

## APPRAISAL OF SOLID WASTE DISPOSAL METHODS AND PRIVATE SECTOR PARTICIPATION IN LAGOS STATE

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### ABSTRACT

*The paper examines solid waste disposal methods and private sector intervention in waste management in a deregulated economy with a specific reference to Lagos State. The study reveals that of about 6000 metric tons of solid wastes generated daily, the average quantity of waste disposed through conventional methods is about 35%. The study observes that minimal emphasis was placed on waste prevention and treatment through minimization while recycling and re-use treatment methods received less than 2% attention. The private sector intervention accounts for only 28% of the waste produced in most of the twenty (20) local government areas assessed, while about 95% of solid wastes generated are improperly disposed. The paper suggests that, private driven enterprise based on local community participation, citizenry re-orientation and general classification of wastes generated at households, markets and*

*industrial settings should be the hallmark of waste management practices while the government should only provide the enabling environment for the operators. This study concludes that operators in the private sector initiatives should be selected based on capacities and wherewithal to manage the wastes and not on political and sundry considerations.*

**Key Words:** *Waste, Environment, Minimization, Recycle/Re-use, Operators, Private Sector, Intervention.*

### INTRODUCTION

Solid waste generation in Lagos State has attained a high proportion in recent years. The visible sight in most conspicuous locations, drains, markets, canals, bus stops, highways, street corners, roads, bridges in the metropolis are heaps of refuse. The population of Lagos metropolis presently about 14 million produces waste in a capacity of 6000 metric tons per day [1]. However, waste management

practices have not developed the capacity to adequately handle the waste generated in various communities of the state. Despite several measures introduced to combat the waste menace, not much success has been achieved both from private, commercial and non-governmental agencies. The management of solid waste generated from the following sources – domestic, commercial and industrial activities presents an enormous challenge to both local and state governments. The city being the commercial nerve centre of Nigeria host over 60% of the entire industries in Nigeria and has been described as one of the most industrialized and populated urban area in the world. An average of 0.5kg – 0.6kg of solid waste is generated by each Nigerians per day, while the entire country generates an average of 60, 000 metric tons per day [1]. About 10% of this municipal solid waste is transferred through the transfer loading station at Ebute-Elefun to the landfill sites while 90% of the total waste collected is disposed off directly at the landfill sites situated at Olusosun in Ojota, Abule-Egba along Abeokuta expressway and Solous along LASU Road, under very unhygienic conditions [1]. Landfill is an engineering method of disposing solid waste by spreading and compacting to smaller volumes thereby reducing environmental hazards [2]. These sites however portend danger to the citizenry living in the area due to sporadic burning of refuse which pollutes the air and visible contamination of underground water through the

leachates from the sites which percolates freely into the surrounding water bodies.

The rapid population explosion due to daily influx of people into Lagos State have stretched the available waste disposal facilities beyond the limit of their capacity. It is reported that there had been no time in the past ten years when the Waste Management Agency in Lagos State carted more than 70% of the generated waste within their area of operation [1]. This is the most likely reason for the huge backlog of refuse visible in major spots in the metropolis and resulting in health hazards. While the national population is growing at about 2.8%, the rate of urban growth is as high as 5.5% in cities like Lagos, Abuja, Port Harcourt, Kaduna, Kano. These phenomenal growths have a multiplier effect on the tonnage of waste generated daily. Waste generated often results from the activities of living things, and most industrial revolutions concentrates people in urban areas resulting in high population density which has a direct proportion on the quantity of waste produced. UNICEF and WHO have presently committed huge financial resources and efforts on roll back malaria programme and other waste and airborne diseases in the Sub-Sahara Africa. This effort is however not yielding the expected result due to poor waste management in most urban cities and towns, which resulted into health hazards. The bane of most of the attempts to grapple with the waste management problems in



Nigeria had been the failure to simultaneously consider all the components of what is called the waste management cycle [3]. The five part components of a comprehensive solid waste management programme are Collection, Transfer, Recycling, Resource Recovery and Disposal of solid waste. Any effective waste management programme must consider and provide adequately for each component in the cycle.

### **SOLID WASTE GENERATION AND MANAGEMENT PRACTICES IN LAGOS STATE: PAST AND PRESENT**

Solid waste can be described as non-fluid waste materials from domestic, commercial, industrial, agricultural, constructional, mining and exploration activities. Solid waste constitutes metals and tins, glass, paper, food waste, plastic, rubber, textiles, furnishings, garden waste and radioactive wastes among others. Solid waste unlike fluid type of waste is most popular and difficult to manage [4]. Solid waste does not flow, evaporate, diffuse and dissolve and by its natural characteristics, it remains in same form and nature posing management problem in handling and processing [5]. Unlike other environmental problems, which can be solved comprehensively using the experience of other countries, solid waste management is an exception as it also depends on many parameters such as economic, climatic and socio-cultural, which vary

from one settlement to the other. Successful solid waste management method depends on climatic and seasonal variation, foreign exchange limitations, and economy of the region, physical characteristics and the city, social and religious customs, public health awareness, quality of management and technical capacity [1]. Wastes generated in Lagos State are disposed principally at two centres as follows [7].

- i. **Landfill Sites:** There are presently five (5) landfill sites located in Isolo, Achakpo, Ojota, Gbagada and Abule-Egba (Table 1).
- ii. **Dump Sites:** There are presently three [3] major dumpsites in Lagos metropolis. The dumpsites are located in Olusosun, (Ikeja Local Government) – 42 acres and 4537 tones per day, Abule-Egba (Alimosho Local Government) – 10.5 acres and 600 tones per day and Igando (Alimosho Local Government) – 3.5 acres and 150 tones per day.

The Lagos State Waste Disposal Board (LSWDB) was established in 1970's with the primary duty of collecting residential and commercial wastes from source to final dumpsite. This is a project solely funded by the Lagos State Government. The collapsed of LSWDB later gave rise to the establishment of Lagos State Waste Management

Authority (LAWMA) in 1991 with three (3) zonal offices at Simpson (Lagos Mainland Local Government area), Ojodu (Ojodu Local Government area) and Mushin (Mushin Local Government area). LAWMA was again reconstituted in 1992 to incorporate local government councils. Chairmen of local government councils were constituted as the Board of Directors of LAWMA and charged with the following responsibilities [1]:

- Collection and disposal of industrial and commercial wastes from various locations in Lagos State.
- Loading station control and supervision.
- Management, control and supervision of landfill sites.
- Provision of complimentary services to Private Sector Participation (PSP) operators in domestic waste.

Some of the limitations in the operations of LAWMA were:

- Political parties interference in the management of LAWMA activities.
- Lack of adequate support to technical services.
- Poor coordination by the government and the constitution of LAWMA's board on sentiment and politics rather than merit.

- Lack of appropriate cost charges for waste collected from the populace. Waste collection is almost free of charge.
- Delay release of funds for maintenance of facilities and other activities.
- Lack of adequate network in debt recovery from the local government.
- Incessant change of LAWMA's leadership.

The changes in the structure of LAWMA over a period of ten (10) years are highlighted in Table 2.

LAWMA however made effort in providing the following:

- Provision of mechanical shovels and crew to Highway Manager Ltd for bulk loading of waste. The Highway Manager Ltd is a private enterprise engaged by Lagos State Government to clean the major highways.
- Provisions of dino refuse bins in areas of high refuse generation and carting away to dumpsites.
- Provision of mammoth compactor trucks in specially designated areas of high refuse generated.

In 1991 and 1992, the tonnage of domestic waste disposed by LAWMA decreased to 2.4 and 1.8 million tons respectively, then to 1.2 million tons as described in Table 3. [6]



The reason advanced for the noticed short fall are due to political instability coupled with the non-availability of serviceable equipment for waste handling. Very low quantity of waste was also disposed at the local government level between 1988 and 1993 as revealed in Table 4 due to similar reasons.

The abysmal performances of local governments in managing waste are observed as the usurpation of local government constitutional role of waste management by the State Government making fund, machinery and other infrastructures availability difficult for operators to work.

### **PRIVATE SECTOR PARTICIPATION (PSP) INTERVENTION IN WASTE MANAGEMENT IN LAGOS STATE**

In 1960s through the 1970s, most prominent private waste disposal agents were the cart pushers whose activities spread around local communities. Some of them also double as scavengers specialized in retrieving items for recycling such as: plastic, metal, rubber, ceramics, polythene, tins, bottles, electrical components among others. These items are sold to some industries for processing while other non-valuable items such as agricultural waste, clinical waste are dumped indiscriminately at some non-designated centres such as marshy site, canals,

swampy site, lagoon, bush path and neighbouring road paths.

As waste generation increase in volume in the 1980s and 1990s due to population explosion as a result of massive drift, solid waste management in the State became a complete menace. Government was unable to cope with the management of solid waste due to poor facilities network, inadequate funding and insufficient management practices among others. The decision to privatise waste management practices in Lagos State brought the Highway Managers Ltd and other participants. There are presently about 383 Private Sector Participation (PSP) operators and more than 1,500 cart pushers and scavengers in Lagos State [8]. The identified waste collection methods in Lagos State are [9]:

- Door to door collection system.
- Bin collection system.
- Communal/Bulk collection system.
- Street waste collection.
- Cellophane bag collection system.

Indiscriminate dumpsites are prominent in the state, from the study. Some of these locations are drainage channels, canals, lagoon, swampy sites, street corners, highways and roadsides. Table 5 presents the breakdown of the private sector participation on waste collection in Lagos State. The PSP operators failed to perform and improve the cleanliness of the environment due to:

- Lack of awareness and proper education of the masses on waste disposal methods and benefits.
- Lack of the will to pay for waste disposed by the masses. A lot of people still see waste collection as government social responsibility, hence arbitrary dumping at any available site.
- Inability to enforce payments by government functionaries.
- Lack of coordinated efforts from sanitary officers in various local governments to monitor, assess and penalized indiscriminate waste disposal offenders.
- Poor incentives from government to enhance smooth operations in terms of facilities, infrastructure and funding.
- Inadequate provision of dumps sites.
- Incessant change of government policies on waste management.
- Most private waste collectors are non-professionals and lacked adequate facilities to disposed and the process waste appropriately.

To correct these flaws, the Lagos State Ministry of Environment is presently reforming the activities of private sector operators. The reformation activities include:

- Rehabilitation of three (3) major dumpsites – Olushosun, Abule Egba and Solous.

- Employment of seventeen (17) new private sector waste collectors operators for selected twenty four (24) out of the 57 newly created local governments in the State as phase one.
- The complete phasing out of both cart pushers and scavengers.
- The provision of ten (10) compactors by each operator.

### METHODOLOGY

The appraisal was conducted through structured questionnaires and personal interview of stakeholders and visits to dumpsites and non designated locations scattered across the State. Selected sites for the study are markets, highway roadside, motor park, lagoon and swampy sites, industrial sites, public institutions and schools. Information requested are classified in the following categories: quantity of waste generated, quantity of waste disposed, nature of waste generated, number of PSP operators, facilities involved in disposing the waste. The questionnaire targets the activities of government establishments, private collectors, cart pushers, scavengers and also assessed the behavioural tendency of the general public in respect to waste handling and disposal. The established processing methods in waste treatment, re-use, re-cycle and recovery processes were evaluated for solid waste generated and presented in Tables 5 and 6.



## RESULTS AND DISCUSSIONS

The report of the study as presented in Tables 5, 6 showed that 35% of the total wastes collected are disposed off at undesignated dumpsites, about 1.2% is recovered, 0.7% recycled, 1.3% re-used and 96.6% disposed off directly at dumpsites and landfill locations. Most of the private sector operators lacked necessary equipment and technical expertise to manage the waste. The selection process was not based on competency and professionalism. The result also showed that about 53% of the originally listed PSP operators are functional. The number of PSP engaged in waste collection is abysmally low in most local governments when compared with the population of the local government area and the tonnage of waste generated. The study also revealed that 90% of Lagos State residents have a dismal 4% attitude to waste management ethics, resulting in indiscriminate disposal of refuse at undesignated locations in the metropolis. 68% of Lagos residents do not pay for waste disposed while the enforcement strategy of government is ineffective. The result also showed, inadequate operators in the following local government areas (Agege, Badagry, Ikorodu, Kosofe, Ojo, Oshodi-Isolo and Epe) considering the tonnage of waste generated. The operators were not selected on the basis of generic classification, source and locations of waste produced. Most of the local governments assessed do not have numerical record of cart pushers and

scavengers. The study revealed the obvious lack of maintenance of equipment, machinery and low revenue generation and indiscriminate dumping methods on sites by residents resulting in continuous and significant decrease in tonnage of waste disposed.

## SUGGESTIONS FOR IMPROVEMENT

The remedies to effectively curb the present waste collection transfer problems and improve the activities of PSP in the State required both short term and long term measures. The short term programme covers mainly waste collection and transfer to dumpsites. The collection points should be categorized along the source and location of waste generated that is, markets, industries, schools, hospitals and other public institutions. The operators should be classified along the nature of waste produced and the sources of waste produced (figure 1). The long term measure involves planning to integrate various waste management concepts such as the waste to wealth programme, establishment of transfer stations, establishment of equipment design, fabrication and development centres as well as training and capacity building for public health officers and PSP operators. Government should restrict specified operators to the disposal of waste that are peculiar to their environment. This will not only serve as employment opportunity but will also ensure the development of waste collection and transfer

facilities. Government should also encourage waste prevention rather than collection of waste generated from various sources only. The industries should be encouraged to provide packaging materials that could be easily recycled and processed, while the populace are remunerated for waste pack, recovered and return to the manufacturer.

Further possible solutions to the observed problem of waste management in the State from the study are summarily highlighted below.

- Community based groups' waste collection and transfer practices. The community should be made to play the major role among the stakeholders as described in the developed model (Fig 1).
- Sources of waste should be classified and disposal method peculiar to the source and location of waste employed – Agricultural waste, Industrial waste, Domestic waste (Fig1). The operators should be engaged on the basis of generic classification of waste and location.
- The selected PSP waste collectors should be enforced to employ up to date equipment in the handling of waste and should also be constituted into co-operatives.
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- Strategic approach to mobilize the masses in paying for waste disposed should be created.
- Waste management should be approached from entrepreneurship perspective with effective marketing strategy.

## CONCLUSION

Effective solid waste management goes beyond collection, transportation and disposal, which as at today is the current practice in Lagos State. The present huge investment of both the state and local governments on solid waste handling have yielded little impact on the entire process of management. A comprehensive approach should be on community-based waste management target. The present arrangement which involves the employment of PSP operators with ten (10) compactors may be ineffective afterall considering the financial burden required. Waste management process should be allowed to grow from smaller community participation.

The waste collection programme through PSP will be improved extensively should waste collection be based on population density, living standard of people, place of residence and culture. The cart pushers, which presently constitute a menace through the creation of indiscriminate dumpsites in the metropolis should be restructured to serve at community based level with a designated



dumpsites, instead of being phased out. They could serve as transit collectors in the overall waste management cycle with adequately improved equipment.

Finally, garbage collection is a big business and should be treated as such. Lagos State Waste Management approach largely embrace collection and transfer to dumpsites. This is only one of the components of a comprehensive waste management cycle. To ensure successful waste management practices towards a clean environment while other components namely, prevention, recovery, recycling and marketing of treated waste products should be given greater attention through organized private sector participation waste to wealth programme (PSP – WTWP), while the government plays a facilitator role. Apart from waste minimization activities currently practiced, sorting from source, community participation, provision of incentives, training and promotion should be integrated into waste management policy and practices in the State.

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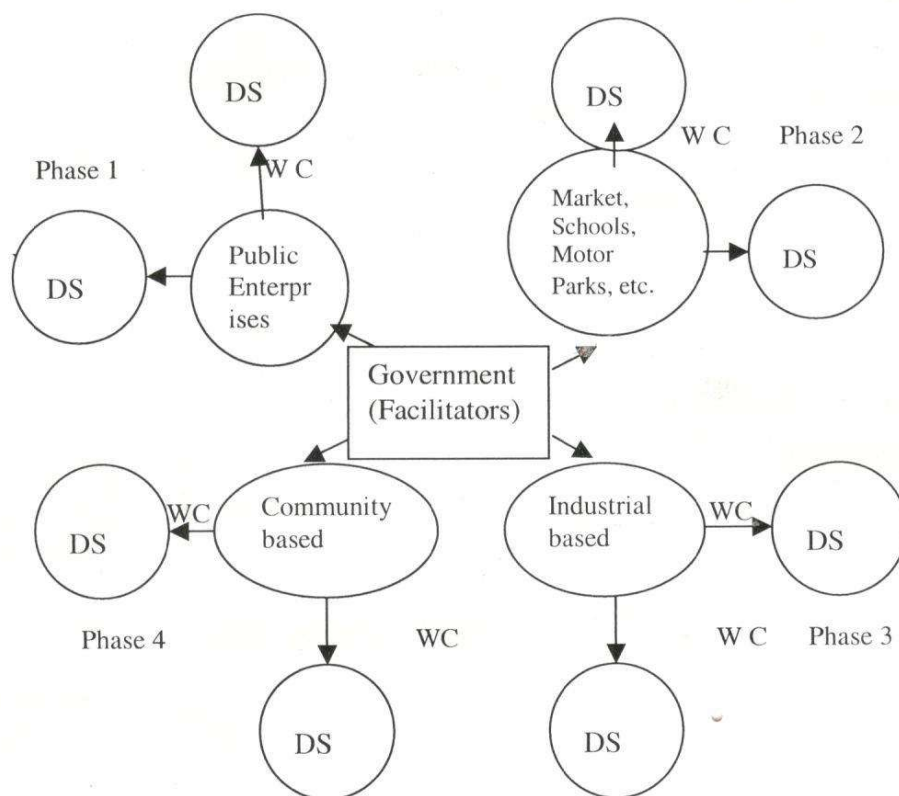
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**Table 1: Waste Disposed at Five (5) Landfill Sites in Lagos State**

| Land Sites   | Total Tones Per Day (TPD) | Total Tones Per Year (TPY) |
|--------------|---------------------------|----------------------------|
| Isolo        | 203                       | 74, 180                    |
| Achakpo      | 624                       | 227, 813                   |
| Ojota        | 257                       | 93, 826                    |
| Gbagada      | 16                        | 51, 970                    |
| Abule-Egba   | 42                        | 15, 379                    |
| <b>Total</b> | <b>1, 442</b>             | <b>417, 003</b>            |

*Source: Osuntogun [7] 2002*





**Fig 1: Developed Model Among the Stakeholders for Solid Waste Management Practice**

**KEY**

- DS - Dumpsites
- WC - Waste Classification before Transfer

**Table2: Waste Management Authorities in Lagos State (1971 – 1997)**

| YEAR          | NAME OF AGENCY                         | SUPERVISING AUTHORITY                                          |
|---------------|----------------------------------------|----------------------------------------------------------------|
| Prior to 1977 | Lagos Municipal Refuse Board           | Lagos State Municipal Council                                  |
| 1977          | Lagos State Refuse Disposal Board      | Lagos State Ministry of Works & Transport                      |
| 1991          | Lagos State Waste Management Authority | Ministry of Environment & Physical Planning                    |
| 1992 to 1997  | Local Government Councils & LAWMA      | Local Government & Ministry of Environment & Physical Planning |
| 1997 to Date  | LAWMA                                  | Ministry of Environment                                        |

*Source: Odunaiya [1]; 2002*

**Table 3: LAWMA Waste Disposal Performance (1988 – 1997)**

| YEAR | DOMESTIC WASTE DISPOSAL (MILLION TONS) |
|------|----------------------------------------|
| 1988 | 2.1                                    |
| 1989 | 3.2                                    |
| 1990 | 3.5                                    |
| 1991 | 2.4                                    |
| 1992 | 1.8                                    |
| 1994 | 1.2                                    |
| 1995 | 1.0                                    |
| 1997 | 0.5                                    |

*Source: Olorunfemi [6] (2000)*



**Table 4: Local Government Domestic Waste Disposed (1988 - 1993)**

| YEAR | QUANTITY DISPOSED<br>(THOUSAND TONS) |
|------|--------------------------------------|
| 1988 | 99.7                                 |
| 1989 | 15.7                                 |
| 1990 | 24.2                                 |
| 1991 | 4.8                                  |
| 1992 | 2.5                                  |
| 1993 | 2.0                                  |

*Source: Olorunfemi [6] (2000)*

## APPENDIX

Table 5: PSP Operators Performance in Lagos State

| S/N | Local Government Area | Number of Wards | PSP Registered | PSP Functional | Estimated Waste Generated Tones/Day | Waste Removed (Collected) Tones/Day | Re-used %   | Recovery %  | Recycling % |
|-----|-----------------------|-----------------|----------------|----------------|-------------------------------------|-------------------------------------|-------------|-------------|-------------|
| 1.  | Agege                 | 10              | 12             | 8              | 368                                 | 280                                 | 0.8         | 0.2         | 0.1         |
| 2   | Ajeromi-Ifelodun      | 8               | 10             | 7              | 130                                 | 78                                  | -           | 0.3         | -           |
| 3   | Alimosho              | 20              | 27             | 18             | 480                                 | 288                                 | -           | -           | 0.2         |
| 4   | Amuwo-Odofin          | 8               | 10             | 6              | 158                                 | 95                                  | 0.3         | 0.8         | -           |
| 5   | Apapa                 | 10              | 12             | 8              | 70                                  | 42                                  | -           | -           | 0.2         |
| 6   | Badagry               | 20              | 22             | 12             | 420                                 | 252                                 | 0.4         | -           | -           |
| 7   | Lagos Mainland        | 12              | 16             | 10             | 160                                 | 96                                  | -           | -           | -           |
| 8   | Ibeju-Lekki           | 7               | 10             | 6              | 45                                  | 27                                  | 0.2         | -           | 0.3         |
| 9   | Ifako-Ijaiye          | 10              | 15             | 7              | 140                                 | 84                                  | -           | -           | -           |
| 10  | Ikeja                 | 15              | 20             | 18             | 52                                  | 31                                  | -           | -           | -           |
| 11  | Ikorodu               | 20              | 29             | 17             | 480                                 | 288                                 | 0.3         | -           | -           |
| 12  | Kosofe                | 20              | 32             | 13             | 460                                 | 276                                 | -           | -           | 0.2         |
| 13  | Lagos Island          | 19              | 20             | 12             | 150                                 | 90                                  | -           | 0.2         | -           |
| 14  | Eti-Osa               | 10              | 12             | 7              | 110                                 | 66                                  | 0.2         | -           | 0.2         |
| 15  | Mushin                | 20              | 23             | 11             | 170                                 | 102                                 | -           | 0.2         | -           |
| 16  | Ojo                   | 8               | 9              | 4              | 300                                 | 180                                 | -           | -           | 0.3         |
| 17  | Oshodi-Isolo          | 20              | 24             | 18             | 280                                 | 168                                 | 0.1         | -           | -           |
| 18  | Shomolu               | 17              | 18             | 10             | 170                                 | 102                                 | -           | 0.6         | -           |
| 19  | Surulere              | 17              | 19             | 12             | 180                                 | 108                                 | -           | 0.2         | 0.1         |
| 20  | Epe                   | 20              | 26             | 4              | 380                                 | 228                                 | 0.2         | -           | -           |
|     | <b>Total</b>          | <b>291</b>      | <b>383</b>     | <b>217</b>     | <b>5829</b>                         | <b>3081</b>                         | <b>1.3%</b> | <b>1.2%</b> | <b>0.9%</b> |

Source: Field Survey (2004)



**Table 6: MAJOR REFUSE OPERATORS FOR 20 LGA-PHASES 1**

| S/N | Local Govt.                  | Market | Schools | Motor Park | Army/Police Barrack | Health Institutions |
|-----|------------------------------|--------|---------|------------|---------------------|---------------------|
| 001 | Agboyi-Ketu                  | 18     | 50      | 2          | 2                   | 25                  |
| 002 | Amuwo Odofin                 | 10     | 75      | 2          | -                   | 13                  |
| 003 | Apapa                        | 3      | 75      | 4          | 4                   | 26                  |
| 004 | Bariga                       | 6      | 82      | 1          | 1                   | 28                  |
| 005 | Ikeja                        | 7      | 26      | 4          | 3                   | 29                  |
| 006 | Ikoyi-Obalende               | 2      | -       | 1          | 6                   | 7                   |
| 007 | Iru-Victoria Island          | 3      | -       | 1          | 4                   | 4                   |
| 008 | Isolo                        | 7      | 42      | 3          | 1                   | 41                  |
| 009 | Kosofe                       | 5      | 63      | 2          | 1                   | 68                  |
| 010 | Lagos Island East            | 5      |         | 6          | 3                   | 6                   |
| 011 | Lagos-Island West            | 17     | 17      | 6          | -                   | 10                  |
| 012 | Lagos-Mainland (Ebute-Metta) | 5      | -       | 3          | 3                   | -                   |
| 013 | Mushin-Ajina                 | 8      | 309     | 1          | 4                   | 13                  |
| 014 | Odi-Olowo                    | 4      | -       | 3          | 1                   | 2                   |
| 015 | Ojodu                        | 5      | 186     | 3          | -                   | 16                  |
| 016 | Onigbongbo                   | 6      | -       | 4          | 4                   | 10                  |
| 017 | Oshodi                       | 14     | 72      | -          | 3                   | 45                  |
| 018 | Shomolu                      | 4      | -       | 4          | 1                   | 22                  |
| 019 | Surulere                     | 8      | 122     | -          | 2                   | 6                   |
| 020 | Yaba                         | 5      | 5       | 5          | 5                   | 15                  |
| 021 | Ojo                          | 12     | -       | -          | 1                   | -                   |

Source: Field Survey (2004)