Musasa *et al.*
Smart Construction and Sustainable Cities (2025) 3:9
https://doi.org/10.1007/s44268-025-00055-9

Smart Construction and Sustainable Cities

RESEARCH

Open Access

Residents' perceptions towards illegal household solid waste disposal: A case of Chegutu, Zimbabwe

Tatenda Musasa[1], Amato Chireshe[1], Steven Jerie[1], Thelma Machisi[1], Tapiwa Shabani[1] and Takunda Shabani[1*]

Abstract

Solid waste management has been a daunting problem in Zimbabwe over the past few years. The research sought to examine residents' knowledge, attitudes and perceptions towards illegal household solid waste disposal in ward 8, Chegutu. The study adopted descriptive research design which used qualitative and quantitative data collection methods namely questionnaires, interviews and field observation. A total 55 questionnaires were administered randomly amongst residents who were willing to participate since out of 64 people 9 declined to respond. Interviews were done with purposefully selected key informants which included Environmental Management Agency (EMA) officer, senior health officer from city council and small-scale enterprise owners. Statistical Package for Social Sciences (SPSS) version 21and content analysis was used to analyse quantitative and qualitative data respectively. Results demonstrated existence of 9 major illegal dumpsites in ward 8, Chegutu. Findings revealed types of solid waste namely biodegradable (47.27%), inorganic waste (32.73%), glass and tin (14.55%) and rags, clothes (5.45%). Disposal practices established were open burning (72.73%), resource recovery (14.55), animal feeding (9.09%) and composting (3.64). Results showed that majority of households (50.91%) lacked understanding of waste management. Residents were seen to be oblivious to the state of illegal dumpsites near them as 46% reported that they were not concerned at all and had negative attitudes and perceptions that city council is solely responsible for solid waste management. Research verdicts indicated that solid waste management (SWM) remains a challenge in ward 8, Chegutu as all efforts from city council and EMA have seemingly failed. The study recommends that city council should improve stakeholder participation and use of approaches which support circular economy namely recycle and reuse.

Keywords Residents knowledge, Illegal disposal, Household, Solid waste disposal, Chegutu, Zimbabwe

1 Introduction

Illegal household waste disposal is a practice that many have become so familiar with in almost all countries and this is mainly due to different attitudes and perception of each household [1, 2]. This illegal activity is also found in developed countries such as Australia whereby in many urban areas there has been a prevalence of illegal dumping on kerbsides. Despite frequent refuse collection and the availability of recycling plants, people will still dump waste on kerbsides and claim it is due to lack of transport and storage [3, 4]. Paradoxically, this is a negative

*Correspondence:
Takunda Shabani
shabstaku@gmail.com
[1] Department of Geography Environmental Sustainability and Resilience Building, Midlands State University, Gweru, Zimbabwe

attitude which allows people to become lazy and neglect the effects illegal dumping has on the community and always think it is the municipal council's responsibility [5]. China, as the most populous country produces a lot of waste and it has implemented a waste separation strategy to manage household waste which started in 2012 [6]. The strategy is meant to alleviate illegal household dumping and increase household waste recycling however due to people's attitudes,it has not always been successful in other parts of the country due to less residents being engaged and ignoring the efforts [6].

Most residents do not consider the consequences of illegal household waste disposal due to attitudes such as putting the responsibility onto the government as well as the not in my back yard (NIMB) attitude [7, 8]. The NIMBYism culture will not accept any solid waste management infrastructure without their approval first [9]. They would rather illegally dump onto roads and kerbsides instead of keeping it in their yards until it can be collected hence it clearly affects these developing countries. In the province of Laguna, Philippines in the town of Los Banos, a research study by Barloa et al. [10], stipulated that community participation was necessary for proper solid waste management however residents within the town had knowledge of solid waste management as well as good attitude towards it but it unfortunately did not mean they were doing anything about it. It proves that residents might have the knowledge and the right attitude but ignorance and sometimes circumstances may deter them from performing the right practices to help in managing solid waste at individual level.

Desa et al. [11], argues that acceptance of new attitude depends on who is presenting the knowledge, how it is presented, how the person is perceived, the credibility of the communicator, and the conditions by which the knowledge was received. This becomes true in the sense that residents will tend to have a negative attitude and perception towards waste management. This is due to the incompetence of municipal councils that are responsible for waste collection when they stop collecting due to mechanical errors and lack of funds [12–15]. Residents may easily become ignorant due to the perception that if the municipality cannot perform its duty, then why should they do it for them hence leading to an accumulation of illegal household solid waste disposal within communities [11, 16, 17]. In Sierra Leone, solid waste is also an issue of concern as the main contributors come from households. Longe [18] and Almasi et al., [19], posit that on household level, females have positive attitudes and perceptions due to the fact that they are responsible for keeping their homes and compounds clean. This shows that the relationship between gender influences the attitude and perceptions towards household solid waste as females will do it as a duty whilst men will not really take part [19]. Education also influences attitudes and perception in waste management as people become naturally blind and ignorant to the problems arising from illegal household solid waste disposal [20–22].

To have a sound solid waste management system, local authorities need not only to implement it but to also involve residents in awareness programs for them to acquire sufficient knowledge on how to handle solid waste as well as the negative impacts solid waste has on communities if mishandled [23–26]. Muiruri [26] and Jerie et al. [23–25] further emphasizes on the importance of understanding residents' concerns, behaviour and willingness to participate in solid waste management programs for there to be an in-depth understanding of the knowledge they possess. A research study by Laor [27], showed that knowledge of solid waste management was highly influenced by variables which were age, education level and occupation and the group with the least knowledge were all below 20 years of age and in terms of occupation, general contractors had the least knowledge of solid waste management.

In Zimbabwe, illegal household solid waste disposal threatens the wellbeing and health of the country as it is found nearly everywhere due to the economic decline [16, 17, 28, 29]. This has left multiple local authorities unable to provide services as they should such as the collection of garbage. This implies that efforts aimed at contributing towards the attainment of Sustainable Development Goals (SDG's) for example SDG3 on good health and wellbeing are compromised especially in areas with increasing population, a scenario also noted by Jerie et al. [23–25]. This is attributed to the fact that illegal household solid waste generated seems to increase faster than the ability of city authorities to meet the financial and technical costs needed to cater for the growth [30, 31]. In ward 8 of Chegutu, the local municipality is facing a series of problems which compromise its ability to provide adequate service delivery to maintain a safe and healthy living environment. This compounded by inadequate vehicles to transport solid waste, financial incapacitation which has resulted in illegal dumping of waste in the streets which increase the risk of disease associated with illegal waste dumping. Due to economic hardships, the local residents ignore the consequences of illegal household solid waste dumping during vending as their main intention is to get money hence everything else may not matter to them. It is against this backdrop that the present study seeks to examine the resident's knowledge, attitude and perception towards illegal household solid waste disposal in ward 8, Chegutu.

2 Materials and methods

2.1 Location of study area

The study was conducted in the small town of Chegutu formerly known as Hartley, ward 8 which is located in Chegutu District (Fig. 1). The town is approximately situated in the Hartley hills 107 km, southwest of the capital Harare at altitude 1 180 m above sea level. Temperatures in Chegutu vary throughout the year ranging from 10 to 31 degrees Celsius. September to November is the hot season which stretches for 3 months having October as the hottest month with 29 degrees Celsius and the cold season stretches from end of May to July with June being the coldest month with 10 degrees Celsius. Annual rainfall in Chegutu is between 750–1000 mm and the rain season begins in November ending in March with January receiving the most rain of average 208 mm and march with the least. April to October are the dry months which do not receive any rainfall. According to Makova et al. [32], the red-clay soil is most dominant with some clay and loam soils and the vegetation type consist of the tree bush Savanna with *Brachystegia spiciformis* (musasa), *Colophospermum mopane* (mopane) and *Julbernardia globiflora* (munhondo) trees as well as the fox tail grass. Makova et al. [32] also further emphasizes that the area is in the Great dyke of Zimbabwe as the terrain consist of granite, greenstone belts and Zimbabwe craton. Chegutu is in the Mupfure catchment with Mupfure river crossing through it to join the Sanyati river. As of the 2022 census, the town of Chegutu is home

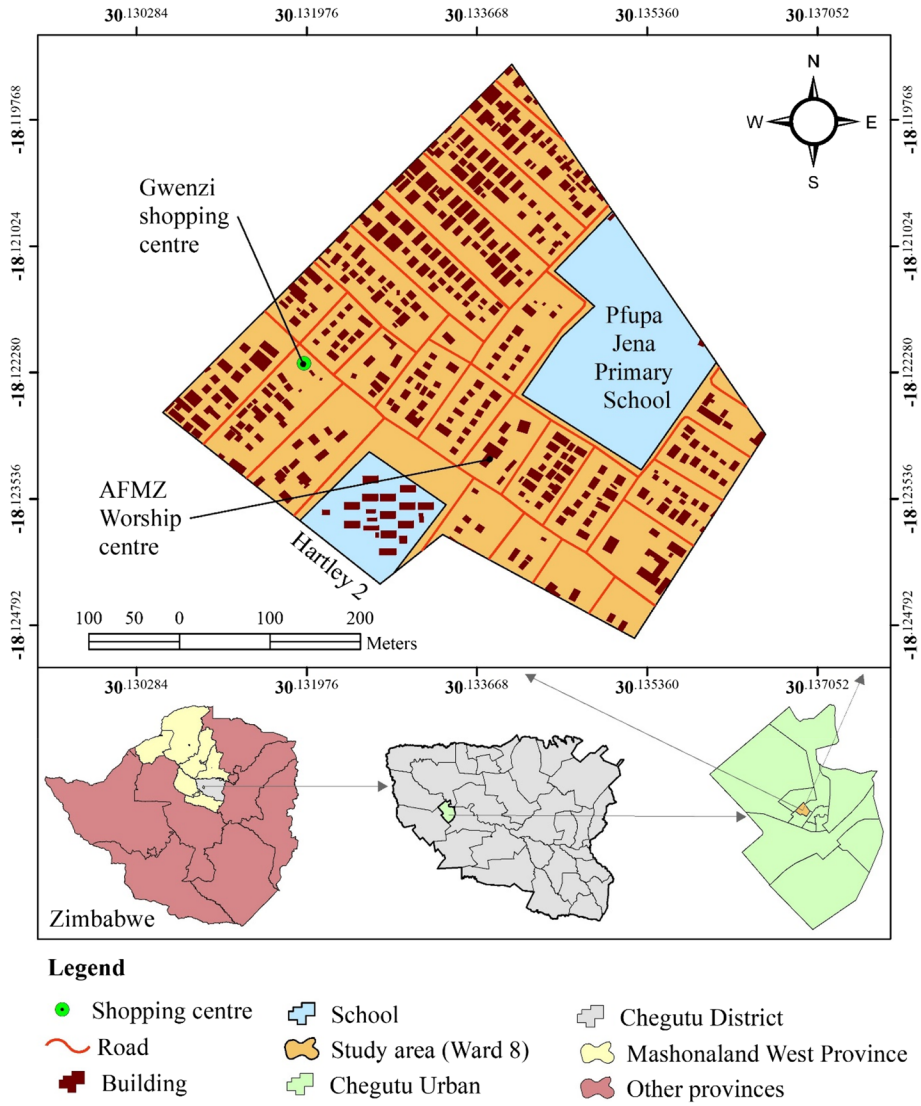

Fig. 1 Map of Chegutu Ward 8, Zimbabwe. Source: Authors

to a total population of 50 590 with males summing up to 23 974 and dominated by a sum of 26 616 females [33].

2.2 Method of data collection

Descriptive research design was adopted, where quantitative and qualitative research were used to enhance the quality and validity of data collected on knowledge, attitudes, perceptions on illegal household disposal. The study targeted households in ward 8 Chegutu, Chegutu City Council members from the health department, EMA officer because they had knowledge on household solid waste disposal. According to Zimbabwe National Statistics Agency [33], ward 8 has a total of 845 household heads and the researchers narrowed down the total population using Slovin's formula to determine sample size;

$$n = \frac{N}{1 + Ne^2}$$

where n = Number of sample size.
N = Total population.
e = desired margin of error

$$\text{n} = \frac{845}{1+845(0.12)^2}$$

64 sample size

Therefore, the sample size for the purpose of this study was 64 households, however A total 55 questionnaires were administered to residents who were willing to participate since out of 64 people 9 declined to respond. In this case, researchers used probability sampling which allows every member within the population a probable chance of being selected for data collection and this method vastly represents the whole population [34]. Simple random sampling was used to ensure the proper representation of the population because it gave everyone a chance of being selected by assigning numbers to a group of people and researchers picked numbers randomly which meant those people were to be targets of data collection. Purposive sampling was also used to select key informants such as an EMA officer, 2 City council staff and 2 small-scale enterprise owners because they had knowledge on household solid waste. Questionnaires, interviews and field observations were used to collect primary data. Semi-structured interviews were used to obtain information from informants such as EMA officer, City council member and small-scale enterprise owners. Interviews were on the types of solid waste that is disposed, the spatial distribution of dumpsites, evident disposal practices employed by residents. Field observations were guided by observation check list. Researchers observed the types of solid waste that was being illegally disposed by residents as well as the locations that are frequently dumped and some of the solid waste disposal practices being employed.

Researchers used mapping as a way to establish the spatial distribution of illegal dumpsites within ward 8 in Chegutu. The coordinates collected by the researchers were gathered onto a record sheet and then the data was captured and transferred to ArcGIS 10.5. The points collected were imported onto the study area map to depict the exact location of the points and the streets in which they are located. This was done to show the distribution of dumpsites which is how close or far they were from each other as well as their size and the areas that were most dumped such as near roadsides.

2.2.1 Questionnaire survey

Questionnaires with both close-ended and open-ended questions were used to collect data regarding residents' knowledge, attitudes and perceptions on waste management. Additionally, questionnaires were utilised to collect data about nature of solid waste generated, management strategies including disposal methods as well as some of the elements that were used to proffer the framework. During data collection 64 questionnaires were prepared, however, 9 of the respondents declined to participate, therefore the researcher deal with 55 questionnaire participants. Data from questionnaire's closed questions, among other quantitative data was analysed using Statistical Package for Social Sciences.

2.3 Data analysis and presentation

Quantitative data was analysed using Statistical Package for Social Sciences (SPSS), since it offered reliable and fast answers. The method was used to analyse data variables which include type of solid waste disposed, waste disposal methods and frequencies of disposal. Content analysis was used to analyse qualitative data for example from collected using interviews. because it allowed researchers to analyse the relationship between household solid waste disposal and residents' knowledge, attitude and perceptions. Data obtained was cleaned by removing duplicate and irrelevant data, fixing missing data, translating any languages that were not English and standardizing capitalization. A combination of inductive and deductive coding was used by the researchers to analyse data variables that include attitudes and perceptions of residents, reactions of residents towards SWM and solid waste disposal methods. A chi-square test was done to determine the relationship between employment and waste management knowledge. Researchers presented the data through the use of graphs, tables, pictures and charts.

3 Results and discussion

3.1 Mapping the location of illegal solid waste dumpsites in ward 8, Chegutu

This study aimed at locating the spatial distribution of illegal dumpsites in ward 8 Chegutu whilst linking to the solid waste types found within the area. The study area map provided shows the spatial distribution of illegal dumpsites that are distributed along major roads and along the school wall (Fig. 2). Findings showed that there were 9 major dumpsites within ward 8, Chegutu which were randomly distributed. Three of the dumpsites were found along the school wall, and this was attributed to the fact that the school is a central point which joins the main road to small streets thus allowing residents to illegally dump solid waste away from their houses but close enough to walk to the school wall. In harmony with this, the EMA Officer indicated that most of these dumpsites were normally located along roads and streets as well as school walls. The EMA officer attributed the spread of these illegal dumpsites to the NIMBY attitude and behaviour in which residents would rather pollute open spaces and streets with solid waste instead of their own homesteads. Illegal dumpsites (Fig. 2) along the school wall were also due to students disposing of their waste during breaks and lunch times. However, during an interview with the senior health officer it was indicated that these illegal dumpsites are not spreading any further than where they already were due to their clean up exercises which are done fortnightly. These efforts by the local authority are done to prevent an overgrowth or accumulation of these illegal dumpsites into larger and unmanageable dumpsites. In other countries such as Czech Republic, GIS based mobile applications have been put in use to allow individuals to report illegal dumpsites as a way of monitoring and reducing the number of dumpsites. These dumpsites were of different dimensions ranging from 2 m length x 4 m width, 4 m x 4 m, 7 m x 9 m, 10 m x 8 m. The larger dumpsites were located slightly faraway from residents and found along the school wall.

3.2 Types of household solid waste disposed on illegal dumps in ward 8, Chegutu

3.2.1 Biodegradable waste

The questionnaire survey results revealed that most of the household solid waste that was illegally disposed was biodegradable waste (47.27%) also called organic waste (Fig. 3), a situation supported by Chireshe et al. [35] and Zikali et al. [36]. Biodegradable waste was mainly found in groups of food waste, garden waste and yard waste which included vegetable remnants, leaves from trees and leftover food. The senior health officer from city council during an interview established that biodegradable waste was the most common in illegal household waste dumps and attributed it to the high consumption rates and household sizes of ward 8, Chegutu. Due to majority of the household heads being able to make a living through self-employment such as vegetable reselling and landscaping, it causes an influx of organic household

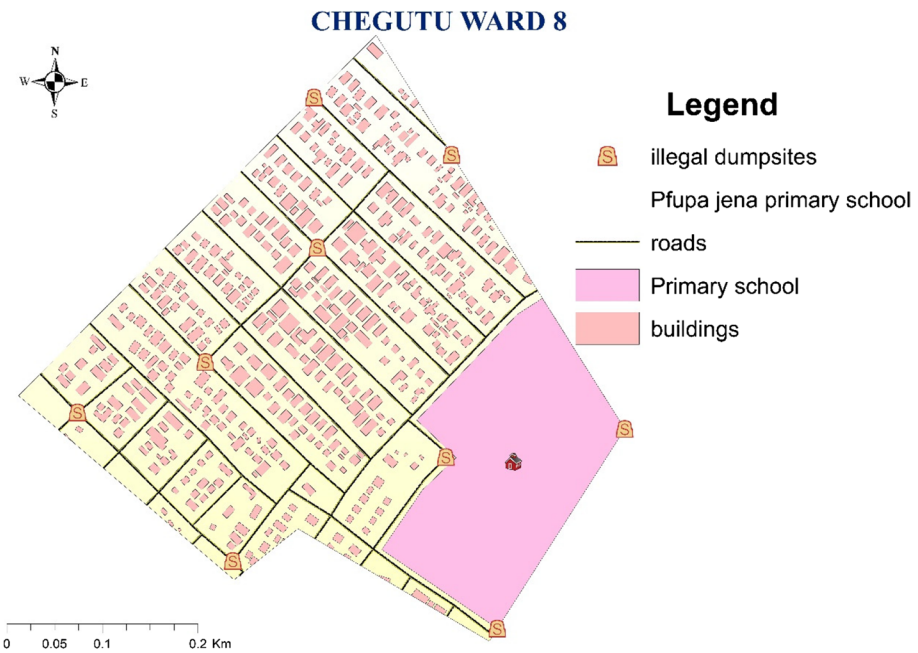

Fig. 2 Illegal dumpsites in ward 8, Chegutu. Source: Authors

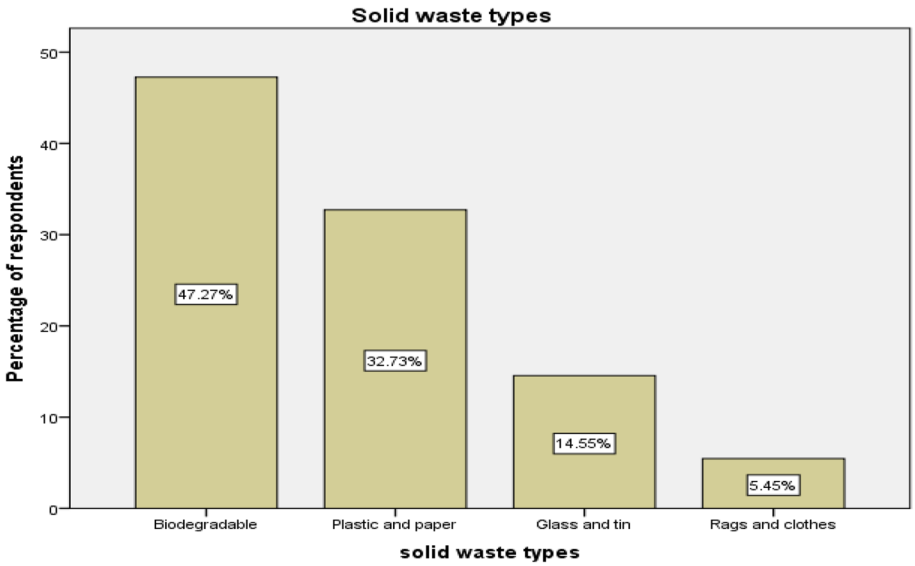

Fig. 3 Different types of illegal household solid waste disposed on illegal dumps in ward 8, Chegutu. Source: Field Survey

solid waste being dumped illegally on the streets. This can also be attributed to activities such as hedge and lawn cutting which residents normally dispose of on the streets and any open spaces as most times refuse collectors will not be able to collect such type of waste.

3.2.2 Inorganic waste: plastic and paper

Through the questionnaire survey, it was established that plastic and papers (inorganic waste) were 32.73% of the total household solid waste within illegal dumpsites in ward 8, Chegutu (Fig. 3). The results showed that plastic and paper were found in excess due to the fast-paced life in urban areas where most households tend to buy plastic packaged goods, fast foods served in cardboard materials and plastic bags, a view also upheld by Ngaza et al. [37]. According to the senior health officer from the city council, they had seen an increase in high density polyethylene (HDPE) and low-density polyethylene (LDPE) plastic in household solid waste. These are mainly found in form of shampoo, milk, water bottles and chemical containers as well as bread wraps.

3.2.3 Glass and tin

Glass and tin waste type was the second component of inorganic waste with 14.55% in ward 8 of Chegutu (Fig. 3). This was found in the form of shattered glass windows, water glasses and glass containers of mayonnaise as well as coffee tins, baked beans and corned meat tins. Broken glasses were found due to break ins by burglars which left windows broken and most of the glass and tin were due to households buying and using products packaged with those materials. Butler [38], reports that glass can be recycled by remelting it and forming new glass materials as well as resource recovery as such cases in Japan. However due to the economic hardships in Zimbabwe, in Chegutu there is no company that can offer such services hence people resort to dumping or using glass containers in their homes as is evidenced by the scarcity as well as information from an interview with one of the council workers.

3.2.4 Rags and clothes

Rags and clothes were the least inorganic component with 5.45% (Fig. 3). During an interview, the EMA officer highlighted that rags and clothes were found in illegal dumpsites and were disposed of when they got too old as well as old blankets. This was information they attained from their normal dumpsite routine surveys. According to Lawton [39], Korsunova [40] and Goudeau [41], solid waste in the form of rags and clothing can be recycled into several different things as well as resource recovery where they can be recreated. However, they are not biodegradable hence can take as much time as plastic to perish. Unfortunately, in ward 8, Chegutu, majority of households fail to recycle rags and clothes hence end up throwing them away as trash and illegally dumping them.

3.3 Household solid waste disposal methods

3.3.1 Open burning

Results from the questionnaire survey depicted that majority of households (72.73%) preferred open burning (Fig. 4) as a substitute of waste collection when the

service had not been delivered. Respondents preferred open burning to make more space available and completely getting rid of organic waste such as dried up leaves as well as inorganic waste such as plastics, papers and rags, a condition also reported by Ngaza et al. [37]. They also chose the method as it would not require any expense from them because it can be done easily and by any member of the household hence saving themselves from any extra costs of waste collection services. An interview with the senior health officer provided information which entailed that residents normally openly burn their solid waste due to failures or unforeseen challenges that lead to the failure of local authority to collect refuse sometimes for weeks.

3.3.2 Resource recovery

Questionnaire survey results showed that 14.55% of households (Fig. 4) chose resource recovery as a disposal practice. Resource recovery was mostly done by unemployed respondents as it was a way for them to get some money. This was done through collecting and gathering glass, plastic and tin waste for resale. Most residents collect plastic ware, beverage tins which can be recycled into new materials such as plastic buckets by companies hence getting money off it. Waste such as glass containers were mostly reused within household for kitchen use and 2 L bottles are sometimes cleaned and repackaged by indoor business for detergents. Results showed that majority of this type of waste (glass mainly) is usually scarce in dumpsites and that is due to residents gathering it for resale to companies that reuse them. This finding concurs with that of Kwenda et al. [42] and Zikali [43] who also indicated that resource recovery is mainly done by so called waste pickers or scavengers who collect waste that can be recycled at dumpsites or large supermarket bins.

3.3.3 Animal feeding

Questionnaire survey results showed that most household kept pets such as cats and dogs as well as poultry (sasso chickens), rabbits and guinea pigs for consumption which were fed using organic waste such as leftover food, vegetable, and fruit remnant. The issue of using organic food waste to feed domestic animals is also illustrated by studies by [28, 29] and Shabani et al. [44]. Findings from this study, it was revealed that 9.09% (Fig. 4) were practicing this disposal method which was mainly because they kept dogs for protection and poultry for their own consumption to reduce costs of buying meat and make food available for larger households as well as to add on to their finances. This was caused by poverty and high rates of unemployment as household heads try to fend for their families.

3.3.4 Composting

Households in ward 8, Chegutu showed that 3.64% practiced composting as a way of disposing their solid biodegradable waste (Fig. 4), a strategy which is also practiced in Harare [45]. This was done at household level by burying biodegradable solid waste and they used the compost for gardening as it contains nutrient dense soil which promotes good growth of vegetables. This was attributed

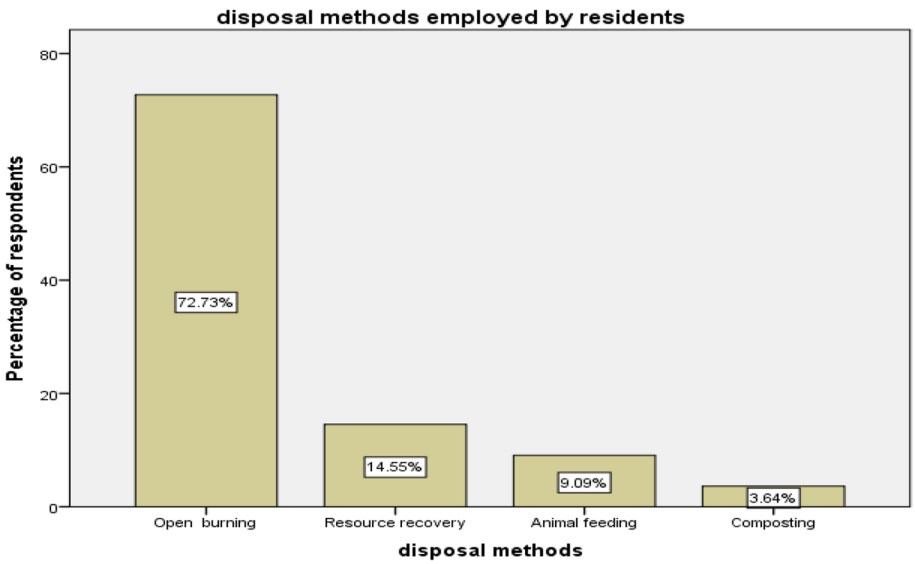

Fig. 4 Disposal methods employed by residents in ward 8, Chegutu. Source: Field survey

to the knowledge level which most residents have in terms of biodegradable solid waste as well as households trying to avoid the cost of paying for private collection services. Majority of the elderly household heads have knowledge of how to perform this disposal method as it has been around for some time and is quite inexpensive and easy. During an interview with the senior health officer from city council, it was established that this method was mostly done by households where there were gardens which were sometimes run as a business by selling all sorts of vegetables thus creating self-employment for the household.

3.4 Knowledge, attitude and perceptions of residents towards solid waste management

3.4.1 Knowledge of residents towards solid waste management

Results from the study showed that majority of households (50.91%) had an average understanding of what solid waste management meant whereas a smaller population of the least educated (21.82%) indicated that they did not understand what it meant. In addition, another set including those that had achieved tertiary level education (27.27%) as shown in Fig. 5 indicated that they understood the principles and responsibilities of solid waste management. This proved that education level does in fact influence knowledge on solid waste management as argued by Chikowore [46]. A chi-square test was taken to prove the association between education level and knowledge of solid waste management. Results showed that there is a significant relationship between the variables whereby *P* value is 0.002 which is less than 0.05. This shows that the more an individual is educated, the more they acquire knowledge about solid waste management. Respondents with average education and above are most likely to have an understanding of waste management knowledge. These results concur with Debrah et al. [47], who indicated that education was a vital factor that influenced knowledge of individuals as well as their behaviour towards waste management.

Findings indicated that most residents (81.8%) of ward 8, Chegutu had received some awareness and knowledge of solid waste management hence local authority had made an effort to alert them of how to manage solid waste and its consequences. This was also established during interviews with the senior health officer whom attested to monthly exercises such as clean up campaigns with the youths as well as spreading information on waste management. Interviews with small-scale business owners also showed that there had been efforts by local authority and EMA to alert them of waste management practices as they were visited for inspections. Employment status was also found to be a key aspect in knowledge of waste management. This is because majority of the employed residents 21.8% were seen to know much more about solid waste management as well as the self-employed residents 41.8%. This might be attributed to factors such as high education

Fig. 5 Showing knowledge of residents towards solid waste management. Source: Field survey

levels as well as exposure to waste management issues within work places as nowadays the topic affects everyone.

Furthermore, questionnaire survey results revealed that 63.6% of household respondents knew of the negative impacts caused by illegal dumpsites such as foul smells and diseases whereas 36.4% where oblivious to the dangers illegal dumpsites caused. However, majority of the respondents 46% were not concerned with the status of illegal dumpsites within their area which might probably be attributed to their ignorance and getting used to the situation as it has been going on for quite some time. This concurs with studies which indicated that inappropriate management of solid waste in Zimbabwe is worsened by lack of enough knowledge, therefore approaches to awareness of citizens are essential [48]. 36% of the respondents were averagely concerned and only 18% were extremely concerned because they were aware of the consequences and negative impacts caused by illegal dumpsites especially when they have accumulated overtime.

3.4.2 Attitude and perception of residents towards solid waste management

Questionnaire survey results indicated that (90.91%) of household respondents perceived that solid waste management was sorely the local authority's responsibility and they were not responsible for anything regarding solid waste except to gather it up (Fig. 6). A few household respondents (9.09%) had the opposite view that they were partially responsible for managing waste from household level. These perceptions were based on ignorant and unconcerned residents who felt that the rates they paid towards such services would relieve them of the duty to manage waste at household level. According to the EMA officer, there is a pattern in the way they neglect solid waste which gives them the conclusion that they do not care. Household respondents indicated that a greater part (36%) of them were averagely concerned whereas some were not concerned (46%) at all and a few (18%) were extremely concerned with the state and number of illegal dumpsites within their area. This was evidenced by the failure of systems put in place by the local authority to help reduce the spread of illegal dumpsites. The senior health officer pointed to local authority putting systems such as educating residents on how to treat waste through ward health promoters. These health promoters within each ward teach residents on ways to handle waste in accordance to local authority protocol. However, residents in ward 8 were seen to be ignorant and unresponsive towards these efforts hence the systems were ineffective. Residents in ward 8, Chegutu claimed that the collection services by the local authority were not as effective as they sometimes do not collect waste on time. Due to this, residents feel the need to dispose of waste on roads to prevent waste accumulation in their yards which can cause diseases. Around 90% of the residents were not pleased with their service.

Willingness to pay for services was seen to be another issue affecting solid waste management in ward 8. This is because as much as residents claim to be paying their rates, local authority claims otherwise. Residents are not

Fig. 6 Waste management responsibility. Source: Field survey

paying as much as they should hence it hinders the local authority's ability to provide efficient services. Results are in line with researches which indicated that the problem of solid waste management is also attributed to the blame game between local authorities and residents in urban various areas in Zimbabwe [16, 17]. Unfortunately, residents do not understand and are still unwilling to pay for better services hence crippling the waste management efforts. 65.5% of the residents agreed to being aware of the negative impacts caused by illegal solid waste dumping and only 34.5% denied any knowledge of the negative impacts. Their awareness is due to evident outbreaks of diarrhoeal diseases especially affecting children, however most deny the relationship between the diseases and illegal dumpsites.

3.5 Proposed framework to enhance solid waste management practices in Chegutu, Zimbabwe

The purpose of a framework that enhances solid waste management is to aid in practices that further the benefits and implementation of new ways that improve the issue at hand (Fig. 7). Solid waste management being a problem throughout the world requires different intervention frameworks depending with the specific problems at hand. In this case of ward 8, Chegutu, the researcher proposes a framework that addresses the shortfalls within the already existing system (Fig. 7). The framework necessitates the need for solutions such as land filling, stakeholder participation, technological advancements, waste sorting, recycling and financial inputs from investors.

The need for land filling is long overdue for municipalities as it helps in alleviating illegal dumping. Landfill refers to a site used for waste disposal which includes municipal solid waste (MSW) and all other types. It is necessary because it accommodates large amounts of waste and can be used as temporary storage and processing waste. This framework advocates for landfills as a waste management tool as it allows for better waste management if done correctly. This will help waste to be taken directly from households to the landfills whether by residents or municipal collection services. One of the major reasons why existing frameworks have failed is due to the inability to involve social issues which also include stakeholder participation. Stakeholder participation refers to the inclusiveness of any party that might be affected directly by decisions made by the local authority [49–51]. Existing frameworks usually fail due to not being transparent with the public as well as not taking their views and thoughts into consideration. This allows for negative feelings and attitude towards the municipality as the decisions will mostly feel as if they are being taken advantage of. Involving the public, their ethics and perceptions as well as allowing them to be represented in decision making yields better understanding and increases chances of waste management systems to improve.

Investing in technological advancements is another factor that this framework supports. This is because majority of existing frameworks fail to equip themselves with the latest technology and equipment which slows down progress. The need for new GIS equipment such as monitors, GPS as well as proper trucks for waste collection allows waste management to be done effectively and timely. Issues such as waste sorting and recycling are an effective way to reduce waste materials around the area. This is because waste sorting at household level

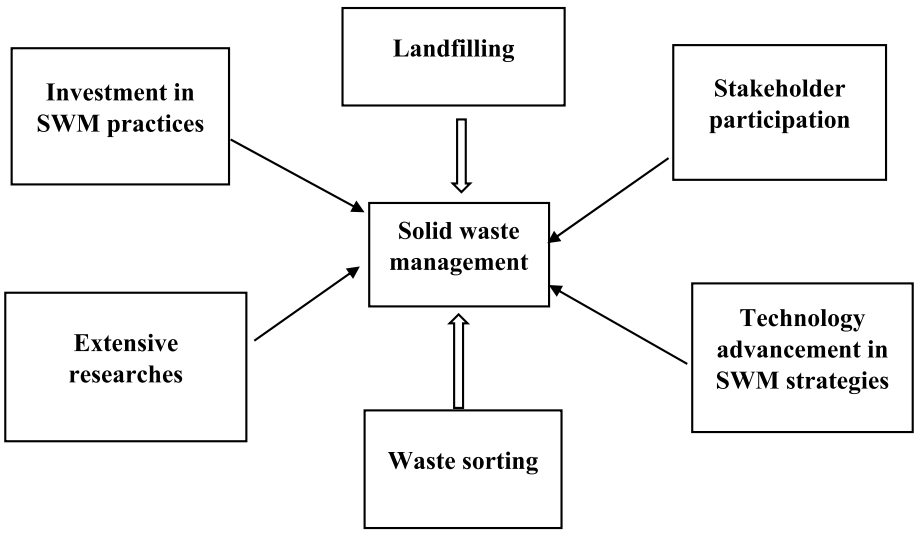

Fig. 7 Proposed framework to enhance solid waste management practices in Chegutu, Zimbabwe. Source: Authors

makes sure waste is divided into several categories such as biodegradable, plastic and papers. It allows for an easy way to know how to deal with each type of waste such as sending biodegradable to landfills and plastics to be recycled. This also encourages some fund generation as residents pay for their waste to be recycled. Lastly, municipality should work on luring investors to induct into the framework and supply funds to implement these goals. This is because most municipalities fail to implement these frameworks due to financial constraints as the public does not always pay rates. By so doing, it allows a sufficient waste management system which definitely makes some changes in managing the way waste is handled.

A comprehensive framework incorporating sanitary landfills, stakeholder participation, extensive research, waste sorting and technology utilisation (Fig. 7) can significantly minimise illegal household solid waste disposal in Chegutu, Zimbabwe. Through establishment of sanitary landfills that adhere to environmental standards, the community ensure safe waste management while reducing illegal dumping sites in Chegutu. Engaging stakeholders including local residents, government bodies and non-governmental agencies fosters a sense of ownership and accountability towards waste management practices. This enables local people to avoid behaviours that results in appearance of solid waste on illegal sites while various organisations work together to advocate for policies which are against inappropriate disposal of waste in Chegutu. Extensive research into local waste generation patterns enables tailored solutions that address specific community needs in Chegutu, thus facilitating availability of enough solid waste data. Enough data enables proper planning in terms of solid waste collection, paving route for adequate collection so that people will not apply illegal disposal to cover the gap of insufficient collection. Implementing effective waste sorting initiatives at the household level encourages recycling and reduces the volume of waste generated and disposed, therefore maintaining environmental integrity in Chegutu since illegal disposal is limited. Furthermore, leveraging technology such as mobile applications for reporting illegal dumping can enhance monitoring efforts and facilitate quicker responses from authorities. Financial resources are crucial to support these initiatives, ensuring sustainable operations and maintenance of facilities in Chegutu. Collectively, these elements create an integrated approach that promotes responsible waste disposal behaviours among residents in Chegutu in order to reduce illegal disposal of waste and burden to local authorities, as supported by researches carried out by Shabani and Jerie [28, 29].

4 Limitations of the research

The study has several limitations that are worth to be pointed out. Firstly, the reliance on self-reported data can introduce inaccuracies due to social desirability bias, where respondents might underreport their own contributions to illegal waste disposal. The study may also lack longitudinal data, limiting insights into how perceptions change over time or in response to interventions. Geographic constraints also play a role, focusing solely on Chegutu may overlook broader regional factors influencing waste management practices. Moreover, external factors such as economic conditions and local governance effectiveness were not thoroughly examined, which could provide context for residents' attitudes towards waste disposal practices.

5 Conclusion and recommendations

The study examined the resident's knowledge, attitudes and perception towards illegal household waste solid waste disposal in ward 8, Chegutu. Nature of solid waste generated include biodegradable (47.27%), plastics and papers (32.73%), glass and tin (14.55%) among other types. Disposal of solid waste is characterised by utilisation of open burning (72.73%), composting (3.64%), although illegal disposal of solid waste is an issue of concern in the area. The study findings demonstrate that solid waste has been a major challenge as most illegal dumpsites have been located along major roads and the school wall (Fig. 2). Discarding of solid waste on non-designated areas was attributed to a number of factors but largely due to inadequate knowledge about impacts of waste since 71.92% of the respondents show limited knowledge. This has been posing threats as various types of waste are dumped in illegal areas which has potential to present health, social and safety concerns if no meaningful interventions are made. The local authority has also been unable to prevent illegal dumping due to the unresponsiveness of residents due to negative attitudes and perceptions. A scenario worsened by the fact that about 90.91% consider management of solid waste encompassing removal of illegally disposed waste, a responsibility of local municipality/local authority. As a result, local people in ward 8 of Chegutu have been disposing waste in illegal dumping areas owing to inadequate refuse collection. In other instances, they have resorted to disposal practises such as open burning which have devastating effects to the environment. This coupled with lack of awareness training and resident negative attitude which needs to be cultivated has rendered solid waste management a daunting task which requires attention. Findings also show that residents do not really care of waste management at household level and that they are oblivious of the benefits they could gain from learning how to

handle waste properly. Local authority has been unable to cope due to all these problems that hinder their efforts to reduce household solid waste dumping.

Due to the clearly exposed problems in waste management, the following recommendations are proposed. Local authority should also work with EMA to implement an intensive awareness exercise which will be done thoroughly to make sure each and every resident benefits from it. This can also be done in schools to eradicate throwing away of waste by students both at school and at home. Municipality of Chegutu should improve their stakeholder participation by being transparent with residents. This can be done by holding meetings with residents on any issue that affects them such as the increase of rates and any changes to schedules. This allows residents to have a say in any decisions that can directly affect them. Also, by properly communicating with residents on any changes in waste collection schedules and times, it helps residents to prepare their waste in time. It also prevents any waste being left out and illegally dumped. Local authority under the department of health and treasury should also make provisions for increased waste collection during holiday seasons as waste increases especially around festive season. This helps reduce the amount of waste that will be illegally disposed of. EMA should increase their inspections and surveys around ward 8, Chegutu to thoroughly monitor illegal dumpsite activity in conjunction with Municipality of Chegutu. This can be done by making available technology which can be useful such as an advanced GIS system to frequently map and locate all illegal dumpsites. Chegutu municipality must invest in approaches which support circular economy namely reuse, recycle and recovery.

Implementing effective waste management strategies in Chegutu can significantly enhance residents' quality of life, therefore approaches which promote behavioural change and contribute to sustainable city development are essential. This implies that establishing community awareness programs about the impacts of illegal waste disposal is significant so that residents can adopt segregation, reuse and recycling practices, strategies which limit quantity of disposed waste. Awareness activities fosters a sense of responsibility and encourages behavioural shifts towards more sustainable habits. Moreover, responsible local authorities must offer adequate waste collection services to residents, so that residents are not forced to resort to illegal dumping. Furthermore, engaging local communities in decision-making processes regarding waste management can empower residents and strengthen community ties, leading to increased civic participation. Ultimately, these recommendations support sustainable urban development by promoting environmental stewardship and ensuring that Chegutu evolves into a cleaner and healthier for future generations.

Authors' contributions
Tatenda Musasa (T.M: Writing the original draft and data collection. Amato Chireshe (A.C): Writing the paper and data collection. Thelma Machisi (T.M): Writing the paper and data collection. Steven Jerie, Tapiwa Shabani, Takunda Shabani (T. S): Writing of original draft and editing of the paper.

Funding
Non applicable.

Data availability
Available from the authors on reasonable request.

Declarations

Ethics approval and consent to participate
Approval was granted by Midlands State University to carry out the research as well as to publish under its name.
All authors participated and agreed to participate up to final revision of the manuscript.

Consent for publication
All authors agreed to publish the review.

Competing interests
The authors declare no conflict of interest.

Received: 11 November 2024 Revised: 29 April 2025 Accepted: 8 June 2025
Published online: 26 June 2025

References

1. Smol M, Duda J, Czaplicka-Kotas A, Szołdrowska D (2020) Transformation towards circular economy (CE) in municipal waste management system: Model solutions for Poland. Sustainability 12(11):4561
2. Suleman D, Mariwah S, Agyapong R (2015) Residents perception and attitudes towards urban solid waste management in Oguaa. J Soc Sci 7:27
3. Chua MH, Yau Y (2022) Institutional Analysis and Development (IAD) approach for determining the effects of the waste charging scheme on household food waste recycling. Sustainability 14(23):16120
4. Viljoen JM, Schenck CJ, Volschenk L, Blaauw PF, Grobler L (2021) Household waste management practices and challenges in a rural remote town in the Hantam Municipality in the Northern Cape South Africa. Sustainability 13(11):5903
5. Massoud MA, Mokbel M, Alawieh S, Yassin N (2019) Towards improved governance for sustainable solid waste management in Lebanon: Centralised vs decentralised approaches. Waste Manage Res 37(7):686–697
6. Lou T, Wang D, Chen H, Niu D (2020) Different perceptions of belief: predicting household solid waste separation behavior of urban and rural residents in China. Sustainability 12(18):7778
7. Fadhullah W, Imran N, Ismail S, Jaafar M, Abdullah H (2022) Household solid waste management practices and perceptions among residents in the East Coast of Malaysia. BMC Public Health 22(1):1
8. Spencer R, Reeve-Lewis B, Rugg J, Barata E (2020) Journeys in the shadow private rented sector. Safer Renting, London
9. Holm, R., Chunga, B., Mallory, A., Hutchings, P. & Parker, A. (2021). A Qualitative Study of NIMBYism for Waste in Smaller Urban Areas of a Low-Income Country, Mzuzu, Malawi. Environmental Health Insights, 15p.117863022098414.
10. Barloa E, Lapie L, Cruz C (2016) Knowledge, attitudes, and practices on solid waste management among undergraduate students in a Philippine state university. J Environ Earth Sci 6(6):146

11. Desa A, Kadir N, Yusooff F (2012) A study on the knowledge, attitudes, awareness status and behaviour concerning solid waste management. Procedia Soc Behav Sci 18(2011):643–648
12. Lissah SY, Ayanore MA, Krugu JK, Aberese-Ako M, Ruiter RA (2021) Managing urban solid waste in Ghana: Perspectives and experiences of municipal waste company managers and supervisors in an urban municipality. PLoS ONE 16(3):e0248392
13. McAllister J. Factors influencing solid waste management in the developing world. Utah state university 2015.
14. Muiruri, J.M. (2022). Assessment of Residents' Knowledge, Attitude and Practices on Solid Waste Management in Eastleigh South Ward, Nairobi, Kenya (Doctoral dissertation, University of Nairobi).
15. Salvia G, Zimmermann N, Willan C, Hale J, Gitau H, Muindi K, Gichana E, Davies M (2021) The wicked problem of waste management: an attention-based analysis of stakeholder behaviours. J Clean Prod 326:129200
16. Shabani, T. & Jerie, S. Medical solid waste management status in Zimbabwe. Journal of Material Cycles and Waste Management 2023 1–16.
17. Shabani T, Jerie S (2023) A review on the effectiveness of integrated management system in institutional solid waste management in Zimbabwe. Environ Sci Pollut Res 30(45):100248–100264
18. Longe OM (2021) An assessment of the energy poverty and gender nexus towards clean energy adoption in rural South Africa. Energies 14(12):3708
19. Almasi A, Mohammadi M, Azizi A, Berizi Z, Shamisi K, Mosavi SA (2019) Assessing the knowledge, attitude and practice of the Kermanshahi women towards reducing, recycling and reusing of municipal solid waste. Resour Conserv Recycl 141:329–338
20. Chen, H. & Yuan, Y., 2022. The impact of ignorance and bias on information security protection motivation: a case of e-waste handling. Internet Research, (ahead-of-print).
21. Karin K (2015) Knowledge, attitudes and behaviour regarding waste management in a grammar and a comprehensive school in England – results from a school questionnaire. J Teacher Educ Sustainabil 17(1):58
22. Ndlovu, E. (2021). Stakeholders' perceptions of environmental injustices and of community-based environmental education: a case study of the Stortplaats community in KwaZulu Natal (Doctoral dissertation).
23. Jerie S, Chireshe A, Shabani T, Shabani T (2024) Residents' willingness to pay for sustainable solid waste management services: a case of Glenview suburb, Harare Zimbabwe. Smart Constr Sustain Cities 2(1):21
24. Jerie S, Shabani T, Shabani T (2024) Management of safety and health hazards associated with construction and demolition waste in Zimbabwe. Discov Environ 2(1):56
25. Jerie S, Shabani T, Shabani T, Chireshe A (2024) The potential role of safety, health, environmental quality (SHEQ) management systems in sustainable landfill management in Zimbabwe-a review. Discover Sustainability 5(1):396
26. Muiruri J, Wahome R, Karatu K (2020) Study of residents' attitude and knowledge on management of solid waste in Eastleigh, Nairobi Kenya. J Environ Protect 11(10):779
27. Laor P, Suma Y, Keawdounglek V, Hongtong A, Apidechkul T, Pasukphun N (2018) Knowledge, attitude and practice of municipal solid waste management among highland residents in Northern Thailand. J Health Res 32(2):123
28. Shabani, T., Jerie, S. & Shabani, T. (2023). Applicability of the life cycle assessment model in solid waste management in Zimbabwe. Circ Econ Sustainabil 1–21.
29. Shabani T, Mutekwa VT, Shabani T (2023) Developing a sustainable integrated solid waste management framework for rural hospitals in Chirumanzu District Zimbabwe. Circ Econ Sustainabil 4(2):1183–1217
30. Mkumbuzi SH. Investigating the performance of a community based approach to solid waste management: A case study of Nkulumane Suburb in Bulawayo, Zimbabwe (Doctoral dissertation) 2018.
31. Ncube A, Sadondo P, Makhanda R, Mabika C, Beinisch N, Cocker J, Gwenzi W, Ulgiati S (2022) Circular bioeconomy potential and challenges within an African context: from theory to practice. J Clean Prod 367:133068
32. Makova, R., Mapira, J. & Shambira, L. (2019). The effectiveness of drought mitigation strategies in chegutu district, Mashonaland west province, Zimbabwe. European Journal of Social Aciences Studies, 4 (1).
33. Zimbabwe National Statistics Agency, (2022). Zimbabwe Population Census 2012 National Report. http://www.zimstat.co.zw/wp-content/uploads/publications/Population/population/2012-national-report.pdf
34. Adwok J (2015) Probality sampling-A guideline for quantitative health care research. Ann Afr Surg 12(2):95–99
35. Chireshe A, Shabani T, Shabani T (2023) Safety and health risks associated with illegal municipal solid waste disposal in urban Zimbabwe."A case of Masvingo City." Saf Extr Environ 5(3):243–252
36. Zikali NM, Chingoto RM, Utete B, Kunedzimwe F (2022) Household solid waste handling practices and recycling value for integrated solid waste management in a developing city in Zimbabwe. Scient Afr 16:e01150
37. Ngaza, N., Mapira, J., & Mandiudza, M. Recycling of Plastic Waste and The Quest for Sustainable Development in Masvingo, Zimbabwe. European Journal of Social Sciences Studies 2018.
38. Butler ,J. H. & Hooper, P D. (2019). Glass waste, Waste, 2 .https://www.sciencedirect.com/science/article/pii/B9780128150603000153
39. Lawton G (2022) Can fashion really go green? New Scientist 254(3389):38–45
40. Korsunova A, Horn S, Vainio A (2021) Understanding circular economy in everyday life: Perceptions of young adults in the Finnish context. Sustain Prod Consumpt 26:759–769
41. Goudeau C, Stall-Meadows C (2012) An unexpected direction in solid waste reduction: Household textiles and clothing recycling. J Extension 50(5):19
42. Kwenda PR, Lagerwall G, Eker S, Van Ruijven B (2022) A mini-review on household solid waste management systems in low-income developing countries: A case study of urban Harare City Zimbabwe. Waste Manage Res 40(2):139–153
43. Zikali N (2022) Household solid waste handling practices and recycling value for integrated solid waste management in a developing city in Zimbabwe. Scient Afr 16:e01150
44. Shabani T, Mutekwa VT, Shabani T (2024) Environmental health risks associated with solid waste management at rural hospitals in Chirumanzu District Zimbabwe. SN Soc Sci 4(2):20
45. Kwenda Phyllis, R., Gareth, L., & Sibel, E. Van Ruijven Bas Community-Based Management of Household Solid Waste for Harare, Zimbabwe: A System Dynamics Approach. Journal of Waste Management & Recycling Technology. SRC/JWMRT-102. 2023 101(1);2-12. https://doi.org/10.47363/JWMRT/2023
46. Chikowore N (2021) Factors influencing household waste management practices in Zimbabwe. J Mater Cycles Waste Manage 23(1):386–393
47. Debrah JK, Vidal DG, Dinis MAP (2021) Raising awareness on solid waste management through formal education for sustainability: a developing countries evidence review. Recycling 6(1):6
48. Dlamini W, Zikhali W (2024) Management of solid waste by households at Nkayi growth point in Zimbabwe. Waste Manage Bullet 2(1):266–275
49. Allesch A, Brunner P (2014) Assessment methods for solid waste management: A literature review. Waste management research. J Sustain Circ Econ 32(6):461
50. Barletti JPS, Larson AM, Hewlett C, Delgado D (2020) Designing for engagement: a realist synthesis review of how context affects the outcomes of multi-stakeholder forums on land use and/or land-use change. World Dev 127:104753
51. Stober D, Suškevičs M, Eiter S, Müller S, Martinát S, Buchecker M (2021) What is the quality of participatory renewable energy planning in Europe? A comparative analysis of innovative practices in 25 projects. Energy Res Soc Sci 71:101804

Publisher's Note