

# **Impact of Food Packaging Materials on the Environment**

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## **Abstract**

Food packaging encloses food contents to protect them from tampering or contamination from physical, chemical, and biological sources, with active packaging being the standard packaging system used for preserving food products. This study aims to examine the impact of food packaging materials on the human environment. Three Research questions guided the study. To achieve this, the descriptive survey research design was adopted. The study focused on Odeda local government area. The simple random sampling technique was used to select 150 community members within the study area. A four-point Likert Type Rating Scale Questionnaire type, 'Impact of Food Packaging Materials on the Environment', was used to collect data from the selected respondents. The descriptive statistics of frequency counts and the simple percentage were used to analyze the demographic data and the research questions. Findings revealed, amongst other things, that food packaging materials significantly affect the environment if not rightly disposed of. To this end, the study recommended that Government should ensure the provision of disposable vehicles which would help collect waste and, importantly, there should be a campaign towards the appropriate disposal of food packaging materials by the people; this campaign should, amongst other things, address the need for an environment that is free for harmful substance for human habitation.

**Keywords:** Biological Substance, Chemical Substance; Contamination; Food packaging; Physical environment

## **Introduction**

Food packaging ensures safety within the food supply and consumption value chain. Advancements in food processing and packaging are drastically increasing to conform to the growing needs of food safety standards as prescribed by regulatory agencies and meet the needs of humans.

Despite the importance of packaging food products, packaging what humans consume has become a canker and a menace that needs to be tackled head-on across Nigerian communities. The end product of packaged foods and products ends up making the marketplace filthy, and the gutters choked with its concomitant spread of mosquitoes and diseases such as malaria, dysentery and diarrhoea. This is all because most consumers do not

consider the adverse environmental impacts of the products they consume, particularly how they dispose of the food package.

Most often, consumers claim to have read extensively on waste management processes, but to their utmost surprise, the negative impact of packaging waste in the communities keeps rising. The effort made by District, Municipal and Metropolitan Assemblies has yet to yield any positive results. The harm caused by packaging waste to the environment, human beings and animals, and marine habitats, continues persistently at an alarming rate which people disregard. In some cases, despite warnings and cautions placed on food products by producers and even regulatory bodies, consumers find it challenging to adhere to safety and waste disposal standards, thereby causing a great deal of harm to the environment.

Irrespective of the continuous call for consumers to be cautious of the habit of indiscriminate disposal of packaging by-products and the various moves to deal efficiently with packaging waste materials, the country is confronted with several fundamental problems that continue to emerge and harm the water bodies.

Indiscriminate disposal of packaging wastes into gutters and sewages accounts significantly for the perinea flooding in the major cities in Nigeria, with particular reference to the urban centre like Lagos, where flooding has become a recurring occurrence since they block the water pathways and even transfer waste to the Atlantic Oceans. This, in effect, brings indescribable hardship to the city dwellers exposed to hazards and other environmental challenges affecting human existence. Most of them become displaced, lose their properties and make them economically handicapped as they struggle to find a replacement for their lost properties. For these reasons, there is an urgent need to look at the menace and provide ways it can be curbed or controlled.

### **History of Food Packaging in Nigeria**

An early man developed his packaging technology by using leaves for wrapping purposes in Nigeria, such as cocoyam, banana, plantain, and 'uma' leaves. Again the skin of a goat was used for the first flexible packaging material in the environment through the transport of water and wine. Early containers were made by placating rushes or reeds and small wooden casks produced by methods similar to coopers today, evidenced by how food is packaged and preserved for human consumption. Ancient Egyptians were masters of the art of preservation, demonstrated in the tombs of pharaohs and in preserving bodies and other materials. However, it is just the beginning with modern packaging as the original industrial revolution changed the structure of society and concentrated through prominent members of people in

towns, cities so altering their habits and creating a great demand for similar quantities of various products in extensive replication in order to meet the growing human need for food consumption (William, 2011).

Historically, the establishment of the packaging industry in Nigeria started way back in 1964 with Bordpak Company, the first manufacturer of corrugate cartons. Before then, goods like beverages, sugar and milk were imported in wooden crates or corrugated cases and cartons by the colonial masters, which were distributed across the colonial markets for the consumption of the people, especially the elites. Premier industries like Guinness, Tate and Lyle, Lever Brothers and Nigerian Breweries were amongst the first to benefit from Bordpak Company.

Bordpak, based at Apapa, later had a three-in-one integrated complex which produced corrugated cartons, folding boxes (light pack), flexible wrappers, labels, laminates and sachets. Also, corner-glued trays, cartons, and boxes were produced for agricultural products like day-old chicks, vegetables, fruits, meat, chicken, and eggs. BPP packaging company, also based in Apapa and owned by UAC Nigeria Ltd, followed in Bordpak's food steps, producing similar packaging items (Oloyede & Balogun, 2013)

## **The Environmental Impact of Food**

### **Packaging**

Environmental degradation caused by food packaging materials is a subject that has been discussed previously in academic discourses. Some materials like plastic are dumped almost everywhere, harming the ecosystem. As crucial as packaging for the preservation of food products are, they pose a significant threat to the environment and human existence, especially when they are subject to unplanned disposal. Packaging creation requires the consumption of natural resources and hence destroys a number of the expected animal habitats. Some companies only re-grow a few natural resources they exploit, like trees.

The industrial process of making these packaging materials also degrades the environment, as toxic gasses are introduced into the air. If these processes are not controlled, the air will get more toxic. Sometimes these packaging wastes are dumped irresponsibly, causing environmental pollution, and a few do not degrade the least bit. Forest resources are commonly used for packaging materials like wood and paper. Contentious and unrestricted consumption of forest resources through their use for producing packaged materials will go a long way to undermine and alter the growth balance of forest resources, which are essential for human existence. An undermined growth balance will cause norms like erosion, desertification, water shortages and a series of ecological problems.

Non-degradable packaging materials stay around for an especially while, these materials may vary, but their effects are identical. Such packaging still destroys the soil and other environmental components via the atmosphere and aquatic systems. The soil is crucial since it is used for agriculture; if affected, it might result in food insecurity.

Food packaging materials are not only harmful to the environment but also to other animals. Packaging waste irresponsibly dumped could also be ingested by other animals causing their demise. Waste dumped within the ocean creates an enormous degradation of the environment and the creatures living within the sea, and the waste might affect the mating seasons.

### **Statement of the Problem**

The environmental consequences of food packaging and consumption have gained much attention in recent years. The World Health Organization estimated that in developed countries, up to 30% of the population suffers from different kinds of diseases yearly, whereas in developing countries, up to 2 million deaths are estimated yearly (Havelaar, A. H. et al., 2013). Every day people worldwide get sick from food, mainly processed and packaged foods. This sickness is called food-borne disease and is caused by dangerous microorganisms or toxic chemicals (WHO, 2006). Others can be symptomatic and unaware of the increased risk of passing the infection to others via the food they handle (Caroline Smith D. et al., 2009). Food safety practices and general requirements in food businesses and establishments of food handlers must have skills and knowledge in food safety and food hygiene for their work. Researchers have attributed these food packaging handling errors to a need for adequate food safety knowledge (Jenkins-McLean T. et al., 2004).

### **Objective**

The main objective of this study is to;

- i) identify different types of food packaging
- ii) assess the effect of food packaging materials on the environment
- iii) proffer possible solutions to the negative effect of food packaging materials on the environment

### **Research Question**

The following are the research questions for this study;

- i) What are the different types of food packaging?
- ii) What are the effects of food packaging materials on the environment?
- iii) What are the possible solutions to the adverse effects of food packaging materials on the environment?

## Population

The population for this study comprises citizens who are residents of the Odeda Local Government of Ogun State. This local government's total number of inhabitants is around 186 200 based on the 2006 population census.

## Sample and Sampling Techniques

The population for the study comprises members of individuals in Odeda LGA, Ogun State, which stands at 186 200 based on the 2006 population census release. From the preceding, 150 respondents were randomly selected as samples from different socio-economic classes in the selected population in the study area. All selected respondents were accorded equal treatment and questionnaire administration for the study.

## Research Instrument

The research instrument for this study was a questionnaire. The questionnaire was designed to obtain information on the personal details of the respondents as well as statements dealing with the various aspects of the research objectives and questions. The questionnaire was a close-ended one with a modified Likert scale of Strongly Agree (SA), Agree (A), Strongly Disagree (SD), and Disagree (D).

## Procedure for Data Collection

The researcher administered the research instrument (questionnaire) and retrieved it immediately after completion by the researcher to prevent losses.

## Data Analysis Techniques

The quantitative component of the data analysis encapsulated the descriptive and inferential analysis of the data. Computations of frequency and percentages were used in the descriptive.

## Result

**Table 1**

### Research Question: What Are Different Types of Food Packaging

#### Different Types of Food Packaging

	SA	A	SD	D	mean	Standard Deviation
Boxes (Cereal, Frozen pizza, Snacks Crackers, etc	70 (46.7%)	78 (0.5%)	1 (0.7%)	1 (0.7%)	3.45	1.03

Bags (Snacks like chips, Fruit and Vegetables, etc)	76 (50.7%)	72 (48%)	0 (0)	2 (1.3%)	3.48	0.99
Cans (Drinks, Soup, Meats, etc)	76 (50.7%)	70 (46.7%)	0 (0)	4 (2.7%)	3.45	1.23
Wrappers (Candy, Granola bars, etc)	75 (50%)	68 (45%)	3 (2.0%)	4 (2.7%)	3.43	1.10
Glass Bottles (soft drinks)	72 (48%)	74 (49%)	0 (0)	4 (2.7%)	3.43	1.13
Nylon (sweets, biscuits)	88 (58.7%)	58 (38.7%)	4 (2.7%)	0 (0)	3.56	1.12
Paper (sweets, biscuits)	63 (42%)	84 (56%)	2 (1.3%)	1 (0.67%)	3.39	1.02

From table 1 above showed the different types of Food packaging which include Boxes (Cereal, Frozen pizza, Snacks crackers, etc), Bags, Cans, Wrappers. etc

## Research Question 2: What Are The Effect of Food Packaging Materials On The Environment?

### Effect Of Food Packaging Materials On The Environment

Table 2

ITEMS	SA (%)	A (%)	SD (%)	D (%)	mean	S.D
Environmental pollution	67 (44.7%)	73 (48.7)	8 (5.3)	2 (1.3)	3.37	0.98
Threat to human health and environment	65 (43.3%)	75 (50.0)	2 (1.3)	8 (5.3)	3.31	1.02
Blockage of drainage	77 (51.3%)	72 (48.0)	1 (0.7)	0 (0)	3.51	1.13
Littering of environment	70 (46.7%)	75 (50)	5 (3.3)	0 (0)	3.43	1.27
Adverse effect of ecosystem	70 (46.7%)	75 (50%)	0 (0)	5 (3.3%)	3.40	1.23
Spread of disease	75 (50.0%)	75 (50.0%)	0 (0)	0 (0)	3.50	1.03
Destruction of soil component	58 (38.7%)	75 (50.0%)	13 (8.7%)	4 (2.7%)	3.25	1.34

Death of animals	68 (45.3%)	77 (51.3%)	0 (0)	5 (3.3%)	3.89	1.10
Death of aquatic habitants	70 (46.7%)	70 (46.7%)	5 (3.3%)	5 (3.3%)	3.67	1.01
bioaccumulation	60 (40%)	60 (40%)	19	11	3.13	1.03

Table 3 showed the effect of Food packaging materials on the environment to include environmental pollution, spread of diseases, blockage of drainage etc

### **Research Question 3: What Are the Possible Solutions to the Negative Effect of Food Packaging Materials on the Environment**

#### **Solution to the Negative Effect of Food Packaging Materials on the Environment**

*Table 3*

ITEMS	SA (%)	A (%)	SD (%)	D (%)	mean	S.D
Right disposal of packaging materials	84 (56.0)	36 (24.0)	15 (10.0)	15 (10.0)	3.26	1.00
Utilization of environmental sanitation officers	71 (47.3)	44 (29.3)	16 (10.7)	19 (12.7)	3.11	1.04
Regulation of chemicals in packaging materials	40 (26.7)	40 (26.7)	30 (20.0)	40 (26.7)	2.53	1.15
Availability of disposable vehicles of packaging materials	64 (42.7)	48 (32.0)	17 (11.3)	21 (14.0)	3.03	1.05
Composting	96 (64)	53 (35.3)	1 (0.7)	0 (0)	2.96	1.11
Combustion operations	88 (58.7)	58 (38.7)	4 (2.6)	0 (0)	3.56	1.12
Land lifting	92 (61.3)	54 (36.0)	1 (0.7)	3 (2.0)	3.57	1.06
Re-cycling	75 (50.0)	66 (44.0)	3 (2.0)	6 (4.0)	3.40	1.09
Stringent law on food packaging	78 (52.0)	55 (6.7)	6 (4.0)	11 (7.3)	3.33	1.25

Employment of cleaners	70 (46.7)	52 (34.7)	21 (14.0)	7 (4.6)	3.23	1.34
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Table 4 shows the possible solutions to the negative effect of food packaging materials on the environment, which include the proper disposal of packaging materials, utilization of environmental sanitation officers, availability of disposal vehicles for packaging materials etc.

### Discussion

The result from the analyzed data in Table 1 indicated the different types of food packaging materials, such as Boxes, Bags, and Cans etc. agreed with APQUA (2009) that there are different packaging materials which are commonly found in the essential market; the result for research question 2 shown in table 2 established that food packaging materials have effects on the environment. This is in line with (WHO, 2007), which agrees that food packaging materials are not only harmful to the environment but also to other animals.

Table 3 aims to investigate the possible solutions to the negative effect of food packaging materials on the environment. It has been noted that the proper disposal of food packaging materials, utilization of environmental sanitation officers, and regulation of chemicals in packaging materials are part of the solutions to the harmful effects of food packaging materials on the environment. Jones's (2004) opinion is in line that disposal of food packaging materials, regulation of chemicals in packaging materials, etc., are ways of preventing the negative effect of food packaging materials on the environment.

### Conclusion

One of the numerous problems affecting the environment can be traced to the food packaging material disposal technique because the study has revealed that food packaging materials are among other factors that constitute environmental pollution and contamination which is capable of posing significant threats to the eco-system as well as spread diseases with a severe effect on human existence and sound living condition.

### Recommendations

The study recommended that:

1. Governments should ensure the provision of disposable vehicles, which will be strategically organized and placed in strategic working conditions to meet the growing waste disposal needs of the communities, especially the urban centres where the



preservation of the environment has become a significant subject which requires national attention.

2. There should be a campaign program to adequately inform and orient the citizens on the short and long-term implications of rightful or wrongful disposal of food packaging materials; this will create a significant path towards an organized waste disposal attitude which is fundamental for environmental preservation.
3. The National Agency for Food Drug Administration and Control, as a primary regulatory agency in the packaged food industry, must ensure that there is regulation of chemicals in packaging materials; this will ensure the reduction in the quantity of chemicals content of the disposed items.
4. Utilization of the Environmental protection agency, which will adequately ensure the monitoring of disposal or evacuation of sites where consumed food packages are dumped to preserve the environment against harmful diseases.
5. Government should create environmental laws and intervention programs that will reduce excess consumed food packages littering and contaminating the environment, thereby increasing human and animal health risks such as diseases.

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