EVALUATING THE IMPLEMENTATION OF EXTENDED PRODUCER RESPONSIBILITY POLICY IN SOLID WASTE MANAGEMENT OF FOOD AND BEVERAGES, LAGOS STATE, NIGERIA

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TITLE PAGE

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A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, NASARAWA STATE UNIVERSITY KEFFI, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF DEGREE OF M.SC IN ENVIRONMENTAL RESOURCE MANAGEMENT (ERM)

DEPARTMENT OF GEOGRAPHY

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NIGERIA

DECLARATION

I hereby declare that this thesis has been written by me and it is a report of my research work. It has not been presented in any previous application for M.Sc. All quotations are indicated, and sources of information specifically acknowledged by means of reference.

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CERTIFICATION

The dissertation 'Evaluating the Implementation of Extended Producer Responsibility Policy in Solid Waste Management of Food and Beverages, Lagos State, Nigeria' meets the regulations governing the award of Master's in environmental resource management, Faculty of Environmental Sciences, Nasarawa State University, Keffi.

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Dean, School of Postgraduate Studies

DEDICATION

I dedicate this work to the Holy Spirit who was my unseen teacher all through the programme who both taught and woke me up when I needed to study and guided me all the way.

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ABSTRACT

Lagos State is plagued with the problem of poor solid waste management. Existing solid waste management mechanisms could not address the need to entrench the concept of Zero waste and eco-friendliness into production. More so, waste management was left entirely in the hands of the consumer, waste collectors and government waste management Agencies. This study ***'Evaluating the Implementation of Extended Producer Responsibility Policy in Solid Waste Management of Food and Beverages in Lagos State, Nigeria,*** *was chosen to help solve the problem of poor solid waste management in Nigeria. A total of three research questions were raised. As such, a two-sectioned Likert-scale questionnaire was administered to reflect the research objectives. A sample of 398 was selected using the Yamane Formula and was administered using the purposive sampling method to the sector's value chain such as producers, importers, recyclers, scavengers and the Product Responsibility Organization amongst others. Data generated was tested using percentages. Result of the analysis revealed stakeholders were yet to comply sufficiently with the provisions of the Policy Guidelines because of the constraints of insufficient knowledge, data and awareness to drive the process. However, results also indicated that the Policy had a good chance to succeed due to its Public Private Partnership status and that stakeholders conceded to the requirement to re-design their products to reflect eco-friendliness. The study concluded with the recommendation that the Regulator would need to set time lines to prompt key players in the Food & Beverage sector to implement the programme and commence aggressive sensitization programmes which would take the policy to enviable levels.*

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Environmental degradation through unsustainable developmental activities resulting in increased waste generation is a major dilemma plaguing the world today. Anijah - Obi (2001) pointed out that social, economic and political realities had made it necessary for serious attention to be paid to the environment especially in the face of rapid development, population growth, urbanization and industrialization. There had been no doubt that environmental problems in Nigeria were quite diverse in nature and were of significant dimension. More so, Osibanjo (2007), supporting Benibo (2008), asserted that poor waste disposal and unsustainable production are part of the major factors militating on the environment. In view of the global nature of these problems, countries all over the world had in the past, made concerted efforts to protect their respective environments.As part of efforts to combat the problem of poor waste management as well as that of incessant introduction of non-eco-friendly products into the production stream and the unsustainable use of natural resources in all of these processes, the Extended Producer Responsibility Policy was developed. Extended Producer Responsibility (EPR) is an environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post - consumer stage of a product's life cycle. The policy also encouraged producers to utilize environmentally friendly materials while promoting the product recycling and less extraction of raw materials to avoid depletion.

Lagos State is littered with empty cans, used pure water nylons, PET and glass bottles as well as discarded electrical/electronic wastes (e-waste). For the purpose of clarification, this research is limited to the Food and Beverage Sector. The Researcher's choice of this sector

as a case study was premised on the fact that the Nigerian Beverage Alliance (a coalition of Beverage Companies founded by Cocoa-Cola in collaboration with the Nigerian Bottling Company, Nestle Nigeria, Nigerian Breweries and Seven Up) has taken the lead by serving as the pilot to the scheme.Anukam (2014) commended the coalition for offering to take responsibility for monitoring its waste from cradle to grave. The leading role played by the Food and Beverage Alliance is the major reason for the choice of this sector for this research.The problem of poor waste management in most major cities in Nigeria is indicative of the fact that there is need to adopt stringent waste management policies that would shift the burden of waste management from the consumer or the statutory waste management organizations to the manufacturers. This strategy is aimed at mandating the producer to assume greater responsibility for managing its products from the time of manufacture to the end of its useful life. EPR is one strategy that if fully embraced, would cater for the inter-sectorial and peculiar requirements of its user. More so, the policy is tailored to the needs of its user as regards geographical location, product type and product life cycle.

EPR is being implemented in several places all over the world. Each program is slightly different, but with the common theme of requiring the producer of a product to assume greater responsibility for managing its product at the end of its useful life. The policy which was birthed from a project developed to address the 'weakest link' in the product responsibility chain which many scholars believe to be the final disposal of products. There are several policies on product lifecycle and the role of the producers, but this policy now appears to be the most critical in solving the problem of solid waste in Lagos State.So far, the product categories that are commonly addressed by various EPR Programmes across the globe are Electric/Electronic Products, Packaging, used Batteries and Automobiles (the list is not exhaustive). From this perspective, adopting and implementing an efficient and effective

EPR model could be the way to prevent further waste contamination and create resource efficiency.

1.2 Statement of the Problem

Waste generation from various anthropogenic activities in Lagos State the economic hub of Nigeria is almost inevitable in view of its growing population. It is pertinent that efforts are made to minimize its generation and at the same time, promote resource conservation by promoting measures that would convert waste to wealth. It is envisaged that the State may have compromised its environment in favour of entrepreneurship and technological advancement. Is economic development a form of evil? Lagos State had in the past, adopted several policies and Programmes in a bid to transform the State from the image of one of the dirtiest cities in Nigeria to an environmentally sound one but to no avail. There are several waste streams in the State due to the activities of so many registered companies involved in the production; marketing or distribution of food and beverage. The high population status of the state presupposes that consumption rate is also very high. The implication is that more solid waste is generated in Lagos than can be adequately disposed. Ironically, most materials dumped either from industrial processes or household are still valuable and can be recycled or reduced. This means that the environment is may be faced with the problem of depletion and extinction of natural resources. Also, wealth which may have been generated from conservation of used products are not sufficiently harnessed. It is for this reason that this research was carried out to evaluate the possibility of the adoption of an inclusion new policy approach to the problem of poor waste management which cuts across the life span of the products in the Food and Beverage Sector.

1.3 Research Questions

In other to carry out a comprehensive investigation into the subject of this research, it is necessary to consider the following questions;

1 How applicable is the EPR Policy Guidelines to factories in the food and beverage Sectorin Lagos State, Nigeria?

2 What are the major constraintsto policy implementation?

3 In what ways can the policy when fully operational, influence product design to reflect eco-friendliness?

1.4 Objectives of the Study

The study is aimed at evaluating the implementation of the EPR Policy in solid waste management of food and beverages in Lagos State, Nigeria.

The aim of the research was achieved through the following objectives:

1 To evaluate the applicability of the Policy Guidelinesby the stakeholders.

2 To identify the major constraints to policy implementation applicability by stakeholders.

3 To examine ways in which the policy, when fully operational, can influence product design to reflect eco-friendliness

1.5 Scope of the Study

This research covered Lagos State in general as the relevant facilities are spread across the State. It was focused on the EPR and its impact on solidwaste derived from the F&B sector within the area of study.It also centred on the activities of key players such as the Government, the Regulator, the Product Responsibility Organization (PRO), Producers, Importers, and all others who had a stake in solid waste management in the F&B Sector.

1.6 Significance of the Study.

This study would enlighten those concerned on the potential benefits the implementation of this policy would have on the environment, the producer, the end-user and all those along the value chain of the product.The study may prompt further research into the applicability of the policy to other sectors of the economy in Lagos State and beyond.Through this process, it is

also hoped that the state government would be better informed on the dangers associated with the misuse of the natural resources and then see the need to advocate for eco-friendly product designing. It would contribute to the existing body of knowledge on the subject and serve as reference for further studies.

1.7 Definition of Terms and acronym

Extended Producer Responsibility (EPR): Extended Producer Responsibility (EPR) is an environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the postconsumer stage of a product's life cycle. It is a concept to promote total life environmental improvements of product systems, and especially the take-back, recovery and final disposal of the product.

Eco-design: Any production process that considers environmental considerations (e.g. raw material use, recyclability, end-of-life waste management requirements) at the product design stage.

Stakeholders: All actors involved in the value chain of a product: producers, retailers, consumers-citizens, local authorities, public and private waste management operators.

Municipal Solid Waste (MSW): MSW is any material for which the generator has no further use, and which is managed at waste disposal, recycling or composting sites. This includes waste from residential sources which is managed both on and off-site, and waste from ICI sources which is managed off-site.

Producer Responsibility Organization (PRO): A "producer responsibility organization", usually a not-for-profit organization or an industry association, is the entity designated by a producer or producers to act on their behalf to administer an extended producer responsibility or product stewardship program. PRO may also be referred to as a "stewardship organization," an "industry funding organization" or a "delegated administrative organization".

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Framework

The whole concept of Sustainable Development is hinged on the fact that anthropogenic activities would always be on the increase because of man's insatiable quest for comfort. Natural resources are indiscriminately depleted to produce all kinds of product brands without recourse to the ability of the earth to renew its resources and the effect of the disposal of the products on the earth's resources.

The underlining philosophy behind the EPR is 'Zero Waste'. This concept encourages the redesign of resource life cycles so that all products are reused. The goal of this is that little or no trash would be sent to landfills or incinerators. The Policy cuts across different waste streams such as Food and Beverage, Electronic, Lead Batteries, Agricultural and many more but this research is focused on solid waste derived from the production or consumption of food items and beverages.

2.1.1 The Concerns over Waste

Health and Safety: Historically, health and safety had been the major concerns in waste management. In the opinion of (Chung, 2006), these still apply as wastes must be managed in a way that minimizes risk to human health. Today, society demands more than this. As well as being safe, waste management must also be sustainable. Sustainability or Sustainable Development has been defined as 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987).

The generation of less waste: The Brundtland report clearly explained how sustainable development could only be achieved if society in general and industry in particular, learned to produce **'more from less'**; more goods and services from less of the world's resources

(including energy), while generating less pollution and waste. In this era of 'green consumerism', this concept of 'more from less' has been taken up by industry. This resulted in a range of concentrated products, light-weighted and refillable packaging, reduction of transport packaging and other innovations (Walls, 2004). Production as well as product changes have been introduced, with many companies using internal recycling of materials as part of solid waste minimisation schemes. All these measures help to reduce the amount of solid waste produced, either as industrial, commercial or domestic waste.

They are improvements in efficiency, i.e. 'eco-efficiency', whether in terms of materials or energy consumption. The costs of raw materials and energy, and rising disposal costs for commercial and industrial waste, will ensure that waste reduction continues to be pursued by industry for economic as well as environmental reasons. Effective implementation of the Policy has been projected to conserve the use of Energy, Steel, Copper, Timber and lots more. There has been interest in promoting further waste reduction using fiscal instruments. Pearce and Turner (1992), for example, suggested ways to reduce the amount of packaging used (and hence appearing as waste) by internalising the costs of waste disposal within packaging manufacture, by means of a packaging levy.

Production as well as product changes have been introduced, with many companies using internal recycling of materials as part of solid waste minimisation schemes. All these measures help to reduce the amount of solid waste produced, either as industrial, commercial or domestic waste. Experience has often shown that extra taxes add to the total cost but do not reduce the base cost of waste management. Often, they become in effect an additional revenue stream rather than being used for specific environmental purposes. Introducing such charging structures to societies not used to them can be politically unpopular. 'Waste minimisation', 'waste reduction' or 'source reduction' are usually placed at the top of the conventional waste management hierarchy. However, source reduction is a necessary

precursor to effective waste management, rather than part of it. Source reduction will affect the volume, and to some extent, the nature of the waste, but there will still be waste for disposal. What is needed, beyond source reduction, is an effective system to manage this waste. The relevance of looking at the whole system could be challenged, since waste management is often split up into many different compartments. Collection of Municipal Solid Waste is usually the duty of local authorities, though may be contracted out to private waste management companies. Disposal often comes under the jurisdiction of another authority, and perhaps another private company. Different operators may contribute to recycling activities – in the case of material collection banks, these may be the material producers.

This is therefore suggestive of the fact that a synergy exists between economic development, social equity and the environment. Therefore, sustainable waste management must be:

- Economically affordable
- Socially acceptable and;
- Environmentally effective.

In the past, the economic cost of a waste management system was the major controlling factor in the decision-making process; more recently however, environmental considerations have played a more important role in this process. The inclusion of the social aspects of waste management in the decision-making process is now a very important consideration. Environmental concerns over the management and disposal of waste can be divided into two major areas namely: conservation of resources and pollution of the environment

These factors have led to material use now growing more slowly than many economies (UNDP, 1998). The per capita use of basic materials such as steel, timber and copper has stabilised in most OECD countries (OECD, 1997) and even declined in some countries for some products. This is not to argue that resources can never be depleted to unacceptable

levels, but in most cases, the time period required for this to happen is extremely long, allowing time for the implementation of technological developments.

EPR Policy was designed to inculcate the Principle of the 5 'P's such that a status of Zero waste would be achieved in the sectors in which it was adopted. A Report from Zero Waste International Alliance (ZWIA) stated that 'Zero Waste is a goal that is ethical, economical, efficient and visionary'. The concept is very relevant to this research because it promotes attitudinal change. Zero Waste invariably, implied a change in product design and supported environmental sustainability through waste reduction and avoidance. A consideration of the prospects the adoption the Policy would bring on the environment as against whatever challenges that may be encountered in its implementation would keep the society better informed. This research work is also based on the 'Concept of Waste Hierarchy which promotes the 'Preventive Approach' in waste handling as against remediation of the environment following harmful practices by man in his bid to concur the environment.

2.1.2 The Extended Producer Responsibility (EPR) Policy and its Provisions

Togo (2004) pointed out that EPR is a policy response to the heightened need faced by most Governments to tackle the problem of increasing waste generation. This policy approach was designed to give producers a significant responsibility for the treatment and disposal of products after use.

"Extended Producer Responsibility" (EPR), was defined by Lindhqvist in a report for the Swedish Ministry of the Environmental and Natural Resources in 1990 (Lindhqvist and Lidgren, 1990) as a preventative environmental protection strategy. The concept was in the past, used to refer to the end-of-life management of products. The Policy varies slightly in its application from sector to sector and from one country to another, as regards its purpose, application and the life cycle phases of products for which the responsibility of producers

were extended. Shiota (1999) opined the EPR was originally perceived as a concept that helped improve the situation surrounding waste management. The EPR policy was comprised of two key elements of implementation or two main environmentally-related goals namely:

1 Design improvements of products.

EPR system were designed to provide incentives for manufacturers to improve products and systems surrounding the life cycle of products as well as;

2 High use of product and material quality through effective collection and re-use or recycling. This goal can be sub-divided into three sub-goals, which are;

a) Effective collection

b) Environmentally-sound treatment of collected products and

c) Extensive use of products and materials in the form of re-use and recycling.

EPR was expected to impact on product design in such a manner that it would in the future, be recognized as a major determinant of product innovation amongst other factors such as push and pull factors including law, consumer preferences and customer requirements. Tojo (2004) provided empirical evidence that EPR law gave tangible incentives for conceptualization of environmentally-conscious designs in the case of electrical and electronic equipment (EEE) and cars in Japan and Sweden. Upstream measures in design, both in terms of reduction of hazardous substances and enhancement of source reduction of material use, re-use and recycling, have been undertaken in both industry sectors in Sweden and Japan respectively. Since manufacturers were given the responsibility of designing more eco-friendly products, it was expected that they would be able to make changes at source to reduce negative environmental impacts of their product throughout its life cycle. This was considered necessary as the producers were the major determinants of the features of their products from the design phase. It was projected that manufacturers, when made responsible for end-of-life management of their products financially and/or physically, would attempt to

devise a means of minimizing the costs associated with end-of life management by changing the design of their products. The establishment of such feedback loops from the downstream (end-of-life management) to the upstream (design of products) was said to be the core of the EPR principle and it distinguished EPR from a mere take-back system. Assigning responsibility primarily to one actor would also avoid the situation where everyone's responsibility becomes no one's responsibility.

2.2 Review of Previous Studies

The emergence of the concept EPR reflected several general trends in environmental policy-making. These trends are the prioritization of preventative measures over end-of-pipe approaches, enhancement of life cycle thinking and a shift from the "command-and-control" approach to a non-prescriptive, goal-oriented approach. Amachree (2014) posited that environmentally sustainable solid waste management was hinged on the hierarchical, integrated approach which involved a close hoop which comprising Reduction, Reuse, Recover, Repair and Recycle (5 R's). For EPR measures to be effective, she further postulated that waste should be sorted by end-users. This implied that there had to be measures to collect products of specific brands from households. Some products (large professional EEE, copying machines) have high end-values while others do not.

Allocating individual financial responsibility to producers for historical products was limited from the viewpoint of design change. It may also create problems with providing adequate financing for orphaned products. Establishment of infrastructure for separate collection and the recovery of discarded products under EPR programmes would not only improve waste management practice but also enhance possibilities for closing material loops. It also increased opportunities for manufacturers to re-obtain the products and/or components for their own re-use and recycling. Sufficient and steady supply of high-quality recycled

materials would help create demand for the recycled materials (Lee, 2002; Peck, 2003). Without such infrastructure, manufacturers' efforts towards design for re-usability and recyclability would be in vain.

Togo (2004) discovered after analysing results from a study she conducted, that there was evidence of design change in response to EPR Programmes. The study was based on EEE and cars in Sweden and Japan. She investigated their perception of the role of EPR on their environmentally-related activities and especially on their environmentally-conscious design development which she noticed changed in conformity to EPR specifications. It was further reported that EPR principle can be implemented through administrative instruments, economic instruments and informative instruments (Lindhqvist, 1992). Examples of EPR-based policy instruments were;

Administrative instruments which included Collection and/or take-back of discarded products, substance and landfill restrictions,

Achievement of collection, re-use (refill) and recycling targets, fulfillment of environmentally sound treatment standards, fulfillment of minimum recycled material content standards and product standard.

i) Economic instruments. These include material/product taxes, subsidies, advance disposal fee systems, deposit-refund systems, upstream combined tax/subsidies, tradable recycling credits

ii) Informative instruments: Refers to reporting to authorities, marking/labeling of products and components, consultation with local governments about the collection network, information provision to consumers about producer responsibility/source separation, information provision to recyclers about the structure and substances used in products

Togo and Hansson (2004) described an EPR programme as one which typically consisted of more than one EPR-based policy instrument. For example, a manufacturer is given the task of taking back a discarded product that he/she has produced (take-back requirement). This requirement may be combined with an introduction of a deposit-refund system to give incentives to consumers to bring back products to an appropriate collection point. A manufacturer may also be required to label material composition of components and to provide information to recyclers regarding the content and structure of their products. Recyclers must meet certain treatment standards. Some of these policy instruments may be incorporated in the revision of existing law governing waste management or the establishment of supplementary law developed in addition to an EPR programme.

In virtually all the EPR programmes, the exact combination of these instruments varies, as evident from several studies. However, the widely considered EPR programmes to date include, at minimum, a take-back requirement for post-consumer products. In this case, the extension of the manufacturer's responsibility means shifting part, or all, of the responsibility for end-of-life management of products from tax payers, waste management authorities and conventional waste dealers, to manufacturers. This shift may bring multiple, inter-related benefits for society, linking and affecting the various phases of the product's life cycle.

With regard to waste management, Veerman (2004) stated that an EPR programme would help to reduce the financial and physical burdens upon waste management authorities. The elimination of toxic substances at source, or at least the separation of components using toxic substances from the rest of the waste stream can reduce the risk of health hazards and environmental damage caused by inappropriate waste management. Separation of toxic substances from the rest of the waste stream can also reduce the cost of waste management.

Manufacturers' expertise and knowledge about their products can be communicated to waste managers (Lifset, 1993). The involvement of private actors increased the efficiency of waste management practice, such as better logistics for transportation, especially when it is not subsidised. Some view the introduction of an EPR programme as a breakthrough that allowed the privatisation of waste management, which had been monopolised by local governments (David, 2014). Demand for separation and recycling created by the EPR programmes may also induce the development of separation/recycling technology. This may lead to a reduction in waste generation. It may also help create a wider demand and supply for second-hand products or longer-life products. Moreover, it is a way of charging the costs associated with end-of-life management of products to It is manifested in a growing use of "pay-as-you-throw" system where consumers pay for waste management depending on the weight and/or size of the waste.

The establishment of infrastructure for separate collection and the recovery of discarded products under EPR programmes would not only help improve waste management practice per se but would also enhance possibilities for closing material loops. It also increases opportunities for manufacturers to re-obtain the products and/or components for their own re-use and recycling. Sufficient and steady supply of high-quality recycled materials would help create demand for the recycled materials (Vanthournout, 1998). Without such infrastructure, manufacturers' efforts towards design for re-usability and recyclability would be in vain. Furthermore, becoming responsible for the end-of-life management of their products financially and/or physically should force manufacturers to be more aware of the issues related to end-of life management of their products. Rational manufacturers would presumably try to find a way to minimise the costs associated with end-of-life management by changing the design of their products (both in terms of structure and material use). In

almost all the existing EPR programmes importers are assigned the same responsibility as domestic manufacturers to cover both domestically-produced products and imported ones. The term "producers" here include both domestic manufacturers and importers. A well-designed EPR system focused on end-of-life issues creates incentives for design changes of products, influences the effectiveness of collection of discarded products, the extent to which collected products are treated in an environmentally-sound way, and secures a high use of products, components and materials in the form of re-use and recycling.

2.2.1 The Global Perspective

For EPR to be effective there would be need for consultations throughout the product chain i.e. material processors to the product end of life. The choice of the specific strain or variant of the Policy to be adopted in any society is dependent on its needs i.e. a clear picture of the current generation and composition of municipal waste. Existing research outcomes from places like China and Sweden showed that EPR laws prompted eco-design changes. Drivers of eco-design were strengthened with positive feedback on the total end-of-life costs to individual producers: namely collection, dismantling, re-use and high-levels of material recycling. A report from OECD (2001) asserted that since the adoption of EPR in Germany, the per capita consumption of packaging was reduced from 94.7kg to 82kg.

British Columbia (BC) a leading implementer of EPR programmes in North America reported that presently in BC, well over 23 different EPR programmes had been implemented. The following major economic and environmental findings were highlighted for the quantities of EPR Materials recovered in 2011:

i) Reduced waste collection and landfilling costs due to EPR programs are substantial with estimated savings of over $30 million due to the recovery of EPR materials in 2011.

ii) Market value of $40 million for EPR materials recovered and sold to markets in 2011.

iii) The estimated net job creation of almost 2,400 jobs.

iv) Avoided disposal of 150,425 tonnes of garbage compared to the likely status quo scenarios. This amounted to 11% of Metro Vancouver's total disposed waste quantity in 2011.

v) EPR materials recovered in 2011 achieved net GHG reductions of 173,000 tonnes eCO2 (equivalent to taking 38,500 cars off the roads for a year), with energy savings of 2.7 million GJ (equivalent to the energy content of 440,000 barrels of oil).

vi) Other environmental benefits, such as keeping hazardous materials out of the environment and litter control, were qualitatively assessed for each EPR program material.

In 1970, BC introduced North America's first deposit-return system for beverage containers. The focus of "bottle bills" introduced in the 1970's was to reduce the impact of litter associated with single-serving, disposable containers (Container Recycling Institute, 2013). The Regulation expanded the scope of regulated beverage containers to include all ready-to-drink beverages except for milk and milk substitutes.

i) Encorp's 2011 program costs for beverage containers were $86.64 million, which equated to $976 per tonne of material collected.

ii) In 2011 Encorp managed a network of 172 return collection facilities, where consumers took their empty containers to collect the deposit refund. Containers for non-alcoholic beverages such as soft drinks, juice, water, sports drinks and alcoholic beverage containers such as wine, spirits, import beers/coolers sold in non-refillable containers were also collected. Customers were also allowed to return domestic beer containers to Encorp depots.

iii) Consumers also returned BDL beverage containers to Liquor Distribution Branch (LDB) stores, licensee retail stores, LDB rural agency stores and selected bottle depots across BC.

iv) BDL operated a system for the reuse of beer bottles. It collected refillable containers which were returned to brewers for reuse. According to BDL, refillable bottles can typically be utilized an average of 15 times before they are recycled. BDL report 8% of the collected bottles are being sent for recycling each year and the rest is reused. Aluminum kegs are also reusable and can last for up to 50 years.

Economic Impacts of EPR on Beverage in North America

a) Reduced municipal curbside collection costs by $44.2 -$45.3 million

b) Avoided garbage collection and landfilling costs by $13.8 - $29.4 million

c) End-market value of $11.3 - $16.4 million with a majority captured in North America

d) Net job creation of 456 - 1,228 jobs.

Environmental Impacts:

a) Saved approximately 392,712 m3 in landfill space compared to the likely status quo scenario.

b) Reduced GHG emissions for 2011 accredited to the EPR programs for beverage containers were close to 112,191 tonnes eCO2.

c) The net energy savings from the reduced need for extraction/processing of virgin materials compared to energy needs for processing and recycling were 1,845,987 GJ. This is equivalent to over 298,076 barrels of crude oil.

d) Having a refund incentive on beverage containers encouraged the recovery of the containers and reduced litter associated with these products. A literature review conducted by the Container Recycling Institute in 2005 found that States in the US with bottle bills had a 69 - 84% decrease in beverage container litter (Anielski, 2007). CM Consulting had in 2002 estimated the avoided litter per ton of recycled material. Approximately 12 million beverage containers were estimated to not end up as litter in BC as result of the EPR Programme.

2.2.2 Benefits derived from the application of the Policy across the GlobeFinancial

a) Cost avoidance

b) Reduced landfill development and operating costs i.e. avoided siting and development costs, avoided landfill disposal costs and deferred post-closure costs.

c) Net Number of jobs (direct and indirectly) created,

d) Value of recovered material in end-markets, and

e) Reduced costs of extraction/processing of virgin materials for products.

Environmental Impacts:

a) Net landfill space savings,

b) Net reduction in greenhouse gas (GHG) emissions,

c) Net energy savings from reduced need for extraction/processing of virgin materials for products,

d) Avoided raw material use.

Qualitative assessment:

a) Avoided waste through Design for Environment

b) Reductions in litter

c) Reduction in environmental contamination

d) Environmental risk avoidance.

e) Introduction of eco-friendly Beverage Containers.

2:2:3 Examples of practical applications of 5R's Principlein some parts of the world.

Bottles made of polyethylene terephthalate (PET, sometimes PETE) are used as raw material for the provision of bottles and containers for packaging a wide range of food products and other consumer goods such as soft drinks, alcoholic beverages, detergents, pharmaceutical products and edible oils. In more developed countries, these containers were easily recycled such that their waste was reduced resulting alternately to a reduced amount of waste deposited at landfills. Worldwide, approximately 7.5 million tons of PET was collected in 2011. This gave rise to 5.9 million tons of flake. In 2008 the amount of post-consumer PET bottles collected for recycling and sold in the United States was approx. 1.45 billion pounds. In 2012, 81% of the PET bottles sold in Switzerland were recycled. In Europe, the EU Waste Framework Directive mandated that by 2020 there should be 50% recycling or reuse of plastics from household streams.

'High quality' recyclables such as entire glass containers, plastic bottles, metals, etc. are often collected door -to- door by individuals or by the waste collectors themselves (Lindsay, 2002). Recyclable materials are also very effectively sorted at the kerbside by people searching through garbage containers and by people scavenging at the landfill/dump. It is this latter form of scavenging that poses the greatest threat to health, represents the poorest living conditions and as such is most urgently in need of improvement. Scavengers need to be

formally involved in the sorting, collecting and recycling of materials. This had been achieved at low cost in the suburbs of Mexico City by the construction of a simple material recovery facility where some of the collected waste (approximately 1500 tonnes per day) is placed on a series of conveyor belts to be sorted by scavengers.

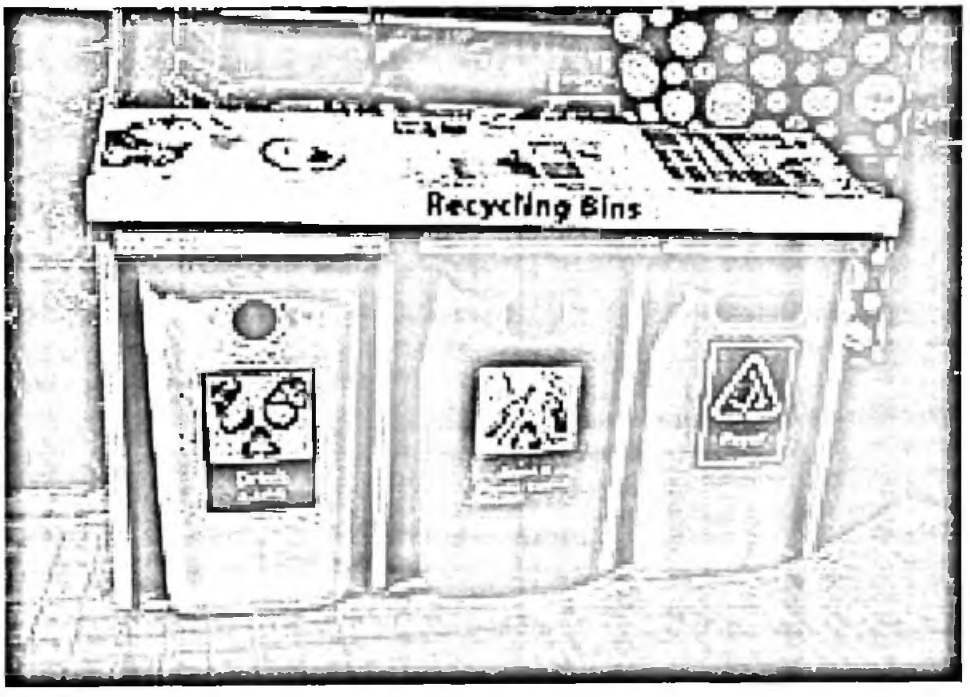


Figure 2:1 Coloured Recycling bins used in Urban Environmental Management and Technology in Singapore



Figure. 2:2 PET bottles are separated from other plastics in a materials recovery facility



Figure 2:3 Bales of crushed PET bottles sorted according to colour: blue, transparent and green

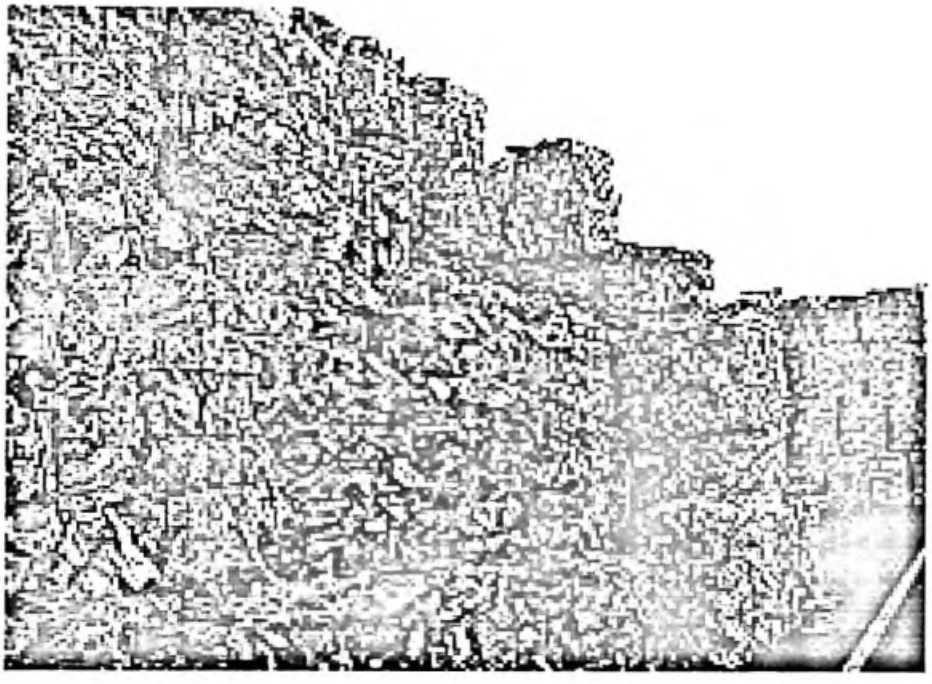


Figure 2:4 Bales of crushed PET bottles

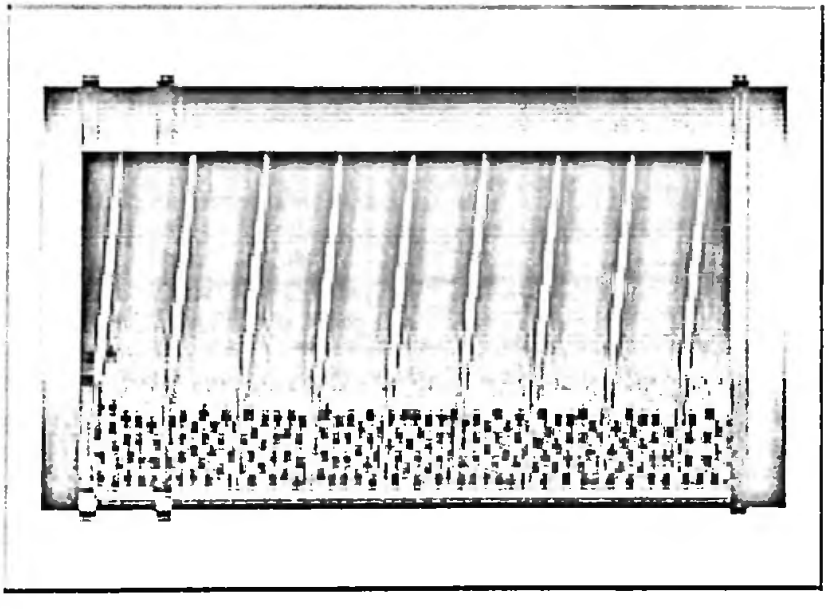


Figure 2:5 IRD drying drum used for the drying of Polyester pellets and polyester bottle flakes.



Figure.2:6 Dog raincoat made from 100% recycled PET fabric.

2.2.4 Policy and Legislative Framework for EPR in Nigeria

The National Environmental Standards and Regulations Enforcement Agency (NESREA) is the legal enabling power behind the enforcement of EPR in any State of Nigeria (Lagos inclusive). The NESREA Act of 25, 2007 was passed into law to address the problem of lack of standards and regulatory framework on environmental issues in Nigeria. Section 7 (g) mandated the Agency to enforce compliance with regulations on the importation, exportation, production, distribution, storage, sale, use, handling and disposal of hazardous chemicals and waste. As part of its mandate to ensure a cleaner and healthy environment for all Nigerians, the Agency identified the need to regulate waste management in Nigeria by taking an initial step of developing National Environmental Regulations such as National Environmental (Sanitation and Waste Control) Regulations, National Environmental (Food, Beverages & Tobacco Sector), National Environmental (Electrical/Electronic Sector) Regulations amongst others.

The Social charter of the National Economic Empowerment and Development Strategy (NEEDS) stressed the importance of setting up an effective private sector partnership in waste management in Nigeria. In some countries, the EPR is managed by the Government at Federal level this the recommendation by NEEDS coupled with the outcome of several research efforts by NESREA, informed the decision to opt for a public-private partner in which corporate organisations such as Public Responsibility Organisations (PRO) formed coalitions to tackle the hydra-headed problem of poor solid waste disposal. In the views of Morrison (2014), such arrangement would enable producers and suppliers accept responsibility for their products so that there is incentive for the design and manufacture of better products which can be reused and recycled.

The EPR is in line with the provisions 4.12 of the National Policy on Environment (1999) which stipulated that sustainable industrial development would be achieved through policy initiatives that ensure production processes incorporated realistic programmes for waste minimization through material recovery and recycling. Furthermore, section 4.19 of the Policy stated that the attainment of the policy objectives of Nigeria's external trade would require the adoption of the under listed strategies:

1 Encouraging the use of recyclable, re-usable and returnable materials in packaging.

2 Establishing the machinery for eco-label awards for products meeting prescribed environmental standards.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study Area

3.1.1 Location of the Study Area

The State is comprised of twenty (20) Local Government Areas with an approximate Landmass of 3,577 km2 (1,381 sq. mi). It has two main vegetation types namely Swamp Forest of the coastal belt and Dry lowland rain forest.

On the North and East, it is bounded by Ogun State and in the West, by the Republic of Benin.

According to Wikipedia reports, the State had a GDP of $91 billion as at 2014. It reported that Lagos State was the most prosperous city in Nigeria with more than half of the Country's industrial capacity located in the suburbs of Lagos. A wide range of manufactured goods are produced in the city such as machinery, motor vehicles, electronic equipment, and processed food and lots more. Lagos State was created on May 1967 and it is situated in the South Western part of Nigeria with 6035'N 30 45'E and Land Area of 3,374 km2. Lagos State is arguably one of the most beautiful States in Nigeria, yet where rubbish seems to grow on the streets.

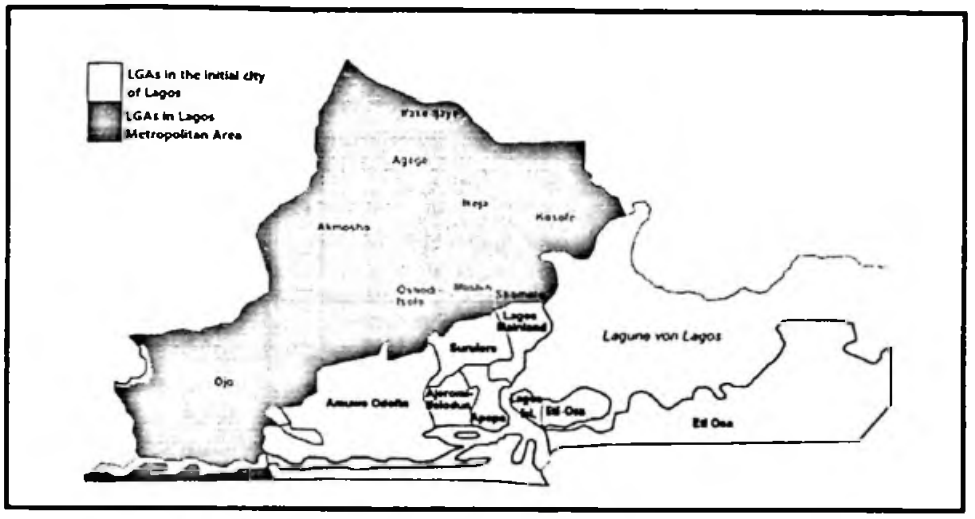


Figure 3.1 Map of Lagos State

3.1.2 Climate

Lagos State has a tropical climate with summers much rainier than the winters. The State lies 6m above sea level. It has lots of sunshine, rainfall and humidity. February over the years was discovered to be the warmest month in the year in Lagos. Lagos is known to be one of the coldest states in Nigeria with two distinct rainy seasons. This has a serious implication of the environment and invariably the management of its waste.

3.1.3 Topography and Drainage

Lagos State has a coastline of 180km long and it is underlain by sedimentary rocks. On a coastal plain, it is characterized by a flat terrain with an average elevation of less than 15m above sea level. Due to over population and very poor town planning, the State had and still is prone to periodic floods. The drainage system in Lagos State is characterized by lagoons.

3.1.4 Population

This segment according to Buckingham (2004) is a description of the population of the study. The population defines the limit within which the research findings are applicable. The population for the research work is the entire population of Lagos State which is estimated at

9,113,605 (2006 Population Census). Lagos State whose Capital City is also known as Lagos is located in the South-western geopolitical zone of Nigeria. It is arguably the fifth largest economy in Africa and a former capital of Nigeria. It is one of largest and fastest growing Cities in Africa.

As at 2016, it was estimated to have grown to about 21 million as recorded by the National Population Census reports whereas, the Lagos State Government estimates the population of Lagos at 17.5 million.

3.1.5 Socio Economic Activities

Lagos State was at one time Capital of Nigeria. It plays hosts to both local and international trade. The State plays host to several manufacturing ventures and small and large scale businesses. In the area of education, tourism, religion and healthcare, Lagos outclasses almost every other State in Nigeria.

Till date, the internally generated revenue from Lagos State places it far above any other State in Nigeria and its economy is self-sufficient. Lagos State enjoys economics diversity and is still exploring more opportunities in every sector.

3.2 Research Methodology

3.2.1 Research Design

The Survey research design was selected for this study. Data was mainly collected from primary sources such as questionnaires and interviews. The aim of evaluating the implementation of the EPR Policy (Food and Beverage Sector) in Lagos State would be achieved by an identification of the target population of the study area, the source and organization of data and the type of instrumentation which is most appropriate. As part of the research design, an appropriate statistical tool was selected. This section situates the study within the limits of Lagos where most of the key players are located and across the various

areas within the State. To address the research questions the following strategies were employed;

- Review of Relevant Literature;
- Development of Questionnaires
- Determination of the target population and sample size.
- Site visits, holding Focused Group Discussions through informed interviews and other means of securing regular constant with key stakeholders cross the study area; and;
- Collation and analysis of data.

3.2.2 Type of Research Design

The applied empirical approach was selected for the study. Qualitative and Quantitative data were applied and analysed to establish the relationship between EPR Policy and solid waste management. It would also be used to evaluate the applicability of the Policy to the manufacturers and other stakeholders as well as identify its expected benefits to the producer and invariably on the environment. Quantitative data would also be used to evaluate the constraints manufacturers, policy makers and the public at large may encounter in the implementation of the policy. Furthermore, the research instrument would examine the ways in which the Policy would achieve its aim of encouraging producers re-design their products.

3.2.3 Choice of Research Design

The study covers the core Companies that make up the Alliance as well as all other key stakeholders in the EPR system such as Manufacturers, Producers, Suppliers, Importers, Distributors, Collectors, Consumers, Government, Producer Responsibility Organizations and several others operating within the Food and Beverage Sector. The choice of Questionnaire was because the EPR Policy in Nigeria is still at its pilot stage and as such, the perception of key stakeholders would serve as an indicator of the true state of things. The study is both descriptive and explanatory.

The Food and Beverage Sector was selected because it was one out of the two sectors (the other been the Electronic and Electrical Sector) already positioned to implement the Policy in Nigeria. Copies of questionnaires were also administered to the sample population. Data obtained would then be analysed to establish the relationship between the variables.

3.2.4 Sample and Sampling Procedure

Sample Size: The Yamane formula was used to calculate the sample size for the study which cuts across all entities in the EPR network such as Producers, Consumers, Recyclers, and Handlers etc. Following the computation, which showed a high level of accuracy (95% confidence level), and an insignificant error margin of 5%, the sample size was placed at 398.

Calculation of Sample Size Using the Yamane Sample Size Calculator

The formula for the calculation of sample size with confidence level of 95% and error margin of 5% is given by:

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

Where n = Sample size, N = Population and e is the error margin

But $N = 9113605$ and $e = 5\% = 0.05$

Therefore, $n = \frac{9113605}{1 + 9113605\ (0.05)^2}$

$$= \frac{9113605}{1 + 9113605\ (0.0025)}$$

$$= \frac{9113605}{1+228}$$

$$= \frac{9113605}{229}$$

$$= \underline{398}$$

Source: Researcher's Calculation, 2018.

3.2.5 Sampling Technique

Due to the nature of the research, two types of sampling techniques were used. Purposive non-probabilistic sampling technique was used in selecting Cocoa-Cola Nigeria Limited and Cadbury Nigeria, as the fore-runners of the Alliance. It was considered that their input in the study would be vital and deemed representative of the entire population of Stakeholders. However, this decision was taken in spite of the inherent limitation of the selection biases of non-randomization of the non-probabilistic technique. Secondly, the stratified probabilistic sampling was used in selecting the other category of respondents namely, the Producers/Manufacturers, Producer Responsibility Organization, Recyclers, Collector, Consumers and Government/NESREA.

3.2.6 Methods of Data Collection

Data was obtained from Primary and Secondary sources.

Primary Data Sources: Primary data was collected via the major research instrument; Questionnaire (please see appendix A) and personal interviews.

Secondary Sources: secondary data were obtained from published and unpublished material such as textbooks, Seminar, Conferences, and Journals, newspapers, Official Presentations, magazines and the Internet. Additional secondary data was obtained from unpublished Lecture Notes.

3.3 Instrumentation

The method used for data collection was Field and Document analysis. Under the field method, structured Interviews of stakeholders were conducted and questionnaires self - administered. The choice of questionnaire is because it is a very good reflection of reality. Another consideration for the choice of Questionnaire is that large sample size due to the volume of entities along the value-chain. The questionnaire is expected to standardize and define limits. The Closed-ended pattern is referred here because it is very clear and precise.

The instrument used for data collection in the study was a self - developed Likert Type Scale Questionnaire. The instrument was divided into two (2) sections with a total of twenty (20) questions. Each section was made up of five (5) questions. Section one was designed to consider personal demographic information from respondents. Sections two to four is a four-point Likert scale designed to measure the key variables in the hypotheses by asking the grading system multiple choice questions. The questionnaire was graded as shown below:

SA	I strongly agree with the statement
A	I agree with the statement
D	I disagree with the statement

SD I strongly disagree with the statement.

An analysis of the result obtained from the weighing system above served as an indicator of how knowledgeable and prepared the various entities which are expected to drive the EPR process in Lagos State really were. It also indicated the extent to which the environment would fair in the long run.

3.3.1 Administration

A total of 438 questionnaires were administered out of which 418 representing 95% were recovered. 5% could not be retrieved. However, only a total of 398 out of the 418 recovered were used being the calculated sample size.

3.3.2 Method of Data Presentation

Data for the study was presented in descriptive form. Tables andfigures were used to enhance clarity.

3.4 Technique of Data Analysis

Data collected was analysed qualitatively using relevant literature and quantitatively through the **Statistical Package Servicesfor the Social Sciences (SPSS)** a computer-based version, which would provide both descriptive and inferential statistics

3.4.1 Procedure for Data Analysis

The study utilized simple percentages to analysis data derived via administration of the research instruments.

3.5 Justification of Methods

The choice of this tool was apt since the study utilized descriptive statistics. The Likert scale is a good way of rating experiences and expectations. Since the EPR is still at its implementation (pilot) phase in Lagos State it became an appropriate tool to use. It offered respondent opportunity to select a rating on a scale that ranged from one extreme to the other.

It gave room for respondents to give a deeper understanding of how respondents felt about the Policy. It would capture the exact sentiment of stakeholders towards the new policy under implementation.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Applicability of Policy Guidelines

The survey gave opportunity for responses to be made to certain questions that were used to evaluate the applicability of the Policy Guidelines by the stakeholders. The results in table 4.1 showed that majority (33.7%) disagreed that the policy was not applicable to their organisation.

Table 4.1 Applicability of Policy

Category	Frequency	%
Strongly Agree	87	21.9
Agree	92	23.1
Disagree	134	33.7
Strongly Disagree	85	21.4
Total	**398**	**100**

Source: Authors Field Work 2019

The strength of agreeing and disagreeing is depicted in the table. Consequently, the implication of those responses is that there are more respondents that believe the policy is not applicable as against those who think it is applicable. This was not surprising because most operators in the value chain in the sector do not have a good understanding of the policy and cannot appreciate its supposed superiority over the existing waste management policy in the State. 21.9% of respondents majorly from the regulators and PRO and among the key companies at the forefront of the implementation strongly believe in its applicability while a corresponding 21.4% are strongly of the view that the policy is not applicable to the sector.

The highest percentage of respondents (33.7) percent, disagree with the suggestion that the Policy was applicable to the F & B sector. The survey observed this figure emanated from the scavenger, retailers and other waste managers down the value chain who were majorly School Certificate holders. In all, a higher percentage of respondents were of the opinion that the policy was not applicable to the Food and Beverage Sector.

4.1.2 Applicability through Public Private Partnership

Table 4.2 showed that about 43.7% of the respondents agreed that the Government will achieve maximum compliance to the Policy through the Public Private Partnership Strategy adopted by NESREA and by the Agency's regular Enforcement activities. Analysis of the responses showed that there was more confidence in the public sector involvement to drive the process. However, 12.6% disagreed with that position in strong terms because they did not have confidence in neither the government nor the public sector's ability to implement the EPR Policy.

Table 4.2 Applicability through the Public Private Partnership Strategy

Category	Frequency	%
Strongly Agree	101	25.4
Agree	174	43.7
Disagree	73	18.3
Strongly Disagree	50	12.6
Total	**398**	**100**

Source: Authors Field Work 2019

4.1.3 Applicability of policy as lasting solution

Majority of the respondents (66.6%) including those who agreed and those who strongly agreed believed that the EPR Policy would proffer a lasting solution to the menace of solid waste management when fully operationalized in Lagos State. They hinged their opinion on the multi-sectorial and inclusive structure of the EPR Policy which held every product importer, manufacturer, handler, seller, user and the government accountable and responsible for waste management from cradle to grave. About 9.8% respondents strongly disagreed with the assertion because they felt it would be difficult to hols importers responsible for products they didn't manufacture especially as there were too many of such 'orphaned' products in the markets in Lagos State. This is shown in table 4.3

Table 4.3 Applicability as lasting solution to solid waste management in Lagos State

Category	Frequency	%
Strongly Agree	83	20.9
Agree	182	45.7
Disagree	94	23.6
Strongly Disagree	39	9.8
Total	**398**	**100**

Source: Authors Field Work 2019

4.1.4 The distribution of various stakeholders

The stakeholder's job description for the survey were categorised and findings showed that a major share of the respondents are form the producer's category with over 40% of them from both small-scale and large-scale producers. Figure 4.1 showed that the least respondents are from the importer's category.

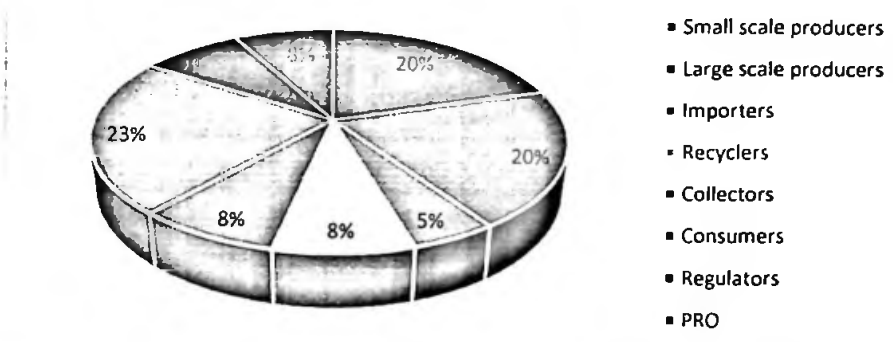


Figure 4.1: Job description of respondents

Source: Authors Field Work 2019

4.1.5 Duration of Job Experience

For the duration of time spent on the job, the result shows that 16.5% of respondents had only 1-5 years of experience in while 32.6% of the respondents had over 16 years of experience as stakeholder (Fig 4.2). Majority of the respondents (50.6%) however, have between 6-15 years' experience in their various jobs. This in effect shows that there is adequate experience from the respondents on issues bothering on waste management and greater commitment to the policy.

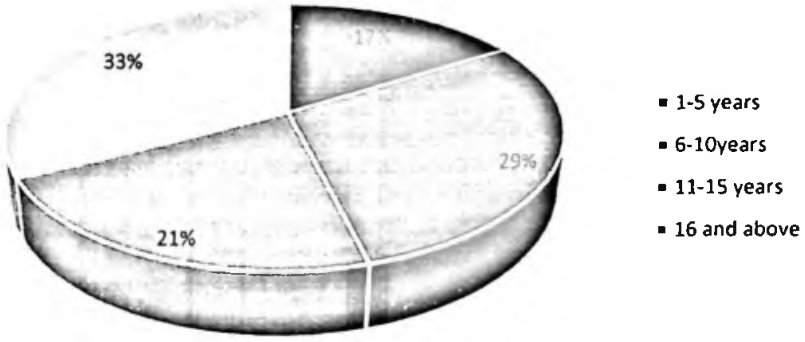


Figure 4.2: Duration of job experience of respondents

Source: Authors Field Work 2019

4.2 Constraints to policy implementation.

Opinions were sought for from respondent in respect of identifying the major constraints to policy implementation applicability by stakeholders. The responses are described as follows;

4.2.1 Lack of Sensitization

Table 4.4 showed that there is a wide consensus with over 50% of the respondents agreeing that both the regulator and the PRO have not made concerted efforts to sensitize the populace about the workability and possible gains of the Extended Producer Responsibility Policy whereas only 13.8% strongly disagree with the assertion that the key players in the sector and the general citizenry had not been adequately sensitized on the nature of the policy and its possible benefits. Those who agreed that the Policy Regulator NESREA and the licenced Producer Responsibility Organization (PRO) had done to sensitise key players in the industry as well as the general citizenry about the workings of the policy opined that the policy would be enforced via government goodwill and a mandatory registration system for all players in the value chain.

Table 4.4Lack of Awareness

Category	Frequency	%
Strongly Agree	101	25.4
Agree	202	50.8
Disagree	40	10.1
Strongly Disagree	55	13.8
Total	**398**	**100**

Source: Authors Field Work 2019

4.2.2 Inadequate distribution of Operational Guidelines

41.5% of the respondents strongly agreed that they have not read a copy of the Operational Guidelines for the Implementation of the Extended Producer Responsibility Programme in Nigeria. They blamed this on fact that aside from Seminars and meetings with the Alliance in the Food and Beverage Sector, jingles and roadshows in all major languages in the country as well as the engagement of Traditional Rulers would help spread the message faster. The policy doesn't seem to enjoy popularity among the respondents even as key players, judging from the results in table 4.5 which is a red flag for its proponents.

Table 4.5 Inadequate distribution of Operational Guidelines

Category	Frequency	%
Strongly Agree	165	41.5
Agree	47	11.8
Disagree	109	27.4
Strongly Disagree	77	19.3
Total	**398**	**100**

Source: Authors Field Work 2019

4.2.3 Inadequate data about solid waste management

About 35.7% of the respondents agreed that the F & B Sector is faced with the challenge of inadequate data about solid waste management and the activities of the producers, importers, recyclers etc. in the State (see table 4.6).

This position was further strengthened by those who strongly agreed (20.9%). Table 4.6 gives a clear representation.

Table 4.6 Inadequate Data

Category	Frequency	%
SA	61	20.9
A	112	35.7
D	142	28.1
SD	83	15.3
Total	**398**	**100**

Source: Authors Field Work 2019

4.2.4 Lack of confidence

The result from this survey clearly showed that there is little difference in opinion between those who agreed and those who don't agree on whether the EPR policy will work in Lagos State or not. Overall, about 55.2% of the respondents expressed fears that the Government through its regulator, would not be able to bring the EPR Policy into full swing in Lagos State due to lack of commitment to government ideals by its officials. On the other hand, 44.8% have opposing views od they argued that the public private sector involvement in this policy,

would give it the edge other policies which were solely enforced by the government Agencies, lacked (see table 4.7).

Table 4.7 Lack of confidence in the Regulator

Category	Frequency	%
Strongly Agree	104	26.1
Agree	116	29.1
Disagree	95	23.9
Strongly Disagree	83	20.9
Total	**398**	**100**

Source: Authors Field Work 2019

4.2.5 Increased Financial Burden

The percentage of respondents who strongly agreed that the implementation of EPR fully in Nigeria would place an adverse financial burden on Consumers and Producers is 39.9%. They opined that the added responsibility of waste managers to monitor a product through its various stages of use to the end of its life would increase cost of the product whereas, manufacturers across the globe are seeking ways to cut the cost of production in view of the current economic realities in Nigeria. The least percentage of respondents are those who strongly disagreed with that position. These respondents emanated from the regulators and PRO who had studies the impact of EPR on product cost and found it to be insignificant.

Table 4.8 is a representation of the result.

Table 4.8 Adverse Financial burden on stakeholders

Category	Frequency	%
Strongly Agree	159	39.9
Agree	121	30.4
Disagree	76	19.1
Strongly Disagree	42	10.6
Total	**398**	**100**

Source: Authors Field Work 2019

4.2.6 Shift in the Responsibility of Solid Waste Management

Responses from the questionnaire showed that about 54% of the respondent agreed with the position that though Lagos State had a waste management mechanism, it still required a policy that would extend responsibility of managing waste from beyond the consumer to the manufacturer. Specifically, 20.1% of the respondents strongly disagreed with the idea of introducing a new waste management policy because they felt several policies had been initiated in the past but to no avail.

Table 4.9 Shift in the Responsibility of Solid Waste Management

Category	Frequency	%
Strongly agree	124	31.2
Agree	92	23.1
Disagree	102	25.6
Strongly Disagree	80	20.1
Total	**398**	**100**

Source: Authors Field Work 2019

4.3 Influence of Product Design

Most of the respondents (68.6%) both agreed and strongly agreed that PET bottles; Plastics and other waste from F & B Sector contributed significantly to the problem of poor solid waste disposal in Lagos State. This position was consistent with the waste characterization profile of the State which showed that waste generated from the F&B sector topped the waste which originated from both low density and high density areas. Only 4% of the respondents strongly disagreed with the position because they believed there was no alternative to the existing product designs which was majorly deprived from paper, plastics amongst others. This position was depicted in Table 4.10.

4.3.1 Eco-friendliness of Products

Table 4.10 Waste from Food & Beverage Sector

Category	Frequency	%
Strongly	154	38.7
A	119	29.9
D	109	27.4
SD	16	4
Total	**398**	**100**

Source: Authors Field Work 2019

In an overwhelming consensus, about 51.3% of the respondent strongly agreed that packaging from the sector can be designed in a more environmentally sustainable manner. This because the present waste problem in the state is obvious and the consistency of the waste clearly showed pointed to the F & B sector as a major contributor. In all, only about 4% of the respondents disagreed because they opined that the waste management problem in the State was holistic. Table 4.11 showed other breakdowns.

Table 4.11 Product Re-design

Category	Frequency	%
Strongly Agree	204	51.3
Agree	179	45
Disagree	8	2
Strongly Disagree	7	1.8
Total	**398**	**100**

Source: Authors Field Work 2019

4.3.2 Product Recycling

8% of the respondents strongly disagreed that with the EPR in place, wealth can be generated from recycled solid waste and natural resources better conserved with the policy. They were of the opinion that waste was worthless. However, 43.5% of the respondents strongly agreed that there was wealth and great potential in waste and that consistent with the waste to wealth project already operational in most states in Nigeria.

These views are shown in table 4.12.

Table 4.12 Wealth generation from recycled solid waste and natural resources

Category	Frequency	%
SA	173	43.5
A	170	42.7
D	23	5.8
SD	32	8
Total	**398**	**100**

Source: Authors Field Work 2019

4.4 Discussion of findings

4.4.1 Applicability of the Policy Guidelines.by the stakeholders.

Lagos has the major food and beverage sector players established doing large scale operations compared to other regions in the country with small and medium scale producers, hence the high expectation of these players to willingly subscribe to the EPR programme as part of the private sector partnering with the government for effective implementation of the policy. As the results have shown, majority of the respondents agreed that the policy is applicable to their organisation.It is believed that even with the Lagos State waste management mechanism in place, it still requires a policy that would extend responsibility of managing waste from a product beyond the consumer to the manufacturer. However, there is a wide consensus with over 50% of the respondents agreeing that both the regulator and the PRO have not made concerted efforts to sensitize the populace about the workability and possible gains of the Extended Producer Responsibility Policy. Most have also not read a copy of the operational guidelines for the implementation of the EPR programme in Nigeria and the policy doesn't seem to enjoy popularity among the respondents even as key players.

This is worrisome and can jeopardize the entire process as enlightenment/sensitisation/awareness plays a vital role which cannot be wished away the outcome of the statistical testing showed the need for Regulators and the PRO to embark on aggressive publicity and sensitization campaigns. At the same time, the Regulator should as a matter of urgency, ensure this policy cascades to the other states in the country as that is the only way it can make meaningful impact. The concerted efforts of all key stakeholders as such collectors, handlers, and manufacturers in the value chain would go a long way to change the face of the environment in Lagos State. The EPR Policy would proffer a lasting solution to the menace of solid waste management when fully operationalized in Lagos State.

4.4.2 Major constraints to policy implementation applicability by stakeholders.

Some major challenges militating against the implementation of the EPR Policy in Lagos State were identified as insufficient data base, porosity of the markets such that there is a prevalence of orphaned products which didn't have manufacturers to account for them. The study also identified the challenge of more food and beverage products being imported than those locally produced. Another challenge identified was that of insufficient awareness about the workings of the policy even among members in the F & B value chain. This is confirmed by the little difference in opinion between those who agree and those who don't agree on whether the EPR policy will work in Nigeria. Some respondents expressed fears as to how well the Policy will fare in view of the challenge of poor Policy implementation in Nigeria despite the adoption of the PPP strategy.

Overall, it indicated a lack of awareness and acceptance of the projected benefits of the EPR programme as such, some sector players show little or no commitment to subscribing to the programme. Lagos is a major industrialised hub in Nigeria and so therefore a successful implementation will mean that same success can be achieved in other geopolitical zones of

the country.There is also the lack of proper understanding of the roles of the various identified stakeholders for the effective implementation of the EPR programme and therefore can lead to a slower and less effective synergy. Timelines for various delineated roles and effective enforcement of the policy document by the government are valid tools to ensure sustenance of the EPR programme in Lagos state for the identified waste stream under the Food and beverage Industry.The Survey also indicates a lack of understanding of the actual negative impact of the waste generated from the Food and beverage sector on the environment. There is a misunderstanding that the state waste management authority is effectively managing that waste stream properly, However the EPR programme would establish a formidable structure in ensuring a sustainable value chain to manage most recyclable waste generated from the sector.

Waste collection methods are still very primitive. This poses a serious problem for the scavengers and collectors. Inadequacy of existing waste management facilities and technologies for dealing with waste streams that are constantly increasing both in terms of volume and variety. Most statistics on municipal solid waste composition provide data only by material composition of waste such as organics, glass, plastic, paper, aluminium, steel, etc. As a new Policy, intensive publicity and sensitization is required to enable full compliance. There may be resistance to the process because a lot of people are change-adverse.

4.4.3 Ways in which the policy can influence product design to reflect eco-friendliness

PET bottles; Plastics and other waste from F & B sector contribute significantly to the problem of poor solid waste disposal in Lagos State.The strategies to upgrade the existing solid waste management structure to reflect compliance to EPR in the sector is in place. With the EPR policy, wealth can be generated from recycled solid waste and natural resources better conserved. The study suggests that packaging from the sector can be designed in a

more environmentally sustainable manner. The PRO would be able to motivate and ensure companies comply with the requirement for producers to re-design their products to more eco-friendly designs. The impact of EPR on the environment and on the innovation of eco-friendly food and beverage products may not be an easy variable to evaluate subject to EPR law.Currently, there are no much verifiable data on the actual waste generated by the sector in Lagos, and so moving forward, the EPR programme for the sector would provide the even playing field to generate baseline data which can build up as a tool for effective monitoring and evaluation of the impact of the programme

The study also found that there is an urgent need for local manufacturers to redesign their products to reflect eco friendliness while importers would have to give same consideration in their choice of imports. It also showed the need for the regulators to put stringent policies in place to deter all concerned from further introduction of unsustainable products into the markets.The study clarifies the importance of accepting the Extended Producer Responsibility Programme (EPR) as a stewardship approach by producers to establish their contribution to environmental sustainability. In the wake of the recent menace of plastic waste globally, especially single use plastic which are majorly adopted for packaging in the Food and Beverage sector, the EPR programme will effectively establish current best circular economy approach to waste management. Closed looping in waste management from cradle to grave approach also validates the effectiveness of the EPR programme for the sector.

The research findings derived also supported the Waste characterisation profile of the State which showed that solid waste generated from the F&B sector contributed significantly to the menace of unsightly solid waste in most parts of the State. More importantly however, it aligned with the Bruntland report that production and consumption should not deplete natural resources in such a way that future generations would not be able to meet their own needs.

Furthermore, it justifies the agitation for providing 'more from less' and 'waste minimization'

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study was designed to evaluate the implementation of the Extended Producer Responsibility Policy in the Food and Beverage Sector in Lagos State, Nigeria. The choice of this sector was because it served as pilot of the policy since the EPR was observed to be at its state of infancy generally in Nigeria, and particularly in Lagos state. The EPR policy in Nigeria/Lagos is private sector driven under the close watch of NESREA being regulator of the policy.

The legislative framework for the development of extended producer responsibility Policy in Nigeria was hinged ongeneral legislation on waste management principles, and within the EPR framework the producer was identified as the economic agent who can play a decisive role in avoiding pollution, e.g. through eco-design efforts.

The economic reasoning behind the EPR concept was to have producers internalise treatment and disposal costs so that they have an incentive to design products with longer life span and less environmental depletion. It was expected to be done from the active engagement of all stakeholders in such that benefits gained from producers who improve their products are distributed to all producers who belong to the same PRO. However, the study discovered that a major constraint to the success of the policy was in its slow take off and lack of awareness of its real benefits by even some so-called operatives in the sector and lack of sufficient data about waste management. Illiteracy and lack of trust for government intentions were also identified as constraints. Another challenge was discovered in the area of lack trust and confidence in the regulator as an agent of government whom respondents has already marked and being incapable of implementing policies as seen in most sectors in the Country.

Interestingly, the pendulum shifted when outcome of the research revealed that more stakeholders welcomed the introduction of a new waste management in Lagos State than those who didn't. They also embraced the idea of redesigning products with longer lifespan and less environment damage.

Now, other sectors in the state such as electronics and electrical (e-waste), used batteries, which has commenced the Registration of the Nigerian Battery Recycling Alliance (NBRA)] and several other sectors are gearing towards the adoption of the Policy.

Over the years, several environmental management policies and strategies had been adopted including waste collection, waste sorting and take-back policies but this is the first of its kind in Lagos State and the world at large where responsibility for the disposal of waste would no longer be the sole responsibility of the end user but would be shared by all the key players in a product lifecycle the bulk of which lies with the manufacturer. This policy is expected to have a direct and positive bearing on the environment using more eco-friendly raw materials and product designs.

Findings from the study also showed a worrisome situation of lack of enough preparedness of manufacturers in the sector to set up a structure which would ensure prompt redesigning of products to reflect eco-friendliness. Some major challenges militating against the implementation of the EPR Policy in Lagos State were identified as insufficient data base, porosity of the markets such that there is a prevalence of orphaned products which didn't have manufacturers to account for them. The study also identified the challenge of more food and beverage products being imported than those locally produced. Another challenge identified was that of insufficient awareness about the workings of the policy even among members in the F & B value chain. Some respondents expressed fears as to how well the

Policy will fare in view of the challenge of poor Policy implementation in Nigeria in spite of the adoption of the PPP strategy.

5.2 Conclusion

Findings from the study have reiterated the need for the Regulator and the PRO in the sector under study, to commence the full implementation of the Policy by ensuring all key players along the sector's value chain are educated on the provisions of the Guidelines and comply accordingly. Key drivers of the EPR process in Nigeria are also to attain maximum success by changing the production and disposal trends in Nigeria beginning from Lagos State which serves as pilot of the scheme.

In discussing the applicability of the Policy pertinent questions which captured the essence of the subject were raised and statistically tested.

The outcome of the statistical testing showed the need for regulators and the PRO to embark on aggressive publicity and sensitization campaigns. At the same time, the Regulator should as a matter of urgency, ensure this Policy cascades to the other States in the country as that is the only way it can make meaningful impact. The concerted efforts of all Key Stakeholders as such Collectors, Handlers, and Manufacturers in the value chain would go a long way to change the face of the environment in Lagos State.

The outcome of the study also revealed that most of the respondents viewed the PPP strategy being used by the Government to domesticate the policy as a potent and viable one. This is not to undermine the fears expressed by a sizable number who did not seem to have much confidence in the ability of the Government to implement policies. Also, the idea of kick-starting the process through the big wigs in the sector indicated prospects for better success as smaller entities in the sector would be regulated by the activities of the key players.

The study also indicated a lapse on the part of the regulator and PRO in the area of sensitising the citizenry because they had not been adequately prepared for compliance to the provisions of the policy.

5.3 Recommendations

Following the discussion of findings, the underlisted recommendations are hereby made;

- ✓ Aggressive publicity and sensitization campaign across the Nation so that everyone is carried along and the better-informed people are about the Programme, the more positively they would respond to it.
- ✓ NESREA as regulator would need to proffer timelines to the PRO and other Stakeholders in the Food and Beverage sector to implement the Policy.
- ✓ The Regulator would also need to ensure compliance to Guidelines of the Policy as well as set guidelines for the phase out of undesirable products.
- ✓ Relevant facilities are also to intensify Research efforts and ensure structure is put in place to effect possible re-design of their products that fail to meet eco-friendly standards.
- ✓ There is need for dialogue among stakeholders, Producers, PROs, national and local authorities, waste management industry, NGOs, etc.
- ✓ The Regulator, PRO, Stakeholders and other key players in the sector should, promote the tradition of converting waste to wealth and trash to treasure.

5.4 Limitations of the Study

The challenge of financial constraints as study of this nature required frequent discussion and visits to the facilities which were actually a very far distance from the researcher's place of residence. Also, there is a bit of suspicion and resistance on the part of the respondents to the questionnaires especially because the policy is still in its infancy.

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