

ANALYSIS OF PUBLIC AND PRIVATE AGENTS IN REFUSE DISPOSAL SERVICES IN URBAN TOWNS IN DELTA STATE, NIGERIA

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ABSTRACT

The study was meant to analyse the impact of the new entrant (private sector) into the waste disposal industry against the conventional (public sector) in waste disposal as perceived by users as a means of advocating and promoting co-operative approach or a hand off of the weaker sector among the two. In Nigeria the general belief that waste disposal is a public good has failed, hence the heap of refuse found in Nigerian cities. The study adopted the field survey design using 214 samples, who were Household heads (180) and Environmental officer (34), four research questions and one hypothesis that guided the study. Descriptive statistics and paired t-test were used to analyze the data at 0.05 alpha. It was found that the private sector had advantaged score in all four variables of equipment, personnel, cost effectiveness and general overall effectiveness over the public sector. It was recommended among others that government/private participation should be encouraged and the private sector participation in refuse disposal would be a better means of keeping a sanitary environment.

Key Words: Public, Private, Refuse, Disposal, Nigeria.

INTRODUCTION

The challenges of waste management in developing countries continue to generate thoughts, interest and research. There are three types of waste; solid, liquid and gaseous waste. Solid wastes are commonly found in heaps along Nigeria streets and roads. The odour emanating from such heaps constitute nuisances and the heaps constitute a breeding ground for disease vectors, like mosquitoes, cockroaches, rodents, reptiles, and even human scavengers (the mentality ill) among others (Izugbore and Umoh 2004, Lelege and Ogean 2003, Mebogunje, 1974). Recent researches in waste management include Oludode and Ogundele (2007), Dansu and Oladipupo (2007), Ekpu and Archibong (2007). These researches were directed at either identifying causes or assessing the effects and were concerned with government actions on waste disposal. Others, were interested in methods and recycling of waste. Few attempts have been made to study the place of the private sector in waste management (Cointreau, 1994, nigerianewsnow 2003, Agyepong, 2011).

Before now waste management was the prerogative of the public sector in Nigeria – via the local government or the ministry of waste management. But the heap of refuse found in most public places, the streets, markets, motor parks and so on became of concern to many business persons who felt that the private sector would do better than the public sectors. Earlier attempts by the private sector were in major cities; Lagos, Ibadan, Kaduna, Asaba, Warri to mention but a few. The free waste disposal by the public was being challenged by the ability to pay waste disposal agents of the private sector.

As researchers attempt to look towards the private sector for better environment, this researcher became interested in making a comparison between the public and private agents in waste disposal so as to make policy recommendations based on user's perception. Waste disposal means methods of disposing waste either from the home to the dump site or from the home through the refuse collecting centre to the dump site (Moronkola and Okowlawon, 2003). Or it could be disposal of industrial waste from the company to the dump site. Refuse, according to Oxford Dictionary (2001:757) is "matter thrown away as worthless". Refuse is a major factor on environmental health that has attracted man's attention over the years. According to Egbon (2005:63), "Nigerian progressive industries are a welcome development as these industries produce needed goods and services. However the accumulation of solid, gaseous and liquid wastes in the country has remained one of the insurmountable problems faced by various governments and mankind". Egbon (2005:63) quoting in environmentalist who stated that "refuse, polyethylene bags, plastic, textile, paper garbage's and rubber everywhere. Where do we go from here"? In the past, it was solely government agents that disposed waste. Has this been successful? If so why the heaps or mountains of refuse on our streets? Why are the streets littered with all types of waste including human and animal faecal matters? Hence the intervention of the private sector becomes a welcome development.

There are two patterns of refuse found on Nigerian streets (1) the heap of refuse found in collection centre's that remain unclear at regular interval and (2) polymers, papers, broken bottles, cans, cartoons, food rap leaves, among others. This is due to the use- and -dump anywhere attitude of Nigerians. At times, children and young men and women carry their refuses in bags and throw them on the streets at night. The responsibility of refuse disposal is conventionally that of the local government. Private contractors also collect refuse from homes by emptying refuse drums kept at strategic place within the compound.

This study attempted to compare public and private agents disposing refuse. The major factors that affect waste management technique in Nigerian were lack of equipment such bulldozers, pail loaders, sanitary refuse vans among others (Oreyomi, 1998). Nigerianewsnow (2003) conceptualize that the issue of private sector participation involved three areas: the immediate community such as (Landlords and Tenants Association), the Local Government and Private Sector in refuse disposal. Agyepong (2011) reported that private sector participates in waste management in Ghana was influenced by (i) regulating framework (ii) public attitude (iii) rapid urbanization and poor planning (iv) capacity of human resource (v) finance among others. Cook and Ayee (2004) reported structural changes in policy in environmental health involving, Environmental Health Officers (EHOS) from Ministry of Health to Local Government and to Metropolitan Assemblies. He stated further that, this led to public/private participation.

In Delta State many government agencies have been involved in refuse management, from Local Governments of the Ministry of waste management and Delta State environmental protection agency. With all these public agencies involvement in waste disposal, the environment remains filthy and untidy thus the aesthetic environment of Nigerian street especially Delta State does not exist. Hence both public disposal and private agencies were involved in refuse disposal with similar functions or duplication of functions or conflicting functions. The success of these agencies will depend on the followings, effectiveness, equipment, personnel and cost. These variables will determine patronage or acceptance of either the public or private sector in refuse disposal.

Delta State, Nigeria was chosen for this study because of her multi-lingual structure which is a replica of Nigeria. Delta has more than six (6) tribes. It has Nigerian fair share of oil – revenue which make people believe that Delta’s environment could be a paces setter for other states in Nigeria. She has much rural as well as urban area. It has upland and riverine areas.

REVIEW

Although private participation is not as popular as the public participation in refuse disposal, few authors attempted to survey the relationship or differences between the two. Okoko (2003) studied the girl child scavenger in Lagos. The sample frame was the 3 zone with 20 deposit sites, with 100 girl’s involvement in the study. Their ages were between 9-25 years. The study revealed that the type of materials sorted were rags 1% paper, 12% bottle and glass, 10% metal scraps, 12% and plastic and polythene were 75%. Evidently, the scavenging attitude could be seen as an unorganized private involvement in refuse management and a survival strategy for the low-income earner in urban Nigeria. In another study, Amarasekera (2008) studied the activities, of the informal sector in waste collection and management in urban India. The study revealed that 50% of waste collection in India (Amritsar city) was private/informal sector managed. About 7% of the wastes were recycled while 93% were scavenged. The study revealed that the informal sector was initially misunderstood but further studies have proven their relevance. Based on the findings of the study, a model for solid management for the city of Amritsar was suggested. Amritsar was to seek integration of both the public and informal sectors in waste management. The suggestion if well implemented will create more jobs, reduce poverty and sanitary conditions, and minimize public investment on personnel and equipment.

In another study, Agyepong (2011) reported the activities of Zoomlion Ghana Limited, a private waste management company in Ghana. It reported that the company currently operates in all metropolitan/municipal/district assemblies in Ghana. The range of services include among others solid waste collection, land fill management, land scrapping and beautification services, janitorial and indoor cleaning services, vector control services, fabrication and sales of refuse containers. Agyepong (2011) reported barriers to private sector participation in waste management in Ghana to include regulation framework, public attitude, rapid urbanization and poor planning, capacity of human resources, finance, weak research support and politics. The report recommended the followings: (1) That increase / participation of the policy and supervisory roles of public service in waste management would improve the situations (2) The need for improved legal and regulatory instruments (3) introduction of incentive schemes such as subsidies, concessional loan and tax incentives (4) That waste should be regarded as a great economic resource reform to land acquisition, urban planning with regard to waste management (5) public education on waste disposal should be taken as a national assignment.

Research questions

Four research questions and one hypothesis were generated to guide the study:

1. To what extent is public and private refuse disposal agents differ in the availability of equipment for effective refuse disposal in urban towns in Delta State?
2. To what extent is public and private refuse agents differ on number and quality of personnel for refuse disposal in urban towns in Delta State?
3. To what extent is public and private refuse disposal agents differ in their services in term of cost benefit ratio in urban towns in Delta State?
4. To what extent is public and private refuse disposal agents differ in their effectiveness in refuse disposal in urban towns in Delta State?

Hypothesis

There is no significant difference in efficiency, personnel, equipment availability and cost benefit-ratio in service provision between the public and private sectors in refuse disposal in urban towns in Delta State.

Materials and Method

The study adapted the *expost facto* research design, using cross sectioned approach. Delta State has a population of about 4,000,000 people with a household size of 5 persons per household making a household population of about 800,000 (Delta State Diary, 2003). Nigeria has an urban/rural population of 40:60 (Nigerian Population Statistics, 2006). Thus the household population for this study was estimated at 320,000 household heads. Of this number, only about 9600 use private and public disposal agents (Local Government Records, 2012-pitt study). This amounts to 9600 household heads which form the target population of the study from which the sample size was projected. The inclusion criterion was household using both public and private disposal services. The sample size was 214, household heads and environmental Health Officers. The sample size was informed by the food and agriculture standard, that recommended 184 for a population less than 10,000 (Areoye, 1998). Six urban towns were chosen from the urban towns of the state, by stratification into the three senatorial districts of the state. Two towns each were

picked from each senatorial district by simple ballot. The multi stage cluster and systematic sampling techniques were used throughout the study. The multi-stage was used to select two settlements (two clusters) from each urban-town making a total of 12 settlements. The systematic sampling technique was used to sample 15 household heads from 30 housing units. To select a housing unit, a bottle or pen is spinned at the centre of the settlement and the housing units pointed by spinned bottle becomes the start point of the cluster or settlement. Moving on the right side of the starting point, one housing unit was sampled from every three housing units (systematic sampling techniques) making a total of 15.

From each housing unit, a household using both public and private refuse disposal agents was picked. However when a housing unit has more than one user of public and private refuse disposal agents, a simple ballot was used to sample only one of the households. A total of 180 household heads were sampled for the study. From a sampling frame of 68 Environmental Health Officers, 34 were sampled by systematic sampling. Thus, 180 household heads and 34 Environmental Health Officers took part in the study making a sample size of 214.

The instrument was a self-designed and self reporting public and private refuse disposal questionnaire with 36 statement items. Grouped under efficiency, equipment, personnel and cost effectiveness. The questionnaire was face-value validated by researchers/professors in environmental health, / Head of environment health department and private agent's representatives. It was found worthy of use with minor amendments. The cronbach's alpha was used to determine the internal consistency of the instrument as reliability. It had a cronbach's alpha of .68 which was satisfactory.

The instrument was administered to the head of the household in the house. When the household head was not lettered enough to complete the questionnaire, a learned member of the household guides him/her with explanation and documentation only. The Environmental Health officers were administered the questionnaire in their offices. The data were analyzed using descriptive statistics and per t-test at 0.05 alpha.

This research was conducted between December 2011 and March 2012, a period of 4 months. Delta State is one of the crude oil producing state of Nigeria in the South-south geographical zone.

Data Analysis

The data generated from the study were analyzed as follows:

Table 1: Descriptive Item Analysis of the Variables

Item	X	SD	N
Goveff	10.76	2.86	214
Gov. equip	9.23	2.44	214
Gov.per	8.86	2.37	214
Gov.cosff	8.74	2.23	214
Piveff	11.92	3.74	214
Pivequip	10.98	2.92	214
Pivper	10.79	2.55	214
Pivcosff	11.14	2.56	214

Key:

Goveff	–	Government refuse disposal agents efficiency
Govequip	–	Government refuse disposal agents equipment available
Govper	–	Government refuse disposal agents personnel available
Govcosff	–	Government refuse disposal agents cost effectiveness
Priveff	–	Private refuse disposal agents' efficiency
Privequip	–	Private refuse disposal agents equipment available
Pivper	–	Private refuse disposal agents personnel
Pivcosff	–	Private refuse agents cost effectiveness

Analyzing table 1 revealed that the private refuse disposal agents have advantage over the Government Refuse Disposal Agents; in all four variables of equipment, personnel, cost-benefit ratio (cost effectiveness) and the general efficiency performance.

Table 2: A Paired *t*-test Comparison between Government Refuse Disposal and Private Refuse Disposal Agents on the Availability of Equipment for Refuse Disposal

	Paired Differences					<i>t</i> -value	Sign
	Mean	Std. deviation	Std. error Mean	95% confidence interval of the Difference			
				Lower	Upper		
Govequip	8.23	2.44	0.166	-2.13	-1.36	-8.91	.000
Privequip	10.98	2.92	19				

Table 2 reveals that private agents had a higher means score than government agents on availability of equipment for refuse disposal. A *t*-test comparison between government agents and private agents had a *t*-value of -8.91 and significant at .01, *alpha*. It shows that there is a significant difference between government and private agents on the availability of equipment for refuse disposal. From the mean score it can be deduced that the advantage is in favour of private refuse disposal agents.

Table 3: A paired *t*-test comparison between government refuse disposal agents and private refuse disposal agents on the availability of personnel for refuse disposal

	Paired Differences					<i>t</i> -value	Df	Sign
	Mean	Std. deviation	Std. error Mean	95% confidence interval of the Difference				
				Lower	Upper			
Govper	8.86	2.37	.16	-2.32	-1.52	-9.38	213	.000
Privper	10.79	2.55	.17					

Table 3 reveals that Private Agents had better means than Government Agents on personnel for refuse disposal. A paired t-test comparison had a *t*-value of -9.38 and significant at .01. From the mean, it could be observed that the significant advantage was in favour of private refuse disposal agents; thus, the private sector owns more personnel than public sector in waste disposal.

Table 4: Paired t-test comparison tables between governments refuse disposal agents and private refuse disposal agents on cost-benefit ratio (cost effectiveness)

	Paired Differences					<i>t</i> -value	Df	Sign
	Mean	Std. deviation	Std. error Mean	95% confidence interval of the Difference				
				Lower	Upper			
Govcosff	9.74	2.23	.15	-1.75	-1.05	-7.98	213	.000
Privcosff	11.14	2.57	.17					

Table 4 presentation shows that private refuse disposal agents scored higher mean than Government agents on cost effectiveness. A paired *t*-test comparison revealed -7.0, significant at .01, the significance was in favour of Private Refuse Disposal Agents on cost effectiveness on refuse disposal judging from the means score.

Table 5: A paired t-test comparison table between government and private refuse disposal agents on the overall effectiveness

	Paired Differences					<i>t</i> -value	Df	Sign
	Mean	Std. deviation	Std. error Mean	95% confidence interval of the Difference				
				Lower	Upper			
Goveff	10.78	2.86	.19	-1.76	-5.1	-3.58	213	.000
Priveff	11.92	3.74	.25					

Table five showed that private refuse disposal agents had a higher mean than government refuse disposal agent on the overall evaluation of effectiveness. A paired t-test comparisons shows a *t*-value of -3.58 and significant at .01. The significance is in favour of Private Disposal Agents.

DISCUSSION

Initial analysis of the data by descriptive statistics showed the advantages, the private sector had over the Government sector in disposal of refuse. In all four comparisons of equipment, personnels and cost-ratio benefits (cost effectiveness), the private Refuse Disposal Agents were better than the Government Agents (see table 1).

When equipment variable was measured in comparison, it was revealed that there was significant difference between the Government Disposal Agents and their Private Disposal Agents. By their means, the significance was in favour of the private sector. This finding supports the findings of Ekpu and Archibong (2007) who observed that Environmental Health Officers (Governmental Agents) differ significantly from non Government Agents (Private Agents) in the use of adequate facilities among other items in refuse

disposal. Ekpu et al (2007) also cited Lawal and Aniab (1997) who observed that bureaucratic problems in government do not allow for easy release of funds, employment of adequate manpower and purchase of functional tools required for managing refuse, whereas NGOs find it easier to manage waste by various methods. Government owned organizations find this difficult to achieve. This was also the finding of Oreyomi (2005) who stated that inadequate provision of equipment such as bulldozers, pail-loaders sanitary refuse vans, mechanical shovels and storage containers have affected government effective management of waste in our urban centers.

The study also revealed that there was significant difference between Government Refuse Disposal Agents and Private Refuse Disposal Agents on personnel required for refuse disposal. This was in favour of private agents as deduced from the mean score. This findings tallies with the findings of Lawal and Aniah (1997) as cited by Ekpu and Ardibong (2007). According to the authors, bureaucratic problems in government establishment do not allow for employment of adequate manpower among other items. The study also assessed the cost-ratio benefits (cost effectiveness) between Government Refuse Disposal Agents and Private Refuse Disposal Agents. It was observed that there exists a significant difference between Government Agents and Private Agents in term of cost. Most participants in the study scored the private agents providing better service relative to cost hence the significant difference. This finding correlates the findings of Agyepong (2011) who stated that the traditional method of procuring public infrastructure and service delivery including waste management proved untenable as the public sector entities mandated with execution were characterized by inefficiencies, poor pricing policies, overstaffing, mismanagement and stagnation and therefore did not provide value of money to the public clients.

On the overall evaluation of efficiency of service between the Government Agents and Private Agents, the finding showed significant differences between the two. More participants in the study scored Private sector Agents higher than Government Sector Agents with 11.92 and 10.75 respectively. Thus, the t-value was -3.58 significant at .05 alpha. This correlates the report of Agyepong (2011) who stated that currently, private sector in taking on a major role in the delivery of what were once considered public sector services. According to the author, the progressive increase in the role of private service producers in the waste management sector over the past few years has brought about improved efficiency, effectiveness, integration and accountability. In a similar study in Beirut area, in Lebanon, the Private market for municipal solid waste management become an essential service and private sector waste management was considered more appropriate.

However, this finding was at variance with that of Dansu and Oladipupo-Okorie who found in their study in Nigeria that private sector participation was responsible for poor patronage of household solid waste patronage management by their high monetary charges, inefficiency and the lack of access to approved dumpsite. Dansu and Oladipupo Okorie's (2007) findings could be due to their patterns of research which was not comparative between the public and private sectors and therefore could not have weighted the poor performance on household waste management on the private sector.

Private sector participation is becoming increasingly popular. May be because of the failure of the conventional public method of refuse disposal which many authorities said have failed to achieve the desired result (Akpor 2005, Ikebegbe & Ogeah 2003). The policy involve, is the "user must pay principle" of financing the fiscal management of the environment (Ikelegbe and Ogeah 2003, Agyepong 2011).

CONCLUSION

This study was a comparison of public and private agents in refuse disposal in Delta State. Four research questions and one hypothesis were used to analyse the data. The variables were equipment availability, personnel, cost effectiveness and overall effectiveness. A total of 214 Household Heads and Environmental Health Officers, constituted the sample of the study. The Household survey method using multi-stage and systematic sampling were used to sample the respondents. Descriptive and paired *t*-test statistics were used to analyze the research question and hypothesis. It was found in this study that the Private Refuse Disposal Agents had higher mean scores in all the variables being analyzed. All, four variables of equipment, personnel, cost-ratio benefit and overall effectiveness were significant in favour of the private agents. It was deduced from the findings that there was need to encourage the private sector to move beyond the urban areas in environmental sanitation effort. Government on their part should encourage the private sector by the training of personnel. A larger Private sector participation in refuse disposal would therefore be a better means of keeping a sanitary environment.

RECOMMENDATIONS

It was recommended that:

- 1) The use of the private sector in refuse disposal should be made popular like the conventional method
- 2) Government and the private partnership should be encouraged to increase the scope and practice of private involvement
- 3) Government should include the private sector while planning manpower training for refuse disposal personnel
- 4) The private sector should be encouraged to extend their practice to the rural areas
- 5) Government should sell the idea of public/private investment in the waste industry both locally and internationally.

This study did not consider the degree of barriers factors to private and government participation in refuse disposal. Further studies should include inhibiting factors to both government and private sector refuse disposal efforts. Policy effort and implementation strategies on Government/Private sector should be studied.

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