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POLLUTION CONTROL STRATEGY IN CALABAR METROPOLIS: THE IMPACT OF WASTE RECYCLING

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ABSTRACT

Recycling as a pollution control strategy that is used to manage wastes in most developing nations like Nigeria involves both traditional and modern technologies in separating household waste in order to enhance the recycling, potential. Recycling is one of the strategies used in the investigation to measure the perception of young adults in the Calabar metropolis of Cross River State, Nigeria on affective and ineffective pollution control levels. Pollution control is a function of Recycling frequency. To assess its effectiveness the level of recycling frequency is compared with pollution control effectiveness, that is, Degree of Recycling Frequency (DRF), the impact of one unit of recycling on a given unit of control is measured by the response of young adults' perception of control effectiveness and recycling strategy. The results showed that there is a significant influence of degree of recycling frequency on the level of pollution control effectiveness. The degree of recycling frequency in a place increases as the level of pollution control becomes effective. Similarly, pollution control becomes ineffective. Similarly, pollution control becomes ineffective whenever recycling frequency reduces. The results also indicated that pollution level has significantly reduced in Calabar Metropolis of Cross River State.

Keywords: Pollution, waste, recycling, reuse

INTRODUCTION

In every waste, discard or useless material, there is something useful. This is in harmony with the first and second laws of Thermodynamics. Things that are disposed of by some individuals are collected and either transformed or directly (re)used by others. This reusing implies the conversion of waste from useless to useful by change of handler. Recycling frequency implies reuse, repackaging and reprocessing of waste to other uses. It is converting waste to other uses. In less developed nations like India, Egypt, Senegal and Nigeria most manufactured goods are expensive and the labour of young adults in these societies is cheap. Scavenging in cities like Cairo, Dakar, Lagos and Calabar is a way the young adults use to earn a living. It pays to repair and not waste products (McGraw, 2000).

Therefore when value is attributed to a waste, it becomes useful. This explains why in developing countries an important informal sector has developed as some families earn their livelihood from the sale of discarded materials obtained from open dump.

Recycling, reusing, repackaging and reprocessing as pollution control strategies have been working to reduce the level of domestic, commercial and industrial pollution in developed nations (UNDP, 1998 and Anon, 2005). The recycling of product that was thought unattainable a decade ago has been attained so rapidly especially in the area of plastic and aluminum in both developed and developing nations. The quest to recycle waste in the

developed world partly stems from the rapid rate of exhaustion of raw materials such as geologic minerals and a greater environmental awareness.

The reuse of different sorts of manufactured is an established tradition in less developed nations. An example is the case of auto parts that are regulatory sold in many cities including Calabar metropolis by young adults. From junkyards; compressors, other parts of old and/or non functional refrigerators and empty cosmetic containers are taken to Onitsha where they are cleaned and "repaired" for reuse. Breweries sell their liquid contents only and bottles are taken back for reuse. Use dresses are sold for reuse. There have greatly reduced the volume of waste in the metropolis. In these developing countries the increase in the reuse of manufactured products can be explained by poverty especially in the lower stratum of communities that constitute the bulk of African population.

STATEMENT OF PROBLEM

Poor environmental sanitation conditions such as indiscriminate refuse disposal and uncontrolled economic and industrial activities contribute significant to prevalence of communicable diseases such as malaria, typhoid, cholera, respiratory/pulmonary diseases and pneumonia (Obianima *et al,* 2001). The issue of adverse effects of waste products has posed great concern to stakeholders in environmental development. The purpose of the study was to compare the level of recycling frequency (reuse, repacking, reprocess) and pollution control effectiveness, and the degree of recycling frequency. The hypothesis tested therefore stipulated that pollution control effectiveness and the degree of recycling frequency. The hypothesis tested therefore stipulated that pollution control effectiveness is not significantly related to the degree of recycling frequency.

REVIEW OF LITERATURE

One major strategy that has been in use and popular among communities of developing nations in controlling pollution is recycling. This involves reprocessing of old products that have outlived their usefulness and producing new products.

Sule (2001) observed that recycling/repacking has over the years become an alternative to handle disposal of waste. Most items for recycling, he identified, are often from solid waste usually from glass, newspaper, aluminium and tin bi-metal cans.

Fishbein (1991) stated that the main objectives of recycling and repackaging are two folds. Social benefits, which can be referred to as environmental and economic benefits, which are savings in virgin raw material, reduced energy and water consumption thereby reducing air, land and water pollution.

In the Netherlands, the objective of "No Packaging" which went to the landfills in the year 2000 has been effective and has already been copied by other countries in Europe, North America, members of the Organization for Economic Cooperation and Development (OECD) and even some developing countries (Hamza, 1993). Such actions are said to have prompted significant changes in the sizes, designs and materials of packaging used for a variety of goods and consumer products (LUND, UNEP, 1991, OECD, 1991 & Fishbein, 1991).

UNEP Environmental data report (1988) highlighted that presently, some car manufacturers using large quantities of plastics in their products have adopted the practice of labeling the plastic parts, thus, facilitating the process of sorting them for Recycling. For example, BMW Automobile constructor claims that 80 percent of the 20.000 parts in its cars are recyclable (UNEP, 1989). In the same report Volkswagen claims that they can strip down a car in 20 minutes and that they will take back and recycles their latest Golf model free of charge.

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Most materials considered garbage by the developed nations are re-used in less developed countries. For example in less affluent countries like Egypt, Mexico, and Nigeria there- is a huge market for old tyres, refrigerators, air conditioners, compressors, second hand cars, etc. All these generally found in Nigeria and Calabar Metropolis in particular are called "Tokumbo". Similarly, crap metals from mechanic workshops are recovered and taken to Nnewi for refurbishing and reuse (Miller, 1982). Ayang (1983) reported that in most developing countries, for example Nigeria, a lot of paper and glass recycling are going on, both in private as well as public sectors of the economy. Scrap metals are being recycled for motor parts, auto parts are regularly sold from junkyards. In Lagos Onitsha and Ibadan, secondary utilization or reuse as well as recycling of plastics at Kwara, Akwa Ibom and Rivers States are going on very smoothly. Also is the reuse of bottles from depots of various breweries. Some communities sort and reuse a variety of materials received in their dump.

Study Setting

The area of study is Calabar Metropolis: Calabar South and Calabar Municipality with a high population of young adults seeking employment. The choice is based on the fact that this is the largest urban centre of Cross River State comprising the bulk of industrial, commercial and other human activities. The area of study houses the Calabar Export Process Zone Authority (EPZA), (Okaba, 2005) and the business and tourism resort (TINAPA). Many outfits have been established to provide bank services, industries, professional firms and hotels of high standards in the Metropolis.

METHODOLOGY

The study was based on a descriptive observational survey, involving the analysis or presentation of recycling methods adopted by residents of the study area. The sample for this study was made up of 400 young adults (males and females) who were randomly selected from the entire study area of Calabar Metropolis to form the representative sample of the study population.

They included heads of households, company managers and senior civil servants who reside in the study area irrespective of their status in the society. The stratified random sampling technique was used for selection of six clusters of the Metropolis sub-areas, and then a replicate technique from where the representative population of the study area was drawn and employed in a manner described as "randomizing" (Denga and Ali, 1987). The main instrument used was a 24 item questionnaire, titled: Pollution Control Strategy Assessment Scale (POCAS) designed and developed by the researchers. It addressed personal/demographic data of me respondents, their perceived level or effectiveness of waste control and extent to which this has impacted on pollution reduction in the study area. Here the respondents were asked to express their opinion based on a 6-point Likert-type scale.

RESULTS

In order to test our stated hypothesis, all the data measuring the independent variable were extracted from the data bank and grouped into three sub-categories of recycling frequency. The data were then subjected to analysis, using one-way analysis of variance (ANOVA). The hypothesis was tested on each of the two sub-categories of-the dependent variable. The results of the data analysis are presented in cables 1 and 2. The group means and standard deviations for the two groups on each or the two sub-categories of the dependent variable are presented in Table 2 while the actual results of ANOVA are presented In Table 1. From Table 1, the calculated F-values of EPC (3.12) and IPC (5.02) respectively were each higher than the critical F-value of 3.00 needed to make it significant at 0.05 level with 2 and 397

degrees of freedom. The null hypothesis was therefore rejected for each of these sub categories. This means that the degree of recycling frequency is significantly related to levels of pollution control effectiveness in Calabar Metropolis, particularly with regards to effective and ineffective control. This implies that the higher the degree of recycling frequency, the more effective the Pollution control, Similarly, the lower the degree of recycling frequency, the more ineffective the pollution control.

In order to determine the pattern of relationship between the degree of recycling frequency and the effectiveness of pollution control with regards to effective and ineffective pollution control, the fishers' least significant difference (LSD) multiple comparison analysis was performed on all the groups/degrees of recycling frequency a; perceived by the respondents. The result is presented in Table 2.

DISCUSSION

From Table 2, it can be observed that for the effectiveness of pollution control, the significant Fishers' t-value of -2.43 indicates that the degree of recycling frequency, when the actual level of pollution control effectiveness is average (mean=22. 87) is significantly higher than the degree of recycling frequency when the actual pollution control effectiveness is high (mean = 22.87). The non significant fishers t-values of 0.39 and 1.67 respectively, are indicative of the fact that the degree of recycling frequency when the level of pollution control effectiveness is low (mean = 24.49), is not significantly different from the degree of recycling frequency when the level of pollution control effectiveness is either high (mean =22.87) or average (mean=31.78). Similarly, under effective pollution control, the significant fishers t-values of 3.16 and 2.398 indicate that the degree of recycling frequency is significantly lower when the actual control effectiveness is extremely low (mean 24.52) than when it is effectively high (mean=25.66).

Table 1(Part-I). One-way analysis of variance (ANOVA) for the variability of degree of recycling frequency on the effectiveness of pollution control effectiveness

S/N	*Level of Pollution Control*	*Degree of Recycling Frequency (DRF)*	*N*	*X*	*SD*
1.	Effective Pollution Control (EPC)	High	176	22.87	2.63
		Average	135	31.78	2.48
		Low	89	24.49	2.56
		Total	400	26.24	2.58
2.	Ineffective Pollution Control (IPC)	High	176	25.66	2.34
		Average	135	24.52	2.09
		Low	89	21.77	2.12
		Total	400	24.41	2.13

Source: Fieldwork (2006)

Table 1(Part-II). One-way analysis of variance (ANOVA) for the variability of degree of recycling frequency on the effectiveness of pollution control effectiveness

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S/N	*Level of Pollution Control*	*Sources of Variability*	*SS*	*df*	*MS*	*F*
1.	Effective Pollution Control (EPC)	Between groups	6408.21	2	3204.11	
		Within Groups	407259.73	397	1025.84	3.12*
		Totals	413667.94	399		
2.	Ineffective Pollution Control (IPC)	Between groups	897.20	2	448.60	5.03*
		Within Groups	35499.48	397	89.42	
		Totals	36396.68	399		

Source: Fieldwork (2006)
*Signficant at P>0.05, df=2 and 397, Criti – F=3.00

Table 2. Fishers least significant difference (LSD) multiple comparison analysis of the Relationship between degree of recycling frequency on the effectiveness of pollution control effectiveness

S/N	*Level of Pollution Control*	*Degree of Recycling Frequency (DRF)*	*N=176*	*Average n=135*	*Low n=89*
1.	Effective Pollution Control (EPC)	High	22.87[a]	t-8.91[b]	t-1.62
		Average	t-2.43[c]	31.78	7.29
		Low	t-0.39	1.67	24.49
		MSW 102584	1025.84		
2.	Ineffective Pollution Control (IPC)	High	25.66[a]	1.14[b-]	3.89
		Average	1.05[c]	24.52	2.75
		Low	3.16*	2.13*	21.77
		MSW = 89.42	89.42	398	

Source: Fieldwork (2006)
*P < 0.05, df = 398. Crit – t = 1.960 = 3.00F
[a] = Group means are placed along the diagonals
[b] = Difference between group means, placed above diagonals
[c] = Fishers t-values, placed below the diagonals
* = Significant at 0.05 level (crit-t=1.960)

CONCLUSION

Sequel to analysis of data collected/ results showed that pollution control is effective (increases) whenever the degree of recycling frequency is high. Similarly, a low degree of recycling frequency invariably results in an ineffective pollution control. Scavengers (young adults) in Calabar Metropolis engage in the recovery of bottles, cans, glass, paper, rags, rubber or plastics, scrap metals, straw and wood from all kinds of garbage/refuse dump. These have contributed significantly in reducing pollution levels in Calabar Metropolis. The

scavengers sell these items to middlemen who in turn resell to small industries for further use or transformation.

RECOMMENDATION

Based on the results of the study, the following recommendations are made;

1. A more decent technology should be introduced in the sorting and selection of used materials that are good enough for re-use. This would limit exposure of scavengers/waste handlers to environmental hazards likely to cause infections or diseases to them.
2. Government and private sectors should partner in the acquisition of equipment and the training of personnel for the technical handling of waste material re-use.
3. Government should generate options and stimulate workable recycling alternatives effective enough in the promotion of recycling options, which will facilitate the attainment of clean, conducive and healthy living urban environment at very cheat cost.
4. Individuals and organizations should imbibe and promote the culture of minimizing waste production and where disposable packaging is necessary, the volume of waste in our landfills should be reduced by using materials that are compostable or degradable.
5. There should be an integrated link between urban agriculture and organic wastes produced from domestic sources. Such wastes possess a high humus contain that can boost the output of urban farmer embarking on horticulture, livestock rearing and farming of carefully managed.
6. Following the Johannesburg Conference on sustainable cities in 2002, the intricate link between urban livelihoods and waste disposal problem was highlighted. It is therefore necessary for urban dwellers in developing countries to form a proper waste management system that involves all the stake holders. In so doing, waste could be sorted at source before channeling them to various alternative users.
7. There is the need for society to change their mentality towards waste sorters and collectors. We often refer to them as “scavengers” and in recent years, this has been a derogatory word. This activity could be formalized and improved upon.

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