

**PROMOTING EFFECTIVE SOLID WASTE MANAGEMENT
THROUGH COMMUNITY ENGAGEMENT STRATEGIES:
THE CASE OF CHINHOYI URBAN, ZIMBABWE**

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Abstract

Domestic solid waste management is one of the major challenges facing metropolitan areas of developing countries. Several studies have been conducted on domestic solid waste practices revealing such issues as lack of awareness, inappropriate and often hazardous methods of disposing waste. This paper was a result of a realization that there was a dearth of literature in Zimbabwe on development of cost effective solid waste disposal models and their evaluations. This paper focuses on the development of a social model for adult conduct and solid waste practice since solid waste is a major cause of infectious diseases. This project was carried out with a random sample of 120 residents from Chinhoyi's high density suburbs. Data were collected using participatory, focus group discussions and clean ups review meetings. The community developed a prototype that made community members drop their waste in centralised bins. Municipality then collected waste from these bins. That model helped communities to

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remove dump sites which were converted into gardens. Monitoring exercises showed that community members who were not involved still held negative attitude, continued to shift blame to the municipality and failed to respect the new model. The project recommended that more awareness campaigns be held to improve on the waste management in the suburbs.

Key words: Solid waste, management, urban, community engagement.

Introduction

Solid waste management has become an issue not only in Zimbabwe but also in other countries like India (Desai and Kulkarni, 2012) and in most developing countries (World Bank, 2010). Most developing countries are grappling with the high increase in urban populations leading to high levels of solid waste generation. The increase in solid waste is worsened by changes in lifestyles, eating habits and standards of living. Disposal of packages for fast foods, snacks and other eats, that have become very popular among the youths, has not helped the situation. A survey carried out in the Chinhoyi municipal area, (Mutungwe, Tsvere, Munikwa and Dondo, 2011; Mutungwe, Tsvere, Munikwa, Dondo and Pedzisai, 2014; Musademba, Musiyandaka, Muzinda, Nhemachena and Jambwa, 2012) revealed a high degree of poor solid waste management and the inadequacy of essential facilities for disposal of the waste. Their surveys showed that there was rampant illegal dumping of solid waste resulting in an environment that was a sorry sight.

According to the World Bank, (2011) the overall goal of urban solid waste management is to collect, treat and dispose of solid wastes generated by urban population groups in a manner that is economically, environmentally and socially satisfactory. Local governments are usually authorized to provide solid waste management services, and most local government laws give them exclusive ownership over waste once it has been placed outside a home or establishment for collection. Chinhoyi City Council bye laws give the city responsibility over solid waste management. However the city council's poor revenue base has made it impossible for it to collect refuse from the residential areas. The city's population growth, business activity and consumption patterns drive up solid waste quantities. At the same time, the poor economic growth and poor revenue collection adversely affect the productivity and availability of the solid

waste fleet. Presently, council has only one or two tractors for refuse collection to cater for more than ten residential areas, the city centre and industry. The challenge is to rationalize worker and vehicle performance while expanding services to a growing urban population (Lawuo, Malugu and Mnyawi, 2014). Lawuo, et al. (2014) also notes that in developing countries it is common for municipalities to spend 20-50 percent of their available recurrent budget on solid waste management. Yet, it is also common that 30-60 percent of all the urban solid waste in developing countries is uncollected and less than 50 percent of the population is served. In some cases, as much as 80 percent of the collection and transport equipment is out of service, in need of repair or maintenance. In most developing countries, open dumping with open burning is the norm. It is a sorry sight in high density areas throughout the year to see smoke everywhere resulting in air pollution as well as ecological imbalances wherein different insects and animals are destroyed in the fires.

The insanitary methods used in disposing solid waste are a serious health concern as the illegal dump sites encourage the breeding of disease vectors such as flies, mosquitoes, cockroaches and other pests. In Chinhoyi, the poorly maintained landfill site is prone to ground water contamination because of leachate production. The municipality therefore faces the challenge of reinforcing their available infrastructure to meet the demand for effective solid waste management. The Herald, Thursday 06 December 2012 in an article entitled, 'Diarrhoea Kills 265 people' noted that out of 428 000 cases of common diarrhoea reported during the year were mostly children. The Minister of Health and Child Welfare in Zimbabwe attributed the outbreaks to poor sewerage and solid waste processing and management in all major urban areas. The Minister further said that it would be difficult for Zimbabwe to reduce the diarrhoea and typhoid cases because the causes remained unaddressed. In the Sunday Mail of 06 January 2013, Sharon Kavhu reported that in December 2012 among the 9 000 diarrhoeal cases reported in Zimbabwe, Mashonaland West, in which this study was carried out, recorded the second highest number of diarrhoea cases (1293) after Harare with (1373). The Director of Epidemiology Control in the Ministry of Health and Child Welfare also attributed the high incidence of diarrhoea to deplorable sanitary conditions. Chinhoyi is said to be having problems disposing garbage leading to the city recording the second highest number of diarrhoea cases nationally. These solid waste management problems motivated this research in an effort to engage the community in solid waste management. Currently Chinhoyi Municipality uses the door to door system of waste

collection, where each household bin is collected at the door. Given the weak resource base for the municipality and a depleted fleet of refuse collection vehicles there is need to propose a more efficient and effective method of refuse collection that takes cognisance of the crippling constraints.

Problem statement

Regardless of several attempts to educate the community members on proper solid waste disposal, very little, if any, change has been observed in solid waste management in the urban areas. Municipalities are facing challenges in curbing the formation and use of illegal dumping sites (Mutungwe et al. 2011; Mutungwe et al, 2014; Musadamba et al., 2011; Living Earth 2010; Saungweme, 2012; Desai and Kulkarni, 2012). Research has shown that the majority of community members are aware of proper solid waste management and the consequences of poor solid waste management practices (Mutungwe et al. 2011; Mutungwe et al, 2014). The need to engage the community to promote effective solid waste management in Chinhoyi therefore motivated this action research.

Research objectives:

This study sought to:

- Design a techno-social model for solid waste management
- Implement the community based techno-social model of solid waste management.
- Raise awareness on waste management using the techno-social model among community members.

Literature Review

According to Chriszurburg (2003:213) “management of waste is a basic requirement of ecologically sustainable development”. In Zimbabwe, efforts have been put in place to manage waste. For instance, the Zimbabwe government set up the Environmental Management Agency (EMA) to monitor enforcement of laws towards waste disposal and monitoring performance of municipal councils in environmental issues. EMA was tasked with taking the lead to reorient people on proper waste disposal so that litter is not thrown all over, bins are properly emptied,

industrial waste and raw sewer is properly disposed of so as to reduce environmental pollution and hygienic problems.

In most cities and towns all over the world municipal councils have faced difficulties in dealing with the disposal of solid waste. The Newfoundland and Labrador Waste Management Strategy of April 2002 acknowledged that both government and citizenry should take responsibility of tackling the problem of waste disposal and move away from current practices of burning waste or dumping it into landfills.

In an effort to minimize environmental degradation, Zimbabwe has put in place a Science and Technology Policy (2002) acknowledging that pollution of the country's environment is increasing and requires urgent attention. There is also the Draft Waste Management Strategy (2006) which aims to improve the standards of cleanliness and restore the glamour of Zimbabwe by promoting sustainable waste management practices in all areas in the country. The strategy identifies all problem areas that make the environment dirty and unsightly, which includes littering, illegal dumping, and improper dumping or disposal of waste, vending, and sewage disposal. The strategy proposes an action plan involving all stakeholders for solving these problems. This research aims to contribute towards the above mentioned national efforts by designing and implementing a Techno-social model of waste collection in the Zimbabwean towns.

The research sought to engage the urban communities in the development of an integrated waste management strategy to address the growing problem of waste. Chinhoyi urban is failing to manage waste resulting in piles of waste dumped along roads, on street corners and school boundaries and raw sewage flows into streams. Poor location of dump sites as evidenced by an old dump site which was unearthed after a clean water pipe burst recently in Chikonohono, revealing piles of plastic papers. The council the locals and everyone else did nothing about this site until this team of researchers led a group of volunteers to clear the dump site. Mutungwe, Tsvere, Dondo and Munikwa (2010), in a research carried out on the role of schools in waste management, found out that little was being done to ensure proper waste management for instance minimising dumping of waste on undesignated areas and releasing raw sewage in streams and rivers. Students revealed that what they were being taught was at par with what people (teachers, parents and themselves) practised in reality.

Davidson (2011) noted that waste management practices differ for developed and developing countries, for urban and rural areas and for residential and industrial producers. Most urban centres in Zimbabwe are conspicuous by their piles of garbage by the road sides, strewn litter and overflowing bins as well as urban rivers and streams that exude foul smell due to industrial waste and raw sewer that is disposed into them.

Tucker and Douglas (2007) note that knowing or seeing that others are taking action can create a sense that in people individual contributions are worth the effort. It is with this observation that we set groups that worked together in cleaning their environments with some joining voluntarily later. A national survey in the UK indicated that 5-10% of home composters started due to encouragement from friends (Gray & Toleman 2006). Furthermore, habits were seen to block the take up of new behaviours where routines are so established that consumers never think of questioning them, (Tucker et al 2007). Apathy or a general lack of interest in the idea of prevention has been identified as a general barrier, (Tonglet et al.2004). The feeling that it is someone else's responsibility is another barrier to proper waste disposal. People always believe that it is the municipality's responsibility, to manage waste disposal. This lack of interest is often compounded by a feeling that businesses and industrialists are more responsible for the waste problem than consumers (Obara 2005, Tucker and Douglas 2007, WR0112). While success factors to solid waste management include funding and business development support (Defra 2008), coordination with local authority activities is critical (Curran and Williams 2007).

In a report by the Department of Environment (2002), the Government of Newfoundland and Labrador recognized that it was time to provide a new framework through the development of a provincial waste management strategy. In April 1999 and October 2000, this same government presented a proposal to a Trust for a variety of waste management initiatives which resulted in funding for education and information on projects, clean ups, school recycling programmes, pilot projects on waste diversion and for municipalities to investigate the practicality of regional waste management systems. The report also alluded to the fact that while waste cannot, in practical terms, be completely eliminated; the amount of waste going for disposal can and must be reduced. Similarly in Zimbabwe, there is lots of waste being disposed, some of which could be reduced, reused or recycled, thus reducing the amounts to be collected by city councils.

Methods of data collection

This study took the action research case study format wherein action was undertaken to address the problem of poor solid waste management in the identified environment; Chinhoyi urban. This case study addressed the issue of illegal dumping of waste in Chinhoyi urban residential areas. This was going to be done through the design and implementation of a socio-technical model of solid waste management. The population of the study included all residents of Chinhoyi high density suburbs. Purposive sampling of the residential areas was done selecting those that had high concentration of illegal dumps. Six areas were selected from Chinhoyi urban residential areas with a population of 77929. The sample was randomly selected from six high density suburbs and put into working groups which were labeled A to F. Selection of participants in the project was according to willingness to participate in the project. A total group size of 120 residents was used for the project.

Participants held group discussions in their respective groups. An interview guide was used to direct focus group discussions regarding the development of a techno-social model and how it could be implemented. Consultative meetings were held with church leaders as well as Chinhoyi Municipality management to get their input on the model. A desk study was carried out to design the model incorporating ideas from the community. A prototype was constructed and pilot tested at one centre in the community. Suggestions from the users were then used to improve the final model. The Municipality Health Department and Environmental Management Agency (EMA) helped to distribute a total of 14 models among the seven identified points.

Implementation

Three awareness workshops were held to orient participants on the use of the techno-social model. Installation of the model was punctuated by clean ups of surrounding areas and removal of illegal dumpsites. Public pronouncements promoting the use of the techno-social model were done by the researchers with assistance from council officials in the health department. Researchers monitored the use of the model for four consecutive weeks making follow ups on the council Engineering Department when refuse collection schedule was not adhered to at each of the fourteen collection points. Each participating household was given a 50 litter black plastic bin with lid and a bin liner. These items were distributed for two reasons. Firstly so that

members sort the waste into categories of reusable, recyclable or disposable. The bins were thus to be used to collect disposable solid waste. The second reason was that the bins were used as a form of motivation for members to manage solid waste.

Findings

Designing the techno-social model

Workshops and focus group discussions acknowledged lack of transport on the part of council which resulted in refuse going for three weeks without collection. Service delivery was marked by lack of adequate refuse collection trucks leading to erratic waste collection. Participants alluded to poor communication on the part of council to inform residents on problems or challenges related to refuse collection faced by council. Participants brought out the ideas of central collection points to help council minimize door-to-door refuse collection since there was only one refuse truck/tractor. Centralised collection points were accepted as an effective strategy.

The desk top study came up with various alternatives such as skip bins, rubbish pits, changing illegal dump sites to further away from houses, maintaining current practices of dumping waste anywhere in the environment and putting holes on distributed plastic bins so that they are not used as water containers. All these were then considered to come up with the used model prototype (Figure 1).



Figure 1: Waste management prototype

The model was installed in the presence of community members and community leaders after a clean-up of the surrounding areas. This was then tried and tested by the community with researchers going back to the community to get comments on the usability and functionality of the prototype. It was noted that the idea was good. However, the positioning of the support nuts was too high for easy emptying into tractor by garbage collectors. Modifications were done to hold the model at centre for easy emptying. The bin is itself held at the top rim by bolts and left to swing for emptying into refuse truck.

Implementation

The second model had bolts at the centre to balance the weight of the bin especially when full and for easy tilting to empty the bin. This model proved to be easy to use for both residents when emptying their household bins into this central collection bin and for the refuse collectors when emptying the central collection bin into refuse trucks. The mesh enabled liquid to drain thereby reducing production of odours from organic matter due to decomposition as well as breeding of mosquitoes and flies. Four trees were planted at each central collection point to beautify the place as a way of reducing dumping around the place. Group members were given the task to water the trees and monitor the area to ensure they sites were kept clean. Most people became aware of proper solid waste disposal but do not put this into practice because

- Stigmatization-idea of reuse, recycling and turning waste to wealth is stigmatized; therefore people do not put these into practice.
- Blame shifting-residents blame council for the current state of affairs and council blames residents for creating illegal dumps.
- Negative attitude- efforts to involve some communities were met with resistance, with some asking, ' what's in it for us?' They wanted some form of rewards which we don't have. Some wanted basic needs such as provision of water to their places of residents before they could work to improve solid waste disposal. However, proper solid waste disposal practices are put into practice.

References

Ajol online-Futy Journal of Environment Vol 6, No 2 2011. Slum characteristics of a deplorable Residential District of Akure, Nigeria by FK Omole and JO Owoey)

Curran, A. & Williams, I.D. (2007) Minimising the recovery of household bulky waste in England, In Proceedings of Sardinia 2007, Eleventh International Waste Management and Landfill Symposium, Margherita di Pula, Cagliari, Italy. 1-5 October 2007, USA Environmental Salutory Engineering Centre, Italy

Davidson, G. (2011). Waste management practices, <http://www.al.ca/content/dam/dalhouse/pdf/sustainability/Waste%Management%20literature%20Review%20Final%20June%211%20>

Department of Environment (2002). *The Newfoundland and Labrador Waste Management Strategy of April 2002* retrieved from Government of Newfoundland and Labrador http://www.miga.gov.nl/publications....wastemanagementstrategy_spr2002

Desai and Kulkarni, 2012. Management and monitoring of domestic solid waste material, *Lokavishkar International E-Journal*, I (IV) Oct-Dec, 2012, 111-115.

Draft Waste Management Strategy (2006), Harare, Zimbabwe

Gray, S. and Toleman, I. (2006) National home composting survey results 1997-2005. Sustainable Waste Resource Management Conference Proceedings, 19-21 September, Warwick University, UK.PP775-756

Lawuo, A.Z., Malugu, P., and Mnyawi, S. P. (2014). Perseverance of Poor solid waste management system in urban areas: A Case of Dodoma Municipality, Tanzania, *International Journal of Innovation and Scientific Research*, 8(2) September 2014, 112-117.

Living Earth ideas into Action (2010). Baseline survey of “Urban Waste to Wealth” project. Retrieved from <http://www.livingearth.org.uk> on 12/02/2012

Ministry of Science and Technology (MST)(2002). *The Science and Technology Policy*. Harare, MST.

Musadamba, D., Musiyandaka, S., Muzinda, A., Nhemachena, B., and Jambwa, D. (2011) Municipality solid waste management challenges of Chinhoyi Town in Zimbabwe: Opportunities of waste reduction and recycling, *Journal of Sustainable Development in Africa*, 13(2), 168-180.

Mutungwe, E., Tsvere, M., Munikwa, S., and Dondo, B. (2011). The role of urban primary and secondary schools in minimizing disease outbreak caused by environmental contamination. A case of Chinhoyi, Zimbabwe, *US-China Education Review*, 9B, (4), 258-267.

Mutungwe, E., Tsvere, M., Munikwa, S., Dondo, B. and Pedzisai, C. (2014). A Study of the Level of Awareness and Practices of Solid Waste Management in Chinhoyi Urban, Zimbabwe. *International Journal of Advanced Research in Management and Social Sciences*, Vol. 3 | No. 9 | September 2014, 71-79,

Obara, L. (2005) The ESRC Centre for Business Relationships, Accountability, Sustainability and Society. Is waste minimisation a challenge too far? The Experience of household waste management and Purchasing in the UK. Working Paper Series No29. <http://www.brass.cf.ac.uk/uploads/>

Saungweme, M. (2012). *An integrated waste management approach as an alternative social waste management strategy for Mbare Township, Zimbabwe*. University of Free State: Bloemfontein.

Tonglet, M., Phillips, P.S & Bates, M.P (2004) Determining the drivers for householder pro environmental behaviour: waste minimisation compare to recycling. Resources, conservation and recycling, pp42-48

Tucker, P. & Douglas, P. (2007) WR 0112: Understanding Household Waste Prevention Behaviour. Project for Defra's WREP*.

World Bank (2011). *Urban solid waste management*. Washington DC: World Bank.

World Bank (2012). *Cities face sharply rising cost of garbage treatment*. Washington DC: World Bank.