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The Environmental Impact of Production and Sales of Sachet Water in Nigeria

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Abstract
The daily visible pollution, abuse of and threat to the ecological system, posed by the impact of man's activity and technological and industrial development on the essential components of the natural environment-that is the air, land, and water, belie any appearance of complete ignorance in their regard. This article focused on the numerous factors associated to the environmental impact of production and sales of sachet water in Nigeria. Questionnaire and oral interviews were used for data collection. The research findings revealed that the empty sacs of sachet water waste is not really a problem; rather, it is the poor attitude of the consumers and inhabitants of commercial cities and also lack of education on proper management, disposal and recycling techniques. Besides, some of the samples examined by laboratory analysts showed the presence of fungal contamination and indication of bacteria infection. The implication is that many of the sachet water sold to the publics in Nigeria may be possible source of water borne diseases.

Introduction

In recent times, there has been heightened or increasing concern about water consumption due, in part, to the tension generation by the consumers and environmental cum societal agitation for better conditions of service/quality. It is pertinent to note that provision of portable water is under the concurrent list of the constitution of the Federal Government of Nigeria.

With the growing population, rapid industrialization and new uses for treated water, the demand for treated water from municipal water treatment points often exceed the supply capacity of the treatment plants. Consequently, water supply becomes irregular, epileptic and grossly inadequate. The introduction of package/sachet drinking water at the turn of the millennium, gained national relevance, coupled with sharp and questionable practices and the consumers being faced with the painful challenges of unwholesome practices and environmental hazards.

At the core of this tension is the apparent inability of the producers to meet the complex and competing needs of their publics and the society at large. The situation is compounded by the growing public anxiety as regards, the declining standards of the producers, marketers and product quality, as well as, lack of social responsible marketing.

This loss of confidence in processed sachet drinking water popularly called "pure water" is compounded by the incidence of typhoid fever and water chronic disease prevailing in the society. These problems suggest that there is urgent need to embark on a fundamental re-thinking of sachet water production policy in Nigeria. Ultimately, this study seeks to investigate both the macro and micro environmental problems of the production and sale of sachet water in Nigerian commercial cities and make appropriate recommendations.

For any business to continue in existence, the organization must not only be profit-minded, but also must be conscious of the environment and be accountable to the society for its actions and inactions. Marketers must accept responsibility for consequences of their actions and make every effort to ensure that their decisions, recommendations and actions, function to identify, serve and satisfy all relevant publics, customers, organizations and the overall environment.

Onitsha and its conurbation being the study area is located in the south-eastern part of Nigeria. With the population of about 2 million people, it is

one of the largest cities in Nigeria with full commercial activities and forms the major source of revenue for Anambra State Government. It is bounded north-west by the River Niger.

Statement of the Problems

Clean and safe environment is one of the greatest legacies that a nation can bequeath to its unborn generation. Currently, consumers in municipal and urban authorities of our nation are enmeshed in sticking problem of consumption of unsafe packaged sachet drinking water, with the attendant non-existent plastic waste management agency cum environmental pollution-littering and clogging of drainages. There is growing need for the produces to provide the consumers with safe drinking water without endangering the society. Social rascality and irresponsibility amongst producers and marketers of packaged sachet drinking water is an unassailable fact. Also evident is government insensitivity with respect to environmental management, preservation and protection awareness.

Objectives of the Study

The overall objective of this research is to identify and assess the environmental impact of production and sales of sachet water in Nigeria with special reference to Onitsha and its conurbation.

Specifically the research intends to fulfill the following objectives:

(1) Determining the extent sachet water production and its sales impact on the environment
(2) Ascertaining the set standards by the regulatory agencies for the production of sachet drinking water.
(3) Identifying numerous factors that influence corporate social responsibility.

Research Questions

(1) What is the impact of empty sachet packaged drinking water?
(2) To what extent does the government insensitivity to education need of the consumer in respect of environmental management, preservation and protection affect the consumers' behaviour?
(3) Are the producers of sachet drinking water socially responsible?

Significance of the Study

This study is significant in that it would serve as an instrument to evaluate the extent to which production and sale of sachet water has impacted on the environment as well as, to generate a re-think of a better way of packaging

the product. Also, this study will be of immense help to the management of many organizations, stakeholders and consumers on how their actions or inactions can help protect and improve the natural environment while making the economy better off.

Area of Study

The researcher focuses on the assessment of NAFDAC regulatory operations on the production of packaged drinking water, as well as the environmental impact assessment and producers social responsibility in marketing.

However, the research ought to cover the entire Nigeria but was constrained to cover more on producers, marketers and consumers in Onitsha and its conurbation.

Related Literature

Corporate Social Responsibility

Social responsibility demands that marketers accept an obligation to give equal weight to profits, consumer satisfaction and social well being, in evaluating their firm's performance (Boone and Kurtz, 2004: 88). Measurement of social responsibility is easier than marketing ethics. Socially responsible actions can be mandated by government legislation, whereas social responsibility by business can be promoted by consumer activism. Government regulations may compel organizations to take socially responsible actions on issues of false and deceptive product claims, predatory competition, and environmental policy among others. Moreover, with their powers of respect or withhold purchases, consumers may compel marketers to provide high quality product/service honest and relevant information and modest prices.

Social responsibility of business includes the reactive responsiveness to its obligatory operational activities like economic productive and legal requirements, to its stakeholders namely, the society, government, customers, suppliers, distributors, employees and local community.

The four dimensions of corporate social responsible are namely – economic, legal, ethical and philanthropic (see figure 1) economic and legal dimensions are already being recognized and implemented contemporarily. The last two dimensions-the ethical issues and good corporate citizens perspectives are gradually gaining sizeable and appreciable recognition. The most valid assessment for socially responsible decisions in organizations inferred that,

all marketers regardless of the position in an organization should be responsible for the social aspects of their decisions.

Environmental Impact Assessment

Health Implication: The boom in the trade of polythene package water resulted to an increase in packaging and distribution of water that are mostly likely unwholesome. The health implication of using unwholesome water supplies is enormous and endemic. The inadequacy may result in the production processes under unhygienic environment, poor sanitary conditions of packaging, storage and shelving facilities. This could result to the spread of diseases like typhoid fever, amoebic dysentery, cholera, Helminthasis, campylobacter enteritis, cryptosporidiosis, Balantidiasis, Hepatitis A., Rotavirus diarrhea etc as noted in Orji et al (2006).

Laboratory analysis of different research institutes or firms and individuals on batches of different brands of packaged drinking water sold in Onitsha metropolis, revealed the bacteria components as identified to include: Genera Salmonella, Escherichia, Staphylococcus, Klebsiella, Citrobacter Bacillus species etc as in Ifeanyi (2007). These pathogenic micro organisms and bacteria that indicate faecal pollution impair the health status of the general public and is mainly responsible for such sickness as mentioned above. Customer's product safety is not assured due to the fact that most (if not all) of the sachet water brands found within the area of study has no product production date, expiry date or batch number while some of them are defective products.

Methodology

The population for this study was made of the 309,964 residents at Onitsha (North and South L.G.A, Anambra State, according to 2006 Census figure (National Population Commission).

Since we know the working population to be 309,064, we would use the sample determination formula for known population as developed by Taro Yamane (1964) as follows:

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

Where:

n = The sample size

N = The population size (309,964)

e = The level of precision (± 3 percent)

I = Constant value

Substituting in the equation above we

$$n = \frac{309{,}964}{1 + 309{,}964(0.03)^2}$$

$$n = \frac{309{,}964}{1 + 309{,}964(0.0009)}$$

$$n = \frac{309{,}964}{1 + 278.968}$$

$$n = \frac{309{,}964}{280} = \text{Approx. } 1 + 279$$

n = 1107 Approximately

The sample consisted of 1107 respondents. Simple random sampling water used. It comprised of 940 consumers. 150 stakeholders (Nylon/Plastic manufacturers, Sachet Water Producers and Waste Collectors) 17 staff of regulatory agencies (NAFDAC and FEPA) 40 copies of questionnaire were not returned.

Data were collected through questionnaire/oral interview. Questionnaire was used in situations were the respondent is literate.

The questionnaire was constructed using a five (5) point likert scale as follows:

Strongly Agreed	(SA)	=	5 points
Agreed	(A)	=	4 points
Undecided	(UD)	=	3 points
Disagreed	(D)	=	2 points
Strongly Disagreed	(SD)	=	1 point

The above scale was used to answer research questions 1 and 2

$$x = \frac{\sum Fx}{N}$$

Where X = Mean

Σ = Summation

Fx = Frequency of x

N = Number of occurrence

Summing the nominal values and dividing the total number of scaling items, the cut-off point is determine thus:

$$\frac{5+4+3+2+1}{5} = \frac{15}{5} = 3.00$$

Any item that had a mean score of 3.00 or above was accepted while any item that had mean score of less than 3.00 was rejected.

Results and Findings

Research Question 1: *What are the environmental impacts of empty sachet packaged drinking water sacs?*

From table 1, apart from item No 6, items 1-5 and 7 are above the mean score of 3.0 points. These indicate that 6 out of 7 items in the table confirm that nylon/plastic wastes constitute environmental problem in Onitsha and its conurbation (North and South L.G.As).

Research Question 2: *Does government insensitivity for education needs of the consumers in respect of environmental management, preservation and protection affect the consumers' behaviour?*

From table 2, items 8-10 show that government insensitivity to environmental management education need, affect the consumers' behaviour.

Research Question 3: *Are the producers of sachet drinking water socially responsible?*

From table 3, items 11 and 13 had mean scores above the cut-off point of 3.0 indicating acceptance. Here, the respondents confirm that producers/stakeholders are conscious and mindful of societal welfare but items 12, was rejected because companies/agencies do not embark on social responsibility/environmental sensitization campaign.

Discussion of Findings

Table 1 identified some of the environmental impact of nylon/plastic wastes in Onitsha and its conurbation (North and South L.G.As). They are as follows: that nylon/plastic waste constitute serious environmental problem in Onitsha, unavailability/inaccessibility of waste recycling facilities, indiscriminate disposal of empty sacs of sachet water on roads/streets and gutters/drainages; pollution rate in Onitsha is environmentally unconducive for living especially in Okpoko (New Haven), Fegge and Odakpa areas of Onitsha; generally, consumers, producers and government are jointly and severally blamed for environmental pollution of littering streets with empty sacs of sachet water. Table 2 outlined the extent of government insensitivity to education need of the consumer with respect to environmental management, preservation and protection and the effect on the consumers' behaviour. All the respondents agreed that the consumers' behaviour are affected in the following ways: government being solely responsible to the education need of consumer and the environment, lack of investment in environmental protection conservation and preservation and the unbridled complacency, indolence and unpaid advertisement of ignorance in the attitude of most consumers/inhabitants of Onitsha metropolis due to lack of cognate education on proper disposal and recycling techniques. Other findings revealed that some producers of sachet water do not abide by the guidelines of the regulatory bodies.

Conclusion

The empty sachet water bags are improperly disposed off, littering the streets and clogging the gutters throughout the city, causing visual offensive environment. However, some of the samples examined by laboratory analysts showed the presence of faucal pollution, indication of bacteria. The implication of these findings is that many of the sachet water sold to the publics in Onitsha metropolis may be possible source of spread f water borne disease.

Recommendation

Based on the findings and conclusion of the study, the following recommendations were made:

- Every water packaging company must have a basic functional laboratory that must be certified by NAFDAC and managed by a qualified scientist (Analyst).

- The National Agency for Food and Drug Administration and Control (NAFDAC) should have a record of all registered water packaging companies in all localities and routinely pay surveillance/appraisal visits to them and sanction/close any of them found to be operating below standard.
- Ensure that the leadership of the local government areas are sufficiently exposed to the rule of environmental protection.
- Embark on educational campaign to influence the attitude and perception of the public.
- Government should make recycling facilities more feasible either by granting subsidies on recycling or even reducing electricity costs for commercial operation.
- Producers should mount social responsibility campaign to improve the welfare of the society in which they are doing business.
- Buy-back pack (reverse logistics) should be introduced by the producers and sellers of sachet water to give plastics waste a value as a raw material. The outcome is to create such value on plastic that people will no longer throw them anywhere on the ground but would keep them to sell to whoever is using them as a raw material.

Suggestions

- A well articulated method/strategy to provide safe drinking water, improve sanitation and improve the well being of inhabitants of Onitsha metropolis at a reduced cost.
- Repackaging of sachet water into a resalable, non-biodegradable packs that can serve as raw material for another industry.
- The best approach to tackle the waste management and recycling facilities in the area of study.

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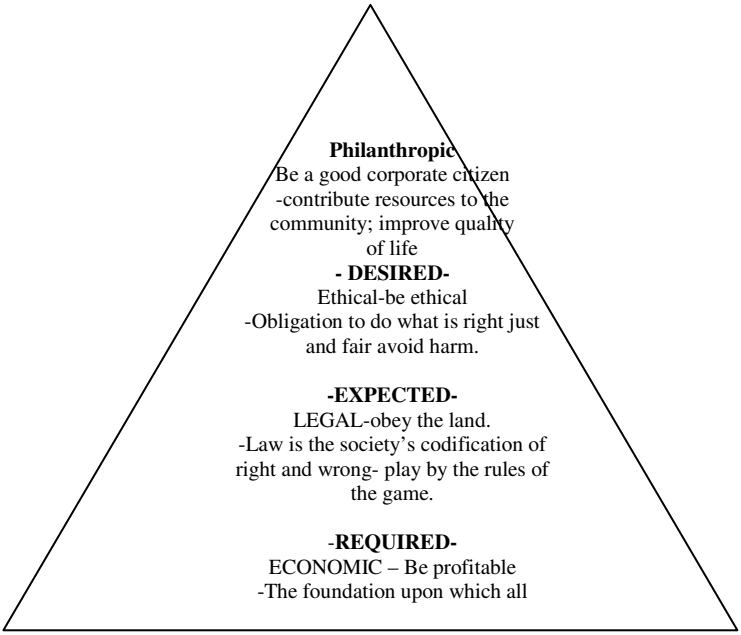
Figure 1: The Four step Pyramid of Corporate Social Responsibility



Source: Reprinted from Business Horizon in Boone. L.E. and Kurtz, D.L – Contemporary Marketing, Masion, Ohio, Thomson-South-Western (2004).

Table 1: Microbial counts of Polythene Packaged Water

Trade/brand name of sample	NAFDAC Reg. No	Place of manufacturer	Mesophilia aerobic bacterial	COLFOR MPN/100 ml	Faecal strep to Cocei cfu/100m	Fungi/CEU 10ml
ZG	01-19xp	Awka	20	3	0	2
NR	01-16LG	Awka	20	0	0	0
CP	01-19LT	Awka	32	0	0	0
RC	01-19LM	Awka	0	0	0	0
PC	01-16XY	Awka	102	20	0	2
OL	01-19LU	Onitsha	320	30	0	0
BR	01-16LL	Onitsha	20	0	2	0
LW	01-19L	Onitsha	196	14	0	0
ST	01-19DT	Onitsha	96	0	0	3
*						

The Brand Names, ZG-ST etc and the NAFDAC Reg. Nos. are coded as we did not obtain permission to use their real names and registration numbers.

Source: Orji, MU. Et al, *Journal of Applied Science 9(3)* **October 2006**

Table II: Bacteria and Fungi Genera Isolated from Different Brands of Sachet Water

Organisms	ZG	NR	CP	RC	PC	OL	BR	LW	ST
Staphylococcus spp	0	0	+	0	0	0	+	+	+
Streptococcus spp		0	0	0	0	0	+	0	0
Escherichia coli	0	0	0	0	+	+	0	+	0
Websiella spp	0	0	0	0	+	+	0	0	0
Serratia spp	+	+	0	0	0	+	0	+	0
Entaobacter spp	+	0	0	0	+	0	0	+	0
Bacillus spp	+	0	+	0	0	0	0	0	0
Alternaria spp	0	0	0	0	+	0	0	0	0
Cladosporium spp	0	0	0	0	0	0	0	0	+
Penicillin spp	+	0	0	0	0	0	0	0	+
Fusairum spp	0	0	0	0	+	0	0	0	0
Cephalosporium spp	0	0	0	0	+	0	0	0	0
Aspergillus's spp	0	0	0	0	0	0	0	0	+

Key: ZG-ST, etc = Different brands of sachet water

O = Organisms not isolated

\+ = Organism isolated

Source: Orji, M.U. et al., Journal of Applied Sciences 9(3), October 2006

Table 1: Mean Responses of Consumers and Stakeholders to Ascertain if Nylon/Plastic Waste is a problem in Onitsha and its Conurbation (North and South L.G.A.)

S/N	Item	5 SA	4 A	3 UD	2 D	1 SD	Mean Score	Remark
1	Whether nylon/plastic waste is a problem in Onitsha metropolis	900 (84%)	28 (3%)	139 (13%)	-	-	4.7	Accepted
2	High rate of nylon/plastic waste problem and the regularly facilities	192 (18%)	640 (60%)	128 (12%)	107 (10%)	-	3.1	Accepted
3	Individual disposal attitude of empty sacs of sachet water as indiscriminate or roads and gutter/drainage	640 (60%)	149 (14%)	22 (2%)	64 (6%)	192 (18%)	3.92	Accepted
4	Negative effect of empty sacs of sachet drinking water on drainage/soil erosion	693 (65%)	171 (16%)	11 (1%)	149 (14%)	43 (4%)	4.2	Accepted
5	Environmental impact assessment of production and sale of sachet water in Onitsha (North & South)	725 (68%)	43 (45)	-	224 (21%)	75 (7%)	4.0	Accepted
6	Pollution rate in Onitsha is environmentally condusive for living	214 (20%)	85 (8%)	21 (2%)	320 (30%)	427 (40%)	2.4	Rejected
7	Consumers, producers and government are blamed for environmental pollution of littering of streets with empty sacs of sachet water	448 (42%)	160 (15%)	11 (1%)	373 (35%)	75 (7%)	3.5	Accepted

Table 2: Mean Responses to the Effect of Government Insensitivity to Environmental Management Education Need on Consumers' Behaviour.

S/N	Item	5 SA	4 A	3 UD	2 D	1 SD	Mean Score	Remark
8	Government is solely responsible to the education	543 (50%)	320 (30%)	21 (2%)	85 (8%)	107 (10%)	4.0	Accepted
9	Lack of investment in environmental protection is connected to lack of ability	566 (53%)	224 (21%)	21 (2%)	160 (15%)	96 (9%)	3.9	Accepted
10	Government insensitivity to education need affect the consumers' beviour	576 (54%)	181 (17%)	43 (4%)	203 (19%)	64 (6%)	3.9	Accepted

Table 3: Mean Responses to ascertain if producers/stakeholders are conscious and mindful of Societal Welfare.

S/N	Item	5 SA	4 A	3 UD	2 D	1 SD	Mean Score	Remark
11	Producers/stakeholders have the welfare of the society in mind	960 (90%)	96 (9%)	11 (1%)	-	-	4.9	Accepted
12	Companies/agencies carry out societal responsibility/ environmental sensitization campaign	320 (30%)	107 (10%)	11 (1%)	224 (21%)	405 (38%)	2.7	Rejected
13	Firms bag socially responsible affects them positively	555 (52%)	139 (13%)	21 (2%)	267 (25%)	85 (8%)	3.8	Accepted