

**INVESTIGATING THE EFFECTIVENESS OF A COMMUNITY BASED  
APPROACH TOWARDS SOLID WASTE MANAGEMENT IN WINDHOEK'S  
OKAHANDJA PARK**

**A THESIS**

**SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE  
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## **ABSTRACT**

Solid waste management is a challenge across the globe due to the increasing diversity of waste characteristics and lack of effective implementation of consistent waste policies accompanied by changing lifestyles, increased production processes and rapid urbanisation. Namibia like many other African countries is facing rapid urbanisation. This has overwhelmed the local authorities' resources for provision of municipal solid waste management henceforth leaving the City of Windhoek grappling to find viable solutions to solid waste management problems, which is health- pollution degradation. A mixed method approach was used for gathering the data where questionnaires were used; interviews were conducted and descriptive statistics. Despite the adoption of the Open Space Street cleaning project, solid waste management in informal settlements where many of the urban poor live is still a critical problem. It has negatively affected them socially and economically. Results show that a large portion of the population perceive the five R's of zero waste (refuse, reduce, recycle, reuse and rot) negatively. This perception is largely rooted in existing programmes provided by the City of Windhoek. The communities have played a minor role in solid waste management as a catalytic instrument in improving their environments. Poor communication, lack of skill influenced informative programmes and negative attitudes have been a problem. The solution to have strict laws on solid waste mismanagement and involve people of different social, ethnic, gender and religious groups in the reconstruction of solid waste management systems to create typical win-win situations will improve their perceptions towards solid waste.

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## **DEDICATION**

*I would like to dedicate this work to my late mother Mrs Anodis Ndlovu as well as dearly departed grandmother, Mrs Monica Nkiwane, for the faith and encouragement they provided during my formative years. May their souls rest in eternal peace.*

## DECLARATION

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## **LIST OF ABBREVIATIONS**

CBO	Community Based Organisations
COW	City of Windhoek
GRN	Government, Republic of Namibia
ISWM	Integrated Solid Waste Management
ISWMH	Integrated Solid Waste Management Hierarchy
LA	Local Authority
MDG	Millennium Development Goals
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NDP	National Development Plan
NGO	Non-Governmental Organisation
OSSC	Open Space Street Cleaning
PPP	Public-Private Partnership
SDG	Sustainable Development Goals
SMART	Specific, Measurable, Achievable, Result-focused and Time-bound
SWMRT	Solid Waste Management Recovery Tool
SWM	Solid Waste Management
UNDP	United Nations Development Programme
UN-HABITAT	United Nations Habitat
WEDC	World Environmental Development Commission
WHO	World Health Organisation





## CHAPTER 1 INTRODUCTION

### 1.1 Background of Study

*“Solid waste is the discarded leftovers of our advanced consumer society. This growing mountain of garbage and trash represents not only an attitude of indifference toward valuable natural resources, but also a serious economic and public health problem” (Jimmy Carter, 1976).*

Proper management of solid waste continues to be a fundamental problem worldwide and especially in the developing countries. In developing countries, this has largely been made worse by rapid urbanisation leading to sprawling informal settlements. Plummer (2013) highlights on the point that growing population, rising standards of living, industrialisation, production and consumption of new products are acting in concert to generate increasingly greater quantities of solid waste, and this in turn is creating serious problems of their management and proper disposal. Developing countries continue to manage solid waste in what may be described as primitive ways such as throwing into open and unregulated dumps. Louw (2009) states that the socio-economic, political pressures, financial constraints, poor planning and resource management; and lack of capacity are all major huddles being experienced by local governments in provision of basic service delivery. This uncontrolled solid waste generation has often led to health hazards, disease outbreaks as well as adverse pollution to most urban areas. Whereas developed countries being aware of the implications of the problems of improper management and disposal, have established regulatory programmes towards sustainable management of increasing solid waste.

Namibia is one of the developing countries that is experiencing urbanization and mostly in the capital city, Windhoek. The City of Windhoek is struggling to deal with rapid

urbanisation and this has led to an alarming rate of growth of informal settlement areas (National Planning Commission, 2013).

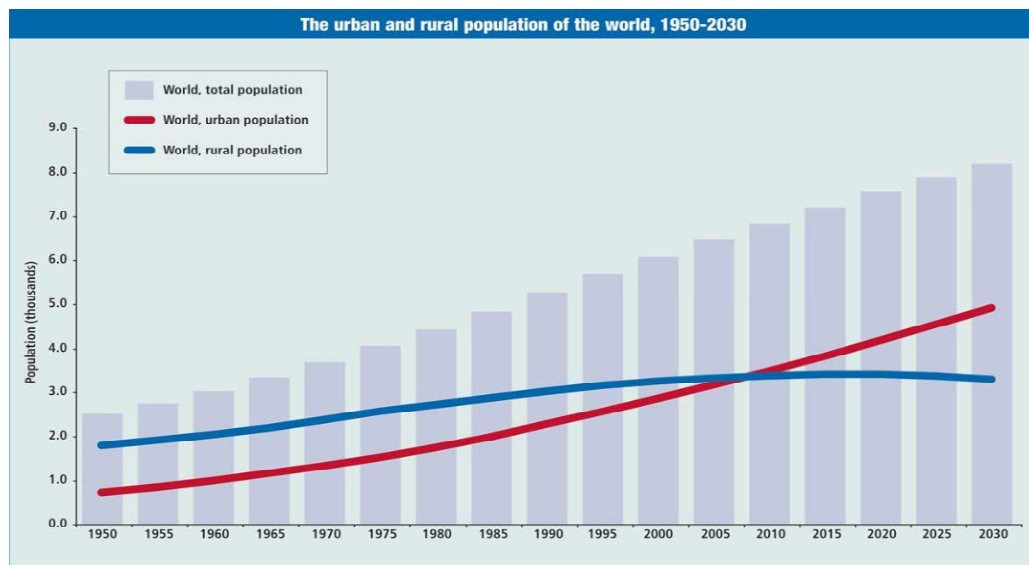
## **1.2 Problem Statement**

The ever increasing and non-controlled urban growth in the informal areas of Windhoek has been of major concern to the City of Windhoek and Central Government. Such unprecedented population growth since Namibia's independence in 1990 can be attributed to reforms in social, political and economic policies. For example, at independence the negative apartheid laws only allowed, "single quarters" accommodation for male migrant workers in the urban areas and mines were removed. This resulted in an increase in post-independence migration from rural to urban thus also resulting in an undefeatable housing provision backlog. This has led to many of these new residents seeking their own housing solutions by installing their own forms of accommodation in unplanned municipal areas thus giving birth to informal settlement areas (Sweeney- Bindels, 2011).

Such urban migration has put immense pressure in the equitable provision of basic services by the public sector. Local Government is finding it difficult to meet the growing demand in the delivery of services that fall under the ambit of the state. Failure to meet these obligations has resulted in a corresponding increase of solid waste and public health crisis. Louw (2009) states that this rapid urbanisation has led to an increase in municipal solid waste and therefore making the conventional methods towards the cleaning of streets, the collection and disposal of solid waste by the City of Windhoek difficult to implement. This has led to high volumes of uncollected waste continuing to pollute the environment causing diverse social and economic effects to the dwellers of these informal settlements. One area experiencing such is Okahandja Park which will form the author's point of reference in this research.

Supported by Kazapua (2015) in his mayoral statement where he highlighted that rapid urbanisation and the high rate of consumption of products has led to more solid waste being generated especially in these proliferating informal areas like Okuryangava extensions mainly Okahandja Park.

The high rate of new shacks being built in Okahandja Park due to the increasing population has further put more pressure on the City of Windhoek when it comes to solid waste management. This has led to high volumes of solid waste with the management cost involved going beyond the capacities of the local authorities (Haidula, 2016). As illustrated below in the graph, it shows the world population growth rate of rural to urban migration from 1950 to 2030 due to the need for better opportunities (United Nations 2010). Rapid population increase in Windhoek is a problem that should have been expected and acted upon to find viable solutions that will eliminate problems that come with urbanisation such as lack of housing that will lead to the increase of precarious areas and these usually come with poor solid waste management.



*Figure 1: Urban and rural population growth of the world, 1950-2030. Source: (United Nations, 2010).*

### **1.3 Research Questions**

- In what ways and to what extent does the community participate in solid waste management in Okahandja Park?
- How can the delivery of an appropriate solid waste management service be improved and sustained in Okahandja Park?
- How can the solid waste management concept be understood and widely received by the Okahandja Park community?

### **1.4 Significance of Study**

The importance of the study is set in deriving an all-inclusive community-based approach system that can employ the re-use, recycle, recovery and reduction of waste by involving the communities and educating them on the importance of solid waste management. This will contribute immensely towards keeping informal settlements clean and free from health hazards. It focused at finding an innovative approach to involve people of different social, ethnic, gender and religious groups in the reconstruction of local waste management system, creating typical win-win situations. This will contribute immensely towards keeping informal settlements clean and free from health hazards.

### **1.5 Limitations of Study**

The main limitations encountered during the research were the poor communication and language barrier between the researcher and the respondents from Okahandja Park. The respondents provided biased information because of fear of being misquoted. Other minor limitations faced were the unavailability of resources, time constraint, non-cooperation, subjective and classified information that could not be shared, delays in the sourcing of

information and bureaucratic delays. To limit some of these constraints, the researcher observed ethical considerations and timeously informed the authorities of the intended interviews.

#### **i. Non-cooperation**

Some of the challenges faced while carrying out the study included non-cooperation from the respondents. Most of the professionals that the researcher intended to interview could not be cooperative due to their busy schedules. Some were not able to give out any information without direct communication to them from their superiors.

#### **ii. Dependency**

The questionnaires given to the respondents have a degree of subjectivity; the researcher had to rely on the honesty and accuracy of participants. Some respondents answered the questionnaires in a rush and this gave inaccurate or subjective information. Thus, it became a challenge to verify the information supplied as individuals were eligible to their own thoughts hence the research solely depended on the respondent's honesty.

#### **iii. Bureaucratic and Procedural delays**

Delays were encountered as the researcher tried to retrieve information like statistics from the authorities. Some of the information required clearance from the superior authorities before being offered to the researcher. Bureaucratic procedures limited the research material.

### **1.6 Delimitation of Study**

The research was limited to the informal settlement of Okahandja Park. The study was limited to this area because of an outbreak of polio that occurred in 2006 and 2010 where it was found that poor solid waste management was part of the cause. Other cases that were reported were bilharzia, malaria and cholera (World Health Organisation, 2013).

Additionally, another fundamental reason for choosing this study area is its location where it has made it more attractive to migrants because of its easy accessibility to the Northern Industrial area where many of them seek employment.

### **1.7 Chapter Conclusion**

Urbanisation is increasing yearly with more people migrating from the rural areas to the urban areas and this has led for the City of Windhoek to face problems of uncontrolled poor solid waste management. As the number of migrating people increases due to search of better opportunities, solid waste is bound to increase in informal settlements if interventions are not forthcoming. Solid waste management in informal settlements of Windhoek need a major transformation because there have been outbreak of water pollution diseases. Sustainable measures are needed to monitor and control the cleanliness in these communities. Improved user perceptions towards the management of solid waste can be a tool towards economy growth and a clean environment.

## CHAPTER 2 LITERATURE REVIEW

### 2.1 Introduction

This chapter reviews the literature and documentation related to solid waste management and how informal urban communities can be involved and educated on this context. The literature reviewed entailed the background of community participation in other developing countries and how it can be applied to Namibia's local context. It further looked at the integration of solid waste management as a collective action that some authors state it has involved poor communities as a cost-effective strategy for achieving sustainable solid waste management (United Nations, 2015).

The literature review then sought to understand the different policies put in place by the Namibian government towards solid waste management, and how local authorities have worked around them to keep informal settlements clean. It was essential to understand the concepts of urban movement and formation of informal settlements and the aftermath of urban regeneration as the research works towards improving the livelihoods of these communities. Through the regeneration of these communities in Windhoek, the researcher was then able to derive or improve the way people relate to solid waste management or shape their behavioural traits through educating themselves the concepts of solid waste management. The aim of the research is to see how a community-based approach methodology could be used as a tool for effective management of solid waste in informal settlements.

The chapter's structure reviews the definition of solid waste management, types of solid waste, and comparisons between how developed countries manage their solid waste with that of developing countries as well how the developing countries can adopt their systems for

better solid waste management. It further looks at the challenges faced in developing countries and how they have tried to manage those challenges by enacting acts and policies. Lastly the chapter progresses onto how communities are an important aspect and how they can be involved towards proper management of solid waste if properly implemented.

## **2.2 Defining Solid Waste Management**

Anand (2010) defines solid waste as any unwanted material that is not discharged to the atmosphere. It is a term used internationally to describe non-liquid waste items from domestic, commercial, industrial, trade, agricultural and mining activities. Non-liquid is a relative term, because sludges of certain kinds fall within the scope of solid waste management. According to the United Nations Habitat (2010), solid waste management is a process of collecting and treating solid waste; and how it can be changed and used as a valuable resource. The United Nations Habitat (2010) further states that it is a concept that can be embraced by every household across the world.

Whereas Kreith (2008) emphasizes that industrialisation has brought a lot of good things and bad things as well. Kreith (2008) states that the negative effects of industrialisation are the creation of solid waste. It can pollute the air and seriously affect the health of humans, wildlife and our environment. Macdonald (2010) points out that any forms of solid waste management need to be effectively communicated and encouraged to the public so that their behaviours and habits can be changed for the better.

The following are three major sources of solid waste as stated by (Kreith, 2008):

### **2.2.1 Residential**

Solid waste from homes include food scraps, plastics, paper, glass, leather, cardboard, metals, yard wastes, ashes and special waste like bulky household items like electronics, tires, batteries, old mattresses and used oil. This is the major source in this research.

### **2.2.2 Industrial**

Industrial sites are one of the biggest contributors of solid waste. They include light and heavy manufacturing industries, construction sites, fabrication plants, canning plants, power and chemical plants. These industries produce solid waste in form of housekeeping wastes, food waste, packaging waste, ashes, construction and demolition materials, special waste, medical waste as well as other hazardous wastes.

### **2.2.3 Municipal services**

The urban centres also contribute immensely to the solid waste crisis in most countries today. Some of the solid waste brought about by the municipal services include, street cleaning, waste from parks, wastewater treatment plants, landscaping wastes and waste from recreational areas.

## **2.3 Solid Waste Management Concept in Developed Countries**

The European Union (2010) observed and synthesised that most developed countries are implementing solid waste management strategies that are emphasizing on the re-use of waste and improving the quality of products that can be recycled. These strategies formed a hierarchy that has an internationally accepted concept in most developed countries. The concept is being used by developed countries to manage solid waste through recycling, reusing and reduction. This is through the introduction of behavioural traits that incorporate

the involvement of citizens by educating them on how to manage their own household solid waste.

The European Union (2010) further states that good management of waste has a system and that will be prevention closely linked with manufacturing products that will require less packaging and using manufacturing methods that are less polluting. This drive was speculated successful when the public got involved through campaigns that raised awareness on consumer demand for products that use less packaging to eliminate waste produced thus creating a more resource efficient market. Therefore, environmental education became a necessity in raising awareness programmes. The need for having stronger environmental programmes increased with rising preference for more environmentally friendly methods such as prevention, reuse and recycling. Developed countries have come up with strict policies that investigate the use reusing or donating, bulk- buying, reduction in packaging and using fewer chemicals on products to reduce toxicity. They further achieved the zero-waste system where solid waste reduction is achieved at several levels, such as reduction per capital waste, environmental education and government policy initiatives.

#### **2.4 Solid Waste Management Processes**

There are different processes used by developed countries to manage their solid waste to maintain a clean environment. They have used different systems and cycles over the years that have become successful and have strict legislations. Developed countries have managed to pass strict legislations that each citizen has managed to follow, and this has helped in building environmental friendly climates for the current generation and future generations. These processes have managed to establish good working relationships between the Local Authorities and the public as each has a role in solid waste management.

The processes followed are the zero-waste system, solid waste management recovery tool, the solid waste management hierarchy and the integrated solid waste management hierarchy. These processes and tools have built a well-established solid waste management system for the developed countries. The first process to be discussed is the zero-waste system as illustrated in figure 2.

### 2.4.1 Zero Waste System

The system works in a cyclical manner where less toxic products are designed for the environment with manufacturers working on clean productions and distribution. This whole cycle can be a success with strict rules imposed by the government where everyone is responsible of their solid waste.



Figure 2: Zero Waste System diagram of a developed country. Source: (Masse, 2015).

According to Masse (2015) the following are the steps of the zero waste system:

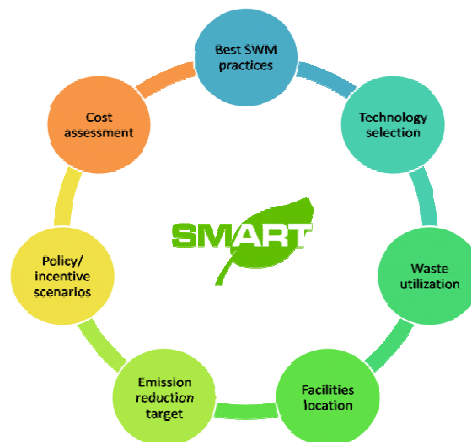
1. Firstly, there is the implementation of strict laws that shift subsidies towards affordable management projects that are eco-friendly.
2. Clean production in every manufacturing plant is enforced where less toxic materials are used or more products are packed in eco-friendly materials that are easy to recycle or discard.
3. After clean production, it is the distribution of the products for consumption.
4. The products are manufactured that a consumer will see the need of reusing the product in their daily activities or recycling, where the recycled material is collected and taken to resource recovery centres to prevent pollution.
5. In resource recovery centres the harvesting takes place whereby new raw materials are reproduced from the recycled material. It is the producer's responsibility to maintain and repair products, like clothing, tyres and appliances, so that they will not have to be thrown out and replaced frequently.
6. The cycle also depicts that through this mechanism of showing commitment towards recycling can start community projects which have created jobs.
7. The last step is shows that rules are continuously changed if the government notices that the ones that are implemented are not as effective as they would have wanted. Continuous changing of laws helps in keeping up with technology and new methods so as their solid waste management system is always up to date.

#### **2.4.2 Solid Waste Management Recovery Tool**

The University of Technology of Malaysia (2012) reported that most of these developed countries have implemented the Solid Waste Management Recovery Tool (SWMRT) which has proved to be a success thus leading to a zero-waste system. It offers an easy to use system for integrated solid waste management planning, cost-effective and environmental friendly

solution for waste utilization system that comprise of waste-to-product and waste-to-energy. This is a vital tool to ensure sustainability and security in solid waste management with cost competitive. SWMRT can be applied worldwide to determine the best possible solid waste management planning for various sectors such as residential, commercial, industrial or even larger scale energy planning for a nation.

The report indicates that the Solid Waste Management Recovery Tool can be an introduction of alternative solid waste treatment technologies including incineration, landfill, composting and recycling give economic benefits and renewable energy options as compared to existing municipal solid waste management system. Not only does it work with solid waste management but can also be used for carbon dioxide emission reduction. SWMRT could also effectively act as a tool to solve the issue of global warming and meet the obligation in the framework of Copenhagen climate change report. This is an innovative tool because it assists in design of the solid waste management with multi-period approach for long term effective planning and scheduling of solid waste. In figure 3 below is the Solid Waste Management Recovery Tool:



*Figure 3: The Solid Waste Management Recovery Tool. Source: (University of Technology of Malaysia, 2012).*

This innovative tool is the first tool to assist in design of the best solid waste management system with multi-period approach for long term effective planning and scheduling of solid waste. The SWMRT uses the best selected technology that is affordable and can be used anywhere targeting pollution agents. It is an emission reduction tool as well that has been designed to measure the best policies that can be result focused and relevant to any individual whether in rural or urban areas. This is an easy to use tool to analyse the trade-offs between technical, economic, and environmental concerns at the national, regional, province, or community level. As it analyses the trade-offs it also features a cost assessment system that helps in determining all affordable techniques towards the best SWM practice that is less strenuous and will be successful over a long period of time. The unique features of the Solid Waste Management Recovery Tool are that it is specific, measurable, achievable, results focused and time bound (SMART). It includes multi-period planning with time-dependent parameters such as, forecast solid waste generation, forecast electricity demand, fuel price variability, construction lead time, financial incentive, and increase in fixed operational and maintenance costs over time.

### **2.4.3 The Hierarchy of Solid Waste Management**

The Earth Engineering Centre (2013) report that for solid waste to be managed effectively and efficiently a hierarchy of solid waste management is the perfect solution. This hierarchy addresses; reducing, reusing, and recycling of waste, aerobic and anaerobic composting, waste-to-energy and sanitary land filling. The hierarchy of solid waste management recognises that source reduction begins with reducing the amount of waste generated and reusing materials to prevent them from entering the waste stream. Once the solid waste is generated, it needs to be collected. Material recovery from solid waste in the form of recycling and composting is recognised to be the most effective way of handling solid waste.

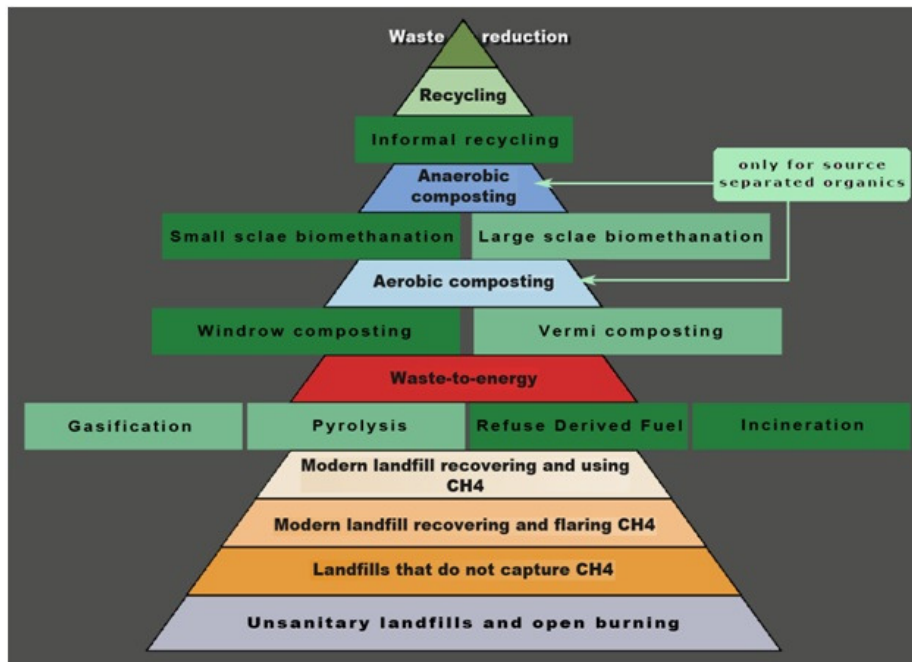


Figure 4: The hierarchy of sustainable solid waste management. Source: (Earth Engineering Centre, 2013).

As illustrated in figure 4 above, Namibia is still in the bottom section of ‘unsanitary landfills and open burning’ of the hierarchy as landfills are still the most common used method of solid waste management. While this is the common method used, recycling methods are slowly starting to be introduced to the people. With recycling methods increasing globally, provisions should be made to handle the non-recyclable solid waste that is and will be generated in the future. A sustainable solution to handle non-recyclable solid waste is energy recovery from the waste. Energy recovery falls below material recovery on the hierarchy. Whereas landfilling of solid waste is equivalent to burying natural resources which could be used as secondary raw materials or as sources of energy. In the present society, landfills are required as a small fraction of solid waste will have to be landfilled. However, unsanitary landfilling or open dumping of wastes is not considered as an option to handle MSW.

## 2.4.4 Integrated Solid Waste Management

United Nations Habitat (2013) defines Integrated Solid Waste Management (ISWM) as the strategic approach to sustainable management of solid wastes covering all sources and all aspects, covering generation, segregation, transfer, sorting, treatment, recovery and disposal in an integrated manner, with an emphasis on maximizing resource use efficiency. This approach is a management system that covers all aspects of solid waste management; from waste generation through collection, transfer, transportation, sorting, treatment and disposal, data and information on waste characterization and quantification (including future trends). It assesses the current solid waste management system for operational stages to provide the basis for developing a concrete and locality-specific management system.

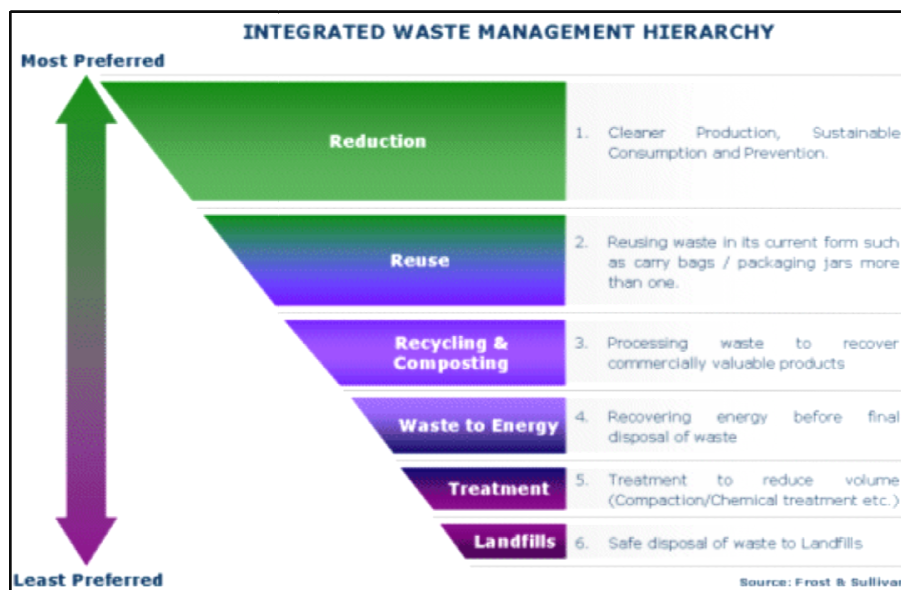


Figure 5: Integrated Solid Waste Management Hierarchy. Source: (Frost & Sullivan, 2015).

As illustrated in figure 5 above Integrated Solid Waste Management Hierarchy is a concept that promotes solid waste avoidance through prevention and general minimisation ahead of any reuse, recycling, treatment and disposal. Solid waste avoidance and reduction should be the first option, if waste cannot be avoided then efforts should be made to minimise the

quantities generated. Once all avoidance and minimisation options have been explored then on-site recovery, reuse and recycling should be considered. Only as a last resort should treatment and disposal be considered and accepted in accordance with the ultimate objective of this Policy.

## **2.5 Challenges towards Solid Waste Management in Developing Countries**

High level of improper waste disposal systems particularly from households will lead to solid waste increment. When people clean their homes and places of work they automatically litter their surroundings which affect the environment and the community. This type of dumping of waste materials forces biodegradable materials to rot and decompose under improper, unhygienic and uncontrolled conditions, and has led to the breeding of infectious organisms that cause diseases (Chandrapa, 2012).

The solid waste management system in developing countries is still displaying an array of problems, including low collection coverage and irregular collection services, crude open dumping leading to breeding of flies and burning without air and water pollution control. The European Union (2010) supported by the World Health Organisation in their Economic Development paper of 2012 state that these public health, environmental, and management problems are caused by various factors which constrain the development of effective solid waste management systems and these are as follows:

### **2.5.1 Technical Constraints**

Most developing countries are lacking human resources at both the national and local levels with technical expertise necessary for solid waste management planning and operation at a minimum. Many office personnel in solid waste management, particularly at the local level, have little or no technical background or training in engineering or management.

Secondly another technical constraint is the lack of overall plans for solid waste management at the local and national levels. As a result, this has led to solid waste technology being often selected without due consideration to its appropriateness in the overall solid waste management system. In some cases, foreign assistance is given to a component of a solid waste management system for which the use of resources may not be most cost-effective. Research and development activities in solid waste management are a low priority in developing countries. The lack of research and development activities in developing countries has led to inappropriate technology being selected in terms of the local climatic and physical conditions, financial and human resource capabilities, and social or cultural acceptability. This has led to the technology selected never used, wasting the resources spent and making such projects unsustainable (World Health Organisation, 2012).

### **2.5.2 Financial Constraints**

The World Health Organisation (2012) further mentions that solid waste management in developing countries is given low priority. As a result, very limited funds are provided to the solid waste management sector by the governments, and the levels of services required for protection of public health and the environment are not attained.

The problem is acute at the local government level where the local taxation system is inadequately developed and, therefore, the financial basis for public services, including solid waste management, is weak. This weak financial basis of local governments can be supplemented by the collection of user service charges. However, users' ability to pay for the services is very limited in poorer developing countries, and their willingness to pay for the services which are irregular and ineffective is not high either. An effective strategy for raising funds needs to be searched in any collaborative project to ensure its sustainability. In addition

to the limited funds, many local governments in developing countries lack good financial management and planning. The lack of financial management and planning depletes the limited resources available for the sector even more quickly and causes the solid waste management services to halt for some periods, thus losing the trust of service users.

### **2.5.3 Institutional Constraints**

Several agencies at the national level are usually involved at least partially in solid waste management. There are no clear roles or functions of the various national agencies defined in relation to solid waste management and no committee designated to coordinate their projects and activities. The lack of coordination among the relevant agencies results in different agencies becoming the national counterpart to different external support agencies for different solid waste management collaborative projects without being aware of what other national agencies are doing. This leads to duplication of efforts, wasting of resources, and unsustainability of overall solid waste management programmes (United Nations-Habitat, 2010).

The lack of effective legislation for solid waste management, which is a norm in most developing countries, is partially responsible for the roles of the relevant national agencies not being clearly defined and the lack of coordination among them. Legislation related to solid waste management in developing countries is usually fragmented, and several acts for example in Namibia, the Local Authorities Act 1992 (Act No 23 of 1992) and the Environmental and Pollution Protection Act 2003 include some clauses on rules and regulations regarding solid waste management. It should be noted that legislation is only effective if it is enforced. Therefore, comprehensive legislation, which avoids the duplication of responsibilities, fills in the gaps of important regulatory functions, and is enforceable for

sustainable development of solid waste management systems. Local ordinance and by-laws on solid waste management are not well developed. Local government institutions are not provided with clear mandates and sufficient resources to fulfil the mandates (United Nations, 2015).

#### **2.5.4 Economic Constraints**

The United Nations Development Programme (2015) states that economic and industrial developments play a key role in solid waste management. An enhanced economy enables more funds to be allocated for solid waste management, providing a more sustainable financial basis. However, developing countries have weak economic bases and, hence, insufficient funds for sustainable development of solid waste management systems. In small developing countries, solid waste recycling activities are affected by the availability of industry to receive and process recycled materials. The weak industry base for recycling activities is a common constraint for the improvement of solid waste management in developing countries.

#### **2.5.5 Social Constraints**

The social status of solid waste management workers is generally low in both developed and developing countries, but more so in developing countries than developed countries. This owes much to a negative perception of people regarding the work which involves the handling of waste or unwanted material. Such people's perception leads to the disrespect for the work and in turn produces low working ethics of labourers and poor quality of their work.

Insufficient resources available in the government sector, collaborative projects often have attempted to mobilize community resources and develop community self-help activities. Results are a mixture of success and failures. Failed projects with inactive communities

usually did not provide people in the community with economic as well as social incentives to participate in activities. The social incentive is based on the responsibility of individuals as part of the community for the improvement of the community and is created by public awareness and school education programmes. The lack of public awareness and school education about the importance of proper solid waste management for health and well-being of people severely restricts the use of community-based approaches in developing countries (United Nations Development Programme, 2013).

In a nutshell if the above constraints are improved in developing countries there will be a reduction in poor management of solid waste. Solid waste management has been a challenge for developing countries because there has been a faster rate of urbanisation than in the developed countries in the recent years. Urban areas are growing in volume at a rate at which the infrastructure and amenities are not growing. This tremendous growth has resulted in strained urban services where lack of resources is encountered thus making solid waste management more difficult.

## **2.6 Environmental Impact of Improper Solid Waste Management**

Krukerja (2015) states that the environmental impact of poor solid waste management has led to the deterioration of surface and subsurface water quality, as well as air and land pollution. This impact depends on the waste composition and disposal practices. Traditional landfills practices that most developing countries still practise produce various landfill gases such as methane, carbon dioxide, carbon monoxide, nitrogen, hydrogen, hydrogen sulphide and ammonia and these can disturb the atmosphere. Additionally, inevitable repercussions of the practice of solid waste disposal in landfills are gas and leachate generation due to primarily microbial decomposition, climatic conditions, refuse characteristics and land filling operations.

Environmental pollution caused by solid waste has been the plague of society and people at large due to its mismanagement. Mounds of rotting waste have long been an eyesore in many countries to their environments. Several solid waste management projects have been implemented to solve the growing solid waste management problem in the context of the developing world; most of these projects are not followed through or are poorly carried out due to social, economic and technical problems (Chang, 2015).

## **2.7 Urbanisation Issues in Namibia**

Urbanisation is the growing number in the proportion of the population residing in towns and cities, brought about by migration from rural areas. It is also the higher urban levels of natural increase resulting from the greater proportion of people of childbearing age in cities (Tchobanoglous, 2009). Additionally, urbanisation results from social change and is most notable in the development of capitalism and industrialisation. In contrast Plummer (2013) argues that urbanisation is the inevitable result of economic growth, with the rise of specialised craftsmen, merchants, and administrators and further views the stresses of the importance of agglomeration economies where cities offer employment markets and well-developed infrastructure which in all increase their comparative advantage. Marshall (2013) observed that the effects of globalization compound replace local processes of urban development and have introduced reasons for urbanisation. Despite rapid urban growth in African countries, economic growth is unevenly distributed especially in urban areas. Kenya, Namibia, South Africa, Zimbabwe, Zambia and Botswana have been identified as among the countries with serious urban inequality. Generally, Africa has the highest level of poverty in the world especially Sub-Saharan Africa where half the population lives below the poverty line (Plummer, 2013).

Sweeney- Bindels (2011) states that Namibia has been faced with an increase in urbanisation leading to sprawling informal settlements and an increase in poverty as more people migrate and face being unemployed. With the continuous growth of these areas more solid waste is being generated and has become an overwhelming issue for the Local Authority as well as for the inhabitants as it has led them to live in distress.

Gunter (2011) claims that the developing countries' rapid urbanization which is synonymous to elimination of poverty is uncontrollable, and it is an unprecedented shift without economic and technological support. This is in view of lack of infrastructure provision which has led to unauthorised occupancy of land and an increase in unsustainable solid waste. Gunter (2011) further argues that this can only be dealt by Local Authorities since they have strong supporting systems that can instruct the involvement of communities to manage their own solid waste. Gunter (2011) calls this participation as community empowerment because it would be an enhancement of the members' capacity to achieve development on the life spaces of civil society whilst improving the conditions of livelihood.

Below in figure 6 is the unauthorised occupancy of land in Windhoek where they have built in restricted areas even though some areas have been cleared by the COW. These areas are called informal settlements.

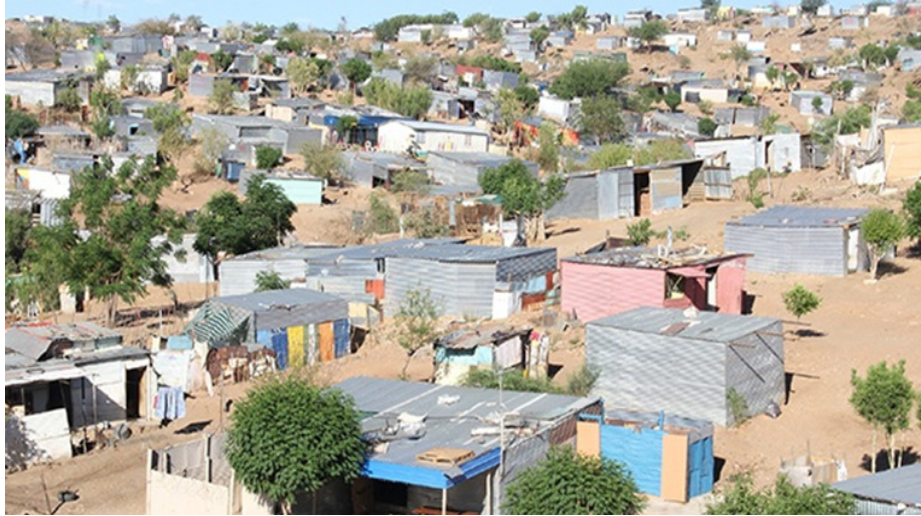


Figure 6: Informal settlement in Windhoek. Source : (Haidula, 2016).

## 2.8 Solid Waste Management Issues in Namibia

*“Many of the city’s Solid Waste problems are caused by public ignorance, or in some instances public carelessness, regarding the protection of the environment. It is therefore imperative for the City of Windhoek to strengthen the area of community education and awareness rising” (Mayoral Speech - Shikongo, 2005).*

The disposal of solid waste is a concern in Namibia, especially that waste has some implications in sustainable development. Therefore, solid waste management has become a concern for the GRN. Sustainable development is of high importance in Namibia, especially since many people are living in poverty and that the national population is growing. Population growth in Namibia has become a challenge because competition over resources has increased (National Planning Commission, 2013). Socio-economic factors such as slow social development, extreme poverty, environmental degradation and inadequate investment in human resource development also have impacts on sustainable development (United Nations Development Programme, 2015) and (World Bank, 2014). In as much sustainable

development will minimize the impacts of the competition over resources and will promote sound environmental management.

The sustainable development concept was developed because of the increasing human basic needs like food, clothing, shelter and employment as well as the environmental problems affecting the planet due to human activities (Glazewski, 2009). If the environment is not taken care of our future generations will grow up in a brown environment (Currie, 2013).

In its attempt to achieve sustainable development, Namibia developed some frameworks which serve as guiding steps towards achieving the sustainable development goals. For reducing poverty and inequality, a poverty reduction strategy has been developed whose implementation is being guided by the National Poverty Reduction Action Programme (National Planning Commission, 2013). Furthermore, Namibia is a global partner to the world's Sustainable Development Goals (SDGs), the seventeen goals that have been agreed upon world-wide with an aim of responding to the world's main developmental challenges; were first targeted to be attained by the year 2015 when they were still MDGs but are currently adopted as SDGs and to be achieved by 2030.

## **2.9 Namibian Policies and Legislation on Solid Waste Management**

Namibia has put in place various policies and acts which are as follows:

1. Environmental Management Act No. 7, 2007
2. Harambee Prosperity Plan
3. Public Private Partnership Bill, 2016
4. Vision 2030
5. National Development Plans (1-5)
6. Solid Waste Management Policy, 2005

These acts, policies and plans were enacted to keep Namibia's climate and environment clean and free from diseases. As the Namibian Government works hand in hand with the United Nations to achieve the Sustainable Development Goals 13 and 6 which are Climate Action and Clean water and Sanitation, policies and plans have been implemented. The policies, acts and plans have been developed so that by year 2030 Namibia will be part of the developed system in terms of infrastructure, clean environment, low poverty lines, low unemployment rates and access to proper solid waste management and sanitation. The researcher will briefly touch on the major ones that Namibia has to meet to achieve the development goals by 2030 and these are as follows:

### **2.9.1 Vision 2030**

Through Vision 2030, Namibia plans to be a prosperous and industrialized nation, developed by human resources, peace, harmony and political stability. It sets the broad thrusts and strategies in the development agenda for the nation over the long-term. It sets the macro-economic framework and long-term targets through which the vision of the society is to be achieved. Furthermore, it serves as the basis or the planning of a greater future for Namibia. With estimates of the population projected at 2.8 million in 2030, more facilities will be needed to cater for them (National Planning Commission, 2013). The improvement of solid waste management will require N\$500 million for the country to attain long-term goals of Vision 2030. Its strategies are to provide better health care, better education and accessibility to clean environments for the people of Namibia especially for women and children.

The National Demographic Health Survey conducted in Namibia in 2007 shows that 45% of the Namibian population do not have access to clean environments (UN Habitat, 2013). With the Namibian government still committed to realising the four Millennium Development

Goals which are to eradicate extreme poverty and hunger, to promote gender equality and empower women, to ensure environmental sustainability and to develop a global partnership for development will lead to the growth of its economy with more people accessible to clean environments and more women and children less prone to diseases and being able to attend school.

### **2.9.2 The Harambee Prosperity Plan**

The Harambee Prosperity Plan was enacted in 2016 and developed to complement the National Development Plans and Vision 2030. The plan is targeting to build better houses for the Namibian people with good solid waste management and to reduce the high unemployment rate. It is working towards building an economical stable structure for the people of Namibia where in cases of solid waste and environment sustainability, the communities will be educated and trained, to create jobs and hatch out entrepreneurial skills among the people to implement green based projects which will boost Namibia's economy. With most Namibians having access to a clean environment that means the current high rates of infant and maternal mortality will be reduced by 2030 (Harambee Prosperity Plan, 2016).

### **2.9.3 Solid Waste Management Policy, 2005**

The Solid Waste Management Policy was adopted in 2005 and implemented in 2008. It brought an idea to introduce a paradigm shift from the conventional pollution control approach to that of solid waste prevention and minimization first, followed by reducing, reusing and recycling of waste and disposal as the last option. The Policy recognises the nutrient and market value of waste and how the proper management thereof can produce opportunities for job creation and community empowerment and continually strive towards finding markets and providing streams to allow for the reuse and recycling of material thus

ensuring that, the solid waste which is generated is harnessed before considered for final disposal. When this policy was introduced by the City of Windhoek, the COW has since realised that it will not win the war on solid waste solely by picking up the waste. This has put in strategies and measures in place to ensure sustainability of all solid waste management efforts through education and awareness raising (Solid Waste Management Policy, 2005).

The strategy of the policy is to enforce regulations that will raise education awareness through the mind-shift from pollution control to pollution prevention; and minimisation being successfully bridged and fostered to a future where solid waste is a resource. The main objective is to provide a framework through which the management of solid waste, irrespective of the nature, toxicity and quantity, shall be governed in Windhoek. It further aims to ensure that the management of waste is done in a risk-free manner so that the impacts of waste on residents and the environment is minimised. The policy aims to broadcast its objectives through education and awareness raising activities that manifest sustainable waste management practices to be upheld always by all relevant public and private stakeholders. The policy recognises that sound waste management relies on having efficient and effective organizational structures and must ensure the active participation of all stakeholders throughout the community (Solid Waste Management Policy, 2008).

The importance of community participation cannot be overlooked in the successful implementation of any policy and the exchange of information is currently identified through knowledge gaps and empowerment opportunities. The policy's utilisation of regulatory tools is not what it emphasises on but also encourages the development of specialised financial regulatory instruments such as powerful economic waste minimisation incentives to implement principles that govern and create an environment that is clean without extensive enforcement. Lastly the policy therefore encourages an approach of consultation, partnerships

and co-operation amongst industry, the public and government (Solid Waste Management Policy, 2008).

#### **2.9.4 Namibia's National Development Plans**

One of Namibia's development frameworks are the NDPs that are crouching towards investment in development. These plans focus on reviving and sustaining the economic growth. NDPs outline policies that are bringing together different economic sectors, addressing Namibia's developmental challenges and sustainable development at large (National Planning Commission, 2015). The government formulated a long-term development framework called Vision 2030, whose goal is, 'that the people of Namibia are well developed, prosperous, healthy and confident in an atmosphere of interpersonal harmony, peace and political stability; as a sovereign nation'. The plans are implemented after every five years with the guideline to meet the vision 2030. Under these plans environment development is one of the major development goals that should be achieved to have a sustainable environment for the people of Namibia whether rich or poor.

#### **2.10 Effectiveness of Policies in Solid Waste Management**

Anderson (2008) states that implementation is about putting policies into practices, and it is often the complex process of planning, organization, coordination and promotion which is necessary to achieve policy objectives, as an activity and implementation constitutes an important, even central, phase in the policy process. Marshall (2015) explains that the implementation phase is the phase that translates policies into actual changes in behaviour and the accompanying approaches that are normally used during implementation are important in stimulating new initiatives in decision making towards a forecasted outcome.

Azahar Abar (2014) points out that effective policy implementation is very crucial towards the achievement of sustainable management of solid waste and that its implementation is not an easy task but is not impossible to attain. In the context of developing countries including Namibia, politics inevitably plays a large role in solid waste management systems. The governance structure of solid waste management is affected by the relationship between central and local governments whereby local governments are not involved in policy making processes and implementation which is a very effective strategy towards achieving the best results. Ta Wee (2014) supports Azahar Abar (2014) by mentioning that an equilibrium status is required between Local Authorities and the citizens for effective solid waste management policy implementation.

Ta Wee (2014) further states that good governance requires participation and collaboration of all relevant parties, including government, non-governmental organisations (NGOs), community groups and the private sector. Additionally, good governance allows the civilians to influence policy and resource allocation. Therefore, it is essential for equitable, effective, and efficient solid waste management policy implementation by allowing for a benchmark. A straightforward, transparent, unambiguous legal and regulatory framework, including functioning inspection and enforcement procedures at the national, provincial, and local levels, is essential to the proper functioning of a solid waste management policy. Weak institutional policies are the key issues faced by developing countries including Namibia because they lack transparency and accountability and therefore, institutional strengthening and capacity building becomes a major driver in policy implementation towards effective solid waste management.

## **2.11 Community Participation**

Kumar (2016) defines a community as people living together in some form of a social organisation and cohesion. Its members share in varying degrees of political, economic, social and cultural characteristics as well as interest whereas community participation is the process by which individuals and families assume responsibility for their own health and welfare of their community and develop the capacity to contribute to their community development.

They tend to work towards better living conditions and are motivated to solve their common problems. This enables them to become agents of their own development instead of positive beneficiaries of development aid.

According to Vaughn (2009) community participation is taken as a crucial aspect of solid waste management. Community participation in solid waste management is always required because solid waste management is a continuous maintenance system. Community participation towards solid waste management has only received attention now from all stakeholders either government or private. Vaughn (2009) further explains that community based solid waste management projects are activities carried out by members of the community in a bid to improve their livelihoods and develop their communities. Kumar (2016) states that all municipalities in developing countries find themselves confronted with management and organizational problems in the fields of sanitation and solid waste management with inabilities to comply with growing demands that concern solid waste collection and as well as technocratic aspects in decision making systems have led to lack of equipment, financial resources, good municipal policies and legal frameworks.

Gray (2012) takes an argument from Craig (2011) where they claimed that community participation and empowerment are the widely advocated issues in developing countries

because of poverty, polarization and social exclusion. World Bank (2010) sees community participation as a means for ensuring that third world development projects reach the poorest in the most efficient and cost-effective way through sharing costs. Stakeholder Forum (2007) highlights the Brundtland Commission report of 1987 which concluded that participation has a key role to play in sustainable development. NGOs are historically identified with community participation and empowerment. It is believed that NGOs are committed to support the communities through empowering them towards development.

The community can exercise power through participation and empowerment. They can help themselves in the development and gain tools for self-reliance. If power is conceptualized in zero terms, empowerment has a negative impact. Increase in power of a certain group may lead to the decrease in power of the other group. Empowerment may have a different meaning depending upon different ideologies. Long-term empowerment through participation should be dealt within the framework of economic, social and political perspectives. Gray (2012) raises the point that participation has become an issue which has harmed those who were supposed to be empowered. They present participation as 'tyranny'. Tyranny is the unjust exercise of power. Craig (2011) gives an essence that a community consists of both men and women. They hold different power relations in the society.

One of the approaches to establish the concept of participatory local appraisal is by applying the concept of community-based development. A community-based development is regarded as co-management, in the form of development of the community together with the local government will aim to actively involve the local people in the activities of planning and implementing development and management.

A community development strategy is the implementation of a planned change which is consciously and seriously conducted through cooperation among people to improve the structure of the existing social system (Chambers, 2007). The direction of the change will be proper to the agreement that has been determined together previously. Basically, the instrument managed in the community development is empowerment. High participation in the development will encourage community members to become involved and to take responsibility towards all resources with the features of open access and common property existing in their environment (Read, 2007).

## **2.12 Perceptions of Communities towards Solid Waste Management**

Perceptions examine the opinions people express when they are asked in various ways to characterise and evaluate issues that may be of value towards problem solving and save people, from potential risk (Kumar and Nandini, 2013). The perception of the people towards solid waste management has always been that it is the responsibility of the local authority to manage solid waste and to keep all territories clean. Local authorities are constitutionally bound to keep their cities or towns clean and have been doing it at high capacities trying to meet all demands, but the scarcity of resources has limited them in some instances, due to the population growth. Many local authorities have been experimenting with several innovative and participatory methods; the three R's which are reduce, reuse and recycle. Over the past years since independence, the City of Windhoek has been engaged in experimenting with new technical options and administrative processes to find innovative methods to address solid waste management more effectively.

The United Nations Conference on Human development held in Stockholm in 1972 declared that;

*“Environmental issues are best handled with the participation of all concerned citizens, on a relevant level. On a national basis, everyone should have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States should facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy should be provided.”*

The aim of this declaration was to address the world especially developing countries that for SWM to be effective, people should be involved. As it has been demonstrated in developed countries, community participation in waste disposal has been a catalyst towards community development because it has given the people a feeling of self-esteem. Community participation is an income generating tool through the possibilities of recycling which will also reduce the high volume of waste that is disposed.

The key precondition for successfully developing people’s participation is for insignificant people to have the ability to participate in, negotiate with, influence, control or take action for SWM. Willingness of the people to get involved in community programs can be approached through enhancing community empowerment which can be established in three steps which are:

- i. Support individual empowerment (self- esteem).
- ii. Enhance personal development through training and building skills among the people.
- iii. Promotion of collective action

Siegel (2012) quotes Longe et al (2009) who goes on to quote Holland and Rosenberg (1996) that, ‘perceptions of one’s capability is said to set a limit to what to do and ultimately what

can be achieved'. Siegel (2012) supports this quote by stating that the influence of perception which describes how a person views himself and the world around him and how it tends to govern behaviour is explained by the Anomie theory, which explains that deviance can arise by accepting culturally determined goals without the acceptability of cultural means. In the case of solid waste management, it translates to either paying for solid waste management services and participation or the rejection of its cost recovery methods and even community involvement. Siegel (2012) further points out that the participatory management approach is considered as an alternative to a traditional solid waste management system in which both the local authority and people can work together and assume responsibilities for better service delivery in SWM.

### **2.13 Solid Waste Management Sustainability**

According to the Solid Waste Management policy (2005) of Namibia the main aim of the COW is to keep a clean Namibia. Steps have been taken towards this strategy and different plans have been implemented over the years since the policy was enacted but the Local Authorities have been faced by challenges in managing solid waste in urban areas such as funding and proper implementation of strategies. Sustainability is important when it comes to solid waste management and for it to be a success it is based on the following principles as taken from the International Labour Organisation, Zimbabwe report. The report, 'Start your Own Recycling Business' is a document that was presented to the people of Zimbabwe in 2007. The document emphasized on the criticality of the management of waste by the people and principles that have been formulated for proper solid waste management and how these principles can lead to well managed community projects. This report can be used in the Namibian context by implementing the same principles to achieve a more manageable

process towards good solid waste management in informal settlement. The principles are as follows:

**Principle 1:** The ‘cradle to grave’ principle demands that waste should be handled properly from the place of generation (cradle is the household) to the final resting place (the grave). This means that all necessary aspects should be provided at the cradle such as receptacles at households; collection of waste should be done and be dumped properly. This principle also calls for close cooperation between the solid waste generator and the authority responsible for collection and disposal (International Labour Organisation, 2007).

**Principle 2:** The lifecycle principle demands proper management of products from date of manufacturing up the ladder until the end of a product’s life. This means that to reduce waste the products should have minimal toxic substances and customers should be educated on how to dispose these at the end of life of the product. This applies more in electronic waste. The duty of care principle also applies in the management of products from date of production to the final resting place because the customers of given products should be able to assist in the management of its waste. This goes hand in glove with environmental education to members of the public because this teaches (International Labour Organisation, 2007).

**Principle 3:** People are to be responsible about waste issues and encouraged to practice the precautionary principle. Advocate for the treatment of waste whose toxicity is not known before they are disposed to ensure that no mistakes are made (International Labour Organisation, 2007).

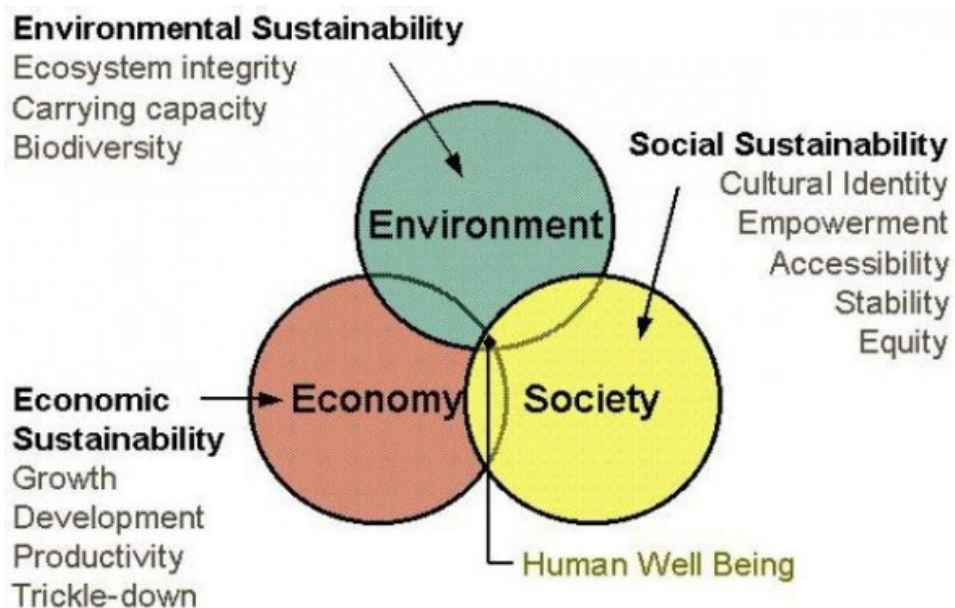
**Principle 4:** There is also the polluter pay principle which is responsible for ensuring that individuals and institutions that pollute the environment pay for their pollution and compensate affected parties. These principles all back up the integrated waste management

principle which demands that all available waste management strategies be effectively implemented.

These principles, if well implemented will ensure that solid waste generation is minimised, and recycling and reusing are upheld where solid waste is treated and properly disposed of in proper landfills. These principles are good strategies in the management of household solid waste because they encourage each individual to manage their solid waste. These principles have been employed in several developed countries and have been a success. It is therefore wise for developing countries to follow the same solid waste management development path.

### 2.13.1 Environmental Sustainability

Sustainable development is development which meets the needs of the present without compromising the ability of future generation to meet their own needs (World Commission on Environment and Development, 2010). This definition was formulated by the WCED, led by the Norwegian Prime Minister Gro Harlem Brundtland, and it relates to a multi-dimensional sustainability as shown in figure 7 below.



*Figure 7: Three Dimensions of Sustainability. Source: (Architecture Décor, 2015).*

The goal of environmental sustainability is to conserve natural resources and to develop alternate sources of solid waste reduction while reducing pollution and harm to the environment. When all three dimensions are strong thus when people live in a system where high-quality life is the norm. They have a clean healthy environment, a satisfactory level of economic well-being, and a robust level of social fulfilment. These three dimensions to be balanced, the sustainable development goals must be fully achieved.

### **2.13.2 Social Sustainability**

One of the approaches to establish the concept of participatory local appraisal is by applying the concept of community-based development. A community-based development can be regarded as co-management, in the form of development which is conducted by the community together with the local government in the planning and implementing development and management activities (Brontowiyono, 2012).

A community development strategy is the implementation of a planned change which is consciously and seriously conducted through cooperation among people to improve the structure of the existing social system (Chambers, 2007). This approach needs to be applied since members of the local society are people who know exactly the condition of the local socio-cultural environment. The earlier involvement of the local people can better guarantee the balance between the development program and the community's aspirations or ideas since it will encourage their sense of belonging. This conceptual approach will open the opportunities for a high continuity level of sustainability over the longer-term period. Chambers (2007) further highlights that this can change their lives by:

- i. Improving their quality of life levels that also conserve local identity and culture, simultaneously.
- ii. Increasing incomes while also distributing wealth more evenly to local people.
- iii. Having an orientation to the development of small scale and medium scale business which can accommodate considerable number of labour force and the use of appropriate technology.
- iv. Encouraging the enthusiasm of competition and cooperation.
- v. Utilizing the available potencies as optimally as possible with the smallest impacts.

### **2.13.3 Economic Sustainability**

For economic sustainability to be a success, environmental sustainability factors and social sustainability factors should be achieved as they are the key to growth and development of a country. A country reaches development once all social classes are achieved as they determine the human's wellbeing and productivity. A productive human being means all negative determinants are suppressed and there is a chance of growth and development.

### **2.14 Strategies for Effective Solid Waste Management**

The United Nations Habitat (2013) and United Nations Development Programme (2015) have worked on trying to eliminate unclean environments and raising awareness to the people of developing countries. Their aim under the United Nations SDGs is to have clean environments by 2030 where solid waste is managed, and every citizen has access to a clean environment with no risks of contracting infectious diseases caused by pollution. The following are strategies that have been seen to be effective:

### **2.14.1 Privatization of solid waste management services**

The recently introduced Namibian Public Private Partnership Act (2016) approved by the National Council defines a Public-Private Partnership as an agreement between a public entity and a private entity, in terms of which the private entity provides public infrastructure assets or services for use, either directly or indirectly, by the public and risk is optimally shared. Public-Private Partnerships have been used for over three decades, starting in 1970s. Initially focusing on economic infrastructure, they have evolved to include the procurement of social infrastructure assets and associated non-core services. They are continuously used in housing, health, corrective facilities, energy, water, and solid waste management projects, and have the benefits of increasing innovation and efficiency, as well as risk transfer. They have been a preference for some government entities in solid waste management projects. The City of Windhoek engaged in a PPP under the Open Space and Street Cleaning system which was developed in 1991. Keyter (2010) elaborated that the reason behind the Open Space and Street Cleaning system was to manage solid waste in informal areas as the COW was facing challenges due to the influx in population growth. He further stated that the purpose of the system was to create employment opportunities and provide a community-based approach towards solid waste management as well curb refuse removal costs. Keyter (2010) further adds that the Open Space Street Cleaning System went through a lot of challenges after being implemented and this led for it to be revised in 2002. It was reintroduced in 2006 as the Ward Contractor System where the COW divided Windhoek into sixteen (16) wards, each monitored by a ward contractor that was tasked with the responsibility of coordinating all solid waste management activities.

### **2.14.2 Public education to enhance public awareness**

Minn (2010) states that the success of the SWM strongly depends on people's behaviour. Responsible behaviour or changes in waste disposal practices can best be made when people understand the issue. Thus, well-tuned awareness raising campaigns should be launched to build people's environmental consciousness, to inform them of the impacts of their indiscriminate waste disposal practices and to broaden their understanding of their responsibilities. Use of the media and even community visits will shape the way people think of solid waste. Jensen (2012) reflects that awareness information is not enough to motivate a change in behaviour because information is understood as data or knowledge that is not reflected.

Environmental education should, therefore, be a fundamental and integral part of education for all members of society. Modern societies, both developed and developing need environmental education in its formal and informal aspects. Knowledge of the environment, its conservation and threats must be integrated with the development of sensitivity to respect the natural environment. Fundamental education is therefore the kind of education aimed at realizing a sustainable living for mankind.

### **2.14.3 Promotion of solid waste as a source of energy**

Solid waste holds the greatest potential as biomass. Biomass is a by-product from human activities that is characterized by negative impacts that may affect man and the environment when disposed of in an inappropriate way. The energy derived from the use of solid waste as a renewable energy resource does not have the same negative environment impact associated with the burning of non-renewable energy sources such as fossil fuel coal. The conversion of solid waste to energy can be undertaken with three main process technologies which are biochemical extraction, thermo-chemical extraction, and mechanical extraction. These can

produce useful products like electricity, heat, and transportation fuel. Solid waste if used as an energy can help in provision of electrical power in developing countries as well eliminate the high volumes of waste that is produced daily (Earth Engineering Centre, 2013).

## **2.15 Case Studies of Effective Community Participation in Solid Waste Management**

Despite problems faced by developing countries due to rapid urbanisation and an increase in housing backlog with more people resorting to living in informal settlements with their families has over the years led to an increase in solid waste, there are success and unsuccessful cases of community involvement in management of solid waste that have been recorded and these are the Mathare Community from Nairobi, Kenya and Quito Community from Equador.

### **2.15.1 Case Study 1: Community participation in Mathare Informal Settlement, Kenya**

One of the success stories in Africa in terms of a community-based approach model towards sustainable solid waste management is the Mathare Informal settlement located North of Kenya. It is one of the largest and fastest growing informal settlements in the world with a population estimation of over two hundred thousand (200 000). It has been deemed the Mathare slums. The people of Mathare are characterised by unsafe and overcrowded housing, elevated exposure to environmental hazards, high prevalence of communicable diseases, and a lack of access to essential services, such as solid waste management, sanitation, water and electricity. Residents in Nairobi's slums frequently suffer from tenure insecurity, while widespread poverty and violence further increase their vulnerabilities. Yet residents have been resilient and entrepreneurial, politically organised and have a range of skills that allow them to survive in one of the most difficult urban environments in East Africa. This has not stopped the residents of Mathare to form a community-based approach towards managing their own solid waste (UNHabitat, 2015).

Extracted from Spatial Collective (2014) where they explain how emergency community-based groups formed in Mathare due to the reason that they bear the brunt of missing services such as a lack of proper solid waste management systems leaving people to literally live on and sometimes off waste. Solid waste is often dumped in the informal communities where it accumulates through time and represents a major health hazard to the inhabitants. Government interventions were often missing or were inadequate to solve the problem of solid waste in the informal settlement therefore they formed self-help organisations that equated to community-based organisations and engaged in solid waste management. These groups have been filling the gap left by the absence of state or private firms. They organise their members to collect trash from the households, sort out valuable materials and sell them to middlemen and industries, and sometimes coordinate community clean-ups.

One such group is Juja Road Self-Help Group, which works on a business model where they collect, sort, and then dispose of garbage from households; something that despite the lack of protective gear and any advanced technology it has been working out relatively well. The group generates modest revenue through solid waste collection, as well as basic re-selling of mainly plastics and metals.

### **2.15.2 Case Study 2: Community participation in Quito Informal Settlement, Ecuador**

This case study has been extracted from Hernandez, et al (2008) where they simulate about the Municipality of Quito, Ecuador how they went about to do a pilot project with the objective to look at solid waste collection and how the communities of Quito can be involved, since the Municipality of Quito lacked enough resources to manage the solid waste produced by the people. The whole idea came into play when micro-enterprises that provided separate organic collection on different days wanted to involve the communities in recycling projects. These small enterprises' aim was to seek help from the people to help them with separating the solid

waste collected. Including the people proved to be less problematic since they were educated about the importance of solid waste if managed well. This led to unity and sovereignty among the people of Quito where community participation made them to learn to recycle their own household solid waste before they discarded it for collection. They not only motivated the community members to participate but also initiated activities to clean the neighbourhoods. This grew into a business for the community where the revenues from the sale of recyclable materials has been used to fund towards the development of the community where better houses have been constructed with proper sanitation facilities as well as more of them having access to electricity. Despite the informal settlement being a success in managing their solid waste poor institutionalization became a problem where sustainability was undermined. Questions arose about the way the funds were starting to be used and the community started to disintegrate and more people disbanding from the projects. This was a major lesson for the Ecuador people that for such projects not to fall out over the years, institutionalisation should be involved. The Ecuador case study gives an insight on awareness-raising campaigns, proper communication channels and necessity for a longer-term institutionalisation strategy being important if such projects are to be implemented.

## **2.16 Chapter Conclusion**

This chapter highlighted the literature review that was found to be pertinent to the study. The literature review is structured on the different opinions of authors that have written on solid waste management, from strategies found to be most effective, effects of poor management, the perception of the communities and lessons learnt from successful projects over the years.

## CHAPTER 3 RESEARCH METHODOLOGY

### 3.1 Introduction

To plan and carry out research, it was necessary for the author to get an in-depth understanding of the research entails thus; Research is an organized and systematic way of finding answers to questions.

Systematic because there is a definite set of procedures and steps which you will follow.

There are certain things in the research process that are always done in order to get the most accurate results.

Organized in that there is a structure or method in going about doing research. It is a planned procedure, not a spontaneous one. It focuses and is limited to a specific scope.

Finding answers is the end of all research. Whether it is the answer to a hypothesis or even a simple question, research is successful when we find answers. Sometimes the answer is no, but it is still an answer.

Questions are central to research. If there are no questions, then the answer is of no use.

Research focuses on relevant, useful, and important questions. Without a question, research has no focus, drive, or purpose (Linguistics, 2011).

### 3.2 Research Design

Ghauri (2010) states that the design of a research is the plan for relating conceptual research problems to applicable and practicable empirical research. This is to provide a strategy or a framework for data collection and analysis. The research methods utilised for data collection were questionnaires, interviews and observational surveys. A survey is an effective tool to get views, attitudes and descriptions as well as for capturing cause-and-effect relationships.

The study followed a qualitative approach where the qualitative method was used to find out individual experiences, perspectives, and opinions on the management of solid waste in the community; this was done using questionnaires and interviews. Royce (2015) states that the qualitative research method gives the researcher an opportunity to interact with individuals or groups whose experiences the researcher wants to understand so as to foster a relationship with them whereas Harwell (2010) suggests that a qualitative research method is usually described as allowing a detailed exploration of a topic of interest in which information is collected by a researcher through case studies, ethnographic work and interviews'. The researcher used case models as comparison what other countries have done to augment the problem of high volumes of solid waste in informal settlements.

In figure 8 on page 46 it illustrates the research design diagram that shows all the stages followed during the research:

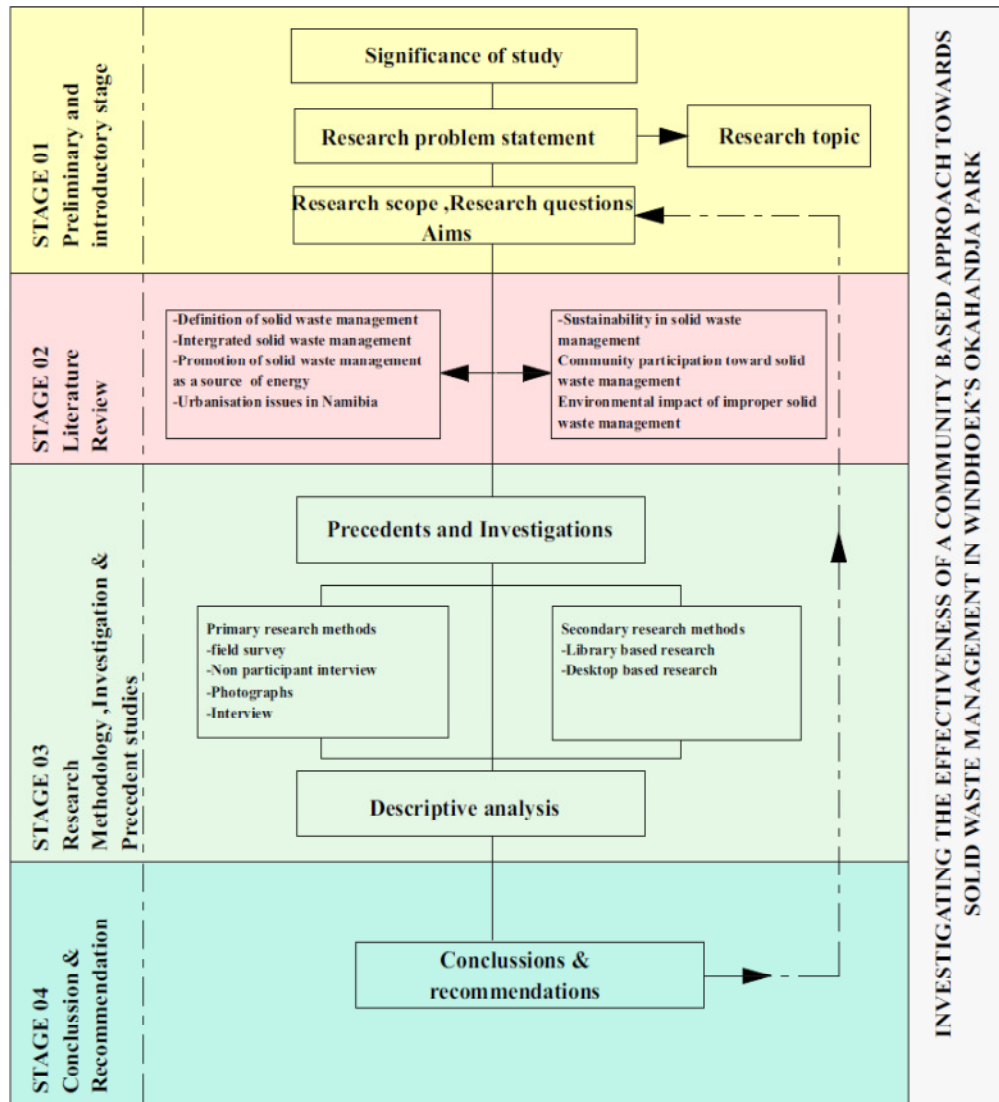


Figure 8: Research Design Diagram. Source: Author.

### 3.3 Population

Okahandja Park has a population of two thousand two hundred and five (2 205) (City of Windhoek, 2016). The target population were the settlement dwellers mainly women, single men and vendors.

Professional personnel from the Solid Waste and Infrastructure Division at the COW which included the Educational Officer, Monitoring and Evaluation Officer, Liaison Officer and the Development Officer were part of the population that was interviewed. Three supervising

personnel from Extreme Cleaning Services Company which is in-charge of cleaning the Okahandja Park Ward were also interviewed. Constraints like being unable to cover the whole population were encountered during the collection of data, thus sampling was found more feasible.

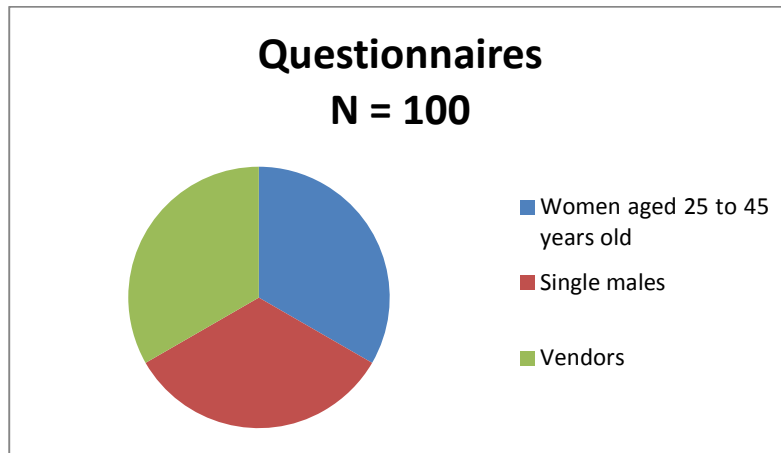
### **3.4 Sampling Procedure**

The aim of the research is to study a sample of participants of the Okahandja Park. The extent to which we can generalise population is dependent on how the sampling technique resembles the population. The sampling technique used for the distribution of questionnaires for the public was the non-probability sampling. A total of one hundred (100) respondents were sampled covering the study area. The individual respondents were chosen through purposive sampling.

#### **3.4.1 Purposive sampling**

Every individual in the population is known and each has a certain probability of being selected. A random process decides the sample based on each individual's probability (Milgram, 2008).

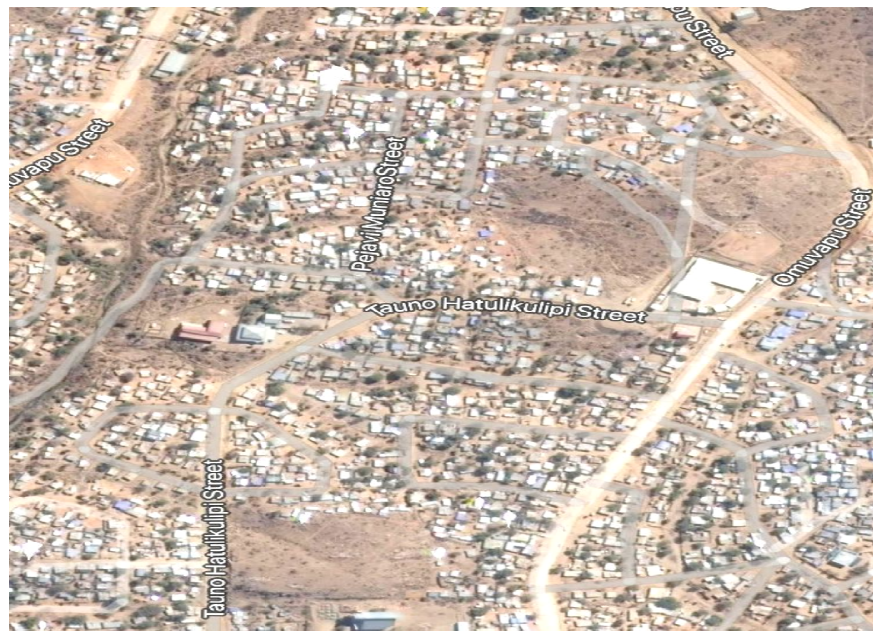
Individuals were selected purposively. The hundred respondents included vendors, women aged between 25 to 45 years old and males who are unmarried or did not live with women. This type of sampling was used so as small, informative samples were selected. Each individual from these classes were selected according to the researcher's judgement. The respondents selected were from three different streets that showed the same characteristics which had more shacks, had more litter and had all the classes required for the research. Questionnaires were then given out to the selected one hundred (100) respondents.



*Figure 9: Distribution of questionnaires.*

The following areas in the Okahandja Park Ward were studied for this research:

- Maxuilili Area - Pejavi Muniaro Street
- Tauno Hatulikulipi street
- Omuvapu Street



*Figure 10: Aerial View of Maxuilili Area (Okahandja Park). Source: (GoogleMaps).*

The use of questionnaires gave the researcher a practical experience during the interaction with the Okahandja Park inhabitants. However, the information collected through questionnaires was difficult to validate due to the respondents reading and interpreting the questions differently, therefore the responses were based on their own interpretation of the question. To close the validity gap, the researcher had to use interpreters.

### **3.5 Research Instruments**

The research followed a qualitative approach, both primary and secondary data collection methods were used. The methods used for data collection included questionnaires, non-participative observation by the researcher, interviews and a series of street surveys, desk review research and library research. The data collection was conducted from August to October 2017 which was for duration of five weeks.

#### **3.5.1 Data collection procedure**

##### **i. Non-participant observation and survey**

This method was used to analyse and document the real-world situation, culture, characteristics, location and activities within Okahandja Park in the Maxuilili section. It took place from 15 September 2017 to 16 September 2017. During the period of the observations, the researcher mapped out the lifestyle of the people of Okahandja Park, their system of solid waste management and photographs were taken. The observations were done early morning before pick-ups, then in the evenings to experience and record as the events within these communities unfold naturally.

##### **ii. Personal experience and engagement**

The researcher had direct contact and close interaction with the dwellers where questionnaires were distributed randomly to the young and the old to get their opinion about

the state of solid waste management in their communities and their experience. Interviews were also undertaken mainly with the community leaders. The main aim was to gather more information on their opinions on the current state and missing functions that would render their communities to be unpleasant spaces to live in. Participation was voluntary, and the responses were recorded on the condition that the participants agreed.

### **3.5.2 Library based research**

The researcher used the University of Namibia and other local libraries available in the vicinity. Libraries were used for literature collection, the study and analysis of earlier studies through journals and reports. Books were useful not only to find information to solve the research problem but also to better understand and explain the research problem.

### **3.5.3 Desktop based research**

This process involved accessing already gathered information either from the originator or from a distributor of primary research on the internet. The research included collecting information from third-party sources such as websites, journals, magazine articles and research and project reports. This was useful for the literature review and precedent studies.

### **3.5.4 Interviews**

Interviews were used to gather information on the solid waste management services within the Okahandja Park. Various professionals from the Solid Waste Management and Infrastructure division at COW were interviewed to get an in-depth understanding on how best they have worked on improving and controlling the state of solid waste in informal settlements. These interviews took place on 6 of September 2017. More insight was shared on the structure and problems faced. Exploratory information was given, and this was

accompanied with a field trip to Okahandja Park where the researcher was shown all the procedures taken to manage solid waste in these communities.

Missing functions were also investigated that were found to render their strategies sustainable towards the improvement of urban quality, and furthermore promote localised development.

#### **i. Professionals in the Solid Waste Management Division**

A wide range of individuals who are involved in the management and design of solid waste management programmes were interviewed using a question schedule. These were the Education Officer, Liaison Officer, Development Officer and the Monitoring and Evaluation Officer. The researcher used a recorder and took notes during the interviews. Each interview was 30 – 45 minutes and the interviews were done individually.

#### **ii. Okahandja Park Individuals and Community Leaders**

Individuals interviewed included; community leaders, home owners mostly women and vendors. Interpreters were used as some were responding in the local languages which were mainly Oshiwambo and Afrikaans.

#### **iii. Private ward contractors**

Supervising workers from the Extreme Cleaning Services were interviewed using a question schedule. The researcher sent an email with the question schedule and carried out telephonic interviews.

### **3.5.5 Focus Groups**

The focus groups were made of the vendors found in the three streets of Maxuilili and randomly chosen individuals who volunteered to be part of the group discussions. Questions were asked in the local language if needed to be and the researcher made use of an interpreter. This was for easy communication with the focus groups and the information

gathered was translated to English. The researcher was part of the group and contributed to motivate the group to participate. The discussions were recorded to ensure that all important information is captured.

### **3.5.6 Questionnaire based research**

The researcher adopted the use of semi- structured questionnaires as this does not confine the respondents to a set of answers and can therefore express their views without any limitations. The questions focused on the respondents understanding of solid waste management and how community participation can be achieved within the Okahandja Park settlement. Although this method was yielding subjective responses, it relied on the responses provided. The researcher assumed that participants' responses were accurate, honest and truthful. Random questions taken from the questionnaire were directed to the focus groups and then the full questionnaire was distributed to the sampled population.

### **3.5.7 Types of questionnaires**

The questionnaires were distributed to the Okahandja Park sampled population that were chosen using purposive sampling. The questionnaire had gaps were the participants were required to fill in their responses on the asked questions.

### **3.5.8 Structure of the questionnaire**

The format of the questionnaire consisted of three sections that the participants were required to complete, the first section was asking the participants about their background. The second section was concerned about the user experience on solid waste generation and management. The third section investigated the community participation awareness and education provided to the people.

### **3.6 Data Analysis**

Data analysis refers to examining what has been collected in a research and making deductions and inferences (Ghauri and Grouhaug, 2010). Data was analysed and presented using descriptive analysis as well as use of pie charts and bar graphs. In-depth analysis of the findings from the questionnaires, interviews, observations and focus group discussions allowed for conclusions and inferences to be made about community participation in solid waste management. Qualitative data from residents was analysed using Microsoft excel to produce totals and percentages which were presented in form of pie charts and tables. All the methods were carried out with ethical consideration were respondent's views were respected and none were forced to be part of the research.

### **3.7 Research Ethics**

It was of paramount importance to maintain high ethical standards to maintain honesty, integrity, accountability and openness (Angelica Orb, 2011 ). Ethical issues in research are the cornerstone for conducting effective and meaningful research. Ethical issues advocate respect and protection of the respondents who should be treated with independence and as such they were informed that the participation is voluntary (Angelica Orb, 2011 ). The five principles of ethics as outsourced by the American Psychologists Association that were followed are:

- Discuss intellectual property clearly.
- Be conscious of multiple roles.
- Follow informed consent rules.
- Respect confidentiality and privacy.
- Tap into research resources (Angelica Orb, 2011 ).

In this research the researcher took several ethical steps to ensure that the research was ethically acceptable. The researcher requested for permission and a research permission letter from the Postgraduate Centre to conduct the research. This letter was used to seek for permission from the City of Windhoek to carry out the research and permission was granted.

### **3.7.1 Confidentiality**

The participants were given assurance that their identities will be kept confidential and the information they provided was to be used for academic purposes only. The respondents requested not to be mentioned and this was respected by the researcher. All records given to the researcher by the COW were kept in confidentiality and protected from any unauthorised observation.

### **3.7.2 Privacy**

The researcher protected the rights and general wellbeing of the participants; this was achieved by observing the ethical considerations of the study.

### **3.7.3 Integrity and responsibility**

Data falsification and dishonesty was avoided by the researcher by being objective the whole research. Literature data was acknowledged by the researcher whereby all authors were acknowledged. Additionally, the researcher kept to appropriate data security. The information is kept in encrypted files and will be kept for a period of four years. Raw data will be destroyed after a period of four years by deleting all the files in the voice recorders.

## **3.8 Chapter Conclusion**

This chapter looked at the research design, the data collection and analysis methods and ethical considerations. Primary and secondary methods were used to collect the information

throughout the research. The researcher observed the ethical considerations to avoid respondents feeling as if they are being interrogated and to give them a sense of comfort as they interacted with the researcher. The information collected was to be inter-linked to give a better understanding of the study.

## **CHAPTER 4 DATA PRESENTATION AND ANALYSIS**

### **4.1 Introduction**

Chapter three introduced the research methods and established its relevance to the study. Important methodological issues such as research design, sampling procedure, data collection tools were discussed in detail. It has also explained the methods used in data analysis. This chapter provides the analysis, presentation and discussion of the research findings. Effective planning strategies by the City of Windhoek authorities depends on reliable data on household and municipal solid waste characteristics, collection and disposal as well as perceptions by stakeholders on effective solid waste management options. The data is discussed in line with the research questions and literature citations in chapters one and two respectively. This chapter presents the findings of the research in terms of residents' perceptions and roles in Solid Waste Management including. The aim of the research was to find out Okahandja Park people's involvement in solid waste management.

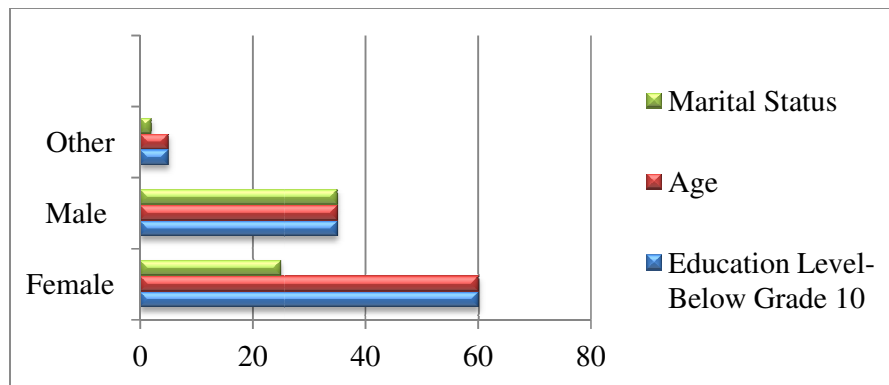
### **4.2 Socio-Economic characteristics of Respondents**

The gender, educational level, occupation and duration of respondents who live in the Okahandja Park area were investigated as a way of providing the background information to the study. These were studied to provide the general characteristics of the study population. In view of this, the findings on these variables are discussed below.

#### **4.2.1 Background Information Distribution**

The graph in Figure 11 shows the gender, age and marital status ratio of the respondents as how they responded in the questionnaires. A total of Sixty (60%) of the respondents were female who have an average age of thirty-five years old and are mostly single mothers who

are cohabitating with their partners or married. From the female respondents twenty-five were married and/ or either cohabitating with their partners and all sixty were in the age range of 25- 45 years. Sixty female respondents specified they did not go beyond grade 10. Thirty-five (35%) were male with an average age of twenty-five years, mostly single and had no grade 10 whilst the remaining five (5%) opted not to say their gender and chose other. This group stated they are single and had an average age of twenty years with no grade 10. From the results it shows the sample had more women since most of them were available at their homes.



*Figure 11: Background information of the respondents.*

A high number of the responses indicated that the respondents are employed and have basic education. From the responses received it showed that many of them migrated from different towns in search of better opportunities so as they will be able to fend for their families but due to a lack of affordable housing in Windhoek they were forced to build their own shacks or rent in the resettlement areas.

#### **4.2.2 Duration and employment status of respondents living in the study area**

As illustrated in figure 12 below; Forty (40%) of the respondents stated that they have been living in Okahandja Park for over ten years and thirty (30%) responses stating they have been

living in the study area for less than five years. Another thirty (30%) stated they have lived in the study area for ten years. Since most of the respondents have been living in the study area for over a decade it is expected to influence their willingness to pay for solid waste management. The longer the period they have lived in the area, the more likely they are to understand the problems of solid waste management (SWM) in the area and the more they would be willing to pay for improvement in solid waste management.

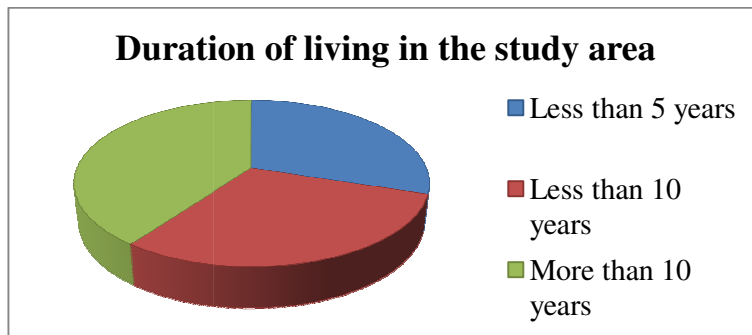


Figure 12: Duration of stay in the study area.

Formal employment rate of the respondents was found to be satisfyingly high with a percentage of fifty (50%) with most of them doing blue collar jobs. The responses also showed that twenty-five (25%) of them are unemployed and the remaining twenty-five (25%) are self-employed with a lot of business activities that helps them to survive with their families as shown in figure 13. Since majority of the respondents are earning a living it means they can afford to pay for the solid waste management services.

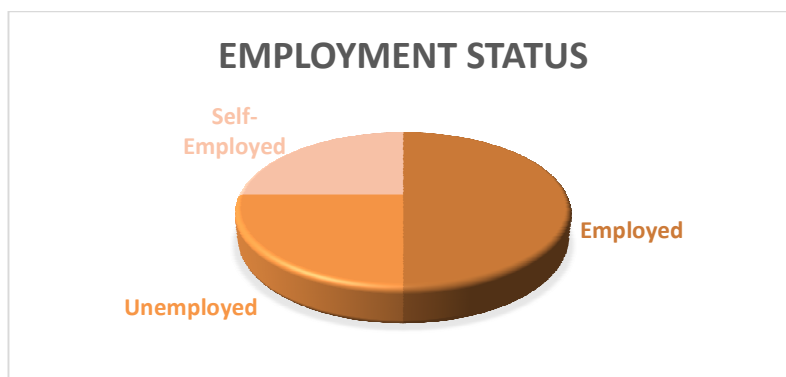


Figure 13: Employment status of respondents.

### 4.3 Solid Waste Generation and Management

#### 4.3.1 Solid waste generated by the respondents

Different types of waste are generated daily. The main types of waste that the respondents mentioned is plastic and food scraps whilst others mentioned they sometimes generate residues of tyres and bottles. From the data collected a total of eighty (80%) of the respondents stated their main source of waste to be food and plastic with each comprising of forty (40%) respectively whilst the twenty (20%) were for the bottles, tyres, wood and metal residues from their welding, carpentry and other miscellaneous businesses.

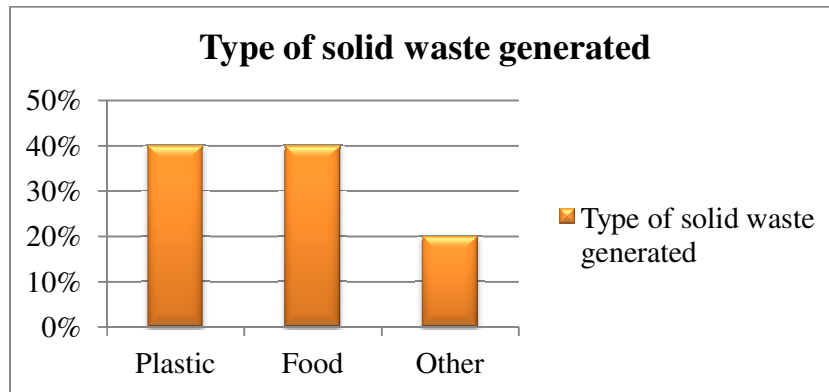
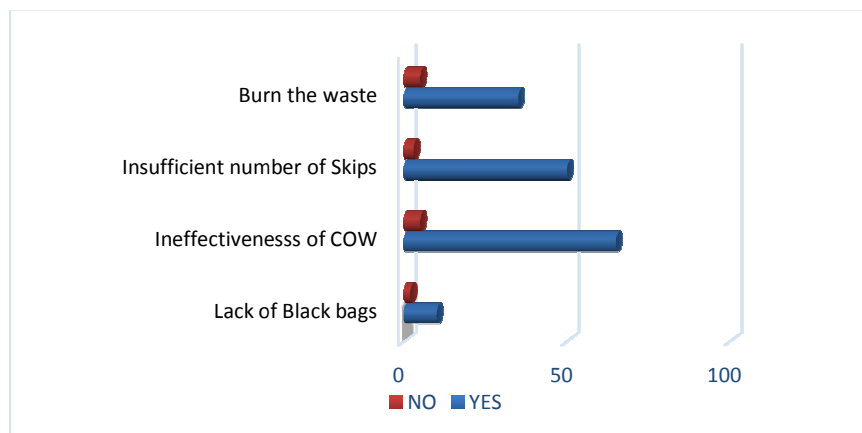


Figure 14: Type of waste generated responses.

#### 4.3.2 Solid waste disposal methods



*Figure 15: Responses on solid waste disposal services.*

The responses shown above in figure 15 indicate that the respondents are dissatisfied with the services from the COW. They highlighted that even though they are given black bags for disposal of their household waste, the COW takes a long time to come pick up the bags. They further indicated they are given two bags per household for a week which they stated it is not enough and thus has forced them to dispose their waste anywhere.



*Figure 16: A black bag hanging at the gate of a household. Source: (Author, October13, 2017).*

The other problem they highlighted was the insufficient number of skip containers as the containers are stationed very far and this has led to many of them disposing their black bags anywhere. The respondents further indicated that dogs usually tear up the bags making the solid waste to clutter everywhere whilst some have concluded that they burn the waste since the waste can stay up to three days uncollected. The solid waste management system is poor in these areas of informal settlements as solid waste is seen scattered everywhere and the people responsible for clearing and cleaning the areas have abandoned their services causing the area to be inhabitable.



*Figure 17: Torn black bags at a dumping site near a sewage gully. Source: (Author, October13, 2017).*



*Figure 18: Cluttered solid waste. Source: (Author, October13, 2017).*

Insufficient number of skip containers is another problem that was perceived from the responses and this made the containers to be full all the time becoming breeding places for flies thus resulting being nicknamed landfills by the people of Okahandja Park. They further highlighted that these skip containers have unbearable smells that have led to those who were staying next to them to move. The respondents' main worry was the sewage burst pipes with water flowing up to the skip containers or where there are disposal sites. Their dissatisfaction

was on the issue of their children being risked on contracting diseases from these parasite infested areas.



*Figure 19: Skip Container in Okahandja Park, Maxuilili Area. Source: (Author, October13, 2017).*



*Figure 20: Empty Skip Container in Okahandja Park, Maxuilili Area. Source: (Author, October13, 2017).*

In figures 19 and 20 above shows skip containers one which is near the road leading to Okuryangava. The pictures were taken at different time intervals with the first one taken in the afternoon and the second one in the morning after it was emptied. Both these skip containers are situated far from most households which most respondents stated they have

opted to dump their waste on the street or in gulleys because they cannot walk long distances to the skip containers just to dump rubbish, so they would rather dump anywhere on the streets.

### 4.3.3 Solid waste management techniques

To assess respondents' views regarding their role in solid waste management, respondents were asked questions regarding the best disposal methods and if they are aware of environmental problems resulting from improper solid waste disposal.

As illustrated below on the graph in figure 21 a high number of the responses indicated that the major technique used to manage their waste is through open space burning which had fifty (50%) responses as it is what they are most familiar with. Recycling and reusing are also other techniques that they have managed to keep up to date with, with each twenty-nine (29%) and twenty-five (25%) responses respectively.

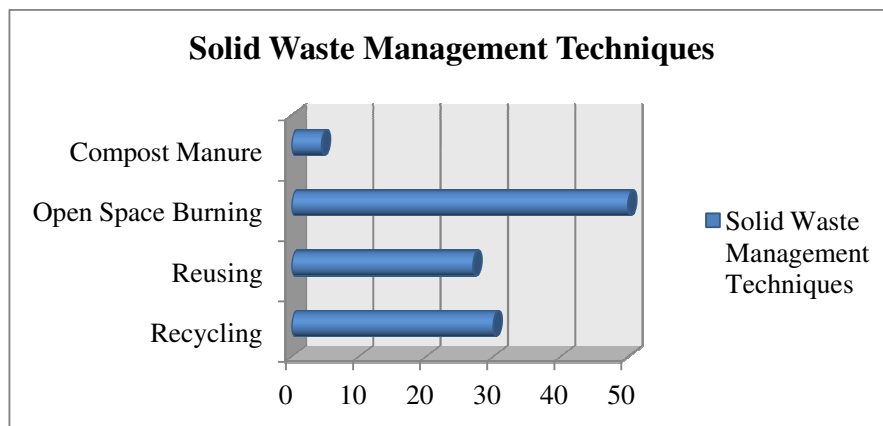


Figure 21: Solid Waste Management Techniques.

The respondents explained that what they normally recycle, or reuse are plastic bags and plastic bottles which they keep for disposal bags and for water storage. Only five (5%) use the composting method because they do not own gardens, therefore they had never had the urge to use their waste as compost manure.

The respondents highlighted on the problems they usually face because of improper waste management and these were their children constantly suffering from diarrhoea and in some cases bilharzias. It was also highlighted that the measures they have taken to curb these problems is to burn uncollected waste.

#### **4.3.4 Solid waste management in Okahandja Park**

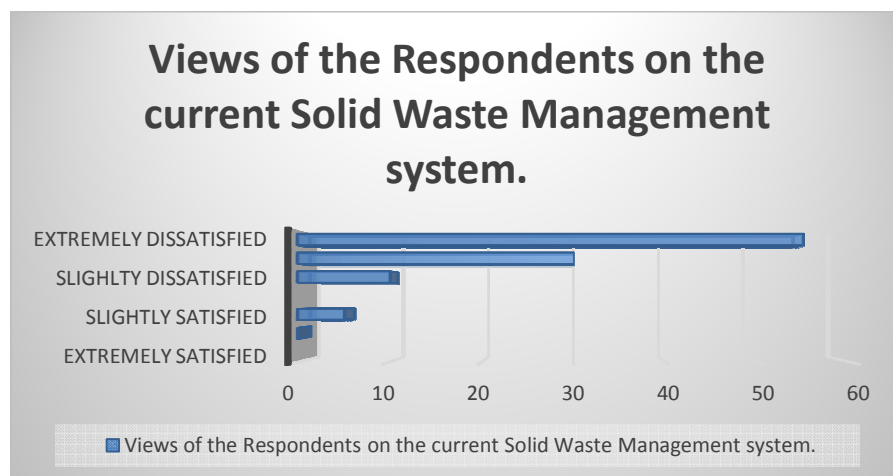
The respondents were asked to give reasons on why waste was found all over places, seventy-five (75%) indicated that solid waste was found all over the community due to the failure of the municipality to manage it while fifteen (15%) stated it was the resident's irresponsibility therefore it should not always be the COW's duty to manage the waste in their areas. The responses which blamed the COW was on the fact that they pay rates therefore they should provide better management systems than what they are providing now because they are now having problems of rodents, mosquitoes and flies breeding in these communities.



*Figure 22: Topography of Okahandja Park. Source: (Author, October 13, 2017).*

The respondents further stated that the council failed to put in place a system on how solid waste can be managed and had failed to punish offenders who pollute. One response noted was:

*“We cannot keep household solid indoors for a long time if they do not collect it as often they should be. The reason is because it produces really bad odors, invites flies, rodents, mosquitoes and other disease-causing pathogens. We tend to throw it onto the street because of fear of catching diseases. When we do it this we feel like we have lessened the burden of catching any diseases. That is why you see the streets dirty with clutter everywhere as the throwing away culture has built in most of us and has become a norm. Our communities will never be clean if waste collection is not improved even though we pay rates”* (Questionnaire).



*Figure 23: Responses to questions on services rendered.*

The above responses in figure 23 showed the people are not satisfied with the manner solid waste is handled in informal settlements as most of these areas are left unattended to and it has become a worrisome problem that they are now accustomed to. As shown on the graph above most of the responses received the respondents are extremely dissatisfied with the current system that the Municipality put in place. They wish if they can be improvements done so as they can also experience the benefits of staying in clean environments compared to formal areas in Windhoek.

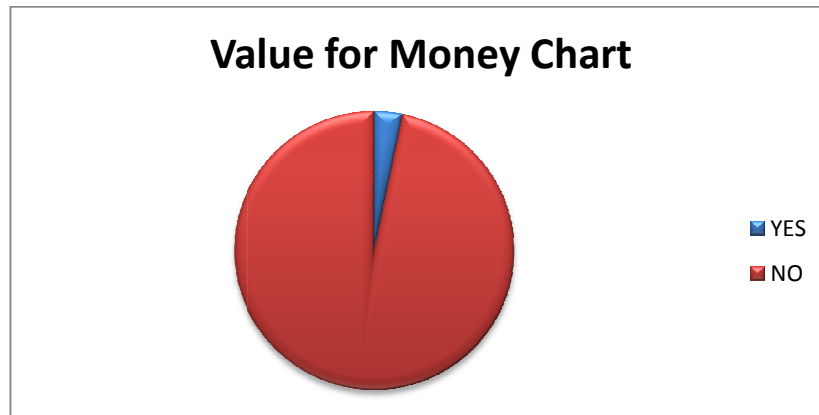


*Figure 24: Streets have become pathogen breeding places. Source: (Author, October 13, 2017).*

#### **4.3.5 Value for Money (Vfm)**

Gay (2008) defines Value for money as the measure of quality of monetary cost of the product or service against the quality and benefits of that product or service considering subjective factors such as fitness for purpose, along with whole of life costs such as installation, training, maintenance and wastage. It is basically used about something that is well worth the money spent on.

Ninety (90%) of the respondents stated that the rates they pay to the Windhoek Municipality are not on par with the services they receive in terms of managing solid waste in their communities. They emphasised they felt they are being robbed of their hard-earned money because there have not been any improvements after so many complaints being placed by their community leaders. They highlighted that they have continuously requested for clean-up services as well as more black bags and skip containers so as their communities can be clean and habitable for their children.



*Figure 25: Value for money responses.*

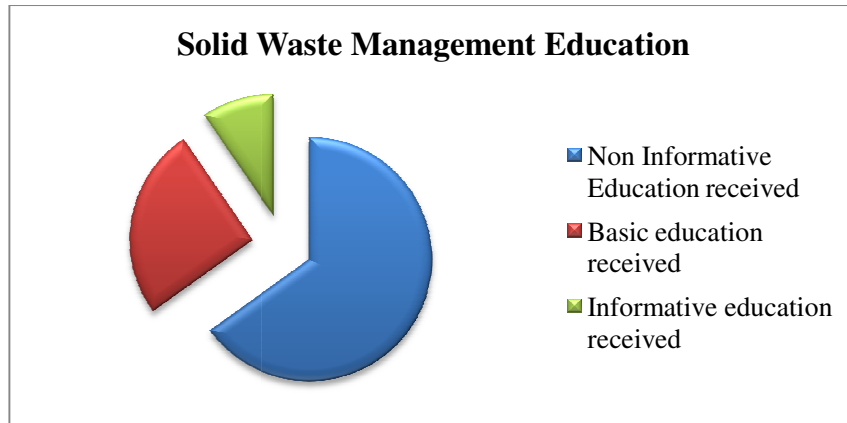
The remaining ten (10%) highlighted that there is value for money in the services rendered and pointed out that the COW is trying to meet up to all their demands, but the increasing population and lack of resources has led to the COW having difficulties in trying to meet up to their demands. They further stated that the rates that they pay are worth the services they receive because they do not pay as much as what is paid in the formal areas. They felt it was their responsibilities as communities to help clean up their communities and make it habitable for their children and women as they are more prone to diseases.

#### **4.4 Community Participation**

##### **4.4.1 Attitudes towards solid waste management education**

The respondents highlighted that they have received awareness programmes on solid waste management, but the education was not sufficient to help them. The respondents further highlighted that the education was limited to the basic stuff and were not educated on the SWM methods that will aid them in generating incomes for their communities. Additionally, the respondents stated that the campaigns have never been innovative to them because they were merely on how they should use the black bags and skip containers. Their views highlighted that since the education they received is basic therefore SWM should be a

responsibility for the COW authorities only. The respondents specified that their responsibility was limited when it came to waste management as they dispose on sites they were showed by the COW authorities.

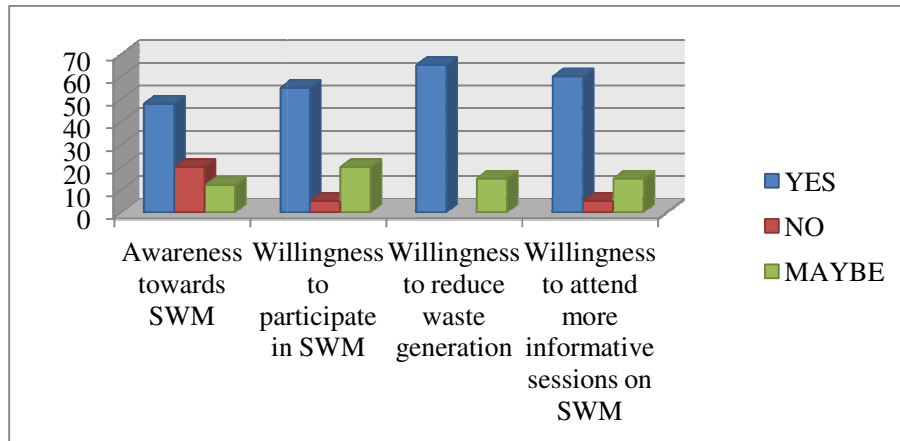


*Figure 26: Responses on SWM education given to the people.*

From the responses illustrated above on the pie chart it shows people in the study lack the necessary knowledge on SWM and this has been highlighted as one of the restrictions that has led them not to worry about keeping their communities clean. Lack of knowledge has been a burrowing effect in our mind sets just as a tree with dying roots. This can be supported by how Okahandja Park residents have kept a blind eye on managing solid waste in their communities because of not being educated strongly on this predicament.

*“Knowledge is Power. Information is liberating. Education is the premise of progress in every society, in every family” (Koffi Annan, 1997).*

#### 4.4.2 Perceptions of the Residents



*Figure 27: Attitudes and Perceptions of Respondents.*

The responses received showed that the respondents would get involved in solid waste management if given proper education that will not only benefit their community. They showed immense interest in joining forces with the COW if their approach becomes more innovative and beneficial to their well-being. Eighty (80%) of the responses were willing to participate in SWM as well get involved in more informative sessions that will help reduce their waste generation.

#### 4.4.3 Benefits of Community participation

Figure 28 show that the respondents had little knowledge about the benefits of solid waste management. They mentioned a few benefits they knew about or thought will bring change in the community if SWM is practised effectively and efficiently with the right resources and guidance. In respect to the pie chart forty-five (45%) of the respondents had knowledge about practising waste management for clean hygienic environments. Thirty (30%) stated that they had little knowledge on projects that can be implemented to generate income for their households whilst the remaining twenty-five (25%) stated that educational projects are

needed to help equip them with more knowledge so that they can be able to work on the other two benefits.

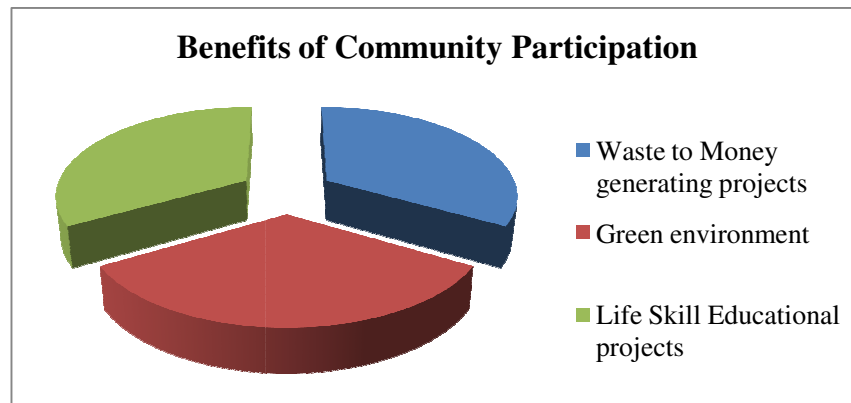


Figure 28: Benefits of Community participation in SWM.

The respondents stated that it is not that they only lack knowledge in SWM, but they need guidance and resources to help them improve the state of their community into a green environment.

#### 4.5 Interview Findings

The interview findings were based on the overall questions asked by the researcher and they are categorised as follows:

##### 4.5.1 Reasons why Solid Waste Management has been a failure in informal settlements

The COW authorities that were interviewed highlighted that the problem they encountered on several occasions in these precarious areas is that the people have approached SWM with negative attitudes. Kumar (2013), states that an attitude is a hypothetical construct that represents an individual's like or dislike for an item. Attitudes are positive, negative or neutral views of an 'Attitude Object'. People can also be 'Ambivalent Towards' a target, meaning that they simultaneously possess a positive and a negative bias towards the attitude in question. It was highlighted that they provide educational programmes that promote

community participation, but this has always been ignored by the residents as they think it will not benefit them. The authorities further highlighted that they have tried to explain to the dwellers that participation does not mean it should operate in a vacuum, but cooperation is the most important link between the COW and the people. Motivational processes have been encouraged in numerous occasions but due to their negativity they have never been interested in participating in promotion of clean environments for their children.

Secondly it was highlighted that manipulation of involving people in SWM with no power or legitimate function has proved to have no guarantee towards objectives and benefits being achieved. For active participatory practices, it is vital to enforce that all relevant actors and their roles have a part in solid waste management. Therefore, ideas have been brought up that opening of markets that concentrate on promoting projects that yield incomes would motivate the residents to participate in household solid waste management.

#### **4.5.2 Responses from the Private Ward Contractors on how Solid Waste Management can be improved in informal settlements.**

The private ward cleaners indicated that the residents of Okahandja Park need educational programmes that will give them more knowledge on the benefits of keeping their surroundings clean. The contractors highlighted on the use of attractive life training programmes as most of these people migrated from their villages to look for jobs therefore if they introduced skills that will benefit the residents in generating incomes through recycling or starting garden projects, they will see the need of managing their solid waste.

The responses they gave indicated that even though they collect and clean the areas daily, there is still a problem of improper dumping of waste as most of the residents are lazy to walk to the skip containers provided as they are in every 3km radius which is far for some

households. Therefore, the residents have opted to dump their disposal bags anywhere accessible to stray dogs that tear up the bags.

#### **4.5.3 Responses on how the communities can be motivated to work with the City of Windhoek and the Private Ward Contractors.**

The COW and the ward contractors encouraged the residents to be more vigilant when it came to their environments and be more cultivated to work towards keeping their surroundings clean. They should not wait for the ward cleaners to come clean, but it is also their duty as residents of these communities to try work together as well as educate their children on the need to live in clean environments so that they grow with that knowledge.

They further highlighted that the GRN should provide for more technical projects that will help the residents to use the waste they generate into profit making projects that will empower them as individuals.

#### **4.6 Chapter Conclusion**

This chapter was on the data analysis objective of the responses given by the participants. The data was analysed and explained on the problems that the people of Okahandja Park are facing when it came to solid waste. More of them believed there can be a drastic change in their community if they got involved and the local authorities do not side-line them. Henceforth a model can be used to improve the situation in these informal settlements and will be explained in detail in the next chapter. It will help in answering the main question which is: In what ways and to what extent does the community participate in solid waste management in informal settlements?

## **CHAPTER 5 INTERPRETATION OF DATA FINDINGS**

### **5.1 Introduction**

Findings from this research indicated poor household solid waste management practices, poor knowledge of proper solid waste disposal and negative attitude towards proper waste management as the main characteristics in improper solid waste management. Poor solid waste management practices are not related to social demographic characteristics such as sex, age, employment status, education or family size but are related to knowledge and attitude. Having higher education does not necessarily mean one now has higher environmental education as environmental education is only gained through informal training and education. Attitude and knowledge predicted household solid waste management. Poor solid waste sorting, separation, and disposal practices found in this research proved that negative attitudes and lack of knowledge led to improper waste management.

### **5.2 Perception and Willingness of Communities to participate in Solid Waste Management**

Empowerment, personal development through training and building skills and promotion of collective action will help to change the perceptions these communities have towards community involvement in solid waste management instead of leaving all responsibility to City of Windhoek. This will influence their sense of intervention in SWM issues in their communities. It will not only change their attitudes towards solid waste management but will improve their relationships. Having been given the platform to share their views on the state of their communities because of solid waste, the respondents became even more confident, participated decisively and shared vision of influencing the management process by stating strategies they saw fit to solve their problems on improper solid waste management. These

findings highlighted that the people are willing to take initiative roles in decision making and leadership.

The respondents got involved during the focus groups discussions, they cooperated more actively. It gave strong evidence that for people to be interested in something they need to be mobilized and encouraged. This will help in enabling the service providers to understand in greater depth the people's opinions and feedback once they also get involved with the people.

Issues of attitudes and perceptions appear to affect residents and council authorities' views regarding SWM in Okahandja Park. An issue such as residents' views on whose responsibility it is to keep the communities clean influences each individual's littering behaviour. Community participation is not an easy path to enforce because it requires strict changes in people's attitude and behaviour and the COW should play the bigger role of recognising the importance of the people. It takes tough measures and will for the local authority to finally recognise the people in SW projects because they have doubts in the communities of having technical abilities to facilitate this participation process. However, with local authorities it was found that they are different in terms of them having political will and perceiving the importance of community participation.

With the findings gathered it showed that lack of knowledge and skills are setbacks that have led to the implementation of ill-conceived solid waste management programmes that have disappointed the people of Okahandja Park, therefore the City of Windhoek should always be ready to partner with the community for an effective SWM process. The findings agree with a report published by the World Bank (2010) where they identified that lack of technical and institutional capacity as barriers in the public-sector form weak partnerships. City of Windhoek needs to change their practices by enhancing their management skills and the need to fulfil their new role of becoming service partners. SWM requires expertise and knowledge,

when it was analysed it was found that some of the residents of Okahandja Park lacked awareness in SWM and this was translated as not practicing pro-environmental behaviour. This means it is very wrong to believe that people who already know about SWM are more likely to change their behaviour towards it. Failure to translate knowledge into practice would limit community participation.

From the findings it can be speculated that respondents can possess knowledge about SWM, but it does not mean that their actual behaviour will correspond to their knowledge. Therefore, it is very important to assure that they understand the consequences of improper solid waste management. Additionally, for people to participate with effectiveness they should be given quality information they can understand and use. For this to be successful, strict policies on achieving ISWM are needed as well as good educational methods that will raise awareness to the people.

Lastly the researcher noticed that power inequalities within the respondents represent an equally important barrier to engagement. This drew a lot of attention that there is a necessity to establish how inequalities can be overcome so as there will be powerful partnerships between the COW and the people of Okahandja Park. Okahandja Park is a marginalized informal settlement and building a platform for local authority to participant dialogues and interactions will enhance self-worth, trust and dedication among the people. This issue can be dealt with by allowing the residents to demand for their needs to be met, exchange ideas with the local authority, plan together and implement these ideas together. This will increase the probability of community participation to be valid, meaningful and inclusive.

### **5.3 Role of City of Windhoek Municipality**

Final findings discovered during interviews held with COW professionals showed that the COW tries and works hard to bring service delivery in solid waste management in informal settlements. The interviewees explained all the services they provide to the informal communities and how they have even encouraged for the open-door policy where they can come and share their problems and views on how to improve the current state of waste management in their communities. The COW stated they implemented the Open Space Street Cleaning project where they contracted different companies to clean all the sixteen wards in Windhoek. Each contractor is to assist with solid waste collection and street cleaning in these wards. For the past years the OSSC has been successful in low density suburbs as compared to the high-density suburbs as found during the research because of population capacity.

The field visits taken by the researcher with the COW personnel showed that these contracted companies are not keeping their end of the agreement as the areas filled with uncollected bags on the streets as well as in the skip containers. This explains why the necessity of community involvement in such situations if the contractors are not doing their part. Analysed from the responses given by the respondents they highlighted that the COW should start community-based organisations that will oversee such projects in their communities to empower them since a high number of them are unemployed. They shared the thought that if given the opportunity they will deliver good results as compared to the cleaning contractors as they have shown not to care about their wellbeing. They stressed out the point that the OSSC is a project that works best in low density suburbs and not in informal settlements.

During the interviews, the COW personnel were further asked about the points that were raised by the Okahandja Park residents in concern with the contracted cleaning company.

COW stressed on the response that it might be true that the ward contractors are not keeping their part of the agreement, but it is also the residents' responsibility to take care of their communities. It should be in them not to be careless with their waste as some dispose in unrestricted areas when they are provided with skip containers.

COW personnel also stressed the point that they do offer educational programmes on solid waste management where they visit schools, churches, community gatherings and even vendors where they share informative sessions with them by teaching them on awareness programmes and dangers of improper management of solid waste. The researcher noticed that there is a training and learning development department in the Solid Waste Management Division at the COW.

COW also highlighted on the plight that vendors leave their produce residue unattended. It should be their responsibility to take care of their vending places. The vendors were not in agreement as they stated that they try to clean their vending stalls, but the skip containers are always full therefore when they dispose their garbage it falls onto the ground which is then blown by the wind or picked by the dogs. They requested for the COW to act and to provide their communities with CBOs which they stated will provide better services than what is provided to them.

The COW noted that collections are done twice a week and the waste is taken to Kupferberg landfill where the waste is disposed permanently. They highlighted the problem they are experiencing is that of scavengers who come to the landfills to pick up wares and take back to the communities. The wares are never used and end up being discarded on the streets again.



*Figure 29: Kupferberg Landfill Site. Source: (Tjihenuna, 2016).*

When the question was raised about the health risk of the landfills to the people, the professionals stated that they are now building incinerators on the municipality compound where most hospital waste and other industrial waste will be incinerated and disposed permanently without risking the lives of the people.



*Figure 30: Scavengers at Kupferberg Landfill. Source: (Tjihenuna, 2016).*

This leaves the question of, Is the COW playing its role of managing waste effectively and efficiently by raising awareness to the people with reference to Okahandja Park Informal Settlement?

The answer to the above-mentioned question can be pointed out from the findings the researcher analysed, that most residents of the Okahandja Park community are disappointed in the way the COW has handled the problem of uncollected solid waste or cleaning of their

streets. Poor informative sessions are provided, and these have not assisted the people to acquire skills and knowledge on how to turn their solid waste into profitable businesses that will create employment and eradicate poverty in their community.

Strong working partnerships are required between the COW and residents of Okahandja Park as it was noted that the contracted cleaning company does not clean the area as required. It was also noted that the residents have negative attitudes towards taking an initiative of taking care of their surroundings. This is shown in figure 31 where carcasses were found disposed carelessly and it was recorded that the carcasses have not been collected for over a month.



*Figure 31: Uncollected carcasses in Okahandja Park. Source: (Author, October 13, 2017).*

#### **5.4 Sustainable Processes towards good working relationships in solid waste management**

Integrated solid waste management can be achieved if all three parties work together in a less compromising and intimidating manner where the parties can learn from each other and share ideas towards sustainable development and waste management.

One of the factors that the contractor stated that is limiting their work progress is the low employee turnover and this has led to ambiguities in the company. The contractor suggested a

process should be introduced whereby all three parties have different responsibilities to partake in as highlighted in the attached partnership model in appendix 1.

The contractors noted that with the growing population there is a need to work with the COW and the community for a more effective way to manage solid waste in the study area as it is very different from the formal areas where every household has a wheelie bin.

From what was perceived, the contractor was eager and interested in forming a relationship with the community and working with them if it means adding more resources that will help the residents benefit socially and economically.

The COW advised on a tag team process whereby all three parties work together with each party respecting its responsibility.

## **5.5 Chapter Conclusion**

This chapter discussed on the results that were found after the data collection. If solid waste is not managed and controlled these areas will experience environment degradation and end up being inhabitable. Excessive measures should be taken towards improper SWM so as ISWM is achieved towards building clean habitable environments by 2030. Participation is important in all community projects; every project is successful if people work together towards achieving goals that benefit all parties involved. Knowledge is the most important characteristic towards good solid waste management.

## **CHAPTER 6 CONCLUSION AND RECOMMENDATIONS**

### **6.1 Introduction**

Conclusions and proposals should reflect the value of any scientific study and these must be contextualized in terms of the research problem and or research questions on which the study was based. The rationale of this last chapter is therefore to draw the study to its end by presenting conclusions and recommendations derived from both the literature review and the empirical research findings. The study revolves around the concept of investigating the relationship between community participation and solid waste management in Okahandja Park informal settlement.

### **6.2 Conclusion**

Throughout the evolution of urbanisation, the quest for an effective solid waste management policy leads to a search for a comprehensive, coordinated and governmental planning which will combine with adequate legislation, adequate fiscal provision, public involvement and awareness to bring about the expected improvement in the quality of our urban landscape.

The research was conducted using the qualitative methodology approach to establish individual experiences, perspectives and opinions on the management of solid waste in Okahandja Park settlement. Relevant theoretical and empirical literature was reviewed on how other countries established models that have helped them manage solid waste in informal settlements. Strategies, policies and acts were analysed in support to the topic. Conventional ways for effectively managing solid waste were found and most of these were not familiar or used by the Okahandja Park residents. The research investigated on the importance of community participation in solid waste management and how it can be introduced in communities like Okahandja Park. Lack of knowledge on waste management

processes is another factor that is affecting the community as a high number of them possess little knowledge or skills that can benefit their communities in terms of solid waste management. Furthermore, the study revealed that most of the people believe that the present solid waste impact on the environment could be minimized if there is a proper waste management system in the area. However, the triangulation of the findings from interviews, questionnaires and observations showed residents lack knowledge and have negative attitudes towards the management of their own household solid waste.

The Local Authority and private ward contractors are also incapacitated, bringing their responsibilities to a low working performance thus resulting in poor service delivery. This is characterised by the lack of funds, poor environmental education given to the people and poor strategies used on improvement of the problem. Due to this there is environmental pollution which has become a threat to the public's health as diseases such as cholera, hepatitis E, TB, malaria and any other health problems that emanate from electrical waste have been reported.

In conclusion it is required that a strict legislation on environmental pollution is passed and critical investigations on how to improve the situation in informal settlements is done to ensure a guaranteed effective and efficient system. Despite all this it was observed that the City of Windhoek needs to create a process that will involve the communities so as they will be able to manage solid waste production in informal settlements.

### **6.3 Recommendations**

The following are recommendation to sustainable solid waste management:

**i. Provide adequate public solid waste bins and solid waste collection processes.**

Lack of public waste bins and adequate waste collection process is the root cause of improper solid waste management. Therefore, authorities must provide wheelie bins and skips. Moreover, it is important to provide separate solid waste bins for different categories of solid waste to promote solid waste separation. In this way, the COW could minimize the improper primary solid waste disposal practices affecting the natural environment. There should be regularity of solid waste collection by the ward contractors, since solid waste is discarded daily. There should be daily solid waste collection processes. However, if the authorities manage to provide waste skips and wheelie bins, at least there will not be littering and dumping of black bags anywhere in the street or in river beds. Furthermore, the landfill site has not met the requirement of a sanitary landfill of the Solid Waste Management Policy and therefore it is described as an open dump.

Adequate core solid waste management equipment such as compaction trucks, and skip loaders are required for an integrated solid waste management. Okahandja Park residents should be encouraged to use proper primary disposal practices and support with waste separation from the household level. In this way some of the separated waste could be reused. Polythene bags and empty water bottles can be recycled, and the food waste can be composted. Through a composting process, it will be possible to reduce the landfill waste as it will provide more sound management in reduced landfill gases as well as an improvement of environmental conditions of the waste management site. Additionally, there should be a monitoring process for the management of the City of Windhoek landfill site. Another

strategy will be to make the community pay fines for polluting. This will help to support the financial base of the waste management process.

**ii. Combining Solid Waste Management policies into development strategies**

To improve the SWM system, it is important to use ISWM strategy and combine SWM policies to development strategies. There should be more environmentally friendly processes combined with development processes to mitigate the significant impacts. Sustainable use of environmental resources and services are important for sound environmental development. Therefore, to achieve sustainable development goals, the development authorities should develop their attentiveness towards sound environmental development and mitigate impact on the environment. Solid Waste Management Division should work with the people and the local government into developing the SWM process. This process would help in promoting eco-friendly strategies. The authorities should encourage people to promote more environmental friendly behaviour. The policies should encourage strict awareness programmes to educate people on solid waste management. The central government should be involved in monitoring the SWM process to mitigate impacts on the environment.

**iii. Solid Waste Prevention principle**

To decrease the usage of natural resources and solid waste disposal, the solid waste prevention and minimization should be promoted. A comprehensive long-term zero waste plan should be developed where it will serve as a map for a methodology to incorporate zero waste policies into long range planning. Policies must include a budget for solid waste reduction programs, incentives to residents and businesses to judiciously use, reuse and recycle materials. Moreover, this will include incentives for local businesses to produce less toxic, more durable, recyclable products. The plan should encompass a detailed solid waste characterization study and identify opportunities for areas of development and improvement

to reach the diversion goal. The goal of the zero-waste plan will be to promote for phased reduction of solid waste going to landfills.

#### **iv. Development of a legal framework**

Current laws and regulations do not address the requirements of the municipal waste sector. Therefore, the basis for the continual improvement of the overall legislative framework, including provision of appropriate instruments and incentives mechanisms for the implementation should be developed.

#### **v. Monitoring**

Monitoring systems should be created to perform SWM practices well and maintain them in the study area. Laws and regulations should be improved for proper waste management practices at local levels and at national levels as the community would be more willing to practice proper waste dumping, waste separation and recycling once the regulation is in place. There must be awareness programmes about the laws and regulations and they should be monitored and evaluated regularly. The media, posters, pamphlets and public notices should be used more to increase the awareness in the community and integrating the waste management with development strategies is vital.

#### **vi. Provision of information and awareness programmes**

Awareness programmes should be organised which include informational campaigns, workshops and public consultation processes to involve the community in the SWM. The lack of opportunities to sell collected waste decreases the interest of people towards recycling therefore the municipality should introduce a process where people can sell their recycled solid waste. In this way the municipality would have managed to encourage people to separate their solid waste. Additionally, creation of cleaning community groups is

encouraged where they will have the responsibility to keep their areas clean. This will enable the community to act more properly as the responsibility is on them if the waste is discharged in improper ways. Moreover, the development authorities should ensure more interaction with the local governments when they are doing development processes as the development accelerates the solid waste generation. The responsible persons for SWM should get involved in the process more actively as well as the political bodies and managerial personnel from the municipality should get involved in the activities more actively to carry out a better SWM process.

Awareness programmes for school children should be carried out on a regular basis so as the children will grow up understanding the importance of solid waste management. Organizing community workshops which effectively reach the largest number of people should be considered. It is important that the responsible authorities have more transparency with their processes and share information with the society about their goals. Furthermore, there should be more information available through educational games and promotions in the community. Knowledge sharing process should be carried out so as the municipality will be able identify practical issues affecting the community

#### **vii. Use of Community Partnership Model**

An extensive model should be put in place so as partnerships will go smoothly with no irregularities or stakeholders stating they do not know their responsibilities and roles. See Appendix 1.

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## **APPENDICES**

### **APPENDIX 1: Partnership Model between Local Authority and Stakeholders**

#### **Municipality**

- Municipality constitutes the Stakeholder group
- Constitutes an internal Interdepartmental Committee
- Establishes the Planning team which supports the stakeholders group

#### **Interdepartmental Committee**

- Provides data and information
- Reports and liaises between Municipality and Stakeholder group
- Reviews action strategies and proposals
- Integrates stakeholder planning decisions with formal planning processes

#### **Stakeholder Group: Municipality, Service agencies, Non-governmental Organizations,**

#### **Community-based Organizations**

- Provides and oversees policy and management of planning process
- Reports and liaises with working groups
- Reports and liaises with the Municipality
- Develops the community vision
- Consults with the public and establishes planning priorities
- Provides legitimisation, public profile and public accessibility
- Reviews action plans and integrates plans of different actors

#### **Planning Team**

- Provides staff support to the Stakeholder Group
- Administers the planning effort

- Provides technical support
- Does problem-solving or ‘trouble-shooting’
- Monitors and evaluates progress

**Working Groups: Service Providers, Service Users, Service Funders, Affected Parties**

<b>Planning Team</b>	<b>Implementation Team</b>	<b>Monitoring &amp; Evaluation Team</b>
Analyses problems and opportunities	Negotiates implementation partnerships	Develops indicators
Proposes action, options and targets	Mobilises resources	Monitors impact and changing conditions
Prepares draft action plans	Institutes projects and programmes	Analyses outcomes
	Documents the activities	Reports on findings

Source: (Muller, 2011)

## APPENDIX 2: Research Permission Letter

### CENTRE FOR POSTGRADUATE STUDIES

University of Namibia, Private Bag 13301, Windhoek, Namibia  
340 Mandume Ndemufayo Avenue, Pioneers Park  
☎ +264 61 206 3275/4662; Fax +264 61 206 3290; URL: <http://www.unam.edu.na>



### RESEARCH PERMISSION LETTER

Student Name : Ms Lungile Natasha NDHLOVU  
Student number : 200813862  
Programme : Master in Public Administration (12 MPAN)

Approved research title: Investigating the effectiveness of a Community Based Approach towards solid waste Management in Windhoek's Okahandja Park Settlement

### TO WHOM IT MAY CONCERN

I hereby confirm that the above mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

The proposal adheres to ethical principles as per attached Ethical Clearance Certificate. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

A handwritten signature in black ink, appearing to be 'Marius Hedimbi', is written over a horizontal line.

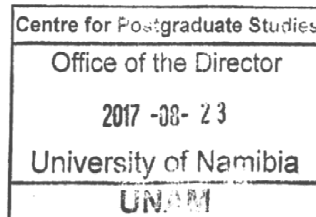
Dr. Marius Hedimbi

Director: Centre for Postgraduate Studies

Tel: +264 61 2063275

E-mail: [directorpgs@unam.na](mailto:directorpgs@unam.na)

.....  
22 Aug 2017



## APPENDIX 3: Individual Questionnaire

### University of Namibia

Faculty of Economics and Management Science

Department of Politics and Administration

### Investigating the effectiveness of a community-based approach towards solid waste management in

### Windhoek's Okahandja Park

Okahandja Park Residents questionnaire

Instructions to respondents:

- i. Do not write your name or contact details on the questionnaire.
- ii. Tick in the spaces provided for closed questions.
- iii. Fill in the spaces provided for open ended questions

#### Section A: Background Information

1. How old are you?

20-25 [ ]    26-30 [ ]    31-35 [ ]    36 – 40 [ ]    41-45 [ ]    46-50 [ ]    above 50 [ ]

2. What is your marital status?

Single [ ]    married [ ]    divorced [ ]    widowed [ ]

3. Sex of the respondent

Female [ ]    male [ ]    other [ ]

4. What is your highest level of education?

Primary [ ]    secondary [ ]    tertiary [ ]    other [ ]

5. Are you currently employed?

Yes [ ]    no [ ]

6. If answered no, please explain your source of income

.....  
.....  
.....

7. Do you have any dependents?

Yes [ ]    no [ ]

8. If yes, how many?

.....

9. How long have you been living in Okahandja park?

0 – 5years [ ]      6-10years [ ]      above 10 years [ ]

10. Did you grow up living here?

Yes [ ]      no [ ]

11. If answered no, please explain

.....  
.....

**Section B: Solid Waste Generation and Management Information**

12. What type of solid waste do you generate daily?

Food [ ]      plastic and paper [ ]      other [ ]

13. If answered other on question 12 , please specify

.....  
.....

14. The waste that you specified you generate, how do you dispose it?

.....  
.....

15. Do you make use of the black bags?

Yes [ ]      no [ ]

If answered no, what do you use?

.....

16. How many times is the refuse collected?

Once a week [ ]      twice a week [ ]      three times a week [ ]      never [ ]

17. When is it collected?

Morning [ ]      afternoon [ ]      evening [ ]      never [ ]

18. Who are responsible for collection of the refuse?

Municipality [ ]      private ward contractor [ ]      community based organisation [ ]      self [ ]

19. What happens if there is no collection as scheduled?

.....  
.....

20. Other than municipality collection, what other methods do you use? Please indicate below:

Method	Type of waste
Recycle	
Reuse	
Burn in open space	
Use as manure	
Other (please specify)	

21. Do you separate the waste before disposal?

Yes [ ]            no [ ]

Explain

.....

22. Are you satisfied with the way waste is managed in your area?

.....

.....

23. How do you think it can be improved if not satisfied with the current management?

.....

.....

24. How much do you pay to the municipality for rates for collection of waste?

.....

25. Do you think it is affordable?

.....

.....

26. Is there value for money in terms of the services rendered?

.....

.....

**Section C: Community Education and Participation**

27. Is the community educated on solid waste management?

Yes [ ]            No [ ]

28. Please explain

.....

.....

29. Do you wish there were facilities that enabled the community to benefit from waste management?

Yes [ ]                      No [ ]

Please explain

.....  
.....

30. Do you think your community will get involved in waste management if given the opportunity?

.....  
.....

31. How do you think they can be attracted to participate in waste management?

.....  
.....

32. Do you think this can benefit your community and in what ways?

.....  
.....

**Thank you for your participation.**

## **APPENDIX 4: Interview Questions for City of Windhoek**

The formal questionnaire was not used except as a reference for unstructured interviews. The researcher felt that allowing conversations to shape organically through discussion would allow for a greater understanding of the answers and issues at hand. This was proven correct, as subjects were able to express themselves in ways not possible when putting pen to paper. It opened useful avenues for further research and consideration.

### **UNIVERSITY OF NAMIBIA**

Faculty of Economics and Management Science

Department of Politics and Administration

#### **Investigating the effectiveness of a community-based approach towards solid waste management in Windhoek's Okahandja Park**

##### **Interview Questions**

1. Please explain more on the capacity of the solid waste management department in the City of Windhoek?
2. What are the goals of this department in terms of solid waste management in informal settlement areas?
3. With the introduction of the Solid Waste Management Policy in 2008, do you think it has improved the management of solid waste in Windhoek?
4. The Municipality of Windhoek enacted the Open Space Street Cleaning campaign by empowering Black Owned SMEs to clean the streets of Windhoek including informal settlements. Do you think the project has been a success over the years since it was introduced?
5. With the New development plan introduced, how do you see it helping in managing solid waste in Windhoek especially with urbanization increasing?
6. On an average, what is the current municipal generation rate of solid waste per day and its composition?
7. How do you mobilize communities especially in informal settlements to participate in solid waste management, which they generate?
8. Have you encountered any problems related to community participation in solid waste collection? If so, what kind of problems and how did you solve them?
9. Have you provided any education on recycling methods to these communities?
10. How did they receive, and have they tried to implement these methods?

## **APPENDIX 5: Interview Questions for Ward Contractor Company**

### **UNIVERSITY OF NAMIBIA**

Faculty of Economics and Management Science

Department of Politics and Administration

### **Investigating the effectiveness of a community-based approach towards solid waste management in Windhoek's Okahandja Park**

#### **Interview Questions for Ward Contractor**

1. How long have you been involved in this ward cleaning project?
2. How many times in a week do you street clean and make sure the waste is removed?
3. How is the workload in informal settlements as compared to formal areas?
4. Is it manageable to keep the streets of these areas clean?
5. Since the introduction of the Open Space Street Cleaning project, has there been any improvement in solid waste management in informal settlements?
6. As the company, responsible for street cleaning, what measures have you taken to keep this ward clean?
7. What obstacles have you faced during this project?
8. Working under the informal settlement ward, what do you think should be introduced as a solution to the rising waste caused by urbanization?
9. Since you are in partnership with the Windhoek Municipality, have you tried to go out and hear from people what discrepancies they are facing and how they wish it can be addressed?
10. Does your partnership foresee involving communities towards managing their own waste?

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