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Effectiveness of the Implementation of Plastic Bags Ban: Empirical Evidence from Kenya

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Abstract
Purpose *– The purpose of this paper is to assess the effectiveness of the implementation of plastic bags ban in Nakuru town, Kenya.*
Design/methodology/approach *–Descriptive cross-sectional research design was adopted for the study. The target population comprised of 500 traders in Nakuru retail market located in Central Business District. Stratified sampling techniques were used to pick a sample size of 167 respondents. Three data gathering tools namely a questionnaire, an interview guide and an observation schedule were used. The reliability of the instruments was computed by using Cronbach-Alpha reliability coefficient. A reliability coefficient of 0.883 was produce which was above the recommended threshold of 0.7 and thus the instruments were deemed reliable. Collected data was analyzed both quantitatively and qualitatively by usage of frequency counts, means, percentages and thematically.*
Findings *– The findings of the study established that despites the strides made to ban plastic bags, there are a number of challenges mitigating against effective implementation. The key challenge being the existence of porous borders which has seen smuggling of the banned plastic in to the country.*
Originality/value *–The study uses data from Kenya, a developing country contrary to previous studies done from developed countries to assess the effectiveness of the implementation of plastic bags ban. The findings of this study, adds to the growing body of evidence that suggests that evidence from western countriesare not fully applicable to developing countries like Kenya due to differences in context as well as the broader cultural differences. Hence it is imperative for regulators in Kenya to develop a viable regulatory framework according to the findings reported in this study, so that they can take enforceable actions to mitigate the potential consequences arising from plastic consumption and plastic waste disposal.*
Keywords: *plastics,* ***environmental****degradation*, non-biodegradable,*waste management*

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I. Introduction

There are immense advantages of plastic bags. Plastics have become an ever-present substance of current society due to its major characteristics of being affordable and lightweight. Its utilization has amplified tens of folds within the last century and still expected to increase towards the next two decades. In the present day, nearly everyone comes into contact with plastics (Plastic bags Economy, 2017). They have many benefits that have made it the material of choice for many applications over the years. The last item within the packaging mix is the plastic bags. Consumers and traders have relied on plastic bags because of the fact that; they are handy, strong, cheap, lightweight, and a healthy means of transporting food and goods (UNEP, 2004). Due to fabrication of desired shape, colour and specification convenient to customers, plastic bags have over the years replaced paper bags, thusholding a solid position in the shoppers' today's economy.Plastic bags Economy report (2017) notes that it is almost impossible to image a world without plastics because it has over the years served as a key enabler across various sectors of the economy in packaging, construction, transportation, healthcare and electronics among others. As a result of its versatility, durability and affordability, the economy has reaped enormous benefits from the continued production and consumption of plastics.

According to USEPA (2008), plastics are polymers that are molecular chains made up of a network of molecular monomers linked together to form macromolecules. Plastic bags which are very popularly used by the people for shopping purposes because of its durability, ease, cheapness and convenience of use but their very hazardous negative impact is never highlighted. It has posed a serious threat to the environment and consumer's health in many direct and indirect ways. Exposure to harmful chemicals during manufacturing, leaching in the stored food items while using plastic packages or chewing of plastic and toys by children are linked with severe adverse health outcomes such as cancers, birth defects, impaired immunity, endocrine disruption, developmental and reproductive effects etc. Further, plastic bags take up to thousands of years to decompose, contaminating

soil and water, and posing significant ingestion, choking and entanglement hazards to take up to thousands of years to decompose, contaminating soil and water, and posing significant ingestion, choking and entanglement hazards to wildlifeon land and in the ocean on land and in the ocean (UNEP, 2018).

For Clapp & Swanston, (2009),there has been a paradigm shift in the international standards linked with the utilization and discarding of plastic bags over the past decade because of the environmental hazard it poses that have threatened both animal well-being and human well-being, instead of like a caring up-to-date convenience. As of 2015, approximately 6300 Mt of plastic waste had been generated, around 9% of which had been recycled, 12% was incinerated, and 79% was accumulated in landfills or the natural environment. If current production and waste management trends continue, roughly 12,000 Mt of plastic waste will be in landfills or in the natural environment by 2050 (Geyer, Jambeck& Law, 2017). Consequently, many nations either prohibit or have a restriction on the selling or using of disposable plastic bags(Clapp & Swanston, 2009).In Ireland for instance, in the 1990s, plastic waste accounted for 5% of the total waste stream and had become a menace by littering towns, the countryside and the coastline. In an attempt to trigger consumer behavior change in the consumption of plastic bags, the government introduced a tax on plastic bags known as PlasTax in 2002. It was hoped that this would encourage the use of reusable shopping bags (O'Neill, 2016).

Retailers and environmental protection organizations signed an agreement with the Austrian government in 2016 committing to reduce the usage of plastic bags. In 2017, large supermarket chains stopped giving free plastic bags to its customers. It became mandatory for customers to have their own reusable shopping bags and if they did not bring their own shopping bags, then they could only purchase reusable ones at the checkout counters (Northern Territory, Australia 2017).

Alarmed by the improper disposal of plastic bags which led to clogged drainage systems, the Rwandan government launched research study in 2004, which established that aesthetical pollution, contamination of water sources, killing fish and threatening agricultural production was linked to plastic bags litter. This led to the government in 2008 outlawing manufacturing, distribution, importation and usage of all plastic bags which were replaced with paper bags and cotton-made reusable bags (Fullerton, 2014). By 1990s, plastic bags menace had become widespread in South Africa. This necessitated the state banning the use ofsingle-use plastic bags in 2003. The ban was soon followed by a nominal levy of ZAR 0.04 to all plastic bags' producers (Hasson, Anthony & Martine 2007).

1.1. The Kenyan Context

In 2017, supermarkets in Kenya used about 100 million plastic bags annually. Given that waste management systems in Kenya are inadequate, manufacturing and using plastic bagsimpacts negatively on the environment, wildlife and human health (Kiprop, 2017). In the capital city Nairobi, plastic waste is accounting for a substantial percentage of litterin the stream. Flimsy plastic bags are associated with the rise of the "flying toilets" common among slum neighborhoods. As a result, the public has raised alarm at large, environmentalists (including the country's 2004 Nobel peace laureate) and the government (Kiprop, 2017). This prompted the government to introduce a sanction about producing, distributing, importation or usage of plastic carrier bags in February 2017. The introduction of this ban was the third time attempt by the government having previously failed to implement the ban in the past decade. The current law banning plastic bags in Kenya is the most severe in the world as offenders are slapped with heavy fines or four-year jail terms (Kuo, 2017). Consequently, supermarket outlets are making available re-usable cotton-made bags to retailers as alternative shopping bags thereby making Kenyans cope to life less of plastic bags (Kuo, 2017).

The implementation of plastic bags ban in Kenya has not been without resistance. Previous attempts to ban plastic bags were selective, targeting to regulate light weight carrier bags with thickness of less than 30 microns, which made monitoring of compliance near impossible (Kuo, 2017). In 2005, Kenya developed a strategy that saw plastics under 30 microns thickness being outlawed. However due to lack of political will and support, this strategy never got to be implemented and it collapsed almost immediately. Two years later, in 2007, in an attempt to protect the environment from degradation, the treasury imposed a 120% levy on plastic bags. This was however met with stiff protests from traders who complained that the 120% tax would make the plastic bags too costly. This forced the parliamentary ad hoc committee on trade and finance to abandon this move all together. During the year2011, Kenya Bureau of Standards together with National Environment Management Authority and tried to ban plastic use of below 60 microns but this again hit a dead end. In a renewed attempt to ban use of plastic bags in Kenya, the cabinet secretary in charge of environment spearheaded the implementation of the ban in 2017. Despite vehement opposition from the Kenya Association of Manufacturers who made a petition to block this implementation, the high court upheld the ban. Kenya's ban on plastic bags hinges on the 2010 constitution that assures every citizen the right of having a healthy, clean environment. It also buttresses the country's commitment to a green economy as envisaged in the Green Economy Strategy and Implementation Plan 2016-2030.

Study by ROSA, (2007) states that Nakuru is among the largest town in Kenya at fourth position after Nairobi, Mombasa and Kisumu and it is approximately 160km North West of Nairobi City. The town has a coverage of an area of 290km^2 of which Lake Nakuru National Park occupying 188km^2. Nakuru Town produces approximately 513 tonnes of solid waste per day equivalent to 187,469 tonnes a year according to a study done by World Bank in 2017. About 80% of the waste comprise of degradable substance materials including organic food, textiles and assorted paper forms from residential households. Accordingly, non-biodegradable solid waste accounts for 20% comprising of assorted forms of metals, plastics, hazardous and combustible substances generated within industrial zones (Ombis, 2017).Approximately a collection of 45% of the waste is disposed at Gioto dumpsite. The remaining 55% is either recycled or left unattended. The top five material wastes generated comprise of organic (46%), fine from sorting 21%, plastic 13%, cardboards (4%) and paper 3% (NEMA, 2015).

Giotto dumpsite is located in Nakuru Town, London Estate about 3 km west of the central business district on Ravine Road and adjacent to Gilanis warehouse. It was established in 1972 to help with the discarding of collected waste from the town. The name Giotto is a kikuyu word meaning "a place with underground heat". It is the major dumpsite to both domestic, agricultural, hospital and electronic wastes (Ombis, 2017). Studies done on the site (Ombis, 2017; NEMA, 2015; KAM, 2010) reveal high concentration of heavy metals in soil sample. This shows how hazardous the site might be to the health of persons and the surrounding environment all together. Due to uncontrolled littering, waste management is growing to be a major fear to both public health and environment in urban areas and especially in Nakuru Town. The dilemma is that poorly managed dumpsite and wrong approaches to solid waste disposal results to blockage of drainage and sewer lines causing floods and spillage of raw sewage, blights, creating serious hazards to public health, pollution of air and water resource, accident hazards, increase in rodent and insect vectors and a cause of greenhouse gases that lead to global warming. Gioto dumpsite has become over crowded due to overuse; the garbage has spilt to the roadside causing major discomfort to motorists and posing a health hazard to residents. Bad smell and emissions are becoming one of the health hazards to the public especially the residents of the area. During the rainy seasons, run off contaminated with leachate finds its way to the water sources around Nakuru including the famous home of flamingos i.e. Lake Nakuru and the rivers that bring water into the lake. It is against this background that in 2017, NEMA, in conjunction with the Kenyan Government imposed a ban on plastic paper bags in order to salvage the environment from the pollution menace caused by the bags. The ban has come with lots of implications ranging from loss of employment and source of livelihood to some households. The effectiveness of the implementation of the ban on plastic bags therefore needs to be assessed.

II. Review of Literature

Recent publications (de Barros, *et.al*, 2020; UNEP, 2018;Plastic bags Economy, 2017; Geyer, Jambeck& Law, 2017) have provided valuable insights into the magnitude and extent of the global plastic bags problems. As a result, there is a policy shift around the world regarding use of the plastic bags. This shift is aimed at addressing associated problems of waste accumulation. A remarkable number of nations and local governments have developed and operationalized policies that intends to curb and reduce Styrofoam and plastic bags. African continent stands out as having the most nations with implementation of total ban on production and usage of plastic bags. More than half of the African countries have implemented plastic bags ban between 2014 and 2017 (UNEP, 2018).

In the Asian continent control of manufacturing plastic bags in a number of nations is through levies. However, despite these attempts, the poor enforcement methods have often contributed to continued wide use and mismanaged single-use plastic bags (Colbert, 2016). In Europe, response to European Union (EU) directive to achieve a sustained reduction in plastic bags used per person by 2025, countries such as Italy and France have opted for bans while Austria have chosen agreements with private sector (EU 2015). Currently, to reduce unwanted single-use plastic waste over packing, European Commission is working on a strategic plastic economy plan 2018-2030. As a result, lightweight plastic bags are banned in most states of Austria (EU 2015). Central and Southern American countries including Haiti and Costa Rica have put in place regulated guidelines on plastic bags usage both at national and sub-national levels. These countries in particular Costa Rica targets becoming the first world nation to eliminate single-use plastics by 2021 (European Commission, Directorate General for Environment, 2015). Most cities and states in North America have introduced guidelines regarding plastic bags ban. For example, in the New York City, control measures to curb single-use Styrofoam products has been put in place (European Union 2015).

It is undeniable that accumulation of plastic waste negatively impacts on the environment. Plastics pile up in landfills, block drainage systems, litter the streets and contaminate oceans, where marine animals end up eating them or get tangled up in them (de Barros, *et.al* 2020). Plastic are the major toxic pollutants of our times. It is made up of non-biodegradable substance that pollutes the air, water and soil **(**Andrady, 2003). Plastic bags are notorious for clogging urban drainage systems. Obstructed drains offer excellent breeding grounds for mosquitoes and other insects. Indiscriminate disposal of plastic bags and toxic metal substances such as a

cadmium pigments on the land leach the underground water (Murray& Cowie, 2011). Garbage mixed with discarded plastic bags make waste processing difficult and also cause dumping problems. Landfills with plastic bags means lengthy toxic preservation as the bags take very long duration to break down and degrade naturally(Andrady, 2003).

Accumulated plastic bags on the sea bed cause massive disruption to aquatic ecology. Endangered sea turtles often eat plastic bags because they resemble prey leading to death due to blockage of the intestines(Murray& Cowie, 2011). Moore *et.al* (2008) notes that 56% of endangered green sea turtles washed ashore in Florida had man-made debris in their digestive tracts. It has been estimated that up to 90% of individual seabirds have ingested plastics as they easily mistake them for prey. Ingestion of plastic bags can cause intestinal obstruction, hormonal abnormalities, and reproductive failure (Azzarello & Van Vleet, 1987). Throughout its entire life plastic spawns pollution. It starts at extraction point of fossil fuel and continues throughits energy chains of intensive toxic processes of production (de Barros, *et.al* 2020; Lusher, *et.al.,* 2015). Fossil fuel used to produce most plastics is also a major contributor to climate change. Contamination of food chain up the ladder increases the likelihood of human being ingesting plastics. French and Malaysian scientists recently conducted research that revealed some plastic micro-particles get lodged into tissues of species of fish like mullet and mackerel commonly eaten by humans (Ryan, 2015). Consumption of large quantities of contaminated fish can cause genetic disruption, infertility and poisoning due to toxic chemical and metallic additives such as mercury, lead and bisphenol that are in plastics and then transferred to humans (Moore, Lattin, and Zellers 2011).

1.2. Theoretical and Conceptual Framework

To conceptualize the effectiveness of the implementation of plastic bags ban, the planned behavior theory and the externalities theory is herein discussed to set the theoretical basis of the study.Ajzen's (1985) talked of the theory of planned behavior(TPB) which accounts for volitional behavior developed from the field of social psychology and from the theoryof behaviour reasoning (Fishbein and Ajzen, 1985). The theory explains that specific human behavior can be envisaged through specific antecedents: behavioral intentions, perceived control and behavioral attitudes or behavioral attitudes.This theory is used to make it possible to understand social and psychological indicators of human behavior (Nosek et al., 2010) which also hypothesizes the norms, attitudes and control that what is perceived to have the ability that can create a particular individual's behaviorsand subsequent intentions (Ajzen, 1985). A major component of the TPB is the behavioral intention. The stronger the intentions to carry out the behavior, the higher the person will carry out the behavior. On the other hand, behavior intentions get influenced from the attitude that the individual expects the behavior as an outcome. The person also carries out a subjected assessment for the perils and also the paybacks for the result. Attitudes are the extent by which a person is having a positive or negative assessment of a particular behavior and has demonstrated an effect on behavioral intentions. Ajzen & Fishbein (1980) posits that attitudes are the extents by which an individual is having an assessment which is either positive or negative about a particular behavior which has demonstrated an effect on the behavior intentions. Hines, Hungerford, and Tomera (1987) in their review of 51 studies found out that attitudes toward specific environmental behaviorslike providing reusable bags and ordinance compliance to carrying a bag, had better prediction of behaviors than the general attitudes.Behavioral beliefs and evaluation of the beliefs are the basis to which attitudes are formed and thus can be operationalized to be the beliefs concerned with the rewards as well as the results about the action performance (Ajzen & Fishbein, 1970). Consequently, attitudes are influenced by the results of undertaking the behavior.

Another aspect to the planned behavior theory is the perception behavior control which distinguishes the TPB from that of reasoned action theory(Ajzen, 1985). Perceived behavior control is the perception of an individual's perception on the difficulties in performing behavior of interest that may point out behavioral intent and the actual behavior. Environmental concern, according to Axelrod and Lehman (1993), helps establish the degree of determinants which influence a person's choice towards different environmentally responsible behaviors. The planned behavior theory has been incorporated in many research studies concerning behavior of purchasing green products. In examining the determinants that influence intentions to buy products that environmentally viable,Kalafatis et al, (1999)established that the planned behavior theory was strong in explaining intentions in the two major markets of Greece and the United Kingdom. They also established that the planned behavior theory seemed more relevant to an already established market like United Kingdom which has well and clearly defined behavior patterns. In Taiwan, the question as to whether bringing a bag or buying a plastic bag at hypermarkets, findings established that the major determinant of bringing bag was self-efficacy.Circumstantial factors like whether purchased item were easy to carry, whether the cost of items is more than anticipated, and whether some items such as underwear garments or condoms would cause embarrassment forecast buying of plastic bags (Lam & Chen, 2006). Ajzen (1991) notes that beliefs provide the basis for attitude, subjective standard and behavioral control. Behavioral beliefs are thought to affect behavioral

attitudes; normative beliefs relate to subjected norms while control beliefs are taken to be associated with perceived behavioral control**.** For example, one can be convinced that that the plastic bags ban helps the environment and that it is good practice to help the environment. This composite belief in behavior could then predict positive attitude towards the ban on plastic bags

In explaining the externalities theory Goolsbee, Levitt and Syverson (2013) defined externalities as a positive or negative consequence of an unrelated third party's economic activity. In other words, the consequences for economic activities are unforeseen if a third-party benefit through production or use of goods or of service, which is a positive externality. By contrast, if production or usage of goods or services harms the third party, it is a negative externality. For Baumol and Oates (1988), two conditionsmust be met in order for something to be an externality; (1) an externality is present when the usefulness or production relationships of some individuals include real variables, the values of which are selected by others not having a specific attention to the effects on the welfare of [the individual] and (2)'the maker of the decision, from whose activity has an effect on the utility levels of others joins the production functions and do not get compensation payment for the action an equal amount resulting from the benefits or costs for the rest'. Negative externalities may come in different forms, and pollution is significant, which many governments have to reduce.A lot of externalities that are negative arise from consuming and disposing of plastics materials.Examples of externalities is inclusive of the aesthetic damage formed by landfills whose content is plastic waste, the effect over life in water bodies caused by plastic substances, the emissions from plastic incineration which is hazardous, and also economic challenges caused by difficulties of plastic utilization from recycling. The externalities of environment allied with the production of plastic bags and their disposal that includes carbon dioxide emissions, water pollution, by solid waste is a classic example of tragedy of the commons. Individually, consumers can benefit through using plastic bags since the purchased goods can be carried around with ease and having less burden of carrying re-usable bags around, while the entire population bears production and disposal costs of plastic bags collectively.

Evidence available proposes that a charge/tax can be highly effective on disposable carrier bags. Example is in Ireland where a tax on bags of plastic has been hailed as an exceptional accomplishment. Study conducted by Convery et al (2007) provides that through the charge, it reduced the use of plastic bags by over 90%, it same timeincreased revenue for the Environment Fund by €12-14 million.Economists look at such a tax like a typical instrument that is market-based to internalize environmental pollution costs and thus correct a failure of market that it has, leading to overuse of plastic bags. Consequently, efficiency has a basis from the external pollution costs pricing, which previously was not included in the consumers' aim in using disposable bags. The findings suggest that economic theory is well supported by market-based instruments (Tietenberg et al. 1999). The economic theory posits that the used bags number will be kept low up to the extent that marginal benefits for internalization equals to marginal costs of reduction (Convery et al., 2007).The conceptual framework below was developed to guide this study. In the framework the independent variable is the environmental pollution while the dependent variable is effectiveness of plastic bags ban. This framework is useful in clarifying and scrutinizing the association among the variables as well as providing a context for interpreting the study findings.

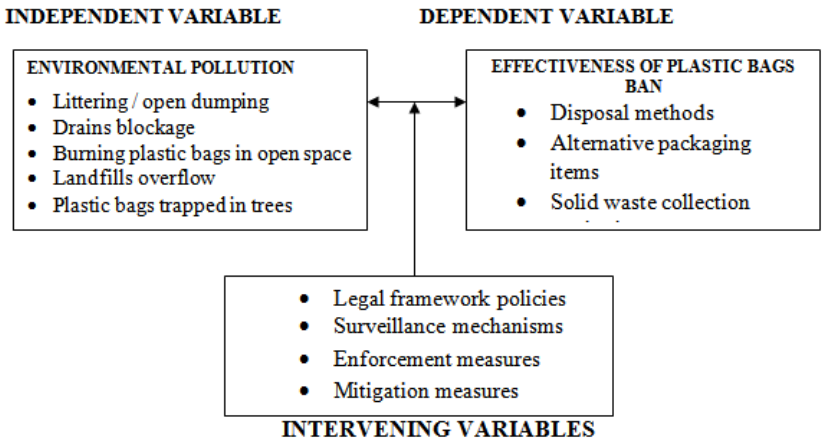

Figure 1: Conceptual Framework

III. Methodology

The study adopted descriptive cross-sectional research design to assess the effectiveness of the implementation of plastic bags ban.Cross-sectional descriptive studies simply characterize the prevalence of a phenomenon in a given population. Prevalence can be evaluated at either time (prevalence point) or over a defined period of time (period prevalence). Zikmund (2003) posits that surveys are quicker accurate methods of

sourcing information about a population in time at a single point. The study targeted a population of 552 respondents comprising of cereals, fruits and vegetables vendors in the retail open-air market located in Nakuru Central Business District, a County Environment Officer and Park Warden, Lake Nakuru National Park as shown in Table 1.

Table 1: Target Population of Respondents

Respondent	Number of respondents
Cereal Traders	300
Fruit Vendors	150
Vegetable Vendors	100
County Environment Officer	1
Park Warden	1
TOTAL	**552**

(Source: Field Data)

Sample random sampling and census techniques were used by the researcher in this study to pick a sample size of 167 respondents from which data for this study was collected. Every element in the study with this method had and equal opportunity to be picked for use. 30% of the 552 traders' population constituted the respondents in this study as it is in table 2.

Table 2: Sample Size of Respondents

Sample Group	Population (N)	Sampling Technique	Sample	Percentage (%)
Cereal Traders	300	Simple Random	90	30
Fruit Vendors	150	Simple Random	45	30
Vegetable Vendors	100	Simple Random	30	30
County Environment Officer	1	Census	1	100
Park Warden	1	Census	1	100
TOTAL	**552**		**167**	

A questionnaire, observation schedule and an interview schedule were used for data collection. The questionnaires were administered to the vendors in Nakuru retail market within the CBD by the researcher.With the use of an observation schedule the researcher in this study observed the effectiveness of plastic bags ban in Nakuru Town within; Rhonda, Flamingo, Milimani Estates, Lake Nakuru National Park northern corridors, Gioto Dumpsite and Nakuru Sewerage Plant.Instruments' reliability was computed using the Cronbach alpha method.A reliability coefficient of 0.883 was produce implying that the instruments were reliable since it was above the recommended threshold of 0.7. Quantitative data was analyzed and presented using frequency distribution, means and percentages as qualitative data was presented thematically to establish meaningful patterns in relation to the views of the respondents.

IV. Results and Discussion

Descriptive statistics (mean, standard deviation) from the filled questionnaires were used to present the findings in table 3 as shown:

Table 3: Effectiveness of the Implementation of Plastic Bags Ban

Descriptive Statistics

Effectiveness of the Implementation of Plastic Bags Ban	N	Mean	Std. Deviation
Bans eliminate plastic bags, which equals less litter and less pollution	125	4.55	0.499
Marine life will improve due to reduced contamination of water bodies	125	4.49	0.502
Improved Drainage infrastructures as a result of elimination of plastic litter which often clogs drainage systems, causing unnecessary flooding	125	4.56	0.498
Decrease breeding ground for the mosquito population which spread malaria	125	4.51	0.502
Improved aesthetic beauty on the environment	125	4.52	0.502
It has led to the reduction of landfills arising from heaps of plastic waste	125	4.46	0.501
Valid N (listwise)	125		

The data generated, by the statistical analysis reveals high mean scores (*M* = 4.55, 4.49, 4.56, 4.51, 4.52, and 4.46) and the low standard deviation scores (*SD* = 0.499, 0.502, 0.498, 0.502, 0.502, and 0.501) implies that the ban on plastic bags has had a positive impact on the environment which has led to less litter and pollution, improve drainage infrastructure, decrease breeding ground for mosquitoes which causes malaria, improved aesthetic beauty on the environment and has led to the reduction of landfills. This is consistent with the findings of Siddiqi and Ahmed (2019) whose study concludethat *t*he rationale for the ban of plastic bags is, inter alia, the impact of these bags on urban drainage systems; the toxic fumes released by improper disposal and incineration; the time they take to break.

The findings of this study and corroborations from previous empirical studies e.g. Moharan (2014), Clapp and Swanston (2009), and Miller (2012) suggesting that implementation of plastic bags bans across nations, would lead to a healthier environment. The study also sought to establish the challenges associated with the ban of plastic bags on consumers' lifestyle. In the same vein, a study by Ahmed and Gotoh (2019) analysing the impact of banning polythene bags in reducing flood disasters of Dhaka City by using contingent valuation method (CVM) and satellite remote sensing came to the conclusion that citizens were considering the banning decision as a positive one in reducing flood disaster in the city.Thomas,Sautkina, Poortinga, Wolstenholme, and Whitmarsh (2019) contend that plastic bags create large amounts of waste and cause lasting environmental problems when inappropriately discarded and as such, they represent a significant environmental and public health threat, and are also emblematic of broader sustainability challenges arising from increasing levels of consumption and waste. Their findings lend supports to this study.

The recent ban by Kenyan government on production, packaging, trading, transfer storage or importation of single-use plastic bags products has elicited varied reactions. The proponents of environmental conservation hailed it as a hallmark decision while traders and end users became enraged. The traders protested the ban claiming that it would lead to reduced frequency of shopping of their products by customers which would negatively impact on their sales and profit margins in the long run. Results from respondents' data generally showed that there has been improved cleanliness in the physical environment as a result of the ban. However, it was established through the observation schedule that despite the plastic bags ban, plastic bags were to some extent being used within the study area, which was attributed to the porous black market of the product. To this effect, the study sought to also establish the challenges facing the implementation effectiveness of plastic bags ban. The findings are summarized in table 4.

Table 4: Challenges Facing the Implementation Effectiveness of Plastic Bags Ban

Descriptive Statistics

Challenges Facing the Implementation Effectiveness of Plastic Bags Ban	N	Mean	Std. Deviation
Sluggish implementation by the enforcement officers	125	4.24	.962
Lack of availability of suitable alternatives	125	2.18	1.285
Porous neighboring borders have negated the gains made in implementation of the ban	125	4.01	1.096
Banning of plastic bags would lead to mass loss of jobs	125	3.19	1.372
Lack of stakeholder involvement	125	4.21	.864
Weak legislative framework	125	3.96	1.214
Lack of proper sensitization of the public	125	4.19	.939
Valid N (listwise)	125		

From the data generated, the analysis outcome highlighted that most of the respondents had the view that there was sluggish implementation of the ban by the concerned government agencies. This is consistent with the findings of Audi (2019) who notes that he weak enforcement from the regulatory bodies, the absence of a long-term strategic plan for plastic waste management in an integrated manner and established policies or directives from the government as a guide for appropriate waste practice are other concerns from the institutional and policy aspects which has rendered the implementation of the ban an uphill and challenging task to accomplish. The respondents noted that porous black market was a key challenge affecting effective implementation of the plastic bags ban in Nakuru Town and other main urban areas in Kenya. This has led to infiltration of the banned products thus negating efforts to implement the ban. Porous regional borders between Kenya, Uganda, Tanzania, Sudan and Somalia have has led to a boom in cross-border exchange. This had led to smuggling of the banned products into Kenya thus making the implementation of this directive a tall order. Very little progress seems to have been realized by key players in seeking products that can be substitute plastic bags. This lends support to Kuo (2017) who noted that implementation of plastic bags ban in Kenya has been faced with intense resistance. Previous attempts to ban plastic bags were selective, targeting to regulate light weight carrier bags with thickness of less than 30 microns, which made monitoring of compliance near impossible

(Kuo, 2017). However due to lack of political will and support, this strategy never got to be implemented and it collapsed almost immediately.

The respondents generally agreed that there was lack of proper stakeholder involvement in implementation of banning the use of plastic bags. This led to an outcry from manufacturers, traders as well as the end users in equal measure. The analysed study data revealed that the general public was not properly sensitized on the benefits of the ban in plastic bags. The findings of this study corroborate other research findings (Behuria, 2019; Njeru, 2006 and Kairu, 2017). Plasticlifecycle management report (2019) ably notes that awareness among consumers is imperative to bring about a change in consuming habits and the throwaway culture embedded in the society. According to Njeru (2006) who conducted a survey in Nairobi in 2001, awareness on the consequences of plastic bag waste in Nairobi was low. The findings of this study however, revealed that most respondents were aware about the effects of plastic bags and associated the ban with environmental protection hence to them, effective implementation of plastic ban should not be a challenge because of their awareness levels.

V. Conclusion

In the wake of effecting the plastic bags ban, it is worth noting that the plastic bags ban in Kenya and Nakuru in particular has led to an improved aesthetic appeal of the physical environment as evidenced by reduced littering and pollution as reduction of landfills arising from heaps of plastic waste. However, despite the ban on plastic bags, there exist myriads of challenges in the effective implementation of the ban arising mainly from the porous source outside the study areas' borders. This has promoted a thriving of black-market business of smuggling plastic bags into the study area. In addition, attitudes of consumers has become a major hinderance of effective implementation of the ban and a lot needs to be done in order to positively influence their plastic consumption behavior.

5.1 Limitations and directions for future research

It is important to note that despite the novelty of the findings, this study was not without limitations. First, the study adopted cross-sectional design. Cross-sectional descriptive studies simply characterize the prevalence of a phenomenon in a given population. Prevalence can be evaluated at either time (prevalence point) or over a defined period of time (period prevalence). In addition,the studywasbasedonasampleof167 respondents,which may be considered a small sample. This may limit the generalizability of the findings.Futureresearchusingalargersamplesizeas well as different contexts may provide additional insights and enhance our understanding of the issues explored here.Based on these findings, the study recommends that there is need for stakeholder engagement in order to raise awareness on the risk associated with the use of plastic bags. The government should provide affordable alternatives. The absence of alternatives has led to the creation of smuggling, black markets and corruption of border control officers. In addition, the government should consider providing incentives to industry. Such as tax rebates and financial incentives to stimulate production of cost-effective alternatives to plastic bags.

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