
AN ASSESSMENT OF WASTEPAPER MANAGEMENT IN A.B.U. MAIN CAMPUS, SAMARU

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DOI: <https://doi.org/10.67203/sp.ICESID.2026>

ABSTRACT

Wastepaper is paper discarded after being used. Post-consumer paper, or wastepaper, is a vital renewable raw material source for the paper industry and can contribute substantially to the reduction in the importation of paper. With over 45,000 students, about 20,000 staff (academic and non-academic) and 106 departments, Ahmadu Bello University, Zaria, is the largest university in West Africa. With a population of about 200 million people, on the average, a Nigerian uses about 10 kg of paper per year. The result showed that for student respondents, 68% between 21-30, 59% are Postgraduate Diploma (PGD) students and 55% have been in ABU for 2-4 years. The demographic results for academic and non-academic staff respondents show that 72% are males, 50% of the respondents are single, 40% between 41-50 years and 62% have worked in ABU for 0 to 5 years. 62.4% of the staff and 54.2% of the students mentioned that reuse of wastepaper is what they do to curb wastepaper generation. The practice among the staff with the highest rank is the burning of wastepaper, while the activity with the least rank is sorting of waste before dumping them into the dustbins. The members of the university community should be encouraged to practice the 3Rs of waste management on waste more than is currently being practiced in the order of reduce, reuse and recycle. With 48.5% of the students Sometimes/Often/Always buy used textbooks, the Student Union can create a book buyback program as one of the methods of mitigating wastepaper generation on campus.

Keywords: A.B.U; wastepaper; book buyback; reduce; reuse and recycle

INTRODUCTION

Paper is a thin sheet material made from a combination of mechanical and chemical processes converting cellulose fibres derived from wood, rags, grasses or other vegetable sources. The raw materials are soaked in water, the water is then drained through a fine mesh, leaving the fibre evenly distributed on the surface of the mesh. This process is followed by pressing and drying. Paper is a versatile material used for several purposes such as books, printing, packaging, decorating, writing, cleaning, wallpaper, filter paper, conservation paper, laminated worktops, toilet tissue, currency, security paper and a number of industrial and construction processes (Hogben, 1951; Mann, 1952).

Wastepaper is paper discarded after being used. Wastepaper from scrap newspapers, books and periodicals, office paper, kraft paper, paper boxes and corrugated paper are all valuable fibrous raw materials (Worldwide Fund for Nature, 2019). Post-consumer paper, or wastepaper, is a vital renewable raw material source for the paper industry and can contribute substantially to the reduction in the importation of paper. Its recycling is also important from the environmental perspective, as systematic collection and recycling of wastepaper can greatly reduce the volume of municipal solid wastes. It has been estimated that recycling one ton of wastepaper results in a saving of 70% raw material, 60% coal, 70% water and 43% energy, as compared to making virgin paper from wood (Ministry of Environment and Forests Notification India, 2011; Devi and Sastry, 2017).

Wastepaper forms a certain percentage of waste stream that ends up in the dumpsite / landfill. According to Alim and Ahmed (2020), paper form about 18% of the waste stream in Gombe town, Gombe State Nigeria. This percentage is significant. If this percentage is reduced or removed from the waste stream, things such as cost of production of paper, land pollution, air pollution and water pollution would be effectively reduced. Nigerian Government policies towards waste sorting, reduce, reuse and recycle would also play an important role in reducing the overall waste stream that ends up dumpsite / landfill (Sridhar and Hammed, 2014).

The key causes of solid waste complications in Nigeria have been associated with large population, poverty and urbanization growth rates complicated by a weak and underfunded infrastructure (Ezeah and Roberts, 2012). The management of solid waste in Nigerian cities continues to pose serious challenges due to the absence of appropriate and organized waste management culture and technologies, arising from financial, political instability, technological constraints and poor implementation of policy (Afun, 2009; Ezerie, George, Chidi and John, 2017).

Ahmadu Bello University (ABU) is a public university founded on October 4, 1962, located in Zaria, Kaduna State in the Northern part of Nigeria. With over 45,000 students, about 20,000 staff (academic and non-academic) and 106 departments, it is the largest university in West Africa and the second largest on the African continent after the University of Cairo in Egypt. The university has two main campuses, the main campus located in Samaru and annex campus in Kongo, both in Zaria (ABU, 2021). With this large population of students enrolled in diploma, undergraduate and postgraduate programmes, there is a large usage of paper for various activities. The Samaru Campus which is the focus of this study has an estimated population of 16,150 people (staff, students and cleaners). A certain percentage of the paper used ends up as waste to the dumpsite. This article looks at the attitude, practices and knowledge of the ABU community towards paper after its use.

On the average, each person in the United States of America uses approximately 749 pounds (339.741 kg) of paper a year. Some the paper goes into things such as books, used in other permanent applications like insulation or roofing shingles for your home (Georgia-Pacific Corporation, 2011). In Nigeria however, the data available is on the quantity of paper imported into the country which is 2 million metric tons annually (Adunola, 2018) with almost zero local production. With a population of about 200 million people, on the average, a Nigerian uses about 10 kg of paper per year.

$$\text{average paper use per Nigerian} = \frac{\text{quantity of paper imported}}{\text{estimated total population}} = \frac{2,000,000,000}{200,000,000}$$

$$= 10 \text{ kg/person}$$

METHODOLOGY

A questionnaire was designed to obtain information from different categories of members of the university community. The respondents were categorized into three, namely staff (academic & non-academic), students and the casual staff who carry out the general cleaning within the university on daily basis. For the purpose of this study, the main campus in Samaru was the main focus. The population of study consists of students, academic & non-academic staff and other members of the university community within the Samaru campus, which is estimated 16,150. The sample size is 201 which was determined using Yamane's formula for determining samples size as seen in equation 1 below.

$$n = \frac{N}{1+N(e)^2}$$

2

where n is sample size, N is population size and e is sampling error ($\pm 7\%$)

out of the 201 used as sample size, 101 questionnaires were administered to student and all were received back, while 50 questionnaires were administered to both academic and non-academic staff, while 50 questionnaires were administered to the cleaners. 48 questionnaires were received from the staff and 48 questionnaires were received from the cleaners. This distribution pattern is necessary because, out of the estimated 16,150 estimated people in the Samaru campus, the student are about half of this population. Based on the estimated population of Samaru campus, the average annual paper use is given by:

$$\text{estimated annual paper usage in ABU} = 16,150 \times 10 \text{ kg/person}$$

$$= 161,500 \text{ kg}$$

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To achieve the aim of this study, a questionnaire was used to find out how wastepaper is managed in ABU. The questionnaire comprises of three different segments namely, for students (33 questions), academic and non-academic staff (30 questions), for casual workers (cleaners) and waste disposal truck drivers (28 questions) which was conducted by interview because most of them can only communicate in Hausa language. The response of each of the casual workers was filled on the

questionnaire as they responded. The questions for each group of respondents were categorized into parts consisting of information related to the sources of wastepaper, wastepaper reduction, wastepaper handling, uses of wastepaper and wastepaper disposal.

Questions on knowledge and awareness had an assign score, using Likert scale, 1-5 for "Never", "Seldom", "sometimes", "often", "always" respectively. The practice statements were scored based on negative or positive wording of the items. For every positive response (Yes) the respondent was scored 2 while every negative response (No) was scored 1. Questions on students practice on wastepaper management and what they will do in some certain situations were assigned a score of 0-4 for 'pass them to friends', 'sell them', 'throw them away', 'keep them', 'others' respectively (Vagias, 2006).

RESULTS AND DISCUSSION

The result showed that for student respondents, their age ranges are 27% below 20, 68% between 21-30, 4% between 31-40 and 1% above 41% respectively. 34% of the respondents are B.Sc. students, 59% are Postgraduate Diploma (PGD) students, 4% are M.Sc. students, 1% are M.Phil. students and 2% are Ph.D. students. on the number of years in ABU, 1% of the respondents have stayed more than 6 years in ABU, 12% have stayed between 4-6 years, 55% for 2-4 years and 32% between 0-2 years.

The demographic results for academic and non- academic staff respondents show that 72% are males while 28% are females. 50% of the respondents are single, 33% are married, 6% are divorced and 11% are widows. Their age ranges are 24% for below 30 years, 36% for 31-40 years, and 40% for 41-50 years. On their level of education, 50% are school certificate holders, 29% B.Sc. holders, 13% are M.Sc. holders and 8% are Ph.D. holders. On the number of years working in ABU, 62% have worked in ABU for 0 to 5 years, 29% for 6 to 10 years and 9% for 11 to 15 years.

The demographic results for cleaners and waste disposal truck drivers shows for their age distribution, 24% are below 30 years, 52% are between 31 to 40 years, 20% are between 41 to 50 years and 4% are above 51 years old. The males are 20% while the females are 80%. Most of the cleaners that are involved in cleaning the class rooms and offices are women, validating the fact that most of the cleaners are women. 13% are single, 54% are married, 4% are divorced, 29% are widows. 75% have been working in ABU between 0-5 years and 25% between 6-10 years.

Table 1: Approaches to wastepaper management by staff on campus

Methods	Frequency	Percentage (%)
Reduce	10	9.9
Recycle	20	19.8
Reuse	63	62.4
Others	8	7.9

Reduce 9.9%, Recycle 19.8%, Reuse 62.4%, Others 7.9%

Table 1 shows that 19.8% of the respondents agreed that recycling is the most common method used for wastepaper management in ABU Samaru campus. 62.4% mentioned that reuse of wastepaper is what they do to curb wastepaper generation within the campus while reducing wastepaper generation is the least method in use for wastepaper management in ABU because paper represent a huge resource used for academic and research activities on campus. It should be noted that 7.9% still adopt other methods such as burning and flushing in suck away are methods they in managing their wastepaper.

Table 2: Approaches to wastepaper management by students on campus

Methods	Frequency	Percentage (%)
Reduce	4	8.3
Recycle	18	37.5
Reuse	26	54.2

Using the percentages as shown in table 2, it can be seen that 54.2% of the students practice wastepaper reuse as wastepaper management method, 37.5% recycling and 8.3% use wastepaper reduction as a method of paper management. Similar to what is practiced by the staff as in table 1, reusing of wastepaper is the second used approach to wastepaper in campus. This is laudable; however, more efforts and awareness should be put into encouraging members of the university community to reduce paper usage as the best approach to wastepaper management.

Table 3: Sources of wastepaper among staff

Sources	Frequency	Percentage (%)
Newspaper	16	11.6
Flyers	12	8.7
Mails	18	13
Memos	12	8.7
Envelope	2	1.4
Seminar papers	18	13
Minutes of meetings	2	1.4
Result deliberations	6	4.3
Printed paper	26	18.8
Project report	12	8.7
Flyers	6	4.3
Minutes of meeting	8	5.8
Others	0	0

The major source of wastepaper among the staff by percentage as shown on table 3 are printed papers (18.8%), mail and seminar papers at (13%), newspaper (11.6%), memos, project report and flyers (8.7%) with files been the least source of wastepaper on campus. Printed paper usually come from request for staff information from individual staff by the university management, draft work of supervisee given to the supervisor, presentations at the departmental boards, faculty boards and senate standing committee meetings, printing of curriculum vitae and other supporting documents during promotion exercises etc.

Furthermore, seminar papers are the second main source of wastepaper due to regular seminars presented by postgraduate students. in this case, each student has to produce a significant number of copies of his/her work for the audience. Most of these seminar papers become waste as soon as the student finishes the presentation for that particular day. There is the need to seriously look into several ways of reducing paper consumption during the above-mentioned activities.

Table 4: Sources of wastepaper among students

Sources	Frequency	Percentage (%)
Lecture notes and course packs	39	38.7
Newspaper	6	5.9
Flyers	17	16.9
Mails	2	2
Cardboards	6	5.9
Printed paper	7	6.9
Textbooks	7	6.9
Seminar papers	8	7.9
Others	9	8.9

Table 4 shows the type of wastepaper generated on campus by students. The study revealed that lecture notes and course packs constitute the largest single source of wastepaper (38.7%) while mails constitute the least source of wastepaper among students on campus (2%). These lecture notes come in form of lecture materials issued by the course lecturer(s), solution to past questions, whole or part of textbook(s) etc, which are usually available at photocopy shops within the department or at other locations within the campus. In most cases, almost all the students in each of the courses procure some or all of these materials, of which they become wastepaper the moment the students conclude their examinations.

The various locations where wastepaper are collected on campus are senate building (10%), printing press (12%), classrooms (15%), staff offices (9%), departmental offices (21%), photocopy centers (12%), residential areas (16%) and other locations such as the field, basketball court and street are 5% respectively. As earlier mentioned, there is a great deal of wastepaper generated from the departmental offices. These usually comprises of request that have been attended to, excess submissions at the end of meetings, photocopies of documents during accreditation and promotion exercises, old documents that are disposed etc.

Table 5: Staff responses to items based on practice

	Never (1)	Seldom (2)	Sometimes (3)	Often (4)	Always (5)	Mean	Rank
Do you sort waste before dumping them into the dustbins?	14	4	18	8	4	2.67	6
Do you shred wastepaper before dumping it into the dustbin?	6	8	22	10	2	2.88	4
Do you work on draft documents electronically instead of on printed paper?	10	6	16	16	0	2.79	5
Do you use the second page of paper with printed materials on one page?	2	8	24	10	4	3.13	2
Do you print on both pages of sheet of paper to reduce paper wastage?	8	2	18	10	8	3.04	3
Do you burn wastepaper?	6	6	14	12	10	3.29	1

Table 5 shows the response of staff to practice on how they handle wastepaper generated in their domain. The practice with the highest rank is the burning of wastepaper, while the activity with the least rank is sorting of waste before dumping them into the dustbins. This is an indication that burning of wastepaper is a common practice which should be discouraged. There are numerous hazards associated with the burning of wastepaper such as air pollution and bush fires in the dry season which the members of the university community are exposed to. Whereas waste sorting that would encourage waste reuse and recycling is not a common practice.

Table 6: Student responses based on practice

	Never (1)	Seldom (2)	Sometimes (3)	Often (4)	Always (5)	Mean	Rank
Do you buy used textbooks?	48	4	38	3	8	2.20	6
Do you work on draft documents electronically instead of on printed paper?	18	10	57	14	2	2.72	3
Do you print on both pages of paper to reduce paper wastage?	4	4	51	22	20	3.50	1
Do you shred paper before dumping to the dustbin?	16	10	47	10	18	3.04	2
Do You burn wastepaper?	32	14	43	7	5	2.40	4
Do you reuse scrap paper?	36	4	52	6	3	2.37	5

Students usually print on both sides of paper in order to reduce paper wastage and to reduce the cost of printing and photocopying which has the highest rank among the activities done by students to reduce paper wastage. However, the least practiced activity is buying used textbooks. There is the need to encourage or come up with a book buyback program on our university campuses. This would help students have access to books at reduced price. Table 7 shows that 27% of academic and non-academic staff are familiar with print preview when working with Microsoft (MS) Word, 23% are familiar with paper settings, 20% are familiar with margin and layout settings, 6% are familiar with how to use comment in MS Word, and 2% can use track changes settings. Furthermore,

Table 7: Familiarity of Staff with MS Word Settings

MS Word Settings	Percentage (%)
Print Preview	27
Paper Settings	23
Margin And Layout Settings	20
Use Comment	6
Track Changes Settings	2
Compare Tab	6
Split Screen	8
Spelling And Grammar	8

Paper shredding machines should be provided at certain offices on campus and Academic staff should be encouraged to send and receive assignments, handouts and course materials using electronic drafted copies. 57% of students reuse scrap paper for calculations, 30% for jotting and 13% for revision in other to reduce wastepaper.

Table 8: Items based on the level of knowledge for staff

	Yes	No
Do you have a dustbin in your office?	40 (83%)	8 (17%)
Do you know what happens to wastepaper after you dump them in dustbin?	20 (42%)	28 (58%)
Do you know that wastepaper can be recycled to get new paper?	46 (96%)	2 (4%)

In table 8, 96% of the respondents have knowledge that waste paper can be recycled to get new paper, 17% do not have a dustbin in their offices and 58% of the academic staff and non-academic staff

do not know what happens to the wastepaper after they are dumped. The mean score shows that they are knowledgeable about common environment friendly wastepaper reduction practice.

Table 9: Application of wastepaper according to staff and students

Application	Frequency	Percentage (%)
Recycled paper bags	24	14
Recycled paper basket	10	6
Paper mâché	30	17
Pen stand	12	7
Recycled paper wall hangings	10	6
Origami crafts	4	2
Egg tray	32	19
Tissue/ toilet / napkin paper	36	21
Others (Packaging and ceiling)	13	8

Table 9 shows the potential application of wastepaper, 21% of respondents have knowledge that recycled paper can be used to make Tissue/ Toilet / Napkin papers while only 2% have knowledge on the use of wastepaper for origami crafts. Other application of wastepaper include used as roof ceiling and common practice is the use for packaging certain

items such as bean cakes, Suya meat, and most fries within and outside the campus.

Table 10: Wastepaper application according to cleaners

Application	Frequency	Percentage (%)
Recycled paper bags	14	12
Recycled paper basket	14	12
Paper mâché	16	14
Pen stand	4	3
Recycled paper wall hangings	6	5
Origami crafts	4	3
Egg tray	26	22
Tissue/ toilet / napkin paper	24	20
Others (Packaging and ceiling)	10	9

Table 10 shows the various application of recycled wastepaper. 22% are aware of egg tray as a major application of wastepaper, 20% are use as tissue/toilet/ and napkin paper within and around the campus. The least used is origami craft which are mostly used by kids in their craft works and assignments. With 9% of the respondents using these recycled papers for packaging and also as ceiling in rooms around campus. Most of the cleaners and waste collects generate some amount of money for the sale of these papers which encourages them to sort out the one-sided printed paper from other papers for the purpose of reuse.

76% of both academic and non-academic staff, cleaners/waste collectors and truck drivers sort their waste before disposing it. There are enough waste bins within the campus but 82% of the cleaner respondents suggested having points for some waste categories which will discourage indiscriminate waste disposal and also encourage the practice of waste sorting generally. The findings of this project revealed that major source of paper waste is printed paper and with the departments being the highest producers of wastepaper (21%), 19% from residential, 15% from classes, 12% from printing and photocopying centers, 10% senate, 9% staff offices and 5% other locations on campus.

The 3Rs of waste management are reduce, reuse and recycle. However, from the responses of both the staff and students, it would be observed that waste reduction is the least practiced approach with 9.9% and 8% for staff and students respectively. There is the need to imbibe the attitude of reducing waste as the most important approach to waste reduction. The main source of wastepaper among staff is printed paper (18.8%), followed by seminar papers and mails (13%) each. Additionally, the main sources of wastepaper among students are Lecture notes and course packs, flyers and others with 38.7%, 16.9% and 8.9% respectively. This corroborates the earlier assertion that if wastepaper is reduced, it would significantly reduce the sources of wastepaper.

On the knowledge of what happens to wastepaper after it has been disposed into the waste bins, the staff and students are aware that wastepaper can be used in applications such as tissue/ toilet / napkin paper — 21%, egg tray — 19% and paper mâché -17%. While in the responses of the cleaners, they are also aware that wastepaper can be used in applications such as egg tray — 22%, tissue/ toilet / napkin paper — 20% and paper mâché -14%.

Finally, a book buyback program is one in which used textbooks and course packs are bought from student who no longer need them at a reduced rate. These books are then sold to students who now need them. This gives a win-win scenario to both the initial owner of the book, as he can still make some money from selling his old books, and to the buyer who would get a fairly new book at a reduced price rather than buying a new book. If the second user is able to take proper care of the book, he may still be able to sell the book through the book buyback program. Such books can be used by as many people as possible until it is defaced.

CONCLUSION

The members of the university community should be encouraged to practice the 3Rs of waste management on waste more than is currently being practiced in the order of reduce, reuse and recycle. With 48.5% of the students Sometimes/Often/Always buy used textbooks, the Student Union can create a book buyback program as one of the methods of mitigating wastepaper generation on campus. The book buyback program is expected to target textbooks and other lecture materials which forms about 45.6% of waste materials generated by the students. 78% academic and non-academic staff respondents are familiar with MS Word features such as print preview, paper settings, how to use comment, margin and layout settings and use track changes settings. This is a significant percentage, which the university management can leverage on to ensure that more staff use these features to save paper. Additionally, 73.7% of wastepaper generated by the staff can be reduced drastically if these features of MS word can be put to use. With the increasing level of global warming there is need for school authority and government to create more room for research, workshops and seminars on ways to better improve our immediate environment and also increase the level of awareness on wastepaper management and promote environment friendly practices.

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