# Assessment of Solid Waste Disposal and Management in Ilesha, Osun State

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***Abstract:*** *This study was designed to assess the solid waste disposal and management in Ilesha metropolis, Nigeria. The primary data were collected through the use of structured questionnaires administered to 100 households. The descriptive survey design was used in this study. The data collected from the research instrument were analyzed using appropriate descriptive statistics. The findings of the study showed that most of the respondents have the knowledge of solid waste disposal. This study indicates that more than average of the respondents disposes food waste more than others. Waste bins were mostly used by the respondents. The wastes were recorded to be burnt by 37% of the respondents, dumped in public bin. Results about the perception about impact of solid waste management revealed that 98.0% of the respondents have heard and have knowledge about environmental impact of solid waste, 92.0% of the respondents know about health impact of solid waste, 99.0% of the respondents are aware that open dump site can breed flies, 90.0% are aware that refuse burning is not healthy for human while 94.0% have noticed waste by the road side and public areas. On the whole, improvements are needed on all solid waste management (SWM) system functional elements, but since disposal is the most problematic of all SWM functional elements in all the surveyed towns it should be given first priority in the planned capacity building efforts.*

**Keywords:** Solid waste, Waste management, Waste bins, Ilesha metropolis

## 1. INTRODUCTION

Rapid population growth results in a substantial increase in solid waste output, with severe socioeconomic and environmental consequences (Lagerkvist and Dahl, 2019). There is currently widespread agreement on standards for sustainable solid waste management; however, only limited efforts have been made so far, and they are tailored to the specific guidelines and needs of each national or regional body (Lagerkvist and Dahlen, 2019). For effective waste management, new tactics are required to develop varied and flexible urban models.

In most parts of the world, urbanization is now one of the biggest contributors to solid waste generation (Kumar and Pandey, 2019; Chen, 2018). Waste is unattractive in Africa and reduces community morale. Inadequate waste management has been linked to the spread of illnesses (World Bank, 2011; Osei *et al.*, 2010). Human activities that serve basic human requirements such as food, shelter, clothing, mobility, and aesthetic quality of life ultimately result in waste production. The trash generated must eventually be disposed of in a manner that does not cause nuisance or contamination to the environment. The amount of waste generated is getting increasingly unmanageable as cities grow in size and population.

Solid waste (SW) collection is an important part of any waste management strategy. It is one of the most significant difficulties facing garbage managers around the world (Ogra, 2013; Chalkias and Lasaridi, 2009). Regardless of the waste management tactics and procedures implemented, the first step is to collect waste in whatever form it may take. The garbage collecting plan should be adapted to fulfill the goals of the waste management processing technique in question, such as land filling or resource recovery. People and a mode of transport to a transfer station, treatment facility, or final dumping site make up the majority of solid trash collection (Oelofse et al., 2018).

Collection methods in developed and underdeveloped countries may differ noticeably. In most industrialized countries, the occurrence of house-to-house collection is fairly frequent, particularly for domestic solid waste collection (Satterthwaite *et al.*, 2018). However, due to a variety of problems, including financial, population increase, and other economic concerns, the use of this strategy

has been limited, particularly in developing countries (Awuah, 2018; Bezama and Agamuthu, 2019). In several countries in Sub-Saharan Africa, garbage collecting techniques like communal container collection methods appear to be the most prevalent (Lloyd, 2019; Lagerkvist, and Dahlen, 2019).

The effectiveness of waste management services in terms of human interface within waste management delivery domains is still mostly unclear. For example, there is essentially no comprehensive examination of consumer views of efficiency across districts in relation to the services of a given waste management provider. However, in order to help policy directions and improve sustainable waste management, it is necessary to have integrated information regarding the effectiveness of waste management service as well as customer satisfaction. However, a comprehensive evaluation of the effectiveness or quality of waste management services cannot be completed without input from waste service users (Udofia *et al.*, 2018).

Solid waste disposal is critical to environmental sanitation and long-term sustainability (Mansoor *et al.*, 2005). A more sustainable environment and better waste management provide potential for increased income, better health, and reduced vulnerability. Despite their high rate of urbanization and expansion in commercial and industrial activity, certain emerging countries, most notably Nigeria, were unable to achieve this due to a lack of preparation, disorganized, and laissez-faire attitude toward better solid waste disposal systems (Afangideh et al., 2012).

One of the primaries environmental issues those emerging countries face is waste disposal. Lack of proper waste management practices in Nigeria has resulted in health hazards, traffic congestion, unsightliness, discomfort, and drainage blockage, to name a few issues (Nwigwe, 2008). In developing countries around the world, solid waste disposal is addressed lightly, particularly in Nigeria, which has witnessed rapid urbanization during the last four decades. People in African countries' casual attitude toward modern trash disposal have caused a severe environmental health threat to human existence in their natural setting (Afangideh *et al.*, 2012). Meanwhile, one of the Western world's goals is to create a sustainable environment.

Solid wastes are all wastes that are generally solid and are abandoned as worthless or unwanted by humans and animals (Okecha, 2000). Solid wastes are divided into three categories based on their sources, environmental risks, utility, and physical properties: municipal solid wastes (MSW), industrial solid wastes (ISW), and agricultural solid wastes (ASW) (Okecha, 2000). Today, Nigeria's biggest cities are trying to eliminate rising piles of solid garbage from their surroundings. The messy aspect of overflowing dumps neglected heaps of solid wastes emerging from family or domestic or kitchen sources, marketplaces, retail and commercial areas is overtaking these important centers of beauty, tranquility, and security (Okecha, 2000). Officials from the city are powerless to stop the illegal and haphazard dumping of hazardous commercial and industrial wastes, which is a blatant violation of our environmental sanitation laws, rules, and regulations (Okebukola, 2001).

The goal of this study is to examine solid waste disposal among families in a big Ilesha city in order to determine the adequacy of community containers, distance from residences to the dumping site, and distance from the collection point to the final disposal site. The purpose of this study is to determine the level of knowledge about solid waste disposal, determine the type of solid waste generated in the home, determine the type of containers used to collect waste, determine how often waste containers are emptied, and determine the perception of solid waste management's impact.

## 2. METHODOLOGY

### 2.1 Research Design

This research employed a descriptive survey design. The researcher used a descriptive survey because it allowed him to generalize the findings from the study's sample. The descriptive survey research method is a fundamental research method that investigates the issue as it already exists (Leedy and Ormrod, 2001). The assessment of solid waste disposal and management in Ilesha is the subject of this study.

### 2.2 Research Setting and Study Area

The research was conducted in Ilesha, Osun State. Ilesha, a large city in the state of Osun, is strategically important as a main gateway to Nigeria's north, south, and east. It's in the rain forest zone of 70 N 50E, which is noted for its agricultural potential. Cocoa, oil palm, kolanuts, cotton, and pumpkins are among the main crops grown.

Ijeshas are people from this section of the state who are recognized for being hardworking, industrious, and well-traveled. Ijeshaland is made up of local governments such as Ilesha East, Ilesha West, Obokun, Oriade, Atakunmosa East, and Atakunmosa West. Iperindo, Ijebu-Jesa, Osu, Esa-Oke, Ikeji Arakeji, Owena Ijesha, Imesi Ile, Ifewara, and nearly 200 more villages are the major towns. According to the 2006 Population Census, Ijesaland's total population is 620,109 people.

Ilesha is reported to have enormous gold resources in commercial amounts, as well as other minerals in significant quantities. The Owa Obokun of Ijeshaland, who is the paramount monarch and head, is the traditional ruler of Ilesha. International Breweries Limited, Wesley Guild Hospital, Ilesha Grammar School, and Osun State College of Technology, Esa Oke are all located in Ilesha. Erin Ijesha Waterfalls, Kiriji War Museum, and the yearly Iwude Festival are all popular tourist destinations in this section of the state.

## 2.3 Population of the study

Because of the huge size of populations, it is difficult, expensive, and time consuming for a researcher to test or examine every aspect or individual in a population. Except in the case of a census survey, it is more practical to employ sampling techniques to draw a convenient representative sample. The total population for this study is drawn from all six LGAs in Ilesha, Osun State. Ilesha is divided into six local governments: Ilesha East, Ilesha West, Obokun, Oriade, Atakunmosa East, and Atakunmosa West.

## 2.4 Target Population

The target populations for the study were men and women living in households within all six local governments in Oyo State and they were conveniently selected for the study.

## 3.5 Sample Size Determination

The simple random sampling technique was used to select respondents from six Local Government Areas in Ilesha, Osun State, Nigeria. They include: Ilesha East, Ilesha West, Obokun, Oriade, Atakunmosa East and Atakunmosa West.

## 2.5 Sampling Technique

Simple random and sampling methods (Multi Sampling) technique was adopted to determine the selection of respondents in the six local government's areas in Ilesha, Osun State. One hundred respondents were randomly selected from one hundred households from six local governments in Ilesha, Osun State.

## 2.6 Research Instrument

The study collected data using a self-designed instrument called the Solid Waste Disposal and Management Questionnaire (SWDMQ). The SWDMQ was divided into three sections: A, B, and C. Section A was used to collect data on the respondents' socio-demographic characteristics, such as age, sex, and so on. Section B featured statistics on trash disposal awareness and methods, whereas Section C contained descriptive elements on the impact of solid waste management. On the Likert Scale, the items were ranked from Strongly Agree (4) to Agree (3), Disagree (2), and Strongly Disagree (2). (1). Negatively phrased items had their scores reversed.

## 2.7 Validation of Research Instrument

Consultations with professionals in the disciplines of test and measurement were used to ensure the instrument's validity. The experts were able to assess the items in terms of topic matter relevancy, linguistic appropriateness, and clarity of intent. According to the experts, the instrument has enough face validity. The instrument was also evaluated by the researcher's supervisor to verify consistency and decrease the ambiguity of the terminology used. Expert judgment was also used to validate the study instrument's items.

## 2.8 Procedure for Data Collection

The Department provided the researcher with a Letter of Introduction. Following that, the researcher went to the sampled center to collect approval letters after a good introduction. The researcher introduced herself to the people who would be answering the survey. The researcher also informed the respondents about the study's objective and promised them that the information they provided in their responses would be kept private. They were also told that there is no cohesion in the piece.

## 2.9 Method of Data Analysis

The information gathered from the study instrument was evaluated using descriptive statistics. To address the research questions, frequency counts and simple percentages were used.

## 3. Result and Discussion
## 3.1 Result
### 3.1.1 Age of Respondents

Findings on the age of respondents revealed that most of the respondents (87.0%) were less than 30 years, followed by 11% of the respondents who were above 41 years. Only 2% of the respondents were within the range of 31 to 40 years old (Table 1).

**Table 1:** **Age of Respondents**

|  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Less than 30 years | 87 | 87.0 | 87.0 | 87.0 |
| 31-40 years | 2 | 2.0 | 2.0 | 89.0 |
| 41 years above | 11 | 11.0 | 11.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 |  |

### 3.1.2. Gender of Respondents
Results on the gender of respondents showed that most of the respondents who participated in the study were female (57.0%) while others were male (43.0%) (Table 2). This implies that female participants participated more in the study.

**Table 2:** **Gender of Respondents**

|  | Frequency | Percentage | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Male | 43 | 23.0 | 43.0 | 43.0 |
| Female | 57 | 57.0 | 57.0 | 57.0 |
| Total | 100 | 100 | 100 | 100 |

### 3.1.3. Marital Status Age of Respondents
Findings on the marital status age of respondents revealed that most of the participants were single (71.0%), others were married (21.0%), divorced (5.0%) and widowed (3.0%) (Table 3). This means that single and married participants took part more in the study.

**Table 3: Marital Status Age of Respondents**

|  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Single | 71 | 71.0 | 71.0 | 71.0 |
| Married | 21 | 21.0 | 21.0 | 92.0 |
| Divorced | 5 | 5.0 | 5.0 | 97.0 |
| Widowed | 3 | 3.0 | 3.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 |  |

### 3.1.4. Highest Level of Education of Respondents
Findings on the highest level of education of respondents were post-secondary education (75.0%), followed by secondary school education (18.0%), no formal education (5.0%) and primary school education (2.0%) (Table 4).

**Table 4:** **Highest Level of Education of Respondents**

|  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| No formal education | 5 | 5.0 | 5.0 | 5.0 |
| Primary | 2 | 2.0 | 2.0 | 7.0 |
| Secondary | 18 | 18.0 | 18.0 | 25.0 |
| Post-secondary | 75 | 75.0 | 75.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 |  |

### 3.1.5. Religious
Results on the religion of respondents indicated that there were more Christians (61%) than Islam (38%) and traditional religion (1%). The percentage shows that more than average of the respondents was Christians (Table 5).

**Table 5: Religious**

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
|  | Islam | 38 | 38.0 | 38.0 | 38.0 |
|  | Christianity | 61 | 61.0 | 61.0 | 99.0 |
|  | Traditional | 1 | 1.0 | 1.0 | 100.0 |
|  | Total | 100 |  | 100.0 |  |

### 3.1.6. Ethnic Group of Respondents

Findings showed that 90% of the respondents were Yoruba, 5% were Hausa, 2% were Igbo and (3%) belonged to other religions (Table 6). This results indicates that most of the respondents were Yoruba

**Table 6:        Ethnic Group of Respondents**

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
|  | Yoruba | 90 | 90.0 | 90.0 | 90.0 |
|  | Hausa | 5 | 5.0 | 5.0 | 95.0 |
|  | Igbo | 2 | 2.0 | 2.0 | 97.0 |
|  | Others | 3 | 3.0 | 3.0 | 100.0 |
|  | Total | 100 | 100.0 | 100.0 |  |

### 3.1.7. Have you heard about solid waste disposal?

The findings of the study showed that most of the respondents have the knowledge of solid waste disposal (91%) and only 9% have not heard of solid waste disposal (Table 7). The result reflects that good numbers of the people are aware of the knowledge of solid waste disposal.

**Table 7: Respondents View**

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
|  | Yes | 91 | 91.0 | 91.0 | 91.0 |
|  | No | 9 | 9.0 | 9.0 | 100.0 |
|  | Total | 100 | 100.0 | 100.0 |  |

### 3.1.8. What type of solid waste comes out from the household?

Finding revealed that food waste carries most of the solid waste coming out of the household (58%), paper waste (14%), tin and can (13%), plastic (08%) and others (07%). This result indicates that more than average of the respondents disposes food waste more than others.

**Table 8: Respondents View**

|  |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
|  | Paper | 14 | 14.0 | 14.0 | 14.0 |
|  | Plastic | 8 | 8.0 | 8.0 | 22.0 |
|  | Food waste | 58 | 58.0 | 58.0 | 80.0 |
|  | Tin and can | 13 | 13.0 | 13.0 | 93.0 |
|  | Others | 7 | 7.0 | 7.0 | 100.0 |
|  | Total | 100 | 100.0 | 100.0 |  |

### 3.1.9. What type of containers do you collect Waste Carton?

The types of containers that respondents use to collect waste carton are waste caton (17%), waste bin (60), old bucket (9%) and plastic bags (14%) (Table 9). Waste bins were mostly used by the respondents.

**Table 9: Respondents View**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Waste Caton | 17 | 17.0 | 17.0 | 17.0 |
| Waste bin | 60 | 60.0 | 60.0 | 77.0 |
| Old bucket | 9 | 9.0 | 9.0 | 86.0 |
| Plastic bags | 14 | 14.0 | 14.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 | |

### 3.1.10. How often is the waste container emptied?

Results shows that containers are emptied by respondents once a day (41%), once in two days (12%), once in three days (19%), once a week (27%) and others (1%) (Table 10).

**Table 10: Respondents View**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Once a day | 41 | 41.0 | 41.0 | 41.0 |
| Once in two days | 12 | 12.0 | 12.0 | 53.0 |
| Once in three days | 19 | 19.0 | 19.0 | 72.0 |
| Once a week | 27 | 27.0 | 27.0 | 99.0 |
| Others | 1 | 1.0 | 1.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 | |

### 3.1.11. Where do you usually put away the collected wastes?

The wastes were recorded to be burnt by 37% of the respondents, dumped in public bin by 37%, put in the river by 7% of the respondents, put by the road side or street side by 2% of the respondents and 15% of the respondents put the wastes in their compound (Table 11).

**Table 11: Respondents View**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Burning | 37 | 37.0 | 37.0 | 37.0 |
| In public bin | 37 | 37.0 | 37.0 | 74.0 |
| By the river/stream | 7 | 7.0 | 7.0 | 81.0 |
| Road side/ streets side | 2 | 2.0 | 2.0 | 83.0 |
| Hole in own compound | 15 | 15.0 | 15.0 | 98.0 |
| Others | 2 | 2.0 | 2.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 | |

### 3.1.12. Perception about Impact of Solid Waste Management

Results about the perception about impact of solid waste management revealed that 98.0% of the respondents have heard and have knowledge about environmental impact of solid waste, 92.0% of the respondents know about health impact of solid waste, 99.0% of the respondents are aware that open dump site can breed flies, 90.0% are aware that refuse burning is not healthy for human while

94.0% have noticed waste by the road side and public areas (Table 12). In the same vein, 91.0% of the respondents have notices burning of waste in their community, 75.0% of the respondents think there is enough information available about the impact of solid waste, 90.0% agreed that everyone has to contribute to proper waste disposal, 88.0% think improper waste management can be reduced and 97.0% of the respondents claimed the need for waste management services (Figure 1).

**Table 12: Respondents View**

| Descriptive Statements | Yes | No |
|---|---|---|
| Do you know about environmental impact of solid waste | 98 (98.0%) | 2 (2.0%) |
| Do you know about health impact of solid waste | 92 (92.0%) | 8 (8.0%) |
| Open dump site can breed flies | 99 (99.0%) | 1 (1.0%) |
| Refuse burning is not healthy for human | 90 (90.0%) | 10 (10.0-%) |
| Do you notice waste by the road side and public areas | 94 (94.0%) | 6 (6.0%) |
| Do you notice burning of waste in your community | 91 (91.0%) | 9 (9.0%) |
| Do you think there is enough information available about the impact of solid waste | 75 (75.0%) | 25 (25.0%) |
| Do you agree that everyone has to contribute to proper waste disposal | 90 (90.0%) | 10 (10.0-%) |
| Do you think improper waste management can be reduced | 88 (88.0%) | 12 (12.0%) |
| There is need for waste management services | 97 (97.0%) | 3 (3.0%) |
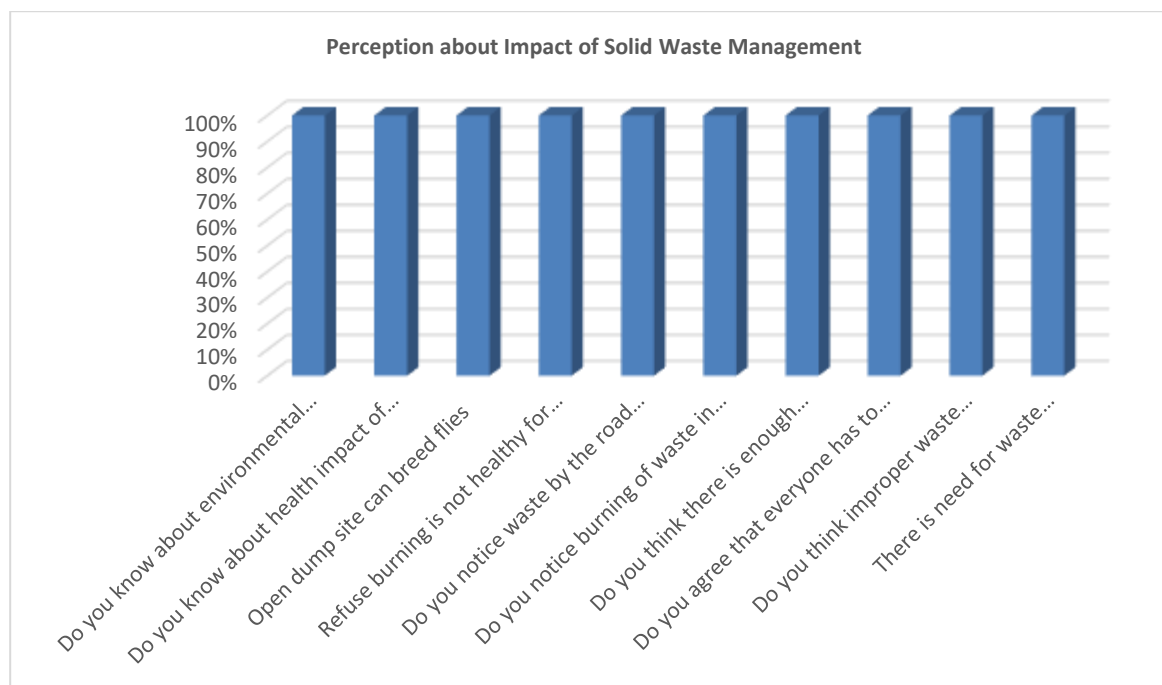


**Figure 1:** Perception about Impact of Solid Waste Management

## 3.2 Discussion

Results showed that most of the respondents empty their containers once a day (41%), Most of the respondents' burn wastes and dump it in public bins. In line with the study, Archer and Pierrehumbert (2013) asserted that proper discarding and management of the solid wastes generated from daily activities is very important in order to minimize the risk to environmental degradation, human and animal health. In the same vein, findings in the study revealed that more than 50% of the respondents are informed about the impact of solid waste management, they have heard and have knowledge about environmental impact of solid waste, health impact of solid waste, that refuse burning is not healthy for human, they noticed waste by the road side and public areas and many more. This corroborated the study of Adams and Luchsinger (2015) who asserted that humans tend to throw them about with little thought of their effects on the environment and overall health of man. Climate Focus (2015) articulated the fact that human need to ensure

that wastes are well disposed in such a way that it won't have negative effects on human and their environment. However, the present study did justice to this as most of the respondents claimed to be aware of proper ways of waste disposal.

## 4. CONCLUSION

The study's findings revealed that the majority of respondents are familiar with solid waste disposal. According to the findings, more than half of the respondents dispose of food trash more frequently than the average person. The majority of the responders utilized trash cans. The garbage were reported to be burned by 37% of the respondents and dumped in public bins by the remaining 37%. The findings revealed that 98.0 percent of respondents have heard and are aware of the environmental impact of solid waste, 92.0 percent of respondents are aware of the health impact of solid waste, 99.0 percent of respondents are aware that open dump sites can breed flies, 90.0 percent are aware that refuse burning is not healthy for humans, and 94.0 percent have noticed waste by the roadside and public places.

Based on the field survey findings and conclusions drawn from them, the following recommendations can be made to guide subsequent efforts on improving solid waste disposal in Ilesha towns:

i. On the whole, improvements are needed on all Solid Waste Management (SWM0 system functional elements, but since disposal is the most problematic of all SWM functional elements in all the surveyed towns it should be given first priority in the planned capacity building efforts.

ii. Institutional framework pertinent to SWM was cited as one of the impediment to effective SWM improvement. Therefore, individual countries must be encouraged to review their respective institutional frameworks with a view to improving them for more effective SWM improvements.

iii. The planned capacity building efforts must include providing to the selected towns SWM equipment and facilities that are well suited the individual towns. The towns must also be urged to provide their workers with appropriate PPE.

iv. Capacity building efforts must incorporate the role of the private sector through public private partnership arrangements or with the private sector as an independent contracted service provider.

v. The planned capacity building efforts must incorporate building the capacity of the selected towns to collect good quality solid waste generation and composition data which will be needed as a firmer basis for improved SWM.

vi. To add more value to the planned SWM improvements and enhance contributions of the local communities, capacity building efforts must incorporate employment creation and income generation for the local communities.

vii. Urban planning practice in all the surveyed towns need to change so as to be more proactive with respect to providing for SWM needs such as communal solid waste storage sites, transfer stations, and final disposal sites.

viii. The changes needed to be made and new things needed to be introduced to improve SWM in the selected towns will call for competencies and skills far beyond what was needed previously. Therefore, the capacity building efforts must incorporate training of the personnel who will be responsible for SWM in the improved regime.

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