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Exploring economic opportunities of the solid waste management policy in Zambia: Case study city of Ndola

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Abstract

This study investigates the economic implications of Zambia's Solid Waste Management Regulation Act 2018, particularly in Ndola. The Act, which integrates private sector engagement in waste management, has unfolded numerous entrepreneurial opportunities. Our research reveals how individuals, including marginalized groups like ex-convicts and single mothers, are transforming waste into a source of income. By scavenging landfills for recyclables, these individuals participate in an emerging value chain, selling waste to entities that repurpose it into economically viable products. This burgeoning sector is not only fostering self-employment but also generating formal jobs, especially for the youth, and contributing to the national economy through taxes and export revenues. The study highlights the dual benefits of this policy: environmental sustainability through reduced landfill waste, and socio-economic upliftment, as evidenced by decreased poverty levels and minimized disease outbreaks due to cleaner public spaces. However, challenges persist, such as the need for more structured waste sorting at landfills and better support systems for vulnerable waste collectors. Overall, the study underscores the transformative potential of waste management policies in fostering economic growth and environmental conservation.

Keywords: Economic opportunities; Solid Waste; Recycling; Entrepreneurship; Environmental Sustainability; Zambia; Ndola

1. Introduction

Recognizing the critical link between solid waste management and climate change, Zambia has proactively addressed these global concerns through the enactment of the Solid Waste Management Regulation Act of 2018. This legislation not only aims to regulate waste management practices and reduce harmful emissions from landfills but also seeks to leverage private sector involvement in a collaborative effort with municipal authorities for efficient waste collection and disposal. This approach aligns with the global dialogue on mitigating the environmental impacts of solid waste, particularly its contribution to global warming and climate change.

Inadequately managed solid waste poses significant threats, including water system contamination and flooding, exacerbated by outdated landfill designs prevalent in many urban areas. These challenges highlight the necessity of contemporary waste management solutions that can prevent the leaching of toxic substances into groundwater systems, a concern documented in studies by Gichamo and Gökçekuş (2019) and Anjum (2016).

The policy analysis component of this study underscores the importance of viewing solid waste management not only as an environmental imperative but also as an economic and social opportunity. Effective policies should create avenues for economic growth, particularly for individuals and small businesses, thereby addressing fundamental human needs as per Maslow's hierarchy (Lester, 2013). This perspective is supported by Pülzl and Treib (2017), who emphasize the role of solid waste policies in fostering sustainable livelihoods. Additionally, stakeholder engagement is crucial for the

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successful implementation of such policies, ensuring that they resonate with the needs and aspirations of the community (Moon, 2019). The USAID's "Capacity Development Resource Guide on Policy Analysis" (2014) further articulates the role of policy in guiding decision-making processes and economic activities within the legal framework, thereby contributing to societal well-being (Thomas and Grindle, 1994).

1.1. The Concept of Waste

While much scholarly literature discusses the problems of waste, a precise definition of 'waste' is often overlooked despite its pivotal role in environmental impact and preservation. The Longman Dictionary of Contemporary English broadly defines waste as materials or substances left over after their primary use (Anand, 2010). Bhada-Tata and Hoornweg (2012) offer a more comprehensive definition, considering waste as all unwanted and economically unusable by-products, residuals, or substances, which are discarded either intentionally or accidentally. Crucially, they posit that the nature, volume, and concentration of waste are key factors in determining its environmental impact.

The generation of waste is an inevitable by-product of transforming raw materials into economically valuable products. This waste is categorized by its source, encompassing medical, industrial, commercial, agricultural, and municipal solid waste (MSW). MSW, in particular, is under the jurisdiction of city municipalities and includes both biodegradable and non-biodegradable substances (Sharma and Jain, 2020). The rise in products made from non-biodegradable polymers, such as plastic bottles and containers, has led to significant accumulation of polymeric waste in landfills (Dwivedi et al., 2019).

Municipal solid waste, however, is not just a challenge but also an opportunity. It is a potential source of raw materials for recycling into economically valuable products, offering substantial profits and positively impacting both households and national economies. There is also a growing global trend towards harnessing waste for energy generation, a technology still nascent in many developing countries (Anjum et al., 2016).

The environmental implications of waste management are profound. Greenhouse gases like CO₂, CH₄, and N₂O emitted from solid waste contribute to ozone layer damage, global warming, and resultant environmental catastrophes such as extreme weather events and wildfires. This further exacerbates human displacement and environmental degradation (Eneh and Oluigbo, 2012).

Moreover, backyard burning of waste contributes significantly to air pollution, causing respiratory problems in humans and animals and irreversible damage to vegetation. Acid rain, a by-product of this pollution, inflicts further harm on land and marine ecosystems, threatening the survival of species unable to adapt to these altered environments (Reyna-Bensusan et al., 2018).

1.2. Theoretical Framework

This research is anchored in two critical theories: Waste Management Theory and the Economic Theory of Entrepreneurship.

Waste Management Theory posits that effective waste management practices should primarily aim to prevent environmental contamination and safeguard human health. Recognizing the inevitability of waste generation from industrial, commercial, and domestic activities, this theory emphasizes the importance of minimizing waste production. It advocates for waste management strategies that are sustainable and environmentally friendly, such as recycling and recovery processes. These strategies are essential in coping with the challenges posed by a growing population and the need for adequate landfill space. Solid waste management policies, according to this theory, play a crucial role in regulating waste generation and disposal, thereby facilitating the creation of commercial and industrial opportunities for recycling and waste recovery (Pongrácz et al., 2004; Moh and Abd Manaf, 2014).

The Economic Theory of Entrepreneurship delves into the dynamics of entrepreneurial activity, defining it as the capacity to take risks and initiate profit-generating ventures using available resources, including natural ones. This theory has evolved through various stages in history. Initially, the Classical perspective limited entrepreneurship to the production and sale of goods. The Neo-Classical phase expanded this view, emphasizing the entrepreneur's ability to identify new economic opportunities and undertake business risks while reducing costs. The Austrian Market Process further broadened the scope, adding the dimension of entrepreneurial behavior in innovating and capitalizing on market opportunities. These economic theories underline the entrepreneurial spirit's pivotal role in driving private sector-led economies. They suggest that the growth of robust economies, especially in developing and third-world countries, relies heavily on understanding and applying these theories to harness entrepreneurial potential (McFaelane, 2016; Walia and Priya, 2020).

2. Material and methods

This study was conducted as a qualitative case study in Ndola, Zambia, focusing on the economic opportunities arising from the solid waste management policy. This methodological approach was chosen for its effectiveness in obtaining a comprehensive understanding of the participants' perspectives and experiences regarding the solid waste management policy and its economic implications.

Data collection was primarily conducted through two methods: focus group discussions and in-depth interviews. The study involved a total of 22 participants, including a diverse range of individuals such as a chief executive officer of a local waste recycling company. These participants were selected using expert and homogenous sampling techniques, ensuring a representative cross-section of individuals with direct experience and financial involvement in Ndola's waste management sector (Baker et al., 2006).

The focus group discussions were designed to facilitate collective insights, while the in-depth interviews provided a more personal exploration of individual experiences and perceptions. This blend of methods enriched the data with both group and individual perspectives. The point of data saturation was used as a criterion to determine the number of interviews, ensuring comprehensive coverage of the topic without redundant information.

Once collected, the data was systematically categorized and analyzed using thematic analysis. This method allowed for the identification and examination of key themes and patterns related to the economic opportunities presented by the solid waste management policy (St. Pierre and Jackson, 2014). Additionally, pictorial representations were utilized to visually articulate and emphasize the findings related to solid waste and its economic potentials

3. Results and discussion

This study reveals the significant entrepreneurial opportunities emerging from the solid waste management policy in Ndola, despite the challenging conditions associated with waste-related trades. The research identified five key economic opportunities:

Solid Waste Scavenging: This activity involves collecting recyclable materials from landfills, public spaces, and drainage areas for sale to recycling companies. Notably, individuals from marginalized backgrounds, including ex-convicts and single mothers, have embraced this opportunity as a sustainable income source, aiding in their social reintegration and financial stability. The low barrier to entry, requiring no initial capital, makes this a viable option for many seeking livelihoods in Ndola.



Figure 1 Recyclable solid waste scavenging at Ndola landfill

Baling of Recyclable Waste: The process of compressing and bundling waste materials like plastic bottles and paper for easier transportation has emerged as a profitable business. This sector has been bolstered by government incentives,

such as the removal of import taxes on baling equipment. Businesses in this area not only source waste from landfills but also from local communities, thereby creating employment opportunities, particularly for the youth.



Figure 2 Solid waste baling for sale

Comprehensive Waste Recycling: A notable facility in Ndola engages in the collection, baling, flaking, and recycling of waste into various products, contributing significantly to the local and international markets. This operation, focusing primarily on recycling PET waste, has created over a hundred jobs and supports hundreds of individual waste suppliers. By-products like HDPE are further processed by other local industries, illustrating a thriving waste recycling ecosystem.



Figure 3 Recycling plant in Ndola

Private Solid Waste Landfills: Entrepreneurial ventures have also emerged in the form of private landfills. For example, a farm on the outskirts of Ndola has adapted its business model to include a landfill service, sorting waste for recycling companies and composting organic waste for agricultural use. This innovative approach demonstrates the versatility of waste management in contributing to both environmental sustainability and economic growth.

Door-to-Door Waste Collection Services: With the expansion of residential areas in Ndola, private waste collection services have become increasingly popular. These services, often operated with light trucks, offer convenient waste disposal solutions for households and have proven to be more profitable than traditional employment for many entrepreneurs.



Figure 4 Trading in recyclable waste at private landfill



Figure 5 Private waste collection van at Ndola landfill

4. Conclusion and Recommendations

The findings of this study highlight the diverse ways in which the solid waste management policy has opened up economic opportunities, contributing to environmental sustainability and addressing climate change. By facilitating waste removal from landfills and urban areas, these entrepreneurial activities have significantly reduced the emission of harmful gases and the risk of waterborne diseases.

Moreover, this commercialization of waste management presents a cost-effective solution for municipalities, reducing the fiscal burden on public resources. Importantly, these ventures have shown potential in alleviating poverty at both community and household levels.

The study recommends that Ndola city council should enhance the efficiency of waste sorting at landfills by designating specific areas for different types of recyclables. This would streamline the process for waste pickers, many of whom belong to vulnerable groups. Additionally, forming an organization to represent these individuals could ensure fair pricing and prevent exploitation by larger recycling companies.

Compliance with ethical standards

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There is no conflict of interest to disclose.

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