

https://dspace.org/

An evaluation of how the conceptualisation of waste influences separation at source behaviours and waste practices: a case study of Elizabeth Fry Village, Vorna Valley, Midrand South Africa

Dune, Tadiwanashe Chido

2017

http://hdl.handle.net/10539/23563

Dune, Tadiwanashe Chido (2017) An evaluation of how the conceptualisation of waste influences separation at source behaviours and waste practices: A case study of Elizabeth Fry Village, Vorna Valley, Midrand South Africa, University of the Witwatersrand, Johannesburg, <http://hdl.handle.net/10539/23563>

Downloaded from a DSpace repository. https://dspace.org/



An evaluation of how the conceptualisation of waste influences separation at source behaviour and waste practices: A Case Study of Elizabeth Fry Village, Vorna Valley, Midrand South Africa

A research report submitted to the School of Geography, Archaeology and Environmental Studies in Partial Fulfillment for the Master's Degree in Science

University of the Witwatersrand

Final Report

Submitted By: Tadiwanashe Dune

561285

Supervisor: Dr. Melanie Samson

Environmental Science Master's (M.Sc)

5 June 2017

DECLARATION

I Tadiwanashe Chido Dune hereby declare that this research report for a Master's Degree in Environmental Science at the University of the Witwatersrand is my own original work and has not previously been submitted to this university or any other tertiary institution. All relevant acknowledgments have been made where quotes or information from other work has been used by way of in text referencing and bibliography.

Date: _____ Signature: _____

ACKNOWLEDGMENTS

I would like to thank The Heavenly Father for guiding me throughout the life of this research and granting the opportunity to complete this Master of Science Degree with specialisation in Environmental Science. My sincere gratitude goes to my supervisor Dr. Melanie Samson whose wealth of knowledge in this field guided me throughout this journey. Her patience, on-going support and passion for this subject were inspiring and crucial to completing this research report. It has been an honour working with her. I would also like to thank all my research participants for providing me with their time. Lastly I would like to thank my loving family and friends with a special thank you to my sister Tatenda Dune who was especially supportive.

ABSTRACT

With consumer culture that encourages societies to buy more, waste production increases as well. A lack of site specific data regarding waste conceptualisations and practices inhibits sustainable waste initiatives such as separation at source programmes from being successful and results in poor participation levels. This research report investigates these issues through a case study of Elizabeth Fry Village (EFV) in Vorna Valley, Midrand, particularly focusing on a Separation at Source programme in Elizabeth Fry Village. This research was conducted over a 6 month period between September 2016 and March 2017. There are two approaches within the broad debate around waste that this research engages with. The first is the approach presented by Moore (2012), Gutberlet (2013), Oteng-Ababio (2014) and Parizeau (2015) who argue that the different ways that people understand and conceptualise waste influences their waste practices, including participation in recycling programmes. The second approach focuses on the practical factors that affect participation in recycling programmes (Tonglet *et al.,* 2004 and Martin *et al.,* 2006). Based on mixed methods including participant observation, interviews, desktop studies and a waste composition study conducted in Elizabeth Fry Village, this research report argues that it is necessary to combine both approaches to develop a comprehensive understanding of people's participation or lack thereof in recycling programmes such as separation at source (S@S). It is recommended that future research explores mechanisms for the better use of putrescible waste and that aspects such as convenience, time, space, knowledge and awareness are further investigated to increase participation rates in the area. Another major aspect identified for future research is exploring how to shift people's conceptualision of waste to recognise it as a positive material.

Keywords:

Recycling, waste, separation at source (S@S), conceptualisation, participation, Elizabeth Fry Village (EFV), Midrand

CONTENTS

DECLARATION i
ACKNOWLEDGMENTS ii
ABSTRACT iii
CONTENTS iv
1. INTRODUCTION 1
2. OUTLINE OF CHAPTERS 5
3. BACKGROUND 7
3.1 Study Area 7
3.2 Pikitup 17
3.3 Legislative framework 21
4. LITERATURE REVIEW 24
4.1 The history and development of waste management 24
4.2 The conceptualisation of waste 29
4.3 Recycling and S@S 32
4.4 Factors influencing participation in recycling and S@S programmes 33
5. CONCEPTUAL FRAMEWORK 36
5.1 The conceptualisation of waste (Moore, 2012) 37
5.2 Theory of Planned Behaviour (Ajzen, 1991) 38
6. METHODOLOGY 41
6.1 The Research Question 41
6.2 The Aims and Objectives of the study 41
6.3 Research Approach (Qualitative) 42
6.4 Research Design (Case Study) 44
6.5 Population and Sampling 46
6.6 Data Collection 47
6.7 Data Analysis 53
6.8 Ethical aspects 54
6.9 Limitations 55

7. RESULTS AND DISCUSSION 57
7.1 Demographic Profile 58
7.2 Waste composition Study 62
7.3 Participation rates 74
7.4 Themes 76
8. CONCLUSIONS 110
9. REFERENCES 113
10. APPENDICES 122
Appendix A – Notification letters to residents 122
Appendix B – Interview Protocols 122
Appendix C– Ethics Certificate 123

1. INTRODUCTION

In 1997 Beal cautioned that increasing urbanisation was intimately linked to the increased production of waste and two decades later, waste remains an issue of growing concern. Domestic waste management is currently one of South Africa's leading environmental problems (CSIR, 2011). Moreover, South Africa has a broad range of legislation especially dedicated to encouraging and ensuring sustainable waste practices (*The Constitution of South Africa* [Act 108 of 1996]; *The National Environmental Management Act* [Act 107 of 1997] and most specifically *The National Environmental Management: Waste Act* [Act 59 of 2008]). It was on 1 July 2009 that the National Environmental Management: Waste Act (which governs waste management in South Africa) came into effect. This emphasised the importance and relevance of waste in South Africa (SAWIC, 2016).

Waste is highly relevant to all people because every day all people produce, and dispose of, a wide variety of materials (Koda, 2012). It is a multifaceted concept holding social, economic, environmental and governance relevance (Gregson and Crang, 2010). Societies have and still do view waste as a negative disturbance to socio-spacial norms (Moore, 2012). This explains Gregson and Crang's (2010) identification of how societies as well as academia have shied away from waste. However, since 2010, academia has seen a significant increase in waste related research. Urban households in particular are responsible for the generation of the majority of municipal solid waste. The component of waste that this research investigated was household participation in recycling programmes that include separating general waste from recyclable materials, also referred to as separation at source (S@S). One of the greatest factors that hinder the success of S@S initiatives is a lack of participation by residents (CSIR, 2011; Fakir and Broomhall, 1999).These initiatives have been introduced into areas of the municipality yet participation levels in recycling programmes remain low. This research thus investigated why.

Drawing on research emphasizing the relevance of how people conceptualise waste and their waste practices (Moore, 2012, Oteng–Ababio, 2014, Gregson and Crang, 2010, Pongracz and Pohjola, 2004 and Gutberlet, 2013), this research aimed to find out whether conceptualisations of waste influences household waste practices, such as waste disposal and participation in recycling programmes like separation at source (S@S) in an urban middle income gated community called Elizabeth Fry Village (EFV) in Vorna Valley, Midrand, Johannesburg. I have lived in EFV for 17 years, which allowed me to have easy access into the area and a better understanding. My interest in this topic surfaced when I learnt that there is a S@S programme in the area I live in and I wanted to understand more about this recycling system. Given that recycling infrastructure is available within the area the question remains: why are participation levels so low? This aim was addressed by exploring the following key research questions:

a) How do EFV residents conceptualise waste?
b) Does the way residents conceptualise waste influence their waste practices (waste disposal)?
c) What are some of the factors that influence S@S participation levels?

These research questions were explored through a case study of EFV. Investigating these waste related issues in a gated community is pertinent because a lot of waste research in South Africa has focused on low-income areas with no controlled access points. A similar study was conducted in Bangkok, Thailand where authors identified gated communities as ideal targets for research on recycling and S@S because of a different dynamic in terms of social capital (Jirawisan, 2011). Gated communities such as EFV are controlled by set access points (de Vos, 2011). In EFV, this access point is a double-boomed gate with a security house. Because this is a secured and closed off space, it is not public space (Landman, 2002). This means that waste pickers or informal recyclers are denied access into EFV, which has sparked major debates about integration in cities. Webster (2001) states that such security villages have their shared and private goods supplied at higher levels of efficiency due efficient pricing. It thus

evident that gated communities are a completely different environment compared to non-gated communities and therefore waste related services will also occur differently.

The programme that this research focused on is Pikitup's flagship project called Separation at Source (S@S) that was initiated by the city's mayor in 2009 (Pikitup, 2016). Pikitup Johannesburg (SOC) is a private company which was developed in January 2001 and the City of Johannesburg Metropolitan Municipality is its only shareholder and client. Pikitup is thus mandated to provide integrated waste management services such as refuse collection to the municipality's residents (City of Johannesburg, 2017). This programme encourages the separation of household waste at home by way of a 3-receptacle model. This means that over and above the conventional black bin, residents are also provided with a clear bag to place recyclable material in as well as a reusable bag for paper only (Pikitup, 2016).

To explore participation levels in this project in EFV, a mixture of qualitative methods were employed. These included participant observation, semi-structured interviews, desktop studies and a waste composition study. Literature has tended to employ a one-sided approach either only focusing on factors that influence participation such as demographics and practical factors such as convenience, space, time and knowledge and awareness of recycling programmes; or only on conceptualisations of waste and rarely a combination of all these aspects. In addition, the methods too are either qualitative methods such as interviews, focus group and questionnaires or; qualitative waste composition studies, rarely a combination of these. Having gathered the findings from a mixture of these methods, I explore whether the conceptualisation of waste influences participation in this recycling programme. Exploring the contents of the waste stream also allows me to explore whether these conceptualisations are supported by matter that that they dispose.

There are two broad approaches that this research engages with. The first is the argument presented by Moore (2012), Gutberlet (2013), Oteng-Ababio (2014), Pongracz and Pohjola (2004) and Parizeau (2015) on how waste is understood and conceptualised differently, thus influencing waste practices. The second approach focuses on the practical factors that affect participation in recycling programmes which

Tonglet *et al.,* 2004 and Martin *et al.,* 2006 explored from The Theory of Planned Behaviour (Azjen, 1991). Based on mixed methods including participant observation, interviews, desktop studies and a waste composition study conducted in Elizabeth Fry Village, this research report argues that it is necessary to combine both approaches to develop a comprehensive understanding of people's participation or lack thereof in recycling programmes such as S@S.

2. OUTLINE OF CHAPTERS

This argument is developed over the following seven chapters:

i. *Background* – The background chapter provides detail on the study area, which is Elizabeth Fry Village - a middle income urban gated community situated in Midrand. The chapter then provides detail on what Pikitup is and how both its recycling S@S programme operate in the study area. Lastly, the legislative framework that underpins this study is explained. The South African Constitution is outlined with its relevance to waste and additional legislation and policies are discussed.

ii. *Literature Review*- This section provides a critical review of the key bodies of literature that informed the research project, the academic debates that this research report engages with and contributes to, and under-researched areas that it addresses in making this contribution. This chapter explores key themes which include: the history and development of waste management; the conceptualisation of waste (how waste is defined, what waste is associated with and its value); recycling and S@S literature which explores definitions; factors influencing waste practices such as participation in recycling and S@S programmes.. This research combines two theoretical approaches of on waste practices. The first theory is that the conceptualisation and different understandings of waste influence waste practices. The second is factors including convenience, time, space, knowledge and awareness of recycling programmes that influence participation recycling programmes.

iii. *Conceptual framework* – The conceptual framework explains which concepts I am framing my research around as well as the key authors from which I have drawn these concepts. A conceptual framework developed by Moore (2012) on the conceptualisation of waste and The Theory of Planned Behaviour (Ajzen, 1991) are explained as two frameworks that were used to develop the conceptual framework that this study employed.

iv. *Methodology*- This section includes a detailed description of the choice of methodology. It presents the constructivist epistemology within which the research is framed and how this influenced the choice of qualitative methods.

The methods include participant observation, interviews, desktop studies and a waste composition study (WCS). Detail is also provided on the method of data analysis which is called Thematic Content Analysis (TCA). The sampling methods which include purposive, convenience and snowball sampling, are all discussed. The ethical procedure is elaborated on which explains how ethical clearance was obtained as well as consent from participants. Lastly, this chapter explains some of the limitations encountered during the entire timeline of this study.

v. *Findings and discussion*- The findings and discussion section are intertwined owing to the choice of methodology for this research. The results are presented as different themes under which quotes from respondents as well as corresponding relevant literature is discussed. The five key themes that emerged from the data include: 1) Conceptualisation of waste and waste disposal (which includes also includes WCS findings) 2) Awareness of S@S programme and environmental knowledge 3) Drivers of S@S participation 4) Deterrents to S@S participation; and 5) Possible solutions. Some of the findings are presented visually with graphs, charts, photographs and field notes.

vi. *Conclusion*- The conclusion draws on what the main findings mean and broader conclusions that can be made about the selected area. It also provides a reminder of the main argument of this research, what contributions it has made and suggests and issues for further exploration.

vii. *References*- This is a bibliography presented as a list of the sources of information that were used to supplement and inform this research. These include peer reviewed journal articles, newspapers and online sources.

3. BACKGROUND

This chapter provides an overview of the selected area of study as well as Pikitup as a company and the recycling programme that the research focuses on. It begins by explaining the locality of the study area and provides very brief geographical and ecological detail. The chapter provides on the gated community (EFV) and Vorna Valley – the region within which EFV is situated, in Midrand, Johannesburg. It then delves into more detail regarding the racial demographics, population size, gender and languages spoken in Vorna Valley specifically. The reason why this area was chosen is also explained. Personal reflections and descriptions of the study area are provided as having been a resident in Vorna Valley for 17 years. A background on Pikitup is also provided and the S@S programme is also explained in more detail.

3.1 Study Area

The research was conducted in EFV which is a boomed off community situated in Vorna Valley, Midrand within the CoJ Municipality. Midrand is geographically located between Pretoria (capital city of South Africa) and Johannesburg (the economic hub of Africa) shown in Figure 1 that follows. It is approximately 28km from Johannesburg and 25km from Pretoria. In total, Midrand is approximately 240km2 in size. Midrand is categorised into eight distinct zones. The study area, Vorna Valley is described in the Midrand State of the Environment Report as having a low residential land use pattern in transition to medium density suburbia with some high density townhouse and cluster house developments, with medium to high population density (Fakir and Broomhall, 1999). Vorna Valley as mentioned is a suburb within Midrand and is approximately 3.44km2 in size. The 2011 Census found a total population of 12 446 people and a total of 4781 households in Vorna Valley. The following table presents gender, race and language statistics for Vorna Valley (Stats SA, 2011). Table 1 that follows provides some key statistics on Vorna Valley.

Table 1: Gender, race and languages of Vorna Valley residents (Stats SA, 2011)

Gender	**People**	**Percentage (%)**
Female	6386	51.31
Male	6060	48.69
Population Group	**People**	**Percentage (%)**
Black African	6648	53.41
Indian or Asian	3112	25
White	2026	16.28
Coloured	526	4.23
Other	135	1.08
First Language	**People**	**Percentage (%)**
English	6798	54.82
IsiZulu	1152	9.29
Other	868	7
Afrikaans	672	5.42
Setswana	618	4.98

Given that it is 2017, it is expected that these values have risen significantly.

Personal reflection on Midrand

From my own experience, Midrand is a rapidly urbanising area. Over my 17 years of residence in Midrand, development has occurred very rapidly, particularly with office parks, shopping centres and residential development. Midrand also has an interesting dynamic of possessing different income areas. There are areas of very high income such as Carlswald and Blue Valley and this can be assumed from the appearance and sizes of the household in these estates. Middle income areas include Vorna Valley, Halfway House and Noordwyk. Low income township areas within Midrand include areas such as Ivory Park, Ebony Park and Rabie Ridge. People often debate on whether the well-known Tembisa Township falls within Midrand as well. I have also identified an increase in the number of schools in Midrand over my time living here which may indicate that there has been an increase in younger age groups in Midrand. Figure 1 below is a regional map showing where Midrand is located.

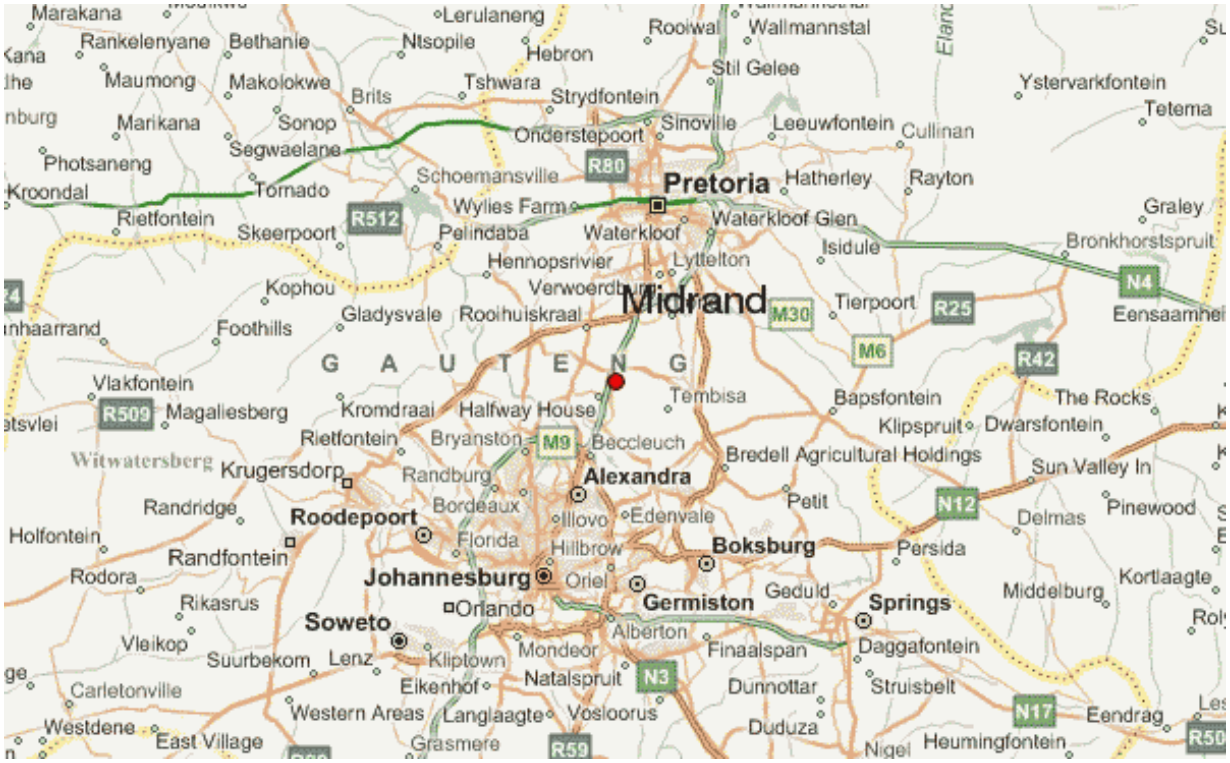


Figure 1: Map of Midrand lying between Johannesburg and Pretoria (http://www.weather-forecast.com/locations/Midrand, 2017).

Personal reflection on Vorna Valley

As a resident who has resided in Vorna Valley for 17 years, I can state that Vorna Valley has changed over this period. There have been several more residential, retail and office park developments in Vorna Valley. Significant developments within Vorna Valley since I moved here in 1999 include Waterfall Park (a high income residence estate, office park, hospital, hotel and shopping centre) as well as the Mall of Africa which is said to be one of the largest malls in the country. In terms of residential developments, what's interesting to note is that virtually all residential developments have been gated community developments which are either apartment complexes or estates. Vorna Valley has also seen a significant increase in the number of crèches and primary schools, which gives insight on fertility rates and increases in the number of individuals in young age groups.

Driving into Vorna Valley, one feels that it is a calm and quiet neighbourhood. Traffic is little to moderate except at peak hours. When driving into Vorna Valley from the N1 highway, one would use the Allandale offramp. The road infrastructure of this offramp recently changed to accommodate increased traffic. One is then greeted with the big Mall of Africa which opened in April 2016. Harry Galaun Road is the main north/south road through Vorna Valley which takes a distinct dip and then elevates. The dip in the road is where the Vorna Valley vlei is located (hence the name "Valley") and this is how one knows they are in Vorna Valley. Vorna Valley is aesthetically pleasing, dominated by apartment complexes and has a notable amount of grass and trees. The streets in Vorna Valley do have different "feels" depending on where one is located. EFV feels different from Harry Galaun or even Burger road which is less than 1km away. Houses in apartment complexes are different from free-standing homes. Apartment complex homes tend to be standardised and smaller. Free-standing homes are all different in size, colour and design. What seems standardised would be the number of vehicles per household which is between two and three, often with double garages. Figure 2 that follows shows a map of Vorna Valley and Figure 3 is a detailed map of the study area EFV.

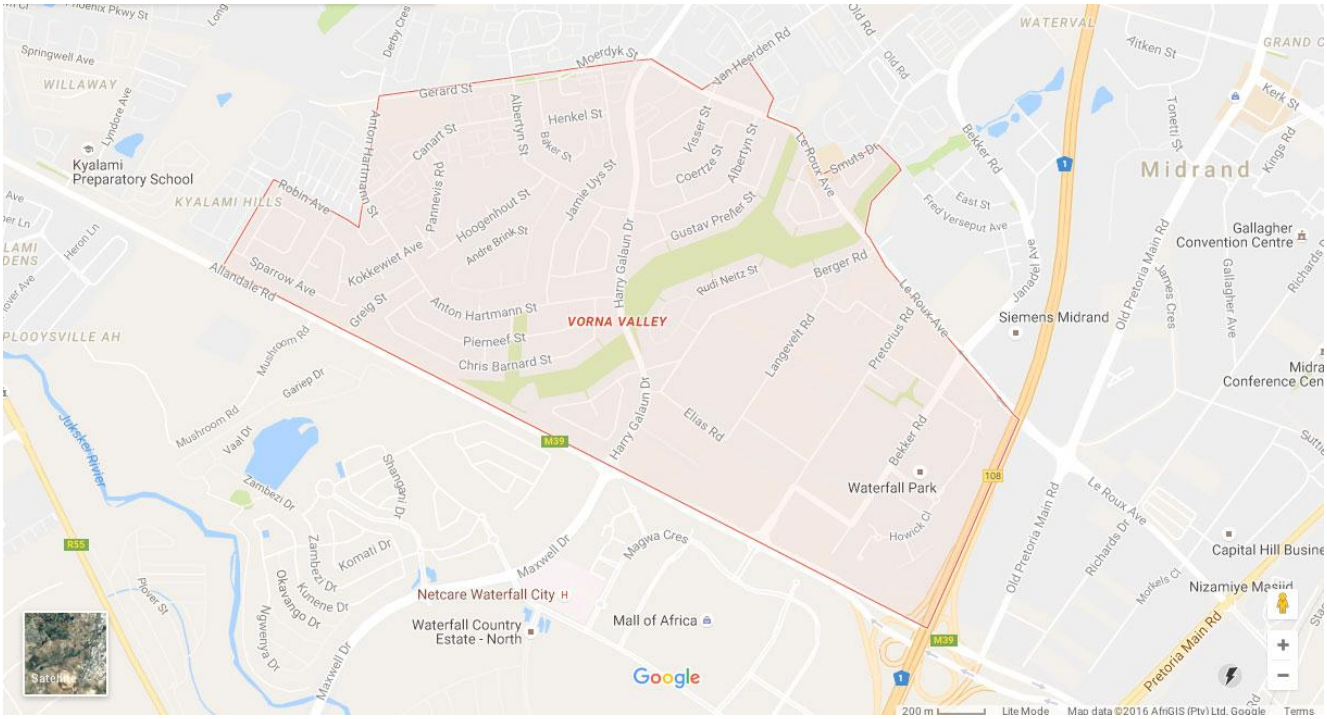


Figure 2: Map of Vorna Valley (http://voiceanddata.co.za/vv__trashed/vorna-valley-map/, 2017)

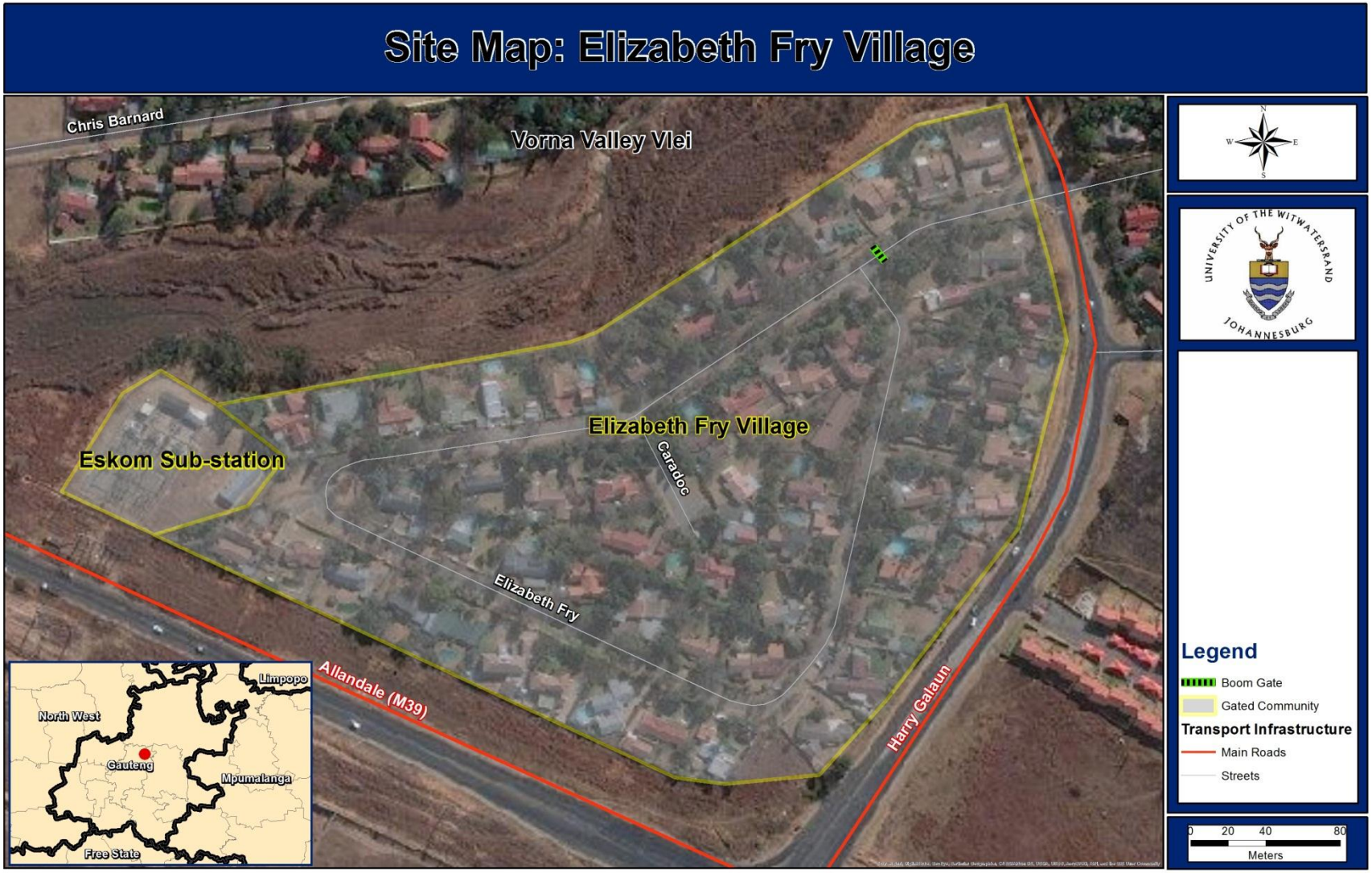


Figure 3: Map of study site - Elizabeth Fry Village Gated Community in Midrand, City of Johannesburg (Source: T Dune, 2017)

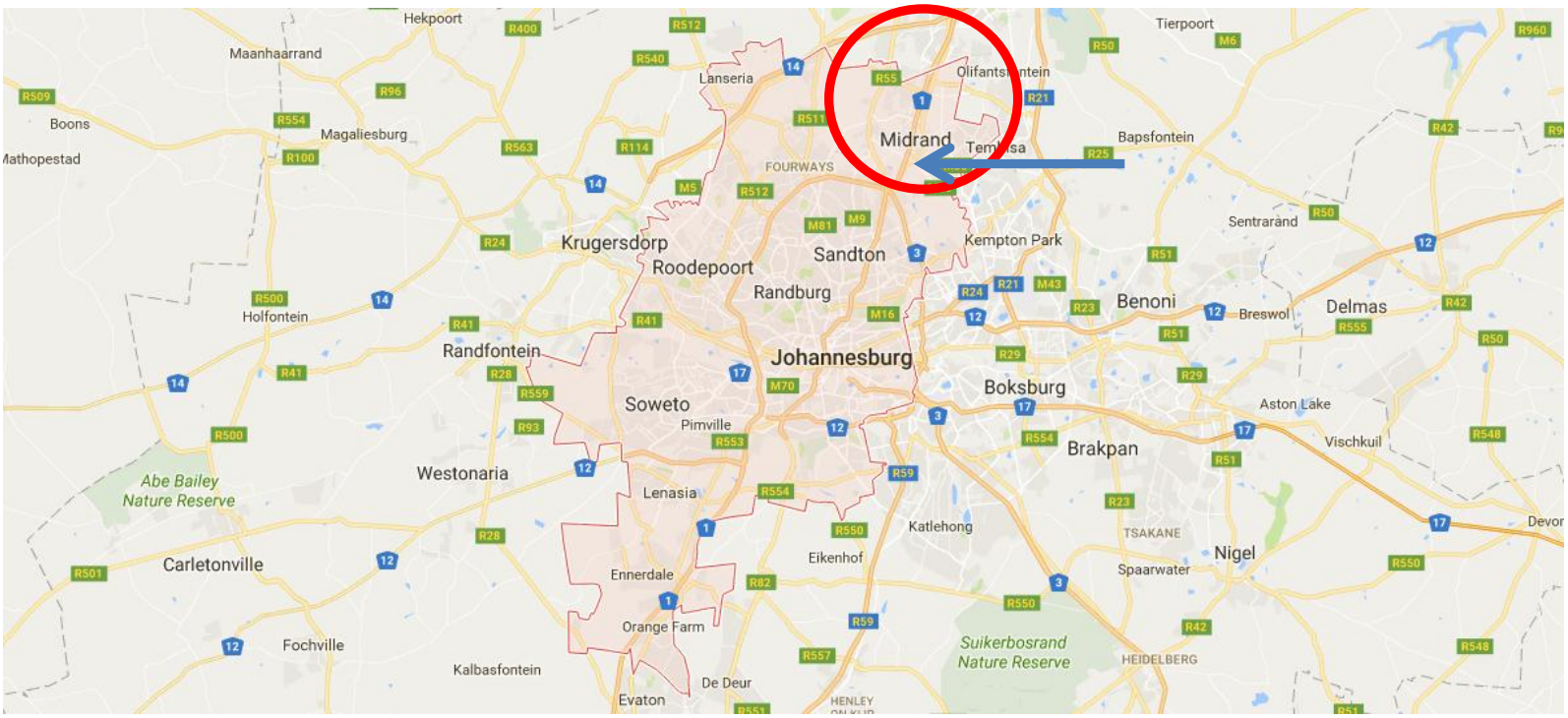


Figure 4: Map of the boundary of the City of Johannesburg as well as Midrand and Vorna Valley

In Figure 4 above, the boundary of the City of Johannesburg is indicated. The red circle indicates Midrand which is in the north of the municipality. The blue arrow shows the situation of Vorna Valley which is in the South of Midrand.

Introduction to EFV

EFV is a middle income, more affluent gated community situated in the south of Midrand. It became a gated community in the early 2000's with the introduction of the boomed area shown in Figure 5 that follows. There are 55 houses in total in this gated community. This community is quiet and tranquil with different types of houses. Some houses are larger than others and easy to see while others have longer driveways making the houses less easily visible. While some homes are face brick, other have a Tuscan feel while others have a more modern feel. Interestingly, two homes are being used as workplaces and therefore often have many cars parked outside them during

business hours. Otherwise, most homes have between 2 – 3 vehicles in total. The environment is safe, comfortable and even though it is a gated community, it does not feel “closed off” from everything else, especially with the introduction of the Mall of Africa. Additionally there is a wide variety of trees and vegetation in the community, in and around the houses, making it a visually appealing area.

The map in Figure 3 shows more detail on EFV indicating its triangular shape with a cul-de-sac in between and a boom gate. The Figures that follow show what it looks like when entering EFV as well as what it looks like within the EFV gated community.



Figure 5: Entrance of EFV with boomed security area (Source: T Dune)



Figure 6: EFV sign at the entrance (Source: T Dune)

When one enters EFV, there is a boom area with a double boom, a gate and security house. Access into EFV is regulated by security where visitors are required to fill in their name, vehicle registration number, details of who they are visiting, the reason for their visit and the time they entered in a visitors' book. The following combination of Figures shows the inside of EFV.



Figure 7: Combined images of EFV (Source: T Dune)



Figure 8: The inside of EFV (Source: T Dune)

Other than the significance of EFV being a gated community where waste is under-researched, the choice of study area was influenced also by the fact that I live in this community. One of the main difficulties of conducting research on household practices in a small community such as gated communities is gaining access not only into the gated community, but into the households. I chose to conduct my study in the area within which I live so that I could draw on my own experiences while building on long established and existing relationships that I hold with these community members to gain access. In addition, the research includes personal insight as well as my insider perspective contributing to the richness of the data. Another advantage to having conducted my research in this area was that I could pilot my study on my family that I reside with in order to test out the questions that were asked and to observe whether they were clear enough and were easy to answer. Conducting preliminary studies helped shape questions that were either confusing or may have been leading. The

following section described the entity that provides waste collection services in the municipality and also manages the S@S programme.

3.2 Pikitup

This subsection provides a background on what Pikitup is as well as how and when it developed. This is relevant because the recycling programme that this research focuses on is owned and run by Pikitup. Two of Pikitup's goals are also discussed in relation to this research.

Pikitup Johannesburg (SOC) Ltd is a private company that through the Companies Act was developed in 2001. Pikitup is entirely owned by the CoJ Metropolitan Municipality, which is its only client and employs over 4500 people. Each day, up to 6000 tons of refuse is collected, whilst approximately 9000 km of street are swept over seven regions (Pikitup, 2015). Pikitup has 12 depots where waste is managed, 44 garden refuse sites and four operating landfill sites. The main services that Pikitup provide are waste management and refuse removal to those that reside in this municipality (Pikitup Business Plan, 2015-16; City of Johannesburg, 2017). Pikitup focuses on ensuring successful minimisation and prevention of waste by implementing initiatives and projects, developing creative ideas and solutions and ensuring partnership and stakeholder participation to achieve its mandate. Pikitup is working towards achieving five goals which fall in line with the goals and projects developed by the CoJ Municipality. Two out of these five goals are relevant to this research and are quoted from the Pikitup Business Plan (2015-2016: 4-5):

> *"Goal 1: Integrated Waste Management, Waste Prevention and Waste Minimisation*
>
> *These activities relate to ensuring that the necessary projects are implemented to ensure prevention and minimisation of waste as well as to divert waste from landfills through tackling all waste streams generated within the City of Johannesburg. Re-use, recycling and recovery activities are prioritised and the*

necessary infrastructure to support these initiatives developed. The projects included are separation at source rollout, with a view to making this mandatory, building buy back centres and garden refuse sites, developing a business case for dealing with green waste and composting as well as addressing the operations and viability of the incinerator. There is an acknowledgement that some of the interventions require technological solutions, therefore collaboration with the private sector is key. The programme also recognises the role of waste reclaimers in the process and relevant interventions are included to build partnerships with reclaimers and recyclers in the roll out of separation at source.

Goal 4: Partnerships and Involving Stakeholders

Behavioural change in the home and in the workplace is key to the success of waste prevention and minimisation and therefore significant resources will be allocated to developing partnership and involving stakeholders in education and awareness programmes. Education and awareness creation in communities is also critical to address matters of illegal dumping, as well as more effective law enforcement. It is acknowledged that Pikitup cannot achieve these goals by itself and therefore requires partnerships and participation from various stakeholders.

These two goals are relevant to this research because they focus on waste prevention, minimisation and diversion away from landfills which are the aspects that S@S deals with. Both goals aim to achieve this by optimising the recycling programmes that have been implemented in various parts of the municipality. Goal 4 particularly relates to this research because it speaks of behavioural change within households which is central to this research report. Additionally it speaks of two important factors which have been mentioned in the literature to influence participation in recycling programmes.

3.2.1 Pikitup S@S programme

Pikitup defines S@S as one of its flagship recycling projects initiated by the Mayor of Johannesburg (Matiwane, 2016) and piloted in 2009 (Pikitup, 2015). This waste minimisation project forms part of Pikitup's approach to change the waste behaviour of Johannesburg residents, diverting waste from landfills, waste to energy solutions and developing an economy that practices recycling through S@S and the reuse, reduction and recycling of waste (Pikitup Business Plan, 2015-2016). The pilot project was initiated having conducted an educational campaign in September of 2009. The S@S project was began in October 2009 where the residential areas of Berariro, Bosmont, Emmarentia, Fairland, Fleurhof, Forest Town, Greenside, Greymont, Linden, Martindale, Mayfair, Montroux, Parkview, Richmond, Triomf, Westcliff and Victory Park were provided with litter bags. This covered 35 000 standalone houses however excluded flats, complexes and townhouses (City of Johanesburg, 2010). By 2015, the project covered 490 000 households (Pikitup, 2015).

Current policy and legislation encourages people to practice recycling and S@S. This means that all people should make it part of their waste management practices to separate waste, reuse waste and minimise the amount of waste that they produce. The CoJ Integrated Waste Management Plan (2011) explains that the priority waste minimisation programmes being carried out by Pikitup include S@S. Pikitup (2015) states that the S@S programme operates on a 3-receptable model that provides residents with bags for recycling every week. This includes a white hessian bag for paper only, as well as cardboard and boxes; and a clear durable recycling plastic bag for recyclable materials. Pikitup (2014) stipulates that this recyclable bag is for bottles, cans, plastics, polystyrene and glass. Figure 9 that follows shows these bags.



Figure 9: Clear bag for recyclables (left) and recycling bag for paper only (right) (Source: T Dune)

This means that only non-recyclable waste remains in the black bins. In EFV, paper only is collected on a Monday, recyclables on a Wednesday and general waste on a Thursday. Pikitup works with co-operatives and small initiatives who assist with the collection and sorting of recyclables (paper, plastic, cans, bottles and electronic waste) from residents to businesses (Pikitup, 2015). Such initiatives have helped generate employment and a source of income for those without employment in the city. To provide a snapshot of success, Pikitup explains that 20 808 tons of dry waste (can, paper, plastic, glass) were diverted from landfill sites in the 2014/15 financial year (Pikitup, 2015). The recyclable materials collected include paper, plastic, cans, bottles and electronic waste (e-waste).

3.3 Legislative framework

There is a wide range of legislation in South Africa that is related to waste and as mentioned, some of it encourages the minimisation of waste through recycling programmes. This legislative framework provides a brief summary of only the legislation and policies that inform this study. Much of the goals, targets and initiatives that are waste related in South Africa are underpinned by legislation. Figure 10 which follows indicates all legislation related to waste.

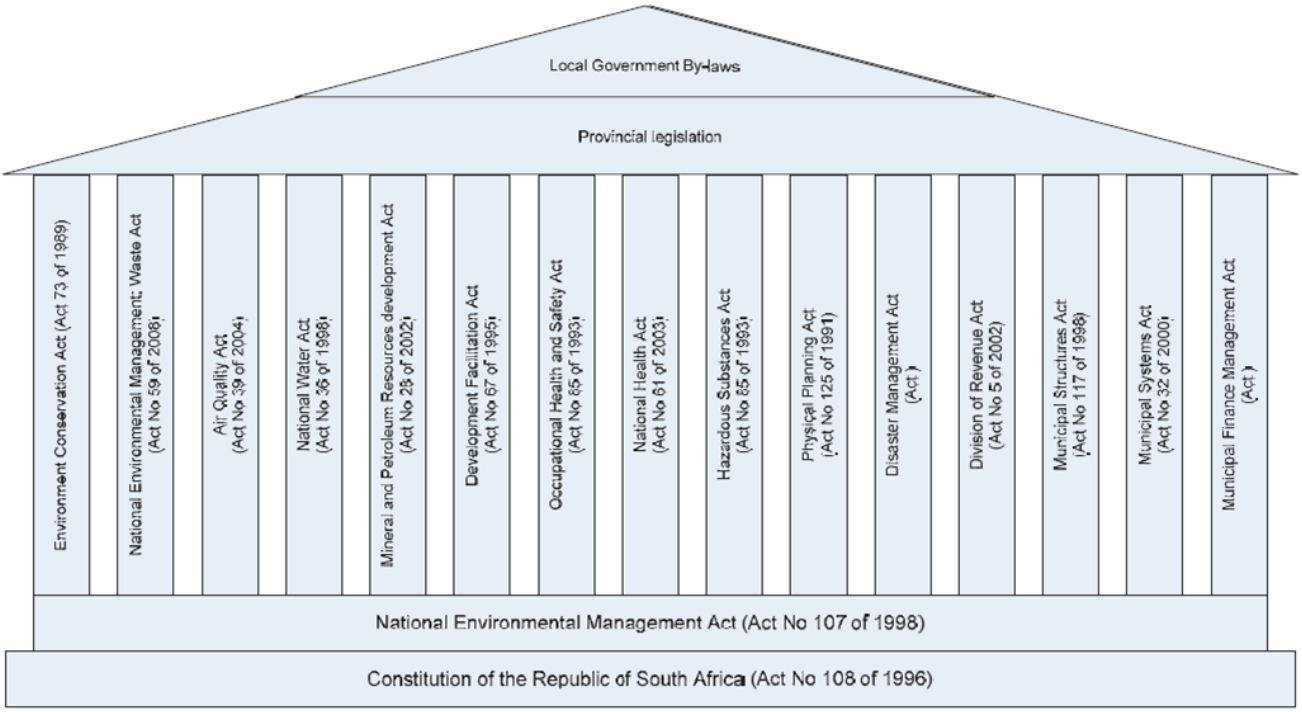


Figure 10: Relevant legislation in connection with waste management in South Africa (City of Johannesburg, 2011)

The Constitution of South Africa (Act 108 of 1996) is the base of all legislation as illustrated in Figure 10. It states that one of key aims of national legislation is to protect the environment whilst the role of local government is to promote a safe and healthy environment. Chapter 2 of the Bill of Rights states that everyone has the right to an environment that does not negatively impact their health or well- being and for the environment to be protected in such a way that it may be preserved for future

generations. In addition, the Constitution adds that this should be done through practices that prevent environmental damage and encourage conservation and social and economic development. Further legislation, policy drivers, projects and initiatives have been developed to fulfill a safe environment for all.

The National Environmental Management Act (NEMA) (Act 107 of 1997) defines pollution as any substance, odour, dust, heat, radioactive waves or waves that cause changes to the environment as a result of emissions from the storage or treatment of waste or any construction. The NEMA (Act 107 of 1997) adds that waste should be avoided and if it can't, it should be minimised through the reuse or recycling of disposed materials and this is the essential part of the NEMA which informs and underpins this study. The promulgamation of NEMA (1998) highlights key areas of environmental concern where waste minimisation forms the cornerstone of waste management (Fiehn and Ball, 2005).

The National Environmental Management: Waste Act (NEMWA) (Act 59 of 2008) aims to address the statements made in the Constitution. NEMWA states that poor waste management practices result in adverse impacts on the environment and these impacts are felt both locally and globally. It also emphasises that waste minimisation practices are key for sustainable development and for environmental protection. This previous statement within legislation indicates the importance of waste minimisation initiatives.

Several policies and plans within South Africa and the CoJ Municipality have been developed for waste and are briefly discussed below. The CoJ IWMP (CoJ, 2011) states that S@S as well as waste composition studies are needed all around the CoJ and both of these are key parts of this study. The City of Johannesburg Metropolitan Municipality Waste Management By-Laws (CoJ WMBL) published by the Municipal Systems Act, 2000 (Act No. 32 of 2000) has three main objectives and one of them includes the regulation of recycling of waste. It is stated that it is the responsibility of the Council to encourage reuse and recycling primarily through S@S.

The Integrated Waste Management Plan published by the Department of Environmental Affairs (Fiehn and Ball, 2005) also emphasises that waste management is an important priority within the National Environmental Management Act, hence the NEMWA.

Avoiding and minimising waste was one of the key issues discussed at the Department of Environmental Affairs and Tourism (DEAT) National Waste Summit. This summit was held from the 26th to 28th of September 2001 in Pietersburg, South Africa. Having acknowledged the need for waste reduction, the summit ended in the signing of the Polokwane Declaration (Fiehn and Ball, 2005). This was marked as the first time that National Government had developed goal and targets for sustainable waste management (Fiehn and Ball, 2005). The main objective of the Polokwane Declaration was not only to have cut down on waste disposal by half by 2012 by also to achieve zero waste by 2022 (Fiehn and Ball, 2005). This places emphasis on the need for the success of waste minimisation, recycling and S@S programmes.

Lastly, the National Waste Management Strategy (NWMS) is a holistic strategy that is being implemented to deal with issues surrounding pollution and formulates strategies, initiatives, plans and targets to be reached within a set amount of time. The NWMS follows commitment to an efficient waste information system, the reduction of waste, encourages recycling and Health Care Waste and Capacity Building (Fiehn and Ball, 2005).

This background chapter gave some insight on the study area, Pikitup as the company that runs the S@S programme of interest, details on the S@S programme in EFV and lastly gave an overview of relevant legislation. The following chapter is the Literature Review which presents a detailed overview of the relevant literature that I frame my research around.

4. LITERATURE REVIEW

This chapter provides a critical overview of research relevant to framing my project. The academic debates and themes that are explored in the literature review include: the history and development of waste management, the conceptualisation and definitions of waste, the value of waste and recycling and S@S. I begin by presenting a historical timeline of waste management developed by Wilson (2007) who argues for six elements that through time developed waste management. Additionally I engage with some of the early debates around waste management making reference to a seminar that took place at Queen Mary University of London in UK (25 February 2014) where a range of speakers expressed their experience with waste from the 1960s till present. The discussions that took place at this seminar serve as useful not only because the information is rich and from direct words that were spoken by highly experienced people in the field of waste, but because of the length of their experience in their field which means that their insight spans over decades. I then explore how waste is conceptualised, defined, what it is associated with and its value. The need for a paradigm shift in conceptualisation triggered the main research aim which is to explore how residents conceptualise waste and whether this influences their recycling practices. Following this I explore the theme of recycling and S@S and the factors that influence participation in recycling programmes. I conclude by identifying key insights from the literature reviewed that this research report draws on, as well as areas that require further research and which this research report seeks to address.

4.1 The history and development of waste management

This subsection on the history and development of waste management draws primarily on Wilson (2007) and an oral discussion about 'The Development of Waste Management in the UK c.1960–c.2000' led by Professor Tilli Tansey and experts that have experience in waste from the 1960s, with transcripts edited by Jones and Tansey (2015). Additional perspectives from men and women who have spent their lives working in waste management, waste operatives, policy-developers and politicians from

UK and London were provided at the seminar. Drawing on these sources I briefly describe the timeline of how waste management developed from waste practices.

This subsection traces some of this history of waste practices and waste management. Understanding how humans have interacted with waste through time reveals a great deal about social relationships and reflects on the societies that have generated it (Barles, 2014). Waste has been an issue of concern from the earliest stages of human settlement and civilization. Barbalace (1999) interestingly states that there are four basic processes that have been used in early history to deal with or process waste and they include recycling, combustion, minimisation and dumping, exposing that waste practices such as recycling are not new to society. Gladding, (cited in Jones and Tansey, 2015) states that the dawn of recycling and recovery of materials was in the late 1990s and early 2000s. One can assume that Gladding's view was from a more technological and innovation perspective while Barbalace (1999) may have been referring to the first human practices, prior to technological development. The environmental and health impacts of waste had led to the development of policies and legislation in the UK. An example was identified by Wilson (cited in Jones and Tansey, 2015) who observed that some of the quickest action taken on a waste related crisis from Parliament in England was when there were newspaper reports on the discovery of cyanide on waste grounds in Midlands which children used as playground and after 10 days there was the introduction of the Deposit of Poisonous Waste Act (1972).

As far back as 1000-1800, waste became an issue of concern where it was dumped out in the open on the streets of cities. Concern arose around creating a cleaner environment yet many attempts failed (Wilson, 2007:199). One of the first waste management systems has been dated back to the 18th century in London, allowing for the development of waste collection services. A 50 year long period between 1850 - 1900 saw the relationship between the mismanagement of waste and its impact on public health and sanitation (Wilson, 2007:199). This statement agrees with the main argument presented by Tansey (cited in Jones and Tansey, 2015) where he argues that waste management has essentially been an issue in the medical space where the

health of society depends on efficient waste management. Other speakers at the seminar concurred with Tansey's argument adding that adequate disposal and collection of waste is essential not only for the public but for those who work in the waste industry. The 1960s and '70s saw the onset of an environmental crisis with apprehension on how far industrialisation and urbanisation could push the earth's limits (Barles, 2014; Wilson 2007). Petts (cited in Jones and Tansey, 2015) argues that since the surfacing of the environmental movement of the 1960s-70s, it is evident that waste had more than just an industrial history, but a strong cultural and social layer underlies waste history (Jones and Tansey, 2015).

In an analysis of both developed and developing countries, Wilson (2007: 202-204) identifies six broad elements that have acted as drivers for waste management over time. These broad categories include public health, environmental protection, the resource value of waste, closing the loop, institutional and responsibility issues and lastly public awareness. The historically perspectives that informed these aspects are presented by Wilson (2007) as follows:

i. Public health – a principal driver for waste management, particularly waste collection as previously discussed above and in the last paragraph of page 21
ii. Environmental protection – became a major concern around the 1970s with the onset of the world's environmental crisis. A current perspective is that the main focus is still on poorly managed disposal in developing countries and as a South African resident, I concur.
iii. Resource value of waste – For developing countries, waste serves a means of maintaining livelihoods which is a statement I also concur with because of the informal waste sector, waste pickers and informal recyclers in the country.
iv. Closing the loop – Wilson (2007) makes reference to the waste hierarchy. Briefly, the waste hierarchy is a hierarchical approach to the priorities set out for efficiently using resources (EPA). Figure 11 illustrates the waste hieracrchy.

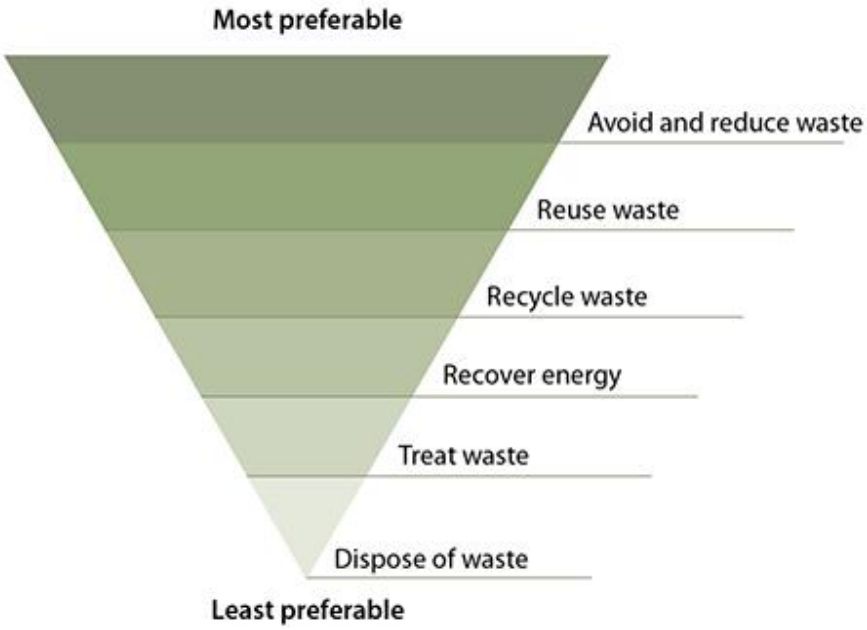


Figure 11: The waste hierarchy (EPA, 2015)

Additionally, a paradigm shift from cradle-to-grave to a cradle-to-cradle approach was developed by the DEAT (2004) in South Africa to address this loop. These two approaches refer to how raw materials or resources (*from cradle*) go through the product life-cycle until they are disposed (*to grave*). Cradle-to-grave simply describes the lifecycle of the raw material through to disposal. On the other hand cradle-to-cradle refers to when these raw materials are not disposed but continue to enter new production cycles or continue to be resources rather that turning into "waste" (Aharonovitch, 2008).

v. Institutional and responsibility issues – The 19th century saw state bodies such as municipalities being assigned to carry out this service however currently in developing countries, the efficiency and even availability of this service is still facing challenges.

vi. Public awareness – While in developed countries, waste continues to gain importance, in developing countries other social aspects such as poverty, food and water security and the maintenance of livelihoods prevails while waste only becomes an important concern when it hinders the ability of these aspects to be address or negatively influences human and environmental health.

Having explored a brief history of waste, it is clear that waste has been a factor that humans have had to deal with since their existence. However with industrialisation, urbanisation and globalisation as well as a culture of increased consumption, waste has gained more and more importance on global environmental agendas. Lenkiewicz (2016) encourages that it is important to recongise that the prioritization of waste management is essential for the achievement of the sustainable development goals, primarily goals 1,2,3,4,5,6,7,8,9,10,12,13,14,15,16 and 17. These goals are illustrated in the Figure that follows.



Figure 12: The Sustainable Development Goals (WasteAidUK, 2016)

Observing the factors that Wilson (2007) argues developed waste management, it is evident that waste was recognised as an important concern in society around the 1970s. In developing countries however, the importance of waste has been slow to gain high importance because of the pressing socio-economic issues that take preference over environmental issues. The history of waste brings the question of how waste has been understood by people and these arguments are engaged with in the next section.

4.2 The conceptualisation of waste

In this study, I analyse the conceptualisation of waste referring to the way people define waste and what people associate with waste - with a focus on value of waste. Waste issues are highly complex and thus require transdisciplinary approaches that also recognise the importance of the role of social aspects, (Gutberlet, 2013:110). Understanding these conceptualisations presents the opportunity for paradigm shifts in ways of thinking, perceiving and conceptualisting waste and these are views expressed by Moore (2012) and Oteng-Ababio (2014).

4.2.1 Defining waste

Because waste means different things to different people (Moore, 2012) and is a contested concept, it is essential to understand how it is conceptualised, particularly by the residents in the area where waste programmes have been introduced. The conceptualisation of waste is a contested concept that means there is no rigid and agreed upon definition of it. Pongracz and Pohjola, (2004) make reference to Hempel's (1966) earlier observation that in order to characterise a concept in science, definitions need to be investigated. They therefore express a pivotal statement arguing that a relationship exists between the way waste is described and the way that it is consequently handled, emphasising the need to explore how waste is defined.

Arguments presented by Pongracz and Pohjola (2004) stem from a European context and they claim that waste related concepts and activities are poorly defined and will hinder proper management of waste. Conversely, in South Africa, waste is described broadly, particularly in the National Environmental Management: Waste Act (NEMWA)

(Act 59 of 2008). On page 10, in Chapter 1 titled Interpretations and principles, the NEMWA defines waste as the following:

> **"waste"** means any substance, whether or not that substance can be reduced, re-used, recycled and recovered—
> *(a)* that is surplus, unwanted, rejected, discarded, abandoned or disposed of;
> *(b)* which the generator has no further use of for the purposes of production;
> *(c)* that must be treated or disposed of; or
> *(d)* that is identified as a waste by the Minister by notice in the *Gazette,*
> and includes waste generated by the mining, medical or other sector, but—
> (i) a by-product is not considered waste; and 35
> (ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste;

This wide-scoped definition from the NEMWA recognises waste as both an item that is unwanted, has exhausted its value and has been thrown away. However, the NEMWA simultaneously identifies waste as material that can undergo processes such as re-use, recycling and recovery to become or rather return to being a resource, also recognised by Gutberlet (2013; 110) and Oteng-Ababio (2014). Similarly, both Moore (2012) and Gutbertlet (2013:110) recognise that waste can be viewed as something useless, unpleasant, bothersome and out of place (Gregson and Crang, 2010), or it could be viewed as something useful.

4.2.2 What is waste associated with?

This sub-section will engage with the concepts and ideas that waste is associated with which also in fact assists in understanding how it is conceptualised. Aspects of disposal are discussed, literature on the value of waste is engaged with and lastly the design of consumer products is analysed. Waste is associated with disorder and processes of disrupting and disturbing the socio-spatial norms of society (Moore, 2012:781). Some important terms that are coupled with waste include: “dispose” and “discard”. Pongracz and Pohjola (2004:142) expand on these terms assuring that both terms have been developed from the process of abandoning. While “disposal” has the assumption of

placement in a suitable setting, “discard” carries that connotation of a lack of use and being unwanted and therefore thrown away.

Gutberlet, (2013:110) explains that an important contradiction exists when waste is viewed as material with no value and simultaneously as a sought-after resource. What is waste to some is a rich source of resources to another (Parizeau, 2015). When waste is perceived as unwanted material, it tends to be associated with having poor or no value. Moreover, the articles are understood by their owners to have exceeded their life span. Oteng-Ababio, (2014:2) agrees stating that the perception of a lack of value means an output with a negative market and seen as objects that have been used to their full potential and for their entire purpose. This often means that the consumer will not use the objects and find them meaningless to both themselves and even other people. Thus both Oteng- Ababio (2014) and Moore (2012) argue that a paradigm shift is needed by communities where waste is not viewed as material that no longer has value but instead as material that has value embedded in it. A closely linked paradigm shift suggested by the Integrated Waste Management Plan by the Department of Environmental Affairs and Tourism (DEAT) refers to a shift from “Cradle to Grave” to “Cradle to Cradle”. This means that products should be designed in a way that they are continuously circulated and where “waste” and “away” do not exist (Fiehn and Ball, 2005).

This reveals and suggests that products are designed to fulfill one goal and as soon as that is achieved, the material changes into waste as expressed by Oteng-Ababio (2014). An easily relatable and valuable example of this is described by both Oteng-Ababio (2014) and Pongracz and Pohjola (2004) about tomato sauce or mustard that remains on a plate once the meal has been eaten. These sauces will not have lost any of their components or have entered a state where they have ceased their purpose, the owner will just have failed to utilise the product. Therefore the product remains useful and can carry out its functions but is no longer used or used again by another consumer (Pongracz and Pohjola, 2004:143). The topic of ownership and transfer of ownership prove to be an important when analysing the value of waste. Banga (2011) as well as

Pongracz and Pohjola (2003:145-146) argue that when the owner of the object changes, some waste can change into a secondary raw material or a new resource for the next person. When the owner changes, the economic value, re-use and recycling potential of that object also change. During the transfer of ownership from one person to another, the value of that material has the potential to transform from something of no use to raw material. These insights offer the opportunity for further research relating to how product design can be optimised to allow for reuse and recycling and maintain their desire for use, even when they change ownership.

4.3 Recycling and S@S

This sub-section explains what recycling and S@S are and a number of ways to understand the two. Debates on what these two concepts mean are also engaged with. Additionally, this sub-section draws on insights related to the factors that influence participation in recycling and S@S programmes.

4.3.1 Defining recycling and S@S

In analysing the history of waste, it was clear it is not a new phenomenon however perhaps efforts to optimise it in the modern era are. Understanding some of the ways recycling is understood is key in any research involving recycling and waste practices. Recycling is defined by NEMWA (South Africa, 2008) as a process where waste is not disposed of but used for additional use. Recycling also involves separation at the source there the waste is generated. The separated materials are used as products or raw materials (South Africa, 2008). Recycling according to Banga (2011) is the most sensible end efficient way of manage solid waste and has both economic and ecological benefits.

Moore (2012) argues that changing views from seeing waste material that has no use to seeing it as a resource allows societies to view the positive impacts of formal recycling on the sustainability and efficiency of municipal solid waste management, informal recycling, waste picking and how the recovery of materials serve as a means of survival or livelihood strategies. Oteng-Ababio (2014) adds to this debate by explaining that this

shift should divert away from the current emphasis on “end-of-the-pipe approach” where waste is collected from households and disposed at landfills with no intention of recycling or reuse, towards the encouragement of consumption within the waste stream. This suggests that waste should be viewed as a resource and residents will find it valuable, therefore allowing them to rethink how they dispose of it. Gutberlet (2013) and Banga (2011) agree that recycling and the culture of waste separation is a difficult process and activity to adapt to for many people. An important observation by Gutberlet (2013) is that recycling is currently recognising the goals of sending zero waste to landfills, a goal initiated by GAIA (Global Alliance for Incinerator Alternatives). However, often this does not translate into changed waste behaviour, which leads me to the next sub-section on influencing factors.

4.4 Factors influencing participation in recycling and S@S programmes

This last sub-section explores an important theme in this research which is the factors that influence (encourage or de-motivate) people to participate in recycling or S@S programmes. This theme is pivotal because, for recycling programmes to be successful, these aspects need to be identified and can be used as target points in how programmes are designed for certain areas. It is my view that such factors can serve as baseline information for waste programme research designs, prior to their implementation in a selected area. Martin *et al.* (2006) who conducted a study in in Borough of Burnley, UK, explains that recycling programmes being available and accessible is important for householders to recycle and participate in such programmes however what is fundamental to understand is the factors that will encourage or demotivate people to actually make use of recycling infrastructure. This statement is central to my study because there are recycling programmes available so the issue does not rest in availability, but rather in what influences participation when the programme exists. This theme has been explored by many researchers and I focus on some of the factors argued to influence participation in recycling programmes.

Having conducted an assessment of waste management practices themselves in Owerri Municipal State, Nigeria, Adogu e*t al.,* 2015:447) acknowledge and agree with

work carried out by Banga (2011) who explored which factors influence recycling in Kampala, Uganda. The main findings of the study by Adogu *et al.* (2015) revealed that socio-economic variables such as gender, household income, levels of awareness of existent recycling activities in the area and levels of education play significant roles in participation in separation activities. These findings speak to Banga's (2011) study which had also found that socio-economic variables, household knowledge, attitudes and practices influence participation. Similar to these studies, my research explores aspects of perception in conjunction with practice.

A seemingly more detailed study by Martin *et al.* (2006) explored the social, cultural and structural influential factors on household waste recycling. A wider range of influential factors were uncovered. Banga (2011), Adogu *et al.* (2015) and Martin *et al.* (2006) had similarities in terms of influence that socio-economic and demographic status has on recycling. The difference was that Martin *et al.* (2006) went further and identified influential factors such as the convenience of recycling, incentives for recycling and waste disposal and rating and preferences for curbside schemes. A key finding therefore was that municipalities need to improve on the reliability, convenience and ease of sustainable waste disposal services. Prior to this in 2004, Tonglet *et al.* had explored what the drivers are for pro-environmental behaviour such as waste minimisation and recycling, in Northamptonshire, UK. They referred to a previous study by Barr e*t al.* (2001) who argues that recycling behaviour is influenced by knowledge and awareness of environmental problems and a concern about the resultant consequences that will have to be faced if waste is mismanaged.

The findings from Tonglet *et al.* (2004) that differ from Martin *et al.* (2006) include the suggestion that attitudes are key in recycling behaviour and serve as the main basis for household recycling. Tonglet e*t al.* (2004) found that adequate opportunities and services as well as recycling knowledge and environmental and community concern are essential factors. Moreover, they found that attitudes are influenced by not being discouraged by physical factors such as convenience, space in the household and time. The factors that both studies found in common include convenience (including ease of use), an adequate amount of space, time required to recycle.

Barr e*t al.* (2001) argue that although waste behaviour is based on values and that recyclers tend to have environmental concerns, the main influence remains related to the logistics or recycling, the level of convenience of recycling and recycling knowledge. The study reveals that attitudes are at the forefront of what influences recycling behaviour and these attitudes are underpinned and driven by opportunities to participate, knowledge on recycling and most importantly, not being discouraged by the practicalities of recycling such as convenience, space and time. This speaks to Martin e*t al.'s* (2006) findings. It is thus evident that while conceptualisations, perceptions and attitudes are pertinent to waste and recycling behaviour, practical factors such as time, space, convenience and ease are key drivers of participation in such programmes. While this study focuses on conceptualisations, it also recognises the need to explore additional influencing factors. This research however explores the different conceptualisations and understandings of waste and whether they impact and influence participation in recycling programmes such as S@S. Different to the above studies, this research report combines four different methods to explore the abovementioned issues.

Conclusion

This literature review presented an overview of the literature that is pertinent to this research. It explored the history of waste and waste management and explored views, arguments and findings from literature on waste conceptualisation, recycling and S@S and how these themes inform this study. Fakir and Broomhall (1999) claimed that there was a lack of studies that focus on waste management in 1999 and having explored waste management literature for Midrand 17 years later, it appears that not much has changed. Having reviewed the literature, I am drawing on the different conceptualisations of waste and the factors that influence recycling and S@S participation to answer my key research questions. Much work has been done on the conceptualisation of waste however this research project combines literature on waste conceptualisation with that of recycling and S@S in an urban community where recycling programmes are available.

5. CONCEPTUAL FRAMEWORK

While the literature review informs what work has been previously done, the conceptual framework explains the key concepts related to waste that I will draw on from the literature. This section will also explain the theoretical framework from which this conceptual framework is developed.

The two main overarching concepts that I engage with throughout the report are “waste” and the concept of S@S. As discussed in the literature, there is no rigid description for waste, making it a contested concept. This therefore means it will be understood differently by different people, which has been discussed in the literature review. In recognising this, this contested concept is explored through investigating how people conceptualise it. This investigation on how waste is conceptualised explores three aspects: 1) the words people associate with waste which reveals how it is defined; 2) whether people view waste as positive or negative and; 3) the value of waste. These three aspects will provide an understanding of recyclers and non-recyclers attitudes towards waste which shape their waste practices.

The main practice and other main concept is that of S@S. According to Furedy and Lardinios (2000:21), the S@S concept was coined by wealthy communities (of the “global north”) around the 1980’s by distinctly contrasting post-consumption materials (“waste”) in order to recover resources at material recovery facilities (MRFs). This study focuses on this practice in households as the source of waste generation. It is particularly participation rates in S@S that are investigated in this report through qualitative methods employed to engage with the residents of the study area. In exploring participation in S@S programmes is where I will engage with concepts such as knowledge and awareness, convenience, space and time. A definition of a convenience service proposed by Farquhar and Rowley (2009:434) is as follows:

> *“The convenience of a service is a judgement made by consumers according to their sense of control over the management, utilization and conversion of their time and effort in achieving their goals associated with access to and use of the service.”*

Farquhar and Rowley (2009:434) additionally motivate that, unlike other researchers, their definition recognises that convenience is not only characterised by reduced time and effort but that consumers are concerned about services offering them control and management on the expenditure of their resources allowing for increased value to be gained while achieving certain goals or daily activities. The conceptual framework that results from having reviewed the literature is one that explores the social aspects such as conceptualisation of waste in urban community households as well as the factors that influence participation in recycling and S@S programmes. A conceptual framework by Moore (2012) and the Theory of Planned Behaviour (Ajzen, 1991) inspired the conceptual framework adopted for this research. It is further explained below.

5.1 The conceptualisation of waste: an analytical matrix (Moore, 2012)

In Moore's (2012) review on recent literature on waste five years ago, she plotted different understandings of waste along two axes in order to contextualise literature on waste (see Figure 13). Positive vs. negative conceptualisations of waste were plotted with dualist vs. relational concepts of waste (Moore, 2012: 780). The positive-negative axis refers to how much a certain approach to waste argues for a certain type of waste that is important. On the left, the concepts are those that identify waste as having specific qualities while concepts on the right of this axis are the opposite and view waste as something that is challenging to categorise. The second (dualist-relational) axis explains how much waste is seen as matter that is not included in society. Concepts above this axis define waste as separate materials that come together via socio-spatial processes. Concepts below this axis depict waste and society as mutually constitutive (Moore, 2012: 782). This conceptual framework on how waste can be conceptualised is valid because this research will also explore different descriptions and understandings of waste which are likely to correlate with those on these two axes. Figure 13 that follows shows these axes.

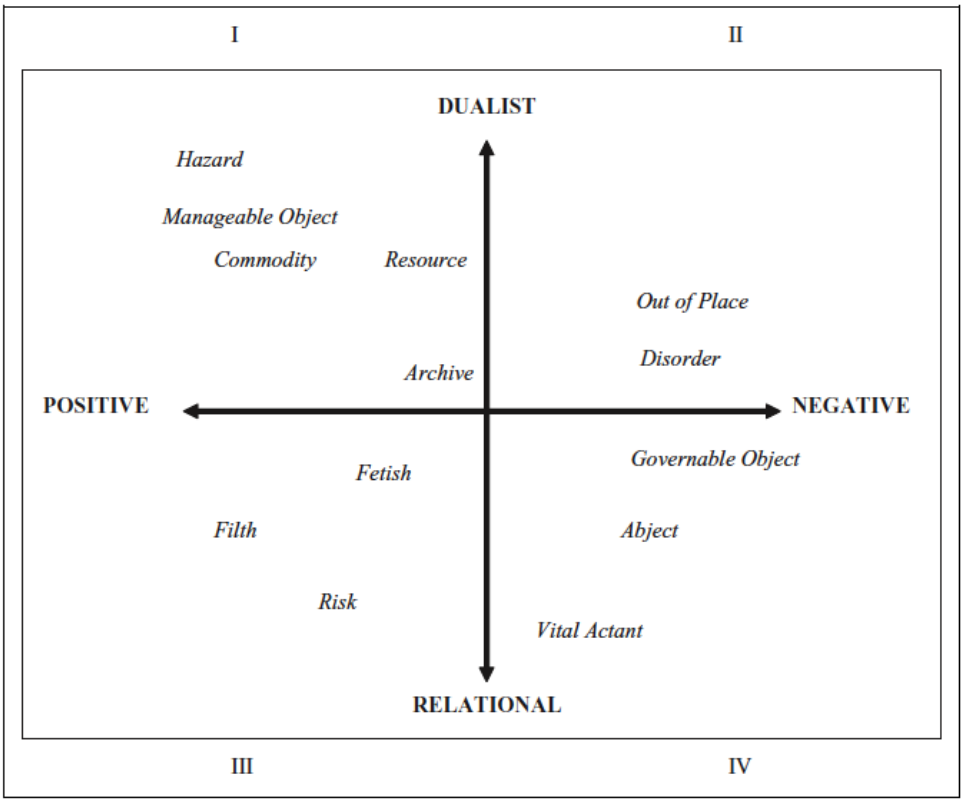


Figure 13: Emerging literature on waste plotted on two axes (adopted from Moore, 2012: 782)

5.2 Theory of Planned Behaviour (Ajzen, 1991)

Another key article that inspired the conceptual framework for this study is by Tonglet *et al.* (2004) who employed the Theory of Planned Behaviour (TPB) in their study trying to determine the drivers for householder pro-environmental behaviour. They specifically compared waste minimisation to recycling in UK. This theoretical framework is underpinned by three variables: attitudes (favourable or unfavourable evaluation of performing the behaviour), subjective norms (perception of social pressure to perform or not to perform the behaviour) and perceived behavioural control (perception of the individual's ability to perform the behaviour) (Tonglet *et al.,* 2004: 31). These factors are illustrated in the Figure that follows from Azjen (1991) who initially developed and explored the TPB.

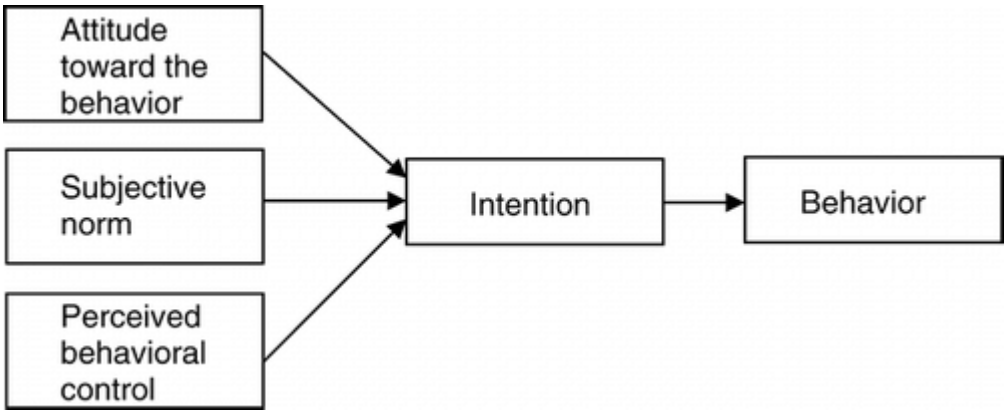


Figure 14: Theory of Planned Behaviour (adopted from Ajzen, 1991 and cited by Tonglet *et al.*,2004)

Figure 14 shows how these variables inform intention, which thus informs the resultant behaviour. This theory arises from a previous theory called Theory of Reasoned Action (Ajzen and Fishbein, 1980) which argues that there is a rational basis for people's behaviour where they reflect on the repercussions and consequences of their behaviour. Tonglet e*t al.* (2004) explain that there have been arguments in literature claiming that recycling behaviour is not sufficiently explained by TPB and have thus proposed that additional aspects be added to this framework. Owing to the argument that this model does not fully explain recycling behaviour, other factors were included such as moral norms, past experience, situational factors, and consequences of recycling and waste minimsation attitudes (Tonglet *et al.* 2004). Tonglet *et al.'s* (2004:36) factor analysis assisted in the description of the factors used for this study.

For this study particularly, the two main factors from the TPB that were employed are:

a) Attitudes (In this study attitudes are investigated primarily by understanding the conceptualisations of waste)
b) Perceived behavioural control (Convenience, effort, knowledge of recycling)

The additional factors relevant to this study (and described Tonglet e*t al.,* 2004:206) are:

c) Moral norms which refers to the moral factors involved in making the decision to carry out the behaviour. In this report, this includes guilt, morals and social responsibility.
d) Situational factors such time, effort and space required to recycle
e) Outcomes which includes environmental concern and protection which has links to knowledge and awareness.

Although TPB inspired the conceptual framework, this study does not employ quantitative methods for data analysis. Renzi and Kolbas (2008) state that qualitative methods are often used when TPB has been employed. However they recognise that some authors and research may choose to use qualitative methods, particularly when they use data from interviews, such as in this study. The selected aspects are inspired by TPB while data analysis is conducted in a qualitative manner. This is discussed further in the methodology section which follows.

6. METHODOLOGY

"Methodology refers to how we gain knowledge about the world and how we collect research data" (Hennink *et al.,* 2011:12). This chapter provides an overview on how I conducted my research and discusses details on the methods I chose for the research, how I came to choose those methods, and how I chose people to participate in my study. I also make reference to some of the literature that has inspired my methods.

6.1 The Aims and Objectives of the study

The main aim of this research was to explore whether the conceptualisations of waste influence household waste practices, such as the way in which waste is disposed as well as participation in recycling programmes like separation at source (S@S) in an urban middle income gated community called Elizabeth Fry Village (EFV) in Midrand. Having resided in EFV, an insider perspective and access to the gated community allowed me to identify that there is a S@S programme in the area I live in. Additionally I wanted to understand more about the recycling system, how it operates and how residents have responded to the availability of this resource. With that in mind, the question remains: why are participation levels so low? This aim was explored by developing and investigating the research questions that follow in the next subsection.

6.2 The Research Question

The following questions serve as the three main research questions.

a) How do EFV residents conceptualise waste?
b) Does the way residents conceptualise waste influence their waste practices (waste disposal)
c) What are some of the factors that influence S@S participation levels?

These research questions were explored through a case study of EFV. Each research question was addressed by using specific methods and this is shown in more detail in Table 2 in the subsection that follows.

6.3 Research Approach

This research is framed by constructivist epistemology. Mason (2006) explains that constructivist epistemology holds that there are different explanations that may exist for the same thing. Guba and Lincoln (1994) and Ponterotto (2005) both describe constructivism as "transactional/subjectivist" where the researcher and that being researched are connected. This view observes knowledge as being generated whilst the researcher and that being researched interact (Guba and Lincoln, 1994). Constructivism adopts a relativist position, acknowledging that there are a number of different realities that exist across different individuals (Ponterotto, 2005). This informs the choice of method of this study. This is because like Guba and Lincoln (1994) and Ponterotto (2005) I concur that people have different knowledge and therefore waste can be understood in different ways. This broad range of understandings of waste will help me understand how it is perceived in my area of study.

This is key for this study because it does not aim to make generalisations but rather to provide and in-depth understanding of a specific area, hence the choice of research design (case study) discussed in subsection 6.4. Constructivism accepts that a number of "knowledges" can exist and social, cultural, gender, ethnic and political factors may have a role to play (Guba and Lincoln, 1994) while the values and experiences of those being researched cannot be put apart from the research investigation process (Ponterotto, 2005). Maraqah (2014) adds that epistemological approaches suggest that people know that something is happening because of the knowledge they have about it and in the same breath, I acknowledge that residents will have knowledge about aspects related to waste in this community because they reside in it. I do not only believe that people possess knowledge, but acquiring this knowledge can be done in a number of ways through engaging with humans. Because of this, my research is framed in a way where people have the knowledge required to answer the research questions. This knowledge is gained by interviewing people and observing their surroundings. This information was gathered and used to answer the research questions (See Table 2).

Constructivist epistemology led to the choice of qualitative methodology as the research approach. Qualitative research is an overarching term that covers a wide variety of

methods and approaches across several disciplines (Ritchie and Lewis, 2003). Qualitative research allows me to ask the “why” and “how” (process) questions, understand multifaceted questions and explain experiences and behaviour whilst engaging with evolving and new topics. These “how” and “why” questions are answered by epistemological approaches which are briefly explained below. Moreover Hennink *et al.* (2011) add that qualitative research aims to explore issues of relevance (issues that are not well researched, as in this gated community), identify themes and most importantly, to include local meaning and different categories of response to research.

Qualitative research was chosen as the methodology of this research because the study is investigating behaviours, choices, conceptualisations and practices of people which require one to engage with the subject on a more personal level. The research questions were designed in a way that explores meaning, understanding and conceptualisation. Therefore the research needs to be done in an open way. To understand what people do and the reasons that shape why, they need to be engaged with. Mack *et al*. (2005) add that qualitative research helps one to gain a rich understanding of a specific social context or a situation occurring in society, justifying why qualitative methods were chosen for this study. By using specific methods such as interviews and observation methods, I can achieve an in-depth approach to people’s experiences, practices and behaviours, which are some key areas that this research explores regarding household waste. People that are studied for qualitative research are studied in their natural settings so as to examine how aspects of their life (social, economic, cultural and physical) may influence their experiences and behaviour, therefore qualitative research takes contextual influences into consideration (Hennink *et al.,* 2011).

Table 2 below illustrates my main sub-questions, the evidence I needed to answer them and the resultant methods chosen. These choices are further elaborated on, following the table below.

Table 2: Methods Table (Source: T Dune)

Sub-Questions	Evidence Needed to answer the question	Method
1) How do EFV residents conceptualise waste?	Answers from residents	Interviews, participant observation
2) Does the way residents conceptualise waste influence their waste practices (waste disposal)?	Looking through and analysing residents' waste	Participant observation, waste composition study and desktop study
3) What are some of the factors that influence participation in S@S programmes in EFV?	Answers from residents	Participant observation interviews and desktop study

Table 2 above clearly shows the key sub-questions that were explored through this research. The methods I chose were informed by their ability to answer my main sub-questions. The methods that have been chosen to answer these questions include participant observation, interviews, desktop studies and a waste composition analysis. These methods are explained in more depth in subsection 6.6 Data collection (where I also expand on why I chose specific methods to answer specific questions) and 6.7. Data analysis.

6.4 Research Design (Case Study)

The research design for this research was a case study. This was influenced by having resided in the area and therefore having an insider perspective which would contribute to the richness and depth of understanding. Additionally I have access into this gated community which has controlled access. I wanted to explore the unique aspects of this middle income gated community and understand how its residents understand waste and their participation in a recycling programme available in their community.

Case studies are described by Stakel (2005) to a well-known way to carry out qualitative investigations. Case studies can be carried out by being analytical, holistic, repeating certain measures or by employing mixed methods as this research does. What is specific about case studies is that the specific case is what is focused on and Stake (2005) explain that the name “case study” emphasises and draws attention to what is unique that can be discovered about the specific case. This is also identified by Yin (1994) who recognises that case study research drawing attention to a specific case by having a limited scope and pointing attention to specific characteristics. Yin (1994) states that case studies are often chosen for research design because they often are useful to answer the “how” questions. In this study, the “how” question would be:

How do EFV residents conceptualise waste and how do these conceptualisations influence waste practices?

Stake (1995) adds that case study research aims to capture the complex aspects of one specific case. A case study is therefore done when a single case is of particular interest. In this study whats interesting is the lack of participation in recycling programmes in a more affluent area where such resources are available.

Case study type research is often critisised in terms of not being able to make generalisations and thus being unable to make significant contributions to academia. Flyvberg (2006) however, identifies this as one of the misconceptions about case study research. Moreover, Stake (1995) praises that case studies reveal the particulars and complexities that exist in one space. Stake (1995) admires that such in-depth studies seek to understand people and processes, listen to experiences and highlight individuality and commonality. It is also argued that case studies are not conducted in order to understand other situations and the main objective is to understand and appreciate a specific case only. The in-depth nature of this study within a study area that I live in could potentially make the research biased, however this was overcome by maintaining objectivity and presenting the research as an in-depth study, rather than a comparative one. Over and above the aforementioned limitations, Mills et al., (2010) argue that exploring one place still has the ability to shed light on either hidden or under-researched aspects that can help understand the broader research issue. In

addition, detailed examination of a single case or place can expose new avenues for thinking and practice.

6.5 Population and Sampling

Sampling forms an essential part of research because it speaks to its reliability. Marshall (1996) explains that it is impractical, inefficient and unethical to study entire populations and therefore sampling is essential to any research study. Given that this research is qualitative, sampling is an important factor. In addition, Marshall (1996) explains that there is a limited amount of value that can be obtained from studying large samples and this falls in line with this research because it is being conducted in a community with only 55 households and with only 53 of those households occupied with residents. Important to note is that the sample for this research does not aim to represent all urban communities or communities that have S@S programmes or to make broad generalisations but rather aims to provide and in-depth investigation of a selected area and provide a detailed review of the processes that may be at play. This research is centred on households and the interviews were done in the participants' household (dwelling). A total of 22 households were used for interviews and this represents 40% of the total households in EFV. Specific detail on the population sampled for this research is provided in subsection 7.1 Demographic Profile.

Sampling for this research project included purposive, convenience and later snowball sampling. Marshall (1996), and Patton and Cochran (2002) agree that purposive sampling is a common sampling method in qualitative research and explain that this is because it selects certain individuals who are likely to provide valuable information and are productive. In this case such individuals were the EFV community leader, VVRA residents association liaison who communicated with Pikitup, residents who have resided in EFV for a few decades and a Pikitup official (manager). As a Pikitup official employed by Pikitup, she has valuable inside information that is not always easily accessible to the public.

Convenience sampling on the other hand is described as sampling that assists in saving costs and time (Patton and Cochran, 2002). This research made use of convenience sampling because as a member of the society analysed, it was expected to be easiest

to begin next door with neighbours and familiar faces and then to extend to houses further away. In addition, access to EFV was granted through residency in the area. This provided an added insider perspective advantage that informed the study and contributed to its depth.

Lastly, snowball sampling was also used and it is also known as chain-referral sampling. It is defined as a method for sampling where a sample is developed by those in the study area who may know of others who may have knowledge on the matter being studied (Biernacki and Waldorf, 1981). Whilst conducting my research, in about four cases, participants referred me either to a next door neighbour or to a friend in the community who I could approach to participate in the study. This revealed that in this community, there are long-term relationships that have been built among residents and as the data collection process continued, this sampling methods showed to be highly valuable and useful.

6.6 Data Collection

Prior to data collection, members of EFV were provided with hand delivered letters (Appendix A) which invited them to partake in the study. Contact details were also provided for anyone who requested additional information or wanted to participate. The following Figures illustrate the delivery process.



Figure 15: Process of hand delivery of notification letters to households (Source: T.R. Dune)

This helped create awareness and enthusiasm that the area is being studied. As Table 2 illustrates, this research employed a mixture of methods. These methods are explained below.

6.1.1 Participant Observational Fieldwork

Participant observation was the primary method. Participant observational fieldwork has been a method of understanding social sciences since the early 1910's (Erickson, 1985). It involves the intensive, long term participation in the natural setting of the researched object or people, careful observation followed by copious writing of everything that happens as well as collection of other forms of evidence such as pictures and audio tapes (Erickson, 1985). This is then followed by reflecting on all records collected in the field and reporting. Reporting can be done by text, charts, tables and descriptive statistics. Participant observational fieldwork is especially useful when a researcher wants to explore the location of where certain processes occur (as I want to explore the recycling process and system in EFV), causal linkage in their natural setting (factors influencing household S@S and recycling) and relationships between actors (people and waste) (Erickson, 1985). Lastly, participant observational fieldwork answers questions that explore what is occurring in a natural setting as a whole (how people dispose of their waste, what people dispose, etc.) which surveys, questionnaires or interviews may not recognise (Erickson, 1985).

This research has two participant observation components: participant observation within households and outside households. This research method of field observation was previously used by Agbesola (2013) to evaluate municipal solid waste management in Lagos, Nigeria. Field observation outside the households involved walking around the area taking notes of the average amount of bags disposed of and how waste is collected by Pikitup. Pictures were also taken with a camera. 31 years ago in 1986, Collier and Collier identified that humans tend to be poor observers and that detailed and informative visual information can be provided by photographs. I decided to include photographs in this research not only to provide rich data but also to allow readers to gain a better understanding of the research area. The photographs also serve as evidence of conducting the research and play a role in inviting readers into the context

of the study. I think that visual images provide a lot of information that descriptions can't. Mostly for this research, photographs are used to show processes, illustrate the study area and supplement findings.

Observation within the household was primarily the location of bins, fullness of bins, number of bins, contents of the bin etc. At the end of the interview process (which is explained in the next sub-section), I asked residents if they were comfortable for me to take photographs of their bins, garbage bags and waste. I explained to them that this would contribute to the richness of my data and they were allowed to permit or decline this request. More general photographs were taken on a larger scale and this was done during the days when waste is collected (recycled paper on Mondays, recyclable materials on Wednesdays and general waste on Thursdays).

A key element of this participant observation is that I am a knowing actor because I reside in the study area; therefore I included some of my own reflections. Participant observation was carried out throughout the entire project timeline. I kept a camera and a notebook with me at all times so that I could take notes of anything that I saw that was interesting in EFV. This method only ceased when the data analysis phase of my research was completed in March 2017.

6.1.2 Interviews

Britten (1995) and Polkinghorne (2005) express that interviews are a well-known tool that is used when conducting qualitative research. In-depth interviews aim to explore how people perceive things and how they narrate their experiences (Hennink *et al.,* 2011), which is ideal for research that aims to explore how people conceptualise a contested concept like waste. Because interviews are usually conducted in a (natural) setting such as the participant's home, I could observe the socio-cultural and socio-economic aspects that telephonic interviews or questionnaires may not gain. The type of interviews I chose to conduct were semi-structured interviews, which are explained by Britten (1995) to be interviews that that have a loose structure and have make use of open ended questions (See Appendix B). Britten (1995) and Polkinghorne (2005) agree that the interviewer and interviewee may at some point diverge from that specific topic

to explain other concepts, emotions or feelings in more depth and semi-structured interviews provide for this potential diversion. In addition, an interviewer tends to follow on the conversational threads that the respondent presents.

For these reasons I chose to conduct semi-structured interviews because if waste means different things to different people, they will express how they feel about it differently. Other than being a multifaceted concept, waste is something that all people deal with daily, so I wanted to allow that space for people to express themselves rather than having a rigid and structured interview which may limit what respondents want to share. Throughout interviews, I used a voice recorder to audio tape interviews to accommodate diversions from questions as mentioned above. I chose to record my interviews so that I had a reliable back-up to my notes and so that I could capture entire responses for transcription. This method was also used by Agbesola (2013).

A total of 22 households were interviewed. In some cases, more than one household member would participate resulting in more than one household member being interviewed per household, although the research design initially intended to interview one person per household. In an extreme case I interviewed five residents of the same household then in three cases I interviewed two members of the same household cases. Raised interest in the study among other members thus resulted in 33 household members having participated in the interview process, where 12 were male and 21 were female. When this would be the case, each household member's responses would be transcribed separately. I also observed agreements and disputes about any questions asked and this is explained in more detail in Chapter 7. My sample also included four key informants and these are people who I identified that may have valuable information that is more extensive or detailed compared to regular respondents, therefore making them highly valuable to the study (Payne and Payne, 2004). The Key informants were 1) the Vorna Valley Residence Association (VVRA) secretary, 2) EFV community leader, 3) Pikitup Manager, and 4) an EFV resident who has resided in the area for almost four decades.

6.1.3 Waste composition study (WCS)

Tonglet *et al.* (2003) and Bandara *et al.* (2007) agree that for any sustainable waste programme to be successful, it is important to understand how much waste is generated and what is present in the waste stream of the selected study area. A WCS formed part of my field observation. An integral part of this study sought to explore whether peoples' conceptualisation and understanding of waste shapes their waste practices. I therefore chose to analyse waste generation rates, disposal behaviours and waste composition which were all achieved by conducting a WCS.

Households that agreed to participate in the interview process were the same households used for the WCS. Not all the households that participated in the interview process proceeded to agree. Only 16 out of the 22 households that participated in the interview process agreed to have me sort through their waste. This revealed that as much as waste is seen as "other" and people do not like being in contact with it, it reflects on their practices which are personal to them. I informed participants that I would be analysing their garbage and this may include collection and analysis of their garbage by the researcher prior to its collection by Pikitup. Each household had their waste collected for analysis on a Thursday morning or Wednesday evening allowing for a week's worth of waste. The waste was separated into the following broad categories: *Dry waste*: paper, plastic, cans, glass, e-waste, metals; and *Wet Waste/Putrescible waste*: organic matter, food. Collection of waste after a week's worth of waste was inspired by Bandara *et al.* (2007). Their research was conducted in Sri Lanka where the WCS examined waste generated over a week for each household. For my research this method of collection allowed for a uniform time frame for analysis, allowing for data analysis to be simpler.

The materials used to analyse waste composition were inspired by a study conducted by Agbesola (2013) in, Nigeria. The following materials were also used in that study and showed not only to be financially feasible but also to be effective for data analysis. Making use of these materials in the way that Agbesola (2013) used them was

favourable for a study like mine that is based in the community that I live in. The materials used are explained below.

- Camera (to capture photographs of waste contents, bins, and to enhance how results are presented and described)
- All-purpose rubber hand gloves and face mask (for basic hygiene and prevention of direct contact with bad odours or any potential hazardous waste)
- Large piece of plastic (used as surface for working space to prevent additional pollution and used to separate waste into categories)
- Kitchen scale (weighing of each category of waste)
- Notebook and pen (for notes and recording quantities)

Methods for sub-questions

I will now explain why I chose certain methods for certain sub-questions. Question 1 asks how people in EFV conceptualise waste to further explore the main argument which is that the conceptualisation of waste plays a key role in influencing waste practices. How waste is conceptualised needs to be analysed through asking people a variety of questions about waste, including how they define it and what they associate it with (Gutberlet, 2013). To achieve this personal interaction with residents, interviews proved to be the best method because people can be directly asked about their views. A desktop study with a focus on literature about the conceptualisation of waste helped understand why people conceptualise waste in a certain way.

Question 2 asks whether the way residents conceptualise waste influences their waste practices. Answering this requires an understanding of the study area's waste stream which explains why I chose to conduct a WCS which included physical observation of waste, separation into categories and weighing. Knowledge of the amount of waste produced, how residents dispose of it and what it contains requires me to be in contact with the study area's waste. A desktop study refers to the exploration of literature on

waste practices to supplement or compare my findings to. The desktop study included journal articles and other studies that explored similar themes.

Question 3 asks what some of the factors that influence participation in recycling and S@S programmes in EFV. Again this required me to engage with residents and ask them. I also took count of how many people participate and how they participate by seeing how many bins would be placed on the curbside on the days when different wastes were being collected etc. For this question I also did a desktop study which involved exploring the findings of other studies and literature that conducted similar research. Having done a desktop study assisted me in observing and acknowledging similarities but more importantly to identify why there are deviation and differences from other studies.

6.7 Data Analysis

The method of data analysis that has been used is Thematic Content Analysis (TCA). TCA was used to analyse the responses during the interview processes. This method of data analysis is descriptive and is limited to textural data as explained by Anderson (2007). Neuendorf (2002) describes TCA to be both a scientific and message-based method of analysis. Anderson (2007) adds that the epistemological position of one who carries out TCA is objective. The data that has been gathered by the researcher is transcribed, given that the interviews were audio taped. Briefly explained, TCA takes a number of transcripts and organises them into common categories and themes (Braun and Clarke, 2006). Themes are identified and developed by reviewing the transcripts and looking for common answers, expressions and words used by respondents (Anderson, 2007). This process was repeated a number of times. These themes help express commonality of voices across respondents or they may help identify disparities between respondents. Each theme or category is then given a relevant title or name that directly relates to the content within the theme. Interpretation of the data is done during the discussion where relevant literature is then linked to the themes and responses from respondents. The advantage of TCA is that it transforms material in textual form to forms that are most relevant, simpler and more manageable to

understand for a reader (Weber, 1990). A simple diagram adopted from Braun and Clarke (2006) follows.

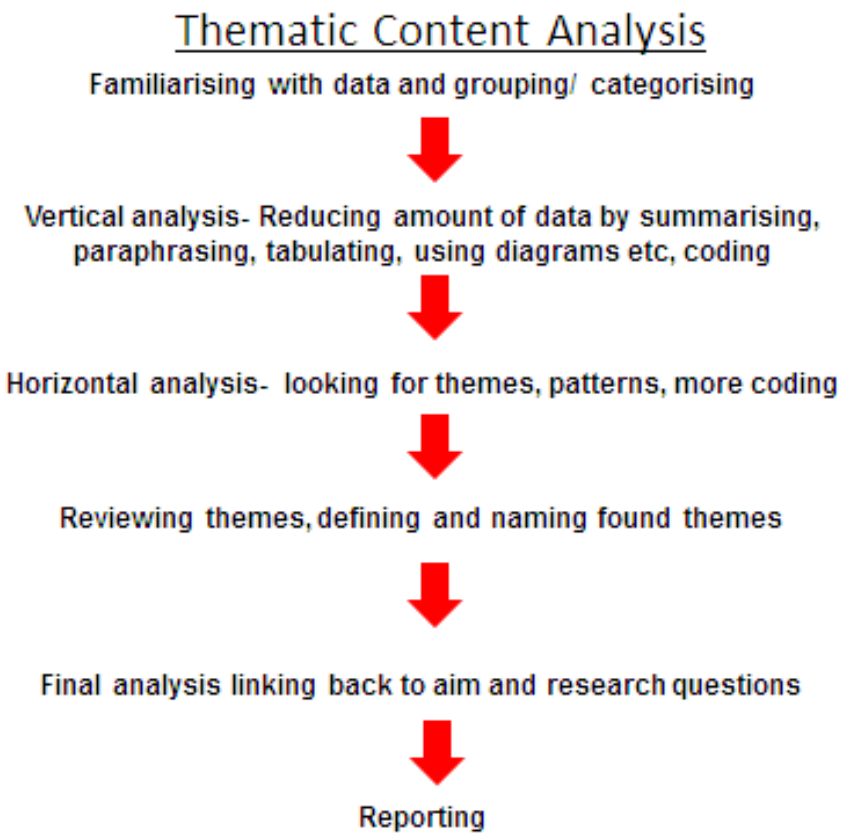


Figure 16: Thematic Content Analysis (T Dune; adopted from Braun and Clarke, 2006)

6.8 Ethical aspects

Ethical considerations are of high importance in qualitative research. This includes seeking permission, formal or informal consent, formal permission from research institutes (In this case Wits University Ethics Committee), minimisation of harm and anonymity as well as confidentiality (Hennink *et al.,* 2011). When research requires face to face interaction, Rohleder *et al.* (2007) state that any information drawn or shared by participants should be kept fully anonymous and the identities of respondents should not be revealed. A simple way to achieve this is through informed consent.

Ritchie and Lewis (2003) explain that formal informed consent is required for qualitative research that involves respondents. Informed consent involves a clear explanation of what the study is about and what it aims to achieve and the format in which it will be carried out (Hennink *et al.,* 2011). It also involves respecting respondents and allowing them to agree that they willingly want to take part in the study. This was accomplished by printing consent forms which briefly inform participants about the research, its broad aims, objectives and methods. This form was signed and presented to respondents before all interviews were conducted.

The point of ethics in research according to Mack *et al*. (2005) is to protect the well-being of respondents. An ethical review of this research and its intended qualitative methods was conducted by the Wits University Ethics Committee. An ethics clearance certificate was provided by the Wits Ethics Committee; granting me permission to conduct this qualitative research (See Appendix C). This study followed the ethical procedures of Wits University for interviewing, audio recording and approaching households. The participants in this study were not below the age of 18. However all respondents required protection and the relevant ethical procedure for engaging with members of the public was adhered to. The conditions of anonymity and confidentiality were clearly explained to all respondents, explaining that their identities will not be disclosed; ensuring that they will remain anonymous with their identities protected (Ritchie *et al.,* 2013). It is often encouraged not only for researchers to be open-minded but to also be culturally sensitive when engaging with participants that may be from a broad range of political, economic, cultural and social backgrounds (Hennink *et al.,* 2011)

6.9 Limitations

As with any study, this study has some limitations which will be reflected on below. This section outlines some of the difficulties encountered during the study. The first limitation was linked to the study area. The study area only has a total of 55 households, thus limiting the sample size given that willingness to participate by residents tends to influence sample size. Additionally, the influence of willingness to participate resulted in a disproportional number of recyclers vs. non-recyclers in the sample. Low participation

rates in EFV (14 out of 55 households i.e. 25%) further affected the amount of recyclers that were in the sample. Additionally, only 53 of the households have present residents. Another limitation is that it cannot be compared to other areas.

Another limitation was that the timeframe to complete this research report was short and it had to be completed whilst completing 6 full-time Master's Modules. Furthermore, engaging with people at their households means that this can only be done at their convenience and not strictly according to one's planned schedule. Finally, Polkinghorne (2005) states that the quality of data depends on the ability of a respondent to explain their experiences. The quality is also dependent on the depth of that respondents provide to the explanations of their perspectives.

7. RESULTS AND DISCUSSION

The interview process was carried out in the late afternoons/early evenings of weekdays (between 6:00pm – 7:30pm) as well as weekends (between 12:00p.m. and 16:00p.m.). In the case of weekdays, residents will have just returned from work. This chapter begins with a representation of the demographic profile of the sample. The WCS results are then presented followed by participation rates. While the data is shaped by the research questions, the results are presented in terms of themes having used TCA data analysis method. Five key themes were developed, namely: 1) Conceptualisation of waste (which includes also includesthe conceptualisatin of waste disposal as well as the WCS's findings) 2) Awareness of S@S programme and environmental knowledge 3) Drivers of S@S participation 4) Deterrents to S@S participation; and 5) Possible solutions. The themes are discussed by providing some of the quotes from respondents and relevant literature which substantiates some of the statements made in this report.

7.1 Demographic Profile

The demographics section provides insight on the people that formed part of the sample. This includes detail on race, sex, age, education levels and household size. The demographic profile was included to provide insight on the sample.

Figure 17 below illustrates the racial profile of the sample.

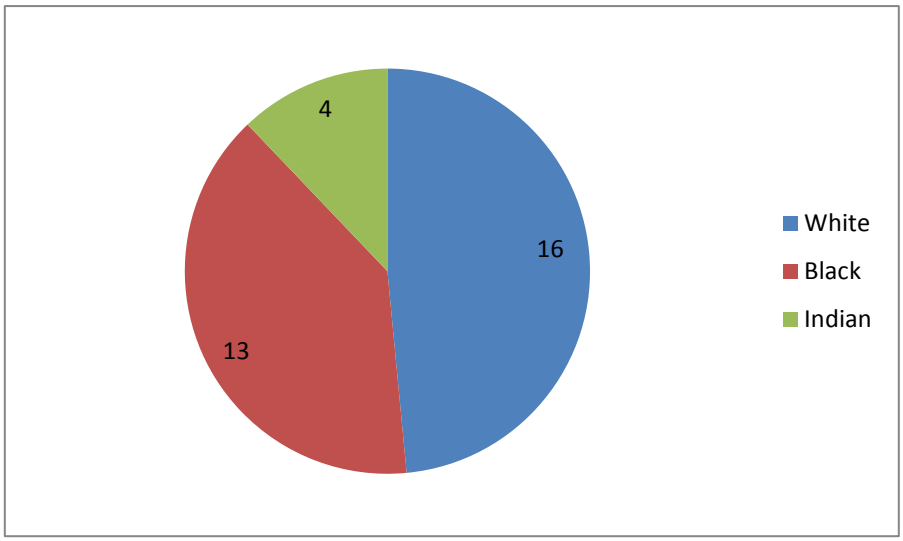


Figure 17: Racial profile of study sample (Source: Research data)

Figure 17 above shows the racial composition of the study sample. In terms of sex, 12 respondents were male and 21 were female. There was a higher participation rate by females, either because they arrive home earlier than their male spouses, work at home or their spouses thought they would have more knowledge on waste. In one instance, I approached a household where there was a gentlemen who requested to meet me on a day where his wife was present, stating that she was likely to know more about waste and what occurs in the area. Figure 18 that follows illustrates the age profile of the sample.

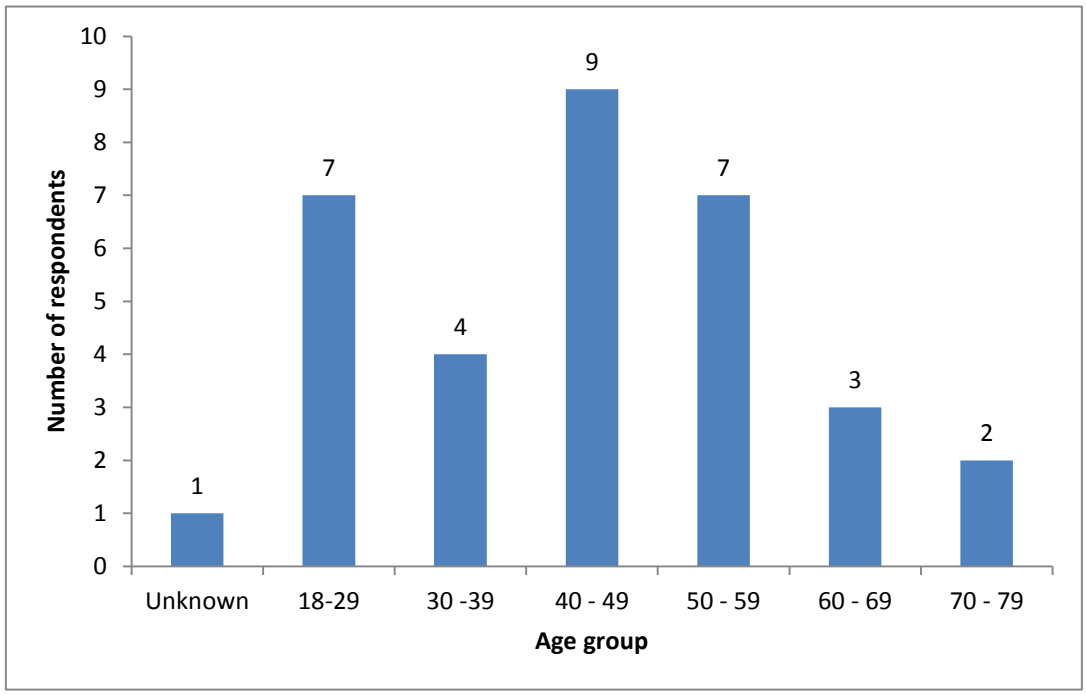


Figure 18: Age profile of study sample (Source: Research data)

Analysing the Figure above, 1 respondent did not disclose their age. Most respondents (9/33) fall in the 40 – 49 year age group. This is followed by the 18 – 29 and 50 – 59 year age groups which both had 7/33 respondents. The 30 – 39 age group had 4/33 respondents, 60 – 69 with 3/33 respondents and the oldest age group 70 – 79 had only 2 respondents.

Education levels in the sample size varied as well and this is shown in Figure 19 that follows. The education levels include primary (grade 1 – 7), secondary (grade 8 to matric), tertiary (university qualification), honours, and master's.

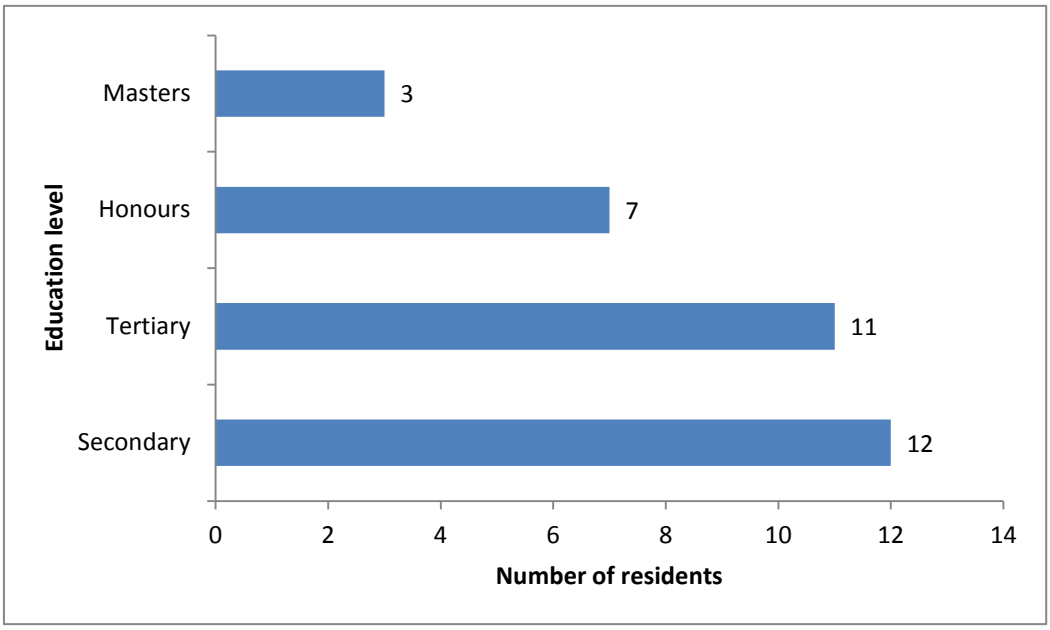


Figure 19: Education levels of sample (Source: Research data)

The sample included residents with education levels ranging from secondary level to master's. Most residents that participated in this research had matric level education (12/33). 11/33 participants had tertiary level education. These qualifications included diplomas, higher diplomas and degrees. 7/33 respondents have honours degrees and 3/33 have master's degrees. The fields that qualified residents had studied included finance, engineering, science, nursing, education, psychology and human resources.

Last to be presented in this demographics chapter is household size. This aspect varied as well with household sizes ranging from one to eight. Household sizes are indicated in Figure 20 that follows.

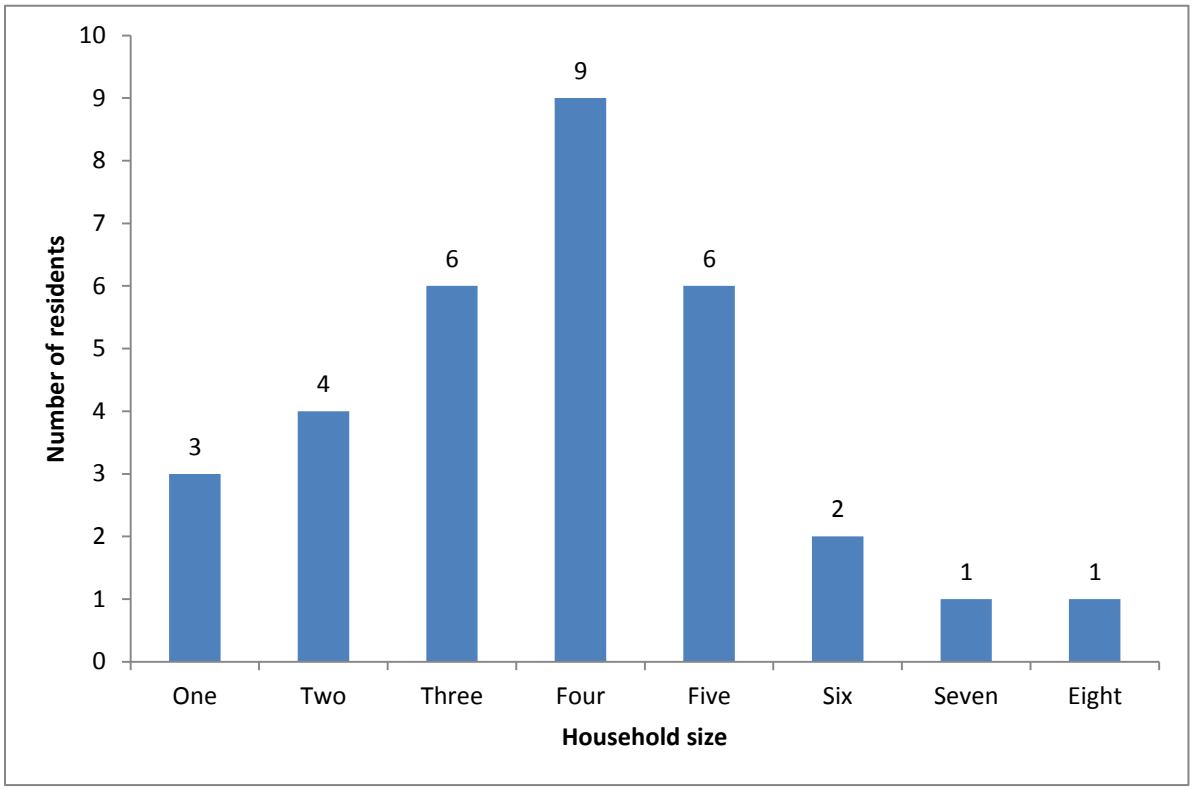


Figure 20: Household sizes of sample participants (Source: Research data)

9/33 respondents live in households with four members. 6/33 respondents live in households with a total of three people and another 6/33 respondents live in households with five people. 4/33 respondents stated that they live in households with only two members while 3/33 respondents stated that they live their households alone. There were respondents who come from households with more members such as 2 respondents with a household size of 6, one with a household size of 7 and one with a household size of 8.

Having analysed the demographics on this sample, it is evident that there is a broad mixture of age groups, education levels and backgrounds and household sizes. Additional interesting facts about the sample are that it included residents who have resided in this community for 3 – 4 decades and they could provide even more in-depth insider information. The study sample also included highly enthusiastic environmentalists, some for their own interest and others in the environmental field at the schools where they teach.

7.2 Waste composition Study

A waste composition study (WCS) was conducted in EFV. A total of 16 households agreed to have me sort through their waste. Of these 16 households, 9 were recyclers and 7 were non-recyclers. It was presumed that the uneven amount of (9/10) recyclers versus (7/23) non-recyclers indicated a stronger preference to participate by recyclers and reluctance by non-recyclers. All data in this section (7.2) only reflects on these 16 respondents that allowed for their waste to be sorted through and weighed for this WCS only. In this WCS, I observed and measured the different groups of waste (dry waste and wet waste) separately. As mentioned, the waste was separated into the following broad categories: *Dry waste*: paper, plastic, cans, glass, e-waste, organic waste, metals and *Wet Waste/Putrescible waste*: organic matter, food. To get a better understanding of the S@S behaviours, I present the data indicating differences between recyclers and non-recyclers. Each household had their waste collected from their household and I analysed it in my own working space (See Figure 21 and 22 that follow). The surface of my working space was two large black bags that were cut open as shown in the following Figures.



.

Figure 21: Working space on tiles (Source: T Dune)

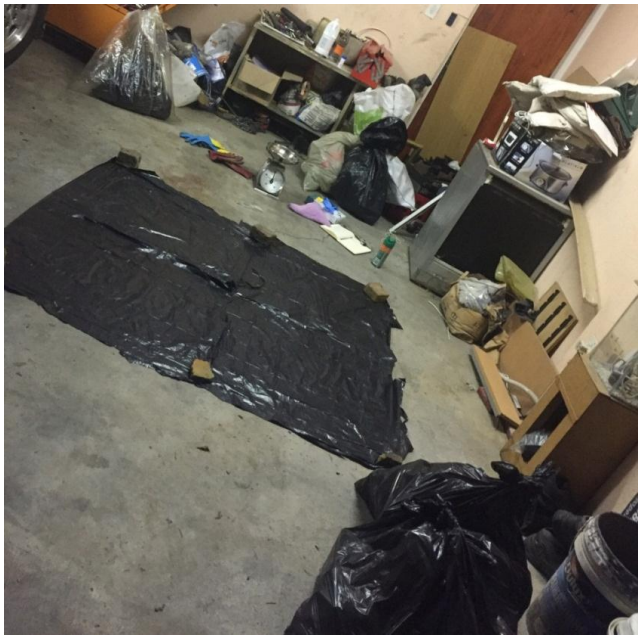


Figure 22: Working space on concrete (Source: T Dune)

For households that do participate in the S@S programme, I measured their recyclable materials on a Wednesday (the day when recyclable materials are collected by Pikitup) and the rest of their general waste on a Thursday when general waste is collected. For households that do not participate in the S@S programme, I measured their waste all at once on a Wednesday evening or Thursday morning. Figure 23 shows how I separated the waste into different categories.



Figure 23: Waste separation process (Source T.R. Dune)

Figure 23 shows the separation of wastes into putrescible, paper, plastic, glass and tin/cans. I either emptied all the contents on to the surface of the black bags or I picked out the larger contents and left the wet/putrescible waste in the bin or black bag.

Description of contents of the sample's waste stream

Having weighed the waste of 16 households, the total amount of waste weighed equated to approximately *79.02kg*. This total included all dry and wet waste. The following Figure illustrates the totals for each category. Red represents dry waste while green represents wet waste.

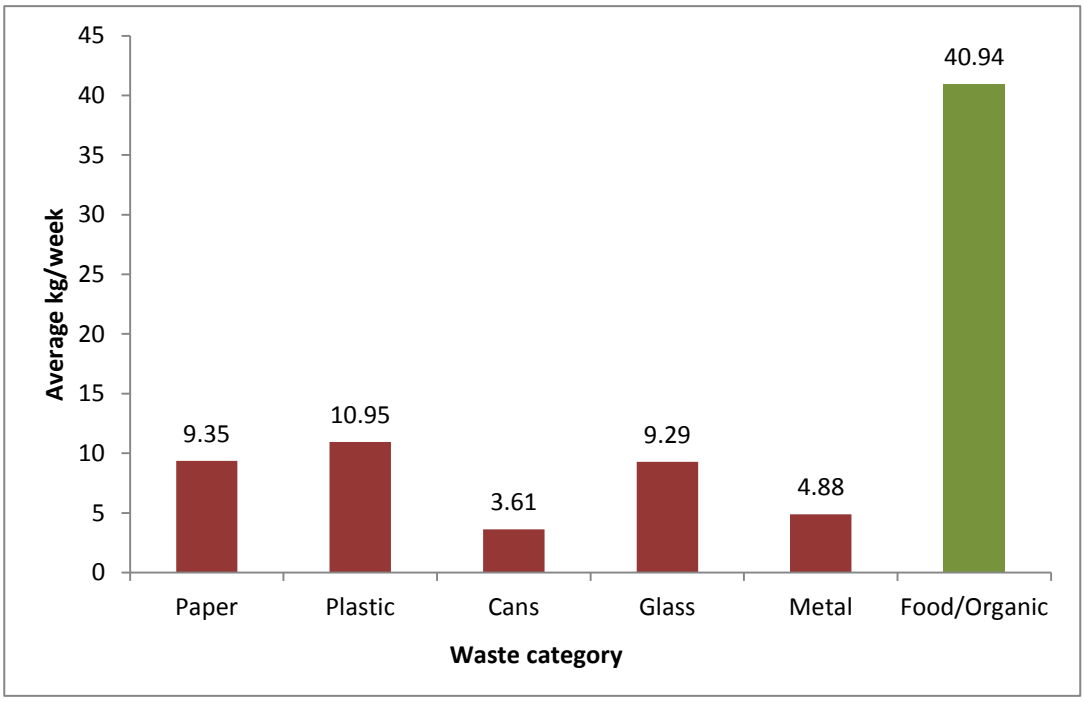


Figure 24: Average waste weighed for each category (Source: Research data)

What is significantly visible in Figure 24 is the amount of wet waste generated compared to the categories of dry waste. Food and organic waste occupied 51.8% of total waste produced. This was followed by plastic (13.9%), paper (11.8) and glass (11.8%), metal (6.2%) and cans (4.5%). These results coincide with those found in a master's thesis conducted by Agbesola (2013) conducted in Lagos, Nigeria where it was found that (55%) of household waste was putrescible waste. Parizeau *at al.* (2013) also conducted a waste composition study where 66% was organic waste. Parizeau *et*

al. (2013) compared their organic waste findings to other waste composition study findings such as 53% found by Bernache-P'erez *et al.* (2001) for Guadalajara, Mexico; 58% found by Chung and Poon (2001) in Guangzhou, China and 68% found by Bolaane and Ali (2004) in Gaborone, Botswana. The findings fall within all those mentioned. The average total waste produced per household per week was calculated and found to be 4.94kg. The following Figure illustrates the different categories within this total.

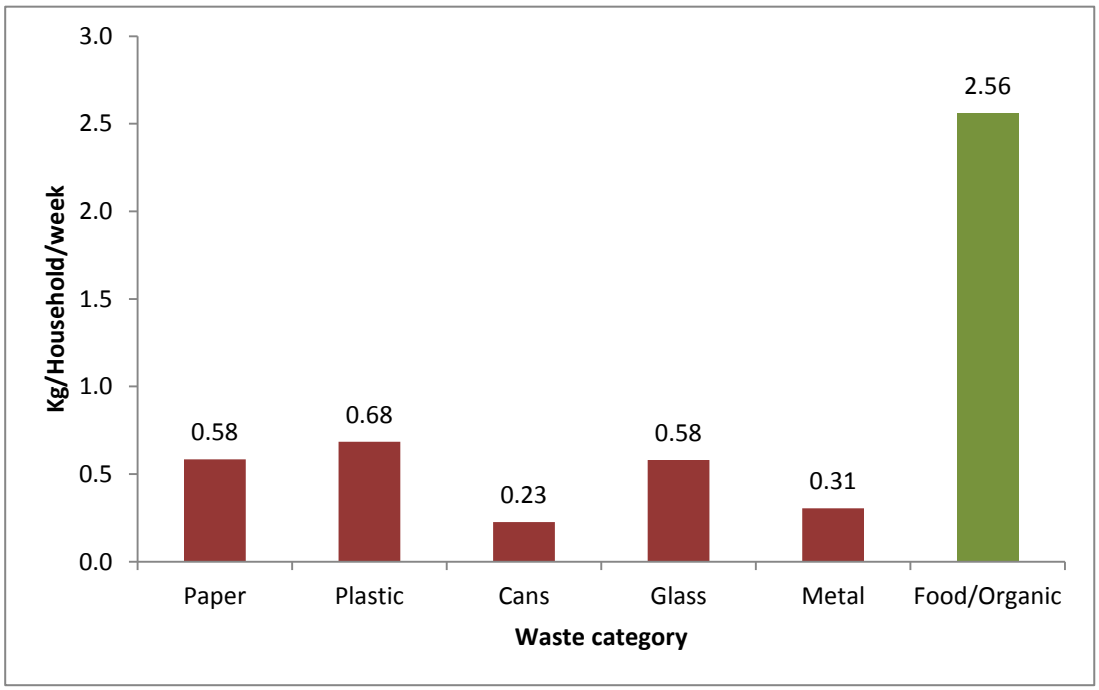


Figure 25: Average waste per household per week (Source: Research data)

Having noted how many residents reside in each of the houses sampled for the WCS I was able to calculate the average amount of waste generated per person per household. Household sizes in the WCS sample ranged from 2 to 8 household members. With a total of 79.02kg of total waste weighed and 16 households sampled with a total of 67 household members for these 16 sampled households, each household member produced an average of 1.18kg of waste per week.

Further details on WCS

Figures 26 and 27 indicate that the waste composition of EFV residents does not differ from those found in other studies of other parts of the world. Waste composition followed the norm of being dominated by putrescible waste. The following Figures show some of the households' food waste.



Figure 26: Organic waste contents from a household (Source: T Dune)



Figure 27: Organic waste from a household (Source: T Dune)

Figure 28 shows the putrescible waste from a household that did not include their organic waste from collection. Interestingly, this household uses their weekly food wastes for a compost heap. The compost heap is approximately 18 months old. The Figures below show the compost heap.



Figure 28: Compost heap where food waste is used by a household (Source: T Dune)

The residents that maintain this compost heap in their backyard explained that they use the compost that is produced to grow pumpkins in their yard. They also explained that temperatures in the compost heap reach up to 50^{o}. Further findings related to food waste were a significant amount of maggots. This is shown in the following Figures.



Figure 29: Maggots on a milk carton (Source: T Dune)



Figure 30: A collection of maggots in food waste (Source: T Dune)

I came into contact with a large amount of maggots which was one of the most challenging parts of conducting the WCS. It was common to find maggots within food waste. This particular households' food waste appeared to have higher moisture content as the Figure shows. Another interesting observation that was made was a garbage bag that was collected which had maggots on one corner. I covered this bag and its maggots with a clear plastic bag. By the time I picked this bag again for analysis, I noticed that there had been heat and moisture generated. Smith *et al.* (2013) explain that chemical decomposers in the form of microorganisms such as actinomyctes, bacteria and fungi are responsible for the decomposition of the materials in a compost heap (such as organic waste). These microorganisms gain energy through the oxidation of organic material, primarily the carbon portion. The process of oxidising is the reason for an increase in temperature of the compost heap or organic material. Where favourable conditions exist, the organic material with increase in temperature at a rapid rate, explaining the high temperatures explained by the residents that maintain a compost heap.

Figure 31 shows the heat and moisture generated in the plastic bag with organic waste and food waste filled with maggots.



Figure 31: Heat and moisture in a bag of food waste with many maggots (Source: T Dune)

Lastly, a comparison of recyclable waste to non-recyclable waste is shown in Figure 32 which follows to observe recycling potential.

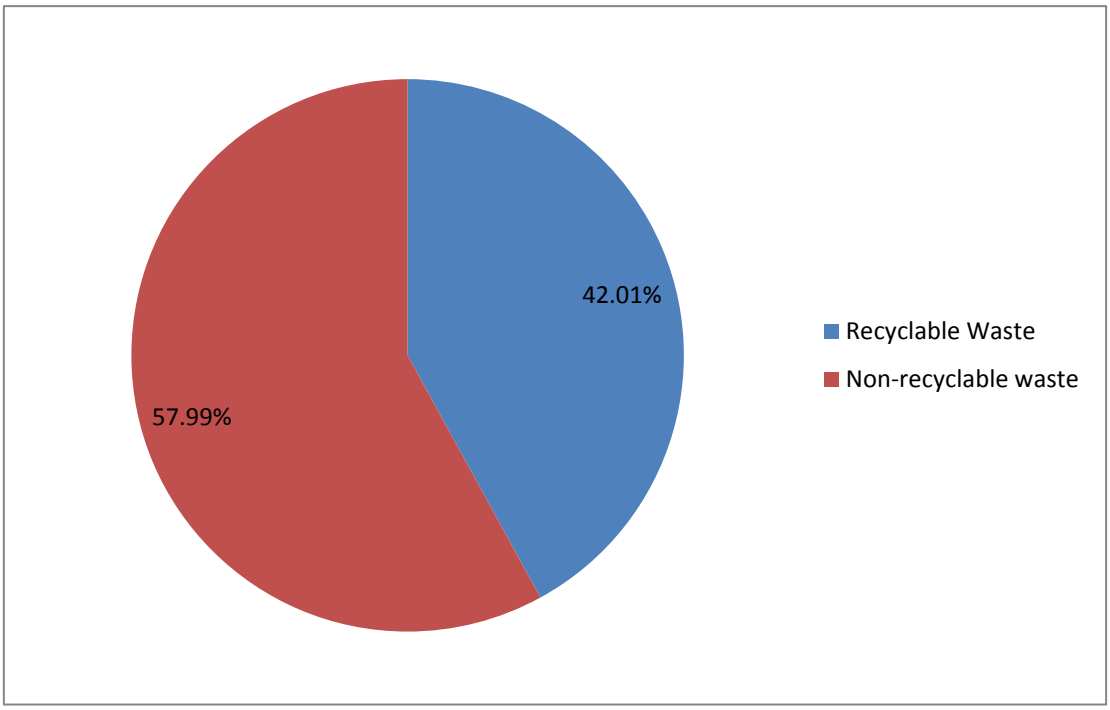


Figure 32: Recycle waste vs. non-recyclable waste (Source: Research data)

Figure 32 above includes paper, plastic, cans and glass as part of recyclable waste (as per the recyclables stipulated by the municipality to be placed in S@S recycle bags) and metal and organic waste as part of non-recyclable waste. This indicates that if all participants of the WCS were to take part in the S@S programme, 42% of their waste would be diverted from landfills. This represents a high recycling potential for the WCS participants alone and an even greater impact would be made if the entire EFV were to participate.

In the following last section, I describe my experience conducting this WCS in a bit more detail. I explain some of the smells I encountered, why I chose to work in my own private space (separating the waste in my own garage and yard), how I felt sorting through waste and whether my views on waste were influenced.

Personal reflection on waste composition process

Going through waste was personally an extremely challenging experience that I had to mentally prepare myself for. Waste that was mixed entirely was difficult to go through because of the range of smells that I was exposed to. The smells I encountered I could immediately identify were mostly rotting or mixed food stuffs that may have been in the bin for a number of days. The smells were of material that was damp, rotten, and decaying or decomposing. One could not necessarily identify what contents were in the waste except for the fact that there was a mixture of food remains. Being exposed to people's wastes that I did not know and just waste in general was sometimes nauseating especially in case of food waste that was particularly moist and more particularly filled with maggots. Going through my own waste was completely different compared to going through other people's waste. The contents of my waste did not entirely differ from those of other households. However, the idea that I was sorting through other people's waste somehow made it more difficult. Going through my own household waste was easier and I felt more comfortable which I expected because I would know and have seen most of the contents in my household's bins.

Other household wastes were not analysed out in the open where people could clearly see what I was doing three reasons. The first was that as much as I was conducting research, I did not want my process to in any way be of any inconvenience to any residents. By inconvenience, I am referring to the discomfort and unpleasant site of waste on their properties, in their neighbourhood or potentially having to smell it. In my experience, people generally responded positively to the fact that I was conducting formal academic research however their views took a bit of a turn when they learnt that I would be sorting through their waste. Even participants that were open to me sorting through their waste demonstrated shame towards me and the work I was going to do. Some showed nervousness asking me not to judge them once I saw what was in their waste such as alcohol bottles and cans. Gutberlet (2016) states that some recyclers bring materials to their homes to separate and recover recyclables at home. Neighbours expressed concern about how sanitary such work and engagement with waste was and demonstrated their disapproval and revulsion towards being around waste. Such issues

are said to result in neighbours insulting and belittling waste workers, thus reinforcing social marginalisation. Furthermore, Gutberlet (2016:60) informs that it is common that waste pickers or recyclers are shamed by the public and even police and other people in positions of authority. Such stimatisation results in the disempowerment of individuals working with waste. Circumstances of this nature were exactly what I was avoiding by separating waste in visible spaces or in the presence of my research participants. The second was that I myself did not want to be seen out in the open analysing waste by residents or by Pikitup refuse collectors. I did not want to be seen by residents with the pre-conceived idea that they may think I am a waste picker rummaging through waste for my own needs rather than research. Additionally I did not want to be seen by Pikitup to avoid any potential conflict with them. This is because often residents leave items for these workers and I did not want to cause any potential conflict if it appeared as though I was searching for goods for myself. This comes strongly from a safety perspective. The last reason is related to privacy. Some people expressed that they would not want to be "judged" because of the contents in their waste. From this I deduced that people would be more comfortable if their waste was separated in a closed space.

Going through my waste and that of my neighbours did not change how I feel about my own waste. As much as I do carry the knowledge and view that value underlies waste and that it can be positive in several ways; that did not eliminate the fact that it was challenging to engage with waste or be in its presence when its smells are foul. Personally while being in such contact with waste, without even being seen, I felt low, like I was doing something that had little value, recognition and appreciation. Abou-ElWafa *et al.* (2012) state that waste collection is a job that does not require any special knowledge, skills, or training and that it can be learnt easily. Furthermore it is regularly associated with the poorest in society and these are some of the factors resulting in waste work's stigmatisation. Binion and Gutberlet (2012) conducted a review of literature on the stigmatised sector of waste work and its physical and emotional health issues. In their review on emotional well-being they explain that social exclusion combined with a lack of security, being shamed and humiliated results in increased levels of vulnerability.

It was thought-provoking that such emotions or similar were evoked even though I knew the value of my research and that I had been commended by many research participants. Waste workers frequently face low social status and social stigma. Social stigmatization according to WIEGO (2017) is a common difficulty among waste workers. Mitchell (2016) explains that working with “dirty” material or substances is not only uncomfortable and repulsive but with it comes a stigma. Mitchell (2016) explains a scenario when working for a waste company in an office, however the fact that it was a waste company meant that her job was stigmatised by being in contact with waste products. Gutberlet (2016) elaborates on how waste work such as informal recycling faces social issues such as stigmatision and negative labeling. Because they work with waste which is regarded as filthy, dirty and disposed material, this is what they are associated with. Not only are they labeled negatively but they are also often harassed by different members of the public who feel entitled to do this because of the negative connotations that waste work has. The negative labeling includes condescending language that reinforces stigmatisation and often results in an even greater societal issue of social exclusion.

It was in these moments that I realised that the mind-shift that is encouraged in policies and literature on waste is much more challenging than I thought. On the other hand, as much as it was challenging, it was very interesting to compare the consumption patterns of different households, to find that they were fairly similar. It was also evident that waste alone has the ability to illustrate the dynamics of different households. I saw that waste itself can tell a story about a household and reveal different things such as eating habits, brand preferences, age profiles (presence of children’s foods, nappies, adult sanitary towels etc.) and general activities in households. In my case for example I saw that different houses have different diets and food preferences. While some homes had different take away leftovers and packaging in their bins, others only had home cooked foods. In one case I counted 21 bananas in one households bin. In another case, one household had a high content of cans and glass bottles from alcohol which suggested that they had hosted some kind of gathering. Another household used newspaper to wrap their more moisturized food contents like meat bones. From this is deduced that the household members probably do this to prevent flies and maggots. Conducting the

waste composition study was extremely informative to my understanding of EFV's waste stream.

7.3 Participation rates

According to my own observation and the information provided by the EFV leader, 14 households participate in the S@S programme. This means that currently, there is a 25% participation rate in the study area. While conducting participant observation, I went around EFV counting how many people had taken out their bags with recyclable materials for collection on a Wednesday and captured the following images.



Figure 33: Images of recycling bags for collection on a Wednesday morning (Source: T Dune)

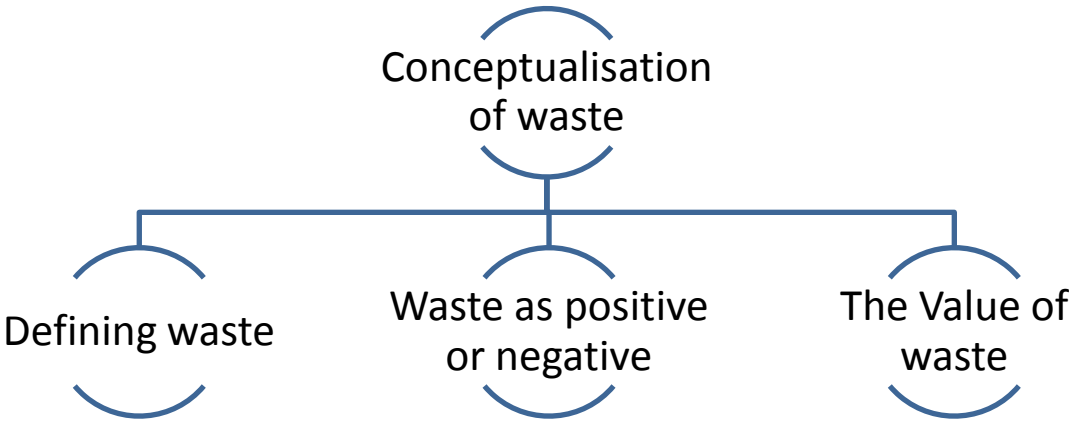
Four out of the 14 households had two bags of recyclables out for collection, while the remaining ten had just one recyclable bag each out for collection. This indicates that some people used more recyclable materials in their households than others. Martin *et al.* (2006: 359) explain that understanding why people do not or only seldom recycle is important for recycling programme developers to design such programmes to target those who don't participate. With only a participation rate of 25%, it is evident that a large amount of households do not participate and I present an analysis to try and understand why. A participation rate of 25% in EFV compares as low to a participation rate of 78% in high income areas and a participation rate below 22% in low income areas (City of Johannesburg, 2010). A success story is that of the residential areas serviced by Waterval Depot which had a participation rate of 48%. In Vorna Valley, participation rates are said to be at 303 participating homes with a monthly joining rate of four households (VVRA Management).

The sample that I studied included 33 household members, 10 were recyclers and 23 non-recyclers. The following section is divided into themes that arose through engaging with EFV residents and in this analysis, I present both the data as well as my experience conducting this research. The results are presented and simultaneously discussed. The findings and experiences throughout participant observation are also included in this following section.

7.4 Themes

7.4.1 The conceptualisation of waste

The conceptualisation of waste is an important theme in this research report because the initial research question aimed to explore how EFV resident understand and perceive waste. Investigating how people conceptualised waste concept allowed me to understand what frame of mind shaped their attitudes to waste and recycling. The following diagram illustrates the major theme of conceptualisation and its sub-themes in this report. The sub-themes include: 1) Defining waste; 2) Waste as positive or negative and 3) The value of waste.



7.4.1.1 Defining waste

Koskela *et al.* (2012) explored how the concept of waste emerged through history and in production. They explain that the word "waste" in the English language originates from the Latin word "*vastum*". This term was used in the Domesday Book to describe fallow land that was untaxed and unable to be utilized (Koskela *et al.,* 2012). In English however, the word waste has been utilized since 1200 to express "desolate regions". However from 1300, the word waste coined its meaning of "useless expenditure" and then from 1500 it started to be used to refer to "refuse matter" (Kosela *et al.,* 2012). It is thus evident that while the meaning of waste has changed over time, the attribution of

negative connotations to waste can be dated back to centuries ago. Today, in 2017, not much has changed, as waste is still seen and associated with negative experiences, disturbance and disruption (Moore, 2012; Gregson and Crang, 2010). In exploring the conceptualisation of waste, residents were asked to provide some of the words that they associate with and would use to define waste. Waste in the context of this question included all waste that residents produced, whether recyclable or putrescible. I explored waste as a collective term including recyclable material as waste as well. In asking residents about waste, this included recyclables as part of waste. The words that were provided were used to generate the word cloud that follows. The words cloud in Figure 34 below illustrates the range of words that were provided by the entire sample. The words that appear the largest had the highest frequency whilst those that are in small text size were mentioned by only a few participants.



Figure 34: Word cloud representing words associated with waste (Source: T Dune)

While the Figure above clearly shows which words were mentioned the most, the smaller words that were mentioned the least include: “gold, energy, resource, efficiency, good, reuse, income, money, unwanted, abuse, impact and negative”.

Figure 35 illustrates this data on a graph showing words mentioned by recyclers and non-recyclers

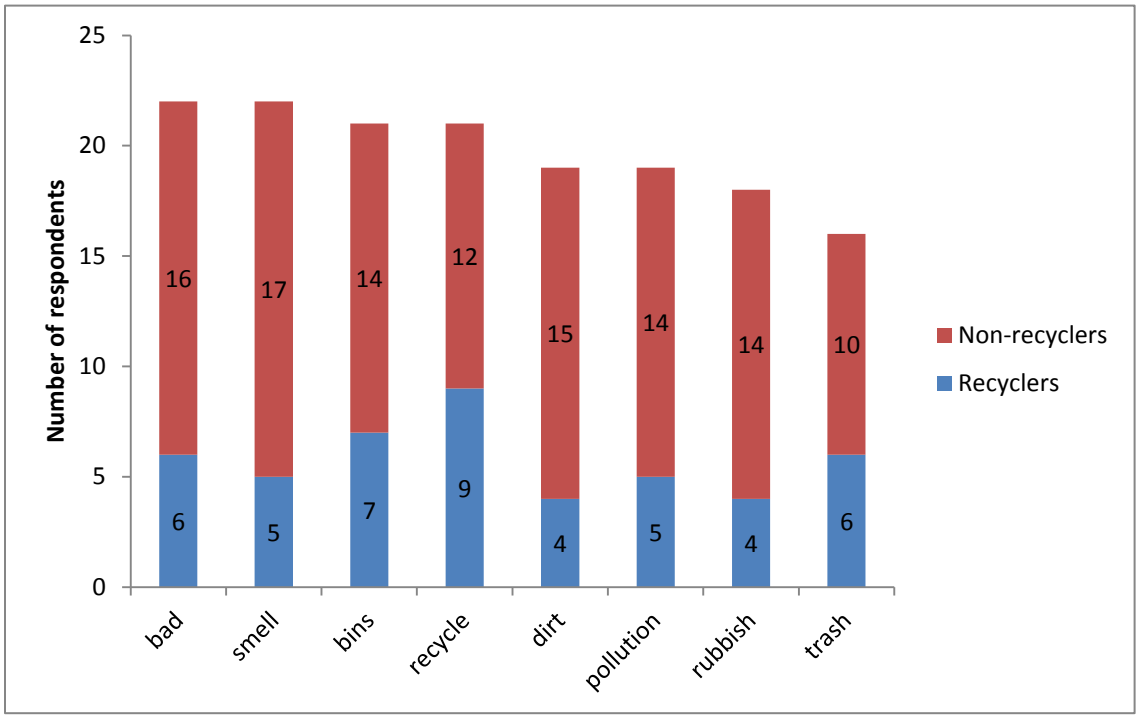


Figure 35: Words which residents associate with waste (Source: Research data)

As Figures 34 and 35 indicate, the most mentioned words were “bad” and “smell” both mentioned by 22/33 respondents. The top seven mentioned words are shown in more detail in Figure 35 above. “Bad” and “smell” were followed by “bins” and (interestingly) “recycle” both mentioned by 21/33 people. The word “recycle” having being mentioned by 21/33 people allows for one to recognise that residents’ views on waste include recyclable material as waste. Other words such as dirt, pollution, rubbish and trash were commonly mentioned. Observing these words, it was evident that people mentioned words with negative connotations except for “recycling” which was the only word with a positive connotation. Referring to Figure 34, other words often mentioned are associated with a negative experience such as bad odours and pests (rats and flies). Additionally, other negative words such as “undesirable, annoying, useless and leftover” were used, which all provide insight on how people view the value of waste. This leads to the next sub-theme, which is whether people view waste as positive or negative.

7.4.1.2 Waste as positive or negative

One of the ideas that this research held was that many people perceive waste negatively. One of the axes that Moore (2012) plotted was literature on was the positive-negative axis. This research also explored whether residents view waste as positive or negative. Participants were asked whether they think waste is a positive or a negative thing and to elaborate. As much as the majority of the words provided by residents had negative connotations, this was not enough to assume that people view waste entirely negatively and so further investigation was conducted. Residents were asked whether they think waste is positive or negative and to elaborate on their view. This was a more direct way of understanding how people conceptualise and perceive waste, allowing them to explain their view. The results to this are illustrated in the diagram that follows.

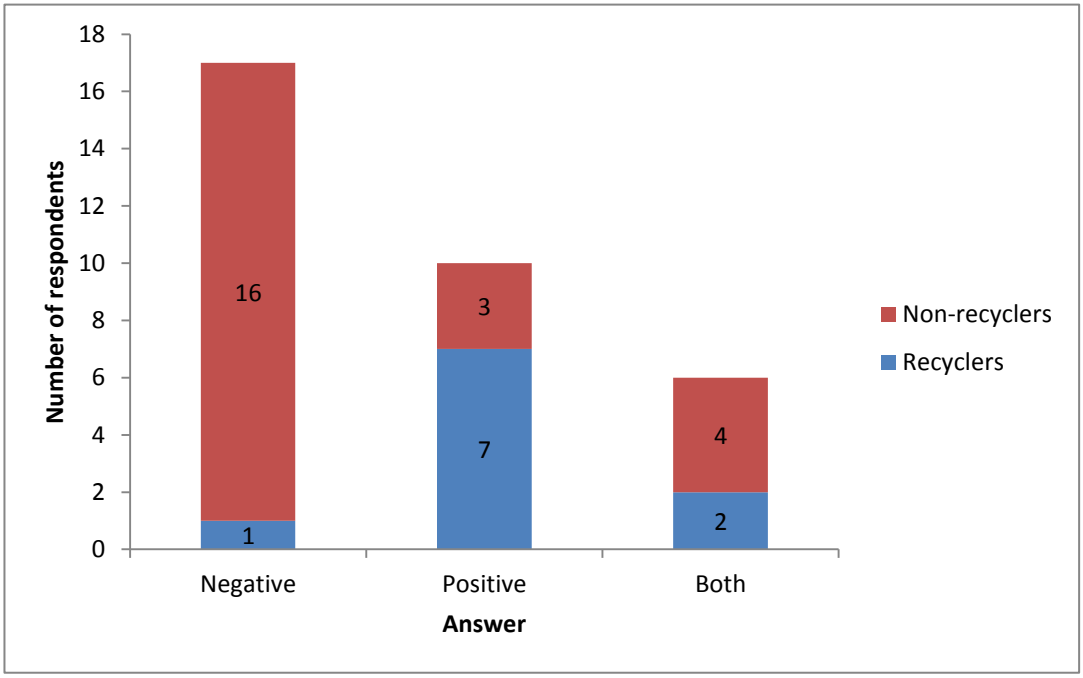


Figure 36: Residents' response to whether waste is positive or negative (Source: Research data)

As Figure 36 indicates, over half of the sample (17/33) responded that waste was a negative thing which speaks to the claims made in this research. Of these 17 respondents, 16 were non-recyclers and 1 was a recycler. It was anticipated that most respondents would view waste negatively as the literature informs (Gregson and Crang,

2010; Moore, 2012). Respondents viewed waste negatively primarily because of the discomfort of it being in their immediate presence and its odour (hence the socio-spatial norms referred to by Moore, 2012) and environmental impacts. These environmental impacts related to waste are explored later. Gregson and Crang's (2010) statement that waste is also perceived as unpleasant, unwanted and bothersome is highlighted in the findings that follow. Below are two responses.

> *"I think waste is highly negative and that is why there is the need to always get it removed and taken away. Even if we think of that not in my back yard phenomenon, nobody wants waste in their surroundings, to see it or smell it. It is negative because it contains things we no longer want and pollutants". – Non-recycling participant 7: 2 (3 November 2016)*

> *"Definitely negative. Waste is the by-products of our living and daily activities that in most cases we can't put any use to. Waste that we produce is negative like at big dumps or especially in poorer areas where it is not as efficiently managed. You have houses right next to huge piles of waste, kids playing around there, it's unhygienic and unhealthy."- Non-recycling participant 22 (11 March 2017)*

On the other hand, 10 respondents stated that waste is positive. Of these 10 respondents, 7 were recyclers and 3 were non-recyclers. Positive responses from the Pikitup official and the EFV community leader follow.

> *"It depends. To me it's positive. I can't say it's negative because whether I like it or not it will always be there. As long as human beings are on earth, there will always be waste. So we have to treat it positively and use it for other things and make it a resource. It's used to pay people and people make a living from it. Even some companies make good use from recyclable waste and don't use 100% virgin material. If you look at packaging companies, most things are recyclable so eventually everything will be recyclable. So when it comes to manufacturing companies, the first thing that must come to their minds is to recycle and make the packaging reusable." – Pikitup Official (20 December 2016)*

"I think waste can be a positive thing. For instance this light fitting above us is made of recycled bottles. The bottles are simply taken from dumpsites, whitened and then used for lamp shades and different light fittings. This man who came up with this idea was unemployed and now he sells his product to restaurants in America, Australia and places overseas. He is huge now and the company is called Green Light District." – EFV Community Leader (15 October 2016)

Lastly, six respondents stated that waste can be both negative and positive. Two of these respondents were recyclers and four were non-recyclers. Two responses are below. Their responses included combinations of the positive and negative aspects presented in the quotes above.

Conclusion

Having made distinctions between the responses of recyclers and non-recyclers in terms of whether waste is positive or negative provided some insight on S@S behaviours in EFV. 7/10 recyclers stated that waste is positive, two recyclers stated that waste is both positive and negative and one recycler stated that waste is negative. This compares to only 3/23 non-recyclers who stated that waste is positive, 4/23 non-recyclers who stated that waste is both positive and negative and 16 non-recyclers who stated that waste is negative. 7/10 recyclers stating that waste is positive while 16/23 non-recyclers stated that waste is negative suggests that most recyclers of the sample view waste positively which may thus influence them to participate in S@S. Most (16/23) non-recyclers having stated that waste is negative may explain their non-participation in S@S. In waste being viewed as negative, the reasons were mostly environmental. This revealed that residents viewed waste as material that resulted in a negative impact on their surroundings and the environmental on a larger scale. Waste was described as negative because it was not only associated with material that nobody wanted and that needed to be removed from one's immediate environment, but it was highly viewed as material that ceased to be valuable. The respondents above described waste as goods that cannot fulfill a purpose and are useless therefore making them lack

value. Responses of this nature established the following sub-theme about the value of waste. The theme of the value of waste is discussed next.

7.4.1.3 The value of waste

Pongracz (2002: 70) emphasizes that waste is a complex and dynamic concept. One of the reasons she provides is that for some consumers, certain materials convert into waste once their main purpose is lost or can no longer be carried out for that consumer. In some cases when certain waste changes ownership (e.g. leftover food, old clothes, and old furniture etc.) it changes from one's output to another's raw material. This means that it can become a resource to another person. In asking residents to provide words that they associate with waste, the words "useless, extra and leftover" were used. These words can be related to how people view the value of certain material and how waste is associated with low or even no value. This sparked the development of this sub-theme which analyses the value of waste. Of the 33 respondents, 12 respondents indicated that waste lacked or had no value at all in their explanation of whether waste is positive or negative. All 12 of these 12 respondents were non-recyclers.

> *"It is stored away in large bins and taken away weekly so that people no longer need to be in contact with it. It is stuff that we do not want or need or cannot use any more to there is no value in that stuff, hence it is thrown away." – Non-recycling participant 11 (18 February 2017)*

> *"It is mostly negative as it has not been consumed. It is what could have been consumed and therefore because it was never consumed or made use of it is thrown away. It has no use." Non-recycling participant 2 (24 September 2016)*

All 12 of the respondents that suggested that waste lacks or does not possess any value being non-recyclers indicates that a relationship does exist between the devaluation of waste and non-participation in recycling programmes. I continued to explore the conceptalisation of waste by asking people whether the contents that they have discarded could be valuable or resourceful to another person. Figure 37 shows the

amount of recyclers and non-recyclers that agreed or disagreed that the material they have thrown away could be of value or a resource to another person.

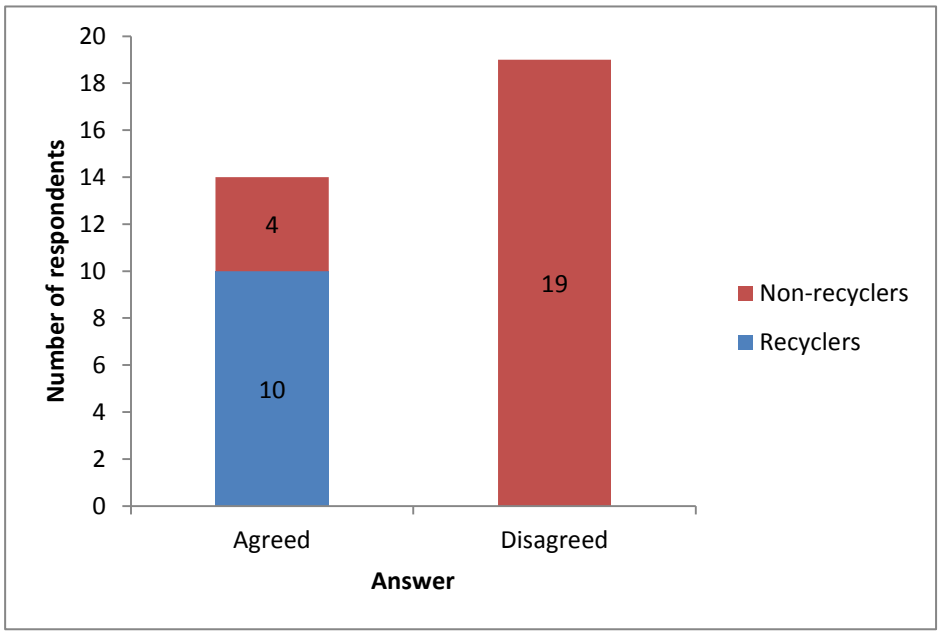


Figure 37: Responses to whether or not waste could be valuable or resourceful after it is discarded (Source: Research data)

14/33 of the respondents agreed that the contents they have thrown away could be useful to another person, even if they have chosen to throw it away. Of these 14 respondents that agreed 10 were all the recyclers that participated in the study and four were non-recyclers as depicted in Figure 37. Reference was made to broken household equipment, recyclable material for other use or basic needs like clothes and food such as shown below.

> *"Yes. Normally what we do is if we think it has value, like a broken ironing board or something, we put it out but not in the bag. We place it next to the bag so that waste collectors can see it clearly and take it if they intend of reusing it or using it for something else." – Recycling participant 4 (3 November 2016)*

> *"Yes. Bottled water for example, I know those bottles are being recycled into a geyser blanket. Glass, once of the main components of new glass is old glass. My father was an auditor and he did an audit for Pilkington's glass on the East*

Rand and for a lot of time they had a fleet of trucks driving around the reef collecting broken glass. They had a pit about 30-40m wide by 100m long of broken glass that when they started manufacturing glass, they just fed that along with the new stuff. The first three month production was simply recycled through the plant. Cans get recycled like with collect-a-can. In the office its costs us about R25 000 a month for recyclers wages." – Recycling participant 1 (24 September 2016)

"Yes. What is not of use to me anymore or not valuable anymore could be valuable to someone else especially if we think of food, which I understand to be one of the most "wasted" resources. It could feed many people. Also in terms of clothes we throw away, e-waste that can be taken to scrap yards are reused. Food waste could be useful for compost heaps. Recyclables could be used to develop other products or as a source of money." – Recycling participant 7 (18 February 2017)

A Pikitup Manager stated the following:

"To other people waste is a problem because it smells and things like that but to other people it is a resource." – Pikitup Official: 3 (20 December 2016)

The above quote by the Pikitup Manager falls in line with the views of Parizeau (2015) who stated that what some people call waste is a rich source of resources to another. The Pikitup manager recognises that there are strong negative connotations with waste owing to the negative environmental, social and even economic impacts that mismanaged waste can have, however even in that, it can be a resource. All recycling respondents agreed that material that they have discarded can be of value or resourceful to another person. This suggests that recycling behaviour in EFV is underpinned by the perception that value exists in waste. Therefore a relationship does exist between recycling and valuing waste because all recycers in this sample agreed that their waste contents had value and can serve other useful purposes to other people. As previously mentioned, authors have encouraged a paradigm shift not only in the perceptions of waste but in their understanding of whether value lies in waste. This research also explored whether this paradigm shift was prevalent in EFV and given the above responses, people (particularly recyclers) are indeed aware that their waste can

have value to other people. Although this is the case, the expected norm remains with majority of the sample (19/33) expressing how there is no value in what they have thrown away. All 19 of these respondents were non-recyclers. Some of these findings are expressed below.

> *"No I don't think there is any value in it. When I have thrown it away I doubt anyone else would want to use it because I will have used it to its full potential anyway."- Non-recycling participant 10 (17 February 2017)*

> *"What I have thrown away cannot be resourceful to someone else. I mean most people don't want to go through waste because they know there is nothing there that they could really use. The other thing is if all the waste has been mixed around then you find food or liquids and other undesirable things to touch in the waste and then it enters a state where nobody would want to use it again for anything" – Non-recycling participant 20 (11 March 2017)*

The responses above by non-recyclers on the value of waste speak to how Pongracz (2002:69) states that "waste is a value concept". It is a concept that is interpreted culturally and subjectively by individuals. In Pongracz's (2002) thesis, she tabulated different definitions of waste and in defining waste as a noun, it was described as "material, food, etc. rejected as superfluous, useless or valueless", "that which is of no value" (Pongracz, 2002:79). The Pikitup Business Plan (2015-2016) explains that the S@S programme is an initiative that promotes a paradigm shift in order to recognise and generate value from waste.

Conclusion

It is thus evident that people also define and conceptualise waste by the value it poses. Exploring the conceptualisation of waste by analysing words associated with waste, positive and negative views on waste and the value of waste as well as separating the views of recyclers from non-recyclers produced interesting findings. The words that were mentioned the most in relation to waste included "bad" and "smell" (mentioned 22 respondents), "bins" and "recycle" (mentioned by 21 respondents). There was no

significant indication that recyclers and non-recyclers associate different words with waste. However the findings took a turn when analysing recyclers and non-recyclers view waste as negative or positive. In the study sample, 7/10 recyclers stated that waste is positive, 1/10 stated that it is negative and 2/10 stated that it was both; showing that most recycling participants have a positive perception of waste. On the other hand, only 3/23 non-recyclers stated that waste is positive, 16/23 stated that it was negative and 4/23 stated that it was both; showing that most non-recyclers have a negative perception of waste. Lastly, in assessing the value of waste, it was also evident that recyclers and non-recyclers viewed the value of waste differently. 10/10 recyclers agreed that the contents they discarded could be of value or resourceful to someone else. This indicates that their participation in S@S is related to the fact that they recognise that value underlies their waste. 19/23 non-recyclers stated that the material they discarded was useless and has no value which may be a reason for non-participation. It is therefore evident that the conceptualisation of waste does have an influence on waste practices and S@S behaviour because overall, recyclers and non-recyclers conceptualised waste differently. The findings provided significant evidence that the conceptualisation of waste is an important factor in waste behaviour such as participation in S@S behaviour.

7.4.1 The Conceptualisation of waste and waste disposal

The second research question of this study asked whether the conceptualisation of waste influences waste practices (disposal). The link between conceptualisation and practice is analysed in this section, combining the qualitative data of the 16 WCS participants and their waste composition findings. Figure 38 shows a comparison of the amount of waste put out for collection by recyclers vs. non-recyclers on a Thursday when general waste is collected by Pikitup. This comparison shows the distinct difference in the amount of waste sent to landfill between recyclers and non-recyclers, since recyclers will have already extracted recyclable materials prior to this by separating at source on a Wednesday. WCS recycler values in this Figure exclude the recyclables that are separated at source.

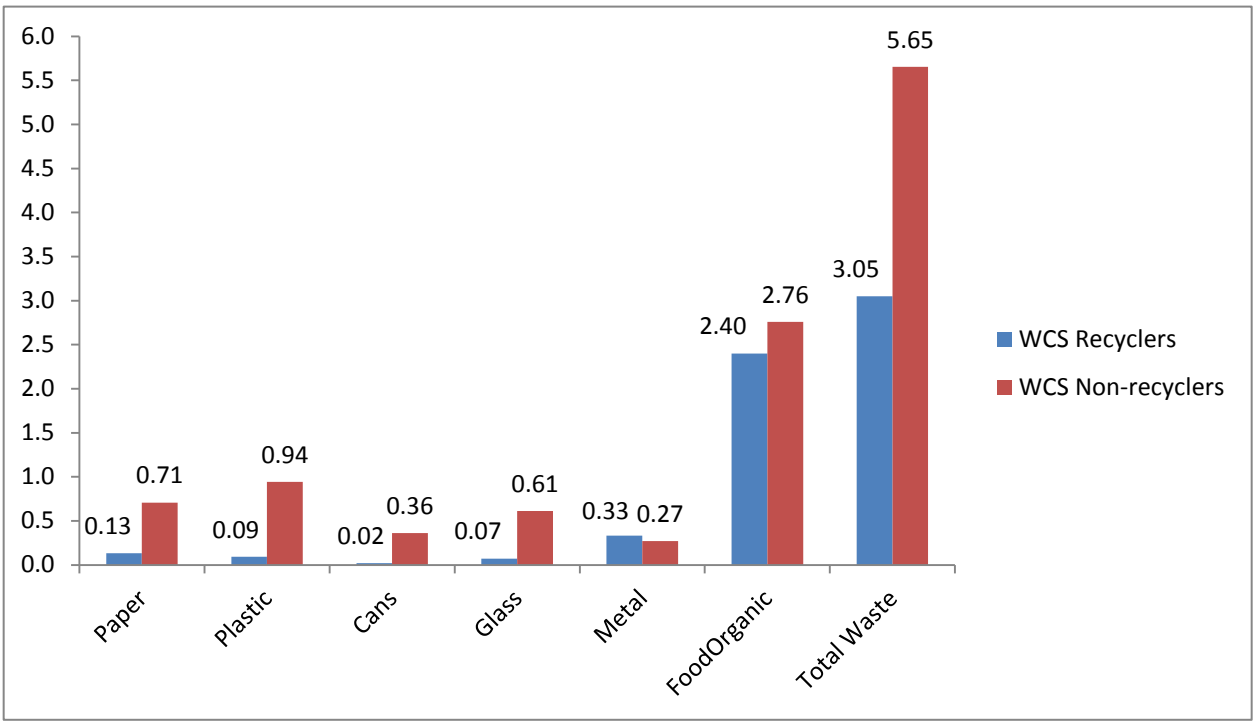


Figure 38: Average amount of waste put out by recycler vs. non-recycler households in rubbish bags when general waste is collected households (that participated in the WCS) (Source: Research data)

Figure 38 depicts a comparison between the average waste compositions of recyclers versus non-recyclers in a week. It represents the average amount of waste that recyclers versus non-recyclers put out for collection on a Thursday when general waste is collected and taken to the landfill. This means that the values presented for recyclers exclude the recyclable material that they have separated at source. Figure 38 clearly indicates that non-recyclers put out more waste for rubbish collection than recyclers, except in the instance of metal, where recyclers put 0.33kg into the trash bin than non-recyclers 0.27 kg. The average amount put out by recycler households is 3.05kg per week while that of non-recycler households is 5.65kg. The largest range is evident in the plastic category where recyclers produced 0.09kg while non-recyclers produced 0.94kg and this is a difference of 0.85kg. Typically food waste remains the element with the highest weight with recyclers having produced 2.4kg and non-recyclers 2.76kg. This difference can be attributed to the fact that some households use their organic waste for composting, such as the household shown earlier in Figure 28.

This data was used in conjunction with the conceptualisations of waste of these of the 9 WCS recyclers in order to analyse whether their S@S practices are aligned to their conceptualisations of waste. Their conceptualisations of waste were analysed in section 7.4.1. It was concluded that recyclers associate waste with recycling while non-recyclers associate waste with bad smells; they demonstrated positive attitudes towards waste while non-recyclers demonstrated negative attitudes towards waste and recyclers recognised that waste could be valuable and resourceful after disposal while most non-recyclers did not. These conceptualisations will be compared to the findings from the WCS in order to analyse whether these conceptualisations are aligned to their S@S practices. Further analysis of S@S behaviour was conducted by taking a closer look at the contents of the WCS recyclers. I observed the amount of recyclable waste still present in their general waste after they had separated at source and presented this in Table 3 below. The table also includes how much recyclable material non-recyclers put out in their general trash, to observe the difference.

Table 3: Average amount of recyclable material put out for waste general waste (kg/week) (Source: Research data)

	Paper	Plastic	Cans	Glass	Total
WCS Recyclers	0.13	0.09	0.02	0.07	**0.32**
WCS Non-recyclers	0.71	0.94	0.36	0.61	**2.62**

Table 3 presents the average amount of recyclable material put out for general collection in recycler and non-recycler households. While non-recycler households put out approximately 2.62 kg of recyclables in their general trash, recyclers put out approximately 0.32 kg. This is about 8 times less than that of non-recyclers. What the above findings also importantly reveal is that although recyclers participate in S@S they still have recyclable material (although in small amounts) present in their general waste after separating their waste. This indicates that recyclers in fact are not recycling completely. I noted that only 2/9 WCS recycling households had no paper at all in their general waste. Only 1/9 WCS recycling household had no plastic at all. This shows that paper and plastic S@S is not fully carried out. It was mostly paper and plastic items that

were still found in general waste, commonly tissue and tissue rolls, sweets and sweetener wrappers and food packaging that either still had food matter in it or that was quite moist owing to the food that was in it.

On the other hand, can and glass S@S seemed to be much more fully practiced. 8/9 WCS recycling households had no cans at all in their general waste while only 1 WCS recycling household had one can in their general waste. 7/9 WCS recycling households had no glass at all in their general waste while 2 WCS recycling households did. I assumed that can and glass S@S was carried out more efficiently perhaps because households tended to have more paper and plastic items compared to more distinct cans and glass items. Having found recyclable material in the general waste of WCS recycler households shows that they are not fully participating although their partial participation results in significantly less recyclables being present in their general waste. Their partial participation in S@S however does still make a very significant impact (reduction) on the amount of waste sent to landfills from EFV. Table 4 below provides detail on the contents found in S@S recyclable bags when recycling households put only recyclables out for collection. A description of the contents follows after the table.

Table 4: Average amount of recyclable material put out by recycling households in S@S recycle bags (kg/week) (Source: Research data)

Paper	Plastic	Cans	Glass	Total
0.35	0.39	0.10	0.48	**1.33**

Table 4 shows that an average of 1.33kg of recyclables is put out by recycling households and therefore this is the average amount each recycling household diverts from landfills. Commonly found contents of recycling bags were larger items such as milk cartons, cardboard boxes (cereal boxes, 6pack milk holder, boxes for packaging), magazines, old books, plastics and glass bottles (bottles for soft drinks, alcohol, sauces, cosmetics) cans and tins (cans for soft drinks and alcohol, tins for tinned food, deodorants and insect spray) food packaging and newspaper. Adding this total of 1.33kg with the 0.32 total for recyclers in Table 3 equates to 1.65kg of recyclables put

out by recyclers (in their general trash and recyclable bags). This total is still significantly less than the total recyclables put out by non-recyclers which was 2.62kg, shown in Table 3.

Conclusion – Conceptualisation in relation to S@S disposal practice

Having analysed the contents of 16 respondents (9 recyclers and 7 non-recyclers) wastes it can be concluded that participation in S@S results in significantly less trash being placed in rubbish bags for collection compared to the non-recyclers. In analysing the conceptualisations of waste of the WCS recyclers, the findings indicate that recyclers demonstrate positive attitudes towards waste. The comparison of these positive conceptualisations of waste to their significantly lower amounts of general waste shows that the conceptualisation of waste does influence S@S behaviour and waste practices. A higher amount of waste being disposed of among non-recyclers is connected to their non-participation in S@S. However literature by Webster (1975) and Schultz *et al.* (1995) informs that it could also be connected to how products are purchased and consumed. An early study by Webster (1975) revealed that recyclers and non-recyclers scored differently on the socially conscious consumerism scale. Recyclers scored higher on this scale suggesting that they have a higher probability of purchasing products that that have been manufactured in a socially or environmentally responsible way. I would associate this with less plastic or paper products and biodegradable materials or behaviour that employs the reuse of grocery bags. This is shown in the data by the significant difference in plastic placed in rubbish bags by recyclers vs. non-recyclers with a 0.85kg difference. Later, in 1995, Schultz *et al.* found that recyclers demonstrated characteristics that make them more responsible which are connected to social responsibility. A key find was that recyclers did not actually participate in S@S fully with recyclable material still being found in their general waste after they had separated at source. Having identified this, it is also key to acknowledge that the rules regarding recycling of materials in not intricately explained by Pikitup, for example how and where to dispose spoiled paper or plastic, certain kinds of plastic, polystyrene etc. However their partial participation in S@S still showed that they

produce significantly less waste that non-recyclers, therefore reducing the amount of waste sent to landfills.

7.4.2 Awareness of S@S programme and Environmental knowledge

This theme brings together the themes of environmental knowledge and awareness of recycling programmes. A significant body of research such as that by Oskamp e*t al.* (1991) in California, USA, Banga (2011) in Kampala, Uganda, Tonglet e*t al.* (2004) in Northamptonshire, UK, Martin *et al.* (2006) in Borough of Burnley, UK and Omran *et al.* (2012) in Gaza city, Palestine has found and argued that awareness of recycling programmes and environmental knowledge influence recycling behaviours and participation in such programmes. The theme of awareness was developed while asking what S@S is and whether such a programme exists in EFV. 4/33 respondents stated that they do not know what S@S source is. All four were non-recyclers. Three out of the four non-recyclers answered that they did not know whether there is a S@S programme in EFV and one stated that there is no S@S programme in EFV. The remaining 29 respondents stated that there is (or that they thought there is) a S@S programme in EFV. Below are some of the definitions that were provided for S@S.

> *"Separation of waste at the source where it is generated. So we split it up here at home where our waste actually comes from." Recycling participant 4 (3 November 2016)*
>
> *"To separate something at the beginning, at the start of the process, where the waste started."- Non-recycling participant 16 (19 February 2017)*

Ahmad *et al.* (2014) explain that exploring awareness and knowledge in terms of the benefits of recycling serves as valuable in studying the attitudes of the study participants. Knowledge was explored by asking residents whether there are any benefits to recycling and what they are. Figure 39 that follows shows the broad groups of responses that were mentioned. Some respondents mentioned more than one benefit of recycling, therefore with responses in more than one broad group.

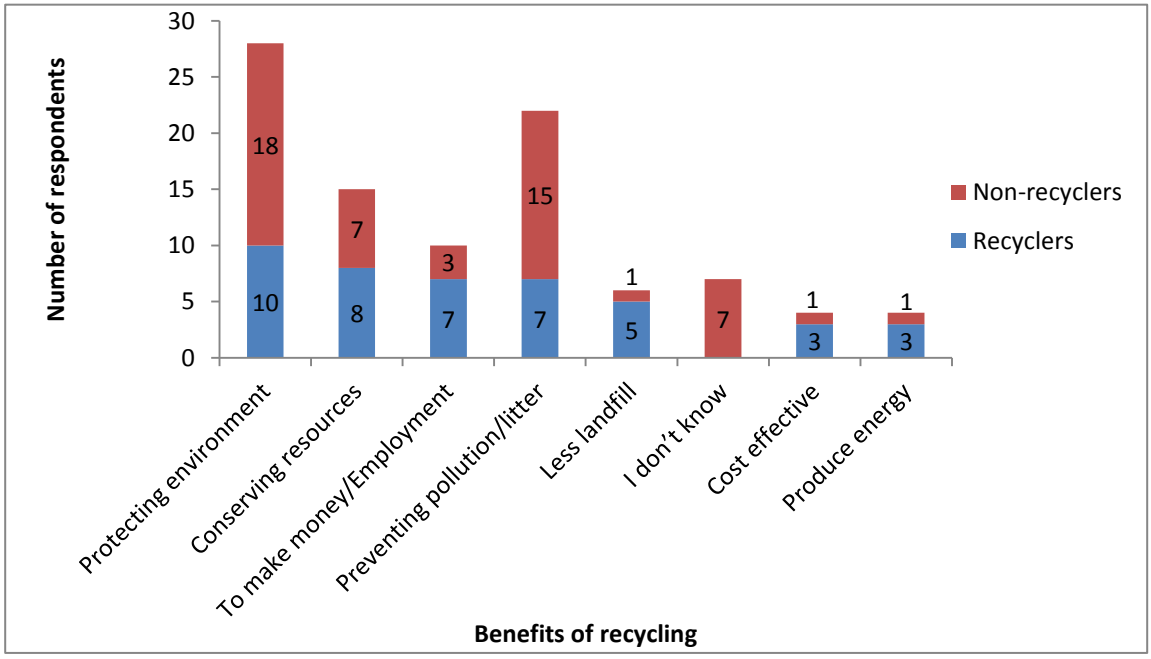


Figure 39: Benefits of recycling mentioned by residents (Source: Research data)

Figure 39 illustrates the different categories of answers provided when residents were asked what the benefits of recycling were. Of these eight categories, it is evident that five of them ("protecting environment; conserving resources; preventing pollution/litter; less landfill; and produce energy") are all based on the environment. This means that 29/33 participants connected recycling with environmental aspects. The understanding of environmental knowledge is key in understanding recycling behaviour (Ahmad e*t al.,* 2014) such as S@S. This indicates that respondents show a high level of environmental knowledge and concern. In 1990, while making comparisons between recyclers and non-recyclers in Illinois, USA, Vining and Ebreo also found that recyclers and non-recyclers shared the same stong belief that the environment is to be protected. Recyclers however showed a broader spectrum of knowledge compared to non-recyclers as they were able to provide benefits across all categories. Non-recyclers responses however were concentrated under two categories, protecting the environment and preventing litter/pollution, as Figure 39 shows. Furthermore, three categories had only 1 response each and additionally, 7 non-recyclers stated that they did not know of any benefits of recycling.

I explored environmental knowledge further, broadening the focus from recycling knowledge, to knowledge on waste. I asked residents if they knew of any environmental, social and/or economic impacts caused by waste. Of all 33 responses, 27 respondents provided environmental impacts of waste. Environmental impacts were provided by 10/10 recyclers and 17/23 non-recyclers, showing a high level of environmental knowledge in the study sample. 13 (5 recyclers and 8 non-recyclers) respondents provided social impacts related to waste and 6 (4 recyclers and 2 non-recyclers) respondents provided economic impacts related to waste. Given that residents mostly had environmental knowledge related to waste, environmental responses are shared below.

> *"The first environmental issue with waste is space. We are running out of space to put waste and that is why recycling is important. We need to put our materials to other use. The other thing is some things are not biodegradable so you don't know what to do with them. Waste is causing a serious environmental disaster and before we know it there will be no space for it, that's when it will start being put where we don't want it, it our ecosystems, rivers, streams oceans and stuff." Recycling participant 2 (11 October 2016)*

> *Environmental is things like the rats and when the waste is too much it falls all over the place or in water like rivers and dams." –Non-recycling participant 4 (11 October 2016)*

> *Littering kills plants and animals. Waste in the ocean is reported so much because of how its killing sealife like penguins. You find that some of these animals have plastic bottles and paper in their mounts not knowing that this is waste." – Non-recycling participant 17 (19 February 2017)*

Conclusion

In this theme awareness of the S@S programme in EFV was explored. 4/33 participants stated that they don't know what S@S is and 4/4 of these respondents were non-recyclers. The remaining 29 participants were aware of what S@S was and this included all 10 recyclers and 19 non-recyclers. This indicated a high level of awareness of what S@S is. The EFV Community Leader mentioned that the programme is reported about in the EFV newsletter and this is the main medium used to share information on the S@S programme. 3/33 respondents (all non-recyclers) stated that they did not know if there was a S@S programme in EFV while 1/33 participants stated that there is no S@S programme in EFV. The remaining 29 respondents stated that they knew that there is a S@S programme in EFV, again indicating a high level of awareness of the programme's existence. However, the fact that there are respondents that are unaware of what S@S is or are not sure as to whether it exists in their community indicates that VVRA in partnership with Pikitup need to intensify public awareness on this programme. Importantly, the findings of this study differ from those argued by many authors because a high level of awareness (29/33) of recycling programmes was evident, yet there is still a low participation rate (14 recycling residents out of a community of 55 residents); it did not show an influence on waste behaviours. These findings are similar to Banga (2011) whose results indicated that households of Kampala, Uganda were aware of recycling and S@S but they still did not participate. It was found however that this was because they did not know how to participate. Banga (2011) however still concluded that awareness was significant in influencing waste separation.

Additionally environmental knowledge was explored by investigating the benefits of recycling and impacts caused by waste. A high level of responses (29/33) including environmental benefits from recycling indicated a high level of environmental knowledge among respondents. The majority of the sample (29/33) indicated that the benefits of recycling were environmental. The impacts of waste were also investigated and again, most (27/33) of the responses were environmental. This shows that most respondents connect recycling and waste to the environment, even though some do not actually

recycle. Vining and Ebreo's (1990) study almost three decades ago had similar findings where recyclers and non-recyclers provided predominantly environmental reasons for recycling, also showing that their sample connected recycling with the environment. This suggests that for this sample, awareness did not appear to influence participation or non-participation in S@S programmes. Environmental knowledge was high among all recyclers (10/10) and non-recyclers (17/23) even though they did not participate in S@S, indicating that other aspects have a greater influence on non-participation in S@S. Recyclers however did indicate a broader spectrum of environmental knowledge. For recyclers, environmental aspects were a discussed by all recyclers indicating that it did influence participation in the S@S programme. This encouraged further investigation in what the drivers of participation in S@S programmes are and this is explored next.

7.4.3 Drivers of S@S participation (EFV recyclers)

Because this theme explores the factors that drive and encourage participation in the S@S programme in EFV, the findings focus on responses from S@S participants. A desktop survey of waste recycling in South Africa was conducted by Oelofse and Strydom (2010). The findings of that study found environmental protection was the main (62% of the sample) personal reason for recycling waste. This was followed by social responsibility/ spiritual awareness with 27% of the responses. This study too found that environmental concern was the key reason why recyclers stated that they recycle, following social responsibility which is the feeling of having to behave or act in ways that protect and benefit the greater community. Although only 10 recyclers (S@S participants) participated in this study, it is still important to present results on them. To understand what drives and encourages participation in the EFV S@S programme, it was important to ask those who participate in the S@S programme what influences or encourages them to participate. The results are shown in Figure 40 that follows.

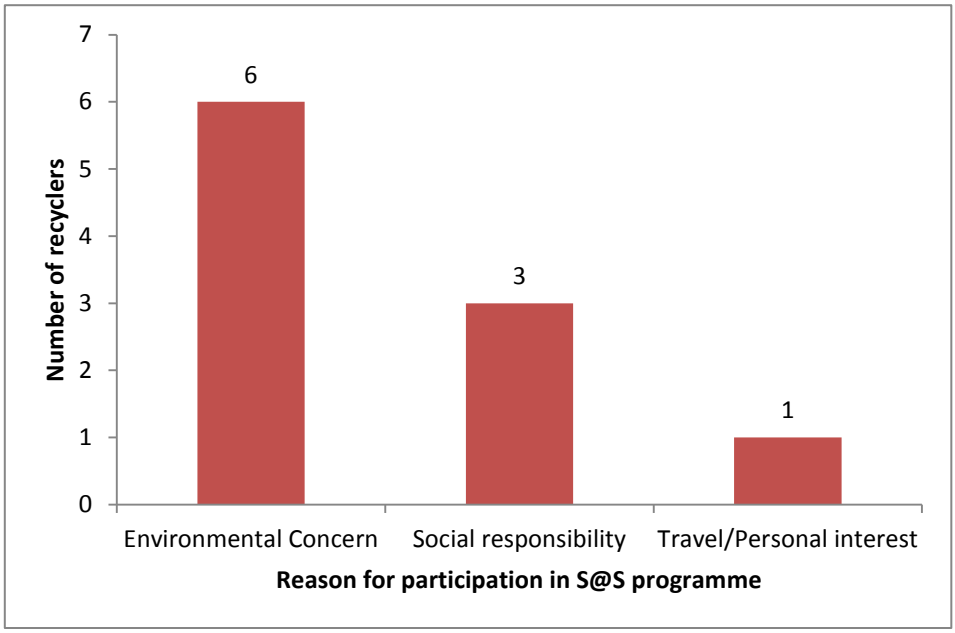


Figure 40: Reasons for participation in S@S programme by recyclers (Source: Research data)

Of the 10 S@S participants, six provided the reason that environmental concern and protection were the reason that they recycled. Two quotes from these recyclers follow.

> *"Wanting to secure a better environment and future for our kids and their generation. Generally protecting the environment." – Recycling participant 4 (3 November 2016)*

> *"Well you want to have some impact on protecting the environment. A lot of people think well, why me? And what impact will one household have and how will they bring about change. It just starts with one household and as others come on board, and so the environment is protected." – Recycling participant 3 (15 October 2016)*

Two S@S participants' responses were related to social responsibility as shown below.

> *"So I can leave a better world for you and your generation. I was in matric in 1961 when J.K Kennedy was inaugurated. We were brought up not asking what your country can do for you but what you can do for your country. It made the biggest*

impression on my classmates and I and most of us are from that generation." – Recycling participant 1 (24 September 2016)

"Because everyone will benefit. If we just dump everything and burn things, we are killing the earth and we need to save it to survive. We can do a lot to save the world and make earth a healthy place for all. I just want the benefits for myself and other people. I feel guilty if I don't do it. I also feel that I am making things easier for people that use these resources and help them make a living." – Recycling participant 10 (11 March 2017)

The last recycler explained that her traveling experience abroad influenced why she participates in the S@S programme.

Honestly the first place I was exposed to it was during a trip to Australia and must say they are really on top of things. Their recycling systems are strict and very efficient. I see the efforts here though but that was the first thing that sparked my interest. Then I am the environmental teacher at my school so I encourage that at school." – Recycling participant 9 (17 February 2017)

Conclusion

Environmental concern showed to be the most mentioned (6/10) reason for participation in the S@S programme. Social responsibility was mentioned by 3/10 recyclers while travel was mentioned by 1/10 recyclers. Tonglet *et al.* (2004) identified that people's concern for the well-being of the community as a healthy place to live was a significant determinant of recycling, as this study found as well. Environmental concern therefore appears to be the dominant factor that influences participation in S@S in EFV. The following theme contrastingly focuses on factors deterring participation in the S@S programmes in EFV.

7.4.4 Deterrents discouraging participation in the S@S programme (EFV non-recyclers)

The theme of deterrents developed as I asked non-recyclers why they do not participate in S@S. Closer to home, a study on South African recycling behaviour conducted by Oelofse and Strydom (2010) has the same findings, stating that convenience was one of the main factors demotivating recycling. To explore the factors that deter participation in the EFV S@S, it was important to ask non-recyclers why they do or do not participate in the recycling S@S programme in EFV. Figure 41 below represents deterrents mentioned by non-recyclers. In some cases, respondents mentioned more than one aspect discouraging them from participating and Figure 41 that follows illustrates how frequently each aspect was mentioned in total.

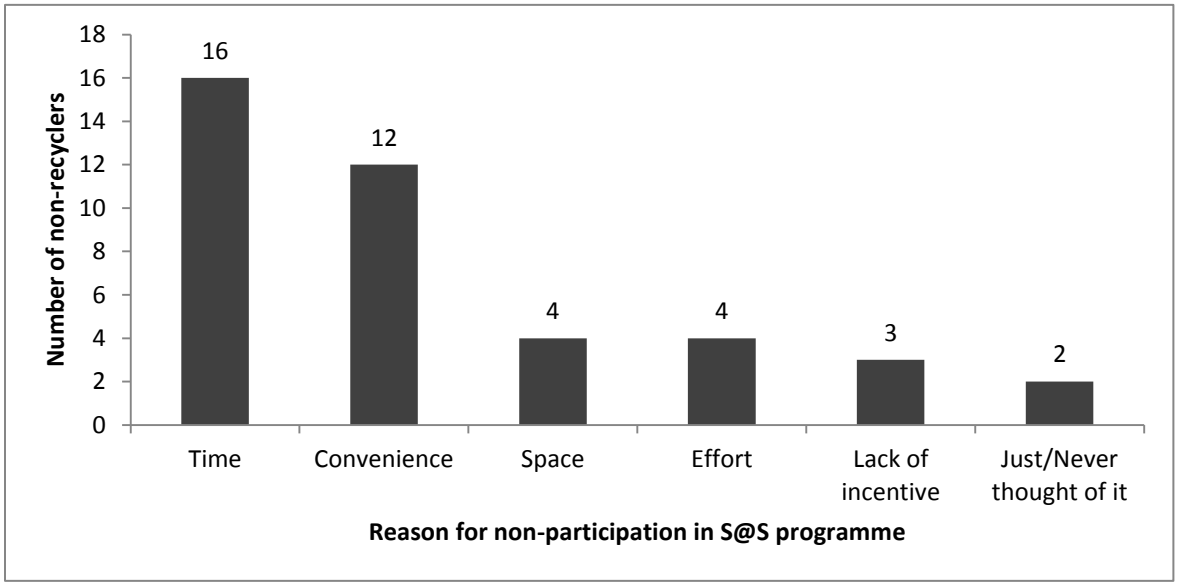


Figure 41: Reasons for not participating in S@S mentioned by non-recyclers (Source: Research data)

As anticipated, time (16/23) and convenience (12/23) were the most mentioned reasons for non-participation in the S@S programme. As such, these are the two aspects that will be discussed.

Similar to a study by Ahmad *et al.* (2014) in Pakistan, the aspect of time was mentioned frequently as well. Ahmad e*t al.* (2014) explored recycling behaviour among students

found that while convenience (and cost) was the main influencing factor of recycling behaviour, it was specifically the time factor that shaped the inclination to recycle. 16 out of 23 non-recyclers explained that they do not of the time to recycle. A quote of this nature is provided below.

> *"I have a very hectic job so my working hours begin early in the morning and I come back late. I then have to clean and cook and so really I don't have the time to take things, my garbage for that matter and put it in different bins." – Non-recycling participant 16 (19 February 2017)*

Convenience was mentioned by 12/23 non-recyclers. Below are two statements that were made regarding convenience.

> *"It's inconvenient for someone who has so many things to do and complete in one week. When you are so busy you don't for once try and prioritise something that isn't even at least convenient for you." – Non-recycling participant 14 (18 February 2017)*

> *"I have too many other things to do that to be recycling when I can just put everything in one bag and Pikitup collects it and separates it at a later stage anyway. If they can maybe come up with a way of making it convenient and easy then maybe I could consider it." – Non-recycling participant 18 (11 March 2017)*

An interesting and insightful contrast existed between statements of convenience made by non-recycling participant 6 and recycling participant 10.

> *"I am hardly ever here and it just never comes to mind. At our workplace [named workplace] its easy because its set up for you. We have all the different bins right there so you can see it and it becomes part of your habit as someone that works there. But now here at home there's no set aside space for that" - Non-recycling participant 6 (15 October 2016)*

> *"The community makes it easy to recycle because you are given the bags to recycle each week so there's the advantage of it being easy and convenient." – Recycling participant 10 (11 March 2017)*

A key paper by Tonglet e*t al.* (2004:212) specifically states that environmental behaviour such as participation in recycling programmes is influenced by not being discouraged by factors such as time, space and convenience. Interestingly, these showed to be three of the exact factors discouraging and demotivating participation in S@S programmes. Convenience particularly was one of the factors that Tonglet *et al.* (2004) and Martin *et al.* (2006) found to be important in influencing participation in household recycling behaviours. Prior to their research, a survey conducted by Perrin and Barton (2001) found that inconvenience and lack of time were the most frequently given reasons for non-participation in a recycling curbside scheme. More recently in 2015, Zhang *et al.* made similar findings in their investigation on waste separation behaviour in China. Their findings showed that convenience and time (or rather lack thereof) had a negative impact on waste separation behaviour identifying the need for enhancements in convenience. Convenience and time were also the two key aspects mentioned in this study.

Conclusion

In exploring the deterring factors that discourage participation in the S@S programme, the two prominent factors were time and convenience. In terms of time, it was indicated that separating waste at source demands too much time, especially for working individuals and parents. This in conjunction with the wide range of research that has had similar findings reinforces the need for S@S programmes to be designed in a way that demands less time from residents. It was intriguing to observe that convenience means different things to different people and that convenience exists in different degrees. Looking at non-recycling participant 6 for example, convenience means the full recycling bags or bins already set out and the ease of only placing the correct category of waste into its designated bin. Recycling participant 10 on the other hand finds that the provision of bags is what is convenient about the S@S programme. Convenience proved to be essential in influencing participation rates in recycling programmes and non-recyclers indicated that if S@S were more convenient or took less time, that could encourage them to participate (such as non-recycling participant 18). It was evident that

for the case of the EFV S@S programme, non-recyclers prefer a programme that provides maximum convenience and requires minimum time.

7.4.5 Possible solutions: The voice of EFV residents

This last theme sheds light on how recyclers and non-reyclers suggest that the S@S and recycling programmes can be improved in terms of participation. This theme consists of concluding remarks that allowed for even deeper insight on how residents view waste and recycling. Both recycling and non-recycling participants had different types of suggestions to improve recycling and S@S programmes either in the community or on a broader scale. These broad categories of suggestions are indicated in the diagram below.

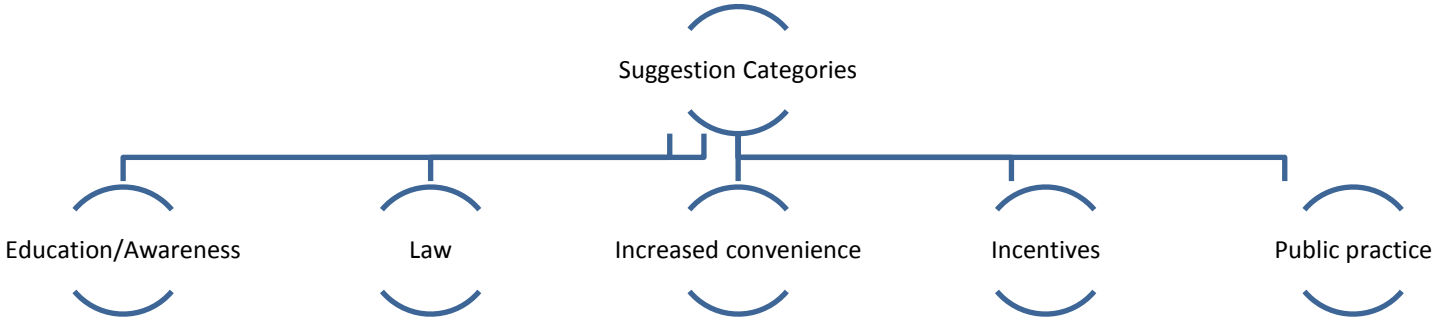


Figure 42 that follows illustrates how many recyclers and non-recyclers made suggestions for each category. Respondents made suggestions that fall into more than one category and this is shown when the same participants have quotes in different areas in the discussions that follow.

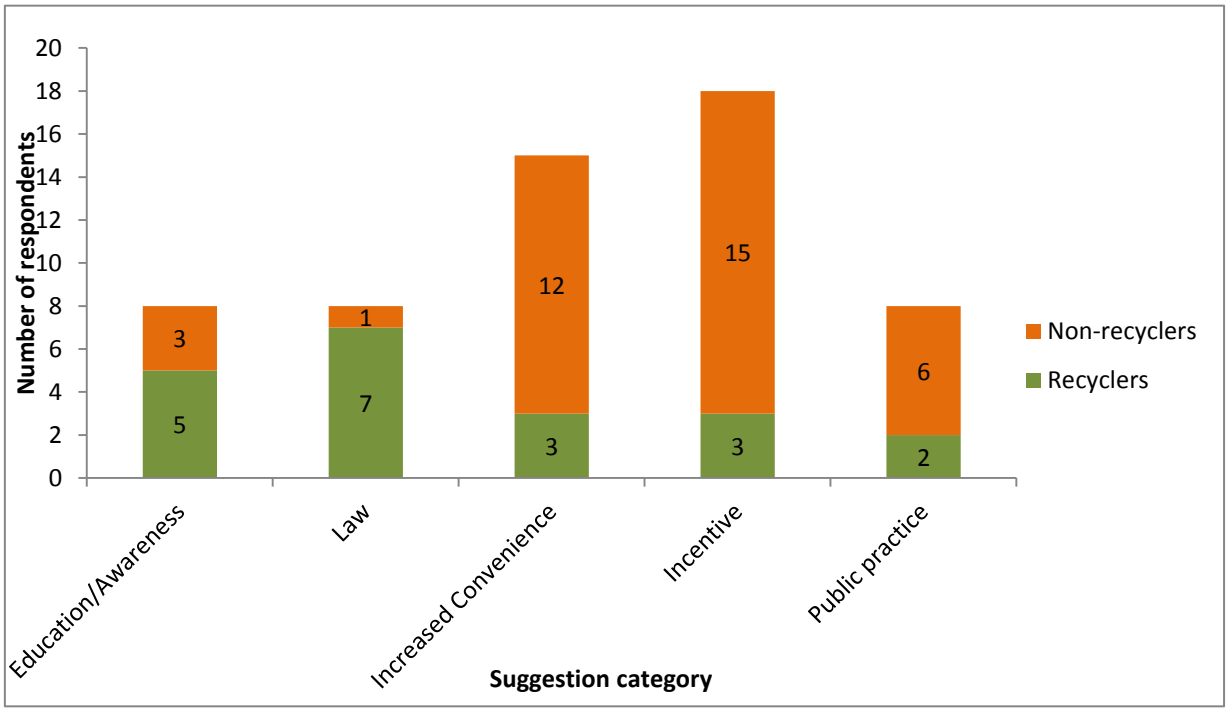


Figure 42: Categories of suggestions made by recyclers and non-recyclers (Source: Research data)

Figure 42 illustrates the broad categories of suggestions and indicates how many recyclers and non-recyclers made suggestions in each. Each category is further discussed.

7.4.5.1 *Incentive*

The most frequently mentioned suggestion included that of incentives or benefits. 18 respondents including 15/23 non-recyclers and 3/10 recyclers suggested that incentives should be developed to enhance participation in recycling. This category had the highest prevalence of non-recyclers, indicating that incentives are an important factor that may encourage their participation. A-Jalil *et al.* (2014) who investigated household recycling behaviour in UK note that incentives form part of policy instruments that contribute to household recycling behvaiour. They describe that there are incentives and disincentives and the examples include rewards (monetary or non-monetary) and penalty fees. The responses from residents below include both incentives and disincentives. Zhang *et al.* (2015) add that these incentives could even be developed by residents themselves and therefore motivate other residents in their communities to

participate. The quotes below indicate that residents feel strongly about incentives as a method that will encourage participation, particularly if the benefits or penalties include money.

> *"If things had value, e.g. deposit back on things. Reward or point system like Pick n Pay smart shopper points and let it counteract off your municipal bill." – Recycling participant 2 (11 October 2016)*

> *"Yes. Graduated costs, sign up and if you undertake to sort at source your municipal bill will be reduced for refuse removal. If you don't, your refuse bill will be much higher." – Recycling participant 1 (24 September 2016)*

The Pikitup official added the following:

> *"The incentive is another thing, the community needs something that will encourage and motivate them. Going into the community with education alone just means that some will and some won't. Remember in the low income area, they need money. You can't tell them to recycle if they don't have bread in the house. Separation at source participation is more in the medium and high income areas because in the high income area, people don't mind recycling and don't have the expectation of receiving something back." – Pikitup Official (20 December 2016)*

The previous statement made by the Pikitup official highlights the importance of how incentives shape participation in S@S programmes. She however made distinctions between low, medium and high income area participation rates identifying that because the circumstance differ in different areas, different elements will motivate participation. Exploring the differences between economic areas could be an area recommended for further investigation in the future. The Pikitup Business Plan (2015-2016) states that incentives and disincentives are being investigated and contemplated. Incentives being the most mentioned suggestion by non-recyclers indicates that they view recycling as a practice that should be in some way rewarded. Vining and Ebreo(1990) identified that non-recyclers were more concerned with monetary and convenience factors influencing recycling. This study has similar findings. With increased monetary concerns, it is

therefore no surprise that most (15/23) non-recyclers would have the suggestion incentives should be explored for recycling.

7.4.5.2 *Increased convenience*

Convenience analysed as a deterrent to participation showed to be a factor that had a strong influence on S@S participation and this is argued by several authors as discussed in section 7.4.4. Residents shared this same view with increased convenience being a topic mentioned by 14 respondents in total, 12/23 non-recyclers and 2 recyclers. This category had the second highest amount of non-recyclers motivating for it, further highlighting that convenience is crucial in S@S participation. The respondents however indicated that convenience for them was in connection with recycling infrastructure such as the bins, their size and locality of their placement.

> *"I think we should have the different bins here in this closed street. These bins need to be more accessible. I've requested bins from PIKITUP I don't know how many times and I haven't received it." – EFV Community Leader (24 September 2016)*

> *"I don't think there are enough bins and our bins aren't durable enough. We have broken bins which overflow with waste so it doesn't make it any better if we also have to separate. The City should partner with Pikitup and look at designing one big bin that has different compartments for different trash. There needs to be advancement on the simple things like bins to attract participation." – Non-recycling participant 2 (24 September 2016)*

While exploring suggestions of residents in order to further understand how they view S@S and recycling programmes, it was again evident that convenience was important to consider. Convenience was another suggestion category dominated by non-recyclers (12/23) which reinforces the findings by Vining and Ebreo (1990) of non-recyclers being more concerned with convenience than recyclers. The respondents above made reference to the provision and placement of bins in the area. This indicated that with

more bins being provided for S@S, this would make recycling easier and more convenient, particularly for non-recyclers. With increased convenience, one can assume that that there would be less time consumed, which was the main deterrent for S@S was found in section 7.4.4. The findings above show that non-recyclers view recycling as a practice that should be convenient and easy, therefore the bins for recycling should be placed close enough to increase the ease of recycling. With bins closer, the issue of effort as deterrent to recycling is also addressed as it will require less effort from residents. In 1990, Vining and Ebreo made the same finding that recycling programmes should explore options of increasing inconvenience and almost 30 years later the same suggestion is being made.

7.4.5.3 *Law*

A total of 8/33 respondents stated that participation could be increase by making recycling and S@S an obligation in legislation. Zhang *et al.* (2015) explain that the development and implementation of policies, laws and regulations in communities is the duty of the government.

> *"The only way to get people to do something, especially when they show such resistance and such low participation is to think about law enforcement. I mean why not? It's clear that this is what we should be doing and the Environmental Department should think about that." - Recycling participant 10 (11 March 2017)*

> *"We can't be expected to take recycling seriously when there are so many other issues that the municipality and our country face. Especially if even authorities haven't even enforced this in law." – Non-recycling participant 1 (24 September 2016)*

In the interview with the Pikutup official (20 December 2016), she mentioned that recycling and S@S in fact are being viewed as elements that will form part of legislation. When asked whether S@S is present in any by-laws or if it is just an initiative, the Pikitup official answered with the following:

"It is actually under the Waste Act 2008. Remember we have to minimise the amount of waste going to landfill sites. And laws operate nationally, provincially and locally then are further broken down. Locally it was said that the only way to divert waste is with Separation at Source from homes and communities, but as long as there is no law enforcement, it won't happen and we have long way to go. Our law enforcement needs some work as well and it is not up to scratch."- Pikitup Official (20 December 2016)

What is clear in the above statement by the Pikitup official is the gap between the development of waste minimisation initiatives as projects and the enforcement of waste minimisation through making S@S and recycling mandatory practice. The Pikitup Business Plan (2015-2016) however does state recycling and S@S are being reviewed as becoming mandatory practices once Pikitup has made it as convenient as it can be for residents. This suggestion category was dominated by recyclers (7/10) compared to only 1/23 non-recyclers. This shows that most recyclers are of the view that recycling should be part of law and obligatory practice among residents. The topic of law could be linked back to TPB as a form of behavioural control.

7.4.5.4 *Education and awareness*

The theme of environmental knowledge/education and awareness of S@S programmes was explored in section 7.4.2. The findings of that theme lead to the conclusion that knowledge and awareness do influence S@S behaviour and participation, particularly for recyclers. Residents showed to identify that education and awareness are important to improve S@S participation rates this as well. A total of 8/33 respondents mentioned the importance of education and awareness in enhancing participation in S@S. This included 5/10 recyclers and 3/23 non-recyclers.

Definitely needs to be brought into schools and when you are young. If you think it's the norm like any rules and something they have to do, then it will just carry on with them to adulthood into their own homes and they will pass it on to their own kids. Educating people on what to do is very important and maybe over time it will become compulsory." – EFV Community Leader (24 September 2016)

"There is also the issue of education and consumer education which virtually doesn't exist. This needs to be done much more extensively if we are looking to improve waste management through heightened participation in this S@S programme, not only here but in other residential areas as well." – Recycling participant 1 (24 September 2016)

During the interview with the Pikitup official, she made the following statements concerning education.

"I think that the biggest challenge is education. It is also important to think about funding because education is very expensive. To be able to go into the communities, you must have the resources to do that. Cooperatives also do education, it benefits them and us."

"We need to educate our communities. Not enough effort is put into education as well. And not just education from formal places, but even starting from home so that our kids grow up knowing what to do."

"With education we actually have specific admin that deals with education and communication. Normally we go to malls and do exhibitions, billboards, and adverts on TV. We try use all means to communicate to people. We try target specific people in a certain way. If we go to low income areas, we know what type of media we will use like radio and TV. Sometimes we go door to door and knock and sit and explain so it depends on the area. Our communication, marketing and education are a department on their own. Even the cooperatives have education but we work with them telling that for example we want to go to a certain area and we go put up a gazebo and other things. " – Pikitup Official (20 December 2016)

The above statement from the Pikitup official show that Pikitup puts a large amount of effort and money into educating communities about S@S in order to enhance participation rates. Zhang *et al.* (2015) similarly state that improved participation rates can be achieved by campaigns that focus on the need to separate waste in households. They add that such campaigns should also have a strong focus on the improvement of environmental knowledge, which was the

main factor encouraging S@S participation in this study. Like the EFV Community leader, Zhang *et al.* (2015) agree that schools need to enhance environmental education by introducing environmental activities to the students and this will then spread out into communities, thus increasing awareness of S@S. Education and awareness can also be linked to TPB as a means of building norms, as well as public practice discussed below.

7.4.5.5 *Public practice*

The last category of suggestions made was expressed by 6/23 non-recyclers and 2/10 recyclers. They shared the view that S@S must be practiced by other public parties such as public shopping centres and schools and government departments. This because these are areas and institutions where many people go to that can encourage S@S behaviour on a larger scale.

> *I think that one thing that will encourage us or at least show us that this isn't an idea that that they are just dumping on residents is if we also see it in other areas like malls, shopping areas and more especially government departments and hospitals. As communities we also want to see that larger authorities are taking part if this is such a huge priority." – Non-recycling participant 19 (11 March 2017)*

> *It needs to be seen more out in public if it is a nationwide drive and not only for residents. The different bins must also be at local shopping centres and restaurants even. So that in our everyday lives we see it in our activities that we do outside our homes then we can bring it to our houses." – Non-recycling participant 22 (11March 2017)*

This is a suggestion mentioned by more non-recyclers than non-recyclers. This indicates that it is the view of some non-recyclers that they would want to see S@S being practiced in other types of spaces in the city that they go to in order to motivate them to bring such practices in their own households. Institutions such as universities commonly have S@S garbage bins and I have observed this at the University (Wits) and the University of Johannesburg as well. Introducing S@S at public places such as

shopping centres, restaurants, hospitals etc. allows for the general public rather than just specific residential areas to be exposed to recycling. This suggestion shows that non-recyclers would be more encouraged if they saw S@S being practiced by other larger entities. It could be their view that these entities will not only have a larger impact, but that they too should have the responsibility to recycle waste if it is being encouraged in residential areas.

Conclusion

The five broad categories of suggestions from respondents were: incentives, convenience, law, education and public practice. “Incentives” was a suggestion dominated by non-recyclers. Most non-recyclers suggested that incentives be developed and convenience be enhanced. Literature by Vining and Ebreo (1990) that differentiated recyclers from non-recyclers made the same identification stating that non-recyclers’ concerns with recycling were mostly associated with incentives and convenience. On the other hand, the suggestion of recycling and S@S being mandatory among residents and present in legislation was made by most recyclers viewed it as something that all residents should be obliged to do by law. Recyclers also mostly suggested that when more people are educated and knowledgeable about S@S, participation will be enhanced. The last topic of public practice was mentioned by 6/23 non-recyclers indicating that some non-recyclers would be encouraged to introduce S@S in their homes if they saw S@S elsewhere.

8. CONCLUSIONS

This research report aimed to find out how EFV residents conceptualise waste, whether these conceptualisations influence waste practices (particularly disposal) and what other factors influence participation in the S@S programme available in EFV. Recyclers conceptualised waste positively, recognising its value, while non-recyclers conceptualised waste negatively, associating it with a lack of value. Additionally, the conceptualisation of waste was shown to influence S@S behaviour. The WCS supported this by showing significantly less waste placed in rubbish bags for disposal by recyclers compared to non-recyclers. Other than S@S, this could also be attributed to consumer behaviour. Recyclers diverted a significant amount of recyclables away from the waste stream as evidenced by the fact that they placed 1.33 kg of recyclables in recycling bags. However, it is also important to note that recyclers did not participate in S@S fully as recyclable material was still present in their general waste after S@S. Furthermore, the WCS revealed a waste stream dominated by putrescible waste (51.8%) suggesting that future research needs to explore ways of using putrescible waste more efficiently. 42% of all waste analysed was recyclable, indicating high recycling potential in the area.

The theme of awareness of S@S programme and environmental knowledge showed no distinct differences between recyclers and non-recyclers in terms of awareness. A high level of awareness of the S@S programme was demonstrated by all respondents which indicated that for this sample, awareness did not influence participation. Environmental knowledge was also high across all respondents with most responses being linked to environmental protection. Recyclers indicated broader knowledge on recycling suggesting that this knowledge influences their participation in S@S programmes. The findings on awareness remain inconclusive as there was no evidence indicating that either recyclers or non-recyclers had a higher awareness of S@S or environmental knowledge.

The two themes of drivers and deterrents of S@S participation indicated more distinctly which factors influence participation in S@S. Recyclers showed that the main factors that encourage them to participate in S@S are environmental concern and social

responsibility. Recyclers demonstrated concern for the health of the environment and its resources and additionally indicated that their participation is in order to ensure the well-being of society. The two greatest deterrents to participation in the S@S programme were convenience and time (perceived behavioural control and situational factors). Other deterrents discovered included space, effort, lack of incentive and having just never thought of doing recycling. The last theme of solutions for improving S@S programmes provided a deeper understanding on how the S@S programme is viewed, through suggestions for improving participation. Most non-recyclers suggested the development of incentives or rewards for participation and increased convenience demonstrating that they view recycling as a practice that should be rewarded in some way and not be inconvenient to do. Most recyclers suggested that recycling be obligatory for residents and form part of law showing that they view S@S as practice that everyone should be engaging with.

These findings support my argument that it is necessary to combine both the conceptualisation of waste with other factors through a combination of methods such as participant observation, interviews desktop studies and a WCS to develop a comprehensive understanding of people's participation in recycling programmes such as S@S. My argument therefore brings together the views with of Moore (2012), Gutberlet (2013), Oteng-Ababio (2014), Pongracz and Pohjola (2004) and Parizeau (2015) (on the conceptualisation of waste) and Tonglet *et al.,* 2004 and Martin *et al.,* 2006 (on factors influencing participation in recycling programmes) as my argument brings these bodies of literature together. This was also shown by the bringing together of literatures in the conceptual framework.

The findings of this research not only contribute to South African waste literature and the lack thereof in Midrand, but will be useful in shaping waste management policies and initiatives for the greater CoJ and South African residential areas. This study will also contribute to the understanding of how people conceptualise waste and waste behaviour as producers of waste. While it is unusual for such a study to focus on a middle income and more affluent area with access to recycling programmes, it was unexpected that participation rates would be low. This is informative for waste

managers and waste policy developers so that they rethink recycling initiatives and how residents are encouraged to participate in recycling as well as how waste public awareness and education is carried out. This study indicates that more affluent areas may have access to recycling resources and have high environmental or waste related awareness and education, this may not always translate into participation.

Areas for future research, it should continue to include mechanisms to achieve a paradigm shift in the conceptualisation of waste in order to recognise its positive quality and various potential areas for use after being discarded. Research needs to tap into the manufacturing and production sector of household products and encourage that materials are reusable while products are designed in a more advanced manner allowing them to serve more than just one purpose. Additionally, this study was conducted in a middle income area and further research could make comparisons to lower and higher income areas where the possibility exists that the results may vary. This further research could also pay more attention to the socio-economic aspects of residential areas that do (or do not) have access to such recycling resources and programmes. It would be informative for future research to take note of whether waste education and awareness would have an impact in other (lower and higher) socio-economic areas. Projects that transfer putrescible waste to schools or charities for composting need to be explored. Academia should also pay attention to and further explore composting and biowaste (waste-to-energy) technologies as well as their associated public environmental education, particularly for residential areas.

9. REFERENCES

Abou-ElWafa, H.S., El-Bestar, S.F., El-Gilany, A.H. and Awad, E.E.S., 2012: Musculoskeletal disorders among municipal solid waste collectors in Mansoura, Egypt: a cross-sectional study, Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3467652/ (Accessed 22 March 2017)

Adogu, P.O.U., Uwakwe, K.A., Egenti, N.B., Okwuoha, A.P. and Nkwocha, I.B., 2015: Assessment of Waste Management Practices among Residents of Owerri Municipal Imo State Nigeria. *Journal of Environmental Protection*, 6, 446-456.

Agbesola, Y., 2013: Sustainability of Municipal Solid Waste Management in Nigeria: A Case Study of Lagos. Unpublished paper, Linkoping University, Sweden.

Aharonovitch, L., 2008: Eco Design Basics on Cradle to Grave vs. Cradle to Cradle, Available from: https://www.greenprophet.com/2008/12/cradle-grave/ (Accessed 2 June 2017)

Ahmad, M.S., Bazmi, A.A., Bhutto, A.W., Shahzadi, K. and Bukhari, N., 2016: Students' responses to improve environmental sustainability through recycling: quantitatively improving qualitative model. *Applied Research in Quality of Life*, 11, 253-270.

A-Jalil, E.E., Grant, D.B., Nicholson, J.D. and Deutz, P., 2014. Investigating household recycling behaviour through the interactions between personal and situational factors. *Waste Management and the Environment VII*, 180,113.

Ajzen, I., 1991: The theory of planned behavior. *Organizational behavior and human decision processes*, 50, 179-211.

Anderson, R., 2007: Thematic Content Analysis (TCA): Descriptive Presentation of Qualitative Data Using Microsoft Word, Available from: http://s3.amazonaws.com/academia.edu.documents/36098984/Thematic_Content_Analysis_manuscript.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1496436619&Signature=r2al6AV9DfqjG%2Ft9jNnbf2oaUN4%3D&response-content-

disposition=inline%3B%20filename%3DTHEMATIC_CONTENT_ANALYSIS_on_Microsoft_W.pdf (Accessed 2 June 2017)

Bandara. N.J.G.J., Hettiaratchi, J.P.A., Wirasinghe, S. C., and Pilapiiya, S., 2007: Relation of waste generation and composition to socio-economic factors: a case study. *Environmental Monitoring and Assessment*, 135, 31-39

Banga, M., 2011: Household knowledge, attitudes and practices in solid Waste segregation and recycling: The case of urban Kampala. *Zambia Social Science Journal*, 2, 27-39.

Barbalace, R.C., 1999. The History of Waste: Do you want to be a garbologist?. The History of Waste: Do You Want to Be a Garbologist, Available from: *environmentalchemistry.com/yogi/environmental/wastehistory.html (Accessed 2 June 2017)*

Barles, S., 2014: History of waste management and the social and cultural representations of waste. *The Basic Environmental History*, 199-226.

Barr, S., Gilg, A.W., and Ford N.J., 2001: A conceptual framework for understanding and analysing attitudes towards household-waste management. *Environ Plan A*, 33, 2025–48.

Beal, J., 1997: Thoughts on Poverty from a South Asian Rubbish Dump Gender, Inequality and Household Waste, *IDS Bulletin*, 28, 73-90.

Biernacki, P., and Waldorf, D., 1981: Snowball sampling: Problems and techniques of chain referral sampling. *Sociological methods & research,* 10, 141-163.

Binion, E. and Gutberlet, J., 2012: The effects of handling solid waste on the wellbeing of informal and organized recyclers: a review of the literature. *International Journal of occupational and environmental health*, 18,43-52.

Bolaane, B., 2006: Constraints to promoting people centred approaches in recycling. *Habitat International*, 30, 731-740.

Braun, V., and Clarke, V., 2006: Using thematic analysis in psychology. *Qualitative Research in Psychology,* 3, 77-101.

Britten, N., 1995: Qualitative interviews in medical research. *BMJ* (Clinical research ed.), 311, 251-253.

Census 2011: Vorna Valley. Available from: https://census2011.adrianfrith.com/place/798004028 (Accessed 23 February 2017)

City of Johannesburg, 2000: City of Johannesburg Waste Management By-Laws. Government Printer, Pretoria.

City of Johannesburg, 2008: City of Johannesburg State of the Environment Report, Available from: http://www.joburg.org.za/index.php?option=com_content&task=view&id=3959&Itemid=114, (Accessed 1 June 2016).

City of Johannesburg, 2010: Recycling project success, Available from: http://www.joburg.org.za/index.php?option=com_content&id=5684&Itemid=340 (Accessed 17 March 2017)

City of Johannesburg, 2011: City of Johannesburg Integrated Waste Management Plan, Government Printer, Pretoria.

City of Johannesburg, 2014: Waste recycling economy gains traction in Jozi, Available from: http://www.joburg.org.za/index.php?option=com_content&view=article&id=9171 (Accessed 17 March 2017)

City of Johannesburg, 2017: Pikitup, Available from: http://joburg.org.za/index.php?option=com_content&task=view&id=725&Itemid=66 (Accessed 6 March 2017)

Collier, J. and Collier, M., 1986: *Visual anthropology: Photography as a research method*. UNM Press, University of New Mexico.

CSIR, 2011: Municipal waste management - good practices. Edition 1. CSIR, Pretoria.

de Vos, H., 2011: Residential recycling: an Industrial Engineering approach to strategic waste collection, Available from: http://repository.up.ac.za/bitstream/handle/2263/17952/DeVos_Waste(2011).pdf;sequence=1 (Accessed 1 March 2017) Unpublished paper, University of Pretoria, South Africa

Environment Protection Authority, 2015: The Waste Hierarchy, Available from: http://www.epa.nsw.gov.au/wastestrategy/waste-hierarchy.htm (Accessed 2 June 2017)

Erickson, F., 1985: Qualitative Methods in Research on Teaching, Unpublished paper, Michigan State University, Michigan.

Fakir.S., and Broomhall.L., 1999: Midrand State of the Environment Report, Midrand Green City Project, ICUN, Hatfield.

Farquhar, J.D., and Rowley, J., 2009: Convenience: a services perspective. *Marketing Theory*, 9, 425-438.

Fiehn, H., and Ball,J., 2005: Integrated Waste Management, South Africa Environment Outlook, Department of Environmental Affairs and Tourism, Government Printer, Pretoria.

Flyvberg, B., 2006: Five misunderstandings about case-study research. *Qualitative inquiry*, 12, 219-245.

Furedy, C. and Lardinios, I., 2000: Source separation of household waste materials. *Urban Waste Series*, 7, 21-31.

Gregson, N and Crang,M., 2010: Materiality and waste: inorganic vitality in a networked world. *Environment and Planning*, 42, 1026-1032.

Guba, E.G. and Lincoln, Y.S.,1994: Competing paradigms in qualitative research. *Handbook of qualitative research*. 2, 105.

Gutberlet, J., 2013: Social facets of solid waste: Insights from the global south. *Waste and Resource Management*, 16, 110-113.

Gutberlet, J., 2016: *Urban Recycling Cooperatives: Building Resilient Communities (Vol. 17)*. Routledge: United Kingdom.

Hempel C.G., 1966: *Philosophy of Natural Science. Upper Saddle River*. NJ: Prentice Hall.

Hennink, M., Hutter, I. and Bailey, A. 2011: *Qualitative research methods*. Sage: Thousand Oaks, CA.

Jirawisan, P., 2011: The roles of the community, private sector and local authority in recycling in Bangkok's gated communities. Available from: http://maids-chula.org/wp-content/uploads/2015/07/jirawisan-patra-2011-ENG.pdf (Accessed 1 March 2017)

Jones, E.M and Tansey, E.M., 2015: The Development of Waste Management In the UK C.1960-C.2000. Available from: http://www.histmodbiomed.org/sites/default/files/W56LoRes.pdf (Accessed 1 March 2017)

Koda, S., 2012: Theoretical Approach to the Collaborative Environmental Activities: Household Waste Disposal towards Environmentally Friendly Daily Life. *International Journal of Humanities and Social Science*, 2, 104-110.

Koskela, L.J., Sacks, R. and Rooke, J.A., 2012: A brief history of the concept of waste in production. Available from: iglc.net/Papers/Details/794/pdf (Accessed 9 March 2017)

Landman, K. and Schönteich, M., 2002: Urban fortresses: gated communities as a reaction to crime. *African Security Review*, 11, 71-85.

Lenkiewicz, Z., 2016: Waste and the Sustainable Development Goals. Available from: https://wasteaid.org.uk/waste-sustainable-development-goals/ (Accessed 1 June 2017)

Mack, N., Woodsong, C., MacQueen, K.M., Guest, G. and Namey, E., 2005: *Qualitative research methods: A data collector's field guide*. Family Health International: United States.

Maraqah, H., 2014: Can anyone define Epistemology/ Ontology?, Available from: https://www.researchgate.net/post/Can_anyone_define_Epistemology_Ontology , (Accessed 16 May 2016).

Marshall, M.N., 1996: Sampling for qualitative research. *Family practice*, 13, 522-526.

Martin, M., Williams, I.D. and Clark, M., 2006: Social, cultural and structural influences on household waste recycling: A case study. *Resources, conservation and recycling*, 48, 357-395.

Mason, J., 2006: Mixing methods in a qualitatively driven way. *Qualitative research*, 6, 9-25.

Mills, A.J., Durepos, G. and Wiebe, E., 2010: *Encyclopedia of Case Study Research: L-Z; Index* (Vol. 1). Sage: Thousand Oaks, CA.

Mitchell, L., 2016: Work, dirt and stigma, Available from: https://drlauramitchell.wordpress.com/2016/04/09/work-dirt-and-stigma/ (Accessed 22 March 2017)

Moore, S.A., 2012: Garbage Matters: Concepts in new geographies of waste. *Progress in Human Geography*, 36, 780-799.

Neuendorf, K. A., 2002: *The content analysis guidebook*. Sage Publications: Thousand Oaks, CA.

Oelofse, S.H.H. and Strydom, W.F., 2010: Trigger to recycling in a developing country: in the absence of command-and-control instruments. Available from: http://researchspace.csir.co.za/dspace/bitstream/10204/4702/1/Oelofse5_2010.pdf (Accessed 14 March 2017)

Omran, A., Sarsour, A.K. and Pakir, A.H.K., 2012: An Investigation Into The Factors Influencing The Participation Of Households In Recycling Of Solid Waste. *The International Journal of Health Economics-IJHE*, 2, 4-19.

Oskamp, S., Harrington, M.J., Edwards, T.C., Sherwood, D.L., Okuda, S.M. and Swanson, D.C., 1991: Factors influencing household recycling behavior. *Environment and behavior*, 23, 494-519.

Oteng-Ababio, M. 2014: Rethinking waste as a resource: Insights from a low-income community in Accra, Ghana, City. *Territory and Architecture*, 1, 1-14.

Parizeau, K., 2015: Re-representing the city: waste and public space in Buenos Aires, Argentina in the late 2000s. *Environment and Planning*, 47,284 -299.

Parizeau, K., Maclaren, V. and Chanthy, L., 2006: Waste characterization as an element of waste management planning: Lessons learned from a study in Siem Reap, Cambodia. *Resources, Conservation and Recycling*, 49, 110-128.

Patton, M.Q. and Cochran, M., 2002: *A guide to using qualitative research methodology*. Medecins Sans Frontieres.

Payne, G. and Payne, J., 2004. *Key concepts in social research*. Sage: London.

Pikitup, 2015: Separation at source, Available from: http://www.pikitup.co.za/flagship-projects-2/, (Accessed 19 May 2015)

Pikitup, 2015: Separation@source programme, Available from: http://www.pikitup.co.za/seperationsource/ (Accessed 17 March 2017)

Polkinghorne, D.E., 2005: Language and meaning: Data collection in qualitative research, *Journal of counseling psychology*, 52, 137.

Pongrácz, E. and Pohjola, V.J., 2004: Re-defining waste, the concept of ownership and the role of waste management. *Resources, conservation and Recycling*, 40, 141-153.

Ponterotto, J.G., 2005: Qualitative research in counseling psychology: A primer on research paradigms and philosophy of science. *Journal of counseling psychology*, 52,126.

Renzi, S. and Klobas, J., 2008: Using the theory of planned behavior with qualitative research. Available from: https://www.researchgate.net/publication/46448255_Using_the_Theory_of_Planned_Behavior_with_Qualitative_Research (Accessed 21 March 2017)

Ritchie, J., and Lewis, J., 2003: *Qualitative research practice: A guide for social science students and researchers*. Sage Publications, London.

Ritchie, J., Lewis, J., Nicholls, C.M. and Ormston, R., 2013: *Qualitative research practice: A guide for social science students and researchers*. Sage Publications Ltd, New York.

Rohleder, P., Bozalek, V., Carolissen, R., Leibowitz, B. and Swartz, L., 2008: Students' evaluations of the use of e-learning in a collaborative project between two South African universities. *Higher education*, 56, 95-107.

SAWIC, 2016: Approach to waste in South Africa, Available from: http://sawic.environment.gov.za/?menu=17 (Accessed 6 March 2017)

Schuermans, N., 2016. On the politics of vision and touch: Encountering fearful and fearsome bodies in Cape Town, South Africa. *Encountering the City: Urban Encounters from Accra to New York*, 97.

Scott, A., Oates, C. and Young, W., 2015: A conceptual framework of the adoption and practice of environmental actions in households. *Sustainability*, 7, 5793-5818.

Smith, M.A., Friend, D., and Johnson, H., 2017: The Science of Composting, Available from: https://web.extension.illinois.edu/homecompost/science.cfm (Accessed 2 June 2017)

South Africa, 1996: The Constitution of the Republic of South Africa (Act 108 of 1996), Statutes of the Union of South Africa, Government Printer, Pretoria.

South Africa, 1998: The National Environmental Management Act (Act 57 of 1998), Statutes of the Union of South Africa, Government Printer, Pretoria.

South Africa, 2008: The National Environmental Management: Waste Act (59 of 2008), Statutes of the Union of South Africa, Government Printer, Pretoria.

Stake, R. E., 1995: *The art of case study research*. Sage Publication: Thousand Oaks, CA.

Stake, R. E., 2005: *Qualitative Case Studies. The Sage handbook of qualitative research, 3rd ed.* Sage Publications Ltd: Thousand Oaks, CA.

Statistics South Africa, 2011: Midrand, Available from: http://www.statssa.gov.za/?page_id=4286&id=11295 (Accessed 23 February 2017)

Tonglet, M., Phillips, P.S., and Read, A.D., 2004: Using the Theory of Planned Behaviour to investigate the determinants of recycling behaviour: a case study from Brixworth, UK, Resources, *Conservation and Recycling*, 41, 191–214.

Vining, J. and Ebreo, A., 1990: What makes a recycler? A comparison of recyclers and nonrecyclers. *Environment and behavior*, 22, 55-73.

Weber, R.P., 1990: Basic content analysis. Sage: Thousand Oaks, CA.

Webster, C., 2001: Gated cities of tomorrow. *The Town Planning Review*, 1, 149-170.

Webster, F., 1975: Determining the characteristics of the socially conscious consumer. *Journal of Consumer Research*, 2,188-196.

WIEGO, 2017: Waste Pickers, Available from: http://www.wiego.org/informal-economy/occupational-groups/waste-pickers (Accessed 17 March 2017)

Wilson, D.C., 2007: Development drivers for waste management. *Waste Management & Research* 3, 198-207.

Yin, R.K., 2013. *Case study research: Design and methods*. Sage publications: Thousand Oaks, CA.

Zhang, D., Huang, G., Yin, X. and Gong, Q., 2015: Residents' waste separation behaviors at the source: Using SEM with the theory of planned behavior in Guangzhou, China. *International journal of environmental research and public health*, 12, .9475-9491.

10. APPENDICES

Appendix A – Notification letters to residents

Appendix B – Interview Protocols

Appendix C– Ethics Certificate

Appendix A – Notification letters to residents

Appendix B – Interview Protocols

Appendix C – Ethics Certificate