure**.** This situation is further complicated by low community participation and inadequate collection points, suggesting that solutions must address both logistical and engagement-related barriers to effective waste management in the area.

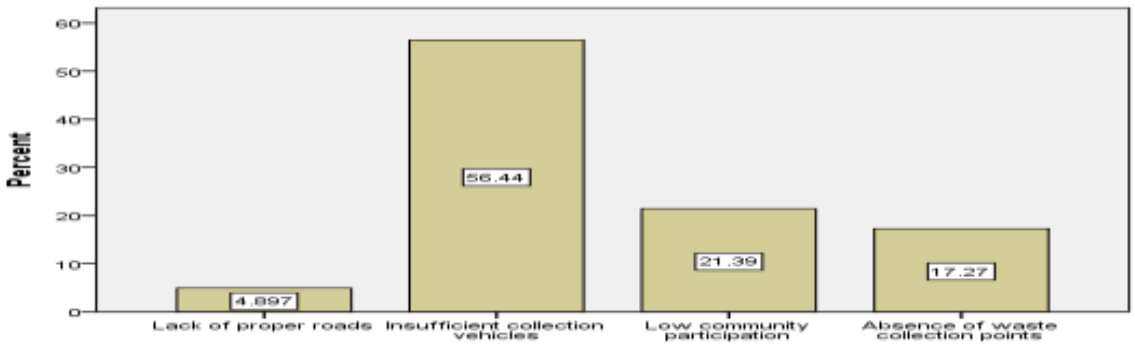

Figure 11: Significant challenge in waste collection in Dangorayo's urban slums

3.14 Factors influencing the volume of household solid waste generated

Consumer habits are the primary driver of household solid waste generation, with 35.3% of survey respondents identifying this as the main factor (Figure 12). Local waste management policies (26.0%) and a combination of factors (24.7%) also play significant roles, while population growth (13.9%) has the least perceived impact on household waste volumes. These findings highlight the critical influence of individual consumption patterns on waste production and suggest that strategies targeting consumer behavior could be most effective in reducing household solid waste.

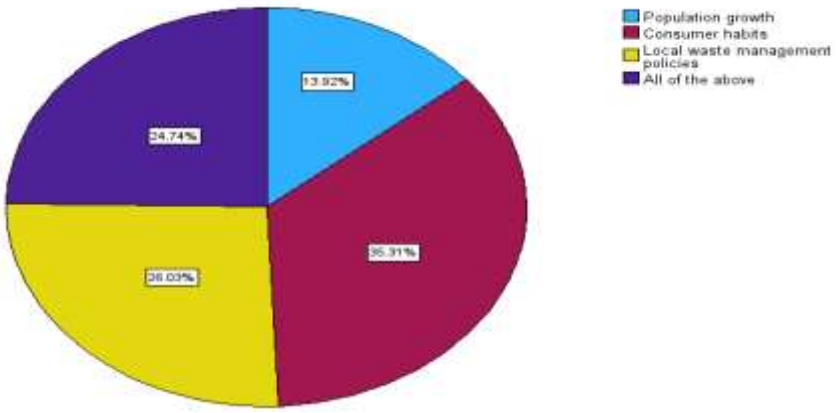

Figure 12: Factor influencing the volume of household solid waste generated

3.15 Estimated amount of waste household generates each week

The results on the estimated amount of total non-biodegradable waste each household generates each week in Dangorayo district, Somalia shows respondents' estimates of the total amount of non-biodegradable waste their households generate each week. The most common response was 6-10kg per week, selected by 162 out of 388 respondents or 41.8% as shown on figure 13. The second most common estimate was 1-5kg per week, chosen by 93 respondents or 24%. 100 respondents (25.8%) estimated their households generate more than 10kg of non-biodegradable waste weekly, while 33 respondents (8.5%) estimated less than 1kg per week.

The results indicate most households in Dangorayo district generate substantial quantities of non-biodegradable waste each week, predominantly in the range of 1-10kg.

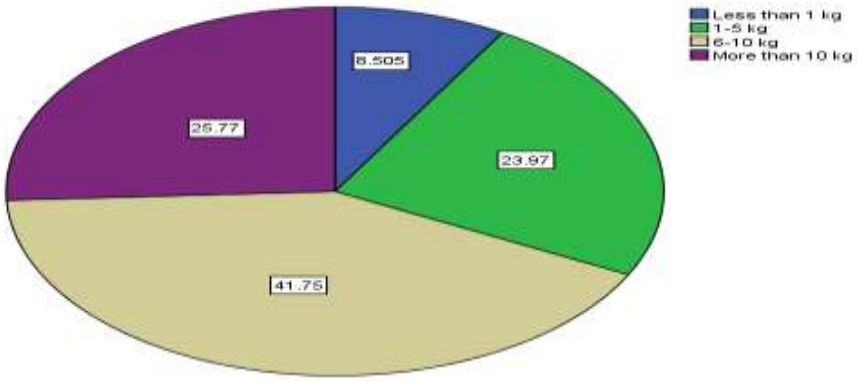

Figure 13: Estimated amount of waste household generates each week.

3.16 Regression analysis (effect of unregulated household waste disposal practices and environmental consequences

The table 4 presents the results of ANOVA and subsequent regression analyses, which examined the regression analysis regarding the unregulated household waste disposal practices and environmental consequences. Findings indicate that unregulated household waste disposal practices significantly predict environmental consequences ($F(1, 386) = 44.197$, $p < .001$, $B = .279$, $SE = .042$, $p < .001$). This suggests a statistically significant association wherein increased engagement in unregulated waste disposal practices corresponds to a greater severity of environmental impacts.

Table 4: Regression analysis (effect of unregulated household waste disposal practices and environmental consequences

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.321a	.103	.100	.82953	.103	44.197	1	386	.000

a. Predictors: (Constant), Unregulated household waste disposal practices

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.413	1	30.413	44.197	.000b
	Residual	265.615	386	.688		
	Total	296.028	387			

a. Dependent Variable: Environmental consequences

b. Predictors: (Constant), Unregulated household waste disposal practices

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	1.923	.117		16.375	.000	1.692	2.154
[1]Unregulated household waste disposal practices	.279	.042	.321	6.648	.000	.196	.361

a. Dependent Variable: Environmental consequences

3.17 Coping mechanisms and adaptive strategies for dealing with unregulated household waste disposal

A survey conducted in the urban slums of Dangorayo District explored residents' coping mechanisms and adaptive strategies for dealing with unregulated household waste disposal. The survey covered six key aspects of waste management, ranging from personal strategies to community initiatives and educational needs. Responses were measured on a scale where higher values indicate stronger agreement with the statements presented. Notably, respondents showed the strongest agreement with the statement that education and awareness programs would greatly improve waste management practices in their community (mean 2.8376), indicating a recognized need for more information and guidance (Table 5). Conversely, there was less agreement about the success of current community initiatives to address waste disposal problems (mean 2.3686), suggesting that collective efforts may be perceived as less effective than desired. The moderate agreement across all statements implies that while residents have developed some strategies to cope with unregulated waste disposal, there is a clear need for more robust and effective waste management solutions in the urban slums of Dangorayo District.

Table 5: Coping mechanisms and adaptive strategies by the community members in response to unregulated household waste disposal.

Responses	Mean	Std. Deviation
How strongly do you agree with the following statement: "I have effective personal strategies for managing household waste without regulated disposal systems?	2.3840	.81615
To what extent do you agree that your community has organized successful collective initiatives to address waste disposal problems	2.3686	.86907
How much do you agree with the statement: "I have made significant adaptations to my living space or daily routines to cope with unregulated waste disposal challenges?	2.7294	1.02247
To what degree do you believe that your community is capable of developing effective waste management solutions without government intervention	2.4485	.79072
How strongly do you agree that the lack of regulated waste disposal has resulted in innovative recycling or reuse practices in your community?	2.5851	.81996
To what extent do you agree that education and awareness programs would greatly improve waste management practices in your community?	2.8376	1.06236
Mean average	**2.5587**	**0.89678**

3.18 Correlation's analysis of the relationship between the severity of unregulated waste disposal and coping mechanisms

The table 6 presents Spearman's rho correlation coefficients, examining the relationship between the severity of unregulated waste disposal and coping mechanisms. The analysis reveals a strong, positive, and statistically significant correlation ($\rho = .773$, $p < .01$, $N = 388$) between the severity of unregulated waste disposal and coping mechanisms. This indicates that a greater severity of unregulated waste disposal is associated with increased use of coping mechanisms.

Table 6: Correlation's analysis of the relationship between the severity of unregulated waste disposal and coping mechanisms

Correlations

			The severity of unregulated waste disposal	coping mechanisms
Spearman's rho	The severity of unregulated waste disposal	Correlation Coefficient	1.000	.773**
		Sig. (2-tailed)	.	.000
		N	388	388
	coping mechanisms	Correlation Coefficient	.773**	1.000
		Sig. (2-tailed)	.000	.
		N	388	388

**. Correlation is significant at the 0.01 level (2-tailed).

The findings of table 4 and 6 reveal that residents' opinions and experiences regarding waste management strategies are moderately positive, with an overall mean score of 2.5587 out of a presumed 5-point scale, suggesting some agreement with the effectiveness of current coping mechanisms and adaptive strategies, but also indicating significant room for improvement. The standard deviation of 0.89678 indicates a moderate level of variability in responses, suggesting that experiences and perceptions differ somewhat among community members. The community in Dangorayo District employs several coping mechanisms and adaptive strategies in response to unregulated household waste disposal. Residents reported having effective personal strategies for managing waste, reflected in a mean score of 2.3840, suggesting individual initiative. Additionally, there is recognition of organized collective efforts to address waste disposal issues, with a mean score of 2.3686, indicating a willingness to collaborate. Many individuals have made significant adaptations to their living spaces or daily routines, as shown by a mean score of 2.7294, highlighting their proactive approach. Furthermore, residents expressed some confidence in the community's capability to develop effective waste management solutions without government intervention, with a mean score of 2.4485. Innovative recycling and reuse practices have emerged due to the lack of regulated waste disposal, indicated by a mean score of 2.5851, reflecting creativity in overcoming challenges. Lastly, there is a strong belief that education and awareness programs could greatly enhance waste management practices, as evidenced by a mean score of 2.8376. Overall, these coping mechanisms demonstrate the community's resilience and proactive stance in managing waste despite the prevailing challenges. This proactive stance is further underscored by a strong, positive correlation ($\rho = .773$, $p < .01$, $N = 388$) between the severity of unregulated waste disposal and the implementation of coping mechanisms. This correlation indicates that as the severity of unregulated waste disposal increases, so does the active implementation of coping mechanisms within the community, demonstrating a direct and responsive adaptation to the escalating challenges posed by inadequate waste management.

4. CONCLUSIONS

The study on household waste management in the urban slums of Dangorayo District reveals significant challenges and inadequacies in current practices. While there is some awareness of proper waste disposal methods, a considerable portion of the population lacks access to regular waste collection services and relies on potentially harmful disposal practices such as open dumping and burning. The community recognizes the need for improved waste management, with education and awareness programs being highly valued. However, limited infrastructure, insufficient collection vehicles, and low community participation hinder effective waste management. The impacts of unregulated waste disposal are severe, affecting public health, environmental quality, and overall living conditions. These findings underscore the urgent need for comprehensive waste management solutions, including

improved infrastructure, consistent services, and continued public awareness campaigns to address the complex waste management issues in Dangorayo's urban slums.

5. RECOMMENDATIONS

The document outlines strategies for improving waste management in the urban slums of Dangorayo, Somalia, focusing on education, service enhancement, compliance, and community involvement. It emphasizes the need for comprehensive education campaigns, increased waste collection services, stricter enforcement of regulations, and encouragement of eco-friendly practices. Additionally, it highlights the importance of analyzing the current waste situation and exploring community coping mechanism.

REFERENCES

1. Etea, T., Girma, E., & Mamo, K. (2021). Risk perceptions and experiences of residents living nearby municipal solid waste open dumpsite in Ginchi Town, Ethiopia: A qualitative study. *Risk Management and Healthcare Policy, 14*, 1681–1690. https://doi.org/10.2147/RMHP.S309295
2. Omer, S., Franco-Jarava, C., Noureldien, A., Omer, M., Abdelrahim, M., Molina, I., & Adam, I. (2021). Impact of placental malaria on maternal, placental and fetal cord responses and its role in pregnancy outcomes in women from Blue Nile State, Sudan. *Malaria Journal, 20*, 35. https://doi.org/10.1186/s12936-021-03580-x
3. Vaverková, M. D., Maxianová, A., Winkler, J., Adamcová, D., & Podlasek, A. (2019). Environmental consequences and the role of illegal waste dumps and their impact on land degradation. *Land Use Policy, 89*, 104234. https://doi.org/10.1016/j.landusepol.2019.104234
4. Morrison, J., & Malik, S. M. M. R. (2023). Population health trends and disease profile in Somalia 1990-2019, and projection to 2030: Will the country achieve sustainable development goals 2 and 3? *BMC Public Health, 23*, 66. https://doi.org/10.1186/s12889-022-14960-6
5. Agyei, A. A., Peprah, A. A., & Sekyere, K. F. (2016). Management of domestic solid waste in Ghana: Perception of households. *International Journal of Development and Sustainability, 5*(4), 157–168. http://www.isdsnet.com/ijds
6. Senekane, M. F., Makhene, A., & Oelofse, S. (2021). Methodology to investigate indigenous solid waste systems and practices in the rural areas surrounding Maseru (Kingdom of Lesotho). *International Journal of Environmental Research and Public Health, 18*(10), 5355. https://doi.org/10.3390/ijerph18105355
7. Ayotamuno, J. M., & Gobo, A. E. (2004). Municipal solid waste management in Port Harcourt, Nigeria: Obstacles and prospects. *Management of Environmental Quality: An International Journal, 15*(4), 389–398. https://doi.org/10.1108/14777830410540135
8. Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration.* University of California Press.
9. Flanagan, M. E., & Zaferatos, N. C. (2000). Appropriate technologies in the traditional Native American smokehouse: Public health considerations in tribal community development. *American Indian Culture and Research Journal, 24*(4), 69–93. https://doi.org/10.17953/aicr.24.4.fm470w08l062g860
10. Muheirwe, F., Kombe, W. J., & Kihila, J. M. (2023). Solid waste collection in the informal settlements of African cities: A regulatory dilemma for actors' participation and collaboration in Kampala. *Urban Forum, 35*, 1–22. https://doi.org/10.1007/s12132-023-09489-9
11. Teshome, Z. T., Ayele, Z. T., & Abib, M. I. (2022). Assessment of solid waste management practices in Kebridehar city, Somali regional state, Ethiopia. *Heliyon, 8*(10), e10451. https://doi.org/10.1016/j.heliyon.2022.e10451
12. Elgizawy, S. M., El-Haggar, S. M., & Nassar, K. (2016). Slum development using zero waste concepts: Construction waste case study. *Procedia Engineering, 145*, 1306–1313. https://doi.org/10.1016/j.proeng.2016.04.168
13. Mazhindu, E., Gumbo, T., & Gondo, T. (2012). Waste management threats to human health and urban aquatic habitats: A case study of Addis Ababa, Ethiopia. In L. F. Marmolejo Rebellon (Ed.), *Waste management: An integrated vision* (pp. 1–16). IntechOpen. https://doi.org/10.5772/48077
14. Dickson-Gómez, J., Nyabigambo, A., Rudd, A., Ssentongo, J., Kiconco, A., & Mayega, R. W. (2023). Water, sanitation, and hygiene challenges in informal settlements in Kampala, Uganda: A qualitative study. *International Journal of Environmental Research and Public Health, 20*(12), 6181. https://doi.org/10.3390/ijerph20126181
15. Getamap.net. (n.d.). *Dan Gorayo (Dangorayo) map, weather and photos – Somalia.* https://www.getamap.net/maps/somalia/nugaal/_dangorayo/
16. UNDP. (2005). *Population estimates by region/district, Somalia 2005 (draft).* United Nations Development Programme (UNDP). Retrieved from https://web.archive.org/web/20170728203029/https://docs.unocha.org/sites/dms/Somalia/UNDP-POP-RURAL-URBAN%202005.pdf

17. Israel, G.D. (1992) Determining Sample Size. University of Florida Cooperative Extension Service, Institute of Food and Agriculture Sciences, EDIS, Florida.
18. Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). SAGE Publications.
19. Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). SAGE Publications.

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