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# Chinhoyi Urban Residents' Attitude towards Solid Waste Management initiatives a deterrent to behaviour change in solid waste disposal

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***Abstract:****The research aimed to determine Chinhoyi Urban residents' attitudes towards initiatives to improve solid waste management and how this impacts on behaviour change. The residents were stratified according to their respective areas of residence in six high density suburbs. A group was formed in each of the six areas basing on their willingness to participate in initiatives set towards improved solid waste management in six high density municipality areas. A total of 200 respondents were then randomly sampled from the six groups. Questionnaires and focus groups were used to collect data from the 200 respondents. Findings show that negative attitude towards initiatives put in place to improve disposal of solid waste is hindering behaviour change in solid waste disposal in Chinhoyi Urban high density suburbs. The researcher recommends a vigorous community involvement drive for behaviour change towards solid waste management in urban areas involving all stakeholders and across age groups. Use of all forms of media such as radio, television, social media, workshops and seminars at different levels and social gatherings including churches should be used as a strategy for driving home the need of all stakeholder involvement to fight indiscriminate littering in areas of residents, industry and the central business areas.*
***Key Words:*** *Waste management, attitudes, initiatives, behaviour change, and solid waste*

## I. Background of the study

Training and Research Support Centre (TARSC), Civic Forum on Housing (CFH) (2010:5) regards solid waste management as one of the major challenges facing almost all urban local authorities in Zimbabwe as a result of 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. This has strained local authority resources, resulting in the failure to provide adequate services to their residents and areas under their jurisdiction. Training and Research Support Centre (TARSC), is a non-profit organisation that worked with the Civic Forum on Housing (CFH) in three pilot urban sites in Zimbabwe (Mutare, Chitungwiza and Epworth) in December 2009 to assess community perceptions, attitudes and practices on the management of waste and communication between local authorities and communities. It was observed that uncollected solid wastes disposed of in illegal dumps along road sides, in open spaces and along streams is rampant in Zimbabwe's municipal areas. Mutungwe, Tsvere, Dondo and Munikwa (2011) looked at the role played by schools in Chinhoyi Urban in minimising disease outbreaks caused by environmental contamination with an aim to strengthen the teaching of waste management in the curriculum. The research noted that little was being done in teaching waste disposal and recommended workshops for teachers to mainstream waste management in the curriculum with the hope that this would improve waste management in the municipality areas. Two teachers from each school in Chinhoyi Urban were taken through a week's training of trainers' workshop on mainstreaming solid waste management. It was meant to instil proper waste disposal practices among the young children regardless of sex. Mutungwe, Tsvere, Munikwa, Dondo and Pedzisai (2014) in a study of the level of awareness and practices in waste management among Chinhoyi residents found that most of the residents were aware of the consequences of waste dumping including disease outbreaks and legal implications. Residents were aware that it was illegal to dump waste and could face fining from the Environmental Management Agency (EMA). According to Dr Furedy (1990), in India the disposal of waste was women and children's business, men were not at all involved or worse still not concerned about how solid waste was disposed of in their own homes! Muhammad and Manu (2013) also made similar observations in cities of Northern Nigeria, a case study of Kaduna Metropolis. Muhammad et al went further to explain that this is common among poor communities as women fend for their families by collecting waste for sale to recycling companies.

Tsvere, Mutungwe, Pedzisai, Dondo and Munikwa (2015) carried out a research that focused on engaging the Chinhoyi community in the management of solid waste. The study developed a techno-social model for residents to improve solid waste disposal resulting in the setting up of a centralised bin prototype. The findings of this research showed that some residents made positive change towards solid waste disposal while others continued dumping waste on undesignated points. The Chinhoyi Municipality then adopted the model and has since added many centralised bins in most suburbs and in town, including skip bins. However, there are residents who still dump litter despite the increase in bins around residential areas and in town, prompting this research.

## II. Objectives

The study should be able to:

- Identify solid waste disposal practices among residents (including motorists and pedestrians) after implementation of waste management initiatives were put in place.
- Identify attitudes and their role in solid waste disposal.
- Examine how the built environment influences attitudes towards solid waste management e.g. lighting, bin availability, unoccupied spaces between houses (open spaces), aesthetics of the environment, function of area/building/location.

Literature Review

Baum (1973) cited in Afangideh, Joseph and Atu (2012:23) propound that problems of waste generation and management in most cities in developing countries could be attributed to low level technology not sophisticated enough to deal with the high levels of waste generation. If high levels of technology were available at the disposal of residents and their municipal councils, the problems that arise in Chinhoyi for instance, would be minimal. High technology would help in recycling resulting in very little being disposed as solid waste for transmission to municipal dumpsites and high technology refuse trucks would be available to collect refuse, compress it and carry more in one trip minimising fuel costs. Sule (2004) cited in Afangideh et al posits that human population and rural-urban migration has increased as well as industrialisation without a complimentary increase in waste management systems to cater for the resultant high rate of waste generation. In 2012 Chinhoyi had an urban population of 79 368, according to the Census Preliminary Report of 2012. This population has increased by the time of this research if the reported urban-rural migration trends are anything to go by.

Nigeria faces solid waste management problems and researchers view this menace as contributing to urban decay (Asuquo 1979, Wagner 1991, Afangideh et al 2012). These problems are not only in Nigeria but are reported in India, Zimbabwe, Nepal, Pakistan and other developing countries. Chinhoyi, like most cities in developing countries has been affected by poor waste management systems that resulted in cholera outbreaks in 2008 and recurrent diarrhoea outbreaks especially in summer. These cholera outbreaks are linked to consequences of poor solid waste management practices. There is a close relationship between poor waste disposal practices and contaminable disease outbreaks (Training and Research Support Centre-TARSC 2010:5)

Afangideh et al (2012:25) define attitude as a predisposition to a specific kind of behaviour. Kelly (1971) cited in Afangideh ibid, defines attitude as a kind of mental set representing a predisposition to form certain opinions. This goes to show that individual people have opinions to situations citing that most people have "non-chalant attitude towards waste disposal". Such kind of people are said to be perceived as those "who litter the environment like no man's business". Even the educated elite people exhibit such behaviour in public places and this goes to show that they have no conscience whatsoever to realise the effect of their actions on the environment and some have the audacity to throw litter outside their moving posh vehicles!

Mutungwe, et al (2014) assert that the majority of Chinhoyi residents are aware of proper solid waste disposal methods and the consequences of bad waste disposal practices although littering is rampant in the city's residential and business areas. More than 70% of residents are aware that it is illegal to dump litter on undesignated areas. In this same research 96.5% of the respondents dumped waste at night since council did not collect garbage as scheduled. Musademba et al (2011) also noted that council's failure to fulfil its obligations resulted in illegal dumping. Some residents had resorted to the use of rubbish pits and burning of litter instead of dumping the litter in streets, according to Mutungwe et al (2014:75). Disposal of waste in backyards is noted to be a negative attitude as this attracts rodents, rats, and mosquito breeding resulting in health problems such as typhoid, dysentery, malaria, cholera and tuberculosis, according to Sule (2004). This method of refuse disposal is used by 68.6% (40.8% used rubbish pits, 15.5 used composts and 12.3% dumped anywhere) of respondents in Mutungwe et al (2014: 75) research findings and is used due to council's failure to collect refuse

Nest (1991) also alludes to the fact that people lack interest towards managing waste they generate and that this poor attitude may be ascribed to environmental protection agencies and or municipalities who do not deliver

their services as expected. Many a times I have heard the Environmental Management Authority in Chinhoyi fining the Municipality Council for failing to manage litter, residents getting river sand from the Hunyani River and so on and so forth but there has not been any change in all this. Instead, EMA's fine system is adding a financial burden to the already overburdened council. Afangideh et al (2012) say it's possible to train and motivate people to develop attitudes and values which result in desirable behaviour towards the environment. Mutungwe et al (2014) developed initiatives to train residents in proper solid waste management and put in place large bins at strategic points for residents to empty their household bins when full. These centralised collection bins would then be emptied by municipal council employees. However, illegal dumping is still rampant in these areas and some residents even dump litter besides the central collection bins! Afangideh et al (2012:26) say:

> *It is true that if a person has a positive attitude towards an object, he/she will go a long way to support the object, so if an individual holds positive attitude towards waste disposal, he/she will definitely increase his/her efforts to environmental sustenance. Attitude in this context can be defined in terms of the level of education, income rate and gender.*

This is true in reference to group members in Chinhoyi who participated in initiatives to develop the central bins. They have stood for the improved refuse disposal in their respective areas for the duration of the project and for their homes after the project. There is behaviour change in these group members and some have greatly influenced their neighbours.

Barr, Gig and Ford (2001) propound that the link between environmental attitudes and actions is a very complex one. This is quite true as evidenced by the hurdles faced during this research in Chinhoyi. Rahardyan, Matsuto, Kakuta and Tanaka (2004) carried out a research to investigate people's concerns about Solid Waste Management (SWM) and their attitudes towards such facilities. The research noted that opposed attitudes towards a SWM facility decrease for residents who visited the SWM facility. The issue of acquainting oneself with initiatives to address solid waste disposal problems helps one to appreciate and accept such efforts as they will be familiar with how the initiative works. Most of Chinhoyi residents who are employed have had little or no time to actually see how these solid waste facilities operate hence, may not understand their value as compared to those participants in the research who actually assisted in the installation of central collection bins and clean-up operations, went through the theory on SWM and actually used the facilities.
Barr (2007) carried out a research that assessed consumer attitudes towards the disposal of small waste electric and electronic equipment (WEEE) and identified key problems raised by implementing the WEEE directive. The aim of this research was to explore the most effective ways of engaging householders in recycling small electric and electronic equipment (EEE). An earlier study by Lober (1993) examined attitudinal and demographic determinants of public preferences towards existing solid waste disposal facilities in the US. Findings showed the importance of self-interest motivations such as perceptions of costs and benefits in influencing attitudes. Shared norms such as need for the facility and the appropriate sphere of government influence were included as influencing attitudes. Earlier studies in India show that public awareness and involvement are seen as essential to environmentally sound planning, (Hills 1984). This is quite applicable to the scenario in Chinhoyi Urban as observations where some residents continued dumping litter despite the large bins installed for them to empty their household bins seem to indicate that residents did not have a shared norm for the need of the large bins. Failure by council to enforce council bye laws through prosecution of offenders may be indicative of the inappropriate sphere of government influence with regards solid waste management, mainly littering nuisance.

Begum, Siwar, Pereira and Jaafor (2009) alluded to the fact that attitudes and behaviour regarding SWM tend to differ based on the size of the group or category. The research was carried out in Malaysia to provide insights on how contractor attitudes and behaviour affect waste management in the construction industry. Findings indicated that contractors that have positive attitude toward waste management also had satisfactory behaviours, supporting Ajzen's theory of planned behaviour. The identified factors that affect contractor attitudes towards waste management include contractor size, source reduction, reuse, recycling measures, frequency of waste collection, staff participation in training programmes and waste disposal method. In this research, waste disposal behaviour and attitude towards waste management were amongst the most significant factors affecting contractor behaviour on waste management. These were noted as necessary to effectively improve waste management, growth and performance as well as to reduce environmental degradation.

A study carried out by Arora and Agarwal (2011) to find knowledge, attitudes and practices of University students with respect to waste management revealed that these were low, less favourable and moderate respectively. The majority (64.33%) of hostel students had less favourable attitude towards waste management and only 1.33% were classified as having good practices while 46.66% were found to have poor practices towards waste management. The remaining 52% had moderate practices. The research found that the level of education did not make any impact on attitude of the respondents regarding waste management. Arora et al (ibid) assert that environmental knowledge; attitudes and practices of young people appear to be crucial as their points of view ultimately play an important role in providing solutions to future environmental problems since they are the future leaders, policy makers and parents. The study recommended the need for an education or training programme on waste management for the students. These findings seem not to be peculiar to Indian university students but also observed among Chinhoyi residents (including Chinhoyi University students and staff) and other cities in Zimbabwe.

Muller and Schienberg (1997) propound that women were regarded as responsible for waste and its disposal in most households. Because of the different responsibilities in the home, women and men may set different public health priorities and environmental standards. Women's preferences in these matters are neglected since men are in higher offices that handle waste management issues and have different views regarding these issues. Gender inequalities contribute to attitudes and men and women differ in their attitudes towards public health and community cleanliness, (Muller and Schienberg, 1997). Rajkumar (2006) explains that in Sri Lankan rural society women are occupied in managing the homes whilst men are at work and earn a living for the family, therefore solid waste is managed by women. This could be related to the Zimbabwean situation were traditionally, women are also mostly responsible for waste disposal and this could explain the higher numbers of women attending workshops, clean up campaigns and engaging in clean up groups in urban residential areas. Some attitudes towards solid waste disposal are gender related.

Banga (2013) asked households in Kampala, Uganda what they thought about solid waste separation in their homes and 40% said it was a good idea while 60% did not support it because they regarded it as time consuming and a dirty job. This therefore should be done at the collection points or at the landfill, according to the respondents in Uganda. The research showed that only 59.4% separated some of their waste. The majority of those who separated the waste did so because they earned an income from the separated waste, while some did so in order to make manure from it. Studies cited in Banga (2013) recommend the reuse and recycling of solid waste (Ekere et al 2009, Banga 2008, Pokhrel and Viraqraghawan 2005, and Omran et al 2009). But for recycling to take place, separation has to be done first. So the absence of a culture of sorting waste hinders the smooth operation of recycling. Ehrampoush (2005) cited in Banga (2013) alluded that successful recycling should be designed to increase society's knowledge, attitudes and positive behaviour towards the recycling of waste. This justifies the significant role of workshops, awareness campaigns for communities in order to effectively manage solid waste. Policies should then be formulated to encourage community participation in managing solid waste.

## III. Methodology

This research was a follow up to the 2014 and 2015 researches that set up initiatives for community engagement on waste management. These two previous research set up groups of volunteers in six high density areas regardless of gender, sex, occupation or age. These groups came from Brundish, Zimbabwe People's Federation for the Homeless, Single Quarters, Gadzema, Pamasaga and White City residential areas. This research now was a follow up on the six high density suburb groups to establish views on why the residential areas were heavily littered, illegal dumpsites were a common feature, how each member contributed to littering or what each member was doing about the situation. Focus group discussions were held and the socio-economic statuses of participants were established through discussions in each group. Discussions also centred on why residents continued emptying bins during the night at illegal dumpsites yet Centralised Collection bins were at their disposal as well as why the majority of residents were reluctant to participate in clean-up operations organised in the six high density areas. After these discussions, 3 workshops were held for the six groups on the theory of solid waste management and how poor solid waste disposal practices impact on climate change and health. Large bins had been installed at six strategic points in 2014 before this research commenced, to cater for the six areas with large illegal dumpsites with assistance of Chinhoyi University of Technology, Environmental Management Agency (EMA) and Chinhoyi Municipality's health section (Mutungwe et al 2014). Residents were informed to empty their household bins into these large bins for council to collect when transport was available as illegal dumping was a serious challenge. Questionnaires were then distributed to the 200 participants to gather data on their practices in solid waste disposal. The questionnaire sought to establish residents' attitudes towards solid waste management initiatives and behaviour change among participants after

being enlightened on dangers of poor solid waste disposal practices. Participants were asked to reflect on their behaviour over the period of the research and a list of their responses in the three months of our working together in the project was compiled. The data was then compiled into a research report.

## IV. Findings and Discussions

Out of the 200 distributed questionnaires, 180 were returned fully completed while 10 had the demographic data only and the remaining 10 were blank. Therefore 180 questionnaires were used to provide data. All the 200 participated in focus group discussions. There were 170 female participants and 10 males. One hundred and sixty eight (168) females and 7 males were aged 30+ and 2 females, 3 males were in the 55+ age group. This shows that the majority of residents who participated in this research were middle aged females. Most researches to do with waste management have shown that women are the most active players in this field (UNDP 2014, WASPA (Asia) 2009, Mehra et al 1996, World Bank 1999, Asi, Busch and Nkengla 2013). No children participated in the research as the research focused on households while children were at school. Unemployed youths seemed not interested at all and this could be attributed to attitudes as most people regard this as a dirty job. Who, at this age would want to be seen by their significant others cleaning the streets, drainages etc. in the middle of the day? The lowest qualification of participants was grade 7 and the highest qualification was ordinary ('O') level. This means that all participants are literate.

**Solid waste disposal practices among residents**

Table 1: At Public Level
The tabled practices were identified as the general practices by residents in public places like in town/central business area in the city, shopping centres in residential areas, streets, while in public transport or travelling in private vehicles.
N= 180 (170 females, 10 males)

| **Identified disposal practices** | **Common practice** | | **Practice common Among Females** | | **Practice common among Males** | |
|---|---|---|---|---|---|---|
| | **Yes** | **No** | **Youths** | **Adults** | **Youths** | **Adults** |
| Throwing fruit peels on the ground after eating fruit. | 135 (75%) | 45 (25%) | Very common | Common | Very common | Common |
| Empty snack packages thrown on the ground after use e.g. sweet wrappers, plastic bags | 170 (94.4) | 10 (5.6%) | Very common | Sometimes | Very common | common |
| Sanitary pads littering | 40 (22.2%) | 140 (77.8%) | Common | Sometimes | Not at all | Not at all |
| Pampers | 175 (97.2%) | 5 (2.8%) | - | Very common | - | - |
| Airtime recharge cards littering | 178 (98.9%) | 2 (1.1%) | Very common | Very common | Very common | Very common |
| Cigarrete butts littering | 180 (100%) | 0 | Not at all | Not at all | Very common | Very common |
| Empty Drink containers littering(glass, tin, plastic) | 172 (95.6%) | 8 (4.4%) | Very common | Common | Very common | Very common |

The findings in table 1 indicate that 175 (97.2%) respondents stated that pampers were wrongly disposed by adult females. Further probing by the research revealed that dumping of pampers was a serious problem in the residential areas that needed urgent attention. One hundred and thirty five (75%) of respondents often throw or have observed others throw fruit peels on the ground after eating the fruit. Throwing away of fruit peels is prevalent in the rain season when many fruits are in season as well as agricultural produce such as maize cobs, fresh ground and round nuts. Motorists were also mentioned as culprits of such bad practice, be they female or male. Airtime recharge cards, empty drink containers and empty food or wrapping papers were mostly thrown on the ground after use; 178 (98.9%), 172 (95.6%) and 170 (94.4%) respectively. Youths were mostly identified for littering practices as they are the main consumers of sweets, crisps, biscuits, airtime etc. Adults absolved themselves from this practice saying they do not consume these products in public except for airtime cards. Airtime recharge cards were wrongly disposed by nearly all participants and other residents. Cigarette butts were consumed by men while sanitary pads were for females and it was agreed that all Cigarette users just throw Cigarette butts on the ground as if this was the taught disposal method. The researcher assumes that this could

be a result of learning by observing as most men learn to smoke secretly; at adolescence thus they even copy the disposal technique!

Table 2: At Household Level

N= 180

| **Identified disposal Practices** | **Yes** | | **No** | | **Females** | | **Males** | |
|---|---|---|---|---|---|---|---|---|
| | **No** | **%** | **No** | **%** | **Y** | **N** | **Y** | **N** |
| Separation of waste | 22 | 12.2 | 158 | 87.8 | 22 | 148 | 0 | 10 |
| Use bins for disposal | 150 | 83.3 | 30 | 16.7 | 147 | 23 | 3 | 7 |
| Use rubbish pits | 18 | 10 | 162 | 90 | 11 | 159 | 7 | 3 |
| *Use Plastic Bags for disposal | 152 | 84.4 | 28 | 15.6 | 152 | 18 | 0 | 10 |
| Empty bins at designated points | 95 | 56.1 | 79 | 43.9 | 95 | 75 | 0 | 10* |
| Dump waste at street corners | 50 | 32.9 | 102 | 67.1 | 50 | 99 | 0 | 10 |
| Empty bins into stream/river | 12 | 6.7 | 168 | 93.3 | 10 | 160 | 2 | 8 |

**Key**

**Most females (140) indicated that they lined bins with plastics for separation purposes since they could not afford to buy separate bins. Only 12 used plastics without the bin.*

*Y= Yes*

*N= No*

Table 2 shows that only 22 (12.2%) separated waste at household level while 158 (87.8%) of the respondents do not separate waste. Only female respondents indicated they separate waste and this is in agreement with findings by Banga (2013) who cited studies done in Pakistan, Bangladesh and Hu Chi Minh City with related results (Beal 1997, Du 1995) and Ekere's 2009 research in Uganda. One hundred and fifty (83.3%) of respondents use bins to dispose waste and of these, 3 were males. Seven other males indicated they used rubbish pits as they could not afford to buy bins. No man indicated they dumped waste. Use of rubbish pits may lead to health problems as alluded to by Sule (2014) as this may be a habitat for rodents, rats and mosquitoes if not well managed. Men indicated they did not empty bins at designated points which may show that it is not part of their business to take care of the bins. However, discussions revealed that men observed people dumping waste in streams in the residential areas; at dumpsites and that this was done at night by women and children. Men observed these trends while coming from beer halls or late night shifts. Respondents mentioned that youths were instructed by parents to empty bins at night, resulting in illegal dumpsites.

**Table 3 Attitudes in solid waste disposal**

**N= 180**

| | **Strongly Agree** | **Agree** | **Strongly Disagree** | **Disagree** | **Not Sure** |
|---|---|---|---|---|---|
| Littering is Municipal Council's problem | 4 | 22 | 80 | 64 | 10 |
| It is proper to dump waste if council fails to collect refuse as per schedule. | 102 | 30 | 12 | 13 | 23 |
| Community workshops on solid waste management help change waste disposal practices of residents. | 81 | 40 | 19 | 26 | 14 |
| Women mostly attend waste management workshops and initiatives. | 134 | 46 | - | - | - |
| Waste disposal is women's business. | 92 | 69 | **7** | 12 | - |
| Separating waste reduces waste to be collected and should be practised by all. | 33 | 65 | 63 | 19 | - |
| Waste disposal are not related to one's level of education. | 48 | 66 | 48 | 11 | 7 |
| Parents are to blame for not training children on proper waste disposal practices. | 51 | 60 | 35 | 38 | 6 |
| Lack of women in higher office in public health | 28 | 58 | 81 | 13 | |

| | | | | | |
|---|---|---|---|---|---|
| contributes to the persistent solid waste disposal problems. | | | | | |
| It is difficult to change behaviour of adult residents regarding waste disposal practices. | 72 | 82 | 15 | 8 | 3 |

The results in table 3 show that the 102 (56.6%) respondents strongly agree that it is proper for residents to dump waste if council fails to collect refuse as per schedule and 30(16.6%)agree. This gives a total of 132 (73.3%) who agree to this statement. This clearly explains the high rate of littering in Chinhoyi since the majority of residents' attitude towards council's inefficiencies in refuse collection regardless of resource constraints, is negative. One hundred and thirty four respondents strongly agreed that women mostly attended workshops and programmes related to waste management and no respondent opposed to this assertion. A total of 161 respondents agreed that waste disposal was a women's business. These findings are in agreement to Muller and Schienberg (1997) and Rajkumar (2006) where women are responsible for waste disposal. Society tends to view women as home makers who have to see to the welfare of the family hence do the cleaning, cooking laundry etc. in the home while the men are out at work (formal employment mostly). This attitude that waste disposal is a women's business results in most men being reckless in their waste disposal practices since they know some woman will clean their mess.

The table also revealed that most (98) agree that separating waste reduces amount of waste to be collected for disposal by the municipality. It is generally agreed that level of education does not guarantee proper waste disposal practices; parents are to blame for not training children proper disposal practices resulting in adults who are irresponsible in waste disposal and that it is difficult to change behaviour of adults towards waste disposal. It is not easy to teach old dog new tricks hence parents should teach their children in their early days proper waste disposal practices.

Focus group discussions revealed that participants in the research had changed attitudes from negative to positive due to the knowledge acquired during workshops, involvement in clean up campaigns and a tour of illegal dumpsites, stream and the municipal dump site. The presentations from researchers, officials from EMA and resource person from Practical Action based in Harare was an eye opener to the dangers of poor waste disposal practices that changed participants way of life with regards waste disposal. Participants, in their respective groups then came up with strategies to improve their areas (Action Plans). In a three week time frame, areas were visited and a remarkable change was observed: no illegal dump sites, no strewn litter and effective use of the central collection bins as well as clean ups were being done once every week at an agreed date and time. Each group had its slogan and name. Some of the names are Chenesai Network (meaning Clean up"), Ruvako Network ("Construction") and Murambatsvina Network ('No to Filthy Environment'). After four months researchers visited the groups and discovered that litter was flowing over the central collection bins, illegal dump sites were resurfacing and littering was showing its ugly head once again. At two centres the bins had been vandalised. Discussions with group members showed that they were demoralised by the lack of cooperation from other residents who continuously littered the areas, disregarded the call to use the central bins and verbally assaulted the participants. The participants were disheartened by comments such as: "What are you gaining from doing a job that has people specifically employed for by municipal council? Are you not paying your rates to council? Don't you have better things to do for your families?" At the end of the day it felt like all the effort put to this project went to waste in as far as trying to improve the community's waste management practices. The good thing is that those who participated in the project are using the knowledge gained to keep their surroundings very clean. Their efforts have been rewarded as council has now built brick and mortar structures at the points created by the research team and participants, replacing the vandalised bins. These are stronger and bigger facilities. Skip bins have been placed at more strategic points by council to encourage central collection of solid waste. Surprisingly some people still litter the areas. This shows that as long as people have not changed their care free attitudes towards littering no matter how much is done for them they will not change their behaviour.

**How the built environment influences attitude towards solid waste management**

The research findings from focus group discussions point to the fact that all open spaces, areas that are dark at night and river banks are prone to dumping. A survey of the areas confirm this, as heaps of litter are visible at these open spaces, in areas where there are no street lights and piles of litter along river or stream banks. These areas have all been littered and have become large dump sites. This also confirms that household bins are emptied during the night when culprits hide in the dark and choose unoccupied spaces to be dumpsites. All clean and frequently used areas are free from piles of litter. Bus stops and shopping areas where bins have been installed are less littered compared to where there are no bins. Therefore the built environment influences attitudes on waste disposal.

**Recommendations**

The research recommends that there be an educational initiative to conscientise the community on the importance of attitude shift towards solid waste management and that everyone is responsible for the state of the environment. The business community should be encouraged to help mobilise and install bins in streets, at shopping centres and bus stops for public use to dispose waste. Since more women are involved in solid waste management initiatives, there is need to ensure more women participate in decision making processes that focus on environmental issues so that their concerns are forwarded and addressed. Council is recommended to give top priority to acquisition of refuse trucks so as to timeously empty bins in residential areas thereby reducing the temptation to resuscitate illegal dumps. All street lights should be functional and open spaces be developed into recreational places or parks, grow flowers or trees to beautify these places and they be well maintained or they be allocated as residential stands so that they are not used as dumping grounds. Raw sewer should not be allowed to flow into rivers as this will encourage residents to use the river banks as dump sites as well. Erection of warning signs against illegal dumping and penalties for such behaviour at open spaces can also be used to deter possible dumping.

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GENDER ROLES IN INFORMAL SOLID WASTE MANAGEMENT IN CITIES OF NORTHERN NIGERIA: A CASE STUDY OF KADUNA METROPOLIS

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