

Full Length Research Paper

Assessment of performance of government and the private sector in the collection and disposal of solid waste in Kampala City during the period 2008-2012

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Accepted 14 October, 2017

This study compared Government funded Kampala Capital City Authority (KCCA) and Private Sector solid waste collection and disposal in Kampala city from 2008 to 2012. Across sectional survey research design was used and the study employed both quantitative and qualitative methods. Participants in the study were selected using proportionate stratified sampling technique. The sample comprised of 770 respondents who were sampled by multistage sampling from the five divisions of Kampala City. The study established that 604,814 tons of SW collected and disposed-off by the private sector from 2008-2012 were more than those of KCCA (570,518 tones). Generally public perception is that the Private sector is performing better than KCCA in rendering SW management services. Since the change in the city administration and restructuring in 2011, the performance of KCCA has outpaced that of the private sector in the collection and disposal of solid waste. At divisional level the Private sector performed better than KCCA in Central and Kawempe divisions while KCCA performed better than the Private sector in other divisions (Nakawa, Makindye and Rubaga divisions) highlighting differences in effectiveness of monitoring activities.

Keyword: Solid waste management, collection and disposal of solid waste, private sector, government supported, performance of institutions, monitoring.

INTRODUCTION

Increased waste generation has been enhanced by rapid population growth in Kampala city. In 1969, the population was 330,700 but this rose to 1,723, 200 in 2012 (KCC, 2008; UBOS, 2009). Solid waste generation increased rapidly in the same period. Industrialization has led to production of plastics and polythene products used as packaging materials on a large scale, yet these are non-biodegradable products that accumulate and pollute the environment.

By 2004, KCC disposed of only 20% of the solid waste that it generated leaving 80% of the households without SW services (NEMA, 2010). The policy on privatization adopted by KCC was intended to improve on the delivery

of services including SW services in Kampala City. The policy was to promote performance, accountability and transparency in the management of public enterprises and services. Bayliss (2005) reports that according to World Bank, governments must negotiate monitor and enforce contracts with private suppliers. In Kampala, several private companies were registered and licensed by KCC to speed up solid waste collection and delivery to the landfill.

Since 1995 the private companies have managed wastes in the gazetted areas of the City. In the meantime, KCCA monitors and supervises the Private sector companies that operate in the five divisions of the city; it also offers SW collection and garbage disposal services. However, no study has been carried out to compare the performance of KCCA and the Private sector in SW collection and disposal in Kampala city yet there are conflicting perceptions about the performance of KCCA and the Private sector companies on solid waste collection and disposal in

Kampala city.

Therefore, this study sought to compare the performance of KCCA and the Private sector on the collection and disposal of SW from Kampala city (2008-2012) with particular emphasis on:

1. Quantity (metric tons) SW delivered to Mpererwe-Kitezi landfill by KCCA and the Private sector.
2. Number of SW trips delivered to Mpererwe-Kitezi landfill by KCCA and the Private sector from Kampala city.
3. Cost of fuel used to transport solid waste to Mpererwe-Kitezi landfill by KCCA and Private sector from Kampala city.
4. Assessment of people's perceptions on the collection and disposal of SW by KCCA and Private sector in Kampala city.

METHODOLOGY

Research Design

A cross-sectional survey research design was used because of the heterogeneous nature of the study population.

Target population

The study population comprised of several categories: waste collectors, drivers, leaders of the KCCA/private companies, health and education inspectors of KCCA, SW engineers, local council leaders, waste pickers and the community of Kampala city which includes institutions, households, industries, business and SW managers of KCCA/Private sector. These respondents were selected from each of the five divisions of Kampala city, namely Central, Rubaga, Kawempe, Makindye and Nakawa.

Sample size and sampling Techniques

Participants in the study were selected using proportionate stratified sampling technique, the group with more individuals had more participants in the sample and the group with fewer individuals had fewer participants in the sample. The sample size comprised of 770 respondents. They included 50 KCCA waste collectors selected by convenience, 30 KCCA drivers selected by random sampling, 5 KCCA waste engineers/managers selected by purposeful sampling, 45 KCCA truck workers who were selected by random sampling, and 5 KCCA health inspectors selected by purposeful sampling as guided by Krejcie and Morgan 1970 tables. Others were; 15 private company leaders, 50 private sector waste collectors, 30 private company drivers, and 45 private company truck workers who were selected either randomly or conveniently. A total of 110 waste pickers and 380 community respondents were also

sampled by multistage sampling from the five divisions of Kampala city. A summary of the target population and sample size are shown in Table 1.1.

METHODS

The methods employed included survey, documentary review, interviews and observation.

Documentary Review

Documentary analysis guides were used to capture data and records on institutional aspects like regulatory controls, ordinances, agreements and by-laws; and on equipment for waste collection and disposal. Data was also obtained for KCCA and Private Sector on SW tonnage delivered to the landfill in the five-year period, 2008 - 2012. The performance was assessed by comparing the quantity of SW delivered to the landfill by both KCCA and the Private sector in the same period.

Survey

Every solid waste manager, one KCCA leader and three private sector leaders in each of the five divisions were given questionnaires seeking information on performance in solid waste collection and disposal, monitoring and enforcement responsibilities on solid waste management. Questions were short, clear and simple as recommended by, Barifaijo, et al (2010). Seventy-six respondents from the communities in each of the five divisions were also given questionnaires to provide information on their perceptions about the performance KCCA and the Private sector on SW collection and disposal in Kampala city.

Direct field observations

Twenty visits, four in each division were made to SW collection points and SW dumping sites to observe working conditions of workers. Visits were also made to households, markets, business premises, industries and institutions to observe SWM at the generation stage. The checklists were used to assess the workers' equipment and tool requirements. Ten visits to waste pickers at solid waste collection points were made in each division. Two visits were made to the landfill to establish its status and that of leachate plant, and tools and equipment used at the site.

Interviews

Direct interviews were administered to SW workers of KCCA and the private sector at solid waste collection points. The SW workers included collectors, drivers and truck loaders. The workers provided information on the state of the tools they use, the solid waste collecting

Table 1.1 A summary of the target population and sample size.

Categories	Drivers	KCCA solid waste managers	KCCA leaders	Private company leaders	KCCA/PS SW collectors	KCCA/PS truck workers	Community	Waste pickers	KCCA health and education inspectors	Total
Target Population	70	05	05	20	132	130	-	150	05	-
Divisions Central	12	01	01	03	20	18	76	22	01	154
Nakawa	12	01	01	03	20	18	76	22	01	154
Makindye	12	01	01	03	20	18	76	22	01	154
	12				20	18				
Kawempe	12	01	01	03	20	18	76	22	01	154
Rubaga	12	01	01	03	20	18	76	22	01	154
Sample size	60	05	05	15	100	90	380	110	05	770

schedules and the status of the roads used by refuse trucks, etc. The waste pickers provided information on the waste materials they pick, SW storage facilities and transportation to marketing centers in the city and the benefits they derive from the sale of waste materials. Furthermore, samples from the communities in each division were interviewed on waste reduction, storage and disposal practices.

Procedure

The pilot study was conducted for two months, from April to May 2012 after which data collection was done in the study area for seven months from June to December 2012 with the help of four research assistants. Questionnaires were distributed to SW managers, town clerks, private sector leaders and community respondents in each of the five divisions of Kampala in June. They were completed and collected from the respondents in August. Interviews and

observations were conducted simultaneously in the study area. The interviews were held from September to December 2012.

Data Analysis

Data was coded entered into the computer system for analysis using Microsoft Excel and Statistical Package for Social Sciences (SPSS) to obtain statistical values that were relied upon in the interpretation and discussion of findings. Quantitative data was presented using frequency tables and graphs. The paired sample difference test analysis, Pearson correlation and Chi square test were used to test the significance of the relationship between the variables after which the discussion of the findings was done according to the study objectives. Qualitative data of descriptive type was coded, transformed into sub-themes and incorporated in findings and discussion sections of this chapter.

FINDINGS

Data of performance on quantity of solid waste (tons) is presented in Tables 1.2 -1.6 and Figures 1.1 -1.4. Overall data indicates that there are variations in the amount of solid waste collected and disposed of by the Private sector and KCCA.

Quantity of solid waste disposal by KCCA and the Private sector

The trends of amount of solid waste disposed of at the landfill by KCCA and the Private sector from 2008 to 2012 are shown in Figure 1.1.

Source: KCCA Records

In the five year period (2008-2012), KCCA had an increase in tonnage delivered to the landfill from 79,769 tons to 147,820 tons (180%) compared to the private sector which had an increase of only 6% from 118,039 tons to 121,923 tons of SW. The increase in solid waste delivery to the landfill could be attributed to improvement in governance and community education by KCCA. Overall during this period, the private sector SW delivered slightly more SW 604,814 total metric tons (51%) than KCCA's 570,518 tons (49%). However, it was established that for the period 2008 to 2012, there was no significant difference ($P > 0.05$) in the tonnage of SW delivered to the landfill by KCCA and that of the private sector companies. The quantity of SW (metric tons) transported to the landfill 2008-2012 by KCCA and the private sector per division is shown in Table 1.2.

Source: KCCA Records

Overall, KCCA increased its tonnage of waste delivery to the landfill by 40% from 16,000 tons in 2008 to 22,500 tons in 2010 and the private sector generally declined by 4% in the same period despite its solid waste deliveries to the landfill having been higher than those of KCCA from 2008 to 2010. With the change in the city administration and restructuring in 2011, the performance of KCCA administration was better than that of the private sector in the collection and disposal of solid waste from the city to the landfill from 2011 to 2012. In 2011, KCCA delivered 28,000 mean tons of solid waste to the landfill which was higher by 16% (24,000 tons) of tons of solid waste by the private sector. The private sector performed better than KCCA in the delivery of solid waste to the landfill from 2008 to 2010 but KCCA performed better than the private sector in waste delivery to the landfill in 2011 and 2012. Comparison of mean SW(tons) in divisions delivered to the landfill by KCCA and the private sector in the years 2008-2012 is shown in Figure 1.3.

Source: KCCA Records

Figure 1.3 reveals that KCCA disposed-off more solid waste than the private sector from the divisions of Rubaga, Nakawa and Makindye while the private sector disposed of more solid waste than KCCA from Kawempe and Central divisions in the same period. KCCA disposed of 20,200 tons which was 12% higher than the private sector that disposed of 18,000 tons from Nakawa division to the landfill. Overall KCCA performed better than the private sector in the Rubaga, Nakawa and Makindye divisions whereas the private sector was better than KCCA in Kawempe and Central division in the amount of wastes delivered to the landfill from 2008 to 2012.

Number of solid waste trips made to the landfill by KCCA and the Private sector

Waste trips delivered to the landfill by KCCA and Private sectors in Kampala city are summarized in Table 4.4 below.

Table 1.3 reveals that the private sector made 86,399 (mean 17, 279 per year) solid waste trips from 2008 to 2012 compared to KCCA's 81, 567 (mean 16,313 trips per year). KCCA SW trips increased by 28% from 11,395 trips in 2008 to 15, 972 trips in 2010, but this was less than the trips made by the private sector in the same period. The Private sector delivered between 17,100 - 17,500 trips of SW from 2008 – 2010 which was more than those made by KCCA in the same period. The private sector experienced a slight decline by 0.9% (163) in the number of trips made to the landfill in 2011. There was a slight increase of 1% (318 trips) to 17,180 trips of the private sector in 2012, yet SW trips delivered by KCCA increased by 3% (637) from 2011 to 2012. The number of trips of the Private sector declined, while KCCA SW trips steadily increased in the five year period 2008-2012. This may be attributed to improved community education and governance by KCCA, see Table 4.4.

Fuel consumption and expenditure by KCCA and the Private sector in Kampala city during 2008-2012

The fuel (Diesel) comparison between KCCA and the Private sector (PS) consumption and expenditure on solid waste transportation to the landfill from Kampala city is shown below in Tables 1.4.

KCCA increased its consumption by 75% (149,328 liters) from 196,844 liters to 346,172 liters and expenditure by 1.1 times from Shs505,889,080= to Shs 1,100,626,232= from 2008 to 2012 compared to the private sector whose fuel consumption declined by 5% (14,205 liters) and expenditure by 28% (166,713,130=) from 2008 to 2010. Furthermore, the private sector increased its fuel consumption by 2% (6,040 liters) from 291, 483 liters in 2011 to 297,523 liters in 2012. This implies that the private sector consumed more fuel and spent more money than the KCCA in the period 2008 to 2010; in other words, the private sector delivered more solid

Table 1. 2. SW delivered to the landfill in metric tons by KCCA and the Private sector per division in Kampala city.

Division	Rubaga		Nakawa		Kawempe		Makindye		Central	
	PS	KCCA	PS	KCCA	PS	KCCA	PS	KCCA	PS	KCCA
Years										
2008	2,790	14,098	16,374	11,272	29,212	12,092	5,595	8,409	67,952	33,896
2009	2,040	16,648	16,644	9,250	37,827	12,039	4,096	8,027	64,803	42,262
2010	2,100	19,648	18,593	21,118	31,414	16,812	4,208	11,708	62,865	42,520
2011	4,730	27,372	18,817	29,759	21,881	25,634	9,535	20,103	63,076	40,495
2012	4,512	27,500	18,420	29,800	22,400	26,700	9,830	21,420	65,100	42,400
Total	16,172	104,802	88,848	101,199	142,734	93,277	33,264	69,667	323,796	201,573
Mean	3,234	20,960	17,769	20,239	28,546	18,655	6,652	13,933	64,759	40,314

waste trips to the landfill than KCCA. The private sector therefore performed better than KCCA during 2008 - 2010. This good performance could be attributed to the private sector's commitment to their contract obligation and increased supervision as well monitoring and evaluation by KCCA. On the other hand, KCCA better performance in 2011 and 2012 could be attributed to the good administration of KCCA which had better community education, supervision and monitoring of the workers activities in their operational area in the city in 2011 to 2012 (Table 1.5).

Public perceptions on the collection and disposal of solid waste by KCCA and the Private sector in Kampala city Sixty percent (114) of the respondents in the affluent areas (Kololo, Naguruand Muyenga) preferred the private sector in the delivery of solid waste services while 80% (152) were satisfied with KCCA's waste services in the less affluent areas including markets, industrial area, business centers and educational institutions. According to the field survey solid waste collection is done daily in some households, markets, industrial area, business centers and educational institutions by both KCCA and the Private sector companies. SW collection is also done on monthly basis or twice in a month by KCCA mainly in markets, industrial areas and educational institutions. KCCA introduced door-to-door waste collection to supplement the communal waste point collection services with the intention of speeding-up waste collection in the city. SW transportation to the landfill from

educational institutions (Makerere University, Kyambogo University and Kampala international University) is done by Private sector companies twice a week.

The majority of households have no specified SW storage facilities such as bins or bags. SW is stored on the ground of the courtyard or backyard. Households in some urban centers are supplied with bags/bins by the Private sectors which are emptied weekly for disposal at the landfill. The market vendors are not supplied with SW storage facilities but they transfer SW to the collection points using polythene bags, boxes, etc. for disposal. Most industries store SW on ground which is transferred to SW collection points for disposal. Business enterprises in the operational areas of KCCA were not supplied with bins or bags; they store SW on ground or improvise solid waste storage containers at the generation stage, which they empty periodically for transportation to the landfill. The high income businesses are supplied with bags by the Private sector which the workers empty periodically. Some institutions of higher learning lack bins/bags; therefore, SW is stored on the ground, or it is either burnt or buried to reduce waste accumulation. According to the field survey, garbage skips were supplied to few SW collection points in markets such as Nakasero and Owino markets by KCCA. Rating of KCCA and the Private sector performance by respondents/ communities on the collection and disposal of SW is shown in Table 1.5.

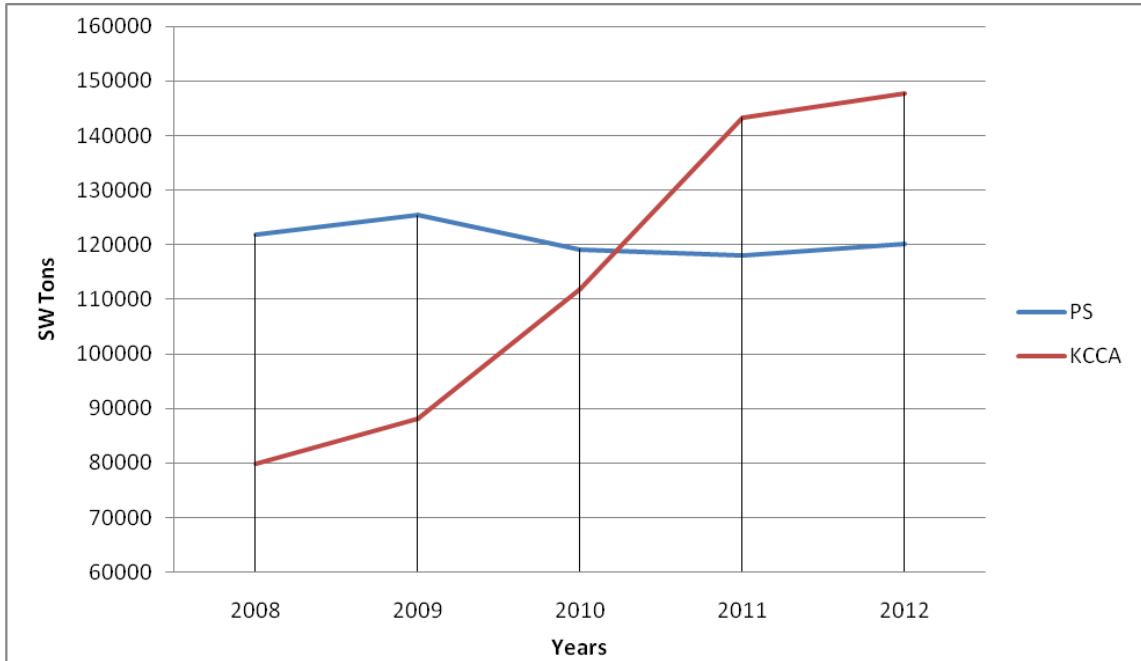


Figure 1. 1. KCCA and Private sector SW delivery to the landfill in metric tons 2008-2012.

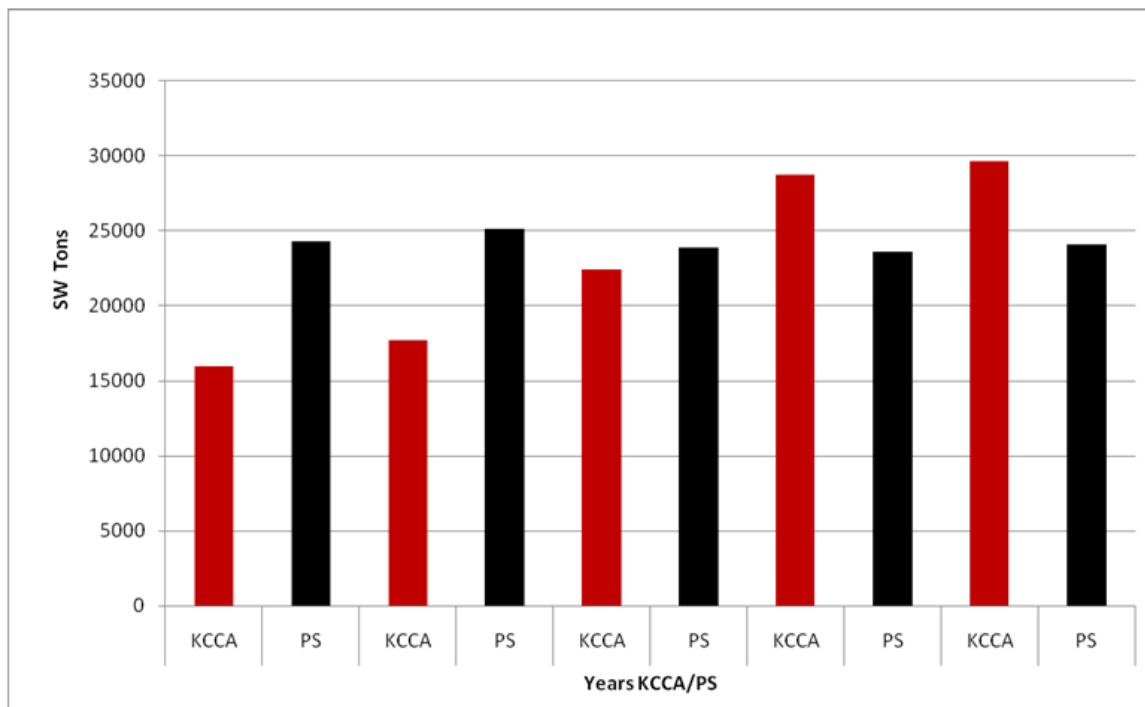


Figure 1. 2. Comparison of means of solid waste in tons for KCCA and PS for Kampala city during 2008-2012.

Three quarters (40%) of the respondents revealed that KCCA is performing poorly on the amount of SW collected in Kampala City. According to them, the amount

of SW transported to the landfill by KCCA is less than that generated in the operational area of KCCA. The Private sector transports more SW from their operational

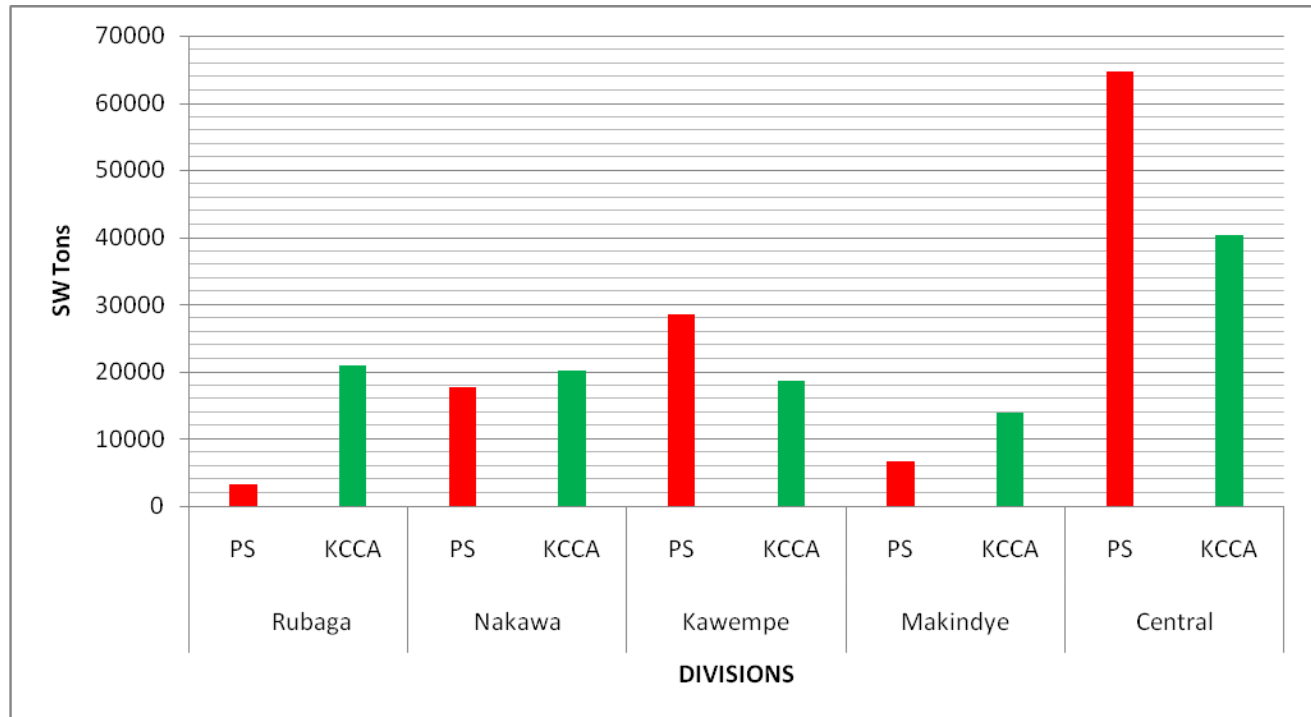


Figure 1. 3. Comparison of mean SW(tons) in divisions delivered to the landfill by KCCA and the private sector in the years 2008-2012.

Table1. 3. Comparative number of trips made during delivery of solid waste to the landfill by KCCA and Private sector in Kampala city (2008- 2012).

Years	KCCA	Private sector (PS)
2008	11,395.0	17,417.0
2009	12,603.0	17,915.0
2010	15,972.0	17,025.0
2011	20,480.0	16,862.0
2012	21,117.0	17,180.0
Total	81,567.0	86,399.0
Mean	16,313.4	17,279.0

areas compared with KCCA. Hence 53% of the respondents rated KCCA as a poor performer on transportation of SW to the landfill compared to 21% who had the same rating for the Private sector.

Sixty three percent 63% (120) rated KCCA as poor a performer in the provision of refuse containers. They further reported that garbage skips are only at a few SW collection points. The Private sector was rated to be good by 42% (80) and excellent by 32% (60) on the provision of containers. The respondents reported that the private companies supply refuse bags to their clients which they empty on weekly basis for households and daily in the commercial centers (Table 1.6). The rating of solid waste collection and disposal at good-excellent level and poor-fair level in divisions of Kampala city is shown in Table 1.6.

Key: WC- Proportion of waste collected, RA- Removal of Accumulated waste, PT- Proportion of waste transported, PC- Provision of Containers

According to public perceptions the Private sector is performing better than KCCA in SW collection and disposal in Kampala city. The Private sector had more respondents who rated it as good or excellent than KCCA (see Table 1.7). In the Central division, KCCA was poorly rated on the proportion of waste collected, removal of accumulated waste and proportion of waste transported. Few respondents 2(5%) rated KCCA as good-excellent on the provision of refuse containers. The Private sector was rated as good- excellent by over 60% of the respondents on these aspects.

In Rubaga division, KCCA was not rated at the "good-excellent" level in the provision of containers. It was rated

Table 1. 4. Comparison of KCCA and Private sector (PS) Fuel (Diesel) Consumption and expenditure on Solid waste transportation to the landfill from Kampala city.

Years	KCCA		Private Sector	
	Fuel Volume (liters)	Expenditure	Fuel Volume (liters)	Expenditure
2008	196,844	505,889,080=	291,443.0	749,008,690=
2009	222,815.9	445,631,800=	283,922.8	567,845,600=
2010	272,018.17	571,238,157=	277,238.6	582,295,560=
2011	335,328.1	938,918,680=	291,483.5	816,153,800=
2012	346,172.4	1,100,828,232=	297,523.5	946,126,730=
Total	1,373,178.57	3,562,505,949=	1,441,611.4	3,661,430,380=
Mean	274,635.71	712,501,189=	288,322.28	732,286,076=

Table 1.5. Rating KCCA and the Private sector performance by respondents/ communities on the collection and disposal of SW in Kampala city.

Items	Proportion of waste collected					Proportion of waste transported				Removal of accumulated waste				Provision of containers			
	KCCA		PS			KCCA		PS		KCCA		PS		KCCA		PS	
Organization	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	
Excellent	0	0	30	15	0	0	25	15	0	0	70	37	0	0	60	32	
Good	50	26	60	32	50	26	70	37	40	21	65	34	0	0	80	42	
Fair	65	34	70	36	40	21	55	29	30	16	25	13	70	37	30	16	
Poor	75	40	30	16	100	53	40	21	120	63	30	16	120	63	20	10	
Σ f	190	100	190	100	190	100	190	100	190	100	190	100	190	100	190	100	

Table 1. 6. Rating of solid waste collection and disposal at good-excellent level in the divisions of Kampala city.

Aspect	Central		Rubaga		Makindye		Kawempe		Nakawa	
	KCCA	PS	KCCA	PS	KCCA	PS	KCCA	PS	KCCA	PS
Good-Excellent	Good-Excellent	Good-Excellent	Good-Excellent	Good-Excellent	Good-Excellent	Good-Excellent	Good-Excellent	Good-Excellent	Good-Excellent	Good-Excellent
W C	0 (0)	26 (68%)	16 (42%)	8 (21%)	3 (8%)	6 (16%)	9 (24%)	24 (63%)	25 (66%)	26 (69%)
R A	0 (0)	12 (32%)	27 (71%)	22 (58%)	0 (0)	7 (19%)	0 (0)	24 (63%)	0 (0)	10 (26%)
P T	0 (0-)	25 (66%)	27 (71%)	27 (71%)	0 (0)	9 (24%)	5 (13%)	20 (53%)	10 (26%)	18 (47%)
P C	2 (5%)	23 (61%)	0 (0)	32 (85%)	0 (0)	32 (84%)	0 (0-)	10 (26%)	0 (0)	15 (40%)
Total	2 (5%)	86 (252%)	70 (184%)	89 (235%)	3 (8%)	54 (143%)	14 (37%)	78 (205%)	35 (92%)	69 (182%)
Mean	1 (1%)	22 (63%)	17 (46%)	22 (58%)	1 (2%)	13 (35%)	3 (9%)	20 (51%)	8 (23%)	17 (45%)

by 38(100%) at the poor-fair level because the clients are not adequately supplied with refuse containers. The Private sector was rated by many respondents 32(85%) as excellent on the provision of containers to clients. However, KCCA was rated as excellent by more respondents 27(71%) compared to the Private sector 22(58%) on the removal of accumulated waste. Therefore, KCCA is performing better than the Private

sector on the removal of accumulated waste and on the amount of waste collected for disposal but the Private sector is performing better than KCCA only on the provision of refuse containers to the clients in Rubaga division (see Table 1.7).

Only 3(8%) of the respondents in Makindye division rated KCCA as good or excellent on the amount of waste collected. More respondents rated the Private sector as

good or excellent on the proportion of waste collected, proportion of waste transported, removal of accumulated waste and on the provision of refuse containers to clients. Unlike the Private sector, KCCA was rated at the poor-fair level of performance on all the aspects of solid waste collection and disposal. This implies that the private sector performed better than KCCA on the various aspects of SW collection and disposal in Makindye division.

In Kawempe division, KCCA was not rated as excellent on removal of accumulated waste and provision of containers but the Private sector was rated as excellent on all the aspects of waste collection and disposal. In Nakawa division, the Private sector performed better than KCCA on the provision of refuse containers and removal of accumulated waste in Nakawa division according to the rating by the majority of the respondents (see Table 1.6).

DISCUSSION

The quantity of waste generation was reported to be 0.5 per capita per day which compares well with 0.6 Kg per capita per day of SW World Resources, (1998-99) for Kampala city. It also compares fairly well with the waste generation of 0.78Kg per capita per day for developing countries (Benkering et al., (1999). For instance, Achankeng (2003) established that 20-80 percent of the SW is disposed of from African cities, which compares well with the 20-30 percent disposed of from Kampala city by KCCA and the Private sector NEMA, (2004/05). The estimate in Kampala also compares well with the field report of 30-40% SW disposal in Kampala. This implies that KCCA has to develop new approaches and methods to reduce on the large quantities of SW which remain uncollected in the city.

KCCA SW collection and disposal was higher in 2011 and 2012. This improvement in waste disposal was attributed to restructuring of KCCA. This was the case according to Pierre et al (2000); Smith (2007) who reported that restructuring the institutional frame work actors/parties improved partnership networking and service delivery in Malaysia. This was supported by Cooper (1998) and Caroline (2014) who said that the main duty of government is to eradicate corruption, increase efficiency and improve service delivery. The NEMA (2008) report stated that KCCA in partnership with the private sector improved its waste disposal operation by 100 percent. According to Rathi (2005) and Nyachhyon (2006), Private sector partnerships have been identified as effective tools for promoting integrated solid waste management because they are promoted to achieve a better provision of services or to improve infrastructure through a contractual relationship between the private and public entities. For example, the Government of Mali, with the assistance of the World Bank, privatized its waste services and waste removal

improved considerably Miles, (1994). This is supported by Water Aid (2008) report which asserted that private sector participation in solid waste management can improve efficiency, reduce the need for municipal investment and share the risk associated with introducing a new technology or system.

The study found out that people residing in affluent parts of the city were more satisfied with the services of the private sector while those in less affluent areas were more satisfied with KCCA SW services. According to Stanwick *et al.* (2002) Drobertz et al (2004) Klapper et al. (2003); Mohd et al. (2015); Coles et al (2001) showed that good corporate governance seems to effectively improve the organizational performance. This may also be attributed to KCCA adherence to guidelines on SW collection and disposal and public involvement in SW collection and disposal. Abdullah (2005); Rachgan (2010); Bjerkli (2013) argued that good governance can be successfully implemented with the participation of various stakeholders (local governments, private sector and community etc.) related with the service.

KCCA transported more SW from Rubaga, Nakawa, and Makindye divisions than the Private sector. The private sector transported more SW than KCCA from Kawempe and Central division. This implies that there was increase in waste collection and disposal over the five-year period for KCCA and the private sector. KCCA waste collection coverage was more compared to that of the private sector. This concurs with George (2005) who said that it is the government's duty to provide effective and efficient services that are not provided by the private sector to the underserved and unprivileged population. Indeed, KCCA's volume of SW delivery to the landfill was higher than the private sector in Nakawa, Makindye and Rubaga while that of the Private sector was higher than KCCA in Kawempe and Central division.

The Private sector transported more SW than KCCA from the most industrialized and commercialized divisions (Kawempe and Central) of Kampala city to the landfill. The Private sector can increase service efficiency and coverage Bartone, (1999); Kristina (2004); Sharholy et al, (2008). This is also attributed to the provision of more personnel, equipment and supervision by the Private sector (Cointreau et al, (2000); Horning, (2005); Hauser, (2000). This implies that the Private sector can increase the volume of SW transported to the landfill by provision of more equipment and personnel. This is supported by Kironde *et al.* (1997) who said that the success of municipalities in waste management is in most cases reflected on availability of resources as well as good governance. Increasing tonnage of SW transported to the landfill by both KCCA and the Private sector was an outcome of the population increase. UN Population Division (2002) predicted that urban population growth rates would be highest in Africa from 1950-2020. Therefore, the increasing urban population could have contributed to the increasing waste generation in

Kampala city. Increasing urban opportunities were reported to be the cause of rapid urban growth rates Domenach-Chich (2000); Harsch (2001). The World Bank reported that 4.5% is the annual urban population growth in Uganda. This percentage increase could be responsible for the increased waste generation in the city. According to MFPED (2008), Uganda's urban population growth rate is 5.7% annually and the total urban population is 3.9 million. Family planning, control of family size and immunization could lessen the growing population and hence reduce on the quantity of waste generation in the city.

The Private sector delivered more trips than KCCA in the five-year period, 2008-2012. This may be attributed to the private sector fulfillment of their contract obligations, i.e., involving their workers, technical staff and technologies Hauser, (2000). However, a breakdown of refuse trucks and delayed salary payments to SW workers could contribute to the less tonnage of SW delivered by KCCA and Private sector. The private sector refuse fuel truck consumption was less than KCCA refuse fuel truck consumption. The correlation coefficient between KCCA and Private sector fuel consumption using the Pearson correlation r-value was 0.5, implying that there was a strong relationship between KCCA and Private sector truck fuel consumption in Kampala city. As fuel consumption for KCCA increased, so did the private sector fuel consumption albeit a different magnitude.

KCCA trucks made more trips to the landfill than the private sector in the two-year period 2011-2012, thus consuming more fuel than the private sector trucks. Consequently KCCA had a higher expenditure on fuel than the Private sector. KCCA improved administration improved waste service delivery. According to Juttau (2011) and Badgie et al. (2012) good governance has been viewed as an important element to promote the national agenda in developing countries in delivery of services. The high prices of fuel may be attributed to the increase in petroleum prices on world market and budget tariffs that were imposed on petroleum by the government from 2008 to 2012. The demand for petroleum products globally is also increasing and it is responsible for the world increase in prices of petroleum products Edward, (2004).

According to the community, KCCA and Private sector were evaluated as good and excellent. This implies that both KCCA and the Private sector performances in SW collection and disposal satisfy the residents of Kampala city. Emerging literature on solid waste management suggests that involvement of professional collectors, private institutions can prove more effective in the management of solid waste rather than involving only public institutions Olley et al. (1999); Coker et al. (1999); Osucha (1999); NEMA (2006/07). Solid waste management services have been provided by the Private sector for decades in the more prosperous nations, with notable successes and their services have been

extended to the south in low income cities. The Private sector has improved on SW collection and disposal in the city (City Environment officer, NEMA). According to the NEMA report (2008), SW collection and disposal has been improved by the Private sector. At the divisional level, KCCA was rated with an average of 33% as excellent on the proportion of waste collected and transported and the removal of accumulated waste; however, the Private sector had a lower average of 26% at the excellent level on the same aspects. This implies that KCCA performed better than the Private sector on collection, transportation and removal of accumulated waste in Rubaga division. This is attributed to KCCA's improved administration and commitment to SW collection and disposal in Rubaga division and the involvement of Private sector companies in SW collection and disposal. However, the Private sector was better than KCCA in supplying SW containers to its clients in Rubaga division. Both KCCA and the Private sector were rated by the majority of respondents in Makindye division as fair with regard to the proportion of SW collected, proportion of SW transported to the landfill and removal of accumulated SW. Hence, both KCCA and the Private sector should improve on their community grading to the excellent level by improving on their performance on all aspects of SW collection and disposal in Makindye division.

The Private sector and KCCA were both good at the amount of SW collected and fair at the proportion of SW they transport to the landfill. Meanwhile the Private sector is better than KCCA at the provision of refuse containers in Nakawa division and the Private sector is better than KCCA at the removal of accumulated waste from Nakawa division. Therefore, the Private sector is better than KCCA in aspects of SW collection and disposal in Nakawa division. The respondents attributed the low rating of KCCA to political interference in solid waste management programs. Rotich et al. (2005) argued that political interference hampers smooth running of local authorities in the management of solid waste in Nairobi city. The respondents rated the Private sector as being better than KCCA at the level of excellent performance in Kawempe and Central division as far as the provision of solid waste services is concerned while KCCA performed well in Rubaga and fairly well in Makindye and Nakawa divisions.

CONCLUSION

Generally, the Private sector transported more metric tons of SW than KCCA to the landfill from Kampala city in the five-year period, 2008-2012. KCCA increased its SW deliveries to the landfill in the same period because of improved governance. Therefore good governance by either public or private organization improves delivery of services including waste management services. However overall it was established that for the period 2008 to

2012, there was no significant difference ($P > 0.05$) in the tonnage of SW delivered to the landfill by KCCA, and the Private sector companies.

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