

# Motivation for Recycling Solid Waste and Exploration of Regulatory Framework: A Case Study of Namibia

Tandiwe P. Mutede<sup>1</sup>, William Chakabwata<sup>2</sup>

**Abstract:-** In this paper the authors discuss the motivations of recycling companies together with stakeholders practicing and promoting recycling solid waste as well as to explore policy and legislation that inform waste recycling in Namibia. The paper is an extract from a national study (2019) on recycling solid waste an emerging raw material industry in Namibia. Solid waste, products such as paper, plastic, glass, aluminium cans, scrap metal and e- waste were recycled. However what was not very clear to the generality of the populace were the motives for formal companies' engagement in the recycling industry and how they were regulated like other business enterprises. An interpretive research approach was used to inform data gathering and interpretation. A qualitative case study facilitated greater understanding of recycling practices in Namibia. Results indicated that environmental, economic and social factors were driving forces behind recycling in the country. However, Namibia lacked a comprehensive recycling legislative framework and relied on a number of disparity legislations that regulated the operations of companies in the country. Policy and intervention programs to improve the operations of the industry should focus on the adoption of an integrated recycling model. Adoption of such an approach should improve recycling activities nationwide. The components of the model included review of legal and regulatory framework; determination of resource requirements; promote development of program of action; strengthening operations through funding, along with the creation of a national database of recyclable garbage.

**Keywords:-** Waste Management, Recycling, Environment

## I. INTRODUCTION

**Solid-Waste Management** is the process of gathering, handling, and getting rid of solid waste that is thrown out by the original owner after it has been used up or is no longer useful.

**Recycling** refers to a series of activities by which material that has reached the end of its current use but may still have economic value is collected, processed and manufactured into new products and subsequent purchasing and use of recycled products.

The word "environment" often refers to "natural surroundings," which include things like air, water, land, plants, animals, and other flora and fauna, as well as "human-made surroundings," which include things like cities, parks, and auxiliary infrastructure for things like transportation, water supply, and electricity.

## II. BACKGROUND TO THE STUDY

Recycling refers to a series of activities by which material that has reached the end of its current use but may still have economic value is collected, processed and manufactured into new products and subsequent purchasing and use of recycled products (Hickman, 2009). It is fascinating to note that recycling has been a practice since the 1800s (Bradbury 2017 cited by Mwanza 2023) and the practice has continued to grow globally driven by economic developments of OECD countries, emerging economies and global population growth. Chandak, 2012; Courtois, 2012; Velis et al., 2012; & Gutberlet, 2010 report that recyclability is handled by recyclers both formally and informally. In industrialized nations, operation processes of recycling are more defined with formal recyclers being dominant players, contrary to most countries of the south, where activities of informal players are more noticeable. Few cities have however assimilated waste pickers into municipal recycling and waste management programs. According to Godfrey et. al. (2019), integrating these informal garbage collectors into upcoming waste management initiatives is essential to maximizing recycling potential and assuring their improved livelihoods. At some point in the past, this was also true in what are today industrialized nations (Velis et al., 2012).

According to Swapan (2009), in emerging countries, solid waste recycling is a budding industry. In Africa, recycling is still low and poorly organized, similar to other developing nations (Tas, & Belon, 2014; Ezeah et al., 2013; Gutberlet, 2010; Mamphitta, 2009; Liebenberg, 2007; Otieno & Taiwo, 2007). This is attributed to a number of factors, including financial limitations, a lack of regulatory oversight, low levels of participation, and ignorance. For instance, Tas, & Belon (2014) estimate that less than 1% of the solid trash produced in Mozambique was recycled. Only a few small local businesses and a few non-governmental groups engage in recycling. 98% of the solid garbage produced each day in Dar as Salaam, according to a research by Senzige et al. (2012), was not recycled. In a research on the management of PET plastics waste via recycling in Khartoum, Fadlalla (2010) found that recycling was low

despite an increase in the amount of plastic garbage produced in that nation. According to Courtois (2012), the recycling industry's full potential has yet to be realized in Africa. He thinks the private sector can play a big role in advancing the sector in underdeveloped nations so that more developing nations may profit from garbage recycling.

Regionally the size of recycling as a growing business in southern Africa has rarely been studied in the context of economic geography. The extraction of raw resources and their subsequent use in the production of manufactured goods are the main topics of economic geography (Hooper & Roger, 1974). According to Forbes and Kirsch (2011, as cited in Tunner, 2012) more research still needs to be carried about the development of new fields of study in economic geography regarding how these industries are distributed in space, accessibility of markets, the availability of raw resources, and the connections between different sectors, to gain a deeper grasp of the processes. Further, Choi (2012) echoes the same views about inadequacy in terms of research in the recycling industry, for example dearth of how the industry is growing and its geographic patterns, Namibia included. Investigation of Namibia's recycling business compared to other commercial activities is still limited and thus more is required for it to be understood for the benefit of policy makers with regards to economic development. Mutumba 2005; Keyter, 2009; Hasheela, 2009; Magen, 2010 & Lindell, 2012 emphasized the demand for more researches in recycling. In Namibia the formal as well as the informal businesses (Kaakunga & Matongela, 2012) are into food and beverage processing, furniture and wood production, engineering, and rehabilitation projects. The selling of drinks and cooked food is mainly dominated by informal sector micro-enterprises.

#### ➤ *Problem Statement*

Recycling is now valued globally, including in Namibia, because of the sustainability revolution that is taking place in resource conservation and environmental preservation (Sukholthaman, 2012). Namibia recycles solid waste, according to empirical research studies (Hasheela, 2009; Magen, 2010; Lindell, 2012; Croset, 2014). According to Ashipala (2012), recycling solid waste for the purpose of creating new materials is still a relatively young industry which is connected to the manufacturing of new materials. Although earlier research showed that recycling operations are still occurring in the nation, no complete study has been done analyzing motivations and enabling environment for formal companies involvement in the fledgling industry. This paper highlights the motivations for the involvement of stakeholders in Namibia in solid waste recycling and the legal framework that guided recycling industry in the country.

#### ➤ *Research Objectives*

In light of this, the study's particular goals were to:

- Investigate the motivations of industry participants in Namibian solid waste recycling; and
- Assess the adequacy of enabling legislation and policies, directing waste recovery and recycling in Namibia.

### III. A REVIEW OF RELATED LITERATURE

Environmental, economic, legal, and societal factors have been highlighted as recycling motivators. Recycling happens for three main reasons, according to Sukholthaman (2012): altruistic or environmental, economic, and legal. Recycling is encouraged for both financial and environmental reasons in both developed and developing nations (Binda, 2014).

#### ➤ *Economic Motives*

Recycling of solid waste is encouraged economically since it is seen as a cost-saving measure. It has been noted that waste management costs local governments a significant amount of money in both wealthy and developing nations. For instance, the collection and disposal of trash has a significant impact on local government budgets in underdeveloped nations. According to Henry et al. (2006), as stated in Lindell (2012), the local authorities' budgets in emerging economies are thought to be consumed by waste management to the tune of 30%. To add on to this, Nemerow et al. (2009), reported in Lindell (2012), solid waste collection accounts for 60–75% of the overall expenses associated with waste management. According to Godfrey et al. (2019), the anticipated investment requirements for Africa's waste management sector in 2015 were between US\$6-42 billion.

On the other hand, the drive towards recyclability has been made necessary by the rising demand for raw materials. Koehn (2011) emphasizes that increasingly, recycling was one of the keys to obtaining secondary raw materials resources. For instance, recycling accounted for around 34% of steel output worldwide according to Koehn (2011) with 47% coming from Germany. According to Hilpert and Mildner (2013) in developing nations such as Brazil, China, and India demand for raw materials has risen due to high demand of manufactured products. These countries have adopted various measures to meet the deficit, measures such importing raw resources, keeping reserves on hand, developing new technologies, and recycling old items like vehicles to get essential raw materials like steel. The use of recycled materials is considered to be cheaper than virgin raw materials (UNEP, 2013). Thus urban mining is more common practice as the expansion of the hunt for alternate raw material sources grows. This practice uses municipal garbage to recover secondary raw resources.

The basis of altruistic reasons lies in the significance of resource conservation and environmental preservation. The need to promote recycling has also been linked to the growing volumes of waste generated according to Smith (2012). In addition, the waste composition has become more complex with detrimental effects to the environment and human health mainly in developing countries where waste management practices are still low particularly with collection and disposal (UNEP, 2015; UN-Habitat, 2010). Poor management of solid waste can result in environmental challenges such as pollution by the leaking of landfills and dumping grounds, or through air pollution caused by burning trash. Moreover, poor waste management can be a

health hazard to the public as well as animals. Workers who are in direct contact with waste can greatly be affected as well. At international level, environmental protection and resource conservation is being encouraged to make sure environmental principles are respected for the benefit of humanity today and in the future (Chukwunonye & Clive, 2012; Modak, 2011; Williams, 2009). Environmental protection for the sake of mankind today and in the future, it is important to guarantee that environmental ideals are upheld according to Godfrey et al. (2019).

#### ➤ *Legal Reasons*

Life depends on the environment. However, over the last decades, growing pressure on the environment has placed environmental concerns on the agenda for law. According to Ruppel (2013), there are fears that if this is not addressed, it might lead to greater difficulties for future generations. In an effort to advance recycling and efficient resource use, governments have introduced variety of economic and legal measures. According to Godfrey et al. (2019), a variety of policy measures such as economic tools, laws, information-based and voluntary methods, environmental labelling, and financial assistance from the general public is imperative. Sustainable policies such as Green Public Procurement (GPP) and Extended Producer Responsibility (EPR) may lead to outcomes that are both economically and environmentally efficient. Europe is where the idea of EPR first appeared. The principle of EPR policies ensure garbage generators carry the responsibility of external expenses connected with items throughout their lifecycles (including disposal at the end) thus giving producers and consumers incentives to alter their behavior, in ways that move waste management up the waste hierarchy ladder. Rodic (2015) states that there is a change in emphasis from garbage to the product in this dimension of EPR policy. EPR regulations to encourage recycling have been implemented far more slowly in developing nations due to reasons such as limited financial resources, absence of a reliable infrastructure as well as a lack of consumer and collector knowledge of the advantages of recycling. Despite the fact, certain nations including Botswana and South Africa, have given it a shot.

#### ➤ *Social Reasons*

Methods of waste disposal like land-filling, incineration, and composting are all appreciated by communities. Awareness about some of the environmental issues they are linked to is there. For instance communities are quite aware about the negative social consequences of modern landfills (Asong, 2010). Thus, community participation and health related reasoning generally influence recycling and waste reduction programs at the municipal level. Despite awareness research reveals that low public participation hamper recycling efforts in developing countries. This scenario can be due to factors such as ignorance, reluctance, lack of recycling infrastructure, and limited recycling technologies (Sukholthaman, 2012).

Vulnerable, underprivileged, and poor social groupings who endure in a very unfriendly physical and social environment benefit from recycling through employment and a livelihood according to Ezeah *et al.* (2013). Manhart (2011) supports the same idea. In Nigeria, rural migrants who are poor participate in recycling of e-waste as it is open to anyone because it does not require specific skills.

## IV. CONCEPTUAL FRAMEWORK

Environmental protection was promoted at the 1992 Rio Earth Summit via sustainable solid waste management and a resource-conscious 21st Green Economy. Disposal-based waste management practices were heavily criticized by the 1960-1970s environmental movements which argued that solid waste should be recycled, composted, or utilized rather than just thrown because it is made up of many components. In turn the recycling economy was strongly encouraged (Schall, 1992 as cited in Gertsakis & Lewis, 2003). According to Phillips and Pittman (2009), the call to promote sustainable activities has become a critical subject the world over necessitated by ecological resource depletion, pollution, climate change, biodiversity loss and other problems (Phillips and Pittman (2009). The notion of sustainable development was introduced by the Brundtland Commission (World Commission on Environment and Development) report (Gertsakis & Lewis, 2003) with the aim of seeking alternative survival possibilities for both the present and the future (Stewart, 2011, p. 20). The phrase has not yet been given a definitive meaning despite the notion of sustainable development's enormous effect. However, mostly used definition is given by the World Commission on Environment and Development Report, 1987, p.43 "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" in (Gertsakis & Lewis, 2003) referenced. In order to fulfill both meeting human needs and advancing technology Agenda 21 and the 1992 Rio Summit both stressed how vital waste management and sustainability are to economic progress. Recycling of solid waste was considered a priority than an option in promoting effective waste management for health and the environment benefits (Hoornweg & Bhada-Tata, 2015; Nathanson, 2015).

Recycling is seen as a waste management technique as well as a source of raw material resources. Recyclability is one of several possibilities, including waste avoidance, waste reduction, and waste reuse for waste minimization according to Figure 1. According to Gertsakis & Lewis (2003) these waste management hierarchy concepts are now often utilized as guiding principles for the creation and execution of waste management policies and procedures.

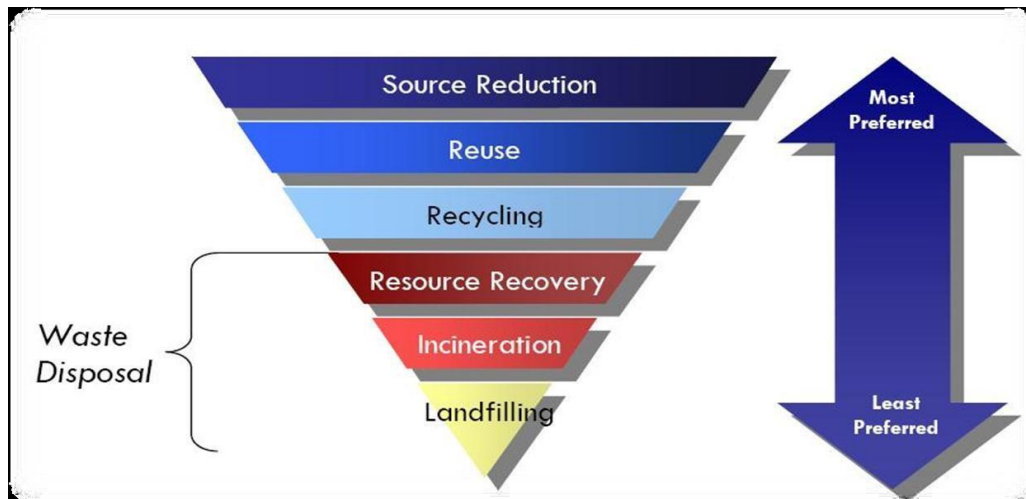


Fig 1 Waste Management Hierarchy  
Source: Nagabooshnam, 2011

**V. RESEARCH METHODOLOGY**

The study was conducted among solid waste recycling companies in the whole of Namibia. The plan was to interview all the 20 identified companies. However, some of the companies were no longer in use to engage the researcher whilst others were unwilling. Ultimately only 15 companies were interviewed. Accidental sampling involves the selection of research participants who are willing and able to take part (Hoyle, Harris, and Judd, 2002). The information was collected through semi structured interviews, document search and observation. The semi- structured interviews were a means of involving stakeholders in the investigations, in order to help the researcher to fully understand, interpret and analyze the data and obtain a clear picture of the operations of the recycling industry. Individual interviews were held with key officials of the 15 companies such as company directors, managers, supervisors and company representatives in the absence of company directors or managers. Direct observation was essential to provide first-hand look at reported issues of waste or any other activities such as processing. The purpose of document search was to learn as much as possible about recycling activities in Namibia as well as to obtain background information regarding the industry.

**VI. FINDINGS**

➤ *Reasons for Corporate Recycling*

Table 1 Reasons for Corporate Recycling

Company	Environmental	Economic	Social	Core or Activity Side
A	Protecting the environment	Business Raw Materials		Side
B	Right thing to do for the environment	Business Raw materials		Core
C	Protecting the environment	Business		Core
D	Environmental	Business		Core
E	Waste reduction	Business		Core
F	Cleanliness	business	Earn a living	Core
G	Safeguarding environment	Entrepreneurship	Uplifting families	Core
H	Cleanliness	Business raw material		Core
I	Waste reduction			Side
J	Environmental	Economic	livelihood	Core
K	Environmental protection			Side
L	Environmental Protection	Raw materials		Side
M	Environmental protection			Core
N	Environmental Protection	Economic		Core
O	Protect and Cleaning of the environment	Economic		Side
Total	15	13	3	

Source: Mutede, 2019

➤ *Discussion of Findings on Motivations of Recycling*

During the interviews, company officials such as directors, managers and supervisors explained in great detail their motives for involvement in recycling business and the legal framework governing their operations. Details of discussions follow.

➤ *Motives for Recycling*

The study identified three main factors influencing involvement of recycling companies into this venture, namely; environmental, economic and social.

## VII. ENVIRONMENTAL

Firstly, there was a general consensus that waste was hazardous both to humans and the environment. Incapacitation to properly manage waste generated in areas of their jurisdiction was the major challenge of local authorities. Consequently, crude dumping was the common waste disposal method in use with no fencing and onsite management activities. Crude dumping involved open disposal of waste without covering it at the end of the day which created problems of smell, flies, rodents and uncontrolled burning and access by waste pickers. Burning of waste created challenges to human health especially among people with chronic diseases such as asthma as reported. In some areas, some of the waste ended up in water drains and dry river beds, a situation the researcher observed as well. Clogged water drains were reported contributing to flooding during rainy seasons. According to literature, crude dumping sites are a health hazard, as they contribute to ground and surface water contamination and air pollution (Amasuomo & Baird 2016). Crude dumping was a major issue of concern among local authorities as well as residents. Recycling was therefore viewed as a necessity than an option in an effort to lessen these negative waste's effects on the environment and people's health.

The preservation of a clean environment was another reason for recycling. Littering of the landscape was a great issue of concern and recycling was seen as one of the solutions to reduce the menace. Plastics, cans, glass bottles were the most noticeable materials in open areas. However plastic waste was one major especially carrier bags and juice drink containers which were seen as an eye sore anywhere. One of the company directors had this to say '*ooh plastics all over, plastic landscape, it is quite unsightly. Everyone sees this including tourists visiting Namibia. Tourism is one of the important sectors of this country. We need to protect it and one way to do so is to keep our environments clean*'. Recycling was viewed as very important.

However, at the time of study not all plastics especially carrier bags could be recycled. Some of them were not fit for recycling as the carrier bags were used for defecation especially at night in the informal settlements and thrown out ( *what they referred to as fly by night toilets*) Carrier bags perched in the thorny bushes was a common picture, which the researcher also observed and some found in dry

river beds to be washed away during the rainy season or blown further by the winds. This scenario was found quite disturbing as one of the directors also echoed that despite the provision of communal toilets in some of the settlements, the people still opted to relieve themselves in the open when nature calls another major issue of concern contributing to pollution of the environment '*recently a toilet was constructed in their area, but no one is using it*'. Hence, even though it was the desire for recycling companies to recover as much plastic as possible for recycling, this practice of using carrier bags for toilets was a hampering factor.

Windhoek municipality, capital city of Namibia was supporting recycling initiatives in many ways in order to guarantee that Windhoek remains one of Africa's cleanest cities, Kigali having taken the lead of being the cleanest city in Africa. Windhoek authorities were determined to reclaim the lost status. Thus recycling efforts were high on their agenda as a waste management strategy.

Furthermore, protection of human as well as animal health was the driving force behind recycling. Crude dumping and especially where dumpsites were not protected, exposed children and animals (cows and donkeys) to danger. In most areas there was need to safeguard landfills to stop animals, especially cattle, from consuming trash like plastic. In Namibia, plastics recycling was seen as crucial to help lessen some of the risks they provide Thus all local authorities had the duty to do so in areas of their jurisdiction.

Namibia, is a very dry country ( drier in southern Africa.).Consequently, grazing pasture .is a difficult task in most regions of the nation. During the study's duration in northern districts of the country some animals like cattle were feeding on anything. Cattle were feeding on plastics and cardboard boxes which lay scattered and at dumpsites especially those which were unfenced. Unfortunately some animals died due to the nature of plastic if consumed (non biodegradable). Consequently efforts were underway to protect dumpsites through fencing in order to contain disposed waste a development which was already underway in the southern district of the country. However, companies entrusted to do the work complained that perimeter fences they erected were being vandalized by waste pickers in order to gain access.

The need to recover some items from dumpsites which were considered of use value exposed people especially children mainly to danger. Children were often victims of broken bottles and other hazardous materials at dumpsites and even in playgrounds as they scavenged items they wanted and played. A study carried earlier by Murghal (2014) on solid waste management in Namibia's northern towns established this finding as well whereby children fell victim to broken bottles and other dangerous objects at dumpsites and in playgrounds. Such incidents were observed common in high-density suburbs. At the time of study, the occurrence of such incidence pushed some companies to start recycling business as the study

established. *'One child was injured very badly by a broken glass bottle and I thought, let me recycle these bottles'* one of the participants echoed. The desire to protect human health was held as one of the factors that led companies to participate in recycling.

Furthermore, the realization of the danger of e-waste also motivated some companies into the industry of recycling. E-waste contains mercury and lead which are toxic elements. However, it also has a significant amount of valuable precious mineral elements, including gold, silver, copper, palladium, and platinum. This paper reveals that the necessity to safeguard the environment from dangerous items like e-waste motivated recycling as well. Most of the time, not everyone was aware of the danger this waste product caused, especially when it was disposed of improperly. Despite the potential damage that it poses to the environment and public health, e-waste was still being dumped at disposal sites in smaller towns. According to Anwasha & Kuna (2013), improper e-waste disposal is associated with danger to human health and the environment. Therefore, it was discovered that efficient e-waste end-of-life management is essential in order to recover crucial mineral components and control dangerous components. In 2014, an e-waste recycling company was established in Windhoek and at the time of study, e-waste was being collected from households, institutions and industries.

Involvement into recycling was also driven by economic motives. According to company executives, their perception was that recycling was a commercial venture just like any business. As a result companies believed that garbage may be used for something valuable for making money as well as promoting economic development and cleaning the environment.

Manufacturing companies perceived it as a cost-saving measure since recycling allowed them to purchase cheaper raw materials. People who work in the product manufacturing industry, particularly in the plastics industry, said that recycled pellets, which are secondary raw materials, were far less expensive than virgin pellets, which are needed to produce their goods. Since virgin materials had to be found from as far away as the Middle East, they were expensive because of the high cost of transportation and the need for foreign money. At the time of the research, recycled pellets were available locally for N\$3/kg whereas imported virgin pellets were priced at N\$20/kg. Companies saw the use of secondary raw materials as a cost-cutting solution since their imports of the raw materials from outside the region were lowering the competitiveness of their products. Thus firms felt it was a noble idea to support the recycling industry as it was essential in cutting their operational costs.

Recycling is a multipurpose method that simultaneously manages garbage and produces secondary materials (Nakatani, 2014). Increased garbage creation, particularly in big cities, also helped to support Namibia's recycling industry. Increased trash production was

associated with high consumer habits, population growth, and economic progress. For example, in Windhoek, waste production reached 75 594 tonnes in 2014, and by 2019 it was expected to reach 86,977 tonnes. With more waste, lifespan of landfills was becoming shorter and shorter. For example, during the research period, the researcher determined that Windhoek had already decommissioned two landfills. So there were fears that if waste was not controlled there were sure to be difficulties.

Local authorities in Windhoek revealed that despite Namibia's large amounts of land, the development of new sites was thought to be exceedingly expensive. Windhoek terrain is mountainous and thus finding nearby suitable land was considered a challenge yet landfills needed to be must be located near the communities they serve in order to reduce transport costs. In addition, officials reported that no one needs a dumpsite nearby, *'not in my backyard syndrome'* was deep rooted in people as one director echoed. Recycling was necessary in order to increase the lifespan of waste sites.

Namibia like other African countries grapples with issues of poverty and unemployment among other challenges. Thus some companies maintained that their involvement in the business of recycling was driven by the need to survive. One of the participants commented, *'My husband lost his job and this is all we could think of as a survival means. Its quite difficult an industry, but what else can we do. Look at my finger nails and hair, I feel shy when I walk into the bank and see other ladies with nice looking hair and well polished nails'*. Thus, social dimension was another push factor among companies, a practice mainly associated with the informal sector as revealed by Mampitta's 2011 reference, Reno in 2009.

## VIII. REGULATORY FRAMEWORK

Regulations, including laws, rules, and regulations guiding recycling industrial activities in Namibia were looked into.

Environmental preservation is a top priority in Namibia as specified in the Constitution of Namibia. Namibia is a member of a number of environmental treaties and conventions demonstrating its commitment to protection of the environment by everybody for the benefit of present and following generations. All recycling players were all aware of this national duty.

However, during the research no direct stand alone legislation to offer a framework for the recycling of solid waste existed. *"No law, no one can take anyone to court for not recycling"*. These were sentiments from some of the companies. Instead, the industry operated under the governance of general laws and policies that governed any other company operations e.g. the Local Authorities Act 23 of 1992, the Environmental Management Act No. 7 of 2007, and the Solid Waste Management Regulations No. 16 of 2011, Windhoek City by-laws, Water Resources Management Act No. 11 of 2013 and Labour Act No. 11 of

2007, Standard Act No 18 of 2005 and the 2015 Public and Environmental Health Act, No. 1. Legislation would be needed to compel people, businesses, and enterprises to engage in recycling in order to stimulate the sector.

## IX. CONCLUSION AND RECOMMENDATIONS

Namibia is recycling. Motives for recycling ranged from environmental, economic, social and others. However, environmental and economic factors stood as the major driving forces. In terms of legislation for managing recycling, the nation didn't have a National recycling program, neither did it have a national solid waste recycling act. The absence of national recycling laws and policies made enforcement of recycling by relevant authorities a big challenge. It was therefore important for the government to introduce legislation compelling waste generators to make sure that their products do not become waste at any point during their lifetime.

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