

## **STRATEGIES FOR ENVIRONMENTAL PROTECTION AGAINST FOOD PACKAGING WASTES IN ENUGU STATE**

**Igba, Elizabeth Chimezie, PhD and Onaga Adaora Thelma.**

Department of Home Economic Education  
Faculty of Education, Ebonyi State University  
Abakaliki, Nigeria

---

**ABSTRACT:** *Environmental protection is a practice of protecting the natural environment on individual, organizational or governmental levels, for the benefit of both the natural environment and humans. Food packaging is an essential medium for preserving the food quality and minimising food wastage. When packaging waste is not properly handled or disposed, they have adverse or harmful effect on human health and also constitute environment, social and economic hazard. The study focused on the strategies for environmental protection against food packaging waste in Enugu state. Specifically, the study was designed to find out how recycling, reusing of food packaging wastes. A survey design was used for the study and questionnaire was used for data collection. The population of the study was 300 workers of Enugu State Waste Management Authority (ESWAMA). The data collected were analysed using mean and frequency, hypothesis was tested using chi square at 0.05 level of significance. The result of the study showed that; recycling, reusing of food packaging wastes help in the environmental protection in Enugu state. It was recommended that; entrepreneurship should be encouraged in the area of recycling and reusing of food packaging wastes. It was also recommended that Enugu state government should encourage companies to design their product for re-use, recyclability and material reduction and those individuals should be encouraged to be environmental friendly.*

**KEYWORDS:** Strategies, Environmental, Protection, Food, Packaging, Wastes

---

### **INTRODUCTION**

Plastic litter has become a chronic problem in every city in Nigeria. Molokwu and Igba (2010) noted that plastics entered the Nigeria market in the early 1970s and were initially a welcome development. They stated that prior to this, foodstuff were wrapped in broad plant leaves which can be used as compost manure for their farms. At present, most household commodities and food items on sale are packaged in plastics. Without a system for disposal or recycling, plastic waste could constitute a hazard to the environment

### **Literature/Theoretical underpinning**

Food packaging materials can be seen as means of food preservation and protection. Azubuike (2013) stated that food packaging materials provide a means to preserve, protect, merchandise, market and distribute foods. World Packaging Organisation, (WPO, 2012), stated that food packaging is an essential medium for preserving the food quality and minimising food wastage. The packaging serves the important function of containing the food, protecting against chemical and physical damage. In view of the above assertion, Robertson (2013) stated that packaging must protect what it sells and sell what it protects.

Generally, the packaging material may either be rigid or flexible. Rigid containers include glass and plastic bottles and jars, cans, pottery, wood boxes, drums, tins, plastic pots and tubes. They give physical protection to the food inside that is not provided by flexible packaging. Flexible packaging on the other hand is a major group of materials that includes plastic, films, papers; foil, some types of vegetable fibres and cloths that can be used to make wrappings, sacks and sealed or unsealed bags. (Environmental Protection Agency (EPA), 2006).

Despite the importance of food packaging on food preservation, it has been noticed that food packaging materials constitute about eighty percent (80%) wastes in most of the areas in Enugu state. Enugu State Ministry of Environment and Enugu State Environmental Protection Agency (2012), observed that many of the materials found in refuse dumps located in the nooks and crannies of Enugu state are food package waste. These food packaging wastes seen in different refuse dumps include; tins, sachets, plastics among others

Food packaging materials becomes a waste when their contents (what they are used to protect) have been used, expired or damaged. Oduma (2013) noted that these food packaging wastes constitutes solid wastes in our environment. He described them to include food packaging waste, household waste like; ashes, broken glasses, papers, old medicine, paper packaging's, plastic materials, timber, metal scraps, abandoned clothing, cellophane bags, construction or demolition debris, abandoned scraped or discarded motor vehicles, tins, plastics among others.

When wastes are not properly handled or disposed, they have adverse or harmful effect on human health and also constitute environmental, social and economic hazard (Oduma, 2013). The uncontrolled fermentation of garbage creates a source of food and habitat for bacterial growth. In the waste environment, insect, rodents, and some bird species proliferate and acts as passive vectors in the transmission of some infectious diseases (Cimen and Yilmaz, 2012). These include; Cholera, (an acute intestinal infection caused by *Vibrio cholera*), malaria, respiratory illness, water pollution among others. Indiscriminate disposal of food packaging refuse dumps leads to stinking odour that pollutes the air (oxygen) we breathe (Enugu State Ministry of Environment and Enugu State Environmental Protection Agency, 2012). When the environment is littered with filthy materials, the aesthetic beauty of such area is menaced.

The consequence is the pollution of the urban environment and creation of urban slum (Molokwu and Igba, 2010). In Enugu the capital of Enugu State, indiscriminate disposal of food packaging wastes at roads, streets, street drains, residential halls, and public places are common. And the rate of waste generation supersedes the rate at which they are been evacuated to the permanent disposal site. The issue of indiscriminate disposal of waste are seen everywhere in all parts of Nigeria with its attendant effects on human health (Molokwu and Igba, 2010).

Indiscriminate and/or random dumping of wastes at roads, streets, or street drains leads to blockage of roads, streets or water channels thereby hindering smooth flow of traffic within the city (Azubike,2013). The artificial and natural water ways or drainage systems are blocked with waste materials causing constant accumulation of stagnant water or at times resulting in over flooding of water from its banks. This stagnant water always breeds mosquitoes, and pile up refuse, harbours rodents and disease causing organisms which constitute health hazards. It can be recalled that at the peak of a rainy season in 2012, many homes, farms and landscapes in Enugu State and other States in Nigeria were over flooded with water and were devastated (Azubike, 2013). The situation was not just because of much rainfall but because some drainage ways were blocked with refuses which made the water to overflow its bank. This

condition rendered so many people homeless, some lives and properties were also lost. This led to high cost of food items such as yams, cassava, rice, garri, vegetables etc. in the affected areas. Most streets have acquired bad reputations due to indiscriminate dumping of waste materials at times as a result of lack of social discipline or carelessness among both users and collectors of those refuses (Molokwu and Igba, 2010).

Moreso, proper waste management can transform waste to wealth thereby generating employment and reducing environmental health hazard associated with the indiscriminate dumping of refuse (Chibuzor, Anayo and Chimezie, 2012). This can be done through recycling, reusing and recovery among others. It is on this note that the researchers tries to find out strategies for environmental protection against food packaging waste in Enugu state capital and its environs to foster healthy living of people in the area.

### **Statement of the Problem**

Food packaging waste is one of the most pressing problems facing our nation today. It is everywhere, surrounding our home, schools and hospitals, lining our road and blocking our drains, water ways and beaches. Our garbage mountains are growing by the day and even, a quick glance Enugu (or indeed any city in the country) helps drive home the point that Nigeria has an extremely serious problem regarding the suitable and sustainable management of solid waste.

Rotting rubbish is unsightly and foul smelling makes it extremely unpleasant to live or work nearby. It also leads to an increase in the incidence of diseases born by vectors such as rat, mosquitoes and flies. Blocked drains and waterways are significant causes of local flooding, plastics and other far less pleasant waste in the form of untreated sewage are regularly encountered when swimming in the sea. More insidiously, the leaching of toxic matter and heavy metals including lead and mercury into the soil and water ways is a serious health hazard, poisoning our soil and water supplies.

Food packaging waste is quite literally choking us. It is not being disposed properly, collected effectively, or managed adequately. Festering heaps of waste lies unattended in residential area, piles of trash are being dumped in beautiful spots and environmentally sensitivity areas.

Nobody enjoys living in a rubbish dump. Although all Nigerians regard garbage as problem and the government too has identified solid waste as one of the most serious environmental and public health hazard in Nigeria today, the general feeling is that it is “somebody else’s responsibility. Years of deteriorating services combined with hitherto apparent unwillingness on the part of successive Government to take effective, but potentially vote losing, measures have resulted in general sense of hopelessness throughout the country.

Over the past few years, there has been a lot of discussion about the problem of solid waste and what to do about it. But for the most part, this has remained at the level of talking – there has been little or no translation of these noble ideal into concrete actions. The problem of garbage and littering remain and intensify by the day. This ugly situation informed the need for this survey. The problem of the study therefore is what are the strategies for the environmental protection against food packaging waste in Enugu state?

### **Purpose of the Study**

The main purpose of the study is to investigate the strategies for environmental protection against food packaging wastes in Enugu state. Specifically, the study sought to

1. Find out how recycling of food packaging wastes will contribute to environmental protection in Enugu state
2. Determine how reusing of food packaging wastes will contribute to environmental protection in Enugu state

### **Significance of the Study**

The importance of this work is numerous; it will be of great importance to government, this is because from the findings of this work, they will be able to know the importance of waste management to the healthy living and to enable them to strategize ways of converting wastes to wealth and thereby creating job opportunities for unemployed indigent citizens in Enugu state.

Furthermore, the findings of the study will help policy makers to create and make strong regulations enforcing companies to build and maintain waste/refuse dumping sites in Enugu state and its environs

The findings of this study will also be of great importance to companies. This is because it will help them in knowing their responsibilities and contributions in environmental protection in Enugu state.

The findings of this study will also be of great importance to families and individuals living in Enugu state. This is because, from the results of the finding, they will be able to know the negative effect of indiscriminate refuse dumping and the importance of sanitation in their environment. Finally, the findings of this study will add to already existing work in the field of environmental protection.

### **Scope of the Study**

This study focused on assessment of the strategies for environmental protection in Enugu state. Specifically, it also focused on how recycling of food packaging wastes will contribute to environmental protection in Enugu state; the study intended to find out how reusing of food packaging wastes will contribute to environmental protection in Enugu state;. The targeted audience for the study include staff of Enugu State Environmental Agency in Enugu metropolis.

### **Research Questions**

The following research questions were formulated to guide the study.

1. How does recycling of food packaging wastes contribute to environmental protection in Enugu State?
2. How does reusing of food packaging wastes contribute to environmental protection in Enugu state?

## **Hypothesis**

The null hypothesis was tested at 0.05 level of significance using chi-square

- 1)  $H_0$  There is no significant difference in the mean responses of male and female ESWAMA on the recycling of food packaging and environmental protection.

## **Research Design**

Survey research design is appropriate for this type of research and so it is used to gather the necessary data. In survey research an investigation is carried out to assess the responses and opinions of respondents on the subject matter, on the strategies of environmental protection against food packaging waste in Enugu Metropolis (Warner, 2006). Survey design also involves gathering information about a small number of people by collecting information from them with the use of questionnaire or interview or combination of both (Warner, 2006).

## **Area of the Study**

The area of this research work is Enugu Metropolis of Enugu state. Enugu state is surrounded in the north by Benue state, in the south by Abia state in the east, by Anambra state and Ebonyi state in the west. Their major food crops include yam, cassava and rice. The major occupation of the people in this area is farming and trading as well as government works. The researchers choose Enugu because they are conversant with the language and terrain of the area.

## **Population of the Study**

The population of this study comprised all the workers of Enugu State Waste Management Authority (ESWAMA). There are three hundred (300) workers of Enugu State Waste Management Authority (ESWAMA). (ESWAMA, 2014).

## **Sample and Sampling Techniques**

A random sampling technique was used to select two hundred workers (100 males and 100 females). The researcher therefore made use of the two hundred (200) (respondents) workers of Enugu State Waste Management Authority (ESWAMA).

## **Instrument for Data Collection**

The main instrument used for this study was structured questionnaire. The questionnaire was divided into two sections. Section A contains questions of general information regarding the sex of the respondent.

Section B contains a total number of forty (40) items. These items were grouped sequentially under the different research questions to which they relate. All these responses in section B were in five point Liker Scale of strongly agree (SA), Agree (A), undecided (U) disagree (D) to Strongly Disagree (SD)

## **Validation of the Instrument**

The instrument was validated by three experts, two from Home Economics Department and one from Measurement and Evaluation. These lecturers vetted each item in terms of their

relevance and sentence structure. Based on their comments and suggestions, the instrument was modified to suit the study.

### Method of Data Collection

Two hundred copies of questionnaires (200) were administered to the respondents in the office of Enugu state waste management authority by the researcher and two research assistants. The researcher and her assistants equally explained the information to the respondents. Sufficient time were given to the respondents to enable them fill the questionnaire. All the items sent were returned indicating 100% return.

### Method of Data Analysis

The research questions were answered on individual basis using frequency and mean while chi-square was used to test hypotheses

**Decision Rule:** Any response with a mean of 3.0 and above was accepted while any one below 3.0 was rejected.

## RESULTS

**Research Question I:** How does recycling of food packaging waste contribute to environmental protection in Enugu State?

**Table 1: Mean response on the recycling of packaging waste and how will it will contribute to environmental protection.**

S/N	ITEM	SA	A	U	D	SD	N	FX	X	REMARKS
1	Without recycling efforts, depletion of forest will ultimately cause an ecological imbalance	86	47	33	21	13	200	772	3.86	Accepted
2	Recycling of wastes reduces the carbon footprint of a product	25	45	13	61	56	200	522	2.61	Rejected
3	Recycling of wastes encourages soil fertility since wastes will not be seen in the farms	14	23	8	86	69	200	437	2.19	Rejected
4	Recycling is a reclusion of disposed waste to the economic production	92	65	5	24	14	200	800	4.00	Accepted
5	Landfill spaces will be conserved if products are recycled	68	45	22	32	33	200	683	3.42	Accepted
6	Recycling is effective strategy for sustaining a healthy environment	83	68	20	16	13	200	792	3.92	Accepted
7	Recycling limits the use of raw materials	77	80	27	8	8	200	810	4.05	Accepted
8	Recycling metals minimises the need mining new materials	59	55	21	41	24	200	684	3.42	Accepted
9	Recycling metals decreases damages to wilderness	26	22	13	76	63	200	472	2.36	Rejected



10	Recycling items often uses less energy than manufacturing energy from a virgin product	38	33	21	64	44	200	557	2.79	Rejected
----	--	----	----	----	----	----	-----	-----	------	----------

The result of the analysis in table 1 reveals that the respondents accepted item 1,4-8 based on the importance of recycling of food packaging wastes and how it helps in the environmental protection with the mean score of 3.86,4.0,3.42,3.92,4.05 and 3.42 respectively.it is now accepted that recycling is an effective strategy for sustaining a healthy environment, it limits the use of raw materials and landfill spaces will be conserved if product are recycled. While the respondents with mean score 2.61, 2.19, 2.36 and 2.79 rejected the fact that recycling of food packaging waste does not help in environmental protection.

**Research question II:** How does reusing of food packaging wastes contribute to environmental protection in Enugu State?

**Table 2: Mean response of reusing of food packaging wastes contribute to environmental protection in Enugu State**

S/N	Item focus	SA	A	U	D	SD	N	FX	X	Remarks
11	Reuse have direct or indirect positive rehabilitative effect on the environment	83	68	20	16	13	200	792	3.92	Accepted
12	Reusing is effective strategy for sustaining a healthy environment	77	80	27	8	8	200	810	4.05	Accepted
13	Reusing limits the use of raw materials	59	55	21	41	24	200	684	3.42	Accepted
14	Reusing metals minimises the need mining new materials	86	47	33	21	13	200	772	3.86	Accepted
15	Reusing metals decreases damages to wilderness	26	22	13	76	63	200	472	2.36	Rejected
16	Reuse improves the global economy	99	55	17	19	10	200	814	4.07	Accepted
17	Reusing can be used as an improvisation	103	59	17	14	7	200	837	4.19	Accepted
18	Reuse gain higher significance in alleviation of environmental problem	99	55	17	19	10	200	814	4.07	Accepted
19	Landfill spaces will also be conserved if product are reused rather than going into dumps or incinerators.	72	55	31	29	13	200	744	3.7	Accepted
20	Reducing of wastes reduces the carbon footprint of a product	23	32	21	65	59	200	495	2.48	Rejected

The analyses of the data in table 11above shows that item 11- 14,16-19with mean scores 3.92, 4.05, 3.86, 4.19 and 4.07 respectively accepted that reusing of food packaging wastes help in environmental protection in Enugu state.On the other hand, item 15 and 20 with the mean score 2.36 and 2.48 rejected that they do not help.

### Test of Hypothesis

SA-strongly agree

A-Agree

U-Undecided

D-Disagree

SD-strongly disagree

All the bracket items are expected frequencies to get it we multiply row total with column total and divide by grand total.i.e

$$\frac{(R1)(C1)}{N}$$

### Where

R1=the total of row

C1=the total of column

N=grand total

### The formular for chi square is

$$X^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where

X=chi square

O<sub>i</sub>=observed frequency

E<sub>i</sub>=expected frequency

**The degree of freedom =(n-1)(m-1) where n and m represent the total number of row and column respectively, which is (5-1)(2-1)=4.At 0.05 level of significance.**

**Hypothesis 1:** There is no significant difference in the mean responses of male and female ESWAMA on the recycling of food packaging waste and environmental protection



**Table 5: Male and female mean response of the recycling of food packaging and environmental protection.**

Items	SA	A	U	D	SD
Male	290 (284)	229 (2415)	90 (91.5)	209 (214.5)	182 (168.5)
Female	278 (284)	254 (24.5)	93 (91.3)	220 (214.5)	155 (168.5)

	O	E	o-e	$[o-e]^2$	$\frac{[o-e]^2}{e}$
A	290	284	6	36	0.127
B	229	241.5	-12.5	156.25	0.647
C	90	91.5	-1.5	2.25	0.025
D	209	214.5	-5.5	30.25	0.141
E	182	168.5	13.5	182.25	1.082
F	278	284	-6	36	0.127
G	254	241.5	12.5	156.25	0.697
H	93	91.3	1.7	2.89	0.013
I	220	214.5	5.5	30.25	0.141
J	155	168.5	-13.5	182.25	1.082s

Therefore, calculated value =4.04

The degree of freedom =4

The critical value =9.49

### Decision Rule

If the calculated chi square ( $\chi^2$ ) value is greater than the critical value the null hypothesis is rejected but if the critical value is greater than calculated value, the null hypothesis is accepted.

### CONCLUSION

From the above computation, the  $H_0$  is accepted, since the critical value (9.49) is greater than the calculated value (4.04), so there is no significance difference between the male and female regarding the recycling of food packaging waste in Enugu state.

### Major findings from the study

The following findings emerged from the study:

- A. The following are the importance of recycling to environment protection against food packaging waste.
1. Recycling is an effective strategy for sustaining a healthy environment
  2. Landfill spaces will be conserved

3. Without recycling efforts, depletion of forest will ultimately cause an ecological imbalance.
  4. Recycling limits the use of raw materials
  5. Recycling items often uses less energy than manufacturing energy from virgin product.
- B.** The following are the importance of reusing to environmental protection against food packaging waste.
1. Reuse have direct or indirect positive rehabilitative effect on the environment
  2. Reusing is effective strategy for sustaining a healthy environment
  3. Reusing limits the use of raw materials
  4. Reusing metals minimises the need mining new materials
  5. Reuse improves the global economy
  6. Reusing can be used as an improvisation
  7. Reuse gain higher significance in alleviation of environmental problem

Landfill spaces will also be conserved if products are reused rather than going into dumps or incinerators.

## **DISCUSSIONS**

The result of the data analysis in Table 1 shows that the respondents accepted that recycling is an effective strategy for sustaining a healthy environment and landfill spaces will be conserved through recycling. It reduces negative impact on the environment that is caused by waste throughout its life span from production to disposal. This approach means that every item of waste is seen not only as a source of pollution to be reduced, but also as a potential resource to be exploited. This is in line with the findings of Akbasli (2010) who says that recycling plays an important strategy in minimizing the generation of waste and reduces the need of hazardous landfill. Recycling also limits the use of raw materials and recycling items often uses less energy than manufacturing energy from a virgin product. The findings are in line with the findings of Cimen and Yilmaz, (2012) who says that recycling is a process to change waste material into new products to present waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution from incineration and waste pollution by reducing the need for conventional waste disposal and lower greenhouse gas emission as compared to plastic production. In line with the findings, the hypothesis presented shows that the critical value (9.49) is greater than the calculated value (4.04); we accepted the null hypothesis, so there is no significant difference between the male and female regarding the recycling of food packaging waste in Enugu State.

The findings from table two, reveal that reusing is very important to environment protection to the extent of having direct or indirect positive rehabilitation effect on the environment, it also gain higher significance in alleviation of environment problem and also help in sustaining a

healthy environment. The companies has done a wonderful job of selling us on the attractiveness and benefits of buying new, improved, special products, however we already collectively own so much that we could all survive for quite a while on the existing product, if we just reused them rather than throwing them to the refuse dump. Instead of buying these items new; save and reuse all. This support the work of Ackerman (2005) who says that reuse have direct or indirect positive rehabilitative effects on human health, the environment, natural resource use, prevention of ground water pollution, reduction of CO<sub>2</sub> emissions and improvement of the global economics. Also the findings are in line with the findings of Aba (2010), who opines that reusing and other environmental protection behaviour in the world is gaining higher significance in alleviation of environmental protection.

## **CONCLUSION**

Food packaging waste material has adverse/harmful effect on human health and also constitute environmental, social and economic hazard. Indiscriminate dumping of wastes at road sides, streets, or street drains, water channels, residential areas harbours and/or breeds most vectors that transmit most infectious diseases in addition to environmental devastation, degradation and pollution. However, in order to reduce these effects of these waste, Recycling, reusing, imposing a mandatory depositing system for certain type of product and take back responsibility policy should be encouraged. While the rate of illegal and indiscriminate dumping of these wastes should be stopped. All these and other assistance will help to reduce these effects, thereby improving a healthy environment. These waste products can be used to create wealth. They can form the capital base of a small business entrepreneur thereby creating job opportunities for the teeming unemployed youths roaming along the streets; this will go a long way in reducing crimes such as kidnapping, robbery, commercial sex workers among others in Nigeria.

## **Recommendations**

1. Enugu state government should introduce an enlightenment programme like seminars on environmental protection so as to help create more awareness among individuals, companies and families on how to manage their waste through recycling and reusing.
2. Enugu state government should provide incinerators for certain types of wastes which will help to facilitate recovery.
3. Entrepreneurship should be encouraged in the area of recycling and reusing.
4. Enugu state government should make a law and order that protect our environment.
5. Enugu state government should encourage companies to design their product for reuse, recyclability and material reduction.

## **Implication of the Study**

The result of the study shows food packaging waste has done more harm than good on human health and this also is detrimental to our environment. The implication is that, if nothing is done to stop illegal and indiscriminate dumping of these waste materials, it will continue to be a threat to our human existence.

**REFERENCES**

- Aba, D. (2010). "Environmental problems in the construction industry with particular reference to the housing sector," *The Professional Builders*. 3: 74-35.
- Ackerman, B. (2005). Implementing a waste management plan during the construction phase of a project," *Journal of construction management economics*. 16(1), 71-78
- Akbasli, M (2010). Material waste in Building Industry: Main causes and prevention," *Journal of construction engineering and management*.128 (4), 316-325
- Azubuikwe C. (2013). Waste management problems in Nigeria: Lagos State in perspective." *The Professional Builders*, 3: 34-45 June.
- Chibuzzor F., Anayor E. and Chimezie D. (2012) socio economic effect on illicit dumping of food packaging waste in Ogbaru Local Government Area of Anambra State international journal of environmental science 5(4) 39 – 60
- Cimen O, Yilmaz M (2012). *Recycling knowledge and behaviour of primary school students*. Uludag University Faculty of education. 25 (1): 63-74
- Enugu state ministry of environment and Enugu state environmental protection agency. (2012). (<http://www.epa.gov/epahome/state.htm>)
- Environmental Protection Agency, (2006). Municipal solid waste in the United States 2005 facts and figures EPA 530. R.06-011.
- Enugu State Waste Management Authority (ESWAMA, 2014). Statistics and Research Unit.
- Molokwu, N and Igba C E. (2010). Waste Menace: A Survey of Plastic Disposal and Production of Goods Using Waste Materials in M. I. Uguru et al (eds). Research and the Realization of Vision 20-2020, 4<sup>th</sup> Edition of Nigerian Universities Research & Development Fair (NURESDEF) 22-26 November, 2010, 255-256.
- Oduma, O (2013). Socioeconomic Characteristics and environmental impact of indiscriminate solid waste in urban areas: A case study of Ebonyi State capital territory of Nigeria. *International Journal of Environmental Research*. 8:7, 155-165
- Robertson, D (2013). The Role of Government and Citizen in Erosion Control" in H.C. Mba et al (eds). Management of Environmental Problems and Hazards in Nigeria. Gower House, Croft Road, Aldershot GU II 3HR, England. Pp 227-236.
- Warner (2006). *"The History of Waste"*. EnvironmentalChemistry.com. Retrieved 2013-12-09.
- Wikipedia (2014). *Waste management*<http://en.wikipedia.org/wiki/Waste-management>
- World packaging organization (WPO), (2012). Environmental education and public participation in environmental management: An awareness campaign. Paper Presented in a Symposium on "Environmental and Social Harmony" at Enugu State University, 26-28 October.