

An Analysis of Solid Waste Generation and Disposal in Dutse Sahelian Zone of Jigawa State, Nigeria

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ABSTRACT: The paper examined the current situation of solid waste generation and disposal practice in Dutse, Sahelian Zone of Jigawa State, Nigeria. It is worth nothing that Jigawa State Environmental Protection Agency (JISEPA) is solely and legally in charge of collection and disposal of all categories of waste in the state. Presently, there is no complete and reliable database on waste management. Approximately, about 1230 tons of Municipal Solid Waste (MSW) is generated on daily basis. Similarly, the waste is mostly from residential areas, administrative centers, markets and higher institutions of learning. It has been observed that currently there is no awareness on waste management disposal method, collection, separation and technical expertise on recycling in the study area. Therefore, open dumping which is the most backward method of waste disposal is currently practice in the state. The waste generated is mostly off-loaded on trucks on daily basis and taken to designated disposal sites behind Sabuwar kasuwa, Fagoji and Burtilan. However, because of poor waste management system, the disposal of solid waste is mostly along gullies. Further investigation and measurement taken revealed that the gully is about 158 m long, 20m wide and 5.3m deep. The study concluded that little differences was evident in the amount of waste generated in the two areas, this has been due largely to the fact that inter-related socio-economic milieu was apparent between the two areas.

Key words: Solid waste, Municipal solid waste, Sahelian Zone, Waste generation, Waste disposal

INTRODUCTION

The issue of solid waste generation and disposal has attracted the attention of writers and scholars alike, particularly in recent years. However, the unfortunate condition of most cities regarding solid waste disposal practice has been discussed extensively in the literature by many scholars. For instance, Al-Khatib et. al. (2010), Lombroso (2009), Hazra and Goel (2009), Ariunbaatar et. al (2014), Nzeadibe (2009), Sha,Ato et. al. (2007), Igoni et. al. (2007), Burnley et. al. (2007), Banar et. al. (2009), Daskalopoulos et. al. (1998), Achanken (2003), Ato et. al.(2007), Song et. al. (2014) among others, with a view to finding a lasting solution to the problems of solid waste and its adverse consequences on human health and environment.

These scientist described the behavior of solid waste generation and disposal practice with emerging view that solid waste posed various environmental problems e. g overcrowding of water ways and drainage channel (resulting to overflow) air pollution, unpleasant odours. Also, it provides breeding ground to other vector of diseases, and provide a habitat to rodents burrow as well as associated threat to community health.

Alkhatib et. al. (2010) argued that economic activities, urbanization, improving living standards and population growth combined to speed up the rate of generation of municipal solid waste (MSW) causing its management to be the main environmental problem affecting urban centers globally. Inappropriate treatment of MSW consequently result to pollution problem such as atmosphere, water and soil and its associated blow on human health has elicited pre-eminent concern and hence, the imperative necessity of finding a comprehensive solution.

Tang et. al. (2010) noted that growing environmental anxiety and the importance on materials and energy recovery. However, MSW management progressively experienced a dramatic transformation from open dumping to controlled landfill and steadily to an integrated management scheme.

Pitt and Smith (2003) observed that the main reason behind waste management is to lessen the quantity of waste generation, thereby decreasing the effects on the environment and reducing the rate of disposal. Similarly, the cost enforces on suburban population located very close to the incineration and landfill will also decrease. In a related development, Sundberg et al. (1993) investigated system approach to municipal solid waste management in Gote Borg and reported that the understanding of the environmental problems has compelled local authorities and governments responsible for the management of waste to devise latest and scientific explanation for a potential waste management techniques.

Solid waste problem and practice are very severe in many regions, obtainable methods for the treatment of waste such as landfills and incineration plants if available are previously and completely utilized. Moreover, due to political and community resistance, the establishment of a good location that are equally reachable and precisely suitable for landfill as well as new concession for waste incineration is more or less unattainable.

Sembiring et al. (2009) observed that particular physical characteristics of towns in developing countries including urbanization, population growth as well as inadequate resources to present a good solid waste management (SWM) system, create series of problems ranging from open dumping, inadequate refuse collection, piling of waste on the roads and streams, all this contribute tremendously to make refuse available in the urban environment and for scavengers.

Solid waste management is the major devastating problem confronting many developing countries. In line with this, Al-Khatib et al. (2010) discussed the growing concern over haphazard disposal of waste resulting to the occurrence of severe pollution problem due to the production of huge amount of waste. He reported that there was inadequate prospect for the improvement of sustainable waste management system in Palestine as government resources were inadequate and more often collection was mostly neglected, only the appropriate disposal of solid waste is recognized as representing a cost.

The trait of solid waste streams and assessment of its generation rate is vital with a view to plan any sustainable management system and to discover the most suitable and feasible options to Municipal solid Waste (MSW). This, however, remained the major problem confronting many organizations; how to expand the management alternatives, enhance the consistency of communication system, and control the relocation of waste stream among composting, recycling, incineration and other services to their viable advantage.

Many current studies have made considerable progress in understanding solid waste management system. Two important studies for example, were that of (Lavrent et al. 2014, Rentizelas et al. 2014, who identified the need for management policies to be implemented. While few other studies (Song et al. 2014, Ariunbaatar et al. 2014) have relatively explored solid waste management method using different criteria. Their inputs showed a great extent of interest and knowledge on solid waste management system.

In the study area, administrative centers, higher institutions of learning, market and residential areas combined to form the main sources of MSW. It was estimated that about 1230 tons of MSW is currently generated on daily basis. However, due to lack of awareness about solid waste and its associated consequences the disposal practice is considered to be haphazard and un-scientific as it is mostly disposed along the gullies due to inefficient designated site for waste disposal.

There has not been any published research on solid waste management in the study area and thus, this research contribute to bridged the gap and create awareness, interest and knowledge in waste management. Based on the above background, therefore, the aim of the study is to examine solid waste generation and disposal practice with a view to find a lasting solution to the unending problem.

Literature Review

A review of the literature has indicated the existence of ample writings and studies available on the subject of solid waste generation and disposal practices. For instance, Gellynck, et al (2011) noted that so long as humans continue to adapt in a given community, solid waste will remain a topical issue. Vergara, et al (2011) observed that in order to minimize waste, it entails lasting performance change. Educational outreach can assist the buyer to understand the effects of their waste generation. Producing incentives for the buyers to create a small quantity of waste is thought possibly to have an impact, e. g. imposition of taxes for producing waste either directly or through pay-as-you throw programme, a situation through which the consumer is responsible for disposal of waste by paying a certain fees for waste disposal depending on the quantity generated, or by raising the fees at land fill.

Gellynck et al (2011) asserts that in reaction to this fee, the quantity of waste from households will drastically reduce or home owners will switch materials for the purpose of recycling. In his analysis, Williams et al (2004) argued that introducing a new system with a view to maximize recycling is only one section of the problem. Encouraging public participation is very important to many local authorities. There is the need to create awareness

among people regarding waste as a resource rather than the waste that is thrown away, and this will help to reduce the volume of waste and at the same time increase recycling.

Moreover, Shekdar, (2008) argued that in South Korea, for example, a reduction in the quantity of waste is achieved from 1.3 -1.40kg/cap/day is not a reduction and minimizing the quantity completely on waste fee system (unit pricing system) in 1995. Hong1999 cited in Shekdar (2008). He also added that there was a rise in the volume of recycling waste during this time from 26.2% to 44.0% while the quantity of waste that goes to landfill reduced from 68.3% to 41.5%.

In Taiwan, the same unit pricing system led to minimize the quantity of waste generated from 1.135kg/cap/day in 1996 to 0.667kg/cap/day during the year period 2005(ibid.)

The study area

The study area is Dutse Local Government Jigawa, State (Northern part of Nigeria). It is located between latitude 11°44.2N and longitude 09°21.58E with an elevation of 780m. Dutse Local Government has a population of about 251,135 people; while the total population of Jigawa State stands at 4,361,002. Statistical analysis revealed that the mean annual temperature is about 27°C with an annual rainfall of 1000mm. The rainfall season usually commences from May-September lasting up to early October in some occasions. Relative humidity is normally between 90%, but a thorough assessment of this condition suggests that the humidity fluctuate over time around July decreasing to 60-80%.

METHODOLOGY

A thorough survey of the disposal sites through non- participant observation was carried out with a view to obtain first hand information on solid waste generation and disposal system. Main attention was concentrated on monitoring the haphazard disposal of waste with a view to ascertain the point and the quantity of waste from the various designated areas. The observation was carried out twice firstly, on the 30th of December, 2013, and secondly, on the 15th of September, 2014 were data were collected over a period of time.

RESULTS AND DISCUSSION

Jigawa state was formerly under effective tutelage of Kano State and occupied most of the southern border, but was carved out from the former Kano State on the 27th August, 1991 by former Head of State, General Ibrahim Babangida. Waste generation in Dutse is always on the increasing trends due to urban growth, resulting from population migration from rural areas owing to socio-economic factors. However, Jigawa State Environmental Protection Agency (JISEPA) is solely and legally responsible for collection and disposal of all categories of waste. It has been observed that with the creation of the state in 1991 onward, there is no any inclusive and consistent database on waste management. The observation conducted suggested that currently there is no awareness on waste management, disposal method, collection, separation and technical expertise on recycling in the study area. There was however, no provision for refuse bins to facilitate disposal and collection method. Although, only two designated areas (Fatara and Dan Masara housing estates) are provided with waste bin for disposal purposes directly by Jigawa State Environmental Protection Agency (JISEPA). This is, because, it is largely inhabited by people of high social class with different educational background. Thus, the idea of haphazard disposal was avoided with a view to keep a clean and serene environment.

Comparatively, little differences were observed in the quantity of waste generated in the area, which has been due largely to the fact that inter related socio-economic milieu was apparent between the two areas.

Couth et. al. (2010) reported that in many developing countries, waste management is of low priority. Poor urban waste management system is associated with shortage of scientific and human assets as well as limited financial support of public service.



Figure 1. A typical disposal site along the gully behind Sabuwar Kasuwa.

Therefore, due to the aforementioned problems, open dumping which is the most backward method of waste disposal is currently practiced in the area. The waste generated is mostly off-loaded on trucks on daily basis and taken to disposal site behind Sabuwar Kasuwa. However, because of poor waste management system, the disposal of solid waste is mostly along the gullies (Figure 1.). The gully is about 158 m long, 20m wide and 5.3m deep. This is consonance with observation of Banar, et al (2008) who reported that in Eskisehir, (Turkey) natural basin is used as designated site for waste disposal and this has been largely due to the fact that regulated sustainable waste management is not put in practice.

However, because of bad-land topography and poor sandy soil, gullies are mostly found almost every where especially in some villages such as Katangare, Fagoji, and Burtilan Figure 2. Therefore, during the raining season the waste collected is usually taken to the above mentioned settlements with a view to control the menace of gully erosion, as the landscape is under constant threat of natural calamities such as erosion, flooding and desertification.



Figure 2. Fagoji disposal site showing the mode and nature of waste disposal,

Although one interesting issue to note is that the environment always remains clean with the establishment of measures to regulate waste disposal by the present administration. Similarly, this is different from what is happening in many developing cities as indiscriminate disposal of waste is usually at open spaces, along the roads, water bodies and drainage channels. In most African cities, for example, Nigeria and Cameroon, Achenkeng

(2003) reported that refuse tend to be thrown away with only a little attention on recycling, but individual waste pickers may go to the landfill site and extract the waste which they can then re-use or recycle.

CONCLUSION

The study illustrate that solid waste generation and disposal practice in Dutse, Sahelian Zone of Jigawa State is on the increasing trend. It was found that Jigawa State Environmental Protection Agency (JISEPA) is legally responsible for collection and disposal waste. Presently, there is no any inclusive and consistent database on waste management. It was however, observed that there is no awareness on waste management, disposal method, collection, separation and technical expertise on recycling in the study area.

It has been found that open dumping which is the most backward method of waste disposal is currently practice in the area. Similarly, because of poor waste management system, the disposal of solid waste is mostly along the gullies. Although, only two designated areas i.e. (Fatara and Dan Masara housing estates) are provided with waste bin for disposal purposes. Little differences was evident in the amount of waste generated in the two areas, this is has been due largely to the fact that inter-related socio-economic milieu was apparent between the two areas.

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