



THE ENVIRONMENTAL IMPACT OF SACHET WATER PRODUCTION IN BAUCHI METROPOLIS

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Abstract

Sachet water waste disposal is a vast problem that needs to be tackled because of the implications it has on biophysical environment such as soil, vegetation air and water (Toyobo, Oyeleke and Amao, 2013) is. Notwithstanding the benefits accruing from sachet water production and consumption, the indiscriminate disposal of the waste in various undesired sites such as along the streets, gutters, motor parks, schools, markets, homes, and venues of social functions etc. poses a lot of threat on the environment especially on the soils on which farming is done. The sachets are made of non-biodegradable synthetic polyethylene (polythene) which does not decompose in the soil even after many years. The polythene even when subjected to burning produces major known and harmful greenhouse gases (GHGs) like carbon monoxide, nitrous oxide and carbon dioxide (Akunyili, 2003). Almost every nook and cranny in Nigeria is littered with sachet water nylon, known to be pure water, the large volume of which in ordinary parlance, constitutes pollution and termed negative externality or economic bad in economics (Babatunde and Biala, 2010). This is as a result of millions of used sachets being thrown on daily basis onto the streets of virtually every city, town, and village in Nigeria. About 70 percent of Nigerian adults drink at least a sachet of pure water per day resulting in about 50 to 60 million used water-sachets disposed daily across the country (Edoga, et al. 2008)).

Introduction

The packaging of this sachet water is made of non-biodegradable synthetic polyethylene (polythene), which does not decay, decompose or corrode, and which when burnt, produces oxides of carbon, nitrogen and sulphur which can harm man and the environment (Williams Mary, 2008). The release of the oxides is due to the petrochemical composition of polythene, out of which the packaging is made. The harm it inflicts on the environment is called environmental degradation, which is a threat to the long-term development prospects of the country and world over.

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 responsibility 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

Problem Statement

In recent times, there has been heightened or increasing concern about water consumption due, in part, to the tension generation by the consumers and economic and 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 (Babatunde and Biala, 2010).

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 economic downturn (Adamu, 2009).

Literature review

Water has been identified to be very important to human existence because it is very necessary for survival. A reliable supply of clean wholesome water is crucial in an attempt to promote healthy living amongst the inhabitants of a well-defined geographical region (Mustapha and Adam, 1999). In an attempt to proffer solution to water problem, it was estimated that 1.2 billion people around the world does not have access to clean safe water and about 2.5 billion people are not provided with adequate sanitation (Third World Water Forum, 2003).

Majority of the affected people that lack access to clean safe water and adequate sanitation are located in the developing countries because the standard industrialized global model for safe water delivery and sanitation technology is not affordable, hence resort to package water (Gadgil and Derby, 2003).

Pure water for the world, works in remote and undeserved regions of developing countries that lack sustainable clean safe drinking water. Sachet water began in 1994 when a dentist from the Brattleboro Vermont rotary club volunteered to go to a small Salvadoran village to provide medical service (Wilson, 2018).

He was moved by the poor living condition and vowed to make a difference and do something. He decides to help the poor by providing rural villages with portable water. Sachet water was set up as a 50cl organization to carry out this important humanitarian effort (Wilson, 2018).

The important role of the operation management function is to measure and control the transformations process by monitoring the output in terms of quality and quantity and use information as feedback to make necessary adjustments toward improvement of the process (Buffa and Sarin, 2003). Improvement in the production process is essential to permit the achievement of operations management objective while customer satisfaction may be ensured through the production of high quality product. In addition, high quality products are essential to maintain customer loyalty and long term customer relationship that may eventually increase profitability of the firm. Hence, provision of high quality products is a mandatory requirement if the organization would succeed in the long run (Davis, et al, 2003).



Fig.1 Sachet/Bottle water production room (Source, jiji.ng photo, 2018)

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). 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 (Boone and Kurtz, 2004).

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 (Babatunde and Biala, 2010).

The four dimensions of corporate social responsible are namely; economic, Legal, ethical and philanthropic economic and legal dimensions are already being recognized and implemented contemporarily.

Environmental Impact of Sachet Water Production

1 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, Helminthiasis, campylobacter enteritis, cryptosporidiosis, Balantidiasis, Hepatitis A., Rotavirus diarrhea etc as noted in (Orji et al, 2006).

2. Flooding

In Nigeria's cities, the most common cause of flooding after excessive rains is poor drainage systems that can't cope, blocked drainage by polythene bags, plastics and plastics related materials. This is called pluvial flooding. Lagos provides a good case study (WeatherHill, 2013). Earlier this year heavy rains and thunderstorms caused havoc in Lagos, Nigeria's economic nerve centre and one of Africa's most populous cities. Residents woke up in many parts of the city to find their streets and homes flooded and their property, including cars and other valuables, submerged which seems to be resulted from effects of poly bags that filled drains (Vanguard, 2018).

3. Effects on Air Quality

Almost every nook and cranny in most of the Nigerias cities is littered with sachet water polythene bags. This is as a result of indiscriminate disposal of sachet water bags onto the streets of virtually every corner in Nigeria's cities. The packaging of this sachet water is made of non-biodegradable synthetic polyethylene which does not decay, decompose or corrode, and which when burnt, produces oxides of carbon, nitrogen and sulphur which can harm man and the environment (Odumegwu, 2016). The environmental externalities caused by the disposal of used water-sachets are, therefore, of three dimensions namely, air pollution, land pollution and water pollution. 014).

4 Effects on Land/Agricultural Production

Sachet water presence decreases the quality of soil texture. The fear among experts is that these bags are in the landscape. And they are not bio-degradable, comprising a pain-in-the-neck. The mockery is that the country is in dearth of framework to address the issue

Study Area

Bauchi metropolis is one of the cities in the North Eastern, Nigeria. It is the capital of Bauchi state; it is located at the north edge of Jos Plateau at an elevation of 616m (Anonymous). The study area represents the part of the topographic map of Bauchi North – East Sheet 149 as produced by the federal survey of Nigeria and it falls within N-E part of the map basement complex (Enwerem, 2006). It is located on the coordinate 10^o.15 -10^o. 22 Northen and 9^o.45 – 9^o.55 Eastern (Source, land survey Bauchi, 2018).

Relief and Drainage

Relief of the study area is characterized by low-lying rocks that are mostly flanked by moving mountainous exposure. The most prominent are the Warinji hill, Zaranda Hotel hills, Miri, Dumi, and other exposure of no great altitudes. Bauchi is situated on the upland terrain, composed of ancient crystalline basement complex rocks. The areas around the town are characterized by hilly topographic elevation of varying height from 533-783m above sea level (Hameed, 2008).

The study area is well drained by many small streams tributaries, which all get their source from the Northwestern and southwestern part of the map. Though the streams are all dry up during dry season. The stream pattern is the trellised drainage, which is associated with landscape and characterized by right angle stream junction (Enwerem, 2006). Some of the streams that drain the entire area are Shadawanka, Kyamro, Gwallagari, Dumi, Barkumbo etc (Hameed, 2008).

Climate and Vegetation

Northern part of Nigeria (Bauchi inclusive) is generally characterized by two (2) distinct climate seasons. The wet and dry seasons usually start in May and end in October of a year. During the rain season there is a slight decrease in daily temperature with an increase in relative humidity of about 94% in August when rainfall is at peak with average rainfall 372-430mm. The dry season begins in November and ends in April and this period may record little or no rainfall, but intense hamattan dust between November and February. The hamattan period is marked by dusty winds, poor visibility, low temperature (21-31°C) and low relative humidity (about 30%) and this period succeeded with a very hot weather condition usually March to April (Hameed, 2008). The mapped area is situated with the mixed leguminous wooded savanna of Nigeria, which is mainly Plateau grass savanna (Enwerem, 2006).

Settlement and Land Use

The major settlements in the study area are mainly urban. They include:-

- ❖ North-North: Rafinmakaranta, Awala, mudalawan, Gidadubu CBN Quarters Shadawankabaracketc
- ❖ North-East: Shekal, Adamu Jumba housing Estate, Inkil, Kandaharetc
- ❖ North-South: Railway Quarters, Zango Federal lowcost, Gudum, Bigietc
- ❖ North-West: Yelwa, Birshi, RafinZurfi, Gwalmeji, Bayaraetc

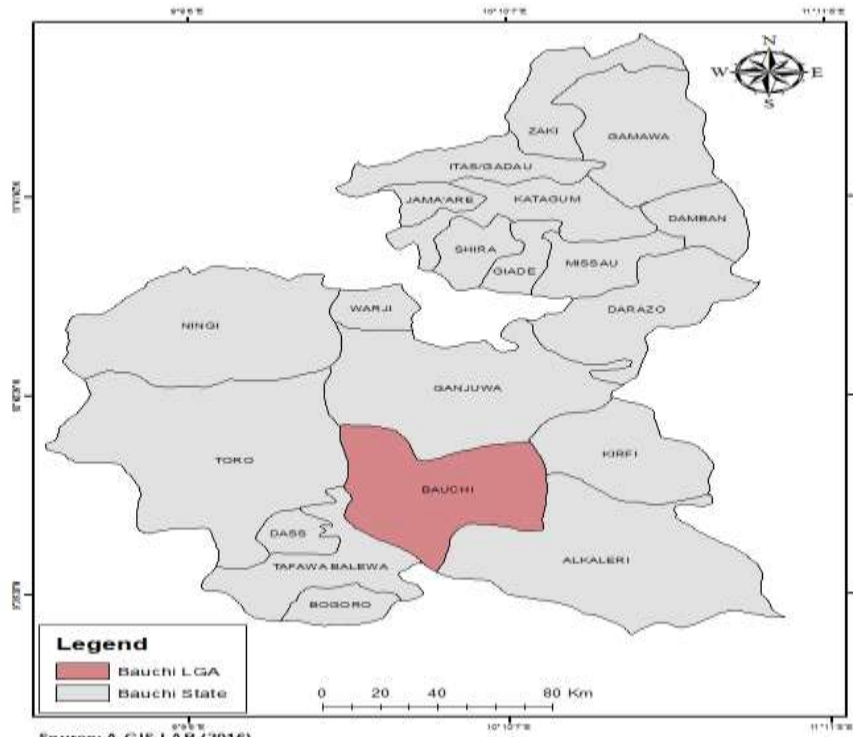
The major land use in the study area is administrative, commercial, industrial, religion and farming activities (Anonymous).

Population

Bauchi has a population of 1,168,777 as projected from 2006 National Population Commission Census (NPC, 2015). Growth rate of 2.8% and $P_n = P_t(1+r)^n$ were used to project the population figure (World Bank, 2013)

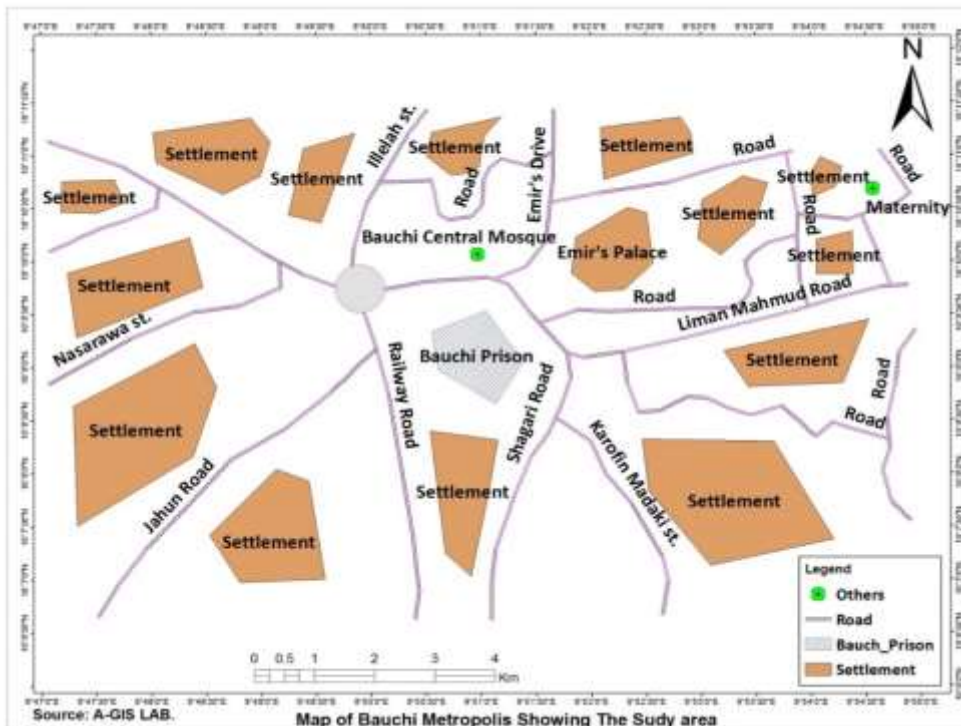
Socio-culture

Bauchi has Gerawa as a tribe or language, alongside Fulani, Jarawa, Sayawa, Gere, Kirbala, Zumbum and hosts of others.



Source: A-GIS LAB (2016)

MAP OF BAUCHI STATE SHOWING BAUCHI LGA



Source: A-GIS LAB.

Map of Bauchi Metropolis Showing The Study area

Data Collection

Information concerning the project was collected in two different forms namely; primary information and secondary data in relation to environmental and economic dimension in Bauchi metropolis.

Primary Data Collection

Reconnaissance:-Field observation on environmental and economic dimension (production, sales, sachet water disposal and their fate in the environment which was conducted with the help of sanitary inspectors of Bauchi State Environmental Protection Agencies (BASEPA), where Sachet water production industries, dump site landfills and farmlands were visited,

Interview:- One on one interview with residence/farmers and Sachet water producers was made to source data on the environmental and economic dimension in the residence of the study area

Questionnaire:-Structured closed ended question (questionnaire) was used where residence/farmers and Sachet water producers were asked based on the environmental and economic dimension. The researcher requested participants to fill the questionnaires to the best of their knowledge and truth. Stratified and random method of sampling were adopted in distribution of questionnaire

Secondary Data Collection

Textbooks were consulted for more information; journals, magazines, internet, and unpublished articles such as thesis, term paper, project etc formed the secondary data source.

Method of Data Analysis and Presentation

Statics tools were employed for the analysis of data; this includes Measures of central tendency: mean, median and mode used to find the average or percentage of respondent's responses. Descriptive statistics tools like chart; bar and pie charts were used in the analysis of data (Doekanem, Ighalo, and Sanusi, 2014)

Result Analysis, Presentation and Discussion

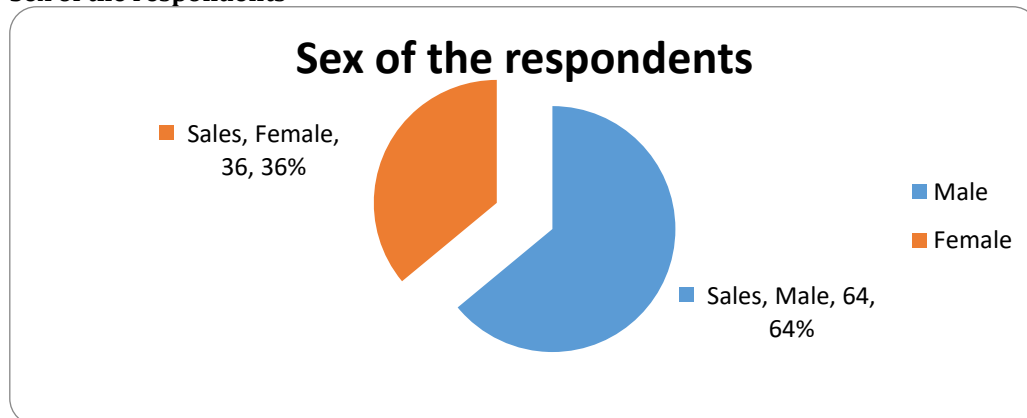
Introduction

This chapter present and highlight in summary data obtained from questionnaires. Out of the 100 questionnaires administered to household in the metropolis 96 were retrieved, upon which the analysis, presentation and discussion were made.

Demographic Profile of the Respondents

This section highlights some of the socioeconomic characteristics of the respondents

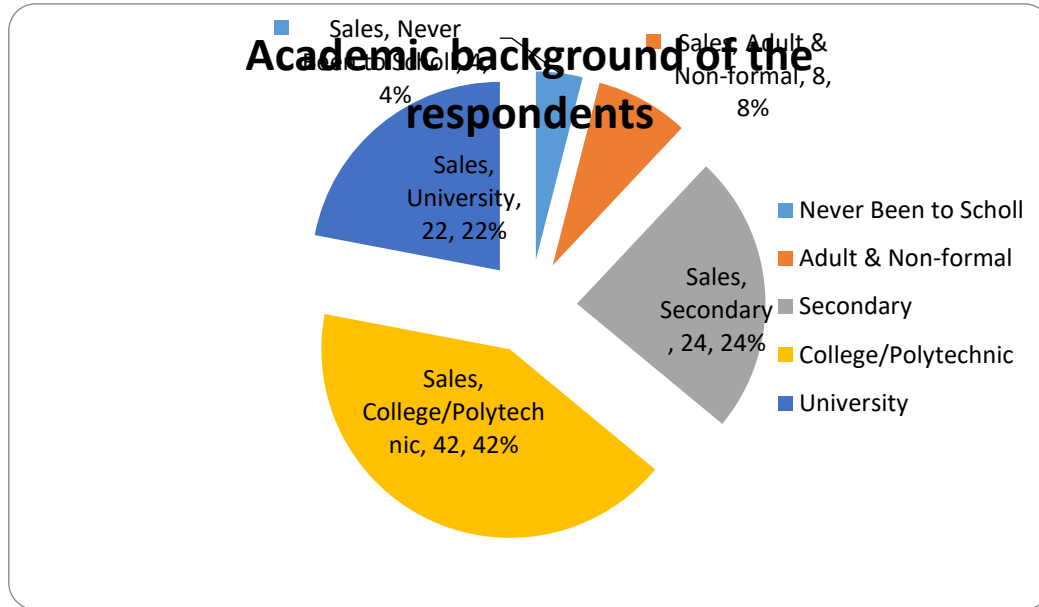
Sex of the respondents



Source: Field Survey, 2018

The results in chart 1 above indicated that 64% of respondents were male and 36% were females

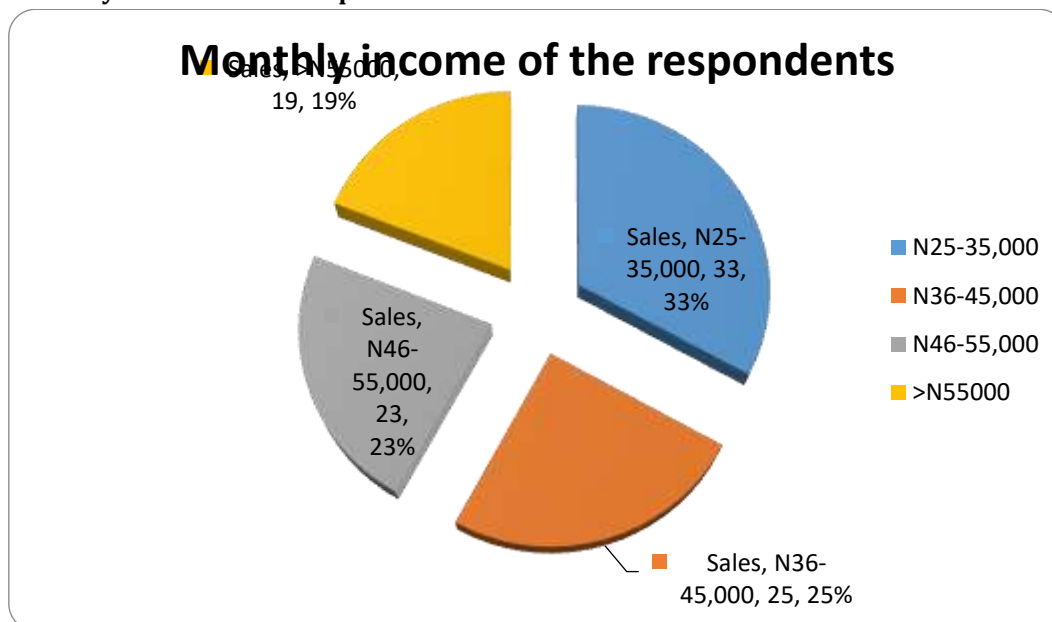
Academic Background of the Respondents



Source: Field Survey, 2018

In the result above, the academic background of the respondents shows that 4% never been to school, 8% attended Adult and Non-Formal education, 25% passed through secondary school, 43% studied in colleges/polytechnic and 22% bagged university certificates.

Monthly Income of the Respondents



Source: Field Survey, 2018

Results in the charts above indicated that 33% had monthly income ranging from N25-N35,000, 25% had N36-45,000, 23% had N46-55,000 and 19% had >N55,000 respectively.

Results and Discussion

In the result presented above it was observed that greater percentage of respondents were male where female have less percent. Most of the respondents were literate as more than half of them had tertiary education certificate (Attended colleges/polytechnic and universities). 58% of respondents income lies between N25, 000-N45, 000 and 42% between N46, 000 and above which were largely government employees with private sector scoring the least against self employed.

Information gathered from the questionnaires indicated that there were sachet water industries in Bauchi metropolis in large number and are in the increase. Respondents dissatisfied with the products quality and claim that most of the products were not certified by the regulators; NAFDAC which go inconsonant with some authors that are poorly produced in Nigeria (Akunyili, 2012). Pathogen may not excluded from sachet water as most of the materials used in sachet water industries for the production of sachet water were borehole water and Municipal water supply, packed in non degradable polythene bag after chlorination. Respondents disagreed that degradable polythene bag and sophisticated technology were used to package and purify water respectively.

Survey instruments (Questionnaires) revealed that sachet water business is lucrative and thriving which many people is engaged in Bauchi metropolis. It was also understood that sachet water industries and retail outlets provide job opportunities to teaming unemployed youth there by reducing unemployment in the metropolis substantially. This is because many youth were engaged into sachet water production work and retailing.

It remain uncertain as to whether or not government imposes multiple taxes on sachet water producers and retailers as respondents were neutral to this claim, thus further study is needed to unearth the true position of this claim. Respondents decried the high cost of sachet water sold in the metropolis despite large quantity of the products being sold on daily basis.

Waste of polythene of all kinds has being a global concern as it portends threat to human health and his environment (William and Mary, 2003, Park, 2009). Result indicates that waste of empty sachet water contributed to blocking of drainages, gutters, sewers which predisposes flooding and litters streets, markets, motor parks as well as general surrounding which makes the environment unaesthetic and serve as breeding place for mosquitoes, vector of diseases and affects digestive tract of animals when ingested and farm land unproductive when buried.

The understatement summarize the findings of this study; economic impacts of sachet water production in Bauchi metropolis.

There was significant number of sachet water producing industries in Bauchi metropolis with increasing capacity. But, products quality of some sachet water was not sure as they do not have NAFDAC number.

Water, chlorine and non degradable polythene bag materials used of sachet water production which most of the products were not certified by NAFDAC and their quality remain doubtful

It was found that sachet water production and retail outlets are business to venture in as are lucrative; produced and sold in large quantities in Bauchi metropolis. It creates job and reduce unemployment.

Recommendation and Conclusion

The principal aims of investigating the economic impacts of sachet water in Bauchi Metropolis was to analyze the quality, economic value and growth of sachet water production in Bauchi metropolis and to improve otherwise. The importance of access to good quality water cannot be overemphasized. Increase in population in Bauchi Metropolis coupled with the inadequate Municipal water supply pose a great pressure on provision of safe drinking water which sachet water seems to be the alternative.

This necessitates large number of people to consume water from sachet water which constitute a major health and environmental problem due to low quality and indiscriminate disposal of empty sachet water. This study recorded the positive tendencies of sachet water production and retailing in Bauchi metropolis. Therefore, it can be concluded that there are numerous industries of sachet water with potential to increase GDP and reduction of unemployment of the metropolis. This project therefore recommends the following to promote the inclusive and sustainable manner of sachet water production, retails and sachet water waste management in Bauchi metropolis for better business development;

- There should be data base or inventory of sachet water industries in the metropolis for easy regulation and waste management plan monitoring.
- Alternative packaging material should be sought to replace non degradable polythene that have become to mans' health and his environment
- Subsidy and soft loan should be made available to sachet water industries to motivate them and improve employment opportunity.
- Strict enforcement of laws and regulations against environmental consequences created by sachet water industries and retails should be made to control bulk/heap of sachet water waste and littering of surrounding. Producers should be forced to internalize their externalities for better environment.
- All sachet water industries should have environmental management plan (EMP) and implement same. A very good economic atmosphere should be provided to private sector to invest in collection, processing and disposal of sachet water wastes in the state.
- Further study should be conducted on this topic using sophisticated statistical model other than the one used in this study to verify claims in this project.

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