

SUSTAINABLE CONSUMPTION PATTERNS, NON-BIODEGRADABLE WASTES REDUCTION AND ENVIRONMENTAL PROTECTION IN KWARA STATE, NIGERIA

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Abstract— Poor consumption patterns aided by the need for packaging and storage of goods have contributed to the burden of non-biodegradable wastes. These patterns stand as major sources of toxic pollutants in the environment making environmental preservation highly compromised. In particular, inadequate management of non-biodegradable waste has been an overriding environmental problem in Kwara State, this is growing into an intractable environmental issue, therefore, there is necessity for an effective mitigation strategy. In view of this need, this study aims to promote sustainable consumption patterns to reduce non-biodegradable wastes and achieve environmental preservation in Kwara State. The objectives of the study were to: (i) assess the level of consumers' willingness to adopt sustainable consumption patterns that support environmental protection; (ii) enumerate key strategies for reducing non-biodegradable wastes so as to promote environmental protection; (iii) examine consumers' perception on the best practice in non-biodegradable wastes management; and (iv) investigate the dominant environmental threat to environmental protection framework in Kwara State. This descriptive study adopted a quantitative research design, with a purposive sampling of a hundred and twenty respondents; the descriptive analysis was based on a hundred and nine questionnaires that were retrieved. The findings of the study showed that: (i) the level of consumers' willingness to employ sustainable consumption patterns that support environmental protection was 89%; (ii) the key strategies for reducing non-biodegradable wastes in order to promote environmental protection included 'willingness to turn in used non-biodegradable materials for recycling' (89%), 'support for agencies that extract non-biodegradable materials from the society' (83.5%), 'ban on use of non-biodegradable materials if alternatives are available' (71.6%), and 'choice of re-usable bags over single-use nylon bags' (69.1%); (iii) the consumers' perception on the best practice in non-biodegradable wastes management was 'recycling' (80.7%); and (iv) the dominant environmental threat to environmental protection framework in Kwara State was 'solid waste pollution' (68.8%). The study concluded that consumer receptivity to

sustainable consumption patterns was high; extraction and ban were among key strategies for non-biodegradable wastes reduction; recycling was considered as the best practice in non-biodegradable wastes management; and solid waste pollution stood as the leading environmental hazard in Kwara State. The study recommends that government functionaries, non-governmental agencies, and relevant environmental protection stakeholders should provide current knowledge on sustainable consumption practices; ensure non-biodegradable wastes reduction framework is all-inclusive; make recycling process of non-biodegradable wastes operative; and completely eradicate solid waste pollution in Kwara State.

Keywords— *Consumption Patterns, Environmental Threat, Non-Biodegradable Wastes, Reduction Strategies.*

I. INTRODUCTION

Sustainable consumption pattern is a subset of the bigger framework of sustainable development which began to grow as far back as the twentieth century. [1] identified the US Congress of the National Environmental Policy Act (NEPA) of 1969; World Conservation Strategy of 1980; and Rio Earth Summit and Declaration of 1992 as three milestone events that contributed to its evolution. The publication, "Our Common Future", known by many as the Brundtland Report in 1987 by the World Commission on Environment and Development (WCED) was also a reference point for environmental sustainability. The Earth Summit which held in Rio de Janeiro, Brazil, became an outstanding event in the evolution of sustainable development; here, one hundred and seventy-eight countries formulated texts of agreements called Agenda 21 which contained the action plan for developing the planet sustainably in the 21st century. As stated by [2], the Brundtland Report contains two key concepts, these are 'needs' and the

‘limitations’ imposed by the state of technology and the environment’s ability to meet present and future needs.

In 2015, Sustainable Development Goals became a global blueprint for development and it was adopted by all the United Nations member States, with a draft containing seventeen (17) goals for sustainable development in a global partnership. Goal 12 was to achieve ‘Responsible Consumption and Production’ and this was to encourage changes in consumption and production patterns. [3] opined that the current trend in consumption and production include the desire to sustain consumption patterns of the growing global population, which will require large natural resources. There is necessity for global water availability, this is currently challenged by various pollutions, and nature is not able to recycle or purify itself adequately because of the level of pollution; and other exigencies relates to energy use. As observed by [4], unsustainable consumption patterns have led to various environmental problems such as deforestation, flooding, erosion, industrial pollution, rainstorm, bush burning, and solid wastes pollution among others. By early twentieth century, studies showed that the world produced twenty times its production capacity for ten years [1]. These trends improved the living conditions of people by the exploitation of non-renewable resources like the forests, wild life and ground water, but the resultant effects were also visible like bio-diversity loss, production of fossil fuel, global warming, climate change and ozone layer depletion [5, 6]; therefore, the need to adopt sustainable consumption patterns became critical.

Several environmental challenges have emerged over the decades, but, non-biodegradable solid wastes pollution formed a fundamental part of environmental protection concerns in Nigeria. Studies showed that environmental protection threats in Kwara State include erosion, land pollution and degradation, water pollution, and air pollution [7, 8, 9, 10, 11, 12, 13, 14, 15, 16]. The present consumption habits mount huge pressure on the environmental media upon which our continued existence rests. According to [17], the global population is estimated to reach 9.6 billion people by 2050, and if current consumption and production patterns remain unchanged, at least two planets will be required to sustain current lifestyles. [18] argued that global population projection may reach 9.8 billion by 2050 and will require resources from almost three planets. Recent statistics showed that economic and social progress toward sustainable consumption and production for the last century was accompanied by environmental degradation which endangers the same systems on which future development and our survival depends; therefore, for change to occur, there has to be global modifications in resource efficiency, and dynamic involvements in multilateral environmental agreements. If simple changes are observed, there are various aspects of consumption that can significantly improve the society. Governments must be proactively involved in reducing non-biodegradable wastes, advancing circular economic practices, upholding sustainable procurement policies, and enforcing applicable regulations accordingly. To transit into a circular economy, products must be designed for longevity,

repairability, and recyclability; and individuals must be encouraged to adopt more sustainable lifestyles like reducing waste, and choosing a sustainable option when it is required.

II. RELATED WORK

A. *Sustainable Consumption Patterns*

Sustainable consumption and production paradigm aims to achieve more and better with less resources. It also refers to attaining economic growth without environmental degradation, and advancing resource efficiency and sustainable lifestyles. Globally, resource consumption rate has exceeded the planet’s capacity to regenerate itself, while waste pollution has risen. Theoretically, sustainable consumption and production refers to “the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations” [19].

[20] opined that sustainable consumption practices will support good and healthy living for all individuals within Earth’s capacity. But, intensive consumers’ environmental and behavioral disposition towards the use of green alternatives is a key. The European Commission on sustainable consumption, production and industrial action plan pushed for smarter consumption and global market for green products, thereby promoting changes in consumer perceptions. This will invariably bring change in demand for green products and reduce environmental degradation. It is important to know how consumers perceive change while deciding on green product purchase because they are often influenced by the level of information access they have. Some consumers in Korea were inclined to buy green products due to its energy saving, recycling, and other eco-friendly attributes. Transiting to sustainable development can be fostered by active change in business strategy for environment-friendly products and services with low detrimental impact on the environment, coupled with change in consumers’ mindset on sustainable consumption practices.

[21] observed that the need for sustainable consumption and production originally featured on the international agenda of United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, where the major cause of environmental deterioration was seen as unsustainable pattern of consumption and production. A definition was proposed for sustainable consumption at the Oslo symposium, which describes it as services and products for basic needs that bring better quality of life, and minimize the use of natural resources and toxic materials in addition to the emissions of waste and pollutants over the life cycle of the service or product, without risking the needs of future generations. In 2002, sustainable consumption and production was of note in the Johannesburg plan of implementation as one of the outcomes of the World Summit on sustainable development. It emphasized the development of a framework of programs that support regional and national initiatives for the shift. Also, in 2015, sustainable consumption and production

was one of the core components of the 2030 Agenda for sustainable development. Thus, the twelfth goal of the agenda was to ensure sustainable consumption and production patterns. From a production perspective, sustainable consumption and production refers to a set of clean production practices and growing resource efficiency, enabled by innovation and technological adjustment. On the consumption part, it involves change in consumption patterns of households and governments through variations in lifestyles, consumer behavior and choices, and procurement strategies for the public sector.

As stated by [22], consumption and production patterns drive the global economy, but they also wreak havoc on the planetary bodies through the unsustainable ways natural resources are extracted. Global reliance on natural resources has deepened over the last two decades, the material footprint grew from 73.2 billion metric tons in 2010 to 85.9 billion metric tons in 2017. This is a 17.4 percent rise, with higher demand for non-metallic minerals (about half of global footprint), due to growth in infrastructure and construction; and in 2015, it was over ten times larger for high-income countries than low-income countries.

B. Conceptualizing Biodegradable and Non-biodegradable Wastes

Defining 'biodegradable and non-biodegradable wastes' starts with knowing what a waste is. Waste as a concept refers to discarded material that has no value for ordinary use; it means any substance that is unwanted or unusable is regarded as waste. [23]. [24] also defined waste as any excess or unwanted substance arising from the application of a process. Different wastes are being generated all over the world such as municipal, industrial and agricultural solid waste, and biomass deposits; these have been associated with large scale pollution of land and water. Most of the wastes are dumped in landfills and incineration sites, but the impact of this choice is significant because greenhouse gases (methane, carbon dioxide) are being emitted. Wastes can also be classified into solid, liquid, gaseous, and radioactive wastes [25]. Solid wastes can be either biodegradable or non-biodegradable based on their responses to the decomposing action of organisms [26]. Both biodegradable and non-biodegradable wastes have harmful effects on human life, other organisms and the environment that host them. Hence, the need to separate biodegradable wastes from non-biodegradable wastes is also necessary.

Biodegradable wastes are wastes that originates from plant or animal sources, and can be degraded by other living organisms; on the other hand, a non-biodegradable waste is a kind of substance that cannot be broken down by natural organisms and acts as a source of pollution [26]. There is a shocking revelation on how long these materials stay in the environment before they decompose: "Glass Bottle - 1 million years; Monofilament Fishing Line - 600 years; Plastic Beverage Bottles - 450 years; Disposable Diapers - 450 years; Aluminum Can - 80 to 200 years; Foamed Plastic Buoy - 80 years; Foamed Plastic Cups - 50 years; Rubber Boot Sole - 50 to 80 years; Tin Cans - 50 years; Leather - 50 years; Nylon Fabric - 30 to 40 years; Plastic Bag - 10 to 20 years; Cigarette Butt - 1 to 5 years;

Wool Sock - 1 to 5 years; Plywood - 1 to 3 years; Waxed Milk Carton - 3 months; Apple Core - 2 months; Newspaper - 6 weeks; Orange or Banana Peel - 2 to 5 weeks; and Paper Towel - 2 to 4 weeks" [27].

[28] in a study on the Thane Creek in Mumbai, India, found that non-biodegradable wastes consist majorly of plastics, glass, and synthetic rubber; common examples included milk and oil bags, footwear, automobile tires, plastic bottles, polyester, and electric bulbs. [29] reported that non-biodegradable products, especially plastics, are preferred by most industries for packaging because they seem durable. Biodegradable wastes include vegetables and fruit peels, fallen leaves and plant parts, animal wastes, household refuse (like paper) and food waste [30]; these can be degraded or broken down to release nutrients such as nitrogen and phosphorus into the soil so that the plants re-utilize them for growth. Anaerobic decomposition of these materials can lead to the production of methane (a biogas) which can serve as an alternative source of energy.

Waste reduction is critical, but current waste management strategies must be improved. Recycling is a common option; according to [31], recycling is the separation of specific materials from other wastes, to re-use or manufacture new products from them. After a conscious effort to separate a recyclable waste, it should be taken to a recycling center provided by the government. The non-recyclable wastes can be further treated or processed by the waste management agencies before discarding them into the environment; this process is also described by [23] as segregation. The non-recyclable wastes are classified into combustibles and non-combustible [25]. The combustibles can be subjected to eco-friendly incineration, whereby the effluents produced from the incineration process is converted into energy or fuel that can power some other processes [23].

The non-combustible waste can be disposed of through landfills. Landfills are technically designed to hold and decompose waste; anaerobic decomposition (in the absence of oxygen) occurs, leading to the production of methane and other biogases [25]. These gases serve as excellent alternatives to fossil fuels; although, they can cause ozone layer depletion if they are released into the atmosphere due to their greenhouse gas content. Hence, the construction of the landfill should contain a storage space for the gases, from which they can be harnessed as a source of energy and power. As stated by [23], increase in population and industrialization has led to a subsequent increase in waste production, besides the increased demand for non-biodegradable materials for transient uses. Unfortunately, waste management technologies have not advanced enough to match up with this need in many places. The implication of this is the accumulation of wastes, to the detriment of Man and his environment [24].

Adverse effects of non-recyclable wastes on the environment include the presence of toxic compounds like bisphenol A, and phthalates. These toxic substances interfere with the human endocrine system, and cause several diseases and failures in some body organs such as the heart, liver and kidneys [29]. Improper management and disposal of wastes

have led to environmental pollution, characterized by accumulation of wastes, and production of unpleasant odor, which renders the air unfit for inhalation. Certain pathogenic organisms are attached to droplets and dust causing serious health problems when inhaled by a susceptible host [30]. Accumulated wastes breed sites for insect vectors and pests; and transmit various diseases into the atmosphere [31]. Surface runoff and strong winds sometimes disperse wastes into bodies of water, and renders the water unsafe for consumption [23]. Improper management of wastes makes more space to be taken by open dump sites, thereby reducing agricultural land [32]. Some wastes leach into the soil with toxic effects on plants. The pollution of water by these wastes reduces its portability for livestock, and plant watering; and reduces the aesthetic value of the environment [24].

Recently, studies showed that non-biodegradable wastes contain more of plastics. [33] opined that even though, industrial production of plastics brought additional ease to human life; the annual production rates of plastic in 1964 was only 15 million metric tons, but by 2018, approximately 8660 million metric tons of virgin plastic were produced globally surpassing the earlier tolls, and it led to massive garbage. In 2015, estimated plastic wastes was up to 6300 million metric tons worldwide, and only 9% of them were recycled, 12% of the wastes were incinerated, and 79% of them were dumped in landfills or natural environments. Campaign for recovery of plastic wastes started in Europe, from 2006 to 2018, they reduced 44% of their landfilling, and increased the energy recovery and recycling practices for waste plastics by over 77%. In 2018, around 29.1 million metric tons of plastic wastes were retrieved from thirty European countries, 32.5% of them was recycled, 42.6% was used for energy recovery, while 24.9% was landfilled, leading to increased plastic pollution.

Dumped plastics may not be degraded for as long as a hundred or a thousand years [33, 34]; and if it breaks down, it forms fragmented micro and nanoparticles that affect human health. There have been policies banning single use plastics since 1991, and scientific investigations have led to the discovery of substitutes for the traditional plastics, known as “bioplastic”. This is made from bio-based or fossil-based materials, and some of them can be non-biodegradable. Currently, almost half of the available bio-based plastics are non-biodegradable [33].

According to [35], the popularity of bioplastics grew initially based on the assumption that bioplastics are hundred per cent biodegradable, compostable and environment-friendly, but, recent studies argued that these bioplastics are not biodegradable and threatens the environment the same way traditional plastics do. [33] noted that bioplastic wastes should be degraded at a particular temperature and pressure, separated from the waste stream, and moved to a suitable composting facility. However, most of the consumers are unaware of this requirement, and compostable bioplastic waste eventually end up in landfills with other plastics. More than eight million tons of plastics are dumped into the ocean yearly, a measure equaling one garbage truck per minute, thus, further existence of the marine ecosystems is uncertain. [36] opined that non-

biodegradable wastes like plastics poses huge risk to the environment due to their rigidity and long-lasting properties, and when dumped in landfill, further damage is done to future land resources.

C. *Environmental Protection*

Basically, the environment refers to land, water, flora, fauna, living creatures, forests, and all living things on earth. Environment is the totality of all extrinsic, physical and biotic factors affecting lives and behavior of all things. It could be physical; social and cultural; and psychological in characteristics. The physical environment describes the geographical climate and weather or the natural conditions of an individual. The social environment refers to an individual’s social, economic and political condition of existence. The psychological environment suggests conditions that surround an individual that are peculiar to them and determine how they relate with other forms of environment. In terms of the structure of the environment, we have physical or biological. Physical environment is classified into lithosphere (solid earth); hydrosphere (water component); and atmosphere (air or gas); while biological environment consists of plants, and animals [37].

Environmental preservation is used simultaneously with environmental protection. [38] described environmental protection as any activity that helps to maintain or restore the quality of environmental media through prevention of emission of pollutants or reducing the presence of polluting substances in environmental media. This can include changes in characteristics of goods and services; changes in consumption patterns; changes in production techniques; treatment or disposal of residuals in separate environmental protection facilities; recycling, and prevention of degradation of the landscape and ecosystems. According to [39], it is important to safe guard key elements of our environment to promote healthy living. It is desirable to have access to clean air, wholesome drinking water, and an environment devoid of harmful effects of waste and noise as the case may apply.

[40] revealed that environmental protection is a core development target in various places, some people are investing in green technologies; generating power from wind and solar sources; and achieving social inclusiveness and sustainable economic growth. [11] showed that in Nigeria, the need to protect the environment became paramount after an Italian firm dumped unwanted wastes into a locality in Koko village, Edo State in 1987. The action served as a huge environmental pollution and prompted the government to enact laws that placed restrictions on such activities in 1988. Before 1988, there were basic laws that governed environmental protection such as River Basin Development Act, and Endangered Species Act. Environmental laws became more established after the Koko village incident; and this led to the formation of a national policy on the environment. The Federal Environmental Protection Agency (FEPA) was created in 1988 to administer and enforce the environmental law. Environmental Impact Assessment (EIA) Act was also promulgated in 1992; Federal Ministry of Environment (FME) absorbed and acquired FEPA functions in 1999, making the environmental impact

assessment of public or private projects to directly be overseen by the FME, the project owners are to prepare EIA reports that present the potential negative impact of the activity on the environment and the plans to prevent or mitigate it, and the reports are to be approved by FME before the project can commence. The National Environmental Standards and Regulation Enforcement Agency (NESREA) Act of 2007 was instituted after the Federal Environmental Protection Agency (FEPA) Act of 1988, this is administered by Federal Ministry of Environment.

One of the strategies for achieving environmental protection is environmental awareness; [8] opined that environmental awareness is the fusion of people's conception, interpretation and perceptions of environmental matters which impact their behavior and the quality of responses and reactions to environmental issues; techniques for effective public awareness include legislation, training, drama, discussion, jingles, print and electronic media, visual display, and public campaign.

[41] revealed that environmental laws in Nigeria consists of 'environmental legislation' which consists of a single law that embodies a comprehensive system of laws that are needed for environmental management, these include Harmful Waste Act 1988, cap 165, LFN 1990; Federal Environmental Protection Agency (FEPA) Act 1988, cap 131, LFN 1990; Environmental Impact Assessment (EIA) Act 1992; secondly, there is 'sectorial legislation' which addresses specific areas of human activities that affect the environment such as Mineral Act 1956, Petroleum Act 1969; and thirdly, there is 'incidental legislation', this contains elements of environmental concerns such as Public Health Act 1917. There are six areas of guidelines and standards for the implementation of the Nigerian Environmental Policy, these are effluents limitations; water quality for industrial water uses at the point of intake; industrial emission limitations; noise exposure limitations; management of solid and hazardous wastes; and pollution abatement in industries.

Kwara State Environmental Protection Law was enacted in 1992, it created the Kwara State Environment Protection Agency (KWEPA) which was saddled with the responsibilities of promoting safe and healthy environment for the people; ensure sustainable development; educate the public on refuse/sewage disposal methods that are State accredited. At the local government level, committees on environmental protection were established to maintain good environmental quality in all the domains. In 2004, the Environmental Sanitation Law was enacted to promote sanitary conditions in the State. This law mandated the regular cleaning of all premises, and proper waste management [11].

In recent times, environmental protection has been greatly impacted by unsustainable production patterns. [42] argued that sustainable production patterns should be given greater consideration over economic concerns because green technologies will support sustainable production. Carbon emissions trading has also featured as an economic means to solve climate issues related to market in some nations. The core objective here is to set target for carbon emission reduction

annually based on the environmental capacity; allocate and sell the allowances to enterprises. The participation of the media in regulating enterprises' environmental behavior encourages enterprises to adopt a positive attitude towards environmental issues. The corporate approach to environmental protection is essential to make environmental protection a social investment.

Demographic and industrial development is also increasing warming of the planet's atmosphere, thereby unbalancing and endangering its inhabitants [17]. [43] observed that environmental protection is often perceived as a conflicting factor for individual freedom and economic growth; and that proponents of environmental sustainability argued that the environment must be seen as a global resource that must be preserved for future generations, irrespective of individual freedom or economic growth; and there should be a regulation of personal behavior and economic activities to achieve environmental protection.

III. METHODOLOGY

This descriptive study adopted a quantitative research design, with a purposive sampling of a hundred and twenty respondents. Primary and secondary data were utilized for the study; the primary data were sourced from structured questionnaire, and the secondary data were from journals, newspapers, and online research papers. The study population consists of Ilorin metropolis (Ilorin South, Ilorin West and Ilorin East) residents with a total number of 781,934 based on the official 2006 national population census [44]. The questionnaire was structured into a section on demographic characteristics, and four sections containing the research questions. Dichotomous questions with two response options of "Yes" and "No" were employed in the study for a clear distinction of qualities, experiences, and opinions. The validity of the instruments for data collection was determined through content validation involving critical evaluation by the researchers; a small sample containing twenty items were administered to randomly selected respondents to test the instrument's reliability. Descriptive statistic was used for the analysis, involving the use of frequencies, percentages, and charts. The ethical considerations included a need to keep confidentiality of the information supplied.

IV. RESULTS AND ANALYSIS

A. Demographic Characteristics of the Respondents.

The demographic characteristics of the respondents showed that 33.9% of them were males, while 66.1% of them were females; their age distribution consists of 6-12 years (1.8%), 13-19 years (34.9%), 20-29 years (56.9%), 30-39 years (3.7%) and 40-49 years (2.7%); their educational level was categorized into primary (1.8%), secondary (22.9%) and tertiary (75.3%); and their marital status were grouped into married (7.3%) and single (92.7%), Table 1 shows the details.

Table 1: Distribution based on Demographic Characteristics of the Respondents

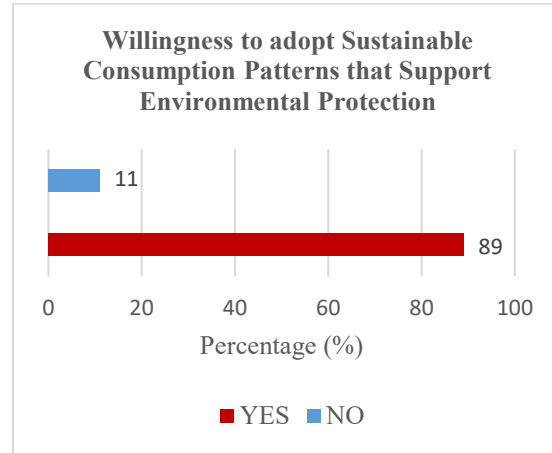
Variable	Categories	Frequency	Percentage (%)
Sex	Male	37	33.9
	Female	72	66.1
Age group (years)	6-12	2	1.8
	13-19	38	34.9
	20-29	62	56.9
	30-39	4	3.7
	40-49	3	2.7
Education	Primary	2	1.8
	Secondary	25	22.9
	Tertiary	82	75.3
Marital Status	Single	101	92.7
	Married	8	7.3
Total		109	100.0

Source: Researchers' Field Survey, 2023.

B. Level of Consumers' Willingness to Adopt Sustainable Consumption Patterns that Support Environmental Protection in Kwara State.

The level of consumers' willingness in adopting sustainable consumption patterns that can support environmental protection in Kwara State was at 89%, while 11% of the respondents declined interest in the employment of new consumption patterns, figure 1 shows the details. This finding is consistent with [20] who revealed that good consumers' environmental behaviour towards consumption of green alternatives is a key to achieving change of patterns; and [21] argued that consumer behavior and choices are required before any meaningful change can take place.

Figure 1: Distribution based on Level of Consumers' Willingness to adopt Sustainable Consumption Patterns that Support Environmental Protection in Kwara State



Source: Researchers' Field Survey, 2023.

C. Key Strategies for Reducing Non-Biodegradable Wastes to Promote Environmental Protection in Kwara State.

The study showed that there are various key strategies for reducing non-biodegradable wastes and promote environmental protection in Kwara State, these are arranged in the order of preference, namely: willingness to turn in used non-biodegradable materials for recycling (89%), support for agencies that extract non-biodegradable materials from the society (83.5%), ban on use of non-biodegradable materials if alternatives are available (71.6%), choice of re-usable bags over single-use nylon bags (69.1%), buy reusable containers (61.5%), recycle old batteries (60%), wear clothes made from natural sources (58.2), reduce demand for single-use plastics or go for reusable bottles and cups (47.3%), give up non-biodegradable chewing gum (45.5%), further production of non-biodegradable materials for single use (33.9%), say "no straw, please" when it is non-biodegradable 33 (30%), and skip non-biodegradable plastic bottle water or drink (24.5%), the details are presented in Table 2. Finding effective strategies for reducing non-biodegradable wastes is necessary for environmental preservation. [4] revealed that strategies are important to forestall environmental problems that are created by unsustainable consumption patterns; [42] argued that effective green strategies should be given higher consideration so as to support the environment; while [18], showed that poor consumption and production patterns cause havoc to environmental media, and so adequate strategies are core development needs.

Table 2: Distribution based on Key Strategies for Reducing Non-Biodegradable Wastes to Promote Environmental Protection in Kwara State

Key Strategies for Reducing Non-Biodegradable Wastes to Promote Environmental Protection				
S/ N	Variable	Response	Frequency	Percentage (%)
1	Willingness to turn in used non-biodegradable materials for recycling	Yes	97	89.0
		No	12	11.0
2	Support for agencies that extract nonbiodegradable materials from the society	Yes	91	83.5
		No	18	16.5
3	Ban on use of non-biodegradable materials if alternatives are available	Yes	78	71.6
		No	31	28.4
4	Choice of re-usable bags over single-use nylon bags	Yes	76	69.1
		No	33	31.9
5	Buy reusable containers	Yes	67	61.5
		No	33	38.5
6	Recycle old batteries	Yes	66	60.0
		No	42	40.0
7	Wear clothes made from natural sources	Yes	64	58.2
		No	45	41.8
8	Reduce demand for single-use plastics or go for reusable bottles and cups	Yes	52	47.3
		No	57	52.7
9	Give up non-biodegradable chewing gum	Yes	50	45.5
		No	49	54.5
10	Further production of non-biodegradable materials for single use	Yes	37	33.9
		No	72	66.1
11	Say “no straw, please” when it is nonbiodegradable	Yes	33	30.0
		No	76	70.0
12	Skip non-biodegradable plastic bottle water or drink	Yes	27	24.5
		No	82	75.5
		Total	109	100.0

Source: Researchers’ Field Survey, 2023.

D. Consumers’ Perception on the Best Practice in Non-Biodegradable Wastes Management in Kwara State

The consumers perception on the best practice in non-biodegradable wastes management in Kwara State is ‘recycling’, this had a high percentage of 80.7%; 10.1% of the respondents chose ‘incineration/landfill’ as a major plan; and 9.2% of the respondents selected ‘re-use’ as the best option, Table 3 shows the details. From the findings, recycling is the most appropriate practice in delimiting the spread of non-biodegradable wastes. This is consistent with [33] that showed that one of the effective ways that plastic wastes can be managed is through recycling; [31] also noted that recycling is the most common option for managing non-biodegradable wastes, while re-use is another alternative. All the studies mentioned above discouraged ‘landfill’ or ‘incineration’ as a waste management principle that must be avoided because of its detrimental impact on the environment.

Table 3: Distribution Based on Consumers’ Perception on the Best Practice in Non-biodegradable Wastes Management in Kwara State

Best Practice in Non-Biodegradable Wastes Management			
Variable	Response	Frequency	Percentage (%)
Recycle	Yes	88	80.7
	No	21	19.3
Incineration/ Landfill	Yes	11	10.1
	No	98	89.9
Re-use	Yes	10	9.2
	No	99	91.8
Total		109	100.0

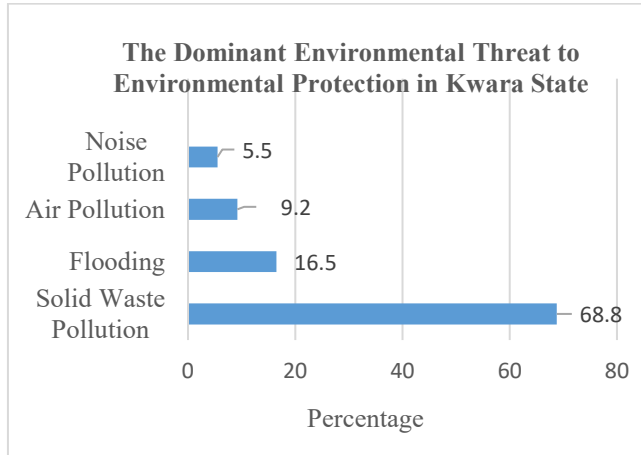
Source: Researchers’ Field Survey, 2023.

E. The Dominant Environmental Threat to Environmental Protection Framework in Kwara State

The findings showed that the dominant environmental threat to environmental protection in Kwara State is ‘solid waste pollution’, 68.8% of the respondents agreed to this assertion; contrarily, 16.5% of them pointed to ‘flooding’ as a dominant environmental issue in the State; while 9.2% of them identified ‘air pollution’ as a core problem for the environment in the State; and 5.5% of them picked ‘noise pollution’. As stated above and presented in Figure 2, ‘solid waste pollution’ dominantly stood out in the list of environmental problems in the State; the findings are consistent with those of previous

studies, they showed that unsustainable consumption patterns has provoked several environmental problems such as flooding, industrial pollution, and solid waste problem [4] land pollution and degradation, water pollution, air pollution [7, 8, 9, 10, 11, 12, 13, 14, 15].

Figure 2: Distribution based on the Dominant Environmental Threat to Environmental Protection Framework in Kwara State



Source: Researchers' Field Survey, 2023.

V. CONCLUSION AND RECOMMENDATIONS

The following conclusions were derived from the study: consumer receptivity to sustainable consumption patterns was high at 89%; key strategies for non-biodegradable wastes reduction comprised of 'willingness to turn in 'used non-biodegradable materials for recycling' (89%), 'support for agencies that extract non-biodegradable materials from the society' (83.5%), 'ban on use of non-biodegradable materials if alternatives are available' (71.6%), 'choice of re-usable bags over single-use nylon bags' (69.1%), 'buy reusable containers' (61.5%), 'recycle old batteries' (60%), 'wear clothes made from natural sources' (58.2), 'reduce demand for single-use plastics or go for reusable bottles and cups' (47.3%), 'give up non-biodegradable chewing gum' (45.5%), 'further production of non-biodegradable materials for single use' (33.9%), 'say "no straw, please" when it is non-biodegradable' 33 (30%), and 'skip non-biodegradable plastic bottle water or drink' (24.5%); the best practice in non-biodegradable wastes management was recycling at 80.7%; and solid waste pollution featured as the leading environmental hazard in Kwara State.

The study recommends that government functionaries, non-governmental agencies, and relevant environmental protection stakeholders should provide current knowledge on sustainable consumption practices; ensure non-biodegradable wastes reduction framework is all-inclusive; make recycling process of non-biodegradable wastes operative; and holistically eradicate solid waste pollution in Kwara State.

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