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ASSESSMENT OF ENVIRONMENTAL EFFECTS OF SOLID WASTE SORTING IN STAFF QUARTERS OF AHMADU BELLO UNIVERSITY, ZARIA NIGERIA

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Abstract

The psychological attitude of people to solid waste sorting is still an issue of investigation. The main thrust of this paper is to assess the environmental effects of solid waste sorting in staff Residential Quarters of Ahmadu Bello University, Samaru Zaria Kaduna, Nigeria. The method employed was Systematic Sampling which required drawing the list of four areas selected after arranging the Staff Quarters in an alphabetical order and a well-structured questionnaire was administered to get information from the respondents. It was discovered that 27% of the respondents agreed that lack of awareness seem to be the factor that hinders waste sorting. It was revealed that 141kg of vegetable waste had the highest weight. In terms of waste generated, area BZ had 56kg followed by area A with 41kg. The conclusion is that the residents of ABU quarters were not fully aware but were ready to imbibe the technology of solid waste sorting. Therefore governmental, non- governmental organization and international institutions can play a vital role by sensitizing, building networks among partners and providing technical knowhow so as to have a successful solid waste sorting for sustainable development.

Key words: Assessment, Ahmadu Bello University Staff Quarters, Environmental Effect, Waste Sorting.
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1.1 Introduction

Waste sorting or selective sorting is simply a process used to separate waste based on its composition. It is carried out by individuals and industries and then more precisely in-specialized sorting centres. Waste reclamation is dependent on sorting. Among other things, it is used to separate recyclable waste from other waste (Lexicon Multimedia Glossary of Science and Technology (LMGST) 2010).

In developed and developing countries, alternative management options for waste are now recognized as important approach to solving waste problem such as; Waste avoidance, reduction, recycling, reuse and composting. Resource recovery from dumped consumer products is growing in significance, as waste is increasingly seen as a valuable resource. As human beings continuously realized that resources are finite, efficient use of resources and resources recovery from wastes are vital for global sustainability (Zaman and Lehmann, 2011). These wastes, which are often littered around in greater, unsorted quantities, eventually find their way in nearby streams and rivers,

which subsequently become polluted (United Nation Environmental Programme, 2002).

Some peoples sorting awareness habit is born out of introduction of new rules and demands can be confusing in the first run, but a longer perspective will increase a possibility to change society's mind; new rules can become a background for awareness. Henriksson, *et al*, (2010) pointed out factors behind awareness and readiness to sort to includes lack of information and knowledge on the need to sort waste before disposal, individual behaviour due to personal motivation, inconvenience, impracticality, age, or disability, insufficient amount of certain types of recycle waste, place of residence, lack of sorting tools, the size of residence plays an important role, skepticism which comes from local authorities, media, family and low profit stimulus.

Pothimamaka (2008) researched on community learning process: a model of solid waste reduction and separation in Bang Sue District, Bangkok Metropolis, Thailand. The author combined both quantitative and qualitative research methods. The study notes that the best practice of solid waste management in developed countries is reduction of waste generated at the source. The study revealed that most people in advanced countries are taught how to deal with solid waste by separating it in their homes, schools and work places.

Post (2007) conducted a study on investigation into waste reduction strategies in Jamaica. The author specifically focused on women participation in solid waste management in order to meet the waste reduction goals set forth by the Jamaican governments. Both qualitative (through in-depth interviews with national and regional institutions within the solid waste management system) and quantitative (through questionnaire survey on the household) research methods were employed. The findings revealed that the greatest potential for initiating waste reduction strategies exists at the household level through community-based programs. The diversion of food waste from the waste stream is currently achieved through the practice of domestic animal feeding.

In another study, Ukoje (2011) analyzed the participation of stakeholders in solid waste management in Zaria, Nigeria. The study considers the framework for participation and character of relationships between stakeholders. The author utilizes the cluster and random method of sampling to select the neighborhoods, households and stakeholder groups for data collection. The study revealed that there is a lack of recognition and cooperation with non-public institution stakeholders in the solid waste management framework in Zaria. In addition, there is inadequate collection and disposal of solid waste by the stakeholders. As such other categories of waste like sorting of domestic waste were not discussed.

An observation of the residential areas of ABU reveals that a lot of waste lie unsorted and are packed together. Given the elitist characteristics of residents in the quarters, it is expected that environmental awareness and contemporary waste management especially waste sorting would be imbibed. The contrary picture has presently given a concern, which deserves a research on the appraisal level of awareness and readiness to Solid Waste Sorting in Staff Quarters of A.B.U. Samaru Zaria, Kaduna Nigeria.

1.2 The Study Area

Ahmadu Bello University, (ABU) Zaria lies between latitudes 11°07'N-11° 09'N and

longitudes 7° 37'E-7° 39'E,.It is about 85 km north of Kaduna. ABU is situated within Zaria and the physical and socio-economic characteristics are similar with that of Zaria. The area lies between 300-900 metres above sea level (Ogunleye, 2006). ABU is located in Zaria but the residential area being considered is on Samaru campus of A.B.U. Zaria is a nodal town for both road and rail transportation modes. The study areas comprises of Area 'A', 'BZ', 'C' and 'F' and a substantial volume of waste is generated on a daily basis, although there is an authorized waste disposal infrastructure in place in these areas.

Figure 1.were selected purposively for in-depth research. Based on available data gotten from the University, each area is made up of varying number of residential apartments and collectively has a total population of 484.

For clarity of expression, population in this study is considered as household. It is expected that every household have a waste collection bin that were weighed after sorting for evaluation (because they probably have the same waste disposal behavior) hence it is a household analysis.

To determine the sample size, Krejcie and Morgan's (1970) Table was consulted and for a population of between 400 and 499, a sample size of 192 is appropriate. Since the population falls within that range which is 484, the sample size was 192 (Table.1).

To determine the number of residents to be sampled from each of the selected neighbourhoods the proportion of the population to the total population was obtained using the formula as follows:

NQ = n/N x 192

Where, NQ is the number of residents per neighbourhood to be sampled, n is the population of the neighbourhood

N is the total population of the housing units under study. 192 respondents were selected using a well – structured questionnaire for a quantitative data. The houses were randomly selected to allow every house the equal opportunity of participation however only one hundred and ninety (190) copies of questionnaire were successfully retrieved. The respondents misplaced Two (2) copies.

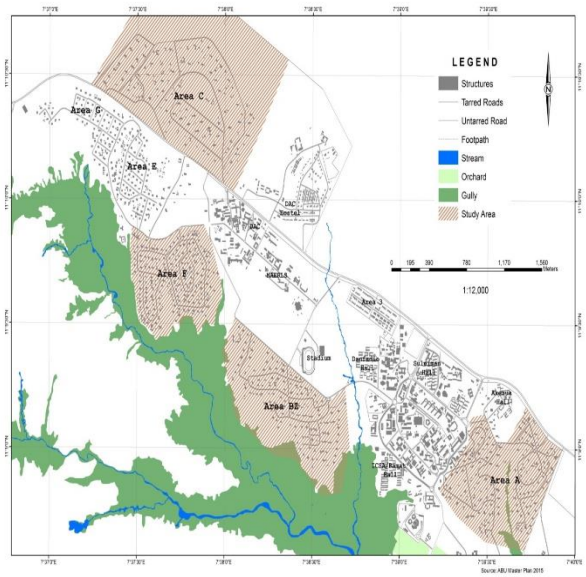

Fig1. Study Area
Source: A.B.U. Master plan, 2018

2.0 METHODOLOGY

The researcher employed the use of waste bin and assigned four bins labeled 1 (cans/bottles), 2 (polythene/plastics), 3 (paper/cardboard) and 4 (vegetable materials) to sample residential unit in each of the areas which were closely monitored. Field observation and FGD in eliciting information for the research was carried out. These contain relevant and well-structured questions aimed at eliciting responses that addresses the objective of the study. Ahmadu Bello University, Zaria is made up of majorly eight areas namely; Area A, Area BZ, Area 3, Area F, Area H, Area C, Area E and Area G

housing units. Four (4) out of the eight (8) housing units of the institution.

Table 1: Selected Neighborhoods and Proportion of Respondents

S/N	Selected Housing Units	Selected Neighborhoods	Population of Neighborhood	Number of Residents sampled	Number of Participatory waste Sorting
1.	AREA 'A'	Bayajida	16	7	6
		Catering Flat	39	15	
		Mai Bedde	29	12	
		Modibo	15	6	
		SarkinMusulmi	20	8	
		Bagauda	9	4	
		El-Kanemi	10	4	
		Plateau Close	8	3	
		Yakubu L	9	4	
2.	AREA 'BZ'	Isa Kaita	23	9	6
		Jama'a	18	7	
		Sardauna	26	10	
		Usman Dalla	15	6	
		AbubakarTafawa	10	4	
		Kudingi	8	3	
		TudunSarki	9	4	
3.	AREA 'C'	Harry Darling	36	14	6
		Moh'dLawal	20	8	
		Suleiman Barau	22	9	
		YahayaGusau	15	6	
		amadukumasi	9	4	
		ladanBaki	8	3	
		Sulu Gambari	9	4	
4.	AREA 'F'	Shehu Idris	41	16	6
		Abdu Gusau	16	6	
		Savannah Flat	17	7	
		Usman Nagogo	10	4	
		Kwamna Anon	8	3`	
		TagwaiSambo	8	3	
	Total		484	192	24

Source: Authors Survey, 2018

Analysis and presentation of information from the questionnaire were done by means of descriptive statistics. Here the analyzed data were summarized and presented in tables, graphs, charts, percentages.

2.3 Results and Discussions

Figure 2 presents the gender distribution of respondents. From the figure, the female were the overwhelming majority from the residential areas sampled. Area 'A' 86%, Area 'BZ' 92%, Area 'C' 82% and Area 'F' 95% compared to the male counterparts Area 'A' 15%, Area 'BZ' 8%, Area 'C' 18% and Area 'F' 5%. The finding shows a clear under representation of the male members of the households.

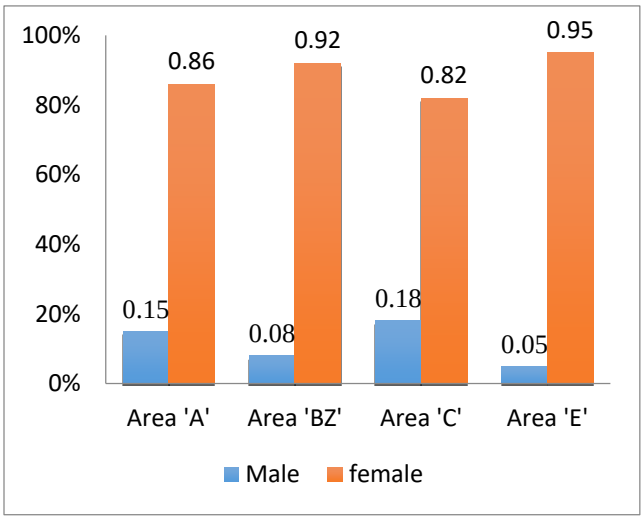

Fig.2. Gender Distribution of Respondents
Source: Authors Analysis, 2018

This is because the respondents are mostly the females who are responsible for the removal and disposal of waste, while the male are often responsible for financial responsibilities in the homes.

Meanwhile the finding is in line with that of Garshol, (2010), where in Weinstein the female outnumbered the male population in waste sorting. Ahmad (2002) noted that women are responsible for maintaining healthy and clean environment and directly affected by inadequate waste management. Living in a community means individual assumes some responsibilities including marriage. For the residents of ABU Samaru quarters included in this study, Figure 4.2 presents the marital status.

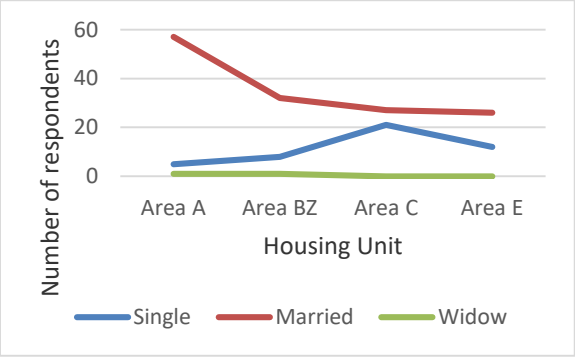

Fig. 3: Marital Status of respondents
Source: Authors Analysis, 2018

The Fig.3 indicates the respondents who were single, married and widowed. Area A has 90% of the respondents who were married which is the highest while the lowest proportion of married respondents were discovered in Area C and F with 30% respectively. Area C has the highest respondents that were single, while Area A was the lowest. From the study area, none of the respondents are widowed. This could be because residential quarters are mostly allocated to matured staff with families.

Table 2: Distribution of respondents by highest educational attainment

Educational Attainment	Frequency	Percentage
Quranic	2	1
Primary	3	2
Secondary	3	2
Tertiary	160	84
Others	22	11
Total	190	100

Source: Authors Analysis, 2018.

The Table 2 presents the highest educational attainment of respondents. The survey generally revealed that out of 190 respondents sampled from the four residential areas, tertiary education recorded the highest with 84%, while 2% accounts for the lowest, which is Qur'anic education. In an oral interview conducted with the Director of Estate Management, it was revealed that staff allocated to Area 'A', Area 'BZ', Area 'C' and Area 'F' are senior staff of the residential quarters, hence the variation in their educational attainment.

The analysis clearly presents most of the respondents are highly educated in reflection of the university environment

where in the work. Another pointer is that most of the respondents were women who were equally educated as well, hence their knowledge of environmental aesthetic will be fairly higher than average.

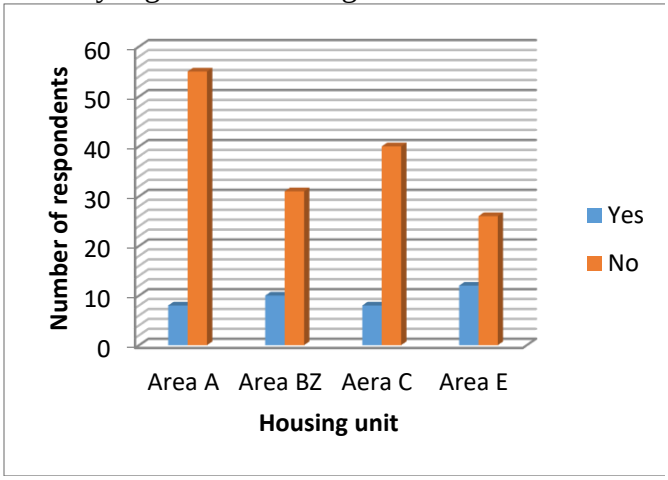

Fig. 4: Waste sorting by respondents
Source; Authors Analysis, 2018

Respondents' responses on waste sorting implies that 90% of the residents do not sort waste in Area A which is the highest while 40% is the lowest in Area F. It is clear that most of the residents do not sort their wastes. This may be due to lack of enlightenment on its benefit. This emphasizes the assertion of UNEP (2002) that an accurate knowledge of the quantity and composition of waste input is essential to the success of resource recovery, which are also required for proper planning, designing and operation of waste management.

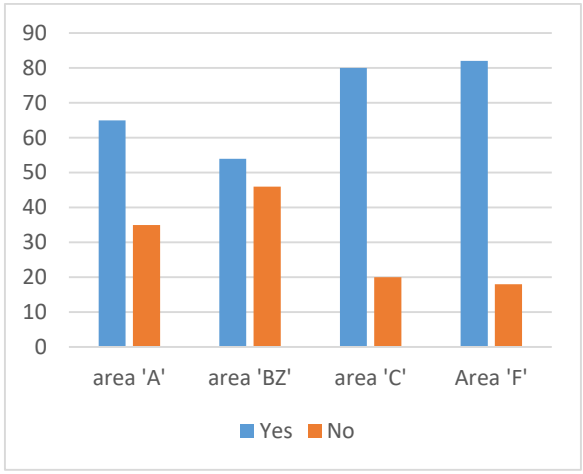

Fig. 5.Level of awareness and readiness to sort waste
Source: Authors Analysis, 2018.

Area 'A' and Area 'BZ' respondents were slightly different. Close to 65% of the respondents from Area 'A' were aware and ready to sort their wastes while 35% were not ready to sort wastes. From Area 'BZ', 54% of the respondents were aware and ready to sort their wastes while the remaining 46% claimed the contrary (Figure 5.). In Area 'C" and "F" 80% of residents were aware and ready to sort their wastes while 20% and 18% respectively, are not. The finding of the study revealed that the high level of formal education of the respondents in the study area (Table 3) does not have to do with knowledge and readiness to sort their wastes.

Table 3: Participation of waste sorting exercise

S/No	Items	Area				Total
		Area 'A'	Area 'BZ'	Area 'C'	Area 'F'	
	Vegetable	56kg	41kg	26.5kg	17kg	140.5kg
	Cans/Bottles	23kg	22kg	9.5kg	9.3kg	63.8kg
	Polythene/ Plastics	27kg	18kg	7.6kg	8.8kg	61.1kg
	Paper/Cardboard	18.2kg	13kg	6.3kg	6.5kg	44kg
	Total	124.2kg	94kg	49.9kg	41.6kg	319.7kg

Source: Authors Analysis, 2018

The highest sorted waste is the one generated from vegetable and cans/bottles, these are 56kg and 23kg respectively which surpasses those generated from polythene/plastics and paper/cardboard weighing 27kg and 18.2kg respectively. Some of these are shown on plate 1, 2 and 3.

Plate 1: Baskets of sorted waste in a participatory demonstration of waste sorting in Area F
Source; Field Survey, 2018.

Plate 1 shows baskets sorted with waste in the study area. To gather information about level of waste sorted from the participatory exercise, the participants sorted wastes were weighed using the weighing scale. Plate 2 also shows the weighing of sorted waste in the study area while Plate 3 shows the variation in the volume of sorted waste.

Plate 2: Weighing of sorted waste in a participatory demonstration in Area A
Source; Field Survey, 2018

Plate 3 : Variation in Quantity of sorted wastes in Area BZ
Source; Field Survey, 2018

From the waste sorting exercise, it is observed that majority of the sorted waste are still reusable and recyclable. Some of these are small unit waste like vegetable, plastic and glass bottles and papers. However vegetable waste dominates the waste stream which came from food consumed. This is in line with the study of Amori, (2013) who stated that out of the average waste generated in residential areas, food waste exhibited the highest percentage followed by plastic related materials.

2.4 FINDINGS

The result of the analysis shows that 83% of the respondents were female. Tertiary education accounts for 84% which seems to be the highest

qualification in the study area. The result of the analysis shows that from the four areas sampled 44% of the respondents are within the age range of 31-40 years.

The study found out that 90% of the residents of ABU do not sort their waste though 65% are aware and ready to. It was revealed that 140.5kg quantity of vegetable waste was sorted in participatory exercise being the highest waste sorted. Area 'A' had the highest (56kg) followed by Area 'BZ' (41kg).

2.5 CONCLUSION

Analysis has been made in this research to appraise the level of awareness and readiness to solid waste sorting in staff residential quarters of Ahmadu Bello University, Main Campus, Samaru, Zaria. From the findings, the major conclusion is that domestic solid waste sorting is not being practiced in staff residential quarters of Ahmadu Bello University, Main Campus, Samaru, Zaria. The knowledge level is low but there is an increasing prospect of adoption of waste sorting. It is recommended that the university authority should create an enabling environment for sensitization of its residents on needs and benefits of sorting waste before disposal as this can serve as a source of revenue through re-use and recycling.

It is recommended that the university authority should create an enabling environment for sensitization of its residents on needs and benefits of sorting waste before disposal. The university authority should also distribute bags/containers and modern sorting machines to residential staff quarters for waste sorting. This will take care of the inadequate spacing in the residential housing units. The University Health Services is responsible for solid waste management and disposal. Enforcement team should be established for mobilizing the participation of university communities in waste sorting through environmental laws. In addition, the use of mechanism of fees, penalties and fines to encourage observances of the law should be enforced.

REFERENCES

Ahmad, R. (2002). Options or Improvement of Solid Waste Management Residents Joined the Opposition Party, Thereby Creating Resentment by the Ruling Class Towards any Area Upgrading Effort.

Henriksson, G, Akesson, L. and Ewert, S (2010). Uncertainty Regarding Waste Handling in Everyday Life Sustainability. 2(9): 2799 – 2813.

Ogunleye, E. K. (2006). Utilisation of Remote Sensing Products in Kaduna State: A Case Study of Kaduna and Zaria Metropolises. *Unpublished PGD Project*. Ambrose Ali University, Ekpoma, Nigeria. 3-10.

Post, J. L. (2007). Solid Waste Management in Jamaica: An Investigation into Waste Reduction Strategies. Unpublished M.Sc. Thesis, Department of Civil Engineering, Michigan Technological University.

Pothimamaka, J. (2008). Community Learning Process: A Model of Solid Waste Reduction and Separation in Bang Sue District, Bangkok Metropolis, and Thailand. *Environment Asia (2).* 43-48. Retrieved from:www.tshe.org/EA Accessed on 12/12/2013.

Zaman, A.U. and Lehmann, S. (2011). *Zero WasteCity*: Zero Waste South Australia Research Center for Sustainable Design and Behavior; School of Art, Architecture and Design, University of South Austrialia. 14-15