IJST EXPLORE International Journal of Science and Technology
CENTRE OF PROFESSIONAL RESEARCH PUBLICATIONS
ISSN 2049-7318

International Journal of Science and Technology Volume 3 No. 5, May, 2014

Prioritization of Evacuation of Solid Waste at Municipal Solid Waste Disposal Centers

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ABSTRACT

Disposal of solid waste is one of the means of managing the waste in our urban centers which requires huge amount of money and other resources such as time. Most agencies face the problem of limited resources for waste disposal and in most cases, evacuation of the waste at waste collection centers are not given equal priority by the agencies. In this study, Analytical Hierarchy Process (AHP) was applied to prioritize evacuation of solid waste in collection centers in Abuja Municipal Council (Federal Capital of Nigeria). Abuja has thirteen (13) waste collection centers and two (2) disposal sites. Three criteria were identified as being used during the waste evacuation exercise. These are *Population Density* (PD) areas, V*ery Important Personalities* (VIP) areas and *Road Network/Drainage Channel* (RNDC) areas. A nine point scale of AHP was used to quantify the verbal judgments obtained from the Officers of the Solid Waste Management Agency in respect of the comparable importance of the criteria in relation to waste evacuation, and comparable importance of the waste collection centers in relation to each of the criteria. An excel spreadsheet program was developed and used to generate the synthesized matrices, consistency indices and priority weights. The results reveal that for waste evacuation in Abuja, Nigeria, Wuse 1 waste collection center should be given the highest priority while Wuye waste collection center should be given the least priority.

Keywords: *Analytic Hierarchy Process, Evacuation, Collection centers, Prioritization, Solid waste.*

I. INTRODUCTION

Solid wastes are things that the owners no longer want at a given time and space, and which have no current or perceived market value. They are not free flowing and thus have remained one of man's most challenging environmental problems. Solid wastes are continuously generated and disposed, and have been observed to be a growing problem. The continous generation and disposal of solid wastes have been ascribed to industrial development and population growth. The evacuation or disposal of solid wastes, which has been considered as the means of managing them, consumes huge amount of money and other resources such as time. Despite the huge investments government spends on them, their management have still remained one of the most problematic environmental sanitation challenges faced by developing countries of the world (United States Environment Protection Agency, 2003; Martin, 2002; Huang *et al*, 2001).
The disposal of solid wastes has over the years been an issue of concern for individuals and government officials especially in urban areas (Caruso, Colorni and Paruccini, 1993; Costi *et al*, 2003; Jadea *et al* , 2008). Most of the solid waste management agencies face the problem of limited resources to evacuate the waste. Solid wastes are generally an unavoidable by-product of economic activities. In Nigeria, due to industrialization and rapid population growth, wastes generally are generated faster than they are collected, transported and evacuated (United States Environmental Protection Agency, 2003; Ogwueleka, 2009; Onibokun and Kumuyi, 2003). It has been observed that management of solid wastes in Nigeria is far from being satisfactory. Many Nigerian cities and towns do not benefit from any organized waste management services and for that reason, wastes are unattended to, buried, burnt or disposed haphazardly (Federal Ministry of Environment, 2005).

The sources of solid wastes in Nigeria can be identified as market places, homesteads, factories, workshops, hospitals, seaports, primary, post primary and tertiary institutions (Akoni, 2007). It has been documented that the volume of waste does not actually constitute problem but the ability or inability of governments, individuals and waste disposal firms to keep up with the task of managing them. Waste management involves collection, keeping, treatment and disposal of waste in such a way as to render them harmless to human and animal life, ecology and the environmental generation. In this paper solid waste disposal is considered as activities of wastes management, which involves collection of the wastes from generating source and transferring the collected wastes to final disposal sites. The wastes are usually collected at various collection centres which are located at different places within a given town or city. These collection centres are always associated with the volume of wastes growing faster than the volume transferred to disposal sites. This implies that the collection centres always have volumes of wastes accumulated and are rarely evacuated due to limited resources. As such, some criteria are usually considered during the waste evacuation at the collection centers.

The objective of this study is to provide numerical measures that provide preferential order of evacuating the waste at waste collection centers, based on certain considered criteria. This should serve as information for solid waste managers in

planning for the evacuation of solid wastes in municipalities. Abuja Municipal Council, Federal Capital of Nigeria was considered as a case study.

II. METHODOLOGY

AHP is a multi-criteria decision making approach that has good mathematical properties appropriate for incorporating value judgments of decision makers in modeling for selection of best alternatives. It is equally appropriate for providing numerical measure of ranking of set of decision making criteria. In addition to its usefulness for decision making, it is also a tool used for deriving information for planning. Thus, AHP is a decision support tool that can be used to solve complex decision problems. It is modeled in tree- like multi-level hierarchy structure of objective, criteria, sub-criteria and alternatives. Pair wise comparism of the criteria and or sub-criteria is established to model same as a pair wise matrix. The result of the evaluation of the matrix is weights of importance of the decision criteria and the relative performance measures of the alternatives in terms of each individual decision criteria (Alonso and Lamata, 2006; Winston, 1993; Zamali, Mohd and AbuOsman, 2010). In this paper, Analytical Hierarchy Process (AHP) is applied for determining priority ratings for solid waste evacuation at collection centers in Abuja Metropolis. The technique incorporates the value judgments of the stakeholders of solid wastes management. The choice of AHP for this problem situation is its suitability in determining accurate estimation pertinent to data through its pair wise comparison. Input to the pair wise comparison is the expression of decision maker's opinion about the value of one single pair wise comparison at a time. Doing this requires that a decision maker chooses his answers among 10-17 discrete choices- each choice is expressed as a linguistic phrase(Zamali, Mohd and Abu Osman, 2010). The pair wise comparisons are quantified by using a scale which is one-to-one mapping between the sets discrete linguistic choices available to the decision maker and a discrete set of numbers, which represents the importance, or weights of the previous linguistic choices. Saaty (1980) proposed such scale quantification as contained in Table 1.

Table 1: Scale of Relative Importance.

Intensity of Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally
3	Weak importance of one over another	Experience and slightly favor one activity over another
5	Essential or strong importance	Experience and judgment strongly favor one activity over another
7	Demonstrated importance	An activity is strongly favored and its dominance demonstrated in practice
9	Absolute importance	The evidence favoring one activity over another is the highest possible of affirmation
2,4,6,8	Intermediate values between the two adjacent judgments	When compromise is needed
Reciprocals of above nonzero	If activity *i* has one of the non zero nos. assigned to it when compared to activity *j* , then *j* has the reciprocal value when compared to *i*.	

Triantaphyllou and Mann (1995) proposed an evaluation of seventy eight (78) different scales in which all alternative scales depart from some psychological theories and developed numbers which were used based on these psychological theories. Psychological experiments have also shown that individuals cannot simultaneously compare more than seven objects (plus or minus two). Consequent upon this, Saaty (1980) established nine (9) as the upper limit and one (1) as the lower limit of his scales and a unit difference between successive scales as seen in Table 2.

Table2: Nine Point Scale for Assessment of Verbal Judgments of the Respondents

S/No.	Verbal judgments of preferences	Numerical Rating
1	Extremely preferred	9
2	Very strongly to extremely preferred	8
3	Very strongly preferred	7
4	Strongly to very strongly preferred	6
5	Strongly preferred	5
6	Moderately to strongly preferred	4
7	Moderately preferred	3
8	Equally to moderately preferred	2
9	Equally preferred	1

Data was collected through direct personal observation. Interview and questionnaire were used as instruments for eliciting responses from the Officers of Solid Waste Management Agency (Abuja Environment Protection Board) and Federal Ministry of Environment, Abuja. Documented materials on the operations of these organizations were also consulted for relevant data to the study. From the sources, the operations of the existing disposal functional element was identified and assessed. Parameters measured and assessed were:

(i) Number and location of waste collection centers (district) and disposal site.
(ii) Waste collection criteria used during waste evacuation.
(iii) Assessment of pair wise comparable importance of the criteria in relation to waste evacuation.
(iv) Assessment of pair wise comparable importance of the collection centers in relation to each criterion.

Based on the measurements and assessments of the parameters, and the preferential scaling of judgments of the Staff of Solid Wastes Management Agency, pair wise comparison matrix of the criteria in relation to waste evacuation and pair wise comparison matrices of the collection centers in relation to each criterion were developed, from which the relative preferential ratings were determined. Abuja Municipal Council has thirteen (13) waste collection areas (district). These are: Garki 1, Garki 2, Wuse 1, Wuse 2, Central Area, Gwarinpa, Maitama, Asokoro, Jabi, Durimi, Lugbe, Kado and Wuye, and two disposal site at Goza and Ajate. It was also observed that the following criteria are considered during waste evacuation exercise: *Population Densities* (PD) area, *Very Important Personalities* (VIP) area and *Road Networks/Drainage Channels* (RNDC) area. The hierarchy for the evacuation of waste is shown in Figure 1.

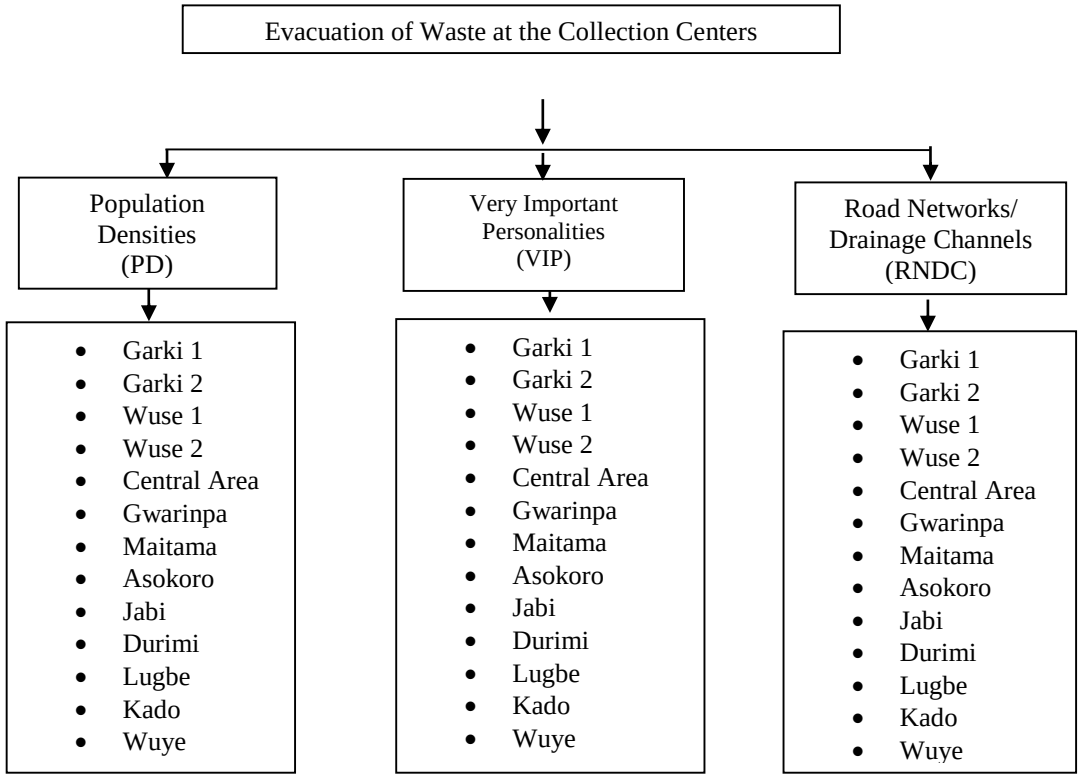

Fig. 1: Hierarchy for waste evacuation

III. RESULT AND DISCUSSION

Nine point (9) scales were used in rating the judgments of the comparable importance of the criteria in relation to waste evacuation (i.e pair wise comparisons of the three criteria in relation to evacuation of volumes of waste), which is shown in Table 3.

Table3: The Pair wise Comparisons of the Three Criteria for the waste evacuation.

S/No.	Pair wise Comparison	More Important Criterion	How Much More Important	Numerical Rating
1	PD-VP	PD	Strongly to very strongly more important	**5**
2	PD-RNDC	PD	Moderately to strongly more important	**2**
3	VP-RNDC	VP	Moderately more important	**3**

The collected data was inputted into an Excel Spreadsheet program developed, which generated the synthesized matrices, consistency indices and priority weights. The corresponding pair wise comparison matrix of the criteria and syntheses matrix of the criteria with priority weights for each criterion are shown in Tables 4 and 5 respectively.

Table4: The Pair wise Comparison Matrix

	Settlement Pattern		
Settlement Pattern	**PD**	**VP**	**RNDC**
PD	1	5	2
VP	1/5	1	3
RNDC	½	1/3	1

Table 5: The Syntheses Matrix of table 4

	Settlement Pattern			
Settlement Pattern	**PD**	**VIP**	**RNDC**	**Priority**
PD	0.5882	0.7895	0.3333	**0.5703**
VIP	0.1176	0.1579	0.5000	**0.2585**
RNDC	0.2941	0.0526	0.1667	**0.1711**

From table 4 and 5: $\lambda_{max} = 3.0523,\ \ CI = 0.0262,\ RI = 0.5245,\ CR = \frac{CI}{RI} = 0.0499 < 0.1$, the judgement is consistent.

Similarly, comparable importance of waste collection centers in relation to each of the three criteria was interactively assessed. These assessments gave rise to the development of three pair wise comparison matrices and their corresponding syntheses matrices with priority weights of each of the collection center. These are shown in Tables 6, 7, 8,9,10 and11 respectively.

Table 6: The Pair wise Comparison Matrix Showing Preferences for the Collection centers based on PD

Location	Garki I	Garki II	Wuse I	Wuse II	Cent. A.	Gwarinpa	Maitama	Asokoro	Jabi	Durimi	Lugbe	Kado	Wuye
Garki 1	1	2	½	½	4	3	4	4	2	3	3	2	3
Garki 2	½	1	½	½	5	2	5	4	3	2	2	3	3
Wuse 1	2	2	1	2	5	4	4	5	3	4	3	4	5
Wuse 2	2	2	½	1	4	3	4	4	2	3	2	3	3
Cent. A.	¼	1/5	1/5	¼	1	½	6	3	½	½	⅓	½	½
Gwarinpa	⅓	½	¼	⅓	2	1	3	2	½	2	2	3	2
Maitama	¼	1/5	¼	¼	1/6	⅓	1	½	⅓	⅓	⅓	⅓	⅓
Asokoro	¼	¼	1/5	¼	⅓	½	2	1	1/2	⅓	⅓	½	¼
Jabi	½	⅓	⅓	½	2	2	3	2	1	2	½	2	3
Durimi	⅓	½	¼	⅓	2	½	3	3	½	1	2	3	2
Lugbe	⅓	½	⅓	½	3	1/2	3	3	2	½	1	2	2
Kado	½	⅓	¼	⅓	2	⅓	3	2	⅓	½	½	1	½
Wuye	⅓	⅓	1/5	⅓	2	½	3	2	⅓	½	½	2	1

Table 7: The Syntheses Matrix of the table 6.

Location	Garki I	Garki II	Wuse I	Wuse II	Cent. A.	Gwarinpa	Maitama	Asokoro	Jabi	Durimi	Lugbe	Kado	Wuye	**Priority**
Garki 1	0.1165	0.1970	0.1049	0.0706	0.1231	0.1679	0.0909	0.1127	0.1274	0.1525	0.1744	0.0759	0.1161	**0.1254**
Garki 2	0.0583	0.0985	0.1049	0.0706	0.1538	0.1119	0.1136	0.1127	0.1911	0.1017	0.1163	0.1139	0.1161	**0.1126**
Wuse 1	0.2330	0.1970	0.2098	0.2824	0.1538	0.2239	0.0909	0.1408	0.1911	0.2034	0.1744	0.1519	0.1935	**0.1882**
Wuse 2	0.2330	0.1970	0.1049	0.1412	0.1231	0.1679	0.0909	0.1127	0.1274	0.1525	0.1163	0.1139	0.1161	**0.1382**
Cent. A.	0.0291	0.0197	0.0420	0.0353	0.0308	0.0280	0.1364	0.0845	0.0318	0.0254	0.0194	0.0190	0.0194	**0.0401**
Gwarinpa	0.0388	0.0493	0.0524	0.0471	0.0615	0.0560	0.0682	0.0563	0.0318	0.1017	0.1163	0.1139	0.0774	**0.0670**
Maitama	0.0156	0.0125	0.0156	0.0156	0.0104	0.0208	0.0625	0.0313	0.0208	0.0208	0.0208	0.0208	0.0208	**0.0222**
Asokoro	0.0291	0.0246	0.0420	0.0353	0.0103	0.0280	0.0455	0.0282	0.0127	0.0169	0.0194	0.0190	0.0194	**0.0254**
Jabi	0.0583	0.0328	0.0699	0.0706	0.0615	0.1119	0.0682	0.0563	0.0637	0.1017	0.0291	0.0759	0.1161	**0.0705**
Durimi	0.0388	0.0493	0.0524	0.0471	0.0615	0.0280	0.0682	0.0845	0.0318	0.0508	0.1163	0.1139	0.0774	**0.0631**
Lugbe	0.0388	0.0493	0.0699	0.0706	0.0923	0.0112	0.0682	0.0845	0.1274	0.0254	0.0581	0.0759	0.0774	**0.0653**
Kado	0.0583	0.0328	0.0524	0.0471	0.0615	0.0187	0.0682	0.0563	0.0212	0.0254	0.0291	0.0380	0.0194	**0.0406**
Wuye	0.0388	0.0328	0.0420	0.0471	0.0615	0.0280	0.0682	0.0563	0.0212	0.0254	0.0116	0.0759	0.0387	**0.0421**

From table 6 and 7: $\lambda_{max} = 13.9500$, $CI = 0.0792$, $RI = 1.5551$ *and* $CR = \frac{CI}{RI} = 0.0509 < 0.1$, *is* consistent.

Table8: The Pair wise Comparison Matrix Showing Preferences for the Collection centers based on VIP

Location	Garki I	Garki II	Wuse I	Wuse II	Cent. A.	Gwarinpa	Maitama	Asokoro	Jabi	Durimi	Lugbe	Kado	Wuye
Garki 1	1	2	2	2	½	3	⅓	⅓	2	3	3	3	3
Garki 2	½	1	½	½	⅓	2	⅓	¼	2	3	½	½	3
Wuse 1	½	2	1	½	½	2	⅓	¼	½	2	½	2	3
Wuse 2	½	2	2	1	½	2	¼	⅓	2	2	2	3	3
Cent. A.	2	3	2	2	1	3	⅓	½	3	3	3	3	4
Gwarinpa	⅓	½	½	½	⅓	1	½	¼	½	2	½	2	2
Maitama	3	3	3	4	3	2	1	4	3	3	4	4	4
Asokoro	3	4	4	3	2	4	¼	1	4	4	3	4	5
Jabi	½	½	2	½	⅓	2	⅓	¼	1	2	2	2	2
Durimi	⅓	⅓	½	½	⅓	½	⅓	¼	½	1	½	½	2
Lugbe	⅓	2	2	½	⅓	2	¼	⅓	½	2	1	2	2
Kado	⅓	2	½	⅓	⅓	½	¼	¼	½	2	½	1	2
Wuye	⅓	⅓	⅓	⅓	¼	½	¼	1/5	½	½	½	½	1

Table 9: The Syntheses Matrix of table 8

Location	Garki I	Garki II	Wuse I	Wuse II	Cent. A.	Gwarinpa	Maitama	Asokoro	Jabi	Durimi	Lugbe	Kado	Wuye	**Priority**
Garki 1	0.0789	0.0882	0.0984	0.1277	0.0513	0.1224	0.0702	0.0406	0.1000	0.1017	0.1429	0.1091	0.0833	**0.0934**
Garki 2	0.0395	0.0441	0.0246	0.0319	0.0342	0.0816	0.0702	0.0305	0.1000	0.1017	0.0238	0.0182	0.0833	**0.0526**
Wuse 1	0.0395	0.0882	0.0492	0.0319	0.0513	0.0816	0.0702	0.0305	0.0250	0.0678	0.0238	0.0727	0.0833	**0.0550**
Wuse 2	0.0395	0.0882	0.0984	0.0638	0.0513	0.0816	0.0526	0.0406	0.1000	0.0678	0.0952	0.1091	0.0833	**0.0747**
Cent. A.	0.1579	0.1324	0.0984	0.1277	0.1026	0.1224	0.0702	0.0610	0.1500	0.1017	0.1429	0.1091	0.1111	**0.1144**
Gwarinpa	0.0263	0.0221	0.0246	0.0319	0.0342	0.0408	0.1053	0.0305	0.0250	0.0678	0.0238	0.0727	0.0556	**0.0431**
Maitama	0.1875	0.1875	0.1875	0.2500	0.1875	0.1250	0.0625	0.2500	0.1875	0.1875	0.2500	0.2500	0.2500	**0.1971**
Asokoro	0.2368	0.1765	0.1967	0.1915	0.2051	0.1633	0.0526	0.1220	0.2000	0.1356	0.1429	0.1455	0.1389	**0.1621**
Jabi	0.0395	0.0221	0.0984	0.0319	0.0342	0.0816	0.0702	0.0305	0.0500	0.0678	0.0952	0.0727	0.0556	**0.0577**
Durimi	0.0263	0.0147	0.0246	0.0319	0.0342	0.0204	0.0702	0.0305	0.0250	0.0339	0.0238	0.0182	0.0556	**0.0315**
Lugbe	0.0263	0.0882	0.0984	0.0319	0.0342	0.0816	0.0526	0.0406	0.0250	0.0678	0.0476	0.0727	0.0556	**0.0556**
Kado	0.0263	0.0882	0.0246	0.0213	0.0342	0.0204	0.0526	0.0305	0.0250	0.0678	0.0238	0.0364	0.0556	**0.0390**
Wuye	0.0263	0.0147	0.0164	0.0213	0.0256	0.0204	0.0526	0.0244	0.0250	0.0169	0.0238	0.0182	0.0278	**0.0241**

From table 8 and 9: $\lambda_{max} = 14.1111$, $CI = 0.0926$, $RI = 1.5551$ *and* $CR = \frac{CI}{RI} = 0.0595 < 0.1$ *is* consistent.

Table10: The Pair wise Comparison Matrix Showing Preferences for the Collection centers based on RNDC

Location	Garki I	Garki II	Wuse I	Wuse II	Cent. A.	Gwarinpa	Maitama	Asokoro	Jabi	Durimi	Lugbe	Kado	Wuye
Garki 1	1	2	3	2	2	2	2	4	4	2	3	3	4
Garki 2	½	1	½	½	¼	⅓	3	2	3	3	3	2	3
Wuse 1	⅓	2	1	2	½	½	2	3	3	2	2	2	3
Wuse 2	½	2	½	1	½	½	2	2	3	2	3	3	4
Cent. A.	½	4	2	2	1	2	2	3	3	3	2	4	3
Gwarinpa	½	3	2	2	½	1	2	2	2	3	2	2	4
Maitama	½	⅓	½	½	½	½	1	½	½	⅓	⅓	½	2
Asokoro	¼	⅓	⅓	½	⅓	½	2	1	½	⅓	½	3	4
Jabi	¼	⅓	⅓	⅓	⅓	½	2	2	1	½	½	½	2
Durimi	½	⅓	½	½	⅓	⅓	3	3	2	1	2	2	2
Lugbe	⅓	⅓	½	⅓	½	½	3	2	2	½	1	½	2
Kado	⅓	½	½	⅓	¼	½	2	⅓	2	½	2	1	2
Wuye	¼	⅓	⅓	¼	⅓	¼	½	¼	½	½	½	½	1

Table 11: The Syntheses Matrix of table 10

Location	Garki I	Garki II	Wuse I	Wuse II	Cent. A.	Gwarinpa	Maitama	Asokoro	Jabi	Durimi	Lugbe	Kado	Wuye	**Priority**
Garki 1	0.1739	0.1200	0.2500	0.1633	0.2727	0.2124	0.0755	0.1595	0.1509	0.1071	0.1374	0.1250	0.1111	**0.1584**
Garki 2	0.0870	0.0600	0.0417	0.0408	0.0341	0.0354	0.1132	0.0797	0.1132	0.1607	0.1374	0.0833	0.0833	**0.0823**
Wuse 1	0.0580	0.1200	0.0833	0.1633	0.0682	0.0531	0.0755	0.1196	0.1132	0.1071	0.0916	0.0833	0.0833	**0.0938**
Wuse 2	0.0870	0.1200	0.0417	0.0816	0.0682	0.0531	0.0755	0.0797	0.1132	0.1071	0.1374	0.1250	0.1111	**0.0924**
Cent. A.	0.0870	0.2400	0.1667	0.1633	0.1364	0.2124	0.0755	0.1196	0.1132	0.1607	0.0916	0.1667	0.0833	**0.1397**
Gwarinpa	0.0870	0.1800	0.1667	0.1633	0.0682	0.1062	0.0755	0.0797	0.0755	0.1607	0.0916	0.0833	0.1111	**0.1114**
Maitama	0.0313	0.0208	0.0313	0.0313	0.0313	0.0313	0.0625	0.0313	0.0313	0.0208	0.0208	0.0313	0.1250	**0.0385**
Asokoro	0.0435	0.0300	0.0278	0.0408	0.0455	0.0531	0.0755	0.0399	0.0189	0.0179	0.0229	0.1250	0.1111	**0.0501**
Wuye	0.0435	0.0200	0.0278	0.0204	0.0455	0.0265	0.0189	0.0100	0.0189	0.0268	0.0229	0.0208	0.0278	**0.0254**
Durimi	0.0870	0.0200	0.0417	0.0408	0.0455	0.0354	0.1132	0.1196	0.0755	0.0536	0.0916	0.0833	0.0556	**0.0664**
Lugbe	0.0580	0.0200	0.0417	0.0272	0.0682	0.0531	0.1132	0.0797	0.0755	0.0268	0.0458	0.0208	0.0556	**0.0527**
Kado	0.0580	0.0300	0.0417	0.0272	0.0341	0.0531	0.0755	0.0133	0.0755	0.0268	0.0916	0.0417	0.0556	**0.0480**

From table 10 and 11: $\lambda_{max} = 14.3104,\ CI = 0.1092,\ RI = 1.5551$ *and* $CR = \frac{CI}{RI} = 0.0702 < 0.1$ *is* consistent.

Table 12 shows the summary of preferential weight for the collection centers in relation to the criterion considered, while Table 13 shows the overall AHP Priority weight of the waste evacuation in the waste collection centers. The results reveal that during the waste evacuation, Wuse 1 should be given attention first, followed by Garki 1, then Wuse 2 and so on. Finally, Wuye should be considered last. The priority levels are given in Table 14.

Table 12: Priorities Weight for Collection Centers Using each Criterion

	Criterion		
Waste Collection Centers	**PD**	**VIP**	**RNDC**
Garki 1	0.1254	0.0934	0.1584
Garki 2	0.1126	0.0526	0.0823
Wuse 1	0.1882	0.0550	0.0938
Wuse 2	0.1382	0.0747	0.0924
Cent. A.	0.0401	0.1144	0.1397
Gwarinpa	0.0670	0.0431	0.1114
Maitama	0.0222	0.1971	0.0385
Asokoro	0.0254	0.1621	0.0501
Jabi	0.0705	0.0577	0.0412
Durimi	0.0631	0.0315	0.0664
Lugbe	0.0653	0.0556	0.0527
Kado	0.0406	0.0390	0.0480
Wuye	0.0421	0.0241	0.0254
Total	1.0000	1.0000	1.0000

Table13: Overall AHP Priori Weight for the Waste Collection Centers

Waste Collection Centers	Criterion Ranking PD (0.5703)	VIP (0.2585)	RNDC (0.1711)	Weight
Garki 1	0.0715	0.0242	0.0271	**0.1228**
Garki 2	0.0642	0.0136	0.0141	**0.0919**
Wuse 1	0.1073	0.0142	0.0161	**0.1376**
Wuse 2	0.0788	0.0193	0.0158	**0.1140**
Cent. A.	0.0228	0.0296	0.0239	**0.0763**
Gwarinpa	0.0382	0.0111	0.0191	**0.0684**
Maitama	0.0127	0.0510	0.0066	**0.0702**
Asokoro	0.0145	0.0419	0.0086	**0.0650**
Jabi	0.0402	0.0149	0.0071	**0.0622**
Durimi	0.0360	0.0081	0.0114	**0.0555**
Lugbe	0.0373	0.0144	0.0090	**0.0606**
Kado	0.0232	0.0101	0.0082	**0.0415**
Wuye	0.0240	0.0062	0.0043	**0.0346**
			Total	**1.0000**

Table 14: AHP Priority Level for the Collection Centers

S/No.	Waste Collection Centers	AHP Priority Weight	Priority Level
1	Wuse 1	**0.1376**	**1st**
2	Garki 1	**0.1228**	**2nd**
3	Wuse 2	**0.1140**	**3rd**
4	Garki 2	**0.0919**	**4th**
5	Cent. A.	**0.0763**	**5th**
6	Maitama	**0.0702**	**6th**
7	Gwarinpa	**0.0684**	**7th**
8	Asokoro	**0.0650**	**8th**
9	Jabi	**0.0622**	**9th**
10	Lugbe	**0.0606**	**10th**
11	Durimi	**0.0555**	**11th**
12	Kado	**0.0415**	**12th**
13	Wuye	**0.0346**	**13th**
	Total	1.0000	

IV. CONCLUSION

The study demonstrates how waste evacuation in Abuja metropolitan can be prioritized based on comparable importance of the waste collection centers and other criteria during waste evacuation exercise. AHP has been used to prioritize the evacuation of waste, in Abuja Municipal council. This should serve as information for proper planning of solid waste management in Abuja Metropolitan Council, and therefore recommended for implementation by the Solid Waste Management Agency.

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