



Chief Editor

Dr. A. Singaraj, M.A., M.Phil., Ph.D.

Editor

Mrs.M.Josephin Immaculate Ruba

Editorial Advisors

1. **Dr.Yi-Lin Yu**, Ph. D
Associate Professor,
Department of Advertising & Public Relations,
Fu Jen Catholic University,
Taipei, Taiwan.
2. **Dr.G. Badri Narayanan**, PhD,
Research Economist,
Center for Global Trade Analysis,
Purdue University,
West Lafayette,
Indiana, USA.
3. **Dr. Gajendra Naidu.J.**, M.Com, LL.M., M.B.A., PhD. MHRM
Professor & Head,
Faculty of Finance, Botho University,
Gaborone Campus, Botho Education Park,
Kgale, Gaborone, Botswana.
4. **Dr. Ahmed Sebihi**
Associate Professor
Islamic Culture and Social Sciences (ICSS),
Department of General Education (DGE),
Gulf Medical University (GMU), UAE.
5. **Dr. Pradeep Kumar Choudhury**,
Assistant Professor,
Institute for Studies in Industrial Development,
An ICSSR Research Institute,
New Delhi- 110070.India.
6. **Dr. Sumita Bharat Goyal**
Assistant Professor,
Department of Commerce,
Central University of Rajasthan,
Bandar Sindri, Dist-Ajmer,
Rajasthan, India
7. **Dr. C. Muniyandi**, M.Sc., M. Phil., Ph. D,
Assistant Professor,
Department of Econometrics,
School of Economics,
Madurai Kamaraj University,
Madurai-625021, Tamil Nadu, India.
8. **Dr. B. Ravi Kumar**,
Assistant Professor
Department of GBEH,
Sree Vidyanikethan Engineering College,
A.Rangampet, Tirupati,
Andhra Pradesh, India
9. **Dr. Gyanendra Awasthi**, M.Sc., Ph.D., NET
Associate Professor & HOD
Department of Biochemistry,
Dolphin (PG) Institute of Biomedical & Natural Sciences,
Dehradun, Uttarakhand, India.
10. **Dr. D.K. Awasthi**, M.SC., Ph.D.
Associate Professor
Department of Chemistry, Sri J.N.P.G. College,
Charbagh, Lucknow,
Uttar Pradesh. India

ISSN (Online) : 2455 - 3662
SJIF Impact Factor :4.924

EPRA International Journal of **Multidisciplinary Research**

Monthly Peer Reviewed & Indexed
International Online Journal

Volume: 4 Issue:7 July 2018



Published By :
EPRA Journals

CC License



**EPRA International Journal of
Multidisciplinary Research (IJMR)**

**TESTING THE FUNDAMENTALS OF PRIVATE-PUBLIC
PARTNERSHIP IN SOLID WASTE MANAGEMENT IN
THE ACCRA METROPOLITAN AREA**

Richard Antwako Adu
Assistant professor,
Department of Environmental Science,
William V.S. Tubman University,
Harper, Liberia

ABSTRACT

Solid waste management (SWM) has undergone many reforms, considering public, private or private-public arrangement to separately meet the public needs. This paper focuses on 1) interrogating the principal-agent theory to understand the private-public partnership, and 2) the impact of private-public partnership in rendering solid waste management in the Accra metropolitan area.

Using multiple sampling techniques, literature and primary sources furnished data on solid waste management operations, procurement and regulatory framework, as well as the shareholders in the solid waste management. Further data collection covered solid waste recoverability, recyclability, marketability and solid waste collection services.

The principal-agent theory largely remains unexplored to optimize sustainable solid waste management under a private-public partnership. Findings indicated that the legal instrument focuses on the single stream at the expense of the various solid waste constituents, resulting in health and environmental degradation. The paper also affirmed that the Accra metropolitan assembly's role is reduced to monitoring, vis-à-vis, the assembly is fraught with both logical and financial problems. The paper further points out that solid waste recovery is under exploited, particularly, because the recycling chain is not well-formalized.

This implies that there are glaring gaps in the solid waste management offered through the private-public partnership in the Accra metropolitan area.

KEYWORDS: *Principal-agent theory, private-public partnership, solid waste scavengers, solid waste management, and waste recoverability*

INTRODUCTION

In responding to the challenges confronting solid waste management (SWM) in the Accra metropolitan area, both private and public monopolies were engaged separately to provide SWM services (Obireh-Opareh and Post, 2002; Oteng-Ababio, 2009), and lately, migrating to the private-public partnerships to offering solid waste management (Oteng-Ababio, 2010). The current arrangement, however, portrays a failing solid waste management, leading to health and environmental complications (Weeks, 1999; Salem et al. 2008). This paper investigates the principal-agent theory to discern private-public partnership and further analyze the impact of private-public partnership on solid waste management in the Accra metropolitan area.

This paper considered 200 respondents for this research. Solid waste management data were extracted from interviews, focus-group discussions, field observations and documentary sources. Data include SWM regulations, procurement, recoverability, recyclability, solid waste collection service. Sampling techniques were integrated suitably to elicit data from SWM shareholders.

Findings indicate that monitoring and regulatory undertaking remains ineffectual; and coupling with the irregular solid waste collection

service in the various income areas. Additionally, the paper revealed that material recoverability remains minimally low, thus closing loops on solid wastes is far-fetched in the Accra metropolitan area.

METHODS AND MATERIALS

Sampling techniques

From Equation 1 (Yamane, 1967), the corrected sample size approximates 204, with statistics estimating resident population of 2.1 million and floating population of 1/2 million (World Bank, 2010). The sample size calculation was referenced at a confidence level and allowable error of 95% and 7%, respectively (Yamane, 1967).

$$n = \frac{N}{1+N(e)^2} \dots \dots \dots \text{Equation 1}$$

Where *n* is the corrected sample size, N being the number of population with *e* as an allowable error (%). However, due to resource constraints, this research considered only 200 respondents as indicated in Table1. Stratified sampling was employed to divide the study area into three economic areas (Table 1), and more importantly, to avoid sampling biases in the suburban divisions. This paper assumed that the suburbs within an economic area share similar characteristics of solid waste management.

Table 1: Summary of the economic and suburban divisions

Economic Area	Suburb	Average Monthly Income (GH¢)	Respondent
Low-income area (Ashiedu Keteke)	James Town	< 100.00	50
	Chorkor		50
Middle-income area (Ashiedu Keteke)	Keneshie	100.00-1000.00	25
	Abbosey Okai		25
High-income area (Ayawaso Central)	Legon	1001.00- 2000.00	25
	Dzowulu		25
Total			200

Table 1 highlights that the low-income areas predominate the respondents for the three income areas, and revealing the gravity of SWM problems in the low-income areas. A respondent is defined as an adult with a three-month residential status, thus, substantiating the respondent to credibly volunteer solid waste management information.

Regarding respondents’ selections, 150 house numbers were marked on identical cards and spatially referenced. Further, without replacement from a box, 100 cards were drawn from the sample frame

representing respondent houses in the low-income areas. In the low-income areas, the paper focused on females because of their vital role in household SWM. Following the same procedure, 100 cards were picked randomly from a separate box of 100 identical cards. This selection order (2nd, 4th, 6th , and 100th) denoted the respondent houses in the high-income areas. The same process was repeated for the middle-income areas. The sampling technique involved both males and females because of their knowledge in household SWM. Additionally, accidental sampling

was used to gather data from the solid waste scavengers and itinerant waste buyers. The accidental sampling deemed appropriate to offset the nomadic nature of the scavengers and itinerant waste buyers, wandering for reclaimed solid wastes in the Accra metropolitan area.

Data and sources

Literature reviews were supported with data from the field observations, interviews, questionnaires as well as focus-group discussions. Data included solid waste regulation, procurement, recoverability, recyclability and solid waste collection services. Further, data were solicited from Accra metropolitan assembly (Waste Management Department), environmental protection agency-Ghana, Zoomlion Ghana Limited, J. Stanley Owusu & Company Limited, and Asadu Royal Waste Limited to complement this research.

Data collection techniques

Field observations centered on primary actors in SWM and included the proposed Kwabenya Landfill, Abokobi and Sarbah dumpsites, sorting and composting plant at Medie, waste management department, Blow Plast Company Limited and defunct Teshie-Nungua Compost Plant. Field observation helped to unearth the house numbering system; with the SWM practices being captured via camera, conversely, instincts associated with SWM remained unobservable (Kothari, 1985).

Maximizing data collection accuracy, two trained field assistants knowledgeable in Ga language assisted with the questionnaires' administration. This language edge spurred participation especially in the low-income areas. This questionnaire was administered broadly for solid waste contractors (Zoomlion Ghana Limited, Asadu Royal Waste Limited, J. Stanley Owusu & Company Limited) and consumers. Being guided through the process, 100 questionnaires were administered in the low-income areas, with middle- and high-income areas receiving 50 respectively.

Informal conversation was applied to acquire SWM data from the assembly members and opinion leaders; while interview guide approach suited the non-governmental organizations and community-based organizations making respondents contextually focused (Kothari, 1985). Open-ended questions for the interview were designed for the Accra metropolitan assembly and environmental protection agency's officers, thus allowing unknown areas to be explored in solid waste management. Lastly, focus-group discussion was used to randomly generate data from 10 squatters at the dumpsite. Focus-group discussion was ineffective because squatters were unwilling to volunteer information related to their present condition,

with the fearful perception of being evacuated by government

RESULTS AND DISCUSSIONS

Principal-agent theory

Principal-agent theory experiences a wave of definitional variance across disciplines. This paper adopted and paraphrased the definition of Jensen and Meckling (1976): a contract under which a principal engages an agent to perform services on the principal's behalf which involves the delegation of authority to the agent. This paper corroborates previous studies by Salani (1997) and European Commission (2003) that private-public partnership is an offshoot of the principal-agent theory. Added to this, this research understood that private-public partnership remains invaluable to meeting the SWM services in the Accra metropolitan area.

Prediction

Findings agreed that SWM is a contract between the private contractors and the Accra metropolitan assembly (Figure 1), and confirming reports by Oteng-Ababio (2010). Further revelation ascertained that the service provision is expanded to include solid waste management contracts, with the assembly's role being reduced solely to monitoring (European Commission, 2003; Salani, 1997). The procurement act proved potent; however, the procurement challenges are deeply embedded in the procuring entity, ranging possibly from resource constraint to inept knowledge of assembly to engage competent potential SWM contractors. Cronyism, favoritism and political interests were tied to SWM in the Accra metropolitan area. Wilson and Scheinberg, (2010) and Oteng-Ababio (2010) claimed that these practices weaken the principal-agent theory for driving the private-public partnership as a means to offering efficient SWM.

Findings further found that the Accra metropolitan assembly represents the public at the city level, and therefore compelling consumers to avail their solid wastes to the waste collection contractors. This implies that the solid waste consumers are not, in anyway, tasked with the responsibility of solid waste disposal. However, the paper established that the consumers are indirectly engaged in decision-making for solid waste management's through their representative leadership (assembly members). Surprisingly, few respondents report that solid waste management's undertakings, particularly collection fees, are being imposed on them, prompting attention to oblivious institutional arrangement for SWM among these respondents.

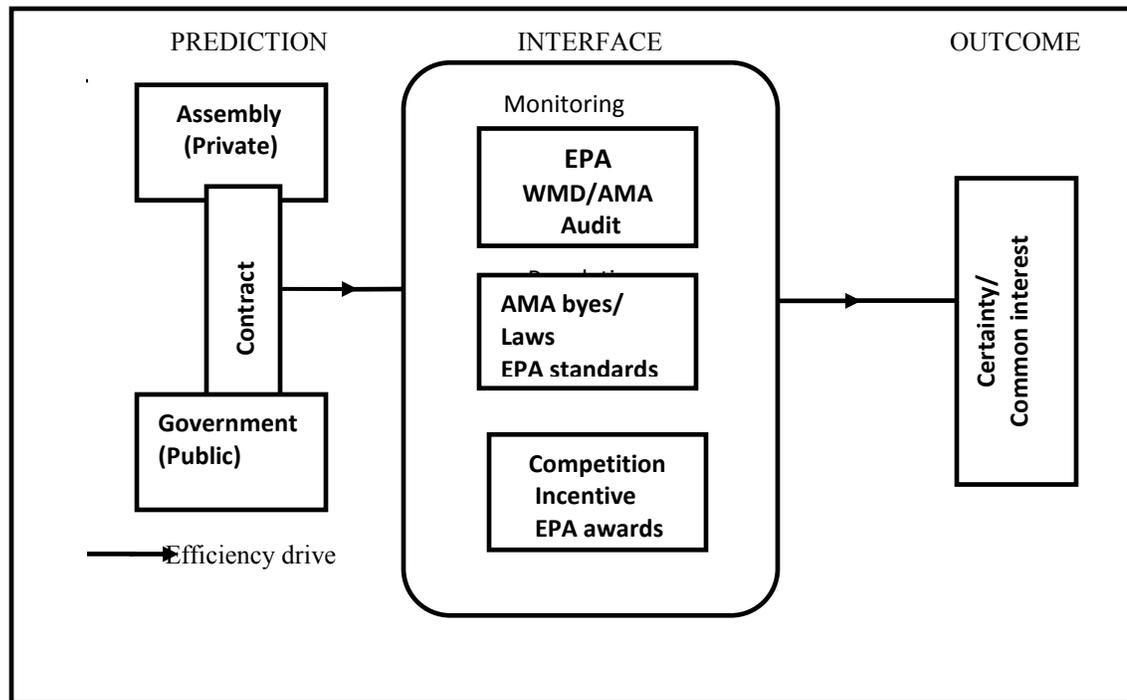


Figure 1: Showing the rudiments of principal-agent theory

This paper also showed that there is a quasi-contract existing between the waste contractors and consumers. This is obvious from the payment of solid waste collection fees among the various income areas. Moreover, the rigorousness of this consumer-contractor arrangement for solid waste collection remains fatal because the utmost action, probably instituted against failing contractual party (waste collector or consumers), is either to resort to new waste collection contractor or discontinue solid waste collection service.

Interface

Findings pointed out that monitoring poses a huge challenge to the assembly and the environmental protection agency-Ghana, and resonating with the studies conducted by Oteng-Ababio (2010). Monumental to this were limited workforce and logistical restraints, and further being exacerbated exceedingly by the administrative undertakings. Monitoring is crucial to the success of private-public partnership (Ogul and Rockman, 1990; McCubbins and Schwartz, 1984), but recurrent deviations distort the principal-agent theory, and gearing subsequently toward deficient solid waste management.

Discovery showed that the regulatory framework holistically spans the entire SWM. Its implication therefore highlights the regulatory loopholes in dealing with the various solid waste constituents, resulting in health and environmental

deterioration. Underpinning the principal-agent theory, the private-public partnership requires a comprehensive regulatory framework to be successful (Agyepong, 2011). Nyachhyon (2006) asserts that the enforcing slackness further saps solid waste management in the Accra metropolitan area. Another upshot clarified that contractual solid waste violators flee with impunity probably because the assembly previously demonstrated contractual dishonesty. According to Nyachhyon (2006), the practice dampens the principal-agent to power the private-public partnership and its resultant effects on the SWM. Budgetary, logistical and funding limitations are notably stressing the private-public partnership to deliver an integrated solid waste management.

Findings established that site identification for SWM facilities is met with remonstrations. Oteng-Ababio (2010) couched it as ‘host-community protest’, and cited the proposed Kwabenya Landfill. Past experience shows that public commitments were not fulfilled, leading to the current insurgency against proposed SWM facility siting.

As seen in Figure 1, the institutional checks are instrumental to the success of private-public partnership grounded in the principal-agent theory. Oteng-Ababio (2009) and Obiri-Opere (2002) remarked this in their studies. This research moreover stressed that carrot and stick approach is a driving force toward achieving a sustainable SWM through private-

public partnership. Likewise, competition stimulates a congenial environment to maximize the private-public partnership for solid waste management. This research concluded that the institutional checks are undermined in the private-public partnership for delivering integrated solid waste management in the Accra metropolitan area.

Outcome

From Figure 2, about 10% and 16% of the respondents patronize communal central container (CCC) in the low- and middle- income areas respectively. In the low-income areas, the respondents are unable to pay service fees while the high-income areas indirectly access the CCC through the *Kaya Bola*

(informal house-to-house solid waste collector). The research also showed that the high-income areas record no communal central container users, with the exception of institutional consumers. In addition, approximately 30% of respondents engaged *Kaya Bola* in the low-income, and 22% using *Kaya Bola* in the middle-income areas (Figure 2). The increased patronage in the low-income areas is probably linked to less service fee. On the contrary, *Kaya Bola* is also practiced in the high-income areas, rendering affordable service to barber shops and beauty salons. Almost 52.3%, 48% and 80% of the respondents use house-to-house service in the low-, middle-, high-income areas respectively (Figure 2).

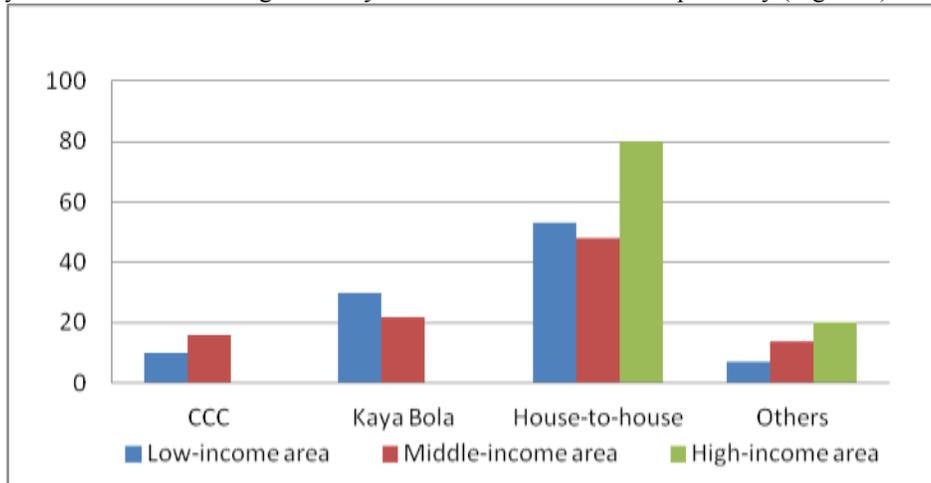


Figure 2: Solid waste collection services

Although there are fees attached, there is clear indication that the respondents are willing to pay those fees. Interestingly, *takeaway* (storing solid waste as farm inputs or throwaways in the peri-urban areas) and *direct dumping* (solid waste dumped into the collection

vehicle by unregistered residents and paying less); and burning received collectively around 17.1%, 14% and 20% in the low-, middle-, and high-income areas respectively (Figure 2).

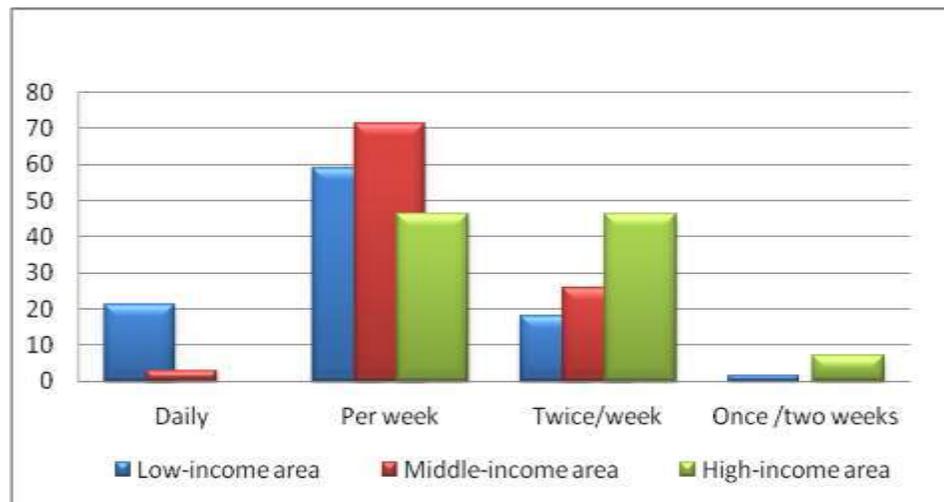


Figure 3: Solid waste collection frequency

As displayed in Figure 3, daily collection frequency accounts for about 21.3% and 10.4% in the low- and middle-income areas respectively, whilst the high-income areas received no daily service. Solid wastes generated from the said areas are mostly organics (Scheinberg and Wilson, 2010), requiring instant disposal to reduce decomposition. Similarly, the food outlets are also beneficiaries of daily solid waste collection in the high-income areas. The three income areas benefit the weekly collection service (Figure 9), with statistics indicating almost 59%, 65.8% and 46.4% for the low-, medium-, and high-income areas respectively; and their probable linkage to more can-consuming food. Importantly, about 18% of the respondents benefit the bi-weekly services in the low-income area; closely 23.7% in the middle-income area and 46.4% in the high-income area (Figure 3). This

service is an arrangement between the contractor and institutional consumers. Apropos to consumer-service provider’s agreement, no service exists agreeably for once every two weeks, but stemming from failing solid waste contractors. This poor performance currently accounts for about 1.6% and 7.1% in the low- and the high-income areas separately.

Solid waste marketability

This research found that the solid waste recovery remains tentative in the Accra metropolitan area, and justifying the claim by Oteng-Ababio (2010). As shown in Table 2, solid waste recovery reaches roughly 35.8% and 26.8%, with recoverable focusing mainly on discarded plastics and cans in low- and middle-areas respectively (Figure 5).

Table 2: Current trend of solid waste recoverability in Accra metropolitan area

Gains	Low-income area	Middle-income area	High-income area
No	64.2%	73.2%	92.9%
Yes	35.8%	26.8%	7.1%

Comparably, about 7.1% of the respondents are involved in solid waste recovery in high-income areas (Table 2). The low recoverability rate is usually associated with the unaccepted presence of iterant solid waste buyers in the high-income areas.

Majority are not involved in the solid waste recovery process as seen in Table 2, implying a possible lack of formality in recycling. In terms of institutional effort, Zoomlion Ghana and Blow Plast

Company Limited have attempted marginally to repurpose solid waste in the Accra metropolitan area.

Moreover, scavengers weakly engage in solid waste recovery, particularly at Abokobi and Sarbah dumpsites. These recoverable items are fed into the industrial and agricultural value chain and help reduce environmental stresses. This finding emphasized that the scavenging process, though environmentally-driven, poses imminent health hazards to scavengers (Daily Graphic 20 July, 2011)



Figure 4: Recovered items ready to be sold by scavengers in the dumpsite

In addition, the paper pointed out that a scavenger earns between GH¢ 1.00 - 6.00 on a daily

basis. The amount gained, depends on the nature and quantity of reclaimed materials as well as scavengers’

bargaining prowess. Disappointed scavengers predicted that iterant waste buyers are profiting from the recoverability business via their direct dealings with individuals or agencies that are involved with recycling.

CONCLUSION

The use of private-public partnership to provide solid waste management has failed; creating health and environmental disorders in the Accra metropolitan area. Private-public partnership had deviated from its fundamentals (principal-agent theory), and being operated in an environment unhealthy for its success. The procurement undertakings were improperly conducted. Moreover, dispensation of solid waste management resources among private contractors remains intractable issues. Solid waste regulation incorporates the commingled solid waste; however, the regulatory gaps for dealing with the solid waste constituents, continue to endanger the Accra metropolitan area. Lastly, solid waste recoverability remains nascent due to inability to embrace recycling, and ultimately closing loops on solid wastes.

Acknowledgement

I greatly acknowledge Prof. Yaradua of William V.S. Tubman University for commenting on the sampling size's technique. Special mention goes to Prof. Miller, formerly of William V.S. Tubman University, Prof Perez and Dr. Abarry of William V.S. Tubman University for proofreading this paper.

Author notes

The content of this paper was discussed at the association of environmental studies and sciences (AESS) conference 2017 in Tucson, Arizona, United States under the title "Failing private-public partnership to provide sustainable solid waste management in Accra Metropolitan Area (AMA)"

REFERENCES

1. Agyepong, S. J. (2011). 'Barriers to private sector participation in sustainable waste management' Experiences of private operators and waste service providers in Ghana, Presentation at the UN Conference on building partnerships for moving towards zero waste, Zoomlion Ghana Limited.
2. Daily Graphic. (2011). Daily Graphic, Wednesday, 20th July 2011, NO.18590 Accra, Ghana, p. 19.
3. European Commission (E.C.) (2003). Public Finances in EMU, Brussels. E.C. Publication.
4. Jensen, M. C. and Meckling, W. H., 1976, 'Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure', *Journal of Financial Economics*, 3 (4), pp 305-360.
5. Kothari, C. R. (1985). *Research methodology-methods and techniques*, Wiley Eastern Limited, New Delhi.
6. McCubbins, M. D. and Schwartz, T. (1984). 'Congressional oversight overlooked: Police patrols versus fire alarms', *American Journal of Political Science*, 28 (1), pp 165-179.
7. Nyachhyon, L. B. (2006). *Prospects and constraints of public private partnership for urban waste management*, Economic Policy Network, Policy Paper 15, http://www.mof.gov.np/economic_policy/pdf/Prospects_Constraints.pdf. Accessed 4 October 2011.
8. Obirih-Opareh, N. and Post, J. (2002). *Quality assessment of public and private modes of solid waste collection in Accra, Ghana*. *Habitat International*, 26, pp 95-112.
9. Ogul, M. S. and Rockman, B. A. (1990). 'Overseeing oversight: New departures and old problems', in *Legislative Studies Quarterly*, <http://www.jstor.org/stable/439999>. Accessed 5 January 2012.
10. Oteng-Ababio, M. (2009). *Private sector involvement in solid waste management in the Greater Accra metropolitan area in Ghana, waste management & research*, pp 1-8.
11. Oteng-Ababio, M. (2010). *Missing links in solid waste management in the greater Accra Metropolitan Area in Ghana*, *geojournal*, 76 (5), pp 551-560.
12. Salani, J. B. (1997). *The economics of contracts: A primer*. Cambridge, Massachusetts.
13. Salem, Z., Hamouri, K., Djemaa, R., Allia, K. (2008). *Evaluation of landfill leachate pollution and treatment, desalination*, 220, pp 108-112.
14. Wilson, D. C. and Scheinberg, A. (2010). *What good practice in solid waste management? manag res*, 28 (12), pp 1055-1056.
15. Weeks, J. R. (1999). *Population: An introduction to concepts and issues*. 7th edn, Wadsworth Publishing Company, United States of America.
16. World Bank/International Bank for Reconstruction and Development (2010). *City of Accra, Ghana: Consultative citizens' report card*. World Bank, Washington.
17. Yamane, T. (1967). *Statistics: An Introductory Analysis*. 2nd ED., New York, Harper and Row.