Perseverance of Poor Solid Waste Management System in Urban Areas: a case of Dodoma Municipality, Tanzania

A.Z. Lawuo, D.Malugu, and S.P Mnyawi

Institute of Rural Development Planning - Lake Zone Centre,
P.O.Box 11957 Mwanza, Tanzania

ABSTRACT: The study examined factors contributing to perseverance of poor solid waste management system in urban areas. specifically the study identified ways and tools used for proper solid waste management system, examined community awareness and attitude towards solid wastes management system and find out the existence of institutional and legal framework and how community comply with the existing laws/bylaws, rules and regulations towards solid waste management system. Both primary and secondary data were collected from a total of 108 respondents by using questionnaires and interview to obtain opinions and reactions persistence of poor solid waste management in urban areas of Tanzania. Findings revealed that negatively stance and perception of people concerning sanitation issues contributes to poor solid waste management in Tanzania. Preponderance of people has little idea on sanitation and most of households did not have rubbish bins. It is recommended that in absence of environmental education sold waste management will continue to be a problem.

KEYWORDS: Environment, Solid, Waste, Urban, Management, Sanitation, Attitude.

1   INTRODUCTION

The overall goal of urban solid waste management is to collect, treat and dispose of solid wastes generated by all urban population groups in an environmentally and socially satisfactory manner using the most economical means available. Local governments are usually authorized to have responsibility for providing 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. As cities grow economically, business activity and consumption patterns drive up solid waste quantities. At the same time, increased traffic congestion adversely affects the productivity of the solid waste fleet. Productivity loss is exacerbated by longer hauls required of the fleet, as open lands for disposal are further and further away from urban centers. The challenge is to rationalize worker and vehicle performance, while expanding services to a growing urban population (FAO, 2011).

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 (World Bank, 2012). Abel, OA (2009) provide that, performance and profitability of Municipal Solid Waste (MSW) management in a low-income city. The research provides an overview of methods and models for integrated planning of a two-phase program: MSW collection and transportation, and MSW treatment. We present the case study of Matadi (the Democratic Republic of Congo) that has a low level of the MSW management compared to other African cities. We develop a spreadsheet model for collection and transportation of MSW which is relevant for low-income cities and enables determining the waste collection fee. A CDM decay model is used to predict the GHG emissions in disposal site. The MSW treatment plant in case of Matadi is evaluated. For the anaerobic digestion technology selected as appropriate for this

plant, the key factors that ensure profitability of the plant are as follows: tipping fee from the municipality (19% of total revenue), amount of carbon credits which can sum up to 16% of the total revenue, expansion of waste collection range from 25 to 50 km. The methods of this study can be used for solving waste problem in other low-income cities where the budget for municipal services is scanty, particularly when starting from a very low level of MSW management. Ajani, OIY (2007) and Arlosoroff, S (1982) age of recipients, location of recipients and occupation of recipients are positively related to the probability of using public waste collection service while the number of years of schooling, amount paid for waste collection service, household size and total monthly income of recipient are negatively related to the probability of using public waste collection service.

According Bartone, C. (2000) large generation of solid waste at high rate need efficient technology to manage the wastes. Of 201 respondents to questionnaire in Abeokuta, 35.8% used waste collection services, 64.2% used other waste disposal options, 16.4% used both, 68.7% and 58.7% were aware of waste collection service and waste management regulations, respectively; while 28.4% separated their solid wastes at source. Blight, G.E. and Mbande, C.M. (1996) a well-managed city with medium or low income may be significantly different from a similar city with poor urban MSW management. Waste stream analysis, material balance and lifecycle assessment may be helpful in sustainable landfill management. Sustainable landfill management may not be possible in absence of complete understanding and required capacity enhancement along with financial support.

Developing and least developed countries are facing serious problems of solid waste management system (Zurbrugg, 2008). Solid waste management is a major environmental concern in many urban areas in Tanzania which needs an immediately action. This situation is severe in cities such as Dar-es-salaam, Mwanza, Arusha and Dodoma region (URT, 2009). Local Government Authorities in many cities are unable to deliver services effectively while illegal dumping of domestic and industrial waste is common practiced. The government in Dodoma Municipality embark on initiatives to addresses problem concerning solid wastes management by mobilizing community working groups under Public-Private Partnership (PPPs) approach about 8-10 solid wastes collectors in Dodoma town by year 2004 were involved and waste collection points established (Dodoma, 2005).

Although numerous efforts undertaken by Municipal government solve problem still solid waste problem dominates exist. With reference to presentation on Community Based Monitoring System (CBMS) in Manila Philippines (2008) discussed that the problem of Solid Waste Management in Dodoma Municipal is out of control in many wards (Dodoma, 2005). Therefore the study examined factors contributing perseverance prevalence of poor Solid Waste Management in urban areas with focus to Makole Ward in Dodoma Municipal. Specifically the study identified ways and tools used by community on solid waste management, examined community's awareness and attitude towards solid waste and solid waste management; discovered existence of institutional and legal framework.

2   MATERIALS AND METHODS

This study conducted in Dodoma Municipality at Makole Ward in 2012. The study area selected since it generate high rate of Solid Waste and it is unplanned area. Both primary and secondary data were collected from 108 respondents using questionnaires and interview to obtain different opinions and reactions towards factors contributing perseverance prevalence of poor Solid Waste Management in urban areas of Tanzania. These methods give interviewee an opportunity to provide more information and get some clarification from the interviewer on issues about factors contributing perseverance prevalence of poor Solid Waste Management in urban areas of Tanzania. Documentary reviews were also conducted by reviewing regional environment management reports. the collected raw data from the field were processed and analyzed through SPSS programme. Descriptive statistics was mainly used to describe the problem under the study by presenting a combination of variables. A cross tabulation used to simplify the understanding of factors contributing perseverance prevalence of poor Solid Waste Management in urban areas of Tanzania.

3   RESULTS AND DISCUSSION

3.1   SOLID WASTE MANAGEMENT HANDLING WAYS AND TOOLS

Wastes generated through human activities should be properly collected, handled, stored, and disposed to minimize hazard to environment and public health. Findings revealed that 90% of respondents said people do mix Solid Waste and do not sort them at all (Table 1). Solid Waste workers worked with bare hands without protecting themselves by wearing gloves. They also used wheelbarrow and simple spades with short handles. The results are in line with the studies carried by Cointreau (1982) which illustrates that in most cases Solid Waste in developing countries are inadequately handled; Many

municipal councils of developing countries do not encourage their people to sort solid wastes as a result it become very difficult to handle it and thus would be the source of many infectious diseases such as cholera, typhoid etc.

Table 1: Sorting of solid wastes (n=98)

Responses	Frequencies	Percentage
Do not sort	88	90
Sort	10	10
Total	98	100

Source: Field data survey, 2012.

Again analysis indicated that community used poor technology in managing solid. The findings indicated that 80.6% of respondents did not have dustbins and only managing solid waste by burning them. This is a poor technology of handling solid waste. By burning solid waste which sometimes contain carbon or petroleum increases carbon dioxide in the air, which is a potential gas that causes global warming as described by (Johansson, 1999).

With respect to awareness and attitude towards solid waste results showed that 84% of respondents had limited knowledge about solid waste and not aware on potential effects to environment. Few respondents (16%) had ideas on solid waste and its effects. Due to lack of relevant knowledge, people are carelessly dumping solid waste in their areas. This situation exacerbates dumping of Solid Waste in the area and therefore causes Solid Waste rampant in the area (Table2).

Table 2: Respondents with knowledge about "solid wastes" and their effects (n=98)

Responses	Frequencies	Percentage
Do not have knowledge	82	84
Have knowledge	16	16
Total	98	100.0

Source: Field data survey, 2012.

With respect to environmental education to examine awareness and attitude of community towards Solid Waste management, findings revealed that primary education created awareness among the society about solid waste management (Table 3). Furthermore formal education has an impact on solid waste and has activated community to understand importance of controlling solid waste in their area. In this case formal environmental education should be looked at as a changing agent that is highly required by people.

Table 3: Levels of education in contrast with collection of solid wastes at home (n=98)

Education level of respondent	Respondents who sort solid waste at their homes	Respondents who do not sort solid waste at their homes	Total
No formal education	0	4	4
Adult Education	23	0	23
Primary Education	37	0	37
Secondary Education	8	6	14
College	20	0	20
Total	88	10	98

Source: Field data survey, 2012.

Analysis on the respondents' awareness and attitudes towards "Solid Waste Management" shows that 91.75% of respondents were not aware on solid waste management. This is a serious factor that leads to persistence prevalence of poor Solid Waste Management in the study area.

Table 4: Respondents with knowledge about solid waste management (n=108)

Responses	Frequencies	Percentage
Do not have knowledge	99	91.7
Have knowledge	09	08.3
Total	108	100.0

Source: Field data survey, 2012.

ATTITUDES TOWARDS SOLID WASTE MANAGEMENT

The whole issue of attitudes appears to affect both inhabitants and authorities regarding solid waste management in Dodoma Municipal. The study revealed that 54% of respondents said that it's a responsibility of municipal council to make surrounding/ environment clean, while few respondents (07%) said it's an individual responsibility and 39% of respondents said that the responsibility should be shared between municipal council and the individuals (Table 5)

Table 5: Responsibility for Cleaning Surroundings (n=98)

Response	Frequency	Percentage
Dodoma Municipal Council	53	54
Individuals	07	07
Both Dodoma Municipal Council & Individuals	38	39
Total	98	100.0

Source: Field data survey, 2012.

This result is the same as the study done by Songsore (1992) which revealed that, the establishment of the Waste Management Department of urban areas and Municipals, the public tend to have the view that the Municipals should be solely responsible for managing solid waste.

Such negative attitude increases Solid Waste in the area because people do not remove Solid Waste from the area of their jurisdictions as part of their responsibility. It was revealed by the study that 52.8% of respondents do not do any formal control of Solid Waste in the study area; only 47.2% do some non formal control by burying or burning wastes in the street.

Concerning the existence of institutional and legal framework, findings revealed that there is no strong institutional framework whereby laws and processes involved in Solid Waste Management could give pace to the government and other stake holders to properly implement Solid Waste Management. There is also no governmental or religion institution or private organizations that deal directly with Solid Waste management in the study area in any form. Only few people have been employed by the municipal council to collect solid waste with very little payments. Lack of effective institutional frame work has directly affected Solid Waste Management and reduces efficiency of Solid Waste Management in the study area. Such effect is concurred with the study made by (Sandra, 2001).

According to Sandra (2001) provided that, Solid Waste Management is a municipal responsibility in nearly all developing countries, but private sector and NGOs and other institutions have to be fully involved. Further Sandra mentioned that, the institutions that provide the services typically should also be restructured so that they become more accountable and transparent to the residents and business establishments they serve. Moreover, Sandra (2001) emphasizes that solid waste units in urban areas should not be managed by public health departments/ institutions only; but they should also involve management of engineers and other institutions that are trained in systems design and operations rationalization.

3.2   COMPLIANCE OF RESPONDENTS WITH LAWS, BY-LAWS, RULES AND REGULATIONS

Legal framework is very crucial in the whole exercise of Solid Waste Management. Central Government as well as local government should establish laws, policies and procedures for solid waste management. Findings showed that 52.7% of respondents have no idea of the existence of the Environmental Management Act (EMA) no.20 of 2004. Only 47.3% of respondents had heard about the law, but they did not know its contents and enforcement from the leaders. Despite that 47.3% of respondents heard about Environment Management Act no.20 of 2004, and they are not sure whether leaders act accordingly.

3.3   COMMUNITY AWARENESS ON ENVIRONMENTAL LAWS

Community awareness on the National Environmental Policy (NEP) of 1997 was investigated during the study. The environmental policy is a pillar of any environmental interventions. It links between the environmental review or decisions and the setting of effective laws, clear objectives and strategies. The National Environmental Policy also explicitly gives obligation and responsibility to each environmental stake holder. Findings revealed that 38% of respondents had idea on the NEP 1997 while 62% of respondents had no knowledge about NEP, 1997. This implied that most of community not aware on environmental laws therefore is difficult to solve environmental issues unless education is conducted.

Table 6: Respondents with knowledge about the National Environmental Policy, 1997

Responses	Frequencies	Percentage
Don't have knowledge	67	**62.0**
Have knowledge	41	**38.0**
Total	**108**	**100.0**

Source: Field data survey, 2012.

3.4   KNOWLEDGE OF THE LAW, BY-LAW IN THE STUDY AREA

Lack of knowledge on law by the community and lack law enforcement and bylaws by the local government authority accelerated the spread of Solid Waste in the study area. Ward and Municipal Environmental Officer reports show that different by-laws, rules and regulations established to deal with solid waste management however people do not comply with. Between Tsh.5, 000/= to Tsh.10, 000/= is charged to a person convicted to have deposited solid waste to unrecognised dumping area as penalty this is according to by-law.

4   CONCLUSIONS AND RECOMMENDATION

It is concluded that in Dodoma municipality there is poor system of solid waste management and applied poor technology. Also there is lack of awareness to most of community on how to handle solid waste this situation affects much health of people. It is recommended that, in order to address the problem of poor Solid Waste Management the following should be done each household should have at least 3 containers with lid, one container for recycle stuff, another for domestic garbage, third container for green waste (waste from garden, trees, edge). Sorting wastes should be done at every household and charged fairly for the process of collection up to damping place.

It is highly recommended that there should be a deliberate effort to establish recycling activities in Dodoma Municipality and elsewhere in the country in order to reduce the amount of Solid Waste in the streets. The Recycling activities should well be designed and be monitored by appropriate experts and taking necessary precautions in order to avoid more pollution to the environment.

REFERENCES

[1]   Abel, OA (2009). An analysis of solid waste generation in a traditional African city: The example of Ogbomoso, Nigeria, Environment and urbanization. *SAGE Journals,* 19(2): 527-537.

[2]   Adewumi, IK; Ogedengbe, MO; Adapter, JA; Fabiyi, YL (2005): Planning organic fertilizer industries for municipal solid wastes management *Journal of Applied Sciences Research*, 1(3): 285-291.

[3]   Ajani, OIY (2007). Determinants of an effective solid waste management in Ibadan Metropolis, Oyo state, Nigeria *Journal of Food, Agriculture and Environment*, 6(1): 152-157.

[4]   Arlosoroff, Saul 1982: "WB/UNDP Integrated resource recovery project: Recycling of wastes in developing countries." In: *Appropriate Waste Management for   Developing Countries*, edited by Kriton Curi. New York: Plenum Press, 1985

[5]   Bartone, C. 2000: *Strategies for Improving Municipal Solid Waste Management: Lessons from World Bank Lending and CWG Activities*. Workshop on Assessing Integrated Urban Solid Waste Management in Municipalities of Latin America and the Caribbean Retrieved at www.aidis.org.br on 12 December 2009

[6]   Blight, G.E. and Mbande, C.M. 1996: Some problems of waste management in developing countries Journal of Solid Waste Technology and Management 23, no. 1, February 1996. pp 19-27.

[7]   Chris Zurbrugg, 2008: Solid Waste Management in Developing Countries

[8]   Cointreau, Sandra.2006. Environmental Management of Urban Solid Wastes in   Developing   Countries: A   Project Guide. Washington, DC: Urban Development Department, World Bank.

[9]   Dodoma, (2005) Promoting Environmentally Sustainable Urban Development in Tanzania (2005): The Sustainable Cities Programme, Tanzania. Retrieved on line at www.scptanzania on 15/July / 2009

[10] EPA, 2005 .Environmental Protection Agency: Solid Waste and Emergency Response –Electronically retrieved on line www.epa.gov/globalwarming on 29 Feb 2010

[11] Johannessen, L.M. 1999. Observations of solid waste landfills in developing countries: Africa, Asia and Latin America. Urban and Local Government Working Paper Series No. 3, the World Bank, Washington, DC.