

Municipal Solid Waste Management Practices in Tarauni Local Government Area, Kano State, Nigeria

Simon Stephen Mshelia, Arhyel Yusuf Mbaya & Emmanuel Galkaye

Department of Geography,
Federal University Gashua,
Yobe State, Nigeria

msheliasimon48@gmail.com

Tel: 08035755461

Abstract

This study has been carried out to evaluate municipal solid management practices in Tarauni Local Government Area of Kano Metropolis using the concept of sustainable development, the principles of polluter pays (PPP) and conceptual framework for stakeholders in municipal solid waste management. Primary data were generated through administration of 384 survey questionnaires and field interview questions to randomly, systematically and purposefully sampled population while secondary data were obtained from desk review of other literatures. Descriptive statistic was employed for analyses of the data. Findings reveal that 37.5% and 21.6% are of the view that the households practice the less sustainable and ineffective methods of indiscriminate dumping on land, water ways, excavated pits and also burning of wastes respectively. The result also shows that 81% depends heavily on Refuse Management and Sanitation Board (REMASAB) and do not want to pay fee for refuse collections. Similarly, 74.7% reported that the practices of waste management by REMASAB are ineffective while 50% reported that the private agencies' practices are effective. The study furthermore, reveals that poor funding, unskilled personnel, bad attitudinal behaviour, poor supervision and access to some streets by vehicles are the challenges facing the waste management agencies. The study recommends use of bioreactor waste treatment technology, strong legislation, public enlightenment and use of contemporary methods, proper funding and supervisions for the agencies to perform optimally.

Index Terms: Sustainable development, dumpsite, effective, waste, stakeholder

1.0 INTRODUCTION

One major feature of the developing world is the presence of municipal solid wastes of different kinds and the inability to effectively management them. These wastes are litters of garbage along streets and drains in virtually almost all the parts of the cities and urban centres. Small, medium to large open dumps are often visible at the backyard, fronts and beside of most homes. Waste management agencies and households collect the refuse and the disposal is often done mostly at unauthorized open dumpsites without buffers located within the municipality or in close proximity to the city (Butu and Mshelia, 2017; Nabegu, 2010; 2015). The issue of municipal solid waste has been in existence for over two decades and seems to defy possible solutions postulated in the developing countries such as Nigeria.

According to Aina (1994), the then Director General of defunct Federal Environmental Protection Agency (FEPA) in Nigeria, is of the view that of all the environmental problems that are bedeviling the nation; the most obvious, persistent, feasible and most embracing as well the one which has consistently portrayed the government and the environmentalists in a bad light is the municipal solid waste. In most Nigerian cities, municipal solid wastes dot major streets, roads, pavements, open spaces, alleys and gutters or drainage channels. To some extent,

heaps and dumps of wastes serve as landmarks use as reference points for getting to a particular direction and location. This is because enormous volume has continued to be generated on daily basis especially in urban centres. According to Nabegu (2015), 2,732 tons of known waste (unknown excluded) are accumulated daily in Kano metropolis which comprises of Taruani LGA. Out of these, only 800 tones are being evacuated from the total accumulated at full capacity on daily basis. This implies that 1,932 tones are left uncollected and have resulted to the littered and heaps of waste and overflowed skips or dustbins with waste in the metropolis most especially in the low class residential and sub-urban areas.

Eziashi (2007) is of the opinion that waste generation is a necessary evil being that man must discard any material that had outlived its usefulness as a waste. The issue troubling most cities is the various management practices employed by households, government and private sectors. Most of the management process, procedures and practices are crude and do not meet the modern means of waste management. Butu and Mshelia (2017) are of view that the waste management agencies only collect and dispose the waste at dumpsites and then set the dumpsites on fire for the wastes to get burnt. The black toxic smoke pollutes the environment which affects visibility and air quality.

The failure of the government and waste management agencies to address the issues of waste holistically has resulted to environmental problems (water, air and land pollutions), obnoxious odour, breeding place of mosquitoes and rodents, irritation, making the environment filthy for habitation and blocking of gutter and roads which can lead to flooding. Other problems are diseases such as cholera, typhoid, and malaria infections. These health and environmental problems are facilitated by the poor wastes management. It is on the basis of the ways in which wastes management are being carried out that the study is anchored on the concept of sustainable development; integrated solid waste management, the principles of polluter pays (PPP) and conceptual framework for stakeholders in municipal solid waste management (Ebikapade and Jim 2016). The study is aimed to evaluate the solid waste management practices by wastes management agencies and effects on the environmental quality in Tarauni LGA of Kano metropolis with the view to provide useful information towards achieving the 2015 Sustainable Development Goal (SDG) 3; Good Health and Well-being for People 6; Clean Water and Sanitation, and 11; Sustainable Cities and Communities.

2.0 MATERIALS AND METHODS

2.1 Location

Taruani Local Government Area (LGA) has its administrative headquarters located at Unguwa Uku. It is among the eight LGAs that formed Kano metropolis; the populous (4194635) and largest (499Km²) urban centre in Northern Nigeria. Geographically, it is located within Latitude 11⁰57'00"N and 12⁰02'00" North of the Equator and Longitudes 08⁰33'00"E and 08⁰36'00"E of Greenwich Meridian (Mshelia *et al*, 2020; NPC 2012; Abdullaziz, 2014). The 2019 projected population of the LGA is 329,430 and covers an area of 28Km² as shown on Figure 1 (Nabegu and Mustapha, 2005; Mshelia *et al* 2020). It shares boundaries with Nasarawa LGA to the North, Kumbotso LGA to the east and south, it is also bounded to the west by Kano Municipal Council (Abullaziz, 2014; Butu and Mshelia, 2017).

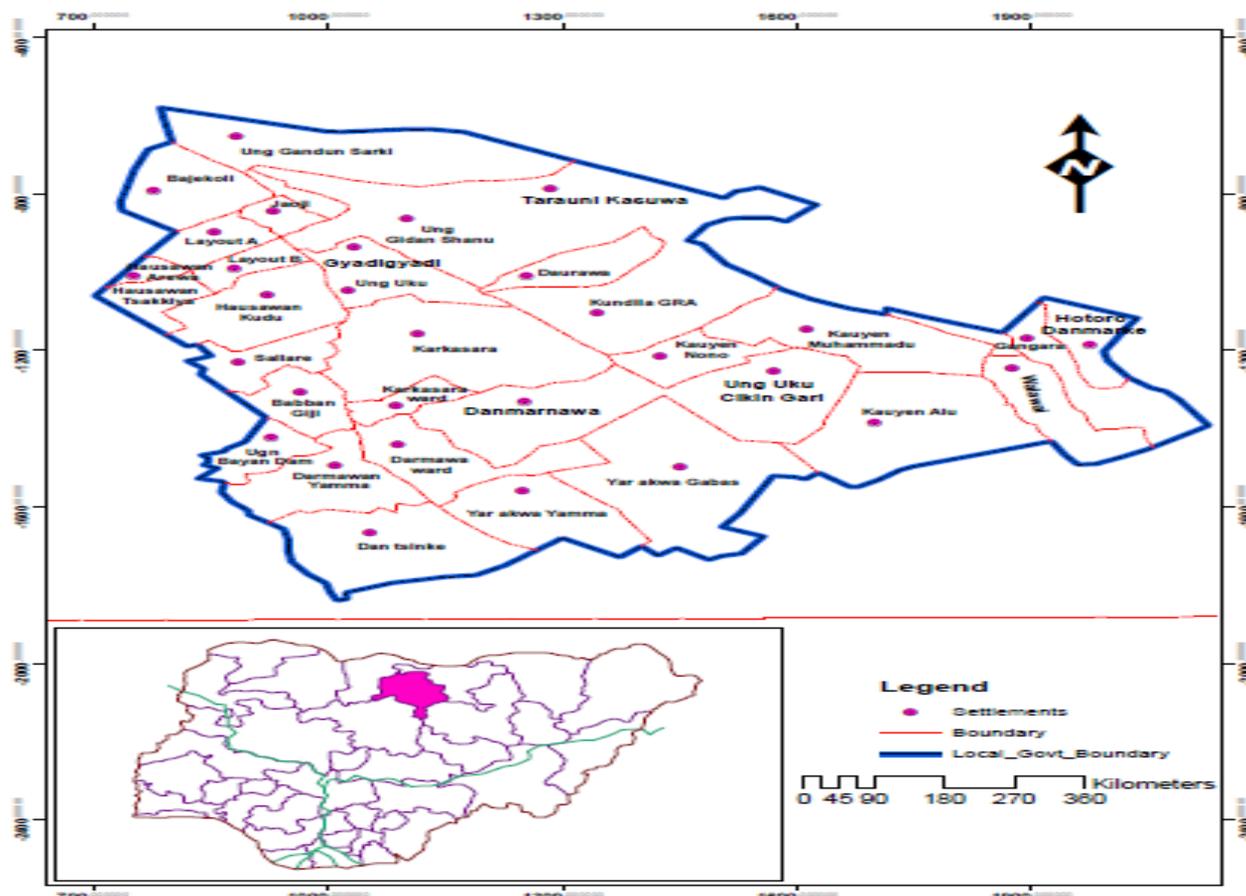


Figure 1: Map of Tarauni LGA
Source: Adopted from Butu and Mshelia (2017)

2.2 Climate and Weather

The LGA falls within the tropical climate characterized by divergent seasons of dry and rain. The mean annual temperature is 27 °C with daily temperature in the months of March to April which often reach 38 – 42 °C. The climate is often influenced by the movement of the two air masses, the maritime air masses originating over Atlantic Ocean and the dry air masses from the Sahara desert. The wet season usually begins May/June – September and the dry period starts October and ends April/May (Ahmed *et al* (2012).

2.3 Sources of Data and Methods

The types of data used for this study includes: socioeconomic and demographic characteristics of the respondents, municipal solid waste management methods, institutions/agencies or stakeholders involve in the management practices in Tarauni LGA of Kano metropolis, functions, effectiveness and capacities of the agencies responsible for the management of wastes in the study area. Other data are on problems or constraints of municipal solid waste management practices by the households and the waste management agencies.

The data were obtained firstly, through the reconnaissance survey. Primary data were generated from structured and semi structured survey questionnaires and field interview questions of municipal solid wastes mismanagement practices by the three major stakeholders; Households, Refuse management and Sanitation Board (REMASAB) and Private Waste Management Institutions/Agencies. The interview questions were self-structured, open and closed-ended questionnaire in a pre-formulated form where follow up questions were asked for further clarity

of questions and responses during the course of the interview (Agbesola, 2013; Bergn, 2009 and Bryman, 2004). Respondents for the study were randomly, systematically and purposefully selected and administered questionnaires based on the sample size recommended by Krejcie and Morgan (1970) in their table for determining sample size from a given set of population. 384 samples of respondents are used for a population which is equal to or greater than 100,000 as a representative for the entire population. Therefore, a total of the 384 out of the 2019 projected population of 329,430 of Tarauni LGA was considered as the sample size for the study as used by Mshelia *et al* (2020). Other sources of data were obtained from documents or materials such as journals, textbooks, the proceedings of seminars and other research works. Photographs of the various municipal solid wastes dumpsites on fire, indiscriminately littered and uncollected waste in access ways, water channels, open spaces and along road were taken at different locations. Descriptive statistics was employed to analyze the data using tables and charts in simple arithmetic mean and frequency.

3.0 RESULTS AND DISCUSSION

This section present data obtained from the field observations, analysis of the retrieved administered questionnaires on municipal solid waste management and outcome of the people interviewed were presented in a form of tables, charts and figures for clear and precise understanding of the findings.

3.1 Socioeconomic and Demographic Data of Respondents in Tarauni LGA

The life style, perception of self and the environmental impacts are to a large extent being determined and influenced by age, marital and social status, occupation and number of children. It is on this basis that the study took into cognizance the socioeconomic and demographic characteristics of the respondents in Tarauni LGA to ascertain the waste management practices that are being carried out.

Out of the 384 respondents, 56% males and 44% females of the population were administered questionnaires as shown on Figure 3.1. This is in line with the view of Muktar (2011) which states that in Kano men are culturally given right to decision power on matters affecting household, health and sanitation decision making in the metropolis without necessarily consulting their wives. This is because most of the women are prohibited from going out of the house (*kulle*). However, to get fair representation the study married the opinion of Dakata (2012) and that of Muktar (2011) where Dakata (2011) is of the view that women are mostly in charge of sweeping and disposing of all sorts of domestic waste in homes.

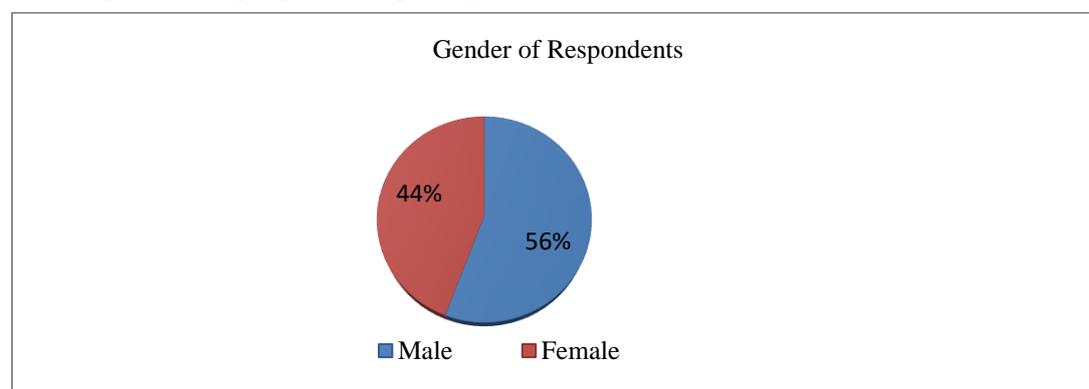


Figure 3.1: Number of Male and Female Respondents

Source: Field Survey (2019)

On age distribution, the highest percentage of 30.2% falls within the age bracket 40-49. This is to give chance to the mature adults who have seen succession of governments, waste

management and other practices in the study area and growth in terms of structure and population to respond accordingly to the questionnaires. Similarly, on the educational status, 36.6% of the respondents; the highest are O levels (Secondary School Certificates). This implies that the understanding of the concept of waste management by some households is limited due to ignorance and their levels of education, thereby increasing the indiscriminate waste disposal and management burden in the area.

3.2: Occupations of the Respondents

Figure 3.2 shows the occupational status of the respondents. Petty trading takes the highest percentages of 30.2% and large scale business records 6.8%; representing a total of 37% of the respondents that are into businesses. This further buttresses the acronyms of Kano as the *Centre of Commerce* which reveals that the major occupation of the people in the study area is trading. More still, 13.5% represents the number of civil servants interviewed while 27.1% of the respondents are housewives who often stay at home to do that house chores such as sweeping and disposal of wastes which form an integral part of this study (Dakata, 2011). Others, such as Mechanics, Carpenters and Drivers represent the 11.5%. This elucidates the generation of solid wastes at commercial centres and homes.

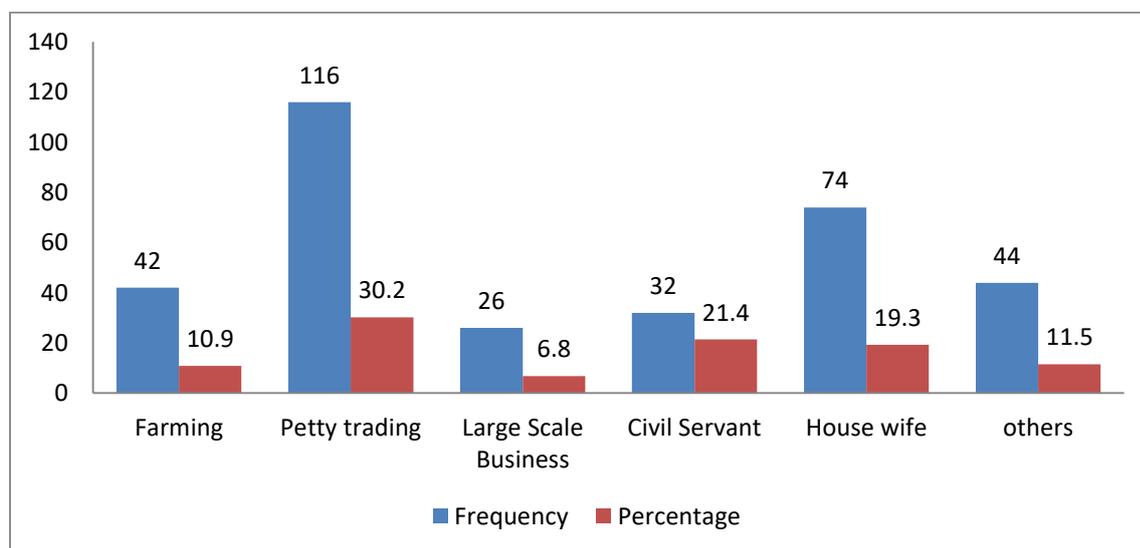


Figure 4.1: Occupations of the Respondents

Source: Field Survey, (2019)

3.3 Family Size of the Respondents

The study furthermore investigated the family size of the respondents on Table 3.1 and this shows that family size determines the volume of waste generated in the household as put forward by Mustapha (2011). It is on this background that 35.9% of the people interviewed have a family size of 17 – 21. Also, 30.2% of respondents have a family size of 12 - 16 and 21 and above recorded 7.8% while 9.6% represents family size of 2 - 6.

Table 3.1: Family Size of the Respondents

| No. of Households | Frequency | % |
|-------------------|-----------|---|
|-------------------|-----------|---|

| | | |
|--------------|-----|------|
| 2- 6 | 37 | 9.6 |
| 7-11 | 63 | 16.4 |
| 12-16 | 116 | 30.2 |
| 17- 21 | 138 | 35.9 |
| 21 and above | 30 | 7.8 |
| Total | 384 | 100 |

Source: Field Survey, (2019)

3.4 Methods or Ways of Municipal Solid Waste Management in Tarauni LGA

Table 3.2 shows 1.6% practice recycle, reuse and recovery, 2.1% are into incineration and composing, 4.2% bury wastes at their backyards and only 0.8% separate wastes. This indicates that contemporary methods of wastes management are inadequately practice in Tarauni LGA. Majority of the respondents of 37.5% dump their waste indiscriminately without recourse, 21.6% use to only sweep and burn the waste they generated, 18% keep wastes in the dust or waste bin and wait for waste management agencies to evacuate it to dumpsites while 14.5% drop wastes at collection points. The study reveals that residents of Tarauni LGA still practice the less sustainable and ineffective methods of dumping on land, canyons, excavated pits and dumping in water or any available space as also reported by Tchobanoglous *et al* (1993); Ogwueleka (2009) and Butu and Mshelia (2017).

Table 3.2: Methods of Waste Management

| Methods | Frequency | % |
|---------------------------------|-----------|------|
| Recycle, reuse and recovery | 6 | 1.6 |
| Incineration and Composing | 8 | 2.1 |
| Sweep and burn waste | 83 | 21.6 |
| Indiscriminate dumping of waste | 144 | 37.5 |
| Keep wastes in waste bin | 69 | 1.8 |
| Bury waste at backyard 1 | 6 | 4.2 |
| Drop waste at collection points | 55 | 14.5 |
| Waste separation | 3 | 0.8 |
| Total | 384 | 100 |

3.5 Waste Management Agencies in Tarauni LGA

Interview with two anonymous staff of Ministry of Works and Infrastructural Development, Kano State on the 23rd October, 2019 showed that government agency; Refuse Management and Sanitation Board (REMASAB) was established in 2003 and saddled with the responsibility of waste management in Kano metropolis which comprises of Tarauni LGA and seven other LGAs. The management is being complemented by private waste management agencies. Figure 3.3 reveals that 81% of the respondents heavily depend on REMASAB for the management of wastes in the LGA while only 19% depends on private wastes management companies. This indicates that people are not willing to pay for the services of waste management and still hold the notion that wastes management is solely the responsibility of the government. This attitude disagrees with international principles such as the Polluter Pays Principle (PPP) which emphasizes that the one who pollutes the environment should apt to it.

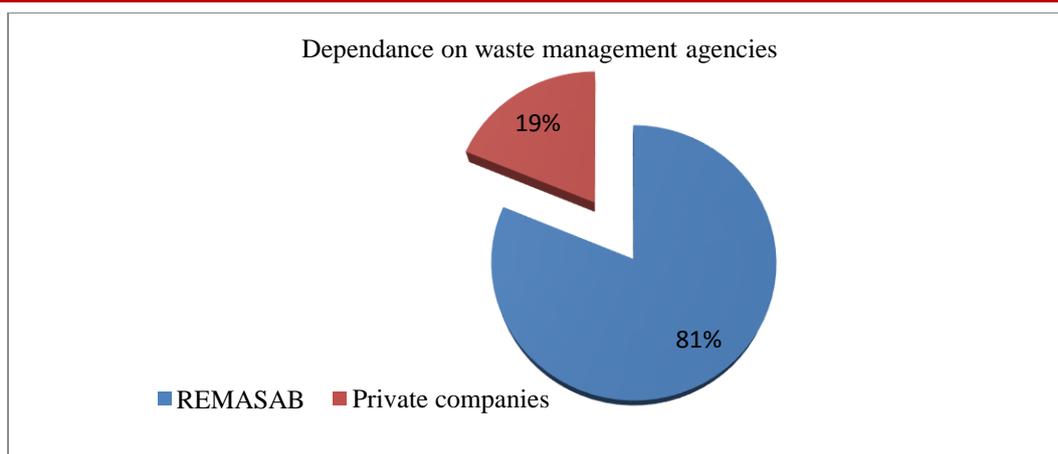


Figure 3.3: Dependence on Waste Management Agencies

Source: Field Survey, (2019)

Further investigation reveals that those who patronize the private waste companies are the top government officials and businessmen that reside along State Road and in the Government Residential Areas (GRA) of Darmanawa ward of the LGA while majority of the residents in Unguwa Uku, Gyadigyadi, Tarauni Kasuwa and Hotoro Danmarke depend on the REMASAB for the management of waste as also view by Nabegu, (2015), This attributes to the presence of uncollected refuse and garbage in some locations of the metropolis as shown on Plate 1



Plate 1: Solid Waste along Main Road

Source: Field Survey, (2019)

3.6 Management of Wastes by REMASAB

A visit to the REMASAB office and interview with three of the staff of the Board reveals that REMASAB do not practice contemporary methods of wastes management but rather the rudimentary methods of street sweeping, collection and disposal of solid wastes at the dumpsites that have no buffer or environmental safeguards and set the sites on fire to burn. Finding reveals that there is no standard landfill in the metropolis and that burning of the wastes produce enormous smokes which pollute the environment and contaminate air quality as shown

on Plate 1. The Board do not also treat, compose or separate wastes but only evacuates garbage to dumpsites which are open excavated land.



Plate 2: Burning of Solid Waste at the Dumpsites

Source: Field Survey, (2019)

3.7 Management of Wastes by REMASAB

Figure 3.4 reveals that 2.1% reported that the management of wastes by REMASAB is very effective and 4.7% of the respondents are of the view that the management of wastes is effective. These two categories of the respondents perhaps live in the GRA around the Government House where the effect of REMASAB is most felt. A percentage of 13.3 opined that the services of the REMASAB are fair. Majority of the respondents of 74.7% view the management of solid waste by REMASAB as ineffective while 5.2% represents those that are in the state of indecision. Therefore, the study shows that municipal solid waste management practices in the study area are generally poor, ineffective and lot needs to be done by the REMASAB to meet up with the solid waste challenges in Kano for sustainable development as also observed by Nabegu (2010).

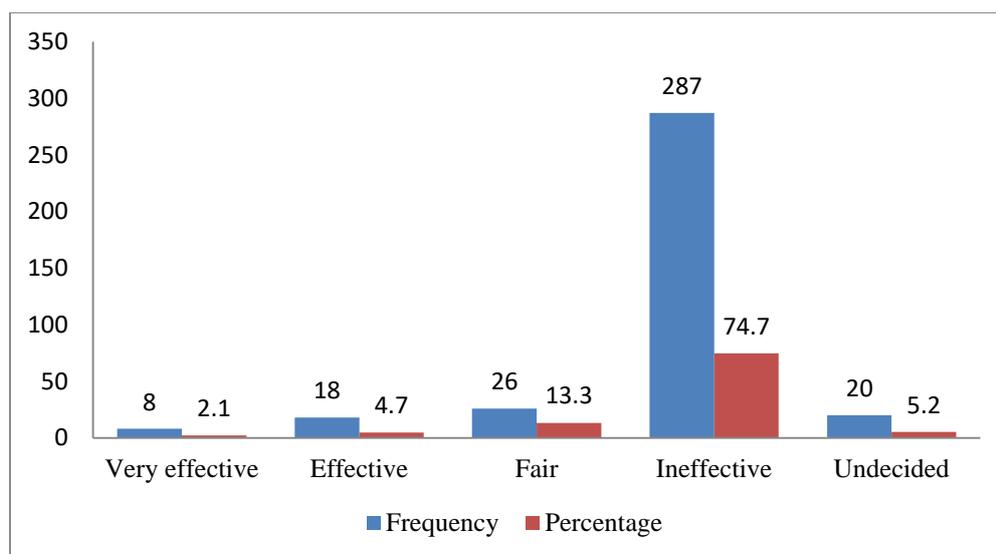


Figure 3.4: Management of Wastes by REMASAB

Source: Field Survey, (2019)

3.8 Management of Waste by Private Agencies

Figure 3.5 shows that 15.4% is of the opinion that management of wastes by the private wastes management companies is very effective, 50% is of the view that the services are effective while 22.9% reported that it is fair. Only 9.6% reported that the management of wastes by private agencies is ineffective and 2.1% is undecided. The findings imply that wastes management by the private agencies are better compared to that of REMASAB which is a government agency. Therefore, it is wake call for the government. The services being rendered by the private waste management companies are paid for by some individuals, households, organisations and some government offices such as Aminu Kano Teaching Hospitals located in Tarauni LGA.

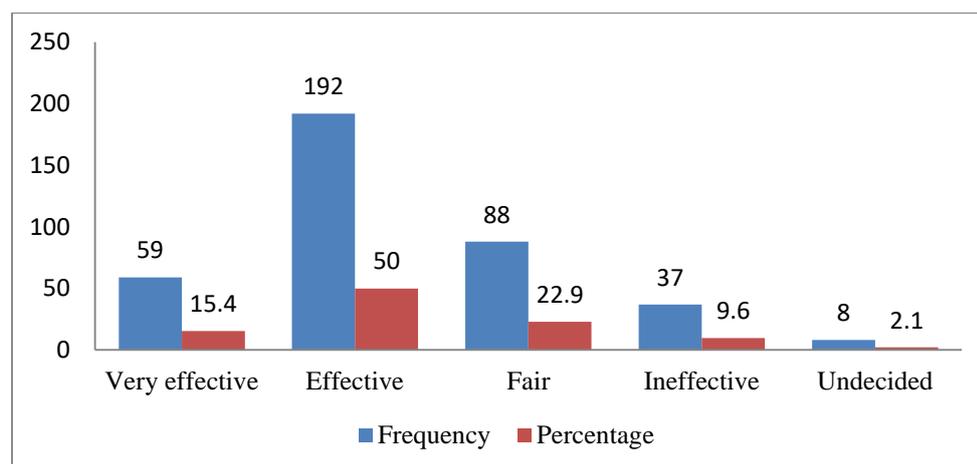


Figure 3.5: Management of Wastes by Private Agencies
Source: Field Survey, (2019)

3.9 Challenge Facing the Wastes Management Agencies in Tarauni LGA

A table 3.3 show that 64.6% of the respondents view all the enumerated issues as the challenges facing municipal solid waste management institutions in Tarauni LGA and wideness in the coverage areas represents 8.3%. This implies that the identified factors on Table 3.3 are the various problems facing both REMASAB and Private Waste Management Companies which attributed to the enormous volume of wastes in the environment as a result of their inability to operate at expected capacities.

Table 3.3 Challenges of Waste management Agencies

| Challenges | Frequency | % |
|----------------------------------|-----------|------|
| Inadequate equipment and workers | 24 | 6.3 |
| Poor funding | 19 | 4.9 |
| Inadequate skilled personnel | 12 | 3.1 |
| Poor attitudinal behaviours | 15 | 3.9 |
| Poor access to some households | 13 | 3.4 |
| Poor supervision | 21 | 5.5 |
| Coverage areas are very wide | 32 | 8.3 |
| All of the above | 248 | 64.6 |
| Total | 384 | 100 |

Source: Field Survey, (2019)

3.10 Critiques of the Study

Municipal solid waste management practices is vast and encompasses many processes such as waste collection, treatment, storage, transportation, disposal, maintenance of waste transport trucks and the dumping facilities in compliance with health codes and environmental regulations and as such; the study did not cover all of these aspects. The study focused on the various practices employed by the households, REMASAB and Private Waste Management Companies as well as the constraints or problems that hinder their effective operations. The study did not also cover the entire ten wards of the LGA; five wards were sampled out of the ten wards. More still, the study did not also look deep into informal waste management practice by the scavengers (*yan bola/jari bola*) who plays great role in waste segregation and in scattering or littering of waste stored in dustbin or receptacles, collection centres and dumpsites through their activities.

Sustainable waste management was not adequately investigated under the study topic and also failed to cover the Monthly Environmentally Sanitation practices which is one of the municipal solid waste management practices employed by the State Government every last Saturday of every month to ensure that people remain at home to clean their environment or communities. Other aspects not covered in details are: waste types, characterizations, composition and waste generation. Another important aspect of waste management which has not been addressed is the integrated municipal solid waste which it is hope to be investigated using the scoreboard methods. Therefore, further studies can be carried out on these aspects of the waste management in Tarauni LGA.

4.0 Conclusions and Recommendations

The study evaluated the various municipal solid waste management methods being practiced in Tarauni LGA by the three stakeholders: Households, REMASAB and Private Waste Management Agencies as well as their capabilities, effectiveness and challenges facing them. Findings reveal that socioeconomic and demographic factors as well as anthropogenic activities contributed to the enormous volume of wastes in the metropolis. Similarly, households do not carryout meaningful management of waste as they only drop wastes at dumpsites or burn them. The REMASAB main practice of waste management is evacuation from collection centres to the dumpsites at Maimalari, Bompai, Hajj Camp, Gyagyadi, Dala, BUK Road, Zaria Road, Maiduguri Road, Daurayi and Challawa in Kano metropolis. The reported that only the ones that seems to be effective those being carried out by the private waste management agencies. Municipal solid wastes management in Tarauni LGA is generally poor and the impact is less felt by the generality of the people. The inability of the agencies to deliver as expected is as a result of identified challenges they are facing in the metropolis such as insufficient fund, inadequate equipment, wide coverage, poor attitudinal behaviour and poor supervision among others.

To meet the SDGs 3; Good Health and Well-being for People 6; Clean Water and Sanitation, and 11; Sustainable Cities and Communities in Tarauni LGA, the study recommends the following:

- i.** There is the need to employ the use of bioreactor waste treatment technology which converts degradable organic matter into consumable fuels and mitigate the effects of wastes that are organic in nature.
- ii.** The LGA in collaboration with the state government should acquire modern waste management equipment.
- iii.** Contemporary methods of waste management such as reuse, recovery, recycle, separation, modern incineration, standard landfilling and composing among others should be encouraged.

- iv. The staff of REMASAB and other waste management agencies should be trained in accordance with modern practices. They should acquire framework of countries that have recorded success in waste management.
- v. Government and heads of agencies should make supervisions of workers and wastes management activities a point of duty.
- vi. There should be strong legislation on ground to punish those that dump wastes indiscriminately in the metropolis.
- vii. Intensive public education and enlightenment campaigns preferably in the local dialects on the dangers of indiscriminate dumping of waste as well as the importance of proper management of waste.
- viii. Residents should be acquainted with the Polluter Pays Principles (PPP) and be made ready to pay fee for waste management.

Reference

- Abdullaziz, T. M. (2014). Analysis of Spatial Distribution of Public Primary Schools in Taurani LGA, Kano State Nigeria, A Dissertation Submitted to the Department of Photogrammetry and Remote Sensing as part for the requirement for award of Professional Masters in Geo-Information Production and Management, 4 – 9.
- Agbesola, Y. (2013). Sustainability of Municipal Solis Waste Management in Nigeria: A Case Study of Lagos. M.Sc Thesis, Presented to Linkoping University, Tema Institute, Department of Water and Environmental Studies, liu.diva-portal.org
- Ahmed, K. (2012). An Account of High Population in Kano State, Northern Nigeria, The Report of Ford Foundation Sponsored Research Project, Department of Geography, Bayero University Kano, 37- 42
- Aina, O. (1994). New National Guidelines to Privatize Waste Management: *The Guardian News Paper*, 18th July, 1994: 8
- Butu, A. W. and Mshelia, S. S. (2017). Assessment of the Effectiveness of Municipal Solid Waste Management in Tarauni Local Government Area, Kano State, Nigeria. *Development Journal of Science and Technology Research*. Vol. 6 (2): 141 – 154
- Berg, B. L. (2009). *Qualitative Research Methods for the Social Sciences* (7th uppl.), Boston, Massachussets: Allyn and Bacon
- Bryman, A. (2004). *Social Research Methods*, Oxford: Oxford University
- Ebikapade, A. and Jim B. (2016). Solid Waste Management Trends in Nigeria, *Journal of Management and Sustainability*, 6(4):1925-4733
- Eziashi, A. C. (2007). Barriers to, Prospect of Solving the Persistent Problem of Solid Waste in Urban Centres, Department of Geography and Planning, University of Jos
- Dakata F. A. and Yelwa S. A. (2012). An Assessment of Mean and Inter-seasonal Variation during Growing Season across Kano Region, Nigeria using normalized difference vegetation index derived from SPOT satellite data, *Global Advanced Research Journal of Social Science*, 1(3):059-064
- Krejcie, A. and Morgan, D. (1970). Table for Determining Sample Size from a Population, In RK Dorfman Ed., *Economic of the Environment*; London: Methuen, 234 – 239
- Mshelia, S. S., Emmanuel, G. and Mbaya, Y.A. (2020). Assessment of Effects of Domestic Wastewater Pollution in Tarauni Local Government Area (LGA), Kano State, Nigeria. *International Journal of Research and Analytical Reviews*. Vol. 7 (2): 881 – 889.
- Muktar, M. (2011). Constraints of Waste Management in Kano Metropolis, Northern Nigeria, Vol.2. No.2. Department of Economics, Bayero University Kano-Nigeria
- Nabegu, A. B. (2010). An Analysis of Municipal Solid Waste in Kano Metropolis, Nigeria. *Techno – Science Africana Journal*, 2:112-114
- Nabegu, A. B. (2015). Institutional Constraints to Municipal Solid Waste Management in

Kano Metropolis, Nigeria. *International Journal of Innovative Environmental Studies Research*, 3(3):13-21.

NPC, (2012). National Population Commission Nigeria; Retrieved from:

www.population.gov.ng

Tchobanoglous, G., Theisen, H. and Vigil, S. (1993). *Integrated Solid Waste: Engineering Principles and Management Issues*, McGraw-Hill Publishing Company, USA.

Ogwueleka, T. C. (2009). Municipal Solid Waste Characteristics and Management in Nigeria, *Iran. J. Environ. Health Sci. Eng.*, 6 (3):173-180