Assessment of solid waste management in three local authorities in Zimbabwe

REPORT OF A COMMUNITY BASED ASSESSMENT

Training and Research Support Centre (TARSC)
With
Civic Forum on Housing (CFH)
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Executive Summary

Solid waste management (SWM) refers to the collection, transport, processing, recycling or disposal, and monitoring of solid waste materials produced by human activity, and is generally undertaken to reduce their effect on health and the environment. The adverse impact of solid waste is best addressed by establishing integrated programs where all types of waste and all facets of the waste management process are considered together. Setting this up calls for clearer information on the current situation with regards to practices, knowledge and perceptions on SWM, particularly at household level.

To support this, Training and Research Support Centre (TARSC), a non profit organisation, worked with the Civic Forum on Housing (CFH) in three pilot urban sites (Mutare, Chitungwiza and Epworth) in December 2009 to assess community perceptions, attitudes and practices on the management and communication between local authorities and communities. We aimed to generate evidence to support stakeholder driven intervention, and to build research capacities in ward level CFH affiliate organization personnel.

The draft report was presented to a review meeting of CFH monitors to review and finalise it. It was also presented at a reporting stakeholder forum hosted by TARSC and CFH in end February 2010, separately reported.

A cross sectional survey collected data through key informant interview of local authority environmental health technicians and ward councilors; and a survey of 220 households in wards in three pilot urban local authority areas, Chitungwiza, Mutare and Epworth. The CFH identified two people from each ward, based on their skills levels and roles in their communities, that were trained as monitors to implement the assessment.

The majority of households were from high density (low income) residential areas, with 5.8 people per household, two thirds with secondary school qualifications and most living in detached housing. Households had relatively high ownership of mobile phones, televisions and radios, important for communication. While 92.2% of households reported access to a safe water source, 50% had interruptions in supplies in the past week, on average of 8 days. When these breaks occurred, households reported fetching water from neighbors and unprotected wells and using stored water, increasing risks of disease. Further, while 87% of the households had access to safe sanitation, bursts of sewer pipes reported by 35% of households led to use nearby public toilets or disposal of faecal waste in or outside the yard, increasing the risk of fly borne disease.

Households and local authorities reported producing high levels of food, yard, plastic and paper waste, particularly from medium density housing, and lower volumes of glass bottles, ceramics and metal tins, more in high than low density areas. This distribution of waste signals opportunities for waste recovery and recycling at household level, including composting of yard and food waste and recycling plastic and paper.

Various receptacles were being used to collect solid waste in houses, mainly metal /plastic bins or plastic bags, but a third of households put waste directly in an outside bin or pit, in open spaces, roadsides and valley/streams nearby. Only one in five households had local authority or non government organization support for accessing bins, with none supplied bins in Epworth. For health reasons, it is recommended that biological waste in

tropical regions like Zimbabwe be collected daily. Half of the households reported no waste collection during the three months prior to the survey, and most households rated poorly the reliability of municipal collection services and expressed reservation about the payments they were making given this poor quality of service. Household practices of using private collectors or pooling resources to hire private plumbers to fix the bursts is a private cost for a public good. With the problems higher in the highest density areas where incomes are lower, this is an inequitable cost burden on the poorest households.

Uncollected solid waste was disposed of in illegal dump sites on roadsides, open spaces, rivers and bridges, posing a health hazard. Low levels of waste segregation were generally reported in all sites mainly relating to the inconvenience of doing this. While three quarters of households' perceived solid waste recycling at household level as a positive way of managing solid waste, only half of the households were actually recycling waste in their homes, moreso in medium density areas There is a potential to reduce yard waste by a further 25%, for example, if recycling were practiced.

Both councilors and household respondents perceived the SW problem as very serious, and reported high levels of willingness to participate in future solid waste management initiatives, including in solid waste segregation and recycling, particularly in high density areas, and particularly if supported by local authorities.

Households respondents felt they could improve SWM by improving equipment and resources for households (bins, stand demarcation in Epworth, pits in yards) communities (roads, community bins, central waste collection sites, recycling services) and local authorities (refuse trucks, fuel, water treatment supplies). They proposed that households and communities receive information and education and are involved in clean up campaigns, that communities form committees to monitor SWM, and that local authorities fine illegal dumping and increase PHI interaction with communities. It was also noted that private companies illegally dumping waste need to be monitored and the practice stopped. There was consistency of view across households, councilors and EHTs on priorities for action in education of residents on SWM, promotion of central waste collection points and recycling, increasing PHI visits and improving local authority resources (staff, trucks and roads).

There appear to be opportunities for Community-Based SWM in these pilot municipal areas. In line with this we suggest the following measures, drawing on the proposals from the people interviewed in the three areas, and based on the evidence of attitudes and practices and the waste produced as found in this survey in the three pilot sites:

1. **To reduce waste production, segregate waste and reduce toxicity or negative impacts of waste generated**

- waste reduction through the design, manufacture, purchase or use of materials eg by using products and packaging that have lower quantity (and toxicity).
- better waste segregation at household and community level to reduce waste to landfills and encourage recycling, encouraged through production of appropriate bins for separate waste, segregated waste collection at communal points, involvement of community groups and small enterprises equipped with appropriate technologies to support segregated waste collection and use, and incentives for segregating waste through information on recycling, health promotion, and organized collection.
- Local authorities and community organization promotion of behavioral change and promote use and return of reusable and returnable containers.

- Development committees and residents associations to enhance participation of communities on SWM, and engage manufacturers and local authorities on practices.

2. To reuse, recycle, compost, or recover materials for use as direct or indirect inputs to new products.

- central locations for solid waste collection within wards, segregating solid waste for recycling and safe disposal in local authority landfills
- intense promotion of household recycling in backyard composting of organic manure for urban agriculture and local manufacture using paper or plastic waste.
- Community recycling through community composting sites close to central refuse collection sites for those households that don't use organic waste.
- Partnerships between large and small scale companies that recycle waste (plastic, paper, metal) and communities, with bins and collection support for recycling.

3. To dispose of residual solid waste in an environmentally sound manner, generally in landfills

- local authority communication and practice to re-establish trust in waste collection
- clean up of existing dumpsites and waste by local authorities and through supported community clean up campaigns, especially from high and medium density areas to avoid unfairly burdening lowest income households with the costs of doing this.
- Community monitoring and prevention of waste dumping supported by communication tools, protective clothing and training in public health
- Local authorities to ensure adequate equipped and resourced EHTs and PHIs and partnerships with community leaders and organizations to complement their regulatory work with promotion of enforcement and of environmental health.
- Capital investment plans to ensure road transport access to community SW collection points, and adequate trucks and fuel to facilitate collection.

Improving household solid waste management in local authorities using a community based integrated approach calls for greater participation of and communication with communities, and institutional support to give communities ownership of the system. . Most households were dissatisfied with the communication between households and authorities and there was a gap in communication, poor response to complaints, limited interaction with public health inspectors and limited information or education to communities. Proposals for enhanced communication included forming mechanisms (community committees, development committees, local authority public relations offices and councilor offices); holding regular meetings with councilors, local authority representatives and residents; opening communication channels through suggestion boxes, meetings, flyers, workshops; using media (radio, television, and newspapers); and using existing resources, for instance water bills, to disseminate information on SWM. It would be timely to integrate updated information and education on SWM into a range of other education activities, including in schools, in professional and community extension worker training programmes, in health literacy training for communities, in information to companies through employer organizations and trade unions, and in induction training for community leaders, parliamentarians and other social leaders.

The severe cholera epidemic in Zimbabwe in 2008/9 was a wake up call on better SWM. The survey indicates the perceived need, willingness and potential resources to respond to this wake up call, and to turn a problem and challenge into an opportunity to build a more sustainable and cost effective system for SWM.

1 Introduction

Solid waste management has emerged as one of the major challenges confronting almost all urban local authorities in Zimbabwe. Rapid urban population growth during the last decade, coupled with hyperinflation, economic decline and a fall in both capital and recurrent real budgets of local authorities, among other factors, placed considerable strain on local authority resources, resulting in the failure to provide adequate services to their residents and areas under their jurisdiction.

Box 1: Elements of solid waste management

According to the United Nations Statistics Division (UNSD), solid wastes refer to all materials that are not prime products, for which the person generating the material has no further use in terms of his/her own purposes of production, transformation or consumption, and which he/she wants to dispose, and that is not intended to be disposed using a pipeline.

Solid waste management is the collection, transport, processing, recycling or disposal, and monitoring of solid waste materials produced by human activity, and is generally undertaken to reduce their effect on health and the environment. The management of solid waste has social, environmental and economic costs.

Zimbabwe produces an average 2.5 million tonnes of solid waste (household and industrial combined) per annum (Practical Action, 2007). Waste collection by local authorities was reported in 2007 to have dropped from 80% of total waste across different local authorities in the mid 1990s to as low as 30% of total waste in some large cities and small towns in 2006 (Practical Action (2007). Areas that were reported to be worst affected at that time were low-income residential areas and informal settlements, with some reporting not receiving waste collection services at all.

Low waste collection levels in recent years have been associated with illegal open dumping and backyard incineration, leading to environmental and health hazards for residents. Smoke from the burning of waste increases the risk of respiratory health problems. The breeding of flies at dumpsites increases the risk of food contamination and fly borne disease. Uncontrolled dumping also increases the risk of contamination of water sources.

Effectively addressing these problems calls for integrated programs that deal with waste management along all steps of the process, from

- Reducing the source of waste
- Reducing the level of waste through domestic recycling
- Managing the way waste is sorted, disposed and collected
- Recycling collective waste
- Managing where and how waste is disposed of.

Strategies that involve reducing the level of waste and recycling waste at individual or community level are more cost effective and pose less risk to the environment and public health. In urban areas, as population sizes increase, it is not sustainable to generate and manage the increasing volume of waste without such strategies. This calls for

information and organization. Households need knowledge, incentives, and support for participation in these strategies for solid waste management. This calls for good communication between local authorities and communities on SWM.

In 1995, a study commissioned by the Ministry of Local Government, Rural and Urban Development stated, however, that most local authorities were failing to include their residents' attitudes on waste management or to draw on or support their knowledge of waste production, waste recovery and waste recycling (Tevera-Mubvani and Associates 1995). The report suggested that the public should be encouraged to participate in solid waste management (SWM) programmes in order to improve the performance of waste management systems.

With the trend towards increasing level of solid waste as urban populations increase, the economic constraints facing local authorities and the public health risks from uncontrolled waste, it is clearly timely to revisit the issue of managing solid waste in a more cost effective and sustainable way. As waste collection services have declined and people have resorted to their own measures, it is timely to reorient towards a more organized system. Prior reports suggest that this should not be one that is dependent only on reliable local authority waste collection and disposal, but also on more effective and healthy waste management at the household and community level, and public co-operation with local authorities. Building and setting incentives for such public co-operation and participation, and identifying opportunities to improve solid waste management calls for more information on current household perceptions, knowledge and practices relating to solid waste management, and on the current level of interactions between local authorities and communities.

To support this, Training and Research Support Centre (TARSC), a non profit organization, through its Community based research training (CBRT) programme, worked with the Civic Forum on Housing (CFH). TARSC provides training, research and support services to develop capacities within public sector and civil society organisations on areas of social policy and social development. The Civic Forum on Housing (CFH) comprises 20 constituent organisations involved in housing delivery, including local authorities and community organisations. The CFH aims to support democratic urban governance to address housing needs and challenges faced by low income communities.

The two organizations worked together to carry out an assessment of community perceptions, attitudes and practices on the management and recycling of solid waste to inform advocacy and planning for improved community management of solid waste and for improved interaction between households and local authorities on solid waste management. The work was carried out in pilot urban sites (Mutare, Chitungwiza and Epworth). Through the same process, TARSC also aimed to build capacities at ward level in personnel from CFH affiliate organizations to gather and report on evidence on solid waste recycling and management in their areas, using scientific methods. Through work to produce both capacities and a base of evidence on solid waste management, we hoped to support evidence based interaction between members of the CFH and local authorities on improved approaches for solid waste management, from both local authorities and communities.

The work was designed and implemented by TARSC (R Loewenson, A Kadungure, Z Mlambo, M Makandwa) with CFH (Sam Chaikosa, Victor Kamba, Augustine Basket, Martha Bazariyo, Philip Muzengeri, Theresa Paul, Piniel Mahodzo, David

Chamwaita, Vimbai Tauzen, Johnson Mironga, Yvonne Rutendo Katiyo, Melba Tambudzai Kasambira, Collen Tawanda Chibvoora, Esnath Gambe, Lewis Chitovoro, Idah Chatindiara, Kundai Madzimure, Alfred Mhere, Rutendo Chasinda, Addlaph Mundembe, Wallace Ngoni Shiridzinomwa, Tonderai Brian Sango and Monica Kudzayi Nyawo). The data was analyzed by A Kadungure and M Makandwa and this draft of the report produced at TARSC (R Loewenson, A Kadungure), with input from Civic Forum on Housing (S Chaikosa)[1].

The draft report was presented to a review meeting of CFH monitors to review and finalise it. It was also presented at a reporting stakeholder forum hosted by TARSC and CFH in end February 2010, separately reported.

2 The survey

The programme aimed to obtain an assessment of community perceptions, knowledge and practices on solid waste management, including waste recycling, in order to improve community management of solid waste and improve the interactions between households and local authorities on solid waste management.

The specific objectives of the assessment were to identify in high, medium and low density households in three local authority areas:

- Household knowledge, perceptions and practices on the management and recycling of solid waste
- The level of household knowledge on local authority roles in solid waste management
- The nature and level of interaction between households and local authorities on solid waste management.

As an associated issue we also gathered basic information on the perceptions and experiences of households on water safety and availability.

The programme aimed further to build capacities in ward level CFH affiliate organization personnel to gather and report evidence on solid waste recycling and management in their areas. We aimed to use the community level evidence both to improve community management of solid waste and to support interaction between communities and local authorities in solid waste recycling and management. The assessment provides evidence that aims to inform dialogue on the findings and actions by the CFH organizations, and will act as baseline evidence to assess changes in knowledge, perceptions and practices on the management and recycling of solid waste as a result of those actions.

This report outlines the methods, findings and conclusions from the programme from the three pilot study sites. The training of CFH monitors in research methods and data collection is separately reported (TARSC, CFH 2010). The findings will be used by CFH and partners to plan interventions to improve household solid waste management in the participating sites, and thereafter assess the impact of these interventions.

[1] We welcome comments and feedback on the report. Please send to admin@tarsc.org, with "*Household Solid waste management*" in the subject line.

The survey assessed the following areas on household solid waste management

Through a household survey

Perceptions on

- levels and risks of solid waste
- Opportunities for waste recycling
- waste management practices by households and authorities
- effectiveness of local authority roles /actions in solid waste management
- communication on local authority roles in solid waste management
- ease and effectiveness interaction between households and local authorities
- gaps and priorities for improvement on waste management
- water safety and availability

Knowledge of

- local authority roles in solid waste management
- options for waste recycling
- public health inspector roles, practices and their outcomes
- waste management complaints procedures and their effectiveness

Practices on

- Generation and disposal of solid waste
- Recycling of solid waste
- interaction with local authorities on solid waste management
- Household experiences of waste collection (frequency, regularity, volume and cost of collections)
- Involvement in public education
- participation in joint meetings with local authorities and the outcomes

Through key informant interviews with local authority environmental health technicians and ward councilors

- Perception and attitudes to interaction on waste management
- Physical solid waste characteristics
- Collection services coverage and quality (frequency, regularity, supply of bins)
- Actions to promote recycling
- Community education, mobilization and participation, and outcomes
- Complaints handling procedures-household education, practice, outcomes and barriers.
- opinions and priorities for improving interaction on solid waste management

3 Methods

A cross sectional survey was implemented in December 2009 with data collection through key informant interview of local authority environmental health technicians and ward councilors; and a household survey that used a standardized questionnaire.

The assessment was carried out in three pilot urban local authority areas, Chitungwiza, Mutare and Epworth, with data collected from ward level sites. (see Figure 1)

Figure 1: Map of Zimbabwe showing the districts with local authority areas surveyed

Population 2008 (CSO)	
Chitungwiza	337 667
Mutare	178 163
Epworth	119 223

The three local authorities were selected purposively as areas where the CFH has active organisations able to take up follow up action. Wards were also purposively selected within these local authorities as places where CFH personnel are based. Six wards were included in Mutare, six in Chitungwiza and three in Epworth (See Table 1). The wards were stratified into high, medium and low housing density to select households in the sample according to their presence in the ward. As the local authorities and wards are not randomly selected, this assessment *does not intend to be generalisable* to the country and is being done to support capacities, evidence, dialogue and action in *those three* local authority areas.

The CFH identified two people from each ward, based on their skills levels and roles in their communities, that were trained as monitors to implement the assessment. Of the 15 selected wards in total, seven wards had two monitors each and the remaining eight wards had one monitor each (See Table 1). A two day training workshop was held to

train the CFH monitors in research methods, separately reported (TARSC CFH 2010). Twenty two CFH monitors were trained and all of them actively participated in the assessment.

Table 1: Distribution of monitors and participating wards

Municipality	Number of monitors	Number of Wards	Total households covered
Mutare	8	6	80
Chitungwiza	9	6	90
Epworth	5	3	50
TOTAL	**22**	**15**	**220**

Prior to any field work the CFH visited the local authority and community representatives in each area and introduced the aims and process of the assessment to obtain authority to implement the work. Interviews were only implemented after the purpose of the work was explained, the confidentiality of individual responses indicated and respondents gave permission to proceed.

3.1 Features of the households

Multi stage random cluster sampling was used to choose the households for the survey, with 5 clusters per ward, and two households randomly selected per cluster from the complete listing of households in the cluster. Given logistic and budget constraints, each monitor covered 10 households, with 20 households per ward where there were two monitors and 10 households for those wards that had one monitor. A total of 80 households were included in Mutare, 90 in Chitungwiza and 50 in Epworth, with a total of 220 households (See Table 1 above).

The majority of households in the survey (86%) were from low income residential areas, given the total share of this type of area in the local authority area. The average number of members of the households was 5.8 and the proportion of female members in these households was 54%, with little variation across area (See Table 2)

Table 2: Average household size and sex distribution by municipal area

Municipality	No of households	Mean number of members per household	Proportion of	
			Males	**Females**
Chitungwiza	90	5.8	45.1	54.9
Epworth	50	5.8	46.7	53.3
Mutare	80	5.7	46.5	53.5
Total	**220**	**5.8**	**46.0**	**54.0**

Nearly two thirds (62%) of the household respondents had attained at least secondary school qualifications, with higher levels of education in Mutare (see Table 3).

Table 3: Level of education of household members

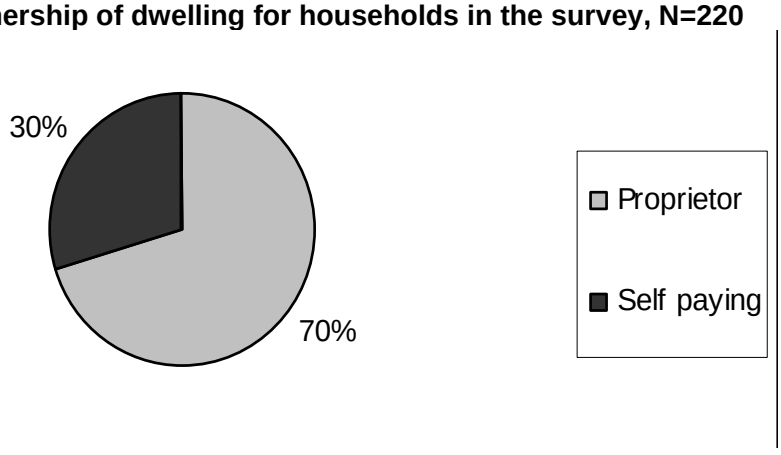
Municipality	No	% of household members with			
		No formal schooling	Complete or partial primary school	Secondary or high school equivalent	Above secondary school
Chitungwiza	90	15.2	23.9	51.8	9.1
Epworth	50	16.0	31.4	47.4	5.2
Mutare	80	13.7	19.8	39.0	27.5
Total	**220**	**14.8**	**23.5**	**46.1**	**15.6**

Most households in the survey lived in detached housing, moreso in Epworth, while in Chitungwiza and Mutare semidetached or flat dwelling was naturally more common in high density areas. Three quarters of households (75%) owned their dwelling units, with ownership higher in Epworth and lower in Chitungwisa. (See Table 4 and Figure 2)

Table 4: Dwelling types and ownership of households in the survey

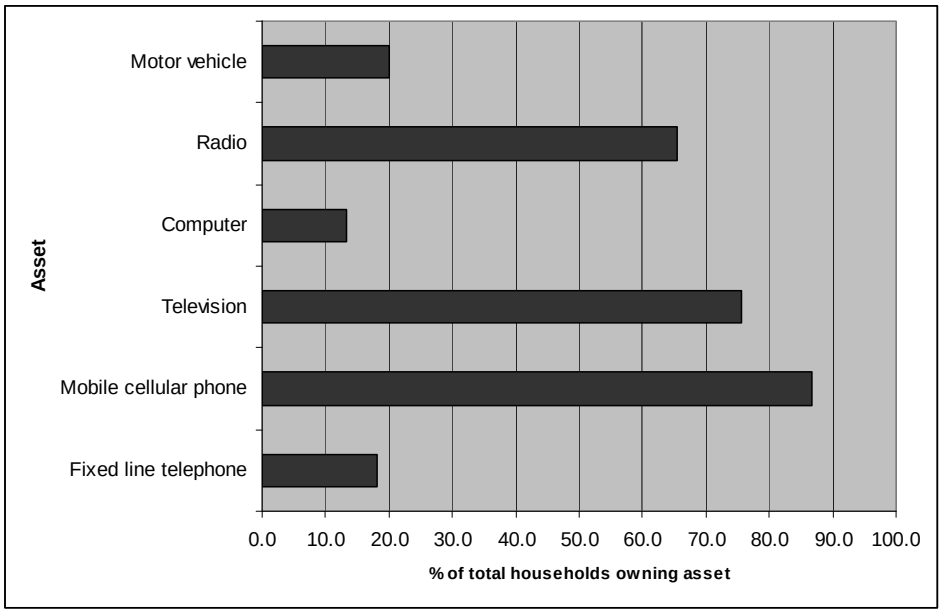
Municipality	Area Type	No	% of households dwelling in			% of households reporting ownership of dwelling as		
			Detached house	Semi detached house	Flat/ Attached/ multi unit housing	Owner/ proprie -tor	Self paying	Tied
Chitungwiza	Medium	10	80.0	20.0	0.0	70.0	30.0	0.0
	High	80	78.2	16.7	5.1	74.4	24.4	1.3
Sub Total		90	78.4	17.0	4.5	73.9	25.0	1.1
Epworth	High	50	98.0	0.0	0.0	90.0	10.0	0.0
Sub Total		50	98.0	0.0	0.0	90.0	10.0	0.0
Mutare	Low	10	100.0	0.0	0.0	40.0	40.0	20.0
	Medium	10	100.0	0.0	0.0	70.0	30.0	0.0
	High	60	61.7	31.7	6.7	73.3	25.0	1.7
Sub Total		80	71.3	23.8	5.0	68.8	27.5	3.8
All Municipalities		**220**	**80.3**	**16.0**	**3.7**	**75.7**	**22.5**	**1.8**

Figure 2: Ownership of dwelling for households in the survey, N=220



Households had relatively high ownership of assets, particularly of mobile phones, televisions and radios (See Figure 3). These are important for communication and information dissemination, although it is possible that they are less functional due to intermittent electricity supplies, and the cost of batteries and alternative power sources. The 2005/6 Demographic and Health Survey (DHS) found comparable results to this assessment, with 77.5% of the urban households having radios, 70.4% TVs, 22.7% a fixed line telephone and 14.1% a car.

Figure 3: Assets of households in the survey



Key informant interviews were obtained from the Environmental health technicians in the three local authorities and 15 ward councilors from the 15 wards covered in the survey.

3.2 Comment on the methods

The CFH monitors were trained in research skills and data collection prior to the fieldwork. The teams were further supported during the fieldwork and the data checked to improve the data quality. Epworth and Chitungwiza were monitored through physical field visits and Mutare monitors supported through phone calls. Some sources of error were noted and will be discussed in the follow up training planned to further strengthen the monitors skills. There were some issues that affected the sampling frame. In ***Chitungwiza*** the Police Camp was left out due to difficulties with access. It was noted that the survey covered households, but there were also small enterprises generating garbage in residential areas that were excluded.

Some questionnaires had incomplete data and some responses to questions were not recorded. These were followed up with the monitors to ensure that data was complete before analysis. Where data inconsistencies were noted during the analysis, follow ups were made with the monitors to review the data and make the relevant corrections. There may be some bias towards more favourable answers on practices by households such as on household waste recycling that would present a more positive picture than in

practice. In two areas conditions changed during the time of the survey: In Mutare the refuse truck arrived at the time of the interviews as a coincidence, while in Chitungwiza running water commenced during the time of the survey. This may have made the responses more favourable.

The researchers had to manage expectations of funds or intervention linked to the survey, in some cases due to previous research activities, and this had to be corrected. Some respondents with official positions were defensive or not forthcoming on issues that involved them, or sought to assign blame. Researchers pursued questions to try to draw out causes of problems rather than to blame individuals.

Notwithstanding these sources of error, we consider the data presented in this report to provide a robust picture of the parameters collected, particularly given that evidence was tri-angulated from different sources (households, councilors and EHTs).

4. Findings

The findings are reported within the following key areas of solid waste management, that is

- Solid waste generation, handling and household storage
- Solid waste collection, recovery and disposal.
- Communication on local authority roles on solid waste management
- Community participation and involvement in solid waste management and satisfaction levels.
- Water and sanitation
- Priorities for improving solid waste management.

4.1 Solid waste generation, handling and household storage

The survey looked at various dimensions of solid waste generation, handling and storage at household level. Over and above determination of the resources and practices used by households and the gaps, the survey also sought to find out household perceptions and attitudes on waste handling and storage.

The assessment did not attempt to quantify the amount of waste generated by households by mass/weight but rather used a volume based approach to determine the contribution of various solid waste types to the total waste in the household using the standard shopping plastic bag as the reference volume. Whilst simple comparisons on the differences in the reported levels are difficult (due to variations in density, shapes of the waste and so on), households and local authorities reported production of considerable amount of food, yard, plastic and paper waste (See Tables 5a and b). Food, paper and yard waste generally had higher volumes than other forms of waste, particularly from medium density housing.

Table 5a: Household reports on levels of solid waste generated per week

Municipality	Density of Area	No	% of households reporting producing more than 5 plastic bags per week of					
			Paper	Plastics	Glass/ Bottles Ceramics	Metal Tins/ Cans	Food waste	Yard Waste
Chitungwiza	Medium*	10	10.0	10.0	0.0	0.0	0.0	30.0
	High	80	1.2	1.2	0.0	0.0	14.9	31.2
Sub Total		90	2.3	2.2	0.0	0.0	13.4	31.2
Epworth	High	50	30.0	10.0	23.9	2.2	8.0	60.0
Sub Total		50	30.0	10.0	23.9	2.2	8.0	60.0
Mutare	Low	10	0.0	0.0	0.0	0.0	0.0	50.0
	Medium	10	50.0	50.0	0.0	10.0	10.0	40.0
	High	60	3.3	1.6	1.7	6.6	6.7	58.3
Sub Total		80	8.7	7.4	2.5	7.5	6.2	55.0
All Municipalities		**220**	**10.9**	**5.9**	**6.0**	**3.3**	**9.6**	**46.4**

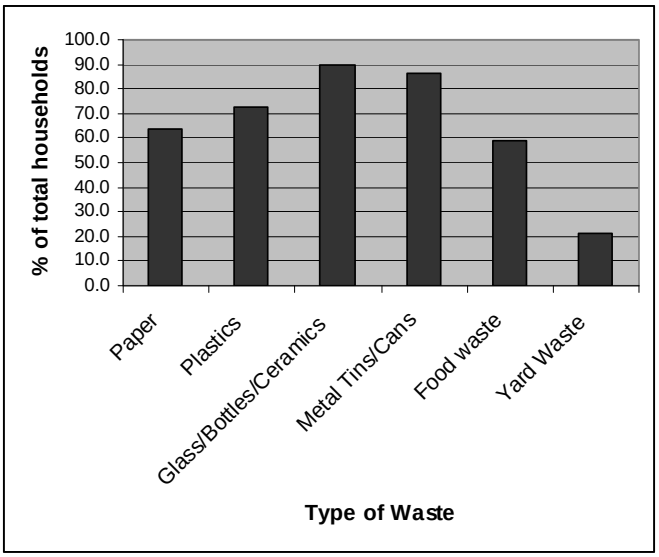
* small sample size in this category so percent findings need to be read with caution, eg on food waste

Table 5b: Major solid waste types by area type reported by local authority informants

Municipality	High Density areas	Medium and low density areas
Chitungwiza	Food waste, paper and plastic	Food waste, cans and yard waste
Epworth	Food waste, cans and plastic	N/A
Mutare	Plastic, paper and cans, yard waste	Plastic, paper and cans, yard waste

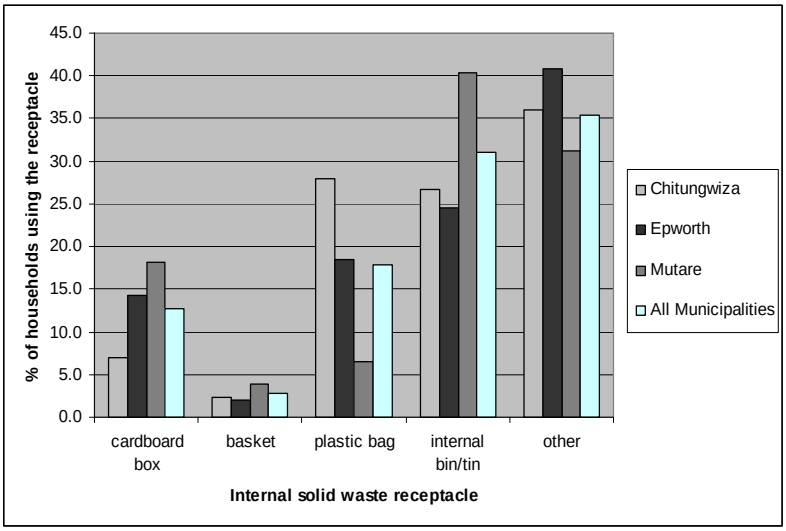
According to household reports, lower volumes were produced of glass bottles, ceramics and metal tins (Figure 4), with higher quantities reported in high than low density areas. The distribution of waste indicate some opportunities for waste recovery and recycling at household level , particularly with regards to yard and food waste composting and plastic and paper recycling.

Figure 4: Households reporting producing less than 2 plastic bags of solid waste type per week



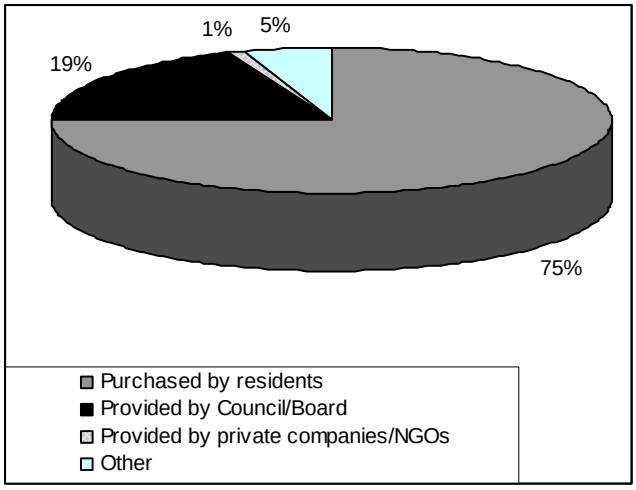
Households reported using various receptacles to collect solid waste in their houses, most frequently metal/plastic bins or plastic bags (See Figure 5). A third (35%) did not use any internal receptacle but put waste directly in an outside bin or pit. Internal receptacles were empted when full with a quarter (26%) emptying these receptacles more than six times a week. Households are using a range of informal means for waste collection internally, (plastic bags, cardboard boxes, plastic buckets and polystyrene sacks) so that while there are measures for managing solid waste, many of the methods are not through durable receptacles. It would be useful to know how far the cost of more formal durable waste collection receptacles is a disincentive to their use.

Figure 5: Household ways of collecting solid waste inside the house.



Households generally do not get support for accessing bins and have to buy these themselves. Only one in five households had any form of support for bins (Figure 6), with none supplied bins in Epworth, and supply to a quarter of households in Mutare and Chitungwiza by EHTs. Other households were purchasing bins on their own.

Figure 6: Household reports on sources of their bins



Of the households that were using internal bins for waste collection, over a third (35%) were empting these internal receptacles unsafely- in open spaces, roadsides and valley/streams nearby, particularly in Chitungwiza (Table 6).These practices threaten public health. Illegal dump sites are a health hazard, and sharp objects and other hazards in the waste are a hazard to people who scavenge waste.

Table 6: Household reports on where internal receptacles are empted

Municipality	Density of Area	No	% of household reporting emptying internal solid waste receptacles							
			outside own bin	outside public bin	road/ street side	open space/ bush nearby	Valley /stream nearby	pit inside yard	bury inside yard	other
Chitungwiza	Medium	10	0.0	11.1	66.7	0.0	0.0	0.0	-	22.2
	High	75	6.5	2.6	55.8	19.5	0.0	9.1	6.5	-
Sub Total		85	5.8	3.5	57.0	17.4	0.0	8.1	5.8	2.3
Epworth	High	47	8.0	0.0	0.0	4.0	8.0	80.0	-	-
Sub Total		47	8.0	0.0	0.0	4.0	8.0	80.0	-	-
Mutare	Low	10	30.0	0.0	0.0	10.0	0.0	50.0	10.0	-
	Medium	10	80.0	0.0	0.0	20.0	0.0	0.0	-	-
	High	43	32.2	5.1	3.4	1.7	0.0	54.2	-	3.4
Sub Total		63	38.0	3.8	2.5	5.1	0.0	46.8	1.3	2.5
All Municipalities		**195**	**18.1**	**2.8**	**23.7**	**9.8**	**1.9**	**39.1**	**2.8**	**1.9**

4.2 Solid Waste collection, recovery and disposal

Solid waste collection is a vital component of the solid waste management process. For health reasons, it is recommended that solid waste in tropical regions like Zimbabwe be collected daily. This is a further challenge for over-stretched local authorities.

Solid waste collection services were found to be extremely limited in all three local authority areas. Half of the households reported no collection during the three months prior to the survey. They had resorted to using private collectors or alternative methods, such as digging pits inside their yards. (See Table 7).
The low income, high density areas reported less frequent waste collection services compared to the higher income low density areas, despite being in the same local authority. Households reported that uncollected solid waste accumulates in roadsides, open spaces and while some is burnt by residents, it is also disposed of in illegal dump sites.

Recommended frequency of solid waste collection

Tropics	Daily
Temperate regions	
Summer	Every 2 days
Winter	Every 3 days
Cool climates	
Summer	Twice a week
Winter	Once a week

Source: IETC/UNDP 1996.

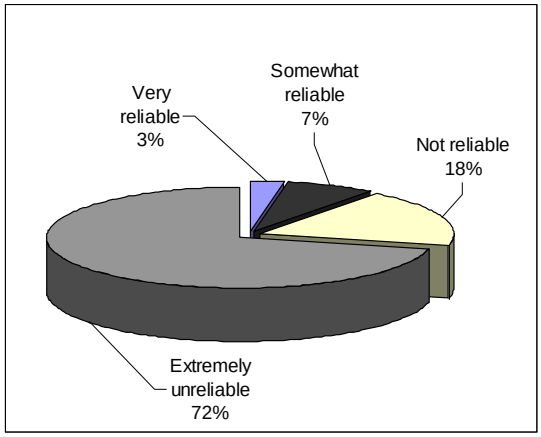
Most households rated poorly the reliability of municipal collection services (See Figure 7). This view was echoed in the municipal EHT interviews, where collection services were reported to be unreliable (Mutare) and extremely unreliable (Epworth and Chitungwiza) across all income areas.

Table 7: Households reports on frequency of collection of solid waste by local authorities

Municipality	Density of Area	Number	% of households reporting that solid waste was collected during the past month				
			More than 8 times	4-8 times	less than 4 times	Never/ we use private collectors	Don't know
Chitungwiza	Medium	10	0.0	0.0	20.0	60.0	0.0
	High	80	0.0	0.0	1.3	68.8	30.0
Sub Total		90	0.0	0.0	3.3	67.8	26.7
Epworth	High	50	0.0	0.0	2.1	44.7	53.2
Sub Total		50	0.0	0.0	2.1	44.7	53.2
Mutare	Low	10	0.0	10.0	60.0	10.0	20.0
	Medium	10	0.0	80.0	20.0	0.0	0.0
	High	60	1.7	3.4	33.9	44.1	16.9
Sub Total		80	1.3	13.9	35.4	34.2	15.2
All Municipalities		**220**	**0.5**	**5.1**	**14.8**	**50.5**	**28.2**

Note: The high level of DON'T know answers is because refuse collection schedules were not consistent or known so they relied on physical sight of refuse collection trucks to know collections had been done. Some collections are done during the week when members of the households are not present.

Figure 7: Household rating of reliability of municipal collection services



Households reported the average **cost of refuse collection** per month: This was found to be lowest in Epworth (US$0.70c) and highest in Chitungwiza (US$8.10). Mutare's average charge was US$4.40. These costs were consistent with figures obtained from the municipal EHTs. Although these costs may appear modest, most households (51%) expressed reservation about paying these amounts due to the poor quality of service from local authorities (Table 8). We did not establish from the local authorities the actual level of payment for refuse collection by households. However households responses indicate that while a large share of households are not willing to pay for the waste collection service, this is largely due to the perception that the service is poor. Willingness may thus increase as service performance improves. Households expressed concern as to whether the money being collected for the service was being used for the purpose and called for greater monitoring to ensure allocation of resources to this area. Respondents indicated that while SWM is a shared responsibility,

local government has core obligations and other organisations and communities can only partner if local authorities play their role in meeting this obligation.

Table 8: Household perceptions regarding paying for Solid waste management services- Household Questionnaire.

Municipality	Density of Area	No	% of households reporting perception on payment of solid waste management as							
			Not willing- It's the duty of the local authority	Not willing- it's the duty of the government	not willing- our income is low	not willing- cost is high	not willing- service is poor	not willing- majority of the waste is reusable	willing- its a shared responsibility	other
Chitungwiza	Medium	10	14.3	14.3	0.0	14.3	42.9	14.3	0.0	0.0
	High	80	12.7	5.1	1.3	6.3	64.6	0.0	10.1	0.0
Sub Total		90	12.8	5.8	1.2	7.0	62.8	1.2	9.3	0.0
Epworth	High	50	2.1	0.0	23.4	10.6	38.3	0.0	21.3	4.3
Sub Total		50	2.1	0.0	23.4	10.6	38.3	0.0	21.3	4.3
Mutare	Low	10	0.0	0.0	10.0	0.0	10.0	0.0	80.0	0.0
	Medium	10	20.0	30.0	10.0	0.0	30.0	0.0	10.0	0.0
	High	60	12.5	5.4	3.6	0.0	55.4	0.0	21.4	1.8
Sub Total		80	11.8	7.9	5.3	0.0	46.1	0.0	27.6	1.3
All Municipalities		**220**	**10.0**	**5.3**	**7.7**	**5.3**	**51.2**	**0.5**	**18.7**	**1.4**

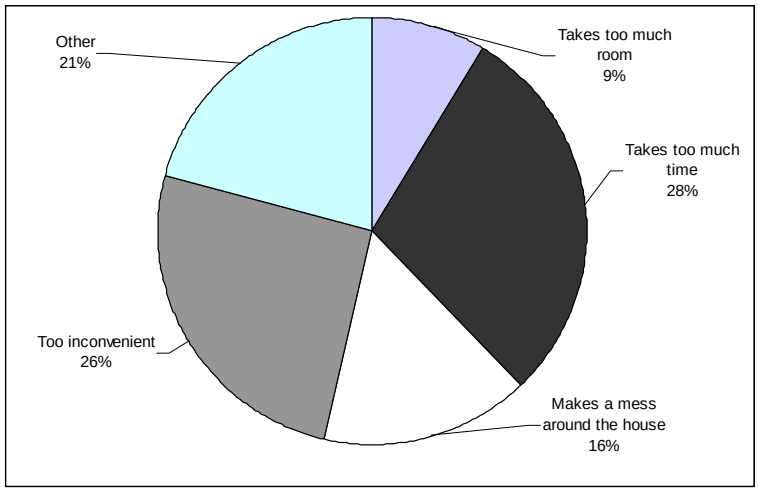
Waste segregation is one of the widely used methods to manage household solid waste at source. The process involves separation of waste by type, for instance biodegradable, plastics, paper and cans. Usually solid waste segregation enables easier recovery of waste at source and promotes recycling as the waste is already sorted out. Segregation is also vital in the management of hazardous waste from households, for instance disposal of used batteries.

Low levels of waste segregation were generally reported by households in all sites except for households from high density/ low income areas in Mutare (See Table 9). Households cited various barriers to segregation of waste (Figure 8). Most of these barriers seem related to the inconvenience of doing this, indicating that encouraging this practice would need some incentives, to create awareness of the benefits of waste segregation, facilitate the practice, such as with receptacles and collection, and support its implementation through promotion by public health inspectors.

Table 9: Household reports on frequency of segregation of solid in the home

Municipality	Density of Area	No	share of households reporting segregating solid waste at home			
			Always	Sometimes	Rarely	Never
Chitungwiza	Medium	10	10.0	40.0	30.0	20.0
	High	80	22.4	17.1	2.6	57.9
Sub Total		90	20.9	19.8	5.8	53.5
Epworth	High	50	22.4	24.5	18.4	34.7
Sub Total		50	22.4	24.5	18.4	34.7
Mutare	Low	10	20.0	30.0	0.0	50.0
	Medium	10	0.0	10.0	40.0	50.0
	High	60	41.4	29.3	3.4	25.9
Sub Total		80	33.3	26.9	7.7	32.1
All Municipalities		**220**	**25.8**	**23.5**	**9.4**	**41.3**

Figure 8: Household reports on barriers to waste segregation



Other includes households that noted having no means to recycle waste and those that saw no value is waste as barriers to waste segregation.

The EHTs reported **Illegal dumping** of solid waste on roadsides, open spaces, rivers and bridges. Over half (57%) of households concurred with the EHTs that illegal dumping was common in their areas, attributing this to limited collection services and SWM initiatives. Illegal dump were reported to have developed over several months, and while some local waste management was noted to be happening at some dump sites, this was at very low levels. The lack of waste separation makes these dump sites a health hazard to adjacent households and to those who recover waste from them.

Respondents suggested that local authorities earmark certain areas within wards as legal sites for solid waste collection for waste to be picked up by local authorities. These could be properly managed by providing for waste separation, fencing the area, and regularly disinfecting waste to reduce disease. This could reduce the costs of door to door collection of refuse and organize waste recovery and recycling in a safer manner.

Three quarters (75%) of households' perceived **solid waste recycling** at household level as a positive way of managing solid waste in all three municipal sites, less so in medium density housing areas. However, only half (51%) of the households noted that they were actually recycling waste in their homes, moreso in medium density areas (See Table 10). The gap between perception and practice could be due to the limited knowledge on recycling in over half of the households (See Figure 9). Interestingly, lower rates of support but higher rates of participation in recycling were found in medium density households, while high density households were more positive, but practiced it less.

A young bare footed boy recovering plastic paper from a dumpsite in Chitungwisa: Source: TARSC, 2010

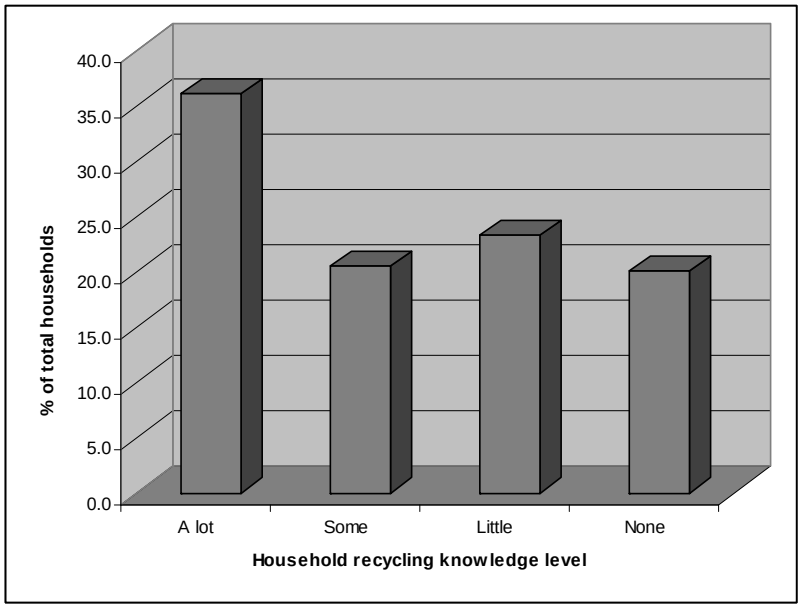
A roadside illegal dump site in a low income residential area in Chitungwiza, 2010.

Source: TARSC, 2010

Table 10: Perception of households on waste recycling- Household questionnaire

Municipality	Density of Area	No	% of households reporting that recycling is				% of households reporting participating in waste recycling at home
			Very important	Somewhat important	Not important	Don't know	
Chitungwiza	Medium	10	60.0	20.0	10.0	10.0	88.9
	High	80	78.2	10.3	7.7	3.8	39.2
Sub Total		90	76.1	11.4	8.0	4.5	44.3
Epworth	High	50	90.0	8.0	2.0	0.0	57.1
Sub Total		50	90.0	8.0	2.0	0.0	57.1
Mutare	Low	10	80.0	10.0	10.0	0.0	20.0
	Medium	10	30.0	50.0	10.0	10.0	70.0
	High	60	65.5	17.2	6.9	10.3	61.0
Sub Total		80	62.8	20.5	7.7	9.0	57.0
All Municipalities		**220**	**74.5**	**13.9**	**6.5**	**5.1**	**51.9**

Figure 9: Household reports on levels of knowledge on recycling of solid waste



Recycling practices at household level were explored through asking respondents how they treated yard waste. Consistent with the findings reported above (Table 10), about half (51%) of the households made compost, 20% applied the yard waste directly into the garden and 23% disposed of the yard waste with other waste. There is thus a potential to reduce yard waste by a further 25% if recycling were practiced by all households, with potential benefits for urban agriculture.

Both councilors and household respondents reported a high level of willingness to participate in solid waste segregation and recycling, particularly in high density areas. All councilors interviewed (100%, N=15) and over three quarters (84%) of households indicated willingness to participate in segregation and recycling programmes (See Table 11). This demands local authority and household co-operation, making the interaction between the two an important issue for improving SWM.

Table 11. Households' willingness to participate in future Solid waste segregation and recycling programmes

Municipality	Density of Area	No	% of households reporting willingness to participate in future SW segregation and recycling programmes as				
			very high	somewhat high	high	low	very low
Chitungwiza	Medium	10	44.4	11.1	22.2	0.0	22.2
	High	80	48.7	12.8	21.8	1.3	15.4
Sub Total		90	48.3	12.6	21.8	1.1	16.1
Epworth	High	50	68.0	6.0	16.0	6.0	4.0
Sub Total		50	68.0	6.0	16.0	6.0	4.0
Mutare	Low	10	30.0	0.0	40.0	20.0	10.0
	Medium	10	30.0	50.0	20.0	0.0	0.0
	High	60	75.0	8.3	3.3	3.3	10.0
Sub Total		80	63.8	12.5	10.0	5.0	8.8
All Municipalities		**220**	**58.5**	**11.1**	**16.1**	**3.7**	**10.6**

4.3 Communication on local authority roles on SWM

While a real and perceived need exists for improved SWM, and there are potentials for improved household knowledge and practices, this depends in part on reliable, organised SWM practices by local authorities, improved communication and information dissemination from local authorities to households, and clarity on the roles and expectations of each. This, together with appropriate technologies to manage and recycle SWM at household and community level, could enhance incentives for good practice.

There was highest consensus across different household types that the local authority role is to educate households on the health hazards of poor SWM, and the majority of households saw a role in providing refuse bins (See Table 12.). Most councilors (60%) perceived SWM as a core function of the local authorities, about quarter (27%) observing that it's a joint role of local authorities, communities, councilors and government. Only 7% of councilors felt they had a role to play in this. Most households (87%) were however dissatisfied with the communication between households and authorities on these roles. This seems to be an area that can be strengthened, and it may call for an increased role for councilors in SWM to promote this interaction. Equally communities themselves were felt to not communicate with authorities, reportedly due to lack of knowledge on how to channel grievances or fear of victimization.

Table 12: Households perceptions on local authority roles in SWM

			% of households agreeing or strongly agreeing on municipality role in SWM:				
Municipality	**Area Type**	**No**	**Timely, regular collection of refuse from households**	**Clearing garbage piling in open spaces and roads**	**Educating households on waste disposal and associated health hazards**	**Providing refuse bins**	**Educating households on waste recycling**
Chitungwiza	Medium	10	100.0	100.0	100.0	100.0	100.0
	High	80	98.8	100.1	100.0	98.8	96.2
Sub Total		90	98.9	100.0	100.0	98.8	96.6
Epworth	High	50	98.0	100.0	100.0	100.0	98.0
Sub Total		50	98.0	100.0	100.0	100.0	98.0
Mutare	Low	10	100.0	90.0	100.0	100.0	100.0
	Medium	10	100.0	100.0	100.0	100.0	100.0
	High	60	83.3	91.7	96.6	98.3	90.0
Sub Total		80	87.6	92.6	97.5	98.9	92.6
All Municipalities		**220**	**94.6**	**97.2**	**99.1**	**99.1**	**95.4**

4.4 Community satisfaction, involvement and participation in SWM

Household surveys in health related issues have shown that the level of satisfaction with services is higher when communities are involved in their planning and implementation, in part due to improved understanding between the communities and service providers (TARSC, CWGH 2009).

The evidence on household perceptions, knowledge and practices indicates that there is scope for improved communication between local authorities and communities to improve SWM at both household and local authority level. This would occur in communication for health promotion, involvement in clean up campaigns and in management of complaints.

One local authority mechanism for this is through the work and visits of **public health inspectors (PHIs).** These environmental health professionals regularly visit communities to monitor environmental issues, promote and educate people on healthy environments and identify priority areas to improve service delivery. PHI's compile community complaints related to water and sanitation and prepare the evidence for prosecution of those who violate the legal provisions relating to environmental health as prescribed in the Public Health Act and its regulations. These are thus key personnel and ensuring and advancing improvements in SWM on grounds of public health.

Despite this, households reported very limited interaction with public health inspectors in the three months prior to the survey, with 14% reporting visits, moreso in Mutare than in other areas. Even in cases where the PHIs were reported to have visited the community, their role was reported to have been limited (See Table 13). Household respondents reported that PHIs were mainly involved in inspecting conditions (48%) or prosecuting offenders (32%), more than communicating with the public, where less than a quarter of households reported such roles. The role of the PHI at this stage seems to be primarily regulatory, which is important, but low promotion activity and reliance on regulation can weaken household activity in this area.

Table 13: Household reports on PHI visits

Municipality	Den-sity of Area	No	% with PHI visit in last 3 mths	% of household reporting that during their visits, the PHI				
				Advised on health effects of waste	Advised on waste handling, reduction, recycling	Prose-cuted offences	Inspected SW conditions in the area	Attended residents' complaints on SW collection
Chitungwiza	Medium	10	0.2	0.0	0.0	0.0	0.0	0.0
	High	80	2.5	11.1	0.0	9.1	9.1	0.0
Sub Total		90	4.4	10.0	0.0	8.3	8.3	0.0
Epworth	High	50	2.0	0.0	0.0	100.0	100.0	0.0
Sub Total		50	2.0	0.0	0.0	100.0	100.0	0.0
Mutare	Low	10	20.0	0.0	0.0	0.0	0.0	0.0
	Medium	10	33.3	33.3	33.3	0.0	33.3	0.0
	High	60	36.7	42.1	31.8	54.5	81.8	50.0
Sub Total		80	34.2	33.3	26.7	40.0	63.3	36.7
All Municipalities		**220**	**14.6**	**26.3**	**18.6**	**32.6**	**48.8**	**25.6**

Both households and councilors perceived the SW problem as very serious, with 82% of household respondents seeing it as posing a risk to their health, particularly in high density areas (See Table 14 and Figure 10) There was high concern for unmanaged waste leading to disease, mosquito breeding and cholera, both major public health problems in Zimbabwe. However, only 26% of household respondents indicated that they had received education on these health hazards by PHIs. It may be that the PHIs do not have the time to manage both inspection, regulatory and health promotion roles, calling for co-operation from civil society organizations and other health workers to ensure such promotion takes place.

Figure 10: Household reports on severity of SW problem

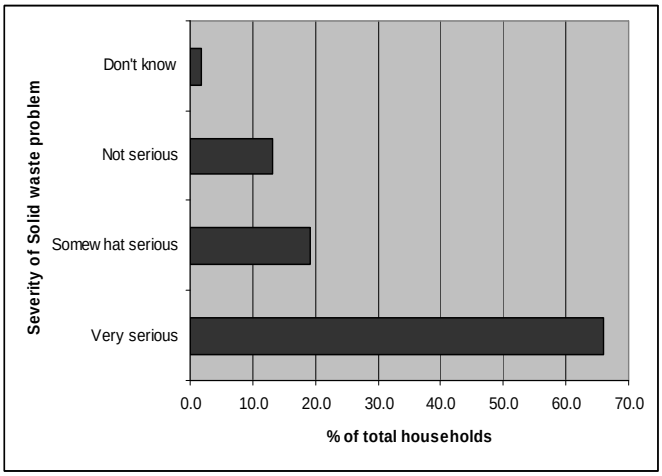


Table 14: Households perceptions on health risks of solid waste

Municipality	Density of Area	No	Share of households reporting perception to SW risks to health as				Share of households strongly agreeing that		
			Not concerned	some what concerned	concerned	very concerned	SW causes diseases	SW breeds and harbors mosqui-toes	SW spreads cholera
Chitungwiza	Medium	10	10.0	20.0	30.0	40.0	100.0	100.0	100.0
	High	80	2.5	2.5	8.8	86.3	87.3	87.3	87.5
Sub Total		90	3.3	4.4	11.1	81.1	88.8	88.8	88.9
Epworth	High	50	0.0	0.0	16.3	83.7	98.0	98.0	98.0
Sub Total		50	0.0	0.0	16.3	83.7	98.0	98.0	98.0
Mutare	Low	10	0.0	0.0	20.0	80.0	60.0	60.0	50.0
	Medium	10	0.0	0.0	30.0	70.0	80.0	90.0	90.0
	High	60	1.7	5.2	8.6	84.5	98.3	98.3	98.3
Sub Total		80	1.3	3.8	12.8	82.1	91.3	92.5	91.3
All Municipalities		**220**	**1.8**	**3.2**	**12.9**	**82.0**	**91.8**	**92.2**	**91.8**

Despite a high perception of the problem, the low level of current participation was further evidenced by a low reported level of **clean up campaigns,** particularly those organized and supported by the local authorities. Only 7.2 % of the households had heard of a local authority organized solid waste clean up campaign in the three months prior to the survey (See Table 15). On the other hand, two thirds of the councilors reported mobilising communities to clean up refuse in their areas, and a third of households (34%) reported community organized clean up campaigns having taken place in the past three months. Households thus appear to be participating more in community organized than in local authority organized campaigns, which is positive but may leave some shortfalls in protective measures or in areas where households are less organized, such as appears to be the case in medium density areas (as shown in Table 15), or less present, as in commercial areas.

Table 15: Households participation in clean up campaigns

Municipality	Density of Area	No	% reporting clean up campaigns	Level of community participation				
				very often	somewhat often	rarely	never	N/a
Chitungwiza	Medium	10	10.0	10.0	0.0	0.0	0.0	90.0
	High	80	25.0	12.5	8.8	1.3	2.5	75.0
Sub Total		90	23.3	12.2	7.8	1.1	2.2	76.7
Epworth	High	50	22.4	14.0	8.0	0.0	2.0	76.0
Sub Total		50	22.4	14.0	8.0	0.0	2.0	76.0
Mutare	Low	10	40.0	10.0	10.0	0.0	20.0	60.0
	Medium	10	0.0	0.0	0.0	0.0	0.0	100.0
	High	60	66.7	40.0	10.0	5.0	10.0	35.0
Sub Total		80	55.0	31.3	8.8	3.8	10.0	46.3
All Municipalities		220	34.7	19.5	8.2	1.8	5.0	65.5

Complaints handling: Whilst councilors and local authority EHTs said they had an easy to use mechanism of handling complains (Table 16), most households had limited knowledge of these procedures and only a few of those who knew the procedures had tried to complain (See Table 17). In Chitungwiza, the councilor had a realistic assessment of household knowledge, but underestimated the level of complaints. In Epworth and Mutare the councilors had a high estimate of knowledge and use of the complaints system than that from household reports. Household respondents cited various reasons for not complaining, including lack of knowledge of or confidence in the people responsible, and the disincentive of lack of follow up to complaints from the local authorities (See Box 2).

Table 16: Councilor reports on channels for handling complaints

Municipality	Local authority has complaints handling procedures that are			% of councilors reporting having proper complains handling procedures
	Clearly defined and easy to use	Known well by residents	Have been utilized in the past 6 months	
Chitungwiza	Somewhat defined	Somewhat well known	No	100.0
Epworth	Clearly defined	Well known	Yes	66.7
Mutare	Somewhat defined	Well known	Yes	100.0
Total				**92.3**

Table 17: Knowledge of complains handling procedures by households

Municipality	Density of Area	No	% of households that know where to channel complaints	Reported source of knowledge	% of households that have tried to complain
Chitungwiza	Medium	10	30.0		50.0
	High	80	39.7		45.6
Sub Total		90	38.6	Local Authority	46.1
Epworth	High	50	36.0	Councilor, Development Committee, Local Board	38.0
Sub Total		50	36.0		38.0
Mutare	Low	10	40.0		10.0
	Medium	10	20.0	Other residents, posters, school, municipal staff, residents representatives	20.0
	High	60	23.7		43.3
Sub Total		80	25.3		36.3
All Municipalities		**220**	**33.2**		**40.6**

Box 2: Household reasons for not complaining

Chitungwiza
The local authority does not pay adequate attention to issues raised
There is no hope of change
We fear victimization from local authority employees
We do not know the people responsible.
We have no time to complain

Epworth
We do not know who to approach at the local board,
The local board does not follow up on issues raised
The local board has poor communication with community
The local board is not concerned

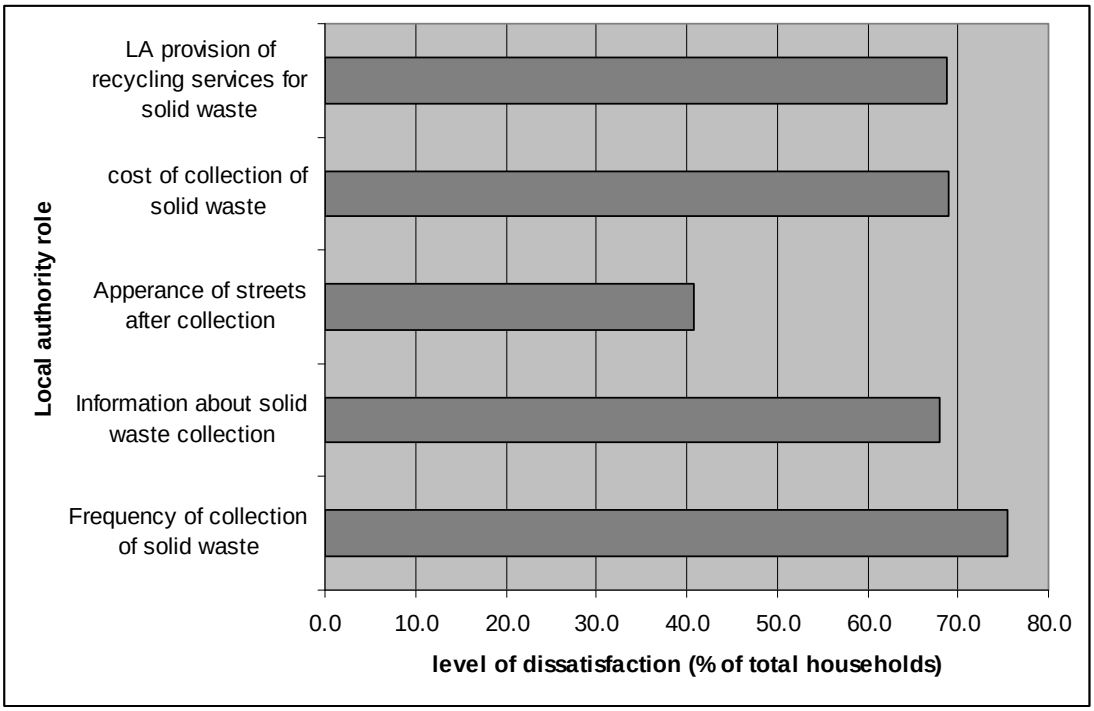
Mutare
The local authority does not take action.
We do not know the responsible person at Local authority
There is little solid waste in our area.
We are able to manage our own waste.

It would appear from the responses that there is room for improvement in the complaints mechanism to support the local authorities in dealing with problems like illegal dumping. From the evidence this may lie in

- Strengthening household knowledge on the complaints mechanisms
- Improving local authority feedback on complaints
- Strengthening the role of the councils in knowing and ensuring follow up to complaints.

There are thus relatively low levels of community interaction with the local authorities. While household respondents were satisfied with the appearance of the streets after waste collections, there were largely dissatisfied (>60% respondents) with frequency and cost of waste collection, provision of recycling services and of information on services (See Figure 11).

Figure 11: Household satisfaction with SWM services



The evidence suggests scope for improving communication and interaction between communities and local authorities on SWM, to support both household and community practices, and to enhance the reliability and responsiveness of local authority services. The councilors, environmental and public health personnel have a role to play in this, as do the organizations and associations within the community itself.

4.5 Water and Sanitation

Access to safe water and sanitation adds to SWM to support environmental health, and is thus a complementary social determinant of health. The Zimbabwe Demographic Health Survey (ZDHS 2005/2006) found in 2005 that 99.4% of urban households had access to a safe drinking water facility. This does not however indicate whether that facility actually produced water on a regular and consistent basis, and the interruptions in provision of safe water, and unavailability of treatment chemicals and power for distribution of water undermined effective access even though the infrastructure was present.

In this survey, 92.2% of households reported having access to a safe water source, lower than prior national averages due to the very low levels of access to safe water in households in Epworth, where a third of households reported using unprotected wells. (See Table 18). Half (50.3%) of households reported however that they had interruptions in supplies on the past week, on average of 8 days. More frequent (87%) and longer (9 day) breaks in supply were found in Chitungwiza, with medium density areas being the worst affected (See Table 19). When these breaks occurred, households reported fetching water from neighbors, using water stored in household containers and fetching water from unprotected wells. While the safety of the water in household containers or unprotected wells was not assessed, nor the distances traveled to fetch water, it is likely

that these situations would increase the risk of contamination and reduce the volumes of water used in domestic hygiene to potentially unsafe levels. Combined with poor SWM, this can further increase the risk of fly borne and other environmental diseases.

Table 18 Household sources of water for consumption

Municipality	Density of Area	No	piped water inside house	piped water inside yard	public tap	borehole	protected well	unprotected well	% with access to safe water
Chitungwiza	Medium	10	0.0	11.1	22.2	22.2	33.3	11.1	88.8
	High	80	43.0	25.3	1.3	8.9	20.3	0.0	98.8
Sub Total		90	38.6	23.9	3.4	10.2	21.6	1.1	97.7
Epworth	High	50	0.0	2.0	0.0	2.0	66.0	30.0	70.0
Sub Total		50	0.0	2.0	0.0	2.0	66.0	30.0	70.0
Mutare	Low	10	80.0	20.0	0.0	0.0	0.0	0.0	100.0
	Medium	10	90.0	10.0	0.0	0.0	0.0	0.0	100.0
	High	60	38.3	48.3	13.3	0.0	0.0	0.0	99.9
Sub Total		80	50.0	40.0	10.0	0.0	0.0	0.0	100.0
All Municipalities		**220**	**33.9**	**24.8**	**5.0**	**4.6**	**23.9**	**7.3**	**92.2**

Table 19: Household reports on reliability of water supplies

Municipality	Density of Area	No	households reporting having had breaks in water supply during the past week	
			% reporting breaks in supply	For (length in days)
Chitungwiza	Medium	10	100.0	19.1
	High	80	86.1	7.8
Sub Total		90	87.2	8.9
Epworth	High	50	-	na
Sub Total		50	-	na
Mutare	Low	10	40.0	2.0
	Medium	10	10.0	2.4
	High	60	18.3	2.3
Sub Total		80	20.0	2.0
All Municipalities*		**220**	**50.3**	**7.8**

* Excluding Epworth which relies on wells

The ZDHS found in 2005/6 that 58.5% of the urban households had access to safe sanitation. In this survey, 87% of the households had access to safe sanitation, lowest in Epworth, where access to safe sanitation was at 54% of respondents. Our survey covered mainly larger urban areas, where sanitation provision is likely to be greater, but we also did not distinguish between shared and unshared facilities, so that some households may have access through sanitation in another stand. This would discourage use.

Bursts of piped sewers were reported by 35% of households, particularly in Chitungwiza and Mutare high density areas (Table 20). When blockages or bursts occur, most households (60%) reported using nearby public toilets. However 40% bury or dispose of faecal waste in or outside the yard, and this may lead to fly borne disease (Figure 12). Households in some of the most affected areas reported that they have been pooling

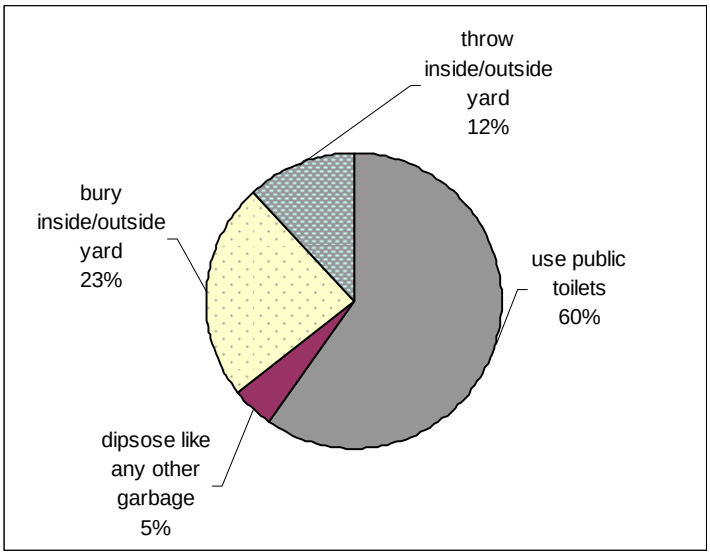
resources and hiring private plumbers to fix the bursts. While these out of pocket expenditures by households are helping to manage the local infrastructure, the fact that the problems are higher in the highest density areas where incomes are lower is an inequitable further cost burden on the poorest households, and thus not in line with national policies of equity in health (or financial protection and contribution to health according to income).

Table 20 Household reports on frequency of bursts/leakages of piped sewer

Municipality	Density of Area	No	% of households reporting leakages/bursts of piped sewer occur					
			Always	Occa-sionally	Sometimes	Rarely	Very rarely	Never
Chitungwiza	Medium	8	0.0	0.0	50.0	25.0	12.5	12.5
	High	78	34.6	11.5	14.1	9.0	12.8	17.9
Sub Total		86	31.4	10.5	17.4	10.5	12.8	17.4
Mutare	Low	10	10.0	0.0	0.0	0.0	40.0	50.0
	Medium	10	10.0	0.0	0.0	0.0	0.0	90.0
	High	60	16.7	13.3	13.3	20.0	11.7	25.0
Sub Total		80	15.0	10.0	10.0	15.0	13.8	36.3
Total *		**166**	**15.0**	**10.0**	**10.0**	**15.0**	**13.8**	**36.3**

* Excluding Epworth which does not have piped sewers

Figure 12: Household reports on alternative sanitary facilities in the event of blockages



4.6 Perceived priorities

Household respondents, councilors and local authority EHTs were asked about their perceived priorities for improving solid waste management and the communication between residents and local authorities in their areas. The feedback from the three groups is shown in Tables 21 and 22.

Table 21: Perceptions on priority areas to improve solid waste management

Municipality	Household Report	Councilor Report	EHT Report
Chitungwiza	Provide bins to households Regular and timely collection of bins from households Provide street, public bins Earmark areas as legal dumping sites Clear illegal dump sites Provide refuse trucks, fuel for collection of waste. Maintain roads Allocate resources for refuse collection Engage private sector to recycle waste. Educate communities on SWM and recycling Form committees to monitor waste disposal and dumping	Educate community on waste segregation and recycling Regular collection of refuse by local authority Recapitalize local authority to purchase equipment Establish water treatment centre Maintain roads and refuse trucks Provide bins	Provide bins Increase frequency of refuse collection. Educate community on SWM Local authority should have a bill of clean environment
Epworth	Provide bins Collect refuse, Repair roads, provide transport to collect refuse Provide recycling services Provide legal sites for waste disposal Fine illegal dumpers A pit in the yard of every household Demarcate stands for people to be responsible for their areas. Increase health inspector visits and roles in engaging people Educate communities on SWM Community clean up campaigns	Community participation in SWM Establish central waste collection points PHI to be visible and work with residents	Collect refuse regularly Provide refuse bins Educate the community on how to manage waste
Mutare	Provide bins Regular schedule for refuse collection Service roads for refuse collection access Provide central refuse deposits for ease of collection by local authority Punish illegal dumping Community clean up campaigns Educate communities on hazards of waste, recycling Community based monitoring of waste dumping through watch teams	Educate communities on SWM Provide resources-bins, refuse trucks Establish a central refuse collection site, monitor and control it	Increase refuse trucks and employees Provide bins to residents Educate the community on SWM Local authority needs an operational plan

The priority areas for improving SWM for households relate to improving equipment and resources for households (bins, stand demarcation, pits in yards) communities (roads, community bins, central waste collection sites, recycling services) and local authorities (refuse trucks, fuel, water treatment supplies). In addition, the households interviewed proposed that households and communities should receive information and education and be involved in clean up campaigns, that communities form teams or committees to monitor SWM, and that local authorities fine illegal dumping and increase PHI interaction with communities. There was consistency across households, councilors and EHTs on education of residents on SWM, promotion of central waste collection points and

recycling, increasing PHI visits and improving local authority resources (staff, trucks and roads).

Table 22: Perceived priorities to improve communication.

Municipality	Household reports	EHT Reports	Councilor Reports
Chitungwiza	Provide suggestion boxes and follow up on issues raised by residents Elect local area residents representatives. Engage a Public Relations Officer in the local authority. Councilors to have offices and monthly meetings in the ward Conduct SWM workshops Print information on water billing. Increase frequency of PHI visits to wards Extend PHI roles to engaging community Educate community through flyers. Use press, website, radio and television to communicate information on SWM..	Engage in monthly meetings with residents Engage a public relations officer at the local authority, Increase motivation of council employees	Council to communicate its roles to residents Monthly meetings with residents Disseminate publications, flyers, radio, television and suggestion boxes Regular report backs from councilors Non politicization of issues Councilors to have offices in wards Local authority to have a public relations officer
Mutare	Use suggestion boxes to gather residents views on SWM Regular meetings with local authority and councilors Establish ward level committees to communicate with local authority on SWM Increased visibility of PHI Establish a Public Relations office in the Local Authority Educate resident on complaints handling procedures. Hold information and feedback workshops with local authority and councilors Use media (radio, television, cellphones) to communicate on SWM	Disseminate information through ward councilor Improve transparency within the local authority	Regularly meet with residents and local authority Use of IEC materials Councilor to have office in ward Local authority to have a public relations officer Establish residents development committees in all wards Residents to have regular feedback meetings with councilors
Epworth	Engage local authority thorough the Development Committees regularly Monthly feedback meetings with development committees and councilor at ward level Form/activate residents associations in all areas. Use suggestion boxes Local authority to carry out regular awareness campaigns PHI visits to increase and to engage the community and the development committees Use IEC materials to disseminate information on SWM	Regular meetings with development committee members Regular feedback meetings with the councilor as the mediator to local authority	Regular meetings with development committees Educate people on complaints channels Use suggestion boxes Form residents committees in wards.

To enhance communication communities, councilors and local authorities identified the need to form mechanisms (community committees, development committees, local authority public relations offices and councilor offices); to hold regular meetings with councilors, local authority representatives and residents; to open communication channels through suggestion boxes, meetings, flyers, workshops and to use media (radio, television, and newspapers), Some households suggested use of existing resources, for instance water bills, to disseminate information on solid waste management.

While there are some consistencies across households, certain areas appear to be having specific needs. For instance, improving the transport and road network and demarcating stands was raised more often in Epworth. It was also noted in this area that private companies from Msasa industrial area illegally dumping waste in Epworth need to be monitored and the practice stopped. In Chitungwiza it was noted that issues of SWM need to be separated from politics and solved across the community as a whole.

5. Discussion and recommendations

This survey found a number of environmental hazards with health and social risks: interruptions in water supplies on the past week, water being used from unprotected wells, bursts of piped sewers; disposal of faecal waste in or outside yards, and emptying household waste in open spaces, roadsides and valley/streams. .

Households were found to produce high levels of food, yard, plastic and paper waste and lower volumes of glass bottles, ceramics and metal tins, more in high than low density areas. Low levels of waste segregation were reported, mainly due to the inconvenience of doing this. Only one in five households had any form of support for accessing bins,. with none supplied bins in Epworth. Half of the households reported no waste collection during the three months prior to the survey, and rated poorly the reliability of municipal collection services.

Households reported pooling resources to hire private plumbers to fix the bursts, or hiring private waste collectors. With the problems higher in the highest density areas where incomes are lower, this is an inequitable cost burden on the poorest households. Some resort to dumping, and uncollected solid waste was accumulating in roadsides, open spaces and disposed of in illegal dump sites on roadsides, open spaces, rivers and bridges.. These dump sites are a health hazard for adjacent households and to those who recover waste from them.

Both councilors and household respondents perceived the SW problem as very serious. However, households and councilors reported high levels of willingness to participate in future solid waste management initiatives, including in solid waste segregation and recycling, particularly in high density areas, particularly if supported by local authorities.

Respondents suggested that local authorities earmark certain areas within wards as legal sites for solid waste collection for waste to be picked up by local authorities. These could be properly managed by providing for waste separation, fencing the area, and regularly disinfecting waste to reduce disease. This could reduce the costs of door to door collection of refuse and organize waste recovery and recycling in a safer manner.

The distribution of waste signals opportunities for waste recovery and recycling at household level, including composting of yard and food waste and recycling plastic and paper. However, only half of the households were actually recycling waste in their homes, moreso in medium density areas. Waste segregation practices would also need support, to create awareness of the benefits of waste segregation, and to facilitate the practice with receptacles and collection, and support its implementation through promotion by public health inspectors.

Households respondents felt they could improve SWM by improving equipment and resources for households (bins, stand demarcation in Epworth, pits in yards) communities (roads – especially in Epworth-, community bins, central waste collection sites, recycling services) and local authorities (refuse trucks, fuel, water treatment supplies). They also propose that households and communities receive information and education and are involved in clean up campaigns, that communities form teams form committees to monitor SWM, and that local authorities fine illegal dumping and increase PHI interaction with communities. It was also noted in this area that private companies from Msasa industrial area illegally dumping waste in Epworth need to be monitored and the practice stopped. There was consistency of view across households, councilors and EHTs on priorities for action in education of residents on SWM, promotion of central waste collection points and recycling, increasing PHI visits and improving local authority resources (staff, trucks and roads).

There appear to be opportunities for **Community-Based Management of Solid Waste (CBM**) in these pilot municipal areas. The United Nations Environment Programme notes that any solid waste management approach should ensure that the programme is appropriately tailored to local conditions, and that practical environmental, social, economic and political needs and realities are balanced. It proposes a waste management hierarchy (Box 3) which includes environmentally sound practices. The hierarchy is a useful policy tool for conserving resources, for minimizing air and water pollution, and for protecting public health and safety.

Box 3: Waste management hierarchy

1. Prevent the production of waste, or reduce the amount generated, reduce toxicity or negative impacts of waste generated.
2. Reuse in their current forms the materials recovered from the waste stream.. Recycle, compost, or recover materials for use as direct or indirect inputs to new products.
3. Recover energy by incineration, anaerobic digestion, or similar processes.
4. Reduce the volume of waste prior to disposal
5. Dispose of residual solid waste in an environmentally sound manner, generally in landfills

Source: Adapted from the United Nations Environment Programme (UNEP); 2005.

In this survey we have found need and opportunity for a range of actions to support this hierarchy. We suggest the following measures, drawing on the proposals from the people interviewed in the three areas, and based on the evidence of attitudes and practices and the waste produced as found in this survey in the three pilot sites:

4. **to reduce waste production, segregate waste and reduce toxicity or negative impacts of waste generated**

   - The level of plastic waste, and the lower level of metal waste suggests that there is scope for waste reduction through the design, manufacture, purchase or use of materials eg by using products and packaging that have lower quantity (and toxicity). For example, companies could be encouraged to package products in more bio-degradeable packaging, supermarkets to encourage and sell cheaply reusable "bag for life" packaging for people to use in shopping and levy charges on plastic bags to reduce use of plastic bags.
   - There is scope for better waste segregation at household and community level to reduce waste to landfills and encourage recycling. This could be encouraged through production of appropriate bins for separate waste, segregated waste collection at communal points, involvement of community groups and small enterprises equipped with appropriate technologies (eg push carts) to support segregated waste collection and use, and incentives for segregating waste through information on recycling, health promotion, and organized collection.
   - Local authorities and community organizations can promote behavioral change and tax and price incentives can be used to encourage companies and communities to reduce production and use of cans, and to promote use and return of reusable and returnable containers.
   - Development committees and residents associations need to be formed or strengthened to enhance organization and participation of communities on SWM, to engage manufacturers of products that generate the waste, the local authorities on services and the communities on environmental practices.

5. **to reuse, recycle, compost, or recover materials for use as direct or indirect inputs to new products.**

   - Local authorities and residents could work together in establishing central locations for solid waste collection within wards, segregating solid waste for recycling and safe disposal in local authority landfills
   - It would by timely for intense promotion of household recycling in backyard composting of organic manure for urban agriculture and local manufacture using paper or plastic waste. Local authorities and councilors could promote and support recycling and community groups be involved in promoting and supporting waste recycling.
   - Community recycling can be implemented through community composting sites close to central refuse collection sites for those households that don't use organic waste.
   - Partnerships can be set up between large and small scale private companies that recycle waste (plastic, paper, metal) and communities, with the latter segregating and depositing waste at central sites based on company and local authority guidelines and private companies providing bins and collection support for waste to be recycled.

6. **To dispose of residual solid waste in an environmentally sound manner, generally in landfills**

   - The local authorities should communicate and keep to their collection schedules and use communication and good practice to re-establish trust in consistent waste collection, so that communities do not resent making payments and also stop dumping waste illegally. This also calls for consistent, timely and regular messages to communities by public health inspectors, councilors and leaders of community based organizations
   - Existing dumpsites and waste need to be dealt with, both by local authorities and through community clean up campaigns, supported by local authority provision of tools (gloves, wheelbarrows, masks, t-shirts). Local authorities should prioritise the collection of waste from illegal sites in high and medium density areas to avoid unfairly burdening lowest income households with the costs of doing this.
   - Communities need to monitor and prevent waste dumping by communities small enterprises and companies and ensure local authority collections through residents associations and community development committees working with local authority public health inspectors, and supported by communication tools (cellphones) and protective clothing. This also calls for training of community leaders and community level members of civil society in public health to better understand and control the public health hazards of poor SWM and to know and support enforcement of the laws.
   - Local authorities should ensure that there are adequate equipped and resourced EHTs and PHIs in their districts and that they build partnerships with community leaders and organizations to complement their regulatory work with promotion of enforcement and of environmental health.
   - Government should ensure in its capital investment plans that all local authority areas have good road transport access to community SW collection points, and adequate trucks and fuel to facilitate collection. With current constraints we propose that the designation and set up of formal protected structures for collective waste management be prioritized and that once established heavy penalties be imposed for illegal waste dumping.

Improving household solid waste management in local authorities using a community based integrated approach calls for greater participation of and communication with communities, and institutional support to give communities ownership of the system. .

To do this the survey evidence suggests that the level of communication between communities, local civil society organizations, councilors and technical personnel in local authorities needs to be improved. Most households were dissatisfied with the communication between households and authorities, including on health promotion, clean up campaigns and in management of complaints. The low reported level of clean up campaigns was found to be due in part to this gap in communication and due to weak organized support supported by the local authorities. Equally household were discouraged from raising complaints due both to lack of knowledge of and confidence in the local authority personnel responsible, and the lack of follow up to complaints from the local authorities. Households reported very limited interaction with public health inspectors with PHIs mainly involved in inspecting conditions or prosecuting offenders.

Few household respondents indicated that they had received education on the health hazards of SWM by PHIs. While we did not assess this, it may be that the local authorities and PHIs are overstretched and do not have the time or resources to manage their inspection, regulatory, implementation and health promotion roles. This calls even more so for co-operation with civil society organizations, community leaders, other health workers, companies and media to ensure such promotion takes place.

A number of proposals were made in the interviews to enhance communication by communities, councilors and local authorities. These included forming mechanisms (community committees, development committees, local authority public relations offices and councilor offices); to hold regular meetings with councilors, local authority representatives and residents; opening communication channels through suggestion boxes, meetings, flyers, workshops and to use media (radio, television, and newspapers); and using existing resources, for instance water bills, to disseminate information on solid waste management. It would also be timely to integrate updated information and education on SWM into a range of other education activities, including in schools, in professional and community extension worker training programmes, in health literacy training for communities, in information to companies through employer organizations and trade unions, and in induction training for community leaders, parliamentarians and other social leaders.

The severe cholera epidemic in Zimbabwe in 2008/9 was a wake up call to organize and respond to a mounting hazard to public health and a lost opportunity for reducing costs and increasing economic opportunities in better management of solid waste. The survey indicates the perceived need, willingness and potential social and institutional resources to respond to this wake up call, and to turn a problem and challenge into an opportunity to build a more sustainable and cost effective system for SWM.

References

1. CSO and Marco International Inc. (2007). *Zimbabwe Demographic and Health Survey 2005-6*. CSO and Marco International Inc: Calverton, MD.
2. DEWA/UNEP (2006) *Africa Environment Outlook 2* .Division of Early Warning and Assessment (DEWA)/ United Nations Environment Programme.
3. IET/UNEP (1996). *International Source Book on Environmentally Sound Technologies for Municipal Solid Waste Management*. International Environment Technology Centre/ United Nations Environment Programme.
4. Iyer, Anjana (2001). *Community Participation in Solid Waste Management: Eperiences of a Pilot Project in Bangalore, India.* Urban Waste Expertise Program, the Netherlands. September. http://www.waste.nl/page/333
5. Johnson H, Wilson G (2000) *Institutional sustainability: 'community' and waste management in Zimbabwe* Development Policy and Practice Discipline, Centre for Complexity and Change, Open University, Milton Keynes MK7 6AA, UK
6. Practical Action (2007). *Community Based Waste Management in Urban Areas*. Practical Action Publications.
7. Practical Action (2007) Community based solid waste management in urban areas, Paper prepared for the second International conference on Appropriate Technology, Harare July 2007.
8. Tevera-Mubvani and Associates (1995). Zimbabwe urban solid waste management study. Report prepared for the Ministry of Local Government, Rural and Urban Development, Harare April, 1995
9. Training and Research Support Centre (TARSC), Community Working Group on Health (CWGH) (2009) Health where it matters most: An assessment of Primary Health Care in Zimbabwe March 2009 Report of a community based assessment, at www.tarsc.org
10. Training and Research Support Centre (TARSC) Civic Forum on Housing (CFH) (2010) Community Based Research on Solid Waste management Stage 1 Training workshop report: Research methods and data collection December 2009: TARSC CBRT Harare
11. UNEP (2006). *Integrated Waste Management Scoreboard: A tool to measure performance in Municipal solid waste management*: United Nations Environment Programme
12. UNEP (2006b). Solid Waste Management volume 1. United Nations Environment Programme.
13. UNEP (2009). *Solid Waste: Generation, handling, treatment and disposal*. Environmental Guidelines for Small Scale Activities in Africa, Chapter 15 United Nations Environment Programme.
14. UNEP-GEO- Team (1999). *Global Environmental Outlook- 2000*. United Nations Environment Programme. http://www.unep.org/geo/geo2000