

Gender and Solid Waste Management in the Informal Sector of Bulawayo, Zimbabwe

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Abstract

This paper aims at assessing the role of gender in solid waste management in the informal sector in the high density suburbs of Bulawayo, the second largest city in Zimbabwe. The quantitative approach used in data collection involved physical characterisation of waste for composition analysis and the measurement of amounts of waste generated in the informal sector. Questionnaire surveys were also used to gather data on waste management practices by gender. Interviews, focus group discussions and participant observations were employed for the collection of qualitative data. Results showed the dominance of women in trades such as food catering and vending, clothes retailing, basket making and textiles while men dominated in motor mechanics, carpentry, welding, tinsmith, spare parts and door and window frame making. Generally, more solid waste is generated in enterprises operated by men than those operated by women. There is generally poor management of waste in the home industries, however, there is a greater level of cleanliness in the enterprises run by women who engage in waste reduction practices such as waste picking and recycling. It is thus necessary to incorporate gender perspectives in all developmental efforts including solid waste management in the informal sector.

Key words: Gender, informal sector, waste management, environmental pollution, recycling.

Introduction

The shrinking of formal sector industries in Zimbabwe has resulted in the growth of home industries in Bulawayo's high density suburbs of Makokoba and Mzilikazi. Informal sector enterprises are those whose activities are not registered in terms of the Companies Act and the Factory and Works Acts of Zimbabwe (Chirisa 2009). These home industries generate solid waste and sound management of the waste is the greatest

challenge currently facing these industries. The informal sector activities produce high quantities of waste which could be detrimental to the environment by contributing to air, water and land pollution as well as pollution of the visual environment if the waste is not properly managed through an efficient waste management system (Tevera and Chikanda 2000; Tevera and Chimhowu 2000; Chen *et al* 2005; Mukhpadhay 2008; Sett and Sahu 2010; Tsuyoshi and Ton 2010). Studies in Zimbabwe have made preliminary assessments on the impact of domestic and formal waste on the environment (Tevera 1991, DNR 1994, Jerie 2006, MLGRUD 1995), but no comprehensive study has been made to determine the characteristics of waste generated in the informal sector as well as the effectiveness of the collection and disposal practices in reducing environmental pollution. Such information is vital for planning in waste storage, collection frequency and disposal so as to minimise negative impacts on the environment (Dahlem and Lager 2008, Matete and Trois 2007, Parrot et al 2009, Zotos et al 2009). Agenda 21 of the United Nations Conference on Environment and Development of 1992 identified waste management as among the global issues of greatest concern to the global community. Agenda 21 also sets out a framework of objectives and activities aimed at maximising environmentally sound re-use and recycling and promoting safe waste disposal and treatment. The reality in most developing countries is, however, different (Afon 2007, Ayomoh et al 2007, Manga et al 2008, Parizean et al 2006, Sett and Sahu 2008).

One of the critical areas that needs to be addressed when reviewing the impact of social factors on service delivery is the gender issue (Basu et al 2008, Nag 2009, Sett and Sahu 2008). In all societies women have a differential role from that of men. As mothers and homemakers as well as educators, entrepreneurs and producers, women more than men, have to play multiple roles. The demands of these multiple roles in poorer countries place women, especially the non-elite ones at a special disadvantage. This problem is huge considering the fact that women constitute 60% of the world's one billion poor and out of a third of a billion people living in absolute poverty, 70% are women. In Zimbabwe's informal sector women constitute 22% of all professional workers, 15% of all skilled workers and 11% of semi-skilled workers. There are over 845 000 macro and small scale enterprises in Zimbabwe providing regular employment to 1.6 million people and two thirds of these enterprises are

run by women. Seventy-six percent of these enterprises are located in the proprietor's home thus contributing to their invisibility in official statistics. Traditionally, Zimbabwean women have less educational opportunities and less chances of training opportunities than men hence they end up engaging in the informal sector enterprises. Pressures on women to participate in income generating activities have increased and so have costs which also traditionally fell on men such as school fees. Women also dominate in petty retail trade with a clustering in the least profitable trades such as the selling of fruits and vegetables. Women involvement in small scale activities is thus generally limited to the areas of preparation of food and beverages, textiles (weaving, crocheting and knitting) and traditional crafts such as pots, basketry, mats and bead work.

This paper thus aims at assessing the role of gender in solid waste management in Bulawayo's informal sector. The informal sector is recognised as part of a waste management system in an urban environment in terms of waste recycling. However, studies have not clearly brought out the issue of waste generation and management by the informal sector as deserving study because some say it is difficult to study and probably the government does not directly generate revenue from this sector. The specific objectives include determining the composition and type of waste generated in informal sector enterprises run by men and women, evaluating the effectiveness of the waste collection and disposal practices employed by male and female entrepreneurs in the informal sector in reducing environmental pollution and to come up with options for sound and gender-sensitive practices for the informal sector in Harare.

Materials and Methods

Solid waste investigation has a very broad outlook overlapping several academic disciplines from the social sciences (Olowomeye 1991; Ezeah 2006). For this reason this research adopted aspects of both quantitative and qualitative approaches. In this study the quantitative approach involved the physical characterisation of solid waste and questionnaire surveys to be utilised to analyse waste samples as well as understand the nature of the relationship between gender and solid waste management practices in the informal sector. The qualitative approach, namely, focus group discussions and participant observations were used to generate

other useful supporting data especially from human subjects so as to strengthen quantitative evidence.

Waste composition study aimed at developing a statistically defensive estimate of the composition of solid waste in the informal sector. Through the composition analysis, the study hopes to further apply the outcomes of the analysis to establish a baseline for future characteristics and measurement of solid waste and establish any variations in waste composition in the various sectors of the informal sector. The study design thus adopted the following procedures in composition analysis:

1. Selection of standardised materials classification categories
2. Conducting a pre sort-site assessment protocol
3. Defining the waste sort protocol
4. Conducting the waste sampling and sorting events
5. Reviewing and compiling the generated data
6. Using statistical techniques to analyse the results.

The material categories followed the same sample characterisation classifications format applied by Burnely (2007). After site assessment a waste protocol to help achieve a consistent sample characterisation was adopted following guidelines by the Environmental Management Agency of Zimbabwe, Chung and Poon (2001) and Burnely (2007). Data collection for the waste compositional study followed the traditional material based classification adopted by Burnely (2007). The samples from the informal sector enterprises were collected in plastic bags and labelled with unique identity marks. These are to be segregated using a pre-designed character template after Chung and Poon (2001) and Chung (2008) and Dahlem and Lagervist (2008). The segregated components were weighed to determine weights as percentages of total weight of a sample.

Questionnaire surveys were used to realise the immediate objectives of the research. To gather data on critical areas on critical areas of solid waste management in the informal sector, the design as recommended by Oppenheim (1992); De Vans (2007) and Baker (2003) was used so as to reduce ambiguity or bias. Two types of questionnaires were to be administered, firstly to the home industry operators and secondly to the neighbouring residents and shop-owners. The questionnaire administered to the home industry

operators aimed at collecting information on the quantity and type of waste produced, waste collection and disposal practices and the enforcement of legislation. The questionnaire directed at neighbouring residents and shop owners aimed at determining their perception on waste produced by the informal sector. Interviews were used for the purpose of gathering information on the waste management system in Bulawayo, planning for waste management in informal enterprises, environmental impact of waste produced in the home industries. The interviews were targeted at policy makers and planners in the organisations dealing with waste management. The personnel shown in Table 1 were interviewed.

Table 1 Organisations, personnel and reasons for interviews

Organisation	Personnel	Reasons for the interview
Bulawayo City Council	Physical planner	To determine the place of gender and the informal sector in physical planning
Bulawayo City Council Amenities Division	City Amenities Manager	To determine the waste management system in Bulawayo and the home industries; waste management guidelines for the home industries; planning for waste management in Bulawayo and the home industries
Bulawayo City Council	City chemist	To establish studies that have been done on the impact of home industries in polluting streams.
Bulawayo City Council Health Department	Senior Health Environmental Officer and the Cleansing Supervisor	To gather information on waste collection and disposal in the home industries. The waste management charges and rentals paid by the home industry operators
Environmental Management Agency	Ecologist	To establish the role of the institution in informal waste management
NGOs	Environmental Co-ordinators	To assess the role of NGOs in informal waste management
Home industries	Chairpersons of the operators	To analyse the waste management system in the informal sector

Results and Discussion

Type of enterprise and their main activities

The main activities associated with the informal sector of Bulawayo involve retailing, motor mechanics, carpentry, tinsmith, welding, plastics and drums, tyres, spare parts, selling and repair of pipes and bath tubs, electric appliances, art and painting, upholstery, textiles, straw basket and battery charging. The enterprises are generally family owned with the skills having been acquired from the formal sector or were passed on within the family. Activities such as carpentry and tinsmith tend to be labour intensive and this is usually family labour that is invariably cheap. Activities such as motor mechanics, selling of spare parts and tyres are specialised and do not require much labour. Any activity is usually associated with a particular gender as well as the type and quantity of solid waste produced. Table 2 shows the percentage by gender of activities associated with particular enterprises. The enterprises dominated by females include food catering, vending and grocery shops, clothes retailing (operated mainly by cross-border traders) and the processing and selling of plastics and drums. Enterprises that include motor mechanics, door and window frame making, tyre repair, carpentry, welding, tinsmith are essentially operated by men.

Table 2: The main activities in Bulawayo's home industries

Enterprise	%	%	Main activities
	Male	Female	
Food catering, vending and grocery shops	21	79	Food preparation and selling of groceries in tuck-shops
Door and window frame making	94	6	Making doors and window frames for the construction of low cost houses
Motor mechanics	98	2	Repairs, battery charging, panel beating and spray painting
Tyre repair	100	0	Mending, polishing and sell of tyres
Carpentry	97	3	Production of furniture and sell of timber
Welding	100	0	Production of burglar bars, window and door frames, gates, fences, scotch carts, and ploughs

Tinsmith	100	0	Making of buckets, dishes, letter boxes, chicken fowl equipment and metal products such as paraffin lamps
Clothes retailing	33	67	Selling of a wide variety of second hand clothes
Spare parts	97	3	Purchase and sell of spare parts ranging from vehicle scrap metal to household machinery
Plastics and drums	48	52	Processing and sell of plastics and empty drums
Miscellaneous	61	39	Selling of electric appliances, asbestos, straw baskets, pipes and bath tubs and upholstery

The main sources of the raw materials used by the home industry operators include recycling, waste dumps, some formal companies and informal traders. Some operators such as those selling clothes dominated by women, obtain their raw materials from neighbouring countries such as South Africa, Botswana, Mozambique and Zambia. Welders and motor mechanics obtain their raw materials through recycling their waste. The motor mechanics use parts of old car shells to repair other vehicles and welders recycle small scrap metals for the repair of scotch carts and ploughs. The formal sector is also a source of raw materials for Bulawayo's informal sector. Raw materials obtained from the formal sector include metal sheets, spare parts, oils, tyres, wire, timber and food items demonstrating backward and forward linkages between the formal and informal sectors.

An important aspect of informalisation is the significant representation of women in informal employment in Africa, where most of them are normally self-employed or unpaid home-based workers (Chen et al 2005). Most of the enterprises operated by women are home-based and this accounts for over 50% of entrepreneurs in many countries, varying from 32% in Kenya to 77% in Botswana. The informal sector in Africa is dominated by trade-related activities with services and manufacturing accounting for only a small percentage of this sector.

Characteristics of waste produced

The solid waste generated in Bulawayo's home industries comprises organic and inorganic constituents such as paper and cardboard, plastic, glass,

metal, textile, rubber, wood shavings, coal, asbestos, car shells, vegetables and putrescibles, soil and builders' rubble and miscellaneous waste such as batteries, electric appliances, windscreen wipers, electric cables and plugs. The composition of the solid waste is illustrated in Table 3.

Table 3 Composition of solid waste in the home industries of Bulawayo (% of total volume)

Material	Description	% of total volume
Paper and cardboard	Newsprint , stickers and litter	9
Plastic	Packaging material, milk and soft drink containers	4
Glass	Clear bottles, jars and plated glass	2
Metal	Ferrous and non-ferrous metals, aluminium and steel metals from tinsmiths, empty containers of paint, motor oil, thinners etc.	8
Textile	Pieces of cloth and fabric	1
Rubber	Tyre pieces, shoes and purses	2
Wood shavings	Shavings soaked with moisture from organic waste, pieces of timber	22
Coal	Small pieces of coal coated with organic matter	3
Asbestos	Small pieces of asbestos	1
Car shells	Rusty car shells which may contain other waste	23
Vegetables, Putrescibles	Fruit and vegetable waste, maize cobs, chicken waste, bones etc	8
Soil, Builders, Rubble	Sand and organic matter, bricks, some stones	15
Miscellaneous	Batteries, electric appliances, windscreen wipers, electric cables, plugs etc	2

The solid waste generated in Bulawayo's home industries comprises a high percentage of wood shavings generated mainly from enterprises operated by men. The high percentage of wood shavings probably indicates the high waste generation rates by carpenters at 2.7 tonnes per week and also the low levels of recycling. Car shells disposed at the home industries operated by men account for 23% of the total volume. The shells occupy the greatest volume in the skips which contributes to the rapid filling of the skips which are heavy and weigh up to 80.1kgs. The home industries are also associated with a high percentage of recyclable materials such as paper and cardboard (9%), ferrous and non-ferrous metals (8%). Recycling of waste is very vital as it reduces the amount of waste that reaches the disposal sites. In terms of quantities, the highest amount comes from welding and it amounts to 37% of the total waste generated in the home industries. This is due to the relatively large number of welders operating in the home industries and the fact that the metal is heavier than other types of solid waste and it comes on the form of aluminium, ferrous and non-ferrous scrap metals. Waste from carpentry is the second heaviest and accounts for 29% of total waste by weight. The advantage of waste generated by carpentry enterprises is that it is recyclable and biodegradable, but it can cause problems in terms of storage and disposal. Although tyres contribute a small amount of the total waste produced by weight (4%) these are not biodegradable and can contribute to rapid filling of disposal sites. Tyres can also resurface years later in disposal sites and burning those does not help either as this results in air pollution.

Options for an environmentally sound waste management strategy in Bulawayo's informal sector

A sound solid waste management strategy for the home industries should aim at minimising impacts on the environment with regards to air, water, land and pollution of the visual environment. From the interviews, questionnaire surveys and focus group discussions three options were suggested by men and women operating the home industries. The first option was that of shared responsibility. This gave shared responsibility of waste management to the Bulawayo City Council, the informal sector operators and the Ministry of Environment. The operators agreed that their roles would be to encourage waste recycling that was already in place, such as selling and trading of waste through advertisements within the home industries. More women (68%) than men (32%) subscribed to

this view. The home industry operators also noted that it was necessary to sort waste into its various constituents before it is recycled and hence wood shavings could only be useful for recycling when not mixed with metals or other organic matter. This was a view shared by an equal number of males and females in Bulawayo. It was agreed that the Bulawayo City Council had to continue providing collection and disposal services and needed to assist the home industries in the sale of recyclable materials to companies. There was need for the Bulawayo City Council to come up with guidelines on waste collection and disposal for the home industries. The Ministry of Environment was critical in educating the home industry operators on sound waste management practices through the Environmental Management Agency (EMA). The informal traders agreed unanimously that this was the most vital option and ranked it at number one. This option was viable in that it made both male and female operators part of the decision making process and made them understand the challenges facing the waste management system in Bulawayo and thus be able to participate in providing solutions to the problems.

The second option gave the entire responsibility of waste management to the Bulawayo City Council. This option, though supported by more men than women, was ranked second because of the irregular collection of waste by the City Council. This option did not give the operators an opportunity to be part of the decision making process in coming up with a sustainable waste management strategy for the home industries. The third option was supported by more women (71%) than men (29%) and gave the waste management responsibility to the informal sector operators. This option was based on composting of organic matter and the recycling of metals. However, though a viable option, most men felt it was too early to undertake such a responsibility in waste management without the assistance of the Bulawayo City Council and the Ministry of Environment who are the custodians of environmental management in Zimbabwe.

Analysis of gender and waste management practices

The ultimate aim of home industries in their operations should be to minimise the amount of solid waste so as to reduce environmental degradation. A major problem posed by poor waste disposal is ground water pollution. Bulawayo has over the years been bedevilled with problems of pollution of water bodies due to waste disposal. Major rivers which supply water to the

City have over the years been polluted resulting in the death of several fish due to chemical waste. Smoke from open burning of waste, dust from inadequate containment, erratic collection and open dumping of waste are some of the problems associated with waste generated in the home industries. Uncollected waste is also a public nuisance and this can be observed at roadways along the home industries impacting on the aesthetic value of the areas and unpleasant odours are a characteristic feature.

Gender thus enters the waste management perspective in Bulawayo's home industries from a number of perspectives. Firstly, men and women view waste from different perspectives. What women perceive to be waste such as old car shells and recyclable scrap metal are important raw materials for motor mechanics and welders. Secondly, the frequently subordinate status of women tends to affect their access to and control of resources and hence for the poorer women of Bulawayo, waste handling is an important source of income. Most women are therefore engaged in waste picking from dump sites to sell as raw materials to home industry operators as well as sorting and washing rather than operating machines in the small scale industries and collection rather than transportation of solid waste. The wider range of enterprises operated by men in Bulawayo's home industries shows that women do not have the range of social-cum-business contacts over a wide area of the city that men have which give access to personal credit and favourable market opportunities.

In terms of environmental monitoring, this study shows that women tend to be more effective than men. There tends to be a greater level of cleanliness in enterprises operated by women such as food vending and retailing, textiles and basket making in the informal sector of Bulawayo. The women also tend to encourage each other to maintain cleanliness in the street. The gender specific health risks of solid waste are not clear in the case of the informal sector of Bulawayo. However, the people who are at risk are women and children who collect waste at waste dumps for recycling and re-sale. The waste collectors are at risk from diseases such as hepatitis, diarrhoea and eye and skin infections. The waste collectors suffer from serious occupational health risks. Due to manual handling and lack of protective clothing and equipment they are undoubtedly

exposed to various health risks (Wilson et al 2006). Getting direct contact with toxic and infectious components, odours, polluted water and air are the most common factors responsible for health risks. Table 4 shows the risk factors associated with handling solid waste.

Table 4: Risk causing factors associated with handling solid waste manually

Origin of risk factor	Examples of source of possible risk
Composition of waste	Toxic, allergic and infectious components including gases, dust, leachate, sharps and broken glass
Nature of organic decomposing waste	Gaseous emissions, bio-aerosols, dust, leachate and fine particle sizes and their changes in the ability to cause a toxic, allergic or infectious health response
Handling of waste	Working in traffic, shovelling, lifting equipment, vibrations, accidents
Processing waste	Odour, noise, vibration, accidents, air and water emissions, residuals, explosions, fires
Disposal of waste	Odour, noise, vibration, stability of waste piles, air and water emissions, explosions, fires

Source: Wilson et al (2006)

Given the opportunity and resources, women are effective as monitors of environmental cleanliness in the home industries of Bulawayo. Most women take rounds within their immediate neighbourhood to check on the waste collection services and to encourage each other to pay for waste collection.

Public meetings and committee meetings are an important component of securing the informal sector enterprises' commitment to pay for services rendered for waste management by the Bulawayo City Council in this era of increasing pressure on municipalities for cost recovery and fiscal discipline. There are divergent views by men and women operating home industries on priorities for new or improved services, preferences or type of service or the willingness to pay installation costs and operating

fees. The composition of the committees that made the decisions on priorities on waste management services in Bulawayo showed that women are most active at the street-level and neighbourhood committees that are closest to their household management role. However, most women felt their views were not represented well at higher level committees as the formality of the settings increased. As a test case the home-based industries were given the opportunity to choose between two types of waste collection service, either public garbage containers at street corners where the operators would bring their waste at low price or waste collection from door-to-door at a higher price. The operators preferred the latter-from a community that was dominated by men who made up 77% of the enterprises. However, not much information is available on the considerations leading to this preference. Considerations should have been the distance between the enterprise and waste container, which member of an enterprise by gender is responsible for taking out the waste and who is able and willing to pay for the waste collection service. At some point women had in the past been members of the highest-level home-industry decision waste management committees especially in Makokoba and Mzilikazi, but had all stopped their participation because they were too busy with earning money for their children to waste time on meetings.

It has been widely acknowledged that the effectiveness of waste disposal initiatives can be improved through the incorporation of an understanding of gender differences and inequalities (Muller and Schienberg 1997). However, these studies have concentrated on the management issues associated with household waste rather the informal sector that is more and more absorbing a large proportion of women. The important issues that have been highlighted though include the support rendered to women especially if they are responsible for waste disposal in easing their work burden through improved family health.

According to Muller and Schrienberg (1997) across many cultures women handle waste in their homes although the richer women delegate this task to servants. In general, women are not paid to handle waste while men do so when they are paid. Due to their less mobility and access to

public spaces, some women who cannot leave their homes for cultural or religious reasons will find it difficult to deliver waste to a neighbourhood collection point. Therefore in orienting and directing policies it is important to take into account the specific needs of women to ensure that they can have equitable and affordable access to facilities and services. All these issues need to be addressed when planning waste management services. How households participate in recycling and collection programmes is influenced by gender division of labour, responsibilities and resources. Therefore, an understanding of these equality issues can contribute to programme effectiveness. Women and men have different opportunities to work in small and medium recycling enterprises, given differential access to such factors as credit, training and time. Initiatives need to address the specific barriers faced by women. Environmental messages are more effective when these are tailored to relevant audiences whether male or female. If, for example, women are responsible for the disposal of organic waste, they should be the explicit target of these messages and special communication plans may be needed to reach them.

Gender division of labour in waste collection and recycling in Hochiminh City and shows a definite division of labour in the formal sector. The division had implications for both men and women's opportunities to participate in the sector and for officials seeking ways to improve the system. In Ecuador the male in the couple contributed the most to household bills in general and hence men paid more for the waste collection service, when it is funded through a surcharge on the electric bill. However, the proportion of women who paid the electricity bill was higher in the middle class neighbourhoods (13%) than in the lower class ones (6%). In most households (88%) women were responsible for separating waste. Men and women generally had different perceptions about how frequently waste is disposed of, about the distance that must be travelled to dispose of waste and about the time spent disposing waste. Waste is considered more time consuming by men than by women. More women than men believed that a municipal waste collection system was more effective, trustworthy, but at the same time more expensive than a private system and more men than women preferred a private garbage collection system.

Conclusion and Recommendations

Men and women operating enterprises in the informal sector of Bulawayo view waste from different perspectives. What men view as waste may be useful to women and vice-versa. Generally women are better managers of solid waste than men as shown by the greater level of cleanliness in the enterprises operated by women. This confirms the natural role of women as homemakers and educators and hence better environmental managers. Solid waste management practice in Zimbabwe has largely focused on the technical aspects/issues of waste disposal with little or no attention paid on the social and economic aspects of those involved in the management process. The new demands for equitable rendering of community services worldwide requires some paradigm shift in the approach of service providers. It is thus necessary to translate knowledge on the all-persuasive effects of gender into a new sector, urban solid waste management. As in other sectors such as the provision of water supply, housing improvement, the implications of gender must be translated in terms of actual operations of the specific sector. Such translated information may assist environmental NGOs, the urban councils and development co-operation organisations to understand the social and gender implications of their environmental work as well as to assist gender and development NGOs and scholars to apply their ideas to waste issues in urban communities. At present there is lack of common understanding among NGOs, local authorities and professionals in these broad fields because the cross-cutting concerns of gender and solid waste are only beginning to be elaborated and few studies exist to date on the interactions between them.

It is now widely accepted that incorporating gender perspectives in development efforts is necessary for the successful implementation of development programmes. The focus on gender rather than women makes it critical to look not only at the category 'women', but at women in relation to men. The ultimate objective of incorporating a gender perspective in development programmes is to promote the equality of men and women in society and to empower women to become protagonists in their own development.

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