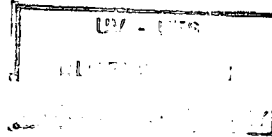


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**An Analysis of Attitudes towards Recycling: Westdene,  
Bloemfontein**

By

**Ashleigh Katherine Marchand**

2004166894

A thesis submitted to comply with terms for the degree

M.Sc. Geography

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University of the Free State

Supervisor: Ms E. Kruger

## TABLE OF CONTENTS

ILLUSTRATIONS.....	vii
ACKNOWLEDGEMENTS.....	viii
ABSTRACT .....	ix
OPSOMMING.....	x
DEFINITIONS .....	xi
CHAPTER 1: FRAMEWORK.....	1
1.2 Problem Statement .....	2
1.3 Purpose of Study.....	2
1.4 Research Questions and Objectives.....	3
1.5 Hypothesis/ Assumptions of Study.....	3
1.6 Limitations of Study .....	3
1.7 Overview of Chapters .....	4
CHAPTER 2: LITERATURE REVIEW.....	5
2.1 History of Waste .....	5
2.2 Overview of Waste.....	6
2.3 Waste Management.....	7
2.3.1 Waste Management Legislation in South Africa .....	8
2.3.1.1 Constitution of the Republic of South Africa. No 108 of 1996 .....	12
2.3.1.2 National Environmental Management Act. No 107 of 1998.....	12
2.3.1.3 National Environmental Management: Waste Act No. 59 of 2008.....	16
2.4 Waste Management Hierarchy .....	18
2.5 Overview of Recycling.....	20
2.5.1 Recycling Advantages and Disadvantages/ Obstacles .....	23

2.5.2	Recycling Internationally .....	26
2.5.3	Recycling in South Africa.....	31
2.5.4	State of Affairs at Mangaung Metropolitan Municipality .....	35
2.6	Overview of Behaviour .....	39
2.6.1	Behaviour Theories .....	40
2.6.2	Attitudes and Behaviour Towards Recycling.....	42
<b>CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY .....</b>		<b>47</b>
3.1.1	Study area .....	48
3.1.2	Questionnaires.....	48
3.1.3	Interviews.....	48
3.1.4	Methodology .....	48
3.2	Sampling Procedures .....	49
3.3	Development of Model .....	50
3.3.1	Original Placement of Model.....	51
<b>CHAPTER 4: RESEARCH FINDINGS, ANALYSIS AND DISCUSSION.....</b>		<b>52</b>
4.1	Questionnaires .....	52
4.1.1	Commercial Data Interpretation.....	53
4.1.1.1	Level 1: Present Situation .....	53
4.1.1.2	Level 2: Education .....	54
4.1.1.3	Level 3: New Strategies.....	55
4.1.1.4	Level 4: Future Situation .....	56
4.2.1	Residential Data Interpretation.....	57
4.2.1.1	Level 1: Present Situation .....	57
4.2.1.2	Level 2: Education .....	58

4.2.1.3	Level 3: New Strategies .....	59
4.2.1.4	Level 4: Future Situation .....	60
4.3	Summary of Results .....	61
4.4	Interviews .....	75
4.4.1.1	Rat Race Waste: Mr. André van Zyl (Owner).....	76
4.4.1.2	Master Recyclers: Mr. Abri Kruger (Owner) .....	77
4.4.1.3	Bergvliet High School: Mrs. Willy Webb (Chief Recycling Coordinator) ....	79
4.5	Summary of Interviews.....	80
<b>CHAPTER 5: CONCLUSIONS.....</b>		<b>81</b>
5.1	Conclusion .....	81
5.2	Recommendations .....	83
<b>REFERENCES.....</b>		<b>85</b>
<b>APPENDICES .....</b>		<b>92</b>

**APPENDICES**

**Appendix A ..... 92**

**Appendix B ..... 93**

**Appendix C ..... 96**

**Appendix D ..... 99**

**Appendix E ..... 103**

**Appendix F ..... 107**

**Appendix G ..... 108**

**Appendix H ..... 117**

## FIGURES

Figure 1: History of Pollution and Waste Policy Interventions in South Africa.....	11
Figure 2: Waste Management Hierarchy .....	19
Figure 3: The advantages and disadvantages of Source Separation versus Mixed Waste Material Recovery .....	25
Figure 4: Main Targets in European Legislation.....	27
Figure 5: Overall generation of waste per certain Member States .....	28
Figure 7: Overall Waste Generation .....	29
Figure 8: WEEE Reused and Recycled in certain EU27 Countries in 2006.....	29
Figure 9: Percentages of Municipal Waste that is landfilled in certain EU 27 Countries in 1995 and 2007 .....	30
Figure10: Recovery rates over time in South Africa for cans, glass, Polyethylene Terephthalate (PET) and plastic bags.....	31
Figure 11: Recycling Material Prices for 2011 .....	33
Figure 12: Tonnes of General Waste Generated and Recycled or Recovered in 2010 .....	35
Figure 13: The Model on Environmental Behaviour.....	41
Figure 14: Recycling Behaviour Model.....	50
Figure 15: Recycling Behaviour Model – Original Placement of Model .....	51
Figure 16: Gender Comparison Chart.....	63
Figure 17: Racial Comparison Chart.....	65
Figure 18: Age Comparison Chart .....	67
Figure 19: Education Comparison Chart .....	69
Figure 20: Residence Term Comparison Chart .....	71
Figure 21: Income Comparison Chart .....	73
Figure 22: Residence Type Comparison Chart.....	74
Figure 23: Commercial Type Comparison Chart.....	75

**TABLES**

**Table 33: Gender comparison questions..... 62**

**Table 34: Race comparison questions ..... 64**

**Table 35: Age comparison questions ..... 66**

**Table 36: Education comparison questions ..... 68**

**Table 37: Residence term comparison questions ..... 70**

**Table 38: Income comparison questions ..... 72**



## ILLUSTRATIONS

<b>Illustration 1: Glass bottles ready to be transported .....</b>	<b>22</b>
<b>Illustration 2: Compacted cans .....</b>	<b>33</b>
<b>Illustration 3: Man collecting plastic bottles .....</b>	<b>77</b>
<b>Illustration 4: Master Recyclers new conveyor and compactor .....</b>	<b>78</b>
<b>Illustration 5: Mondi collecting newspaper from Bergvliet High School .....</b>	<b>80</b>

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## ABSTRACT

South Africa, like any developing country, has a high level of waste generation and limited resources for disposal. This is where a definite problem arises - a large amount of waste is left discarded and unmanaged. Recycling plays an important role in the preservation of the environment. This may be one of the most basic fundamental building blocks of environmental protection. It may not appear to be an impressive process but if performed properly with sufficient management, recycling can be the most efficient form of aiding the environment in the long term. The government, alone, does not and should not have the sole obligation in safeguarding our country against pollution and waste management. The private and public sectors have a common responsibility towards the environment. To initiate any waste management development programme, agreements between the various sectors must be drafted. Just as important to what is mentioned above is the co-operation between all national and local authorities. Certain international countries' lack of legislation and policies concerning waste management have resulted in an independent, informal economy being created, which means that an innovative economic sector has been developed. The purpose of this study is to reveal the current and future recycling behaviour of residential and commercial recipients in Westdene, Bloemfontein. Secondly, the study aims to critically review the current integrated waste management plans and policies that exist. Thirdly, a model is developed to illustrate recycling behaviour and attitude. Results gathered from the analysis reveal that all groups and demographics have similar ideas, covering all questions and variations of questions. All recipients are generally very pro-recycling, but only if the municipality contributes by initiating the required programmes/techniques to be used and facilities. Recipients are all in agreement that more information is needed to effectively succeed in implementing recycling in Westdene, Bloemfontein.

**Keywords:** recycling, environment, waste management, residential, commercial, attitudes, behaviour, legislation, policies

## OPSOMMING

Soos enige ander ontwikkelende land genereer Suid-Afrika hoë volumes rommel en afval en beskik die land slegs oor beperkte hulpbronne om daarvan ontslae te raak. Hieruit ontstaan 'n daadwerklike probleem: groot volumes rommel en afval word weggegooi en niks word daarmee gedoen nie. Herwinning speel 'n belangrike rol in natuurbewaring en –beskerming. Dit blyk moontlik nie 'n baie indrukwekkende proses te wees nie, maar indien dit deeglik bestuur word kan herwinning een van die mees suksesvolle maniere van langtermyn natuurbewaring en –beskerming wees. Die regering kan nie, en moet nie, alleen die verantwoordelikheid dra om ons land teen besoedeling te beskerm deur middel van afvalbestuur nie. Die private en openbare sektore het beide 'n verantwoordelikheid teenoor die omgewing. Om enige afvalbestuurprogram op die been te bring moet hierdie verskillende sektore saamwerk en tot ooreenkomste kom. Sekere internasionale lande se tekort aan wetgewing en beleide aangaande afvalbestuur het die ontstaan van onafhanklike, informele ekonomieë tot gevolg gehad, wat beteken dat nuwe, innoverende ekonomiese sektore ontstaan het. Die doel van hierdie studie is om die huidige en toekomstige herwinningsgedrag van residensiële en kommersiële verbruikers in Westdene, Bloemfontein, te bepaal. Tweedens sal die studie die huidige bestuursplanne en beleide ondersoek. Derdens word 'n model ontwikkel wat herwinningsgedrag en –optrede illustreer. Resultate van die analise toon dat alle groepe en demografieë verenig is in hul uitkyk rakende alle vroeë en variasies op vroeë. Alle respondent is ten gunste van herwinning oor die algemeen, maar slegs indien die munisipaliteit hul kant bring en programme en tegnieke op die been bring en implementeer. Respondente is dit eens dat meer inligting beskikbaar gemaak moet word om van die inisiatief 'n sukses te maak.

**Kernwoorde:** herwinning, omgewing, afvalbestuur, residensiële, kommersiële, houdings, optrede, wetgewing, beleide.

## DEFINITIONS

- Demographics:** Certain characteristics of a particular range of the human population, namely age, race, or education (Jurng, 2009: 15).
- Extrinsic motivation:** Any action or behaviour performed in pursuit of a promised external resultant reward (Jurng, 2009: 15).
- Intrinsic motivation:** Any action or behaviour performed out of enjoyment rather than needing an external justification or reinforcement (Jurng, 2009: 16).
- Normative beliefs:** A person's idea of a perceived behaviour and that idea passed on by critical judgment of others (Jurng, 2009: 16).
- Recycling:** Utilising or processing certain items in such a manner as to be used again, namely paper, metal, plastic or glass (Hornby, 2005: 1219).
- Subjective norm:** Opinions of those particular people that are important to an individual (Jurng, 2009: 17).
- Sustainability:** Being able to support ourselves in a conscientious manner without jeopardizing future generations (Jurng, 2009: 17).
- Waste management:** Activities centred on the application of solid waste organisation. Activities like separation, collection, transportation, processing and storage (Jurng, 2009: 17).

## **CHAPTER 1: FRAMEWORK**

Chapter 1 addresses the framework of the study. It will begin firstly with an introduction to the study, followed by the problem statement, furthermore, the purpose of the study, in addition to the research questions and objectives, hypothesis, limitation of the study and lastly, a summary of the chapters is provided.

### **1.1 Introduction**

Recycling plays an important role in environmental preservation. This is one of the most basic fundamental building blocks of environmental protection. It may not appear to be an impressive process but if performed properly with sufficient management, recycling may be the most efficient form of aiding the environment in the long term.

Research has been done to find out why people do not recycle. The reasons that were found include: economic and cultural background, education level, motivation, attitude, demography, ease of recycling, and concern for the environment. Unfortunately, these reasons only show why people behave in a certain way and not how they can voluntarily change their behaviour (Schultz, 2002: 2).

This research focuses on waste management and recycling, and explores South African legislation which is applicable to waste management, the applicable waste management hierarchies, recycling and pollution. Included in these figures, will be national and international statistics of recycled and recyclable waste and their respective waste streams. Following the literature review, a discussion on the results obtained from the questionnaires will be done. Conclusions and recommendations will follow thereafter.

The main aim of this report is to discuss the recycling behaviour of residents in Westdene, Bloemfontein. This area is representative of Bloemfontein's diverse and complex community.

## **1.2 Problem Statement**

The human population as we know it has increased drastically and exponentially over the last thousand years, including technological advances. This incompatible combination has become increasingly detrimental to earth. This statement explains that the planet is ailing and that there is much to be done in terms of getting back on track - ecologically sound! Recycling is a great remedy to start to recoup the process slowly (Shackelford, 2006).

South Africa, like any other developing country, has a high level of waste generation and limited resources to dispose of it. This is where a definite problem arises - an infinite amount of waste is left discarded and then it may become somebody else's problem to deal with.

Taking responsibility for one's own actions is a hard pill to swallow, but if it is done without hesitation, this waste hurdle could be overcome. Imagine a world where recycling is a way of life and discarding waste is a social taboo. But by facing facts, we are still nowhere near this scenario. Recycling behaviour ranges between noticeable extremes - from nothing to "living green". What are the mechanisms driving these extremes? And what will the recommended plan of action be to overcome these extremes?

The rapid pace at which waste is being produced, contrasted to the waste that is recovered should not be glanced upon lightly (Jurng, 2009).

## **1.3 Purpose of Study**

The purpose of this study is to reveal the current and future recycling behaviour of residential and commercial respondents in Westdene, Bloemfontein. Secondly, this study aims to critically review the current integrated waste management plans and policies. Thirdly, it aims to develop a model to illustrate recycling behaviour and attitude.

#### **1.4 Research Questions and Objectives**

The following objectives have been identified:

1. Explore recycling behaviour both locally and internationally
2. To critically review the integrated waste management plan and policies of South Africa and Bloemfontein
3. To develop a model to illustrate recycling behaviour
4. To develop a profile of the residents of Westdene in terms of recycling attitudes and behaviours
5. To recommend a curbside collection system

#### **1.5 Hypothesis/ Assumptions of Study**

The assumption of this study is summarized as follows: attitudes will be centered on the demographics and current recycling behaviour of recipients. But if you include education and governmental/municipal support in the community, determined future behaviour will be positive. This study also assumes that integrated waste management plans for the Mangaung Metro Municipality are severely lacking in guidance and knowledge.

#### **1.6 Limitations of Study**

1. Limited information on South African recycling statistics is available. After contacting many recycling and packaging corporations little information was available. In some instances, statistics were only available if the researcher was prepared to pay for the information.
2. Updated maps of Bloemfontein residential and commercial sectors were hard to find.
3. Outdated email addresses and websites made communication difficult.
4. Lack of access to the relevant municipal officials.



## **1.7 Overview of Chapters**

Chapter 1 addresses the framework of the study. It will begin firstly with an introduction to the study state, followed by the problem statement, furthermore, the purpose of the study, in addition to the research questions and objectives, hypothesis, limitation of the study and lastly, a summary of the chapters is provided,.

Chapter 2 is a comprehensive discussion of the information relevant to the study, in the Literature Review. Waste management and recycling in South Africa and internationally will be conversed and will include waste management plans and policies in South Africa.

Chapter 3 identifies the Research Design of the study. Research Methods; Research Design of the Questionnaires and Interviews; Methodology and Sampling Procedures; and the Ethical Considerations will be listed in this chapter.

Chapters 4 reviews the Analysis and Discussion of the Research Findings from the questions and interviews. These findings will test the Hypothesis.

Chapter 5 discusses the Conclusion and suggests any Recommendations for further research.

## CHAPTER 2: LITERATURE REVIEW

Chapter 2 is a comprehensive discussion of the information relevant to the study.

### 2.1 History of Waste

Waste, the accumulation and management thereof has always been a factor to be dealt with since the early establishment of communities and the development of trade and industry (Strange, 2011: 1).

Barbalace (2003: Online) indicates that events in history, in terms of waste, have been a problem from ancient times. In 500 BC, the first municipal waste dump of the western world in Athens, Greece, required waste to be discarded at least a mile from the city (Barbalace, 2003: Online ; Jurng, 2009: 18). In 1388, the English Parliament put a stop to waste disposal in rivers and canals (Barbalace, 2003: Online). From the beginning of the 19<sup>th</sup> century, the 'age of sanitation' was well underway (Jurng, 2009: 19). In the USA, on Governor's Island in New York, in 1885, the first waste incinerator was built and in 1898 the first municipal solid waste sorting plant was established (Barbalace, 2003: Online; Jurng, 2009: 19). By 1911, New York City citizens were producing 2.1 kg of waste per day, causing the municipality to branch out to the use landfills by the 1920s as a popular alternative to getting rid of Municipal Solid Waste (MSW). In 1954, in Olympia, Washington, compensation for returns on aluminium cans was done. In 1965, USA passed the first solid waste management laws (Barbalace, 2003: Online).

Legislation on waste management has been promulgated in developing and developed countries since the 1950s (Strange, 2011: 1).

## 2.2 Overview of Waste

Waste as described by the Department of Environmental Affairs and Tourism (DEAT) in the National Environmental Management: Waste Act, No. 59 of 2008, published in the Government Gazette (South Africa. Government Gazette, 2009: 16) is defined as:

“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 purpose 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 mining, medical or other sectors, but –
  - (i) a by-product is not considered waste; and
  - (ii) Any portion of waste, once re-used, recycled and recovered, ceases to be waste.”

Waste is separated into two different categories based on the risk it poses - the categories being general and hazardous waste, (South Africa. DEA, 2005: Online).

Domestic waste as described by DEAT, through the implementation of the National Domestic Waste Collection Standards (South Africa. DEA, 2010a: i), means:

“Waste, excluding hazardous waste, that emanates from premises that are wholly or mainly for residential, educational, health care, sport or recreational purposes. Domestic waste can be classified into recyclable and reusable, compostable and also non-recyclable or non-usable waste. Domestic waste for the purpose of the standards does not include commercial and industrial waste, building rubble and ‘hard’ or non-compostable garden waste”.

Commercial or business waste is mainly packaging materials, for example: glass, paper, plastic, and cans; with a little food waste coming from restaurants and hotels (South Africa. DEA, 2010b: Online).

### **2.3 Waste Management**

According to the Department of Environmental Affairs and Tourism and the Department of Water Affairs and Forestry (Government Gazette, 2000: 5) the government alone does not and should not have the sole obligation for the safeguarding of our country in terms of pollution and waste management. The private and public sectors together have the responsibility to uphold the environment. To begin any waste management development, agreements between the various sectors must be formed. As important to this statement is the co-operation between all national and local authorities.

Individual citizens of South Africa have an obligation to the environment in terms of waste management. This statement may sound idealistic but this is where most of the responsibility should be aimed.

On a wider scale, co-operation between national and international authorities is of great importance too. These important collaborations mean the development of many cross-border agreements, i.e. Agenda 21.

Godfrey (2005: 1) explains that in South Africa there has been a change in the way waste is managed and that the established 'end-of-pipe' solution is no longer sufficient. We should focus on reducing, reusing and recycling of waste, rather than the use of storage, collection and disposal mechanisms. These ideas are also commented on by Darby and Obara (2005: 19), in context of the European Union, and the Department of Environmental Affairs and Tourism and the Department of Water Affairs and Forestry (Government Gazette, 2000: 5) in terms of Integrated Pollution and Waste Management for South Africa, to prevent waste and drastically decrease environmental degradation.

DEAT explains, through the White Paper on Integrated Pollution and Waste Management (South Africa. Government Gazette, 2000: 10), that:

“Integrated pollution and waste management is a holistic and integrated system and process of management, aimed at pollution prevention and minimisation at source, managing the impact of pollution and waste on the receiving environment and remediating damaged environments”.

Subheadings included under the main heading of waste management are: steps taken to avoid pollution or to keep as minimal as possible; to minimise the percentage of waste produced and to also decrease the possible health threats to people and the environment as a whole (Government Gazette, 2007: 15).

Waste management in South Africa is based on the following pieces of legislation as discussed by the Department of Environmental Affairs and Tourism on the South African Waste Information System (SAWIS) website developed in 2005:

1. White Paper on Integrated Pollution and Waste Management (IP&WM) - 1999
2. National Waste Management Strategy (NWMS) – 2000
3. National Environmental Management: Waste Act (No. 59 of 2008) – 2008

### **2.3.1 Waste Management Legislation in South Africa**

As there are uncertainties over escalating economic costs, changing trends have sparked the formation of laws, policies and initiatives intended at reducing waste and increasing the quantity of recycling (Sidique, 2008: 1).

There are errors in implementation and management of waste management policies in municipal departments, as every municipality has its own by-laws complementing or supporting certain pieces of legislation. The waste management policies and legislation are mainly run through local municipalities rather than nationally, even though they might have originated from there (Godfrey, 2005: 6).

Godfrey (2005: 6) continues this statement by discussing that culture and support are key factors in promoting recycling and outlining waste management principles in South Africa. This, he states, is the job of the Department of Environmental Affairs and Tourism (Godfrey, 2005: 6).

Godfrey (2005:5) mentions the principle waste management laws enforced in South Africa are:

1. Constitution of the Republic of South Africa (Act 108 of 1996);
2. Environment Conservation Act (Act 73 of 1989) (repealed in 1998, amended in 2003);
3. National Environmental Management Act (Act 107 of 1998);
4. Health Act (Act 63 of 1977);
5. National Water Act (Act 36 of 1998);
6. Local Government: Municipal Structures Act (Act 117 of 1998);
7. Local Government: Municipal Systems Act (Act 32 of 2000);
8. Occupational Health and Safety Act (Act 85 of 1993);
9. Hazardous Substances Act (Act 15 of 1973);
10. National Road Traffic Act (Act 93 of 1996);

Included in this section of principle waste management laws more recently enforced in South Africa are:

1. National Environmental Management: Waste Act (No. 59 of 2008);
2. National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008);
3. Including a number of Bills, White Papers, Reports, Declarations and Documents.

The environmental and waste policies and legislation is an elaborate web of information, all linked together in one way or another. It may be overwhelming to understand the origins of some of the policies. Figure 1 shows the history of pollution and waste policy interventions in South Africa from 1989 to 2009.

The National Waste Management Strategy proposes a Waste Management Act centered on the Waste Management Hierarchy (Godfrey, 2005: 6). In 2001 the Polokwane Declaration was formed at The National Waste Summit conference, committing South Africa to a 50% reduction of landfill waste by 2012 and then on to 0% waste by 2022 (Godfrey, 2005: 6). Their vision in this declaration is to implement a waste management system, contributing to sustainable development and a definite improvement of the quality of life. This will be made possible by using eco friendly energy and the complete commitment of South Africans to reduce waste (DEAT, 2001: Online).

Taking into account the previous statement there should be a desire to administer an efficient and up-to-date database to ensure whoever may need the informative statistics and management systems of South Africa. This originates from the White Paper on Integrated Pollution and Waste Management, in a goal to maintain efficient integrated pollution and waste management (DEAT, 2006: 4).

The following sections discuss waste management in South Africa in relation to relevant legislation, highlighting key sections in each Act.

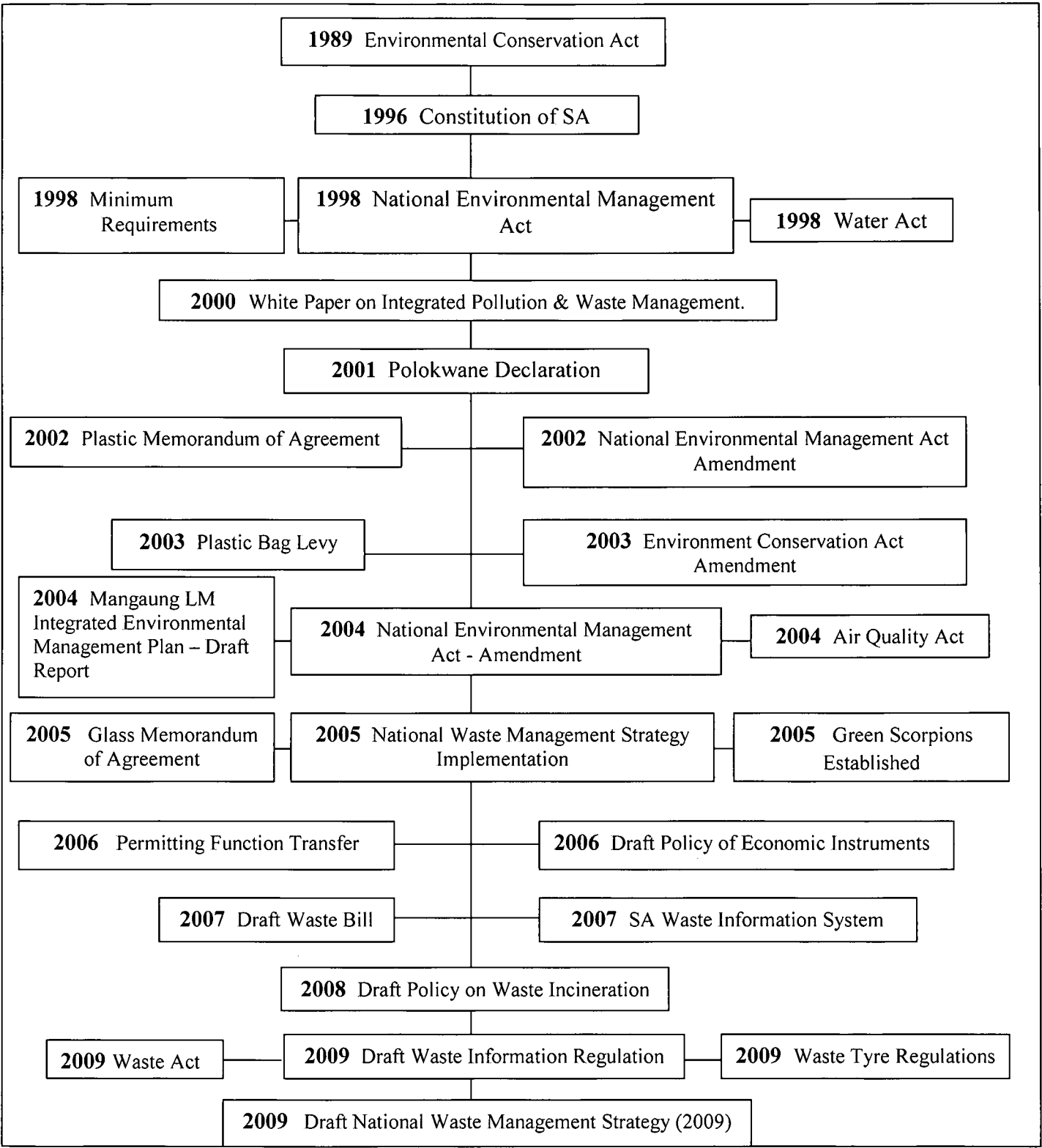


Figure 1: History of Pollution and Waste Policy Interventions in South Africa (1989 – 2009) (Oelofse & Strydom, 2010a: 2)



### 2.3.1.1 Constitution of the Republic of South Africa. No 108 of 1996

Firstly, the Constitution of the Republic of South Africa, No. 108 of 1996, Section 24 (South Africa. Constitution of the Republic of South Africa, 1996: 1251) states that:

“Everyone has the right –

- (a) to an environment that is not harmful to their health or well-being; and
- (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
  - (i) prevent pollution and ecological degradation;
  - (ii) promote conservation; and
  - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.

### 2.3.1.2 National Environmental Management Act. No 107 of 1998

Secondly, the National Environmental Management Act (NEMA), No. 107 of 1998, printed in the Government Gazette, Vol.401 No.19519 (South Africa. Government Gazette, 1998: 2), states that its main purpose is:

“To provide for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state, and to provide for matters connected therewith”.

The Constitution of the Republic of South Africa, No. 108 of 1996, is the backbone and originator of the rights of the environment and the people in it, stated in the National Environment Management Act, No. 107 of 1998 (South Africa. Government Gazette, 1998: 2).

There are a number of sections in NEMA, No, 107 of 1998, that are to be highlighted as core statements, allowing for the development of ideas in this act.

1. Chapter 1, Section 2.2 (South Africa. Government Gazette, 1998: 10) states that:

2. (2) "Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, development, cultural and social equitability".

2. Chapter 1, Section 2.4(a) (ii, iv, viii) (South Africa. Government Gazette, 1998: 10) states that:

2. (4) (a) Sustainable development requires the consideration of all relevant factors including the following:

- (ii) "that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimized and remedied;
- (iv) that waste is avoided or where it cannot be altogether avoided, minimized and reused or recycled where possible and otherwise disposed of in a responsible manner; and
- (vii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied".

3. Chapter 1, Section 2.4(b),(o) and (p) (South Africa. Government Gazette, 1998: 12) states that:

2. (4) (b) "Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option".

- (o) "The environment is held in the public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage".
- (p) "The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment"

4. Chapter 7, Section 28.1; 28.2(a, b); 28.3; 28.8(a, b) (South Africa. Government Gazette, 1998: 40) states that:

28. (1) "Every person who causes, has caused or may cause any significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorized by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment".

(2) "Without limiting the generality of the duty of subsection (1), the persons on whom subsection (1) imposes an obligation to take reasonable measures, include owner of land or premises, a person in control of land or premises or a person who has right to use the land or premises on which or in which –

- (a) any activity or process is or was performed or undertaken; or
- (b) any other situation exists,

which causes, has caused or is likely to cause significant pollution or degradation of the environment".

(3) "The measure required in terms of subsection (1) may include measures to-

- (b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;
- (c) cease, modify or control any act, activity or process causing pollution or degradation;
- (d) contain or prevent the movement of pollutants or the causant of degradation;
- (e) eliminate any source of the pollution or degradation; or
- (f) remedy the effects of the pollution or degradation".

(8) "Subject to subsection (9), the Director-General or provincial head of department may recover all costs incurred as a result of it acting under subsection (7) from any or all of the following persons –

- (a) any person who is or was responsible for, or who directly or indirectly contributed to, the pollution or degradation or the potential pollution or degradation;
  - (b) the owner of the land at the time when pollution or degradation or the potential for pollution or degradation occurred, or that owner's successor in title;
- provided that such person failed to take the measures required of him or her under subsection (1)".

5. Chapter 7, Section 31.1(a) (South Africa. Government Gazette, 1998: 48) states that:

31. (1) "Access to information held by the State is governed by the statute contemplated under section 32(2) of the Constitution: Provided that pending the promulgation of such statute, the following provisions shall apply:

- (a) every person is entitled to have access to information held by the State and organs of state which relates to the implementation of this Act and any other law affecting the environment, and to the state of the environment and actual and future threats to the environment, including any emissions to water, air or soil and the production, handling, transportation, treatment, storage and disposal of hazardous waste and substances".

The Government Gazette No.R.386, printed on 21 April 2006, lists the activities in the Schedule, applicable to Sections 24 and 24D of the National Environmental Management Act, No.107 of 1998, (South Africa. Government Gazette, 2006: 134-145). The applicable section in the Schedule is as follows:

"Activities identified in terms of Section 24(2) (a) and (d) of the Act, which may not commence without environmental authorization from the competent authority and in respect of which the investigation, assessment and communication of potential impact of activities must follow the procedure as described in Regulations 22 to 26 of the Environmental Impact Assessment Regulations, 2006, promulgated in terms of Section 24(5) of the Act".

1. "The construction of facilities or infrastructure, including associated structures or infrastructure, for –
  - (o) the recycling, reuse, handling, temporary storage or treatment of general waste with a throughput capacity of 20 cubic meters or more daily average measured over a period of 30 days, but less than 50 tonnes daily average measured over a period of 30 days.
  
23. The decommissioning of existing facilities or infrastructure, other than facilities or infrastructure that commenced under an environmental authorization issued in terms of the Environmental Impact Assessment Regulations, 2006 made under Section 24(5) of the Act and published in the Government Notice No.R.385 of 2006, for –
  - (d) the disposal of waste;
  - (f) the recycling, handling, temporary storage or treatment of general waste with a daily throughput capacity of 20 cubic meters or more".

This, Notice 386 in Government Gazette 28938, was later repealed and replaced with Notice 544 in Government Gazette 33306 on 18 June 2010 (South Africa. Government Gazette, 2010a: 80).

### **2.3.1.3 National Environmental Management: Waste Act No. 59 of 2008**

The National Environmental Management: Waste Act, No. 59 of 2008, is one of the most important pieces of legislation for this research. As this Act is fairly new, the enactment thereof has had little impact on or has given meaning to the greater community. This piece of legislation has a long way to go before it can reach its full potential. Yes, this legislation is down on paper but will there be enough enthusiasm, knowledge and resources to enforce it? Information like this has been greatly anticipated but is South Africa ready for the commitment? It is all very well for South Africa needing to impress its international counterparts but is there the right level of economic growth, development and sustainability to do it any justice? This is a big step to be made, maybe too big, albeit in the right direction. There may be something lacking with the level of commitment and feeling of responsibility from government and South Africa's people.

The National Environmental Management: Waste Act, No. 59 of 2008, should be read in conjunction with Section 2 in the National Environmental Management Act, No.107 of 1998 (South Africa. Government Gazette, 2009: 20). The National Environmental Management: Waste Act, No.59 of 2008, as published in the Government Gazette (Vol.525, No.32000) on 10 March 2009 (South Africa. Government Gazette, 2009: 2) is:

“To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards regulating the management of waste by all spheres of government, to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith”.

1. Part 3, Section 17(1) and (2), (South Africa. Government Gazette, 2009: 32) states, on the subject of, Reduction, re-use, recycling and recovery of waste, that:

17. (1) “Unless otherwise provided for in this Act, any person who undertakes an activity involving the reduction, re-use, recycling or recovery of waste must, before undertaking that activity, ensure that the reduction, recycling or recovery of the waste –

- (a) uses less natural resources than disposal of such waste; and
- (b) to the extent that it is possible, less harmful to the environment than the disposal of such waste.

(2) The Minister may, after consultation with the Minister of Trade and Industry and by notice in the Gazette, require any person or category of persons to-

- (a) provide for the reduction, re-use, recycling and recovery of products or components of a product manufactured or imported by that person; or
- (b) include a determined percentage of recycled material in a product that is produced, imported or manufactured by that person or category of persons”.

Godfrey (2005: 1) discusses the elements of an integrated waste management system as being waste avoidance, waste generation, source separation for materials recovery (recycling), temporary on-site storage, collection, transport, transfer, materials recovery (recycling), treatment/ processing and disposal.

To decide on which waste management option to use, a waste management hierarchy was formalized to better equip policy makers on the alternatives of waste management.

## **2.4 Waste Management Hierarchy**

The Waste Management Hierarchy is widely used by those working in governments, education, industry and environmentalists as a guiding tool for waste management legislation and programs. From the most favoured option to the least favoured option accordingly (Figure 2): Prevention, minimisation, reuse, recycling, energy recovery and disposal (Li, 2010: 20; Strange, 2011: 4).

South African environmental legislation first utilized the waste management hierarchy in 1998 (Oelofse & Strydom, 2010a: 1).

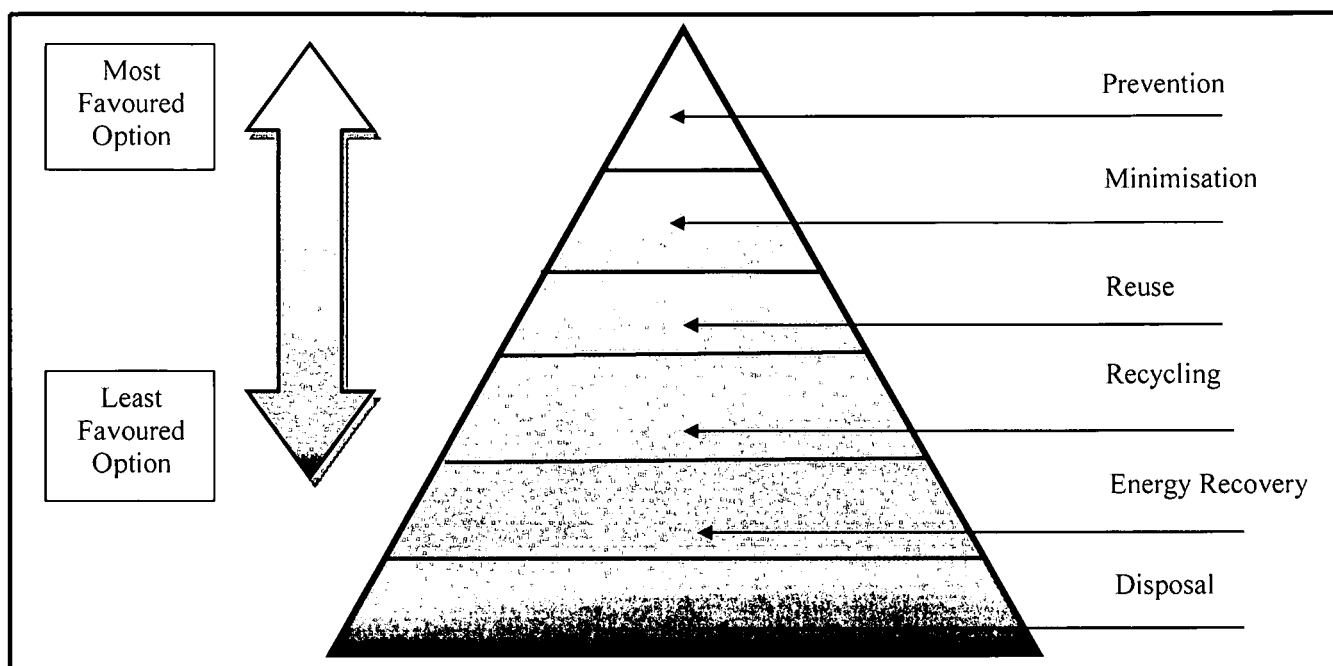


Figure 2: Waste Management Hierarchy (Strange, 2011: 4; Nahman, 2009: 4; Li, 2010: 20)

This Waste Management Hierarchy is typically applicable to South Africa at this present moment, even though South Africa's ideal Waste Management Hierarchy would be positioned or leveled differently (Nahman, 2009: 4).

Arranging the order of partiality is important, lowering the disposal and increasing the proportion of waste reduction, reuse and recycling (Li, 2010: 20). Even though the first option for disposal is the landfill option, as it is mostly inexpensive and is therefore the most appealing and favoured option for solid waste management in South Africa. For South Africa and its citizens, it places a heavy burden to lighten and to ensure the environment's sustainability (Nahman, 2009: 4).

From the beginning, the end-of-life action was utilized mostly in waste management (Battikhi, 2009: 2).



Ideas featured around waste management, mentioned earlier, suggests two possible cycles to think about. Currently, the *cradle-to-grave cycle* is the most utilized, perhaps because it may be the easier of the two cycles to use. This cycle explains that waste is recycled into inferior grade items and then ends up being disposed of in landfills. On the other hand, the *cradle-to-cradle cycle* suggests the reusing of certain products which are still good quality materials, to make similar products, rather than the production of totally new products and then ultimately producing more pollution (Li, 2010: 22).

## 2.5 Overview of Recycling

Guidelines on the recycling of solid waste is mentioned by Godfrey (2005: 3), who states that the recycling process is often acknowledged too broadly, from primary processes through to secondary processes. Waste minimisation processes may take different forms, such as composting, waste exchange through two or more countries and reuse or repair of objects.

Strange (2011: 33) explains that it is greatly understood that waste management practices continue to lean towards landfills rather than other waste management alternatives that are consequently, unsustainable.

The term 'recycle' is described by the Department of Environmental Affairs and Tourism in the National Environmental Management: Waste Act, No. 59 of 2008, published in the Government Gazette (Government Gazette, 2009: 16) as:

“a process where waste is reclaimed for further use, which process involves the separation of waste from the waste stream for further use and the processing of the separated material as a product or raw material”.

Godfrey (2005: 4) states that recycling at its highest level of application will be the direct result of sustainable adoption processes. This will in turn boost numerous prospects in all working sectors.

There are a number of items that can be recycled. These items are divided into two categories, namely common and unusual items. The common items are paper, cardboard, cans, scrap metal plastic, glass (Illustration 1: 22), tyres and oil. The unusual items are motor vehicles, electronic products, batteries and construction and demolition waste (Godfrey, 2005: 4).

There are four possible levels of waste separation (South Africa. DEAT, 2000: 54), before we look at the main waste streams:

1. Two-stream sort – Recyclable materials are separated from general refuse;
2. Three-stream sort – Recyclable fibre like paper and cardboard, glass, metal and plastic, and general refuse;
3. Four-stream sort – Recyclable fibre like paper and cardboard, glass, metal and plastic, organic waste, and general refuse;
4. Multi-stream sort – comprehensive separation of the recyclables.

The waste streams, as categorized by the National Waste Management Strategy Implementation are identified and discussed as possible priority waste streams (South Africa. DEAT, 2005a: 16). They are as follows:

1. Plastics
2. Garden Waste - makes a high proportion of waste disposed in landfills.
3. Building Rubble
4. Batteries
5. Composting of Organic Waste – garden waste makes up to 10% of waste going to landfills, which could potentially be used as compost.

6. Tyres – this is an enormous problem
7. Hazardous Waste
8. E-waste
9. Sawdust and Wood Shavings – this is a problem waste as it does not compost well.
10. Waste Oil – waste oil is being dumped in landfills.
11. Ash
12. Office Paper
13. Glass Recovery – in small towns this is not economically viable as the costs around transportation are high.



Illustration 1: Glass bottles ready to be transported, (Van Zyl, 2011: personal communication)

Single-stream recycling as discussed by Pierce County Department of Public Works and Utilities (Pierce County Department of Public Works and Utilities: 2004: 5) states that it is recyclables mixed into a single bin. This trend replaces the three bin system, throughout the whole country, making the recycling process easier, reducing workforce costs and increasing the percentage of recyclable materials and; increasing diversion rates from 10% to 40% for recyclable material.

There are a few factors that inhibit the efficiency of recycling and waste management. These are factors such as market failure, institutional failure and governmental collapse (Strange, 2011: 33).

DEAT (2005c: 22) states that, as a result of enhanced industrialization, population growth and in a consistent next step, the waste has amplified. Therefore, in order to manage waste, it must be done in an efficient way.

These industrialization processes, including forced social and ethical ideals have caused business activities to become more exclusive and restricted and further more have paved the way for the social responsibility of mega-corporations to become substandard and mediocre. This is in an overall outrageous effort to keep up development efficiency and, along with this, being promoted by policy and legislation alteration (Darby and Obara, 2005: 19).

### **2.5.1 Recycling Advantages and Disadvantages/ Obstacles**

Recycling advantages as stated by Godfrey (2005: 4) and the National Recycling Forum (2010: Online):

1. Lessens the waste stream on its way to landfills, therefore conserving space;
2. Creates jobs;
3. Helps to alleviate pollution and preserves natural resources;
4. Saves energy and lessens manufacturing costs;
5. Reduces litter;

6. Decreases informal salvaging from landfills.

Recycling disadvantage as stated by, El-Guebaly, *et al* (2004: 516) are:

1. Technology is becoming more complex and costly;
2. More time consuming working procedures;
3. Expensive equipment is needed to conserve material costs.

Including external costs associated with higher levels in the Waste Management Hierarchy (Nahman, 2009: 4).

Obstacles that municipalities, throughout all provinces, have experienced concerning recycling are as follows (South Africa. DEAT, 2005a: 12):

1. Limited or lack of markets;
2. Prices for recyclables;
3. Lack of competition;
4. Limited capacity at Local Authorities;
5. Litter;
6. Cable theft;
7. Unsustainable recycling projects;
8. Inappropriate use of waste levies;
9. Co-ordination of recycling initiatives;
10. High transportation costs;
11. Contamination;
12. Access to funding.

Included in this section is De Young's (1990: 256) explanation of the barriers to recycling, experienced by his interviewees as:

1. Not enough information;
2. Not enough room to store the items being recycled;
3. Recycling being too much of a hassle.

The advantages and disadvantages of Source Separation versus Mixed Waste Material Recovery as listed by DEAT (South Africa. DEAT, 2000: 53) are as follows in Figure 3.

	<b>Source Separation</b>	<b>Material Recovery of Mixed Waste</b>
<b>Advantages</b>	<ol style="list-style-type: none"> <li>1. Cleaner Recyclables with higher market demand;</li> <li>2. Generators bear cost and responsibility for partial separation;</li> <li>3. Higher recovery rates than mixed waste separation;</li> <li>4. Lower cost, drop-off facilities can be used.</li> </ol>	<ol style="list-style-type: none"> <li>1. Requires no change in generators habit;</li> <li>2. No need for education of generators;</li> <li>3. No change in collection system;</li> <li>4. Appropriate for multi-family homes or units with high turnover and/or lack of environmental ethic.</li> </ol>
<b>Disadvantages</b>	<ol style="list-style-type: none"> <li>1. Separate collection system or compartmentalized trucks required for kerb-side collection;</li> <li>2. Requires education of generators;</li> <li>3. Added cost of recyclables containers;</li> <li>4. Potential for theft of bins and materials.</li> </ol>	<ol style="list-style-type: none"> <li>1. Contamination of recyclables resulting in lower market demand or unmarketable materials;</li> <li>2. Requires 'dirty' materials recovery facility;</li> <li>3. Lower recovery rate than source separation unless system included production of compost or refuse derived fuels.</li> </ol>

Figure 3: The advantages and disadvantages of Source Separation versus Mixed Waste Material Recovery, (South Africa. DEAT, 2000: 53)

## 2.5.2 Recycling Internationally

The Thematic Strategy on the Prevention and Recycling of Waste was implemented in 2005, forming part of the 6<sup>th</sup> Environmental Action Plan by the European Commission, by the European Union, in Brussels, and reviewed in 2010 (European Commission, 2010: 5). The European Union (EU) is an economic and political partnership that exists between 27 European countries.

Main targets formulated in the existing European legislation in terms of packaging waste include; waste electrical and electronic equipment (WEEE); batteries and accumulators; paper, metal, plastic and glass waste from households, other household waste and similar waste, biodegradable municipal waste; and tyres. The targets are as follows in Figure 4 (European Commission, 2010: 15), under the headings of Collection Targets, Recovery Targets and Recycling Targets.

	Year	Collection Targets	Recovery Targets	Recycling Targets
<b>WEEE</b>	2006	Min 4kg per person per year	70-80% depending on category of WEEE	50-80% including reuse, depending on category of WEEE
	2016	65% of what is set on the market or 85% of waste arising		
<b>Packaging Waste</b>	2008		60%	55% of which 50% metal, 60% glass, paper/cardboard, 22.5% plastics, 15% wood.
<b>Batteries and Accumulators</b>	2009			100% of batteries collected.
	2011			65% lead-acid batteries, 75% nickel-cadmium, 50%

				other.
	2012	25%		
	2016	45%		
<b>Paper, Metal, Plastic and Glass waste from household waste and similar waste</b>	2015	Separate collection for at least, paper, metal, glass and plastic.		
	2020			50%
<b>Biodegradable Municipal Waste</b>	2006 or 2010	Reduction to 75% of 1995 landfill levels	Reduction to 75% of 1995 landfill levels	Reduction to 75% of 1995 landfill levels
	2009 or 2013	Reduction to 75% of 1995 landfill levels	Reduction to 75% of 1995 landfill levels	Reduction to 75% of 1995 landfill levels
	2016 or 2020	Reduction to 75% of 1995 landfill levels	Reduction to 75% of 1995 landfill levels	Reduction to 75% of 1995 landfill levels
<b>Tyres</b>	2006		Zero landfill	Zero landfill

Figure 4: Main Targets in European Legislation, (European Commission, 2010: 15)

The overall waste generation of selected member states being Belgium, Denmark, France, Germany, Netherlands, Sweden and United Kingdom are as follows in Figure 5 (European Commission, 2010: 21).



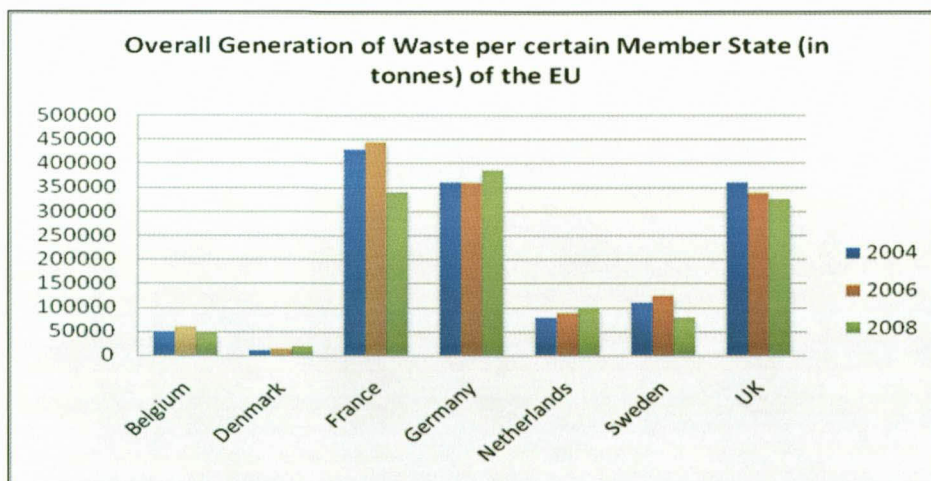


Figure 5: Overall generation of waste per certain Member States (in tonnes) of the EU (European Commission, 2010: 21)

The composition of the waste stream collectively from the EU-27 in 2006 is as follows in Figure 6 (European Commission, 2010: 21).

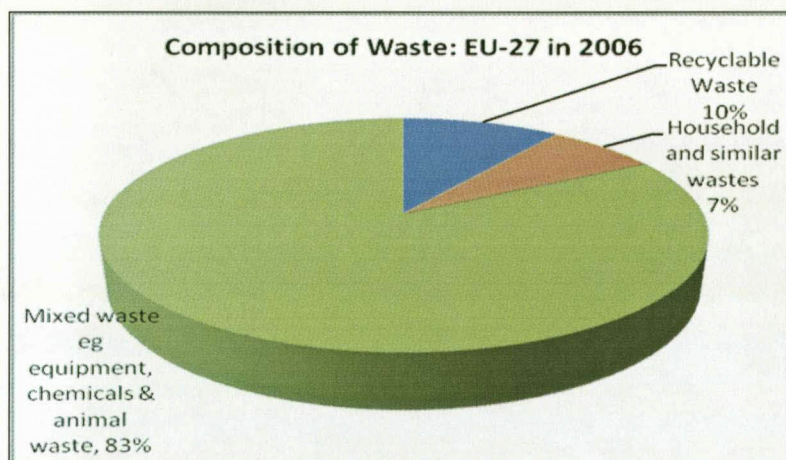


Figure 6: Composition of Waste from the EU-27 in 2006 (European Commission, 2010: 21)

In Figure 7 the overall waste generation produced from 2004 to 2008 by EU-27, EU-15 and EU-12 are shown (European Commission, 2010: 20), “EU-15 statistics increased 4% from 2004 to 2006 but decreased beyond the 2004 level in 2008. EU-12 decreased 4% from 2004 to 2006. EU-27 estimates rose only 1% from 2004 to 2006 but also fell far behind the estimates of 2004”.

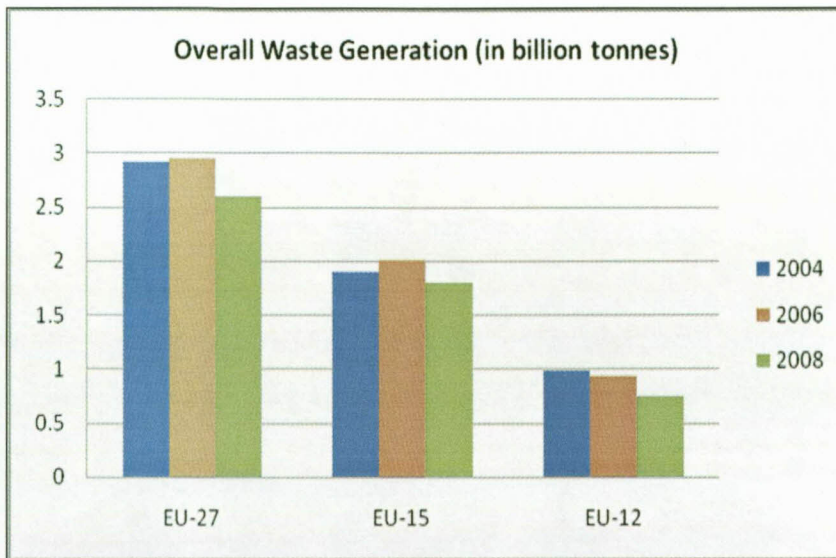


Figure 7: Overall Waste Generation (in billion tonnes) (European Commission, 2010: 20)

In Figure 8, the average collection rate, by 2006, of Electric and Electronic Waste (WEEE), was 23%, by weight of amounts placed on the market. Where WEEE is collected separately, it is broadly recycled, the average rate being 79%. Private households have a collection target of 4kg per capita per year (European Commission, 2010: 35).

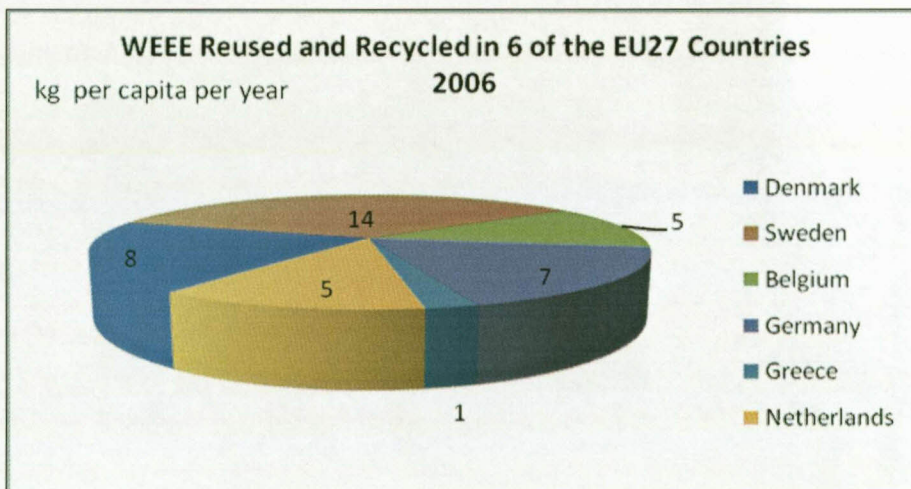


Figure 8: WEEE Reused and Recycled in certain EU27 Countries in 2006 (European Commission, 2010: 36)

Figure 9 illustrates the reduction of the amount of municipal waste disposal in landfills between 1995 and 2007 of EU-27 countries (European Commission, 2010: 41). There are remarkable percentage changes that occur in the majority of the chosen countries. In essence, any decrease in municipal waste that uses the landfill method, is a step in the right direction.

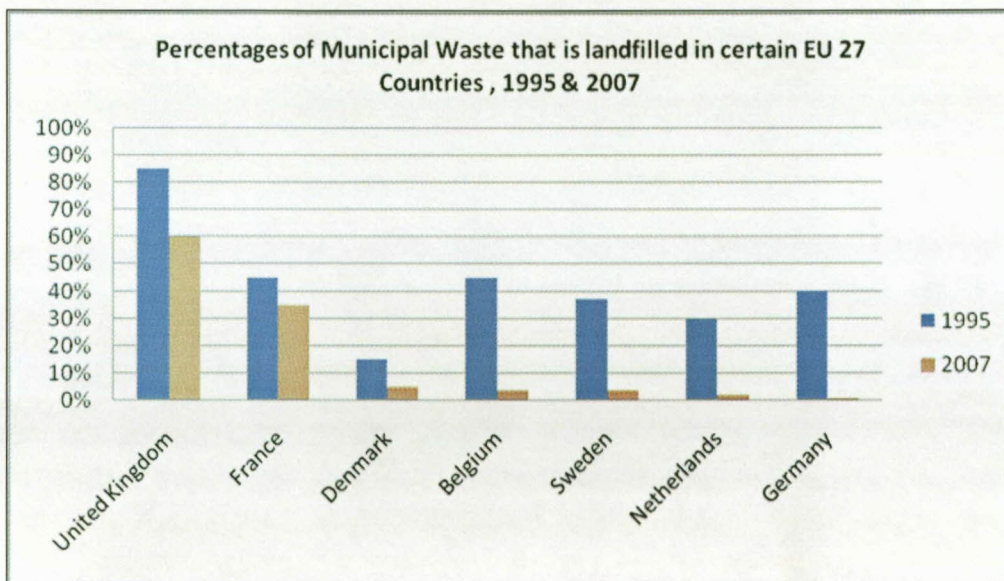


Figure 9: Percentages of Municipal Waste that is landfilled in certain EU 27 Countries in 1995 and 2007 (European Commission, 2010: 41)

European financial support has caused somewhat of a difficulty within the recycling industry and it has been noted that other countries have been left to clean up the mess of waste, this in turn creates problems for the recycling industry in that country (DEAT, 2000: 52).

Certain countries' lack of legislation and policies concerning waste management causes an independent, informal economy to be created. This results in the development of an innovative economic sector. This is the case in China and India, where large amounts of e-waste being generated. This waste, also known as electrical and electronic waste (WEEE), is 8% of the total municipal solid waste and is fast becoming the highest emergent waste stream (Boni *et al.*, 2005: 438).

### 2.5.3 Recycling in South Africa

Recovery and reprocessing statistics revealed that a 23.7% average growth rate over the past couple of years (Oelofse & Strydom, 2010a: 1).

Figure 10 shows that even though mandatory regulations are enforced, they do not seem to be efficient in the waste recovery process (Nahman, 2010: 161).

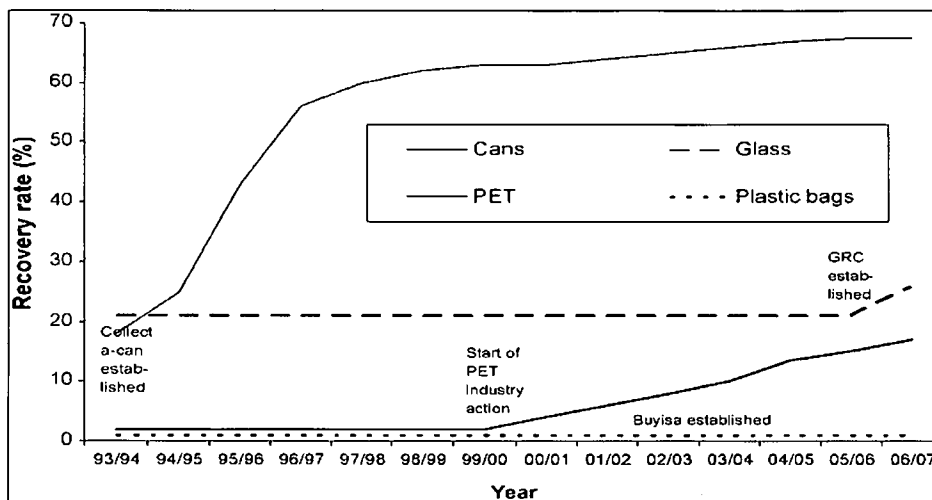


Figure 10: Recovery rates over time in South Africa for cans, glass, Polyethylene Terephthalate (PET) and plastic bags (Nahman, 2010: 161)

Keeping this in mind, historically, 50% of South African communities, most importantly, those in the townships, rural areas and informal settlements, did not have access to waste collection systems (DEAT, 1999: 3). This is reinforced by the DEAT and Management Strategy Implementation in South Africa's statement mentioned earlier in this study (cf. page 39).

On a more positive note, it was stated by Anonymous (2011: Personal Communication) that the previously mentioned statement is no longer true. In the last couple of years waste collection systems have commenced, fetching the waste on a certain day from a collection point on every street in the townships, rural areas and informal settlements around Botshabelo, near Bloemfontein.

There may not have been expansive legislation on waste management in the late 20<sup>th</sup> century but there is still a constant amount of recycling being done in South Africa that has not been formally recognised as these sectors are controlled by demographic and socio-economic factors. Complementing the above statement, the lower income bracket is more likely to need financial incentives, while the middle and upper financial income brackets have purely environmental concerns at heart, motivating their respective recycling behaviours (DEAT, 2000: 51).

Contradictory to the previous statement, waste management legislation has increased greatly, since then.

In the Polokwane Declaration of 2001, South Africa committed itself to the following targets: a 50% reduction of landfill waste by 2012 and then on a 0% waste by 2022 (Godfrey, 2005: 6).

A number of private sector organizations in South Africa are very active in recycling initiatives, for example Mondi, Sappi, the Glass Recycling Association, Collect-a-Can, the Plastics Federation of South Africa, the Packaging Council of South Africa, the Tyre Recycling Association and the National Recycling Forum (DEAT, 2000: 12).

According to the South African Plastic Recycling Organisation (SAPRO), “job creation and economic growth in South Africa has been spurred on by an increase in recycling,” (South African Press Association, 2011: Online).

This statement supports the previously mentioned report from DEAT (DEAT, 2000: 51), where this level of readiness to partake are important to be recognised and coincide with various motivations, whatever they may be.

News24 printed an article which states if the consumers were to recycle instead of just dumping solid waste in landfills, just one ton of waste would add R1095 to salaries and it would also create R 4905 in goods and services, and furthermore produce over R1 million in trade. It also reveals that there was a massive increase of 32% in plastic recycled from 2006 to 2009 (South African Press Association, 2011: Online).

Recycling material prices are displayed, in Figure 11, by Stone (2011: 5). The recycling material prices are for newspaper, cardboard, office paper, cans (Illustration 2: 33) and plastic. These prices may fluctuate but were accurate to the time of printing the article.

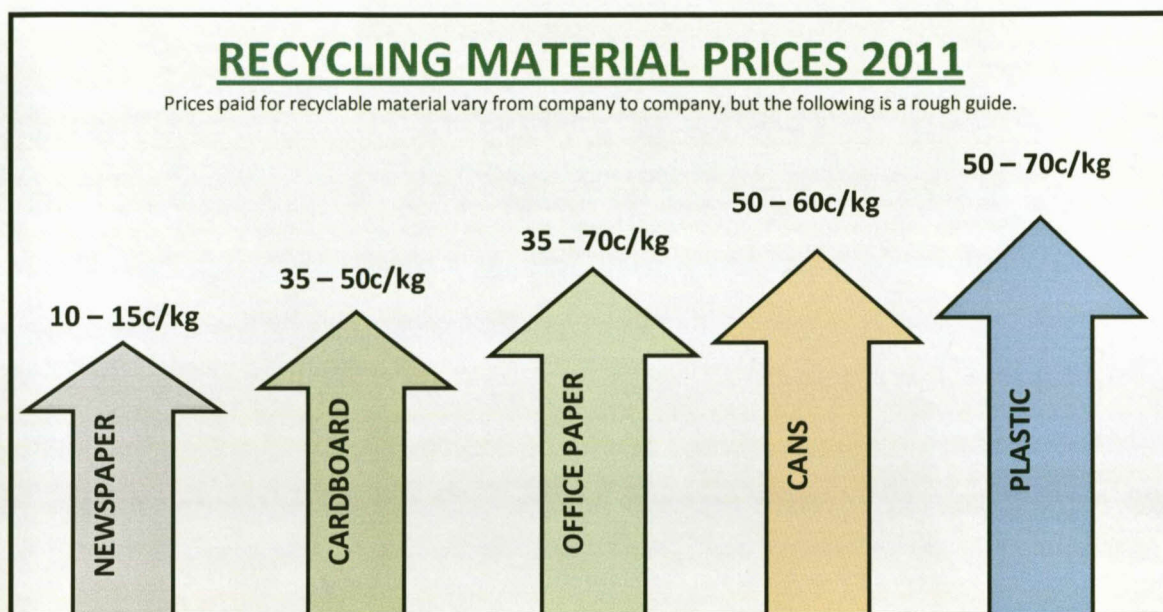


Figure 11: Recycling Material Prices for 2011 (Stone, 2011: 5)



Illustration 2: Compacted cans (Van Zyl, 2011: personal communication)

The Department of Environmental Affairs and Tourism have established a waste information system for South Africa, which will prove to be a valuable aid to local, provincial and national government (DEAT, 2005b: 1). The Department of Environmental Affairs and Tourism (Government Gazette, 2010b: 78) and the Government Gazette 33384 (718), in terms of Regulation 4 of the National Environmental Management: Waste Act No. 59 of 2008, Annexure 1, proposes that “a list of persons conducting the following activities must register on the South African Waste Information System (SAWIS)”. The activities being:

1. Generators of waste;
2. Recycling of waste;
3. Treatment of waste;
4. Disposal of waste; and
5. Exportation of hazardous waste.

The Waste Information System, as mentioned above, is a website geared to display waste statistics for each province and municipality. These waste statistics consists of the following items: the time period, quantity, type, source, and destination. Experience after visiting the website, were somewhat disappointing though, as large amounts of statistics were missing from the website. Whole provinces, since initiation of this website, are yet to enter their data.

2010 statistics is found on the South African Waste Information System (SAWIC) website. Information needed for the statistics were lacking from certain provinces, when, for example, Northern Cape and Gauteng’s data were completely missing. At the time this graph was created, and a few other provinces’ information and data about their recycling and recovery status were missing as well. Figure 12 displays the tonnes of general waste generated and recycled or recovered in 2010.

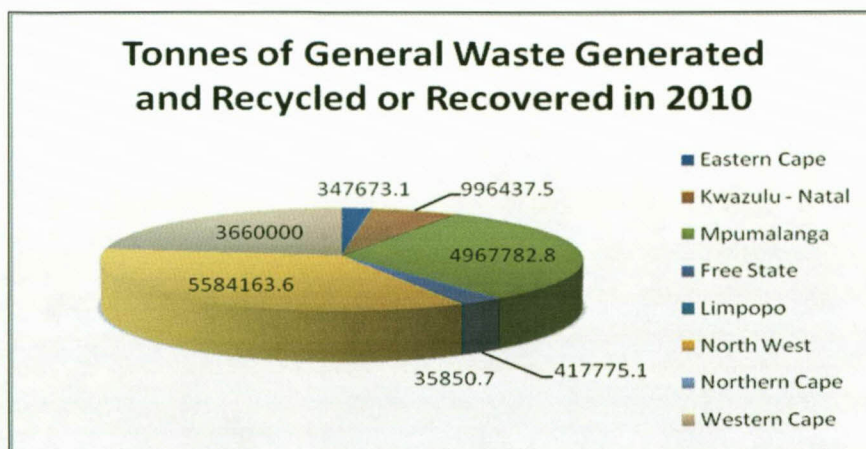


Figure 12: Tonnes of General Waste Generated and Recycled or Recovered in 2010 (South Africa. DEA, 2005: Online)

A mandatory plastic bag regulation was enforced by South Africa's government in 2004. Each bag cost 46c but was eventually decreased to around 21c. Amazingly, in 2006, the amount collected per bag, totalled, an estimated amount of R100 million. This 'fund' aimed at recycling plastic bags, has not delivered on its goals as yet and has not recycled a single bag (Nahman, 2009: 24).

#### 2.5.4 State of Affairs at Mangaung Metropolitan Municipality

Mangaung Metropolitan Municipality, formerly known as Mangaung Local Municipality, situated in the Free State, is the area of focus in this study.

The Integrated Environmental Management Plan by the Directorate of Economic Development and Planning (Mangaung Local Municipality, 2004: 16), for Mangaung Metropolitan Municipality (MMM), has revealed some interesting information about the greater area of Bloemfontein's environmental law espouse.



### **Non-Compliance to environmental procedures:**

It became evident that:

“Mangaung Local Municipality (MLM) does not comply with all regulated environmental legislation, regulation and procedures that require environmental authorization during all service delivery actions and activities. This non-compliance places the municipality and the environment at risk” (South Africa. Mangaung Local Municipality, 2004: 26).

1. Lack of information;
2. Lack of management control;
3. Absence of structure;
4. Lack of access to the law;
5. Lack of knowledge of requirements;
6. Lack of skills to adhere to all regulations;
7. Set in old ways and procedures
8. No monitoring of municipal requirements;
9. Lack of exposure to environmental forums;
10. Absence of central co-ordinating agent;
11. Lack of resources;
12. Lack of knowledge regarding correct procedures;
13. Pesticides handled by unqualified persons;
14. Lack of control measures and procedures for pesticides.

### **Regulator legislation is discussed as:**

“Current by-laws are either out dated or do not address the issue. This results in a lack of proper localized regulations and non-enforcement” (South Africa. Mangaung Local Municipality, 2004: 27).

### **Pollution levels at municipal facilities:**

“Certain municipal facilities contribute significantly towards surrounding water, ground and surface water and air pollution” (South Africa. Mangaung Local Municipality, 2004: 30).

1. Shortage of space or alternatives for disposal of waste;
2. Lack of housekeeping;
3. Lack of spillages of chemical substance (especially servicing of vehicles in uncontrolled workshops);
4. Lack of control on dust contamination and storm water run-off.

### **Waste management and reduction:**

“Increased waste volumes and the controlled and uncontrolled disposal thereof, places tremendous pressure on all environmental resources. Effective management of these environmental resources will require waste reduction and Integrated waste management (cradle to grave concept)” (South Africa. Mangaung Local Municipality, 2004: 35).

1. Illegal dumping of waste;
2. Lack of motivation by residents to reduce waste;
3. Limited resources;
4. Poor compaction and covering with soil leads to wind distribution and pollution of environment;
5. No access control at waste sites;
6. Poor access to waste/dumping sites;
7. Lack of waste management strategy/ Integrated Waste Management Plan (IWMP);
8. Lack of knowledge.

### **Public ownership of environmental resources:**

“Past environmental conservation initiatives proved that success is dependent on public ownership of their environmental resources” (South Africa. Mangaung Local Municipality, 2004: 43).

1. Lack of community involvement in conservation matters;

2. Lack of municipal resources;
3. Supporting environmental interest groups.

### **Environmental skills development of municipal personnel:**

“Although the municipality is committed to sustainable provision of services, personnel need to be trained in environmental skills for effective implementation” (South Africa. Mangaung Local Municipality, 2004: 44).

1. Lack of environmental skills by personnel.

### **Public environmental education:**

“As the general public and every household is both the largest contributor to environmental degradation and conservation alike, an increased level of awareness and knowledge of the general public towards environmental conservation is essential”.

Programmes implemented by the Mangaung Local Municipality to “co-ordinate the sharing of resources” are the Community Based Planning, Management Programme (CBPP) and the Public Awareness and Training Programme (PATP) and the Law Enforcement Programme (LAWP) (South Africa. Mangaung Local Municipality, 2004:44).

The Department of Environmental Affairs and Tourism and their National Waste Management Strategy Implementation in South Africa (South Africa. DEAT, 2005a: 7) has stated that:

“Mangaung Municipality has meticulously formulated a business plan for a buy-back centre which will deal with education and training of recyclers, air space availability at landfills, and air pollution. Their present focus is on recovery of costs and the impacts on the environment”.  
“Mangaung Local Municipality has also undertaken a small community initiative in Malitapifu, where the local community collects waste and transports it to the Mangaung municipal landfill, as the Mangaung Municipality does not collect waste from rural areas”.

## 2.6 Overview of Behaviour

The slogan, “think globally, act locally,” can be very useful in achieving a positive reaction out of a person’s behaviour (Barbaro-Forleo *et al.*, 2001: 514).

Knowledge and understanding are the source of an altered and accepted behaviour. This of course is not an implausible anecdote, as people need to know the consequences of their actions to be able to change their behaviour in a favourable way (Schultz, 2008: 67).

Schultz (2008: 70) then goes on to state, that in order for recycling behaviour levels to be acceptable, knowledge must have a firm foundation. It is known that for environmentally responsible behaviour to be widely accepted and accredited, extrinsic factors, mostly positive, are very important (De Young & Lee, 1994: 63), but some have suggested that these extrinsic factors are only partially effective.

External motivations such as messages and monetary incentives work well as a temporary solution but in the long term, positive and well developed internal motivations need to be found, to motivate individual recycler or concerned citizen. Motivations that are powerful and are conditionally set in a person’s life are the most important to be effective. This becomes even more effective in the long run as part time external justifications will eventually seem meaningless (De Young & Lee, 1994: 64). This phenomenon stated above means the search for other ways to motivate environmental behaviour that is dependable and conscientious.

Because of our ever-changing economic activities, environmental consciousness is taking a major hold in the way corporations and businesses are operated (Barbaro-Forleo *et al.*, 2001: 503).

Unfortunately, waste management has been placed at the bottom of the priorities list of problems in South African governmental and municipal departments. Because of this waste management services have declined or even failed at many municipalities. This has spurred on many negative instances that resulted in an abundance of negative environmental behaviour and many fundamental social aspects being neglected (Oelofse & Strydom, 2010b: 1).

Many social theories on individual behaviour have been developed since the 1950s. Even though the application of psychology and social factors to natural science is young, we have gained huge insight during the last 20 years, around the environment and its problems (Oelofse & Strydom, 2010b: 1).

Environmental psychologies, established late in the 20<sup>th</sup> century, main focus was on the interactions and relationships between people and their environment (Oelofse & Strydom, 2010b: 2).

### **2.6.1 Behaviour Theories**

The theory of reasoned action explains the concept of an action being performed because of an earlier performed behaviour. This performed action may be the result of two different ideas. Firstly, a person's behaviour is spurred on by that particular person's attitude towards the behaviour, and secondly, behaviour might also be because of pressure resulting from society or a smaller community. It may be important to note that an individual's intention towards a certain action is key to any learned behaviour but, it is just as important to keep in mind, the pressures from a person's community to put these behaviours into practices (Oelofse & Strydom, 2010b: 2).

Further explained by Oelofse and Strydom (2010b: 2) is the fact that demographics, personality traits and social differentiations do not play an important role in influencing behaviour directly but it does influence the fundamental beliefs that a person possesses or that of a social group.

Another point brought up from the Theory of Reasoned Action, is that there is a third belief: behavioural control. This belief combines two factors, those of a person's behavioural beliefs or attitude and subjective norm or normative beliefs. This then may influence a person's intentions and their overall behaviour (Oelofse & Strydom, 2010b: 2).

A model of environmental behaviour is presented in Figure 13, which discusses the influence of emotions and environmental awareness on behaviour (Oelofse & Strydom, 2010b: 2).

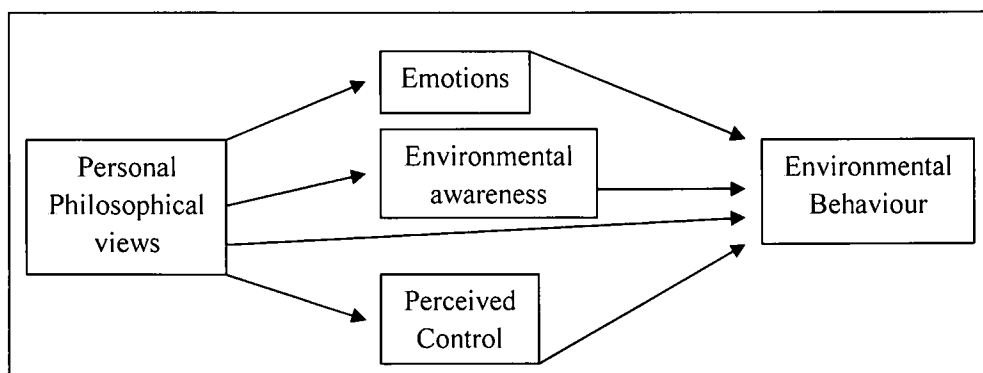


Figure 13: The Model on Environmental Behaviour (Oelofse & Strydom, 2010b: 3)

The model on recycling behaviour originates from the Theory of Reasoned Action, using opportunity and ability to influence an intention-behaviour relationship (Oelofse & Strydom, 2010b: 4).

De Young (1993: 485) mentions that it is easier to sustain conservation behaviour through abridged short term behaviour rather than through long term change. De Young (1993: 485) also mentions that there is one goal that is needed to be reached, that is of a happy medium behaviour that is to be met, where there is little or no interference at all if one's behaviour strays from a set path.

Information-, positive motivational- and coercive techniques are useful in assisting with the change of conservation behaviour (De Young, 1993: 487, 489).

Four behaviour evaluation techniques are recognized by De Young (1993: 496-498):

1. Prompting: they are said to be unreliable and erratic even though their effect can be instantaneous and universal over a complete community.
2. Material incentives: these incentives initiate change straight away and therefore are reliable and also universally acknowledged.

3. Social pressure and material disincentives: adverse affects may come from the use of coercive motives on individuals as their sense of freedom is restricted.
4. Commitment: these techniques are able to change behaviour as fast as material incentives.

The relevance of these behavioural theories applied to waste management and recycling will be discussed in the following section.

### **2.6.2 Attitudes and Behaviour Towards Recycling**

There are various studies being done with very conflicting results. Some studies explain that certain demographics made no difference to environmental behaviour. For example, some studies find that income and education do not make any difference to environmental attitudes and behaviour, but others find positive links between education and the environment (Oelofse & Strydom, 2010b: 4).

Academics are known to be in accord with the fact that demographics are of a greatly reduced importance than that of knowledge, values and attitudes, when explaining economically and ecologically responsible behaviour (Barbaro-Forleo *et al.*, 2001: 505).

Other studies, which focus directly on recycling behaviour, show comparable outcomes. Some studies show positive changes associated with residence type and family size. There are positive correlations between families that do recycle and the amount of knowledge they possess on environmental concerns. Another interesting fact from a study is that studies have shown females to be more protective of the environment than men are, and highlighted their respective attitudes (Oelofse & Strydom, 2010b: 4).

Information which is gained about environmental issues is a duly noted factor in understanding environmentally responsible behaviour (Barbaro-Forleo *et al.*, 2001: 505). But Schultz (2008: 72) underlines this statement by mentioning that possessing certain information does not warrant an intention to recycle but rather a shortage of information may be an obstacle to perform any recycling activities.

Furthermore, Schultz (2008: 72) identifies four motivational factors, positive or negative, which are related to the level of recycling behaviour. These are:

1. Benefits of recycling;
2. Personal inconvenience;
3. External pressure;
4. Financial motives.

Oelofse and Strydom (2010b: 4) discusses that recycling behaviour is influenced by convenience, knowledge and access. Beliefs regarding how easy it may be to recycle and the convenience of recycling spurs on favourable recycling behaviour. Most types of word-of-mouth advertising enforce and assist in motivating optimistic recycling behaviour. Negative behaviour towards recycling might be brought on by the municipalities' failure to collect bins or making trips to drop-off sites. Monetary incentives to recycle assist in changing recycling behaviour, but those that do not receive this reward may quickly abandon recycling.

This above idea was similarly discussed by Darby and Obara (2005: 25), who states that their studies show that specific behaviour relating to demographics, attitudes, education and publicity and the design of the recycling schemes and then goes on to discuss that the barriers to recycling that were found include inadequate facilities, lack of recycling schemes, space, convenience and limited access to transportation.

The incentives to recycle, mentioned earlier, are used as motivating factors. This attributed positive recycling behaviour may even continue long after incentives have been discontinued (Oelofse & Strydom, 2010b: 4).

De Young's (1990: 263) interviewee data shows some interesting results. Firstly, that people were not interested in monetary encouragement, but wanted only to help the environment. Next on the priority list was recycling motivation for a charity and that recycling is morally a good thing to participate in. Lastly, monetary incentives were not a favourable choice for people to stimulate recycling behaviour.



Underlying intentions of performing the correct and morally sound objectives can be enforced by learning as a whole community (Rijsberman, 2008: 6).

There is significant information to back this statement that pressures put on society may assist in the correct recycling behaviour (Oelofse & Strydom, 2010b: 4). People's attitudes to recycling are a significant predictor of behaviour. For example: non-recyclers do not like to participate in surveys and by doing so, then complicate analysis of survey results (Oelofse & Strydom, 2010b: 5).

There have been broad studies done concerning the recycler and the non-recycler but many characteristics cannot compare to those on reuse and waste minimisation behaviour. Ideas featured around these points vary considerably. Similar to recycling behaviour, they are influenced by inconvenience, lack of space, time and knowledge, this then slows down waste minimisation (Oelofse & Strydom, 2010b: 5). De Young, Lee and Marans (1995: 384) reports that non-recyclers discuss recycling to be more inconvenient than recyclers.

To gain the most out of a changed behaviour at maximum effect, waste minimisation attitudes and behaviours need to be identified and implemented. These may be in order to decrease waste production, even while recycling at maximum capacity. It is not the definitive solution to saving the environment (Oelofse & Strydom, 2010b: 6).

De Young (1990: 259) explains that people tend to point out their intention to recycle rather than their real behaviour. These people may also remember all the instances of applicable environmentally acceptable behaviour over a longer period of time and also consider that as reasonable recycling behaviour.

De Young (1990: 258) states that recycling is becoming a socially acceptable behaviour that was once only governed as an eccentric activity but could now soon become the social norm. In conclusion, it was stated that recycling, once a societal taboo, is now the new acceptable social standard of practice.

It was pointed out by De Young and Lee that conservation behaviour is very important for people to live a healthy life on our ailing planet. It must be understood that an individual must not only be capable in those environmentally friendly activities but also actually enjoy doing them (De Young & Lee, 1994: 74). Basically what this means is that, this a slow process of discovery and people would like to be guided knowingly into the beyond without being told what to do, only being reminded at times if one might stray from the correct path (De Young & Lee, 1994: 75).

Individuals may often feel alienated from the rest of the world in a way that they might think or feel towards the environment. Individuals may feel that their feelings of positivity towards the environment are severely insignificant and may feel that their feelings are not worth anything great nor could amount to anything of significant value. Individuals might also feel that their individual effort to save money in their homes to better the environment is a waste of time, but if all these individual efforts are put together, the ultimate result is exponentially outstanding (Hughes & Morgan, 2006: 32).

It is worth mentioning that there are a select few who have begun to have a small or major appreciation for the environment and for what they stand for. People need to become more environmentally conscientious to appreciate over the long run what the desired plan of action is. If this plan of action is not adhered to, another plan must be adopted to encourage future generations to become just as environmentally savvy as one may hope to be (Shackelford, 2006: 1555).

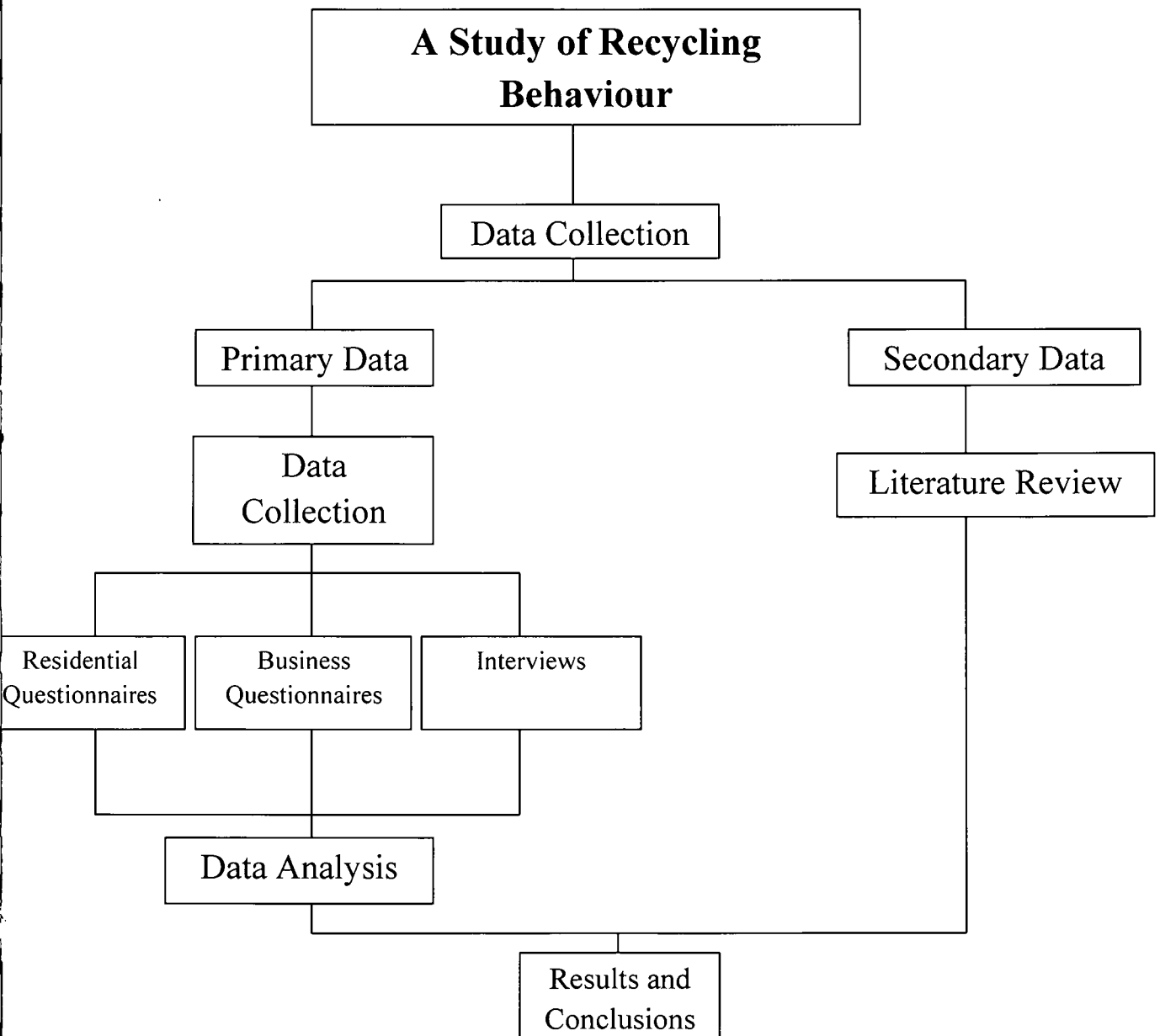
Finally, Oelofse and Strydom (2010b: 6) concludes that research has an important role to play in attempting to understand behaviour and the pressures that shape behaviour. But the responsibility is there to provide and make available the best up to date and recent information, so to make people more aware of just how big an influence they have on the well-being of our environment. This idea needs urgent backing from those in seats of power of our government and local municipalities to apply the best jurisdiction. Consequences of attitudes and behaviours must be realised.

The relationship and the consequences from waste management and sustainable development should not be ignored and by having great waste management policies and plans in place, it will still not have the needed positive effect unless society reacts and adjusts their attitudes and behaviours appropriately (Oelofse & Strydom, 2010b: 6).

## CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

Chapter 3 describes/ introduces the research design and methodology for this research. Listing: research methods; research design of the questionnaires and interviews; and methodology and sampling procedures. The recycling model design will also be presented.

### 3.1 Research Design



### **3.1.1 Study area**

The study was conducted in the Westdene, Bloemfontein. Westdene is a diverse suburb consisting of residential dwellers and commercial businesses.

### **3.1.2 Questionnaires**

Questionnaires were custom-designed and adapted to suit this research study, both for the residential and commercial respondents. There are two questionnaires, one for the residential sector and the other one for the commercial sector. Both questionnaires are identical, but each is modified to meet the specific need of either residential or commercial.

### **3.1.3 Interviews**

Interview questions were designed to best suit the Mangaung Local Municipality and other individuals involved in the recycling business in the Bloemfontein area.

### **3.1.4 Methodology**

The methodology of this quantitative investigation starts off focusing on the model of analysis, using the mean and averages (in terms of graphs and tables) and looks at comparisons between the residential and commercial areas. A recycling model has been custom-designed to display the current behaviour and future behaviour of respondents.

1. Review existing literature to gain knowledge of recycling;
2. Analysis of data by custom-designed recycling model;
3. Data analysis would reveal recycling behaviour of residential and commercial respondents.
4. Provide recommendations

### 3.2 Sampling Procedures

- **Questionnaires**

1. Identify residential and commercial property by random selection to include in pilot study;
2. Compile and send out questionnaires in order to determine current recycling behaviour and what the respondents' future recycling behaviour would be if there were motivating factors. The questionnaires were compiled using a number of adapted questions from other questionnaires and custom-designed questions formulated for this research topic specifically.
3. Residents and commercial respondents filled in the questionnaires on a purely voluntary basis.
4. The questionnaires were completed by 228, out of the 300 desired, respondents in the Westdene area of Bloemfontein, of which 98 were residential and 130 were commercial.
5. Examples of the questionnaires and cover letter can be found under Appendix A, B and C respectively.

- **Interviews**

Interviews were conducted with the following respondents:

1. Interview Rat Race Waste owner Mr. Andre' van Zyl (Appendix D);
2. Interview Master Recyclers owner Mr. Abri Kruger (Appendix E);
3. Interview Recycling Manager at Bergvliet High School, Mrs. Willy (Appendix F);

Interview questions adapted and designed for specific use in this study.

### 3.3 Development of Model

The Recycling Behaviour Model (Figure 14) was developed and adapted from two other models, to form one complete model, relevant to this study. The two models used are the Theory of Planned Behaviour by Ajzen (1991: 182) and the Four Stage Model of User Adoption by Sampson (2010: Online).

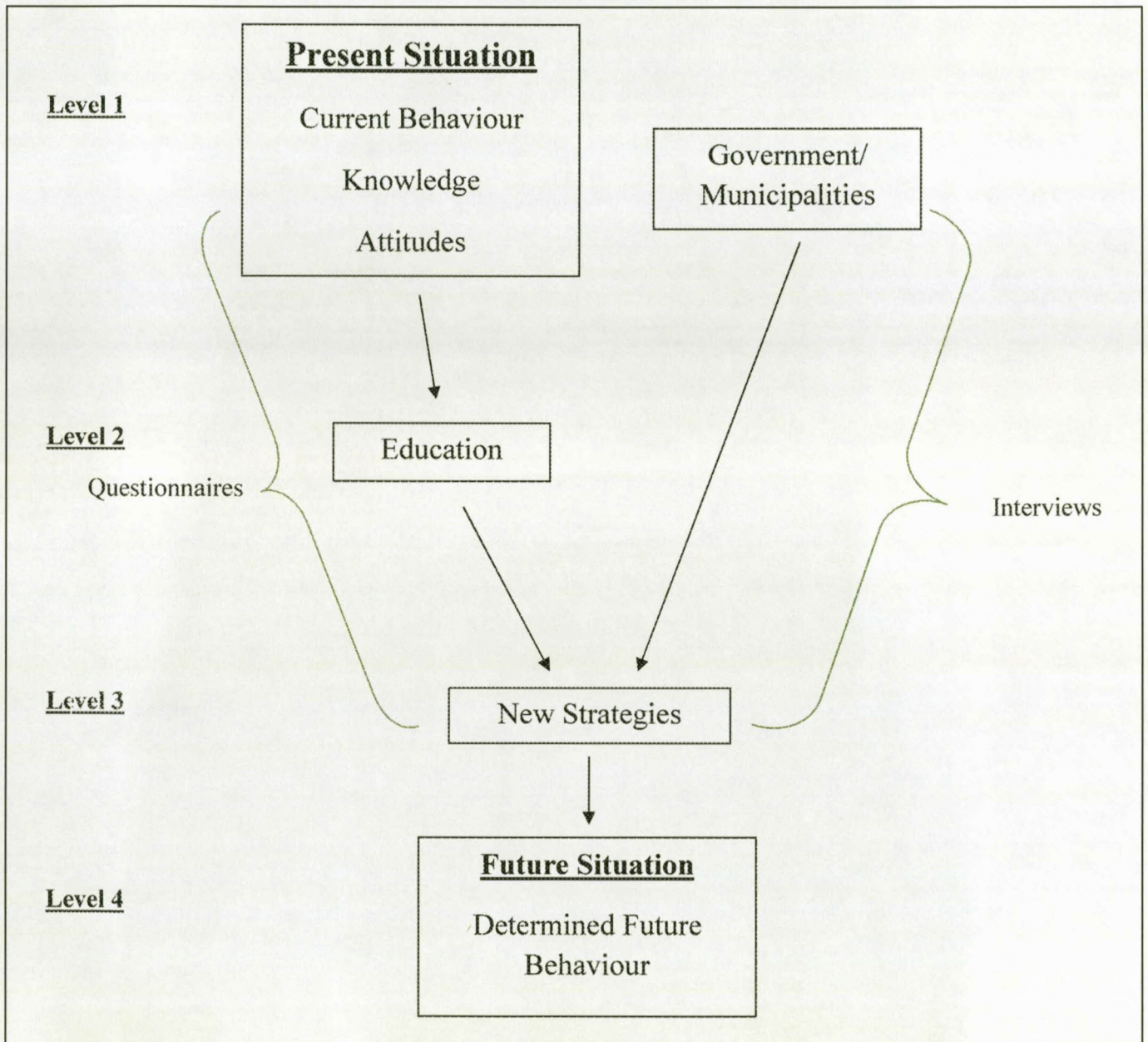


Figure 14: Recycling Behaviour Model

The Theory of Planned Behaviour by Ajzen (1991: 179) describes as intentions to perform many different types of behaviour, resulting from attitudes directed at those behaviours. This includes the changes in those attitudes that then results in many types of behaviour.

The Four Stage Model of User Adoption by Sampson (2010: Online) is a system using levels of analysis and introduction. Firstly, one must get the people's attention and interest. Secondly, one must provide understanding and practical experience. Thirdly, one must find ways to apply it to your situation. Lastly, let it become a new personal interest.

### 3.3.1 Original Placement of Model

Figure 15 indicates the original circular placement of the Recycling Behaviour Model, developed in Figure 14. This indicates that this model is designed to be a multi-layered circular pattern of improvements. Once all levels are achieved, the future situation, representing determined future behaviour, then becomes the present situation, representing the current behaviour, knowledge and attitudes; and then the cycle begins again, adding to the experiences as time passes.

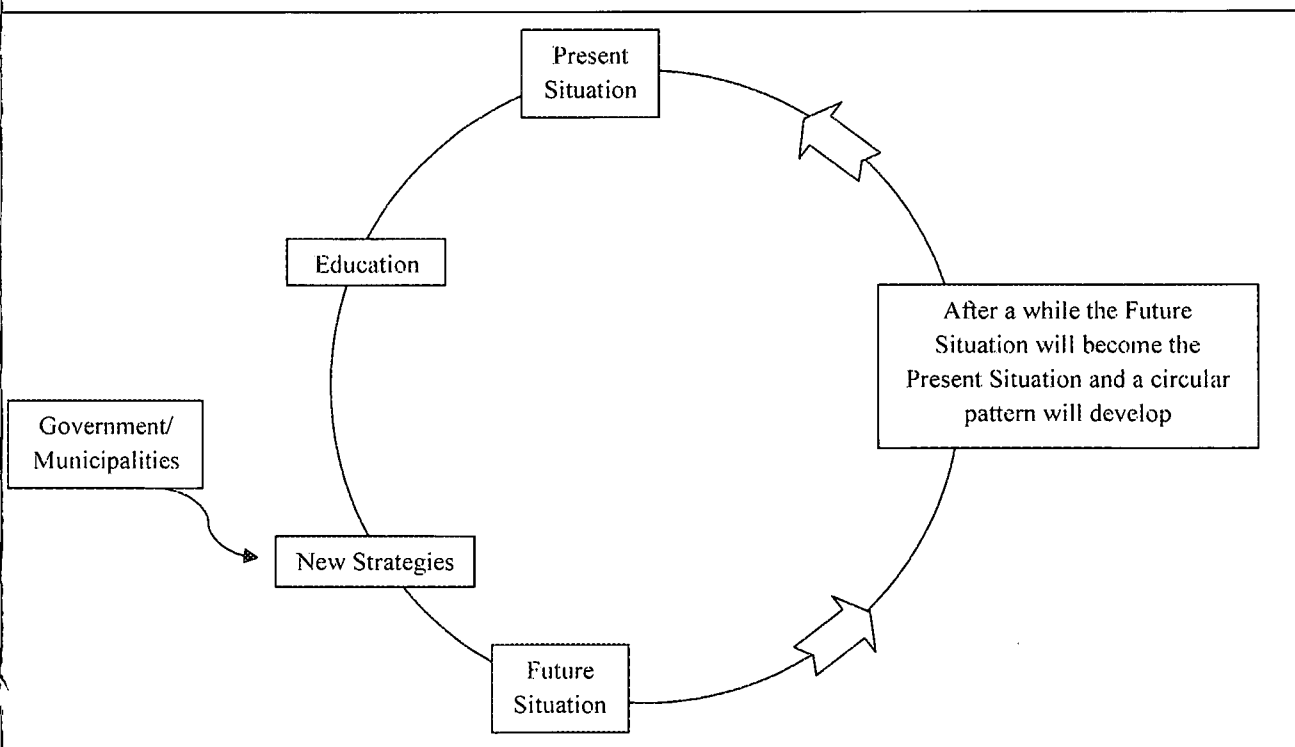
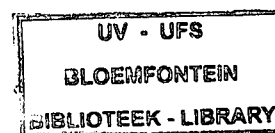


Figure 15: Recycling Behaviour Model – Original Placement of Model





## CHAPTER 4: RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

To begin the analysis of the results, the first few questions of the questionnaire asked for general information, so that the researcher can get a better idea of the recipients' background. The recipients are grouped as commercial (C) and residential (R). This information will be very useful so that the researcher can use it to compare it with other studies done by other researchers.

The findings will be presented under different headings and levels, namely Level 1 Present Situation, Level 2 Education, Level 3 New Strategies and finally, Level 4 Future Situation. Level 1 will also include demographics. Findings and the discussions of results are also included in this chapter.

Below is a summary of the four levels, and which level each question falls under.

<b>Level 1</b>	<b>Present Situation</b> Behaviour, Knowledge, Attitudes	<b>Questions (RESIDENTIAL/COMMERCIAL)</b> <b>1, 2, 3, 4, 5, 6, 7a, b, c, 11, 12, 15, 18, 20, 22, 24</b>
<b>Level 2</b>	<b>Education</b>	<b>Questions (RESIDENTIAL/COMMERCIAL)</b> <b>13, 14, 23</b>
<b>Level 3</b>	<b>New Strategies</b>	<b>Questions (RESIDENTIAL/COMMERCIAL)</b> <b>8, 9, 10</b>
<b>Level 4</b>	<b>Future Situation</b> Determined Future Behaviour	<b>Questions (RESIDENTIAL/COMMERCIAL)</b> <b>16, 19, 21</b>

### 4.1 Questionnaires

Analysis of the questionnaires will be done using a model specifically designed for this study. The findings will be set out to compare residential and commercial sectors.

#### 4.1.1 Commercial Data Interpretation

##### 4.1.1.1 Level 1: Present Situation

Table 18 (Appendix G) represents question 15, which shows the main types of waste that are disposed of into the dustbin that is produced by businesses.

The six main types of waste that are disposed of into a commercial participant's dustbin are: paper, food waste, cans, aluminium and/or tin, newspaper, plastic containers and grocery bags. The percentages are 16.0%, 11.3%, 11.1%, 9.3%, 9.0% and 7.0% respectively. The large amount of waste paper from commercial recipients is an indication of businesses that use a large amount of paper, for example, service providers that make lots of copies of invoices, tenders etc., exactly 68.3% of the 130 commercial recipients questioned.

Table 19 (Appendix G) represents question 18, which asks whether or not the participants knows of any place where recycling of items are done.

3.2% by commercial recipients said 'yes' and 27% said 'no' and 69.8% indicated 'I don't know'. The most predominant answer being, 'I don't know' is an indication of a lack of communication and advertising between residents of Westdene, Mangaung Local Municipality and private recycling companies. This answer was expected.

Table 20 (Appendix G) represents question 20, which discusses what commercial recipients do with their food waste. 71.8% of commercial recipients dispose of food waste in the dustbin, while only 3.2% of commercial recipients use a compost bin. Another good alternative is to sell the food waste as animal feed. 1.6% of commercial recipients make use of this option.

Table 18, Question 15 (Appendix G) discusses the type of waste that goes into commercial recipients' dustbin. The top five types of waste produced by commercial recipients are paper (16%), food waste (11.3%), cans, aluminium/ tins (11.1%), newspaper (9.3%) and plastic containers (9%).

Table 21 (Appendix G) represents question 22, and it discusses the estimated amount of waste (weight) produced daily by a recipient's business. Commercial recipients produce, 61.5% of waste weighing between 5kg and 10kgs; 25.4% of waste weighing between 10kg and 15kgs; 8.5% of waste weighing between 15kg and 20kgs daily and 4.6% of waste weighing over 20kgs per day.

Table 22 (Appendix G) represents question 24, which discusses the most important reasons to recycle. Commercial recipients put 'reduce pollutants' as their first most important reason to recycle, with 55.9% of commercial recipients. 'Reduce energy use' is firstly the most important reason to recycle, including 24.3% of commercial recipients. 16.2% of commercial recipients stated that 'Decrease landfill volumes' as their most important reason to recycle. 7.1% of commercial recipients stated that 'Reduce green house gas emissions' as their foremost important reason to recycle.

#### **4.1.1.2 Level 2: Education**

Table 23 (Appendix G) represents question 13, which indicates the percentages of individuals that, if given more information about why recycling is important, would recycle more. For this question, 47.7% of the commercial recipients strongly agreed, 38.5% agreed with this statement and only 12.3% and 1.5% disagreeing and strongly disagreeing respectively. Here is a clear indication on just how important it is to provide information and to do advertising, hereby encouraging recipients to recycle.

Table 24 (Appendix G) represents the percentages from question 14, which asks the commercial recipients if there are items that they do not know how to recycle. Out of the 130 commercial recipients questioned, 23.8% strongly agreed and 50% agreed. With a combined percentage of 8.7%, commercial recipients stated the options strongly disagree and disagree. This result indicates that commercial recipients are not sure what to recycle and how to recycle waste. Again, with more knowledge and information, commercial recipients would be able to make valid choices to help make a change to our environment.

Table 25 (Appendix G), represents question 23, which discusses the answers to the question: do you think landfills are a good idea? Commercial recipients answering this question with a 'yes' were 57.6% and those answering 'no' were 42.4%. There may be various reasons for these answers. For example, 'yes' as it may provide jobs or that landfills is a better place to put the waste rather than leaving it to accumulate on the suburb streets. A reason why they said 'no', may be because it is a dense pollution 'hotspot' resulting from various factors. The answer "no" may just be those of an uneducated choice, bearing no real understanding of the importance of not using landfills.

#### **4.1.1.3 Level 3: New Strategies**

Question 8 represents Table 26 (Appendix G), which shows the percentages of those who said that they would recycle more, if more facilities were provided in their area. 86.4% of commercial recipients said 'yes' to recycling more compared to the 14% of commercial recipients who said 'no'. This shows that commitment is possible, but that recipients are just waiting for the right motivation to recycle.

Table 27 (Appendix G) represents question 9, which shows the percentages of what techniques the residential and commercial recipients would like to see being implemented into their area. Of the recipients that answered, 41.3% of the commercial recipients would like to see 'coloured recycling bins' to be used as a technique for recycling in their area. 23.8% of commercial recipients would like to see 'more frequent collection of waste' in their area.

Furthermore in question 9, 23% of the commercial recipients would like to see 'more collection points' in their area which would assist their recycling requirements; and 11.9% of commercial recipients would like to have a 'coloured recycling bags' plan implemented in their area. These results show that if sufficient backing from the municipality is given with the correct technique, recycling will increase.

Question 10 is represented by Table 28 (Appendix G), which discusses the idea of the municipality paying for recycling bins and the collection thereof. The question then needs to be asked: if this was done, would the recipients recycle more? There was an overwhelming response of 93% of the commercial recipients who said 'yes', that they would recycle more, while a very small percentage of 7% said 'no' . Again, this is a very clear indication that the municipality has to implement a system to encourage recycling in the community.

#### **4.1.1.4 Level 4: Future Situation**

Table 29 (Appendix G) represents question 16, which discusses the waste items that could possibly be recycled by the recipient, such as paper, newspaper, cans/aluminium/tins, plastic containers and cardboard. When studying the results that were taken in for question 16, the top five most important items that recipients thought they would recycle are the five above mentioned items.

Table 30 (Appendix G) represents question 19, which asks whether the recipients would ever make use of a garden refuse/food waste recycling facility? The answer is: 58.3% of commercial recipients said 'yes', while 41.7% said 'no'. These results indicate that for many commercial recipients, this is not commercially viable or of top priority, but for restaurant type businesses this may be beneficial, as food waste is high.

Table 32 C (Appendix G) represents question 21. Commercial recipients note that their most important benefit of recycling is: that it is environmentally beneficial, and it helps make a much cleaner environment. Their most important drawback of recycling that the recipients saw is that it is time consuming. It may be fair to say that because of these noted benefits and drawbacks of recycling, commercial recipients are not as uneducated as they might have thought they are, and that yes, recycling may be time consuming and a 'bother' in general but the positives that have been noted, show that they realise the overall desired outcome of the recycling process.

## 4.2.1 Residential Data Interpretation

### 4.2.1.1 Level 1: Present Situation

Table 18 (Appendix H) represents question 15, which shows the main types of waste that goes into dustbins produced by households. The six main types of waste going into a residential participant's dustbin are paper, food waste, newspaper, cans/aluminium and/ or tin, glass bottles and plastic containers. The percentages are 10.4%, 9.5%, 8.9%, 8.3%, 8.1% and 7.1% respectively.

Table 19 (Appendix H) represents question 18, which asks whether or not the participants if they know of places where recycling of items may be done. Answers to this question are 'yes' by residential recipients, who represent 2.1% of the household recipients and 12.8% who said 'no' and 85.01% who said 'I don't know', which is an alarmingly high rate.

The most predominant answer being, 'I don't know' is possibly an indication of a lack of communication and/or advertising between residents of Westdene, Mangaung Local Municipality and private recycling companies. This answer was what was expected.

Table 20 (Appendix H) represents question 20, which discusses what residential recipients do with their food waste. 'Put it in the garbage' 9.5%, 'Home compost bin' 9.4%, 'Donate' 2.1%, 'Feed the pet' 19.8%, and 3.1% of residential recipients 'Do not generate any'.

Percentages compared to those in Table 18 (Appendix H), Question 15. The top three methods of getting rid of their food waste according to the residential recipients are 'Put it in the garbage', 'Feed the dog/pet' and 'Home compost bin' percentages as follows are 65.6%, 19.8%, 9.4% respectively.

Table 21 (Appendix H) represents question 22, which discusses the estimated amount of waste produced daily by a recipient's home or business. 81.3% of residential recipients produce between 5kg to 10kg of waste daily, followed by 14.6% of waste weighing between 10kg and 15kg, then 4.2% weighing between 15kg and 20kg. No residential recipient questioned produced more than 20kg of waste daily.

Table 22 (Appendix H) represents question 24, which discusses the most important reasons to recycle. Residential recipients noted, 'reduce pollutants' as their first most important reason to recycle at 56.3%. Then, 26.8% of residential recipients stated, 'reduce energy use' is firstly the most important reason to recycle. 9.6% of residential recipients chose 'decrease landfill volumes' as their most important reason to recycle, while 11.5% of residential recipients stated that 'Reduce green house gas emissions' as their foremost important reason to recycle.

#### **4.2.1.2 Level 2: Education**

Table 23 (Appendix H) represents question 13 which looks at the percentages of individuals that if given more information about why recycling is important, they would recycle more.

This is a positive representation at 30.9% of residential recipients who strongly agree and 46.4% agree, and only 6.2% and 1% disagreeing and strongly disagreeing respectively.

Table 24 (Appendix H) represents the percentages of question 14 stating that recycling would be done if there was more information available to explain why recycling is important.

Residential recipients' combined 'agreeable' percentage of 73.3%, which was very high compared to the combined 10.3% of the 'disagreeable' options chosen. This percentage marks the hope that through enough education, recycling will become more important.

Table 25 (Appendix H) represents question 23, which discusses the answers of the question: do you think landfills are a good idea? Residential recipients answering this question with a 'yes' are 66.3% and those answering 'no' are 33.7%.

There may be various reasons for these answers being what they are. For example, 'yes' could be because it provides jobs or that it is a better place to put the waste than leaving it to accumulate on the suburb streets or 'no' because it is a dense pollution 'hotspot' of various reasons. These answers may also just be those of an uneducated choice, bearing no real understanding of the importance of recycling.

#### **4.2.1.3 Level 3: New Strategies**

Question 8 is represented by Table 26 (Appendix H), which shows the percentages of those who said that they would recycle more if more techniques were provided in their area. The answer provides 78.4% of residential recipients who say 'yes' and only 21.6% say 'no'. This shows that commitment is possible - recipients are just waiting for the right motivation.

Table 27 (Appendix H) is represented as question 9, which shows the percentages of what techniques the residential and commercial recipients would like to see being implemented into their area. The answer reflects that 36.8% of residential recipients would like to see 'coloured recycling bins' in their area to use for recycling, whereas 23.2% of residential recipients would like to see 'more frequent collection of waste'. Furthermore, 23.2% of residential recipients would like to see 'more collection points' to be able to assist in their recycling needs. Finally, 16.8% of residential recipients would like to have a 'coloured recycling bags' plan implemented in their area.

Question 10, is represented by Table 28 (Appendix H), which discusses the idea of the municipality paying for recycling bins and the collection thereof. If this was implemented, would the recipients recycle more? A very clear 'yes' is given by 87.6% of residential recipients, and only 12.4% said 'no'. This shows that if sufficient backing from the municipality is given, recycling will increase.



#### 4.2.1.4 Level 4: Future Situation

Table 29 (Appendix H) represents question 16, which discusses the waste items that could possibly be recycled by the recipient.

The residential recipients' top items (listed from 1<sup>st</sup> to 5<sup>th</sup> important) chosen to possibly recycle are: paper, glass bottles, cans/aluminium/tins, newspapers and plastic containers.

Table 30(Appendix H), represents question 19, which asks if the recipients ever make use of a garden refuse/ food waste recycling facility? The answer is that 62.4% of residential recipients state 'yes', while 37.6% state 'no' in using a garden refuse/ food waste recycling facility.

Table 31 (Appendix H) is represented by question 21. The most important benefit of recycling for a residential recipients' family is a cleaner and beneficial environment. The most important drawback of recycling noted by recipients, impacting their families, is the large amount of time spent on recycling. It may be fair to say that, looking at these noted benefits and drawbacks of recycling, residential recipients are not as uneducated as they might feel they are, and yes, recycling may be time consuming and a 'bother' in general but the positives that have been noted, show that they realise the overall desired results of the recycling process.

### 4.3 Summary of Results

The findings from the research have been very positive. It is important to note, that the most vital outcomes of this data can be plainly pointed out. From the initial outlay of the developed model, namely the Recycling Behaviour Model (Figure 14), representing each level in the model, we can determine a readiness of recipients to advance from the lower levels to the next levels, by looking at the positive results of each single question answered in the questionnaire. The above mentioned levels are: Level 1: Present Situation, Level 2: Education, Level 3: New Strategies, Level 4: Future Situation.

Residential and commercial recipients are eager to recycle. They are just waiting for some incentive from the Marga Mangrove Municipality and the government. A slow start was seen in Question 7, Table 8 and Table 12, representing those who of the residential recipients currently recycled or of the commercial recipients had a recycling protocol, where the dominant answer was 'no'. The desire to recycle is there, and even better still, if facilities are provided.

By cross tabulating various data, interesting results emerge. Various questions were cross tabulated, and the combinations of questions are: Question 1 compared to 8, 10, 11, 12, 13, 18, 19, 23; Question 2 compared to 8, 10, 11, 12, 13, 18, 19, 23; Question 3 compared to 8, 10, 11, 12, 13, 18, 19, 23; Question 4 compared to 8, 10, 11, 12, 13, 18, 19, 23; Question 5 compared to 8, 10, 11, 12, 13, 18, 19, 23; Question 6 compared to 8, 10, 11, 12, 13, 18, 19, 23; Commercial questions 3 and 22, compared to residential questions 3 and 22. These sets of data are also compared terms of residential and commercial.

- Question 1 (gender) compared to 8, 10, 11, 12, 13, 18, 19, 23 is tabularised as follows (Figure 16).

	<b>Males</b>	<b>Females</b>	<b>Male/ Female</b>	<b>Residential/ Commercial</b>
1	Are pro-recycling	Are very pro-recycling	Women are far more pro-recycling than their male counterpart	Commercial women are more pro-recycling than residential woman
				Residential men are more pro-recycling than commercial men
2	Want municipality to pay	Want municipality to pay		
3	Benefits the environment	Benefits the environment		
4	Consistently believes it makes a difference,	Believe it is working		
5	Want more information	Want more information	Women want more information	Men are more consistent than females in general environmental management
6	Do not know how to implement recycling	Do not know how to implement recycling	Women tend to know less about the implementation of recycling than men.	
7	Would use recycling facilities	Would use composting		
8	Are pro-landfills	Are pro-landfills		

Table 33: Gender comparison questions

63

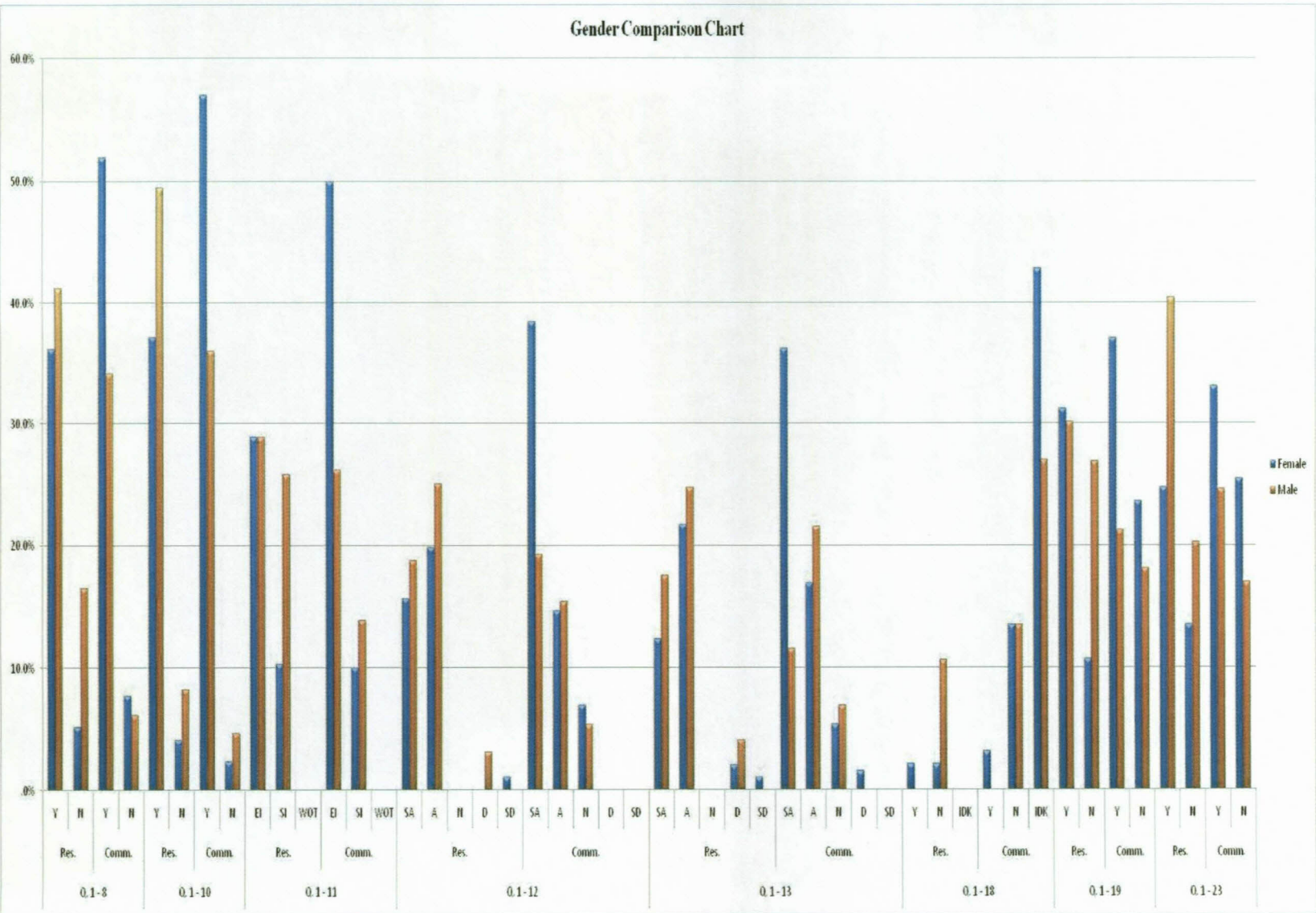


Figure 16: Gender Comparison Chart

What is observed on the one hand is that males are very keen to recycle and to be involved but woman are more pro-recycling overall. Another point noticed is that female commercial recipients are more pro-recycling than residential woman recipients. On the other hand, male residential recipients are more pro-recycling than male commercial recipients. Both the male and female recipients from the residential and commercial sectors would like the municipality to pay for all facilities and services for recycling and the collection thereof.

It is mutually agreed, over all defining groups, that recycling is beneficial to the environment. Even though males are more consistent with their position on recycling and waste management in general, more information is needed by all groups (Male and female, commercial and residential to implement the different levels). Males will use recycling facilities and women are very pro composting. Both genders are pro-landfills.

- Question 2 (Race) compared to 8, 10, 11, 12, 13, 18, 19, 23 is tabularised as follows (Figure 17)

	<b>European/Caucasian</b>	<b>African</b>	<b>Coloured</b>	<b>Asian</b>	<b>Other</b>
1	Consistently pro-recycling	Consistently pro-recycling	Generally pro-recycling	Consistently pro-recycling	Pro-recycling
	More pro-recycling in commercial sector	Constant about recycling in both commercial and residential sector	More pro-recycling in residential sector		Commercial sector more pro-recycling than residential sector
2	Want more information	Want more information			Want more information
3	Do not have facilities,				
4			Use landfills		

Table 34: Race comparison questions

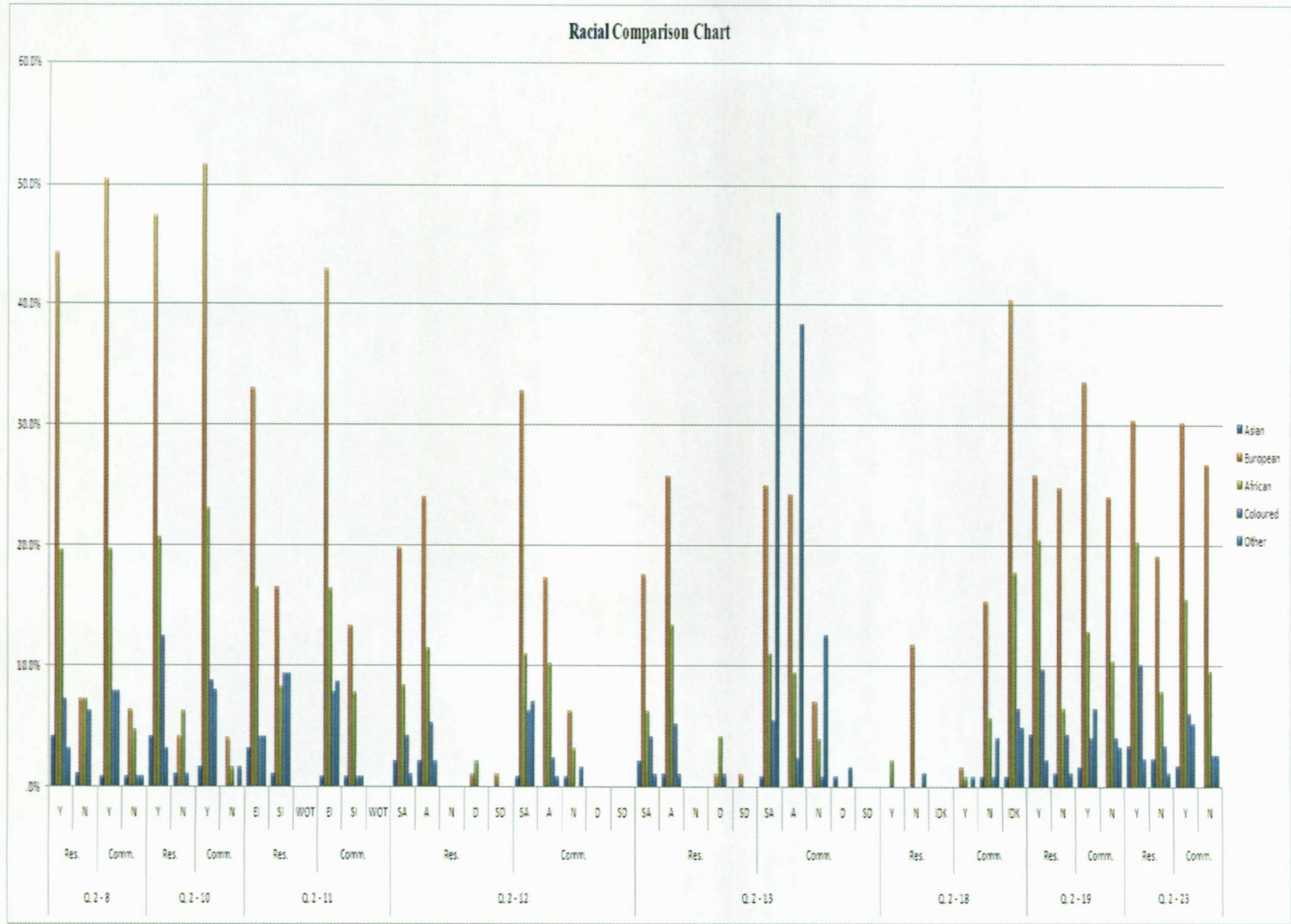


Figure 17: Racial Comparison Chart

Recycling is generally accepted over all races in this study. European/Caucasian commercial recipients are more pro-recycling than coloured commercial recipients. African recipients are constant in their views about recycling in the commercial and residential sectors.

Coloured recipients are more pro-recycling in the residential sector compared to the commercial sector and the other racial recipients groups are very pro-recycling more so in the commercial area than in the residential area. European/ Caucasian, African and others have expressed their interest in receiving more information in the implementation of recycling. European/ Caucasian have noted that there are no available facilities. Coloured recipients are pro-landfills.

- Question 3 (Age) compared to 8, 10, 11, 12, 13, 18, 19, 23 is tabularised as follows (Figure 18).

Age	
1	All groups are very pro-recycling in the commercial sector
2	All groups are pro-recycling in the residential sector
3	All groups use landfills
4	All groups want information

Table 35: Age comparison questions

All age groups mentioned in the commercial sector and residential sectors are pro-recycling. All age groups have noted that they are pro-landfills and desire more information on recycling.

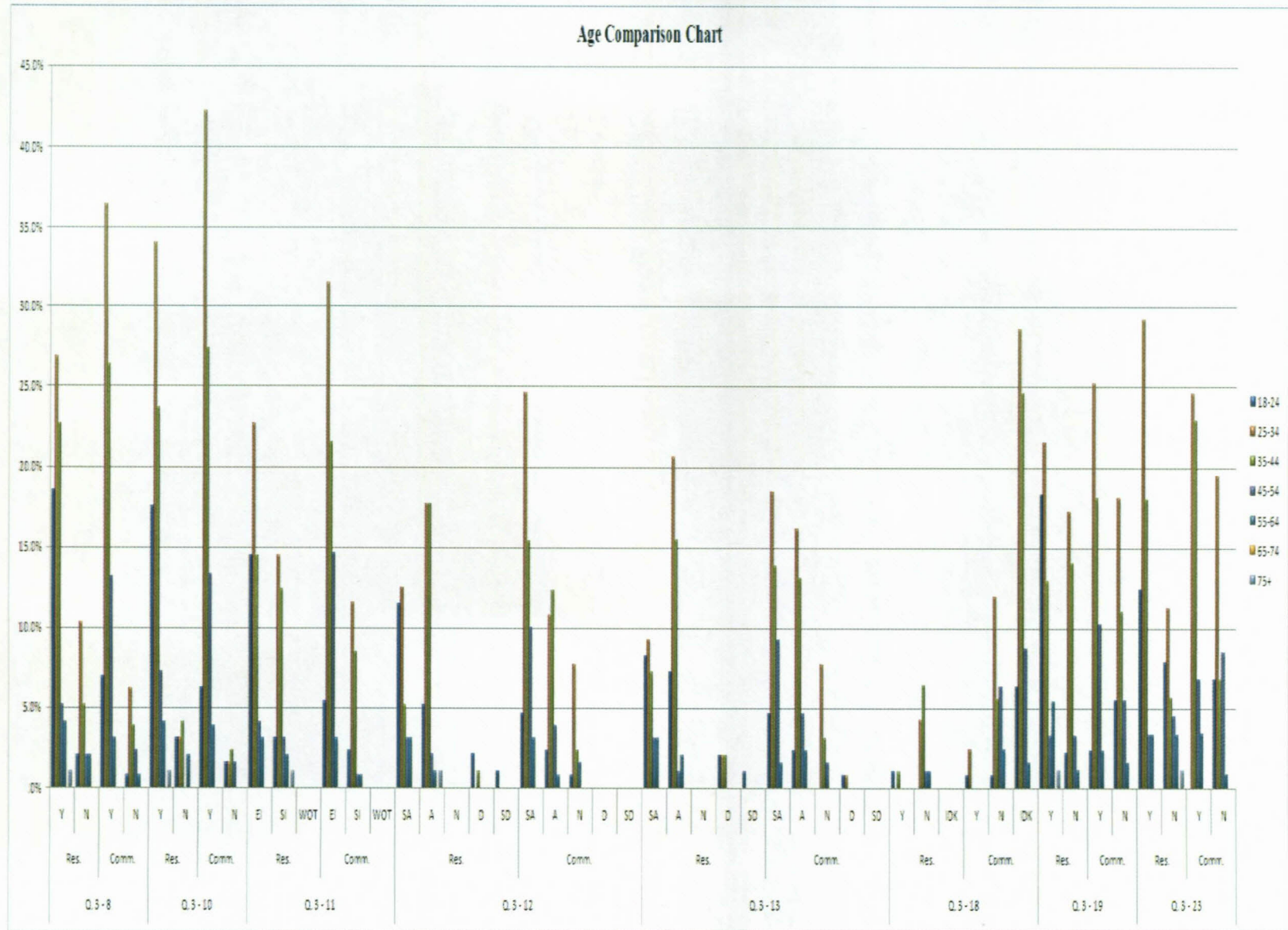


Figure 18: Age Comparison Chart



- Question 4 (Education) compared to 8, 10, 11, 12, 13, 18, 19, 23 is tabularised as follows (Figure 19).

<b>Education</b>	
1	Primary commercial sector not very pro-recycling
2	Secondary and tertiary commercial sector are more pro-recycling
3	All tertiary and secondary sectors want more information
4	All groups use landfills
5	All groups do not have access to facilities

Table 36: Education comparison questions

Commercial recipients with only primary education do not tend to be pro-recycling and waste management. Secondary and Tertiary Commercial recipients are more pro-recycling and desire more information on recycling.

All education levels have stated that they use and are pro-landfills for dumping of waste. This previous statement may be due to the fact that all education levels do not have any access to any recycling facilities.

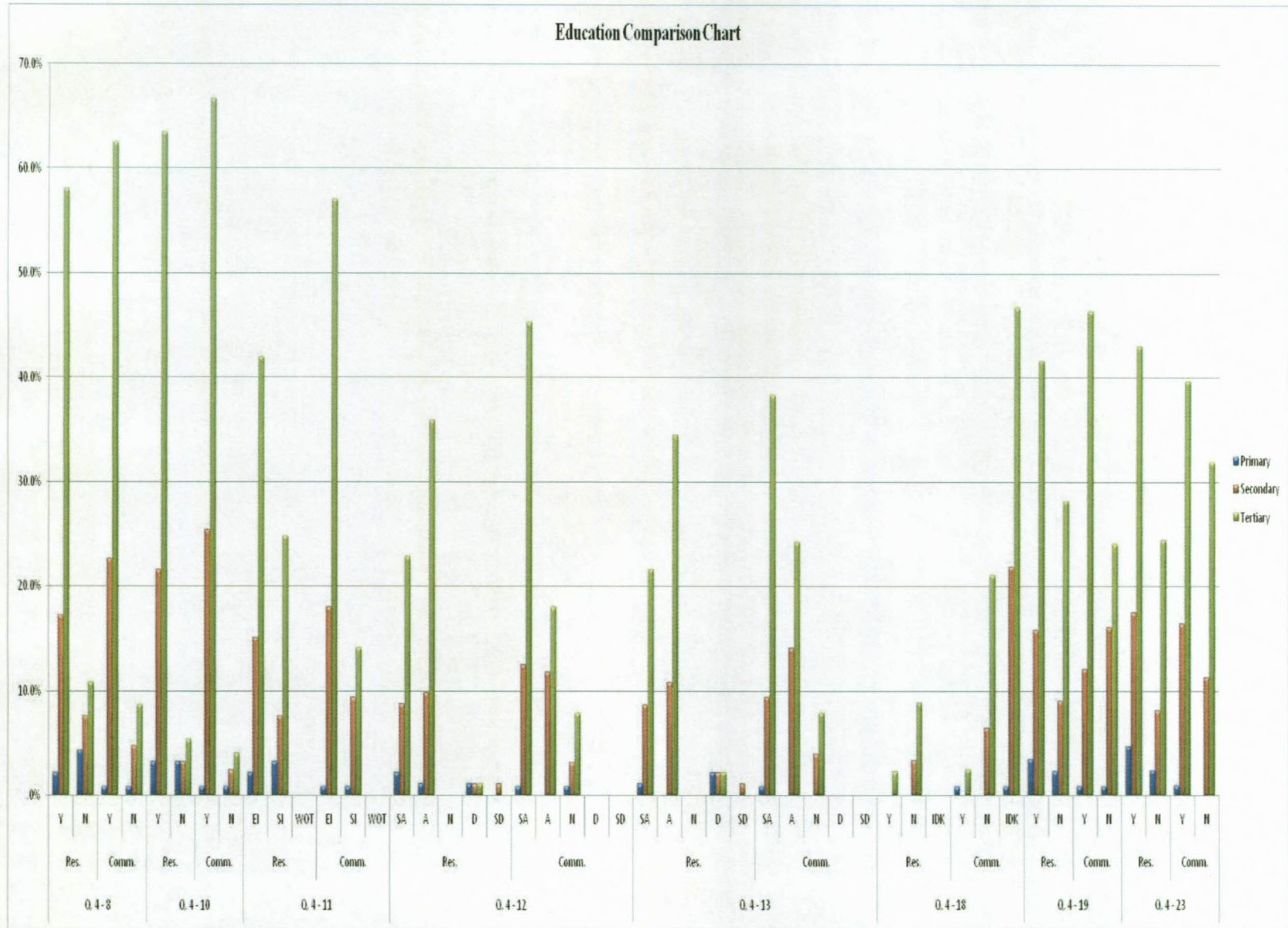


Figure 19: Education Comparison Chart

- Question 5 (Residence Term) compared to 8, 10, 11, 12, 13, 18, 19, 23 is tabularised as follows (Figure 20).

	<b>Residence Term</b>
1	5 – 10 years: far more pro-recycling in the commercial sector
2	0 – 5 years: desires municipality to pay more compared to the other groups
3	All groups have no information on recycling and none have facilities to recycle

Table 37: Residence term comparison questions

Residential recipients who have lived in Westdene for 5 to 10 years are more pro-recycling than in commercial recipients. Recipients who have lived and worked in Westdene for 0 to 5 years, desire that the Municipality pay for and provide the facilities to recycle waste and the collection thereof. All groups from the different sectors have stated that they need information and do not have access to any recycling or separating facilities.

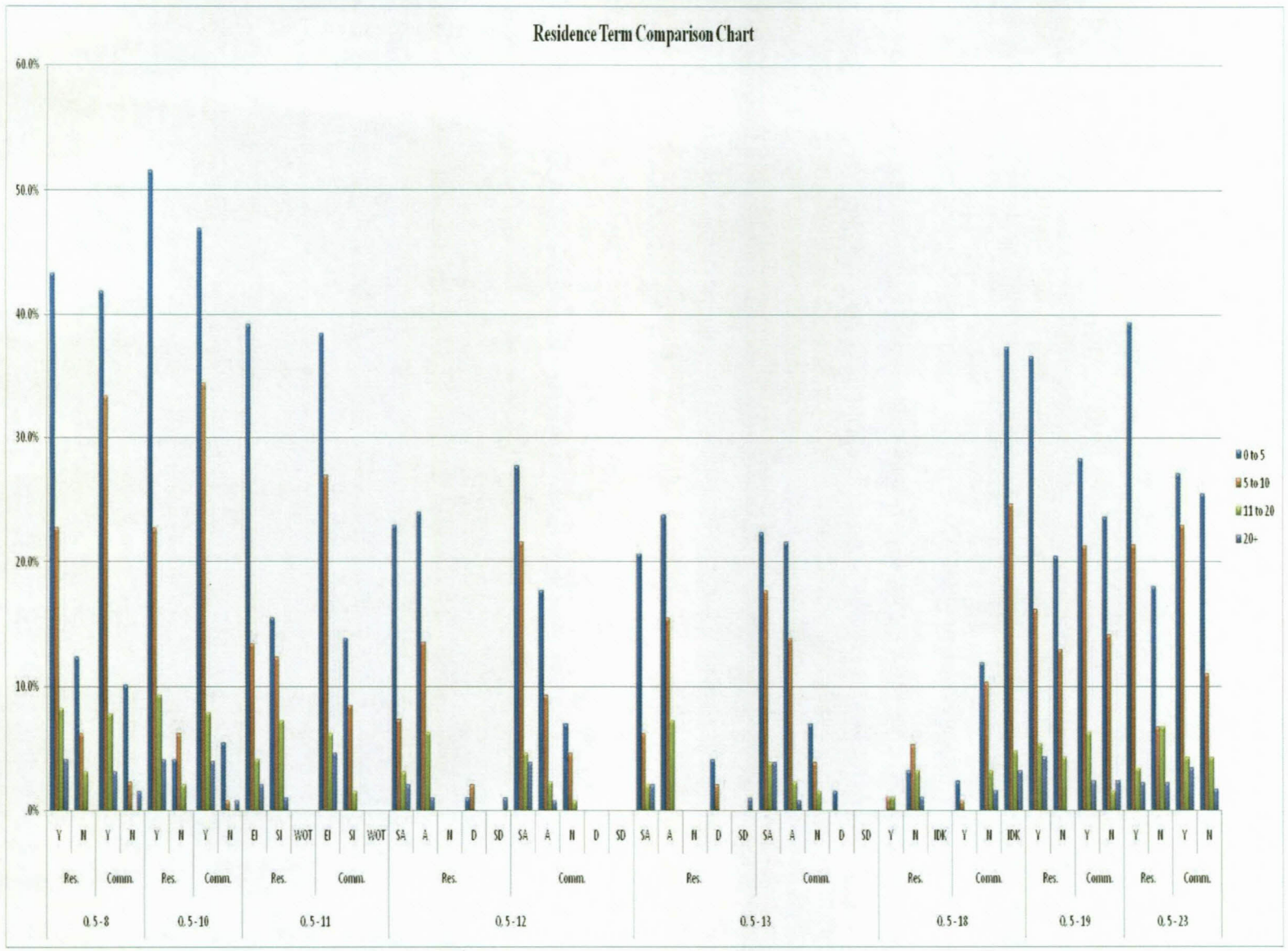


Figure 20: Residence Term Comparison Chart

- Question 6 (Income) compared to 8, 10, 11, 12, 13, 18, 19, 23 is tabularised as follows (Figure 21).

<b>Income</b>	
1	All groups are pro-recycling
2	All groups want information about recycling
3	No groups have facilities for recycling
4	Lower than R5000 and more than R20000 residential income groups' are more pro-recycling
5	More than R20000 income group' use landfills less than other income groups
6	All groups classified in the commercial sector, are more pro-recycling

Table 38: Income comparison questions

All income groups mentioned that they are pro-recycling and desire more information. None of these groups have access to facilities for recycling or the separation of waste. Income groups lower than R5000 and higher than R20000 are more pro-recycling in the residential sector. The income group, higher than R20000, appears to use landfills a lot less than other income groups. All income groups in the commercial sector are more pro-recycling than the residential groups.

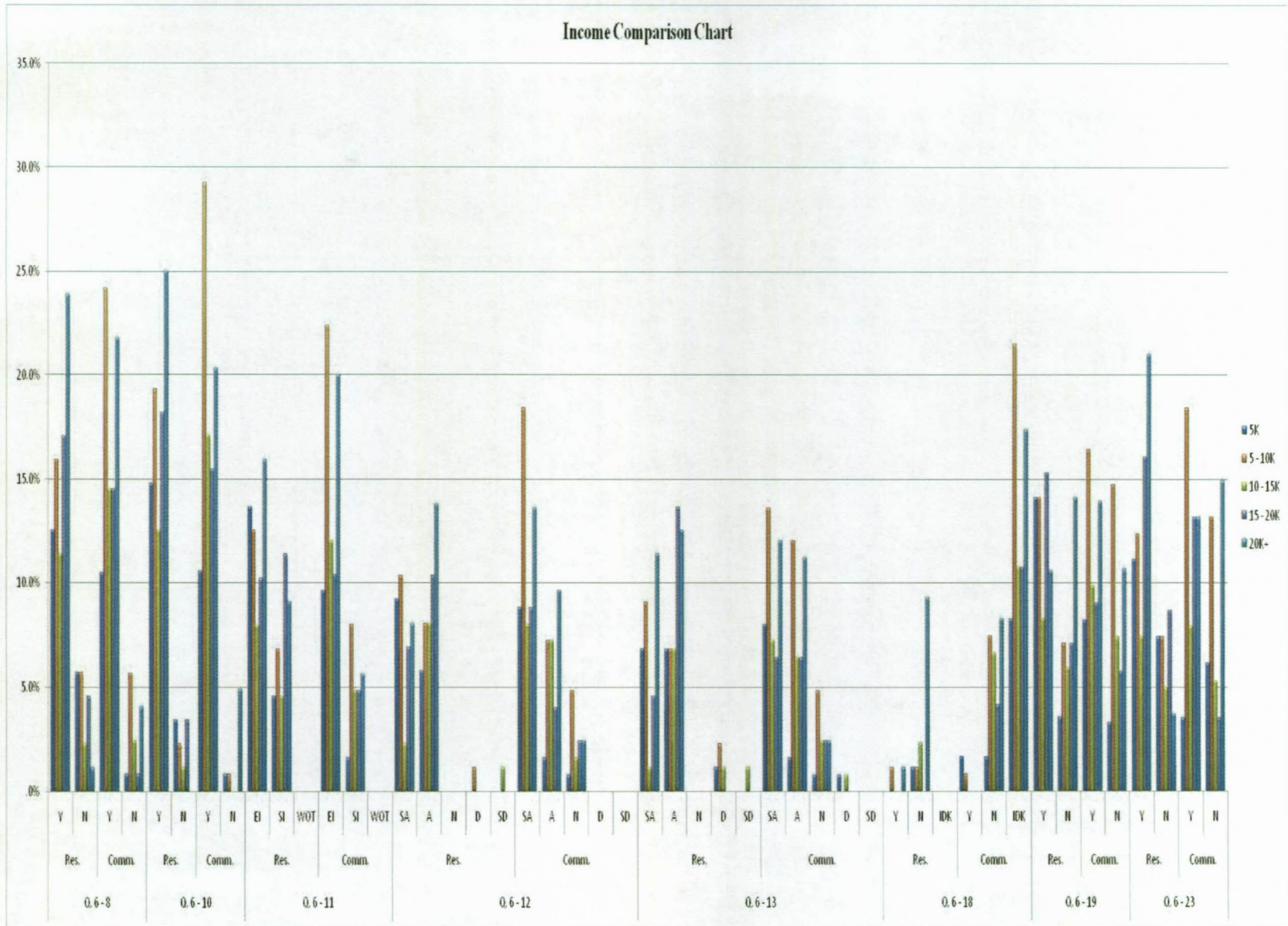


Figure 21: Income Comparison Chart

- Commercial type compared to 3, 22 (Figure 23) and Residential type compared to 3, 22 (Figure 22) are discussed as follows.

In the category weighing 5–10kg per week, residential recipients living in houses produce more waste than those recipients living in a flat. Then in the category weighing 10–15kg per week, residential recipients living in flats produce far more waste than those living in houses. Most recipients interviewed are between the ages of 18 and 34 years old and live in flats. Commercial recipients working in the service sector produce the most waste weighing 5–10kg per week. This result is then, followed by retail. Most recipients interviewed are working in the service business and are between the ages of 25–54 years old.

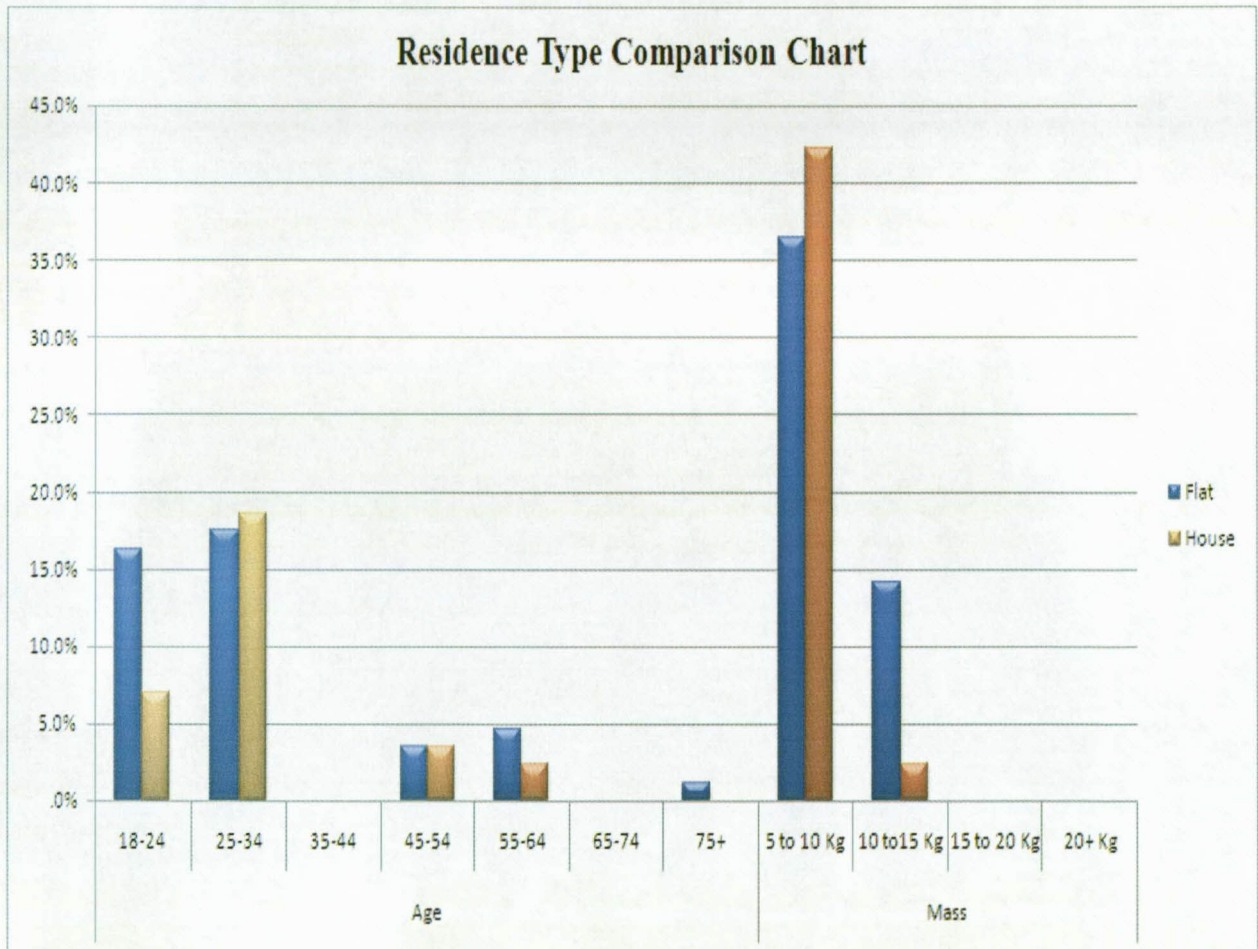


Figure 22: Residence Type Comparison Chart

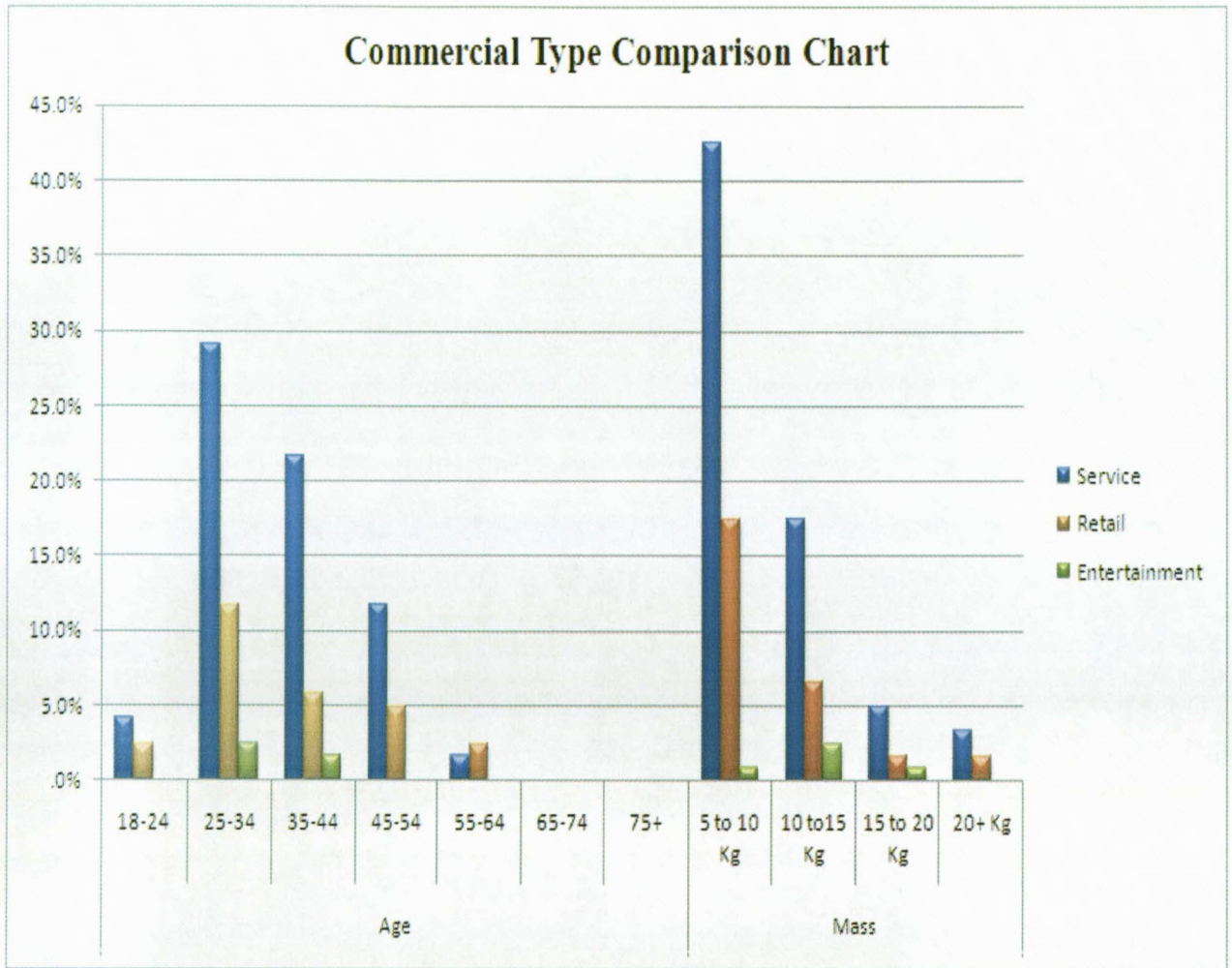


Figure 23: Commercial Type Comparison Chart

#### 4.4 Interviews

Four interviews were conducted to assist with the findings in this report. The first two were from recycling/ collection companies based in Bloemfontein, where the third was an interview from Bergvliet High School in Cape Town.



#### 4.4.1.1 Rat Race Waste: Mr. André van Zyl (Owner)

An interview was conducted with Mr. Andre van Zyl on 11 October 2011, 14:00, at the premises of Rat Race Waste, discussing the topic of recycling and ideas around it. Rat Race Waste founded their recycling business after people started bringing recyclable waste, other than scrap metal. Rat Race Waste accepts most types of recyclables which includes things like glass, plastic, paper and cans. Unfortunately, Rat Race Waste does not collect separated waste from households anymore as it has become uneconomical. Landfills are an important source of income for dump 'scavengers'. Rat Race Waste does not formally collaborate with Mangaung Metropolitan Municipality.

Since the introduction of the IWMS, the municipality's commitment and enthusiasm has diminished. It was stated that Rat Race Waste does work with the Department of Trade and Industry occasionally. Separating waste is too much of an effort for people to manage, this is why there is little recycling currently being done in Bloemfontein. Individual recycling definitely makes a difference, but depends on the person's attitude. South Africa still has a long way to go, in terms of recycling as there are limited funds to build recycling plants. The age groups most willing to recycling, experienced by Rat Race Waste is the 25-30 years old age bracket and then, people older than 60. Perhaps the other age groups do not recycle because of a lack of knowledge.

This man, shown in illustration 3, was bringing plastic bottles to be weighed and thereby was earning a meager living. He was embarrassed about making a living off trading-in recyclable waste because the rest of his family was wealthy. But without realizing it, he is contributing more to the protection of the environment by making an honest living than a lot of people would do, even if they were given an incentive. These 'scavengers' or 'waste pickers' are all adding value without realising it, even if it is only one small bagful at a time.



Illustration 3: Man collecting plastic bottles (Van Zyl, 2011: personal communication)

#### 4.4.1.2 Master Recyclers: Mr. Abri Kruger (Owner)

An interview was conducted with Mr. Abri Kruger, owner of Master Recyclers in Bloemfontein on 20 October 2011 at 08:00. A discussion on the topic of recycling and waste collection, and ideas centred on them was carried out. The interest started about 13 years ago, but was up and running for 7 years now. Mr. Kruger took an interest in people picking up waste material, finding out where it goes and where it finally ends up. Master Recyclers collects large volumes of separated waste from industries and the commercial sector but not from private homes. Currently there are discussions with Sasol to start a few new buy-back centres. No external funding from the government or municipalities is given, all our income is internally based. The only initiative currently being considered is that the Mayor of Bloemfontein has informed Master Recyclers on their responsibility to clean up the city as the President and other important people will be visiting Bloemfontein next year, but no funding was conferred.

Master recyclers feel like they have made a significant contribution to the reducing the amount of waste at Bloemfontein's rubbish dumps, through collection efforts that they have extended the dumps' full capacity from 5 years to 10 years. People do not recycle or separate their waste because of lack of education. Individual recycling makes a difference and it depends on the person's standard of living and depends on the individual's attitude which will affect their behaviour. White people are not so positive about recycling but they are inspired to be environmentally friendly. Black people recycle to earn an honest living and are even small entrepreneurs. Even though expenses are high, in terms of recycling South Africa is doing well, because we have companies like Sappi, Mondi and Nampak. Children love to get involved in recycling! Master Recyclers' business has grown so substantially that they now have a new conveyor and compactor (Illustration 4), which was installed a few months ago - the first of its kind in South Africa, so much so that Sappi has taken an interest. Master Recyclers new machine is fitted with safety and emergency cut-off sensors.



Illustration 4: Master Recyclers new conveyor and compactor (Kruger, 2011: personal communication)

#### 4.4.1.3 Bergvliet High School: Mrs. Willy Webb (Chief Recycling Coordinator)

This interview is put forward as an example to show the Free State just how successful a school recycling program may be, if it is conducted and managed correctly. A school can conduct a recycling project, which rather engages the surrounding community or parents to invest their time and rubbish in the school – children at the school are excluded.

An interview was conducted with Mrs Willy Webb, chief recycling coordinator at Bergvliet Secondary High School, Cape Town, on 21 October 2011 at 10:00, on the topic of recycling and waste collection, and ideas centred around this topic. The project was started at Bergvliet High School 21 years ago after being asked by the school's principal to do so. This she initiated and would only do if all proceeds gained from the project would be used for the school and its pupils.

At the time, Mrs Webb was involved in a similar project at Sweet Valley Primary School in Cape Town, which she had started 2 years earlier, where she was collecting only newspapers. The recycling project funded itself from the beginning, with the help of volunteers.

The first three years the project was run from a wooden wendy house, and then with the proceeds brought in from the recycling, a bakkie was purchased and a single concrete garage was built. Later, with the insurance money, after a fire in the garage, Mrs Webb bought a three door garage which now serves as a sorting depot. According to Mrs Webb, when a person separates the waste at the source, the proceeds received are higher. "The sorted material is collected by Collect-a-Can, Mondi (Illustration 5), Mkamva and Tecpak. There is no participation by the pupils, as they do not want to do it, they are teased and laughed at! This occurs at most high schools, I believe. The only time they participate is if they are in detention. Many past pupils, the community, restaurants, bars and sports clubs contribute with their time. I often collect the recycling myself or it is dropped off at the school. This initiative has made the school R100 000 per year. The best year was R128 000.

The main aim of the recycling project is to collect funds for the school and its pupils. We funded a new laboratory and classroom equipment. We worked 3 years for a kitted out computer room.”



Illustration 5: Mondri collecting newspaper from Bergvliet High School (Webb, 2011: personal communication)

#### 4.5 Summary of Interviews

A positive outlook for landfills has been found to exist between residential recipients, commercial recipients and the interviewees. But on the other hand, according to the interviewees, commercial and residential recipients, the Mangaung Metropolitan Municipality has shown little or no interest in a commitment to implement recycling programmes. Individual recycling does definitely make a difference according to the interviewees, where 80.2% were residential recipients and 87.7% were commercial recipients. Education also plays an important role in the levels of recycling taking place now and in the future. Infrastructure provided by the government and the private sector is also very limited.

## CHAPTER 5: CONCLUSIONS

Chapter 5 will discuss the conclusions and suggest recommendations for further research.

### 5.1 Conclusion

“Conservation behaviour is an intimidating, neglected and ill supported custom or activity. This activity, laid out over a lengthy timeframe gives the appearance of dissipating into nothingness and all traces of achievement seem to disappear all together along with it. These actions possess various differences to all those performing the actions and these differences seem to alter the workings, to include negative effects. These differences have changed the way we view the planned positive outcomes to do with the processes of conservation behaviour” (De Young, 1993: 499, 500).

De Young (1993: 485, 486), an environmental psychologist, states that common patterns of change that we have been experiencing today has persuaded or forcefully coaxed us into altering our mindset about our environmental realities. We become too dependent on our resources and it admittedly becomes an expensive vice. There are various battles to fight to keep our level of prosperity intact, like climate stress, water shortages, food insecurities, energy constraints and a large amount of unnecessary waste. We have to become more innovative and sustainable in the ways we heat our homes, consume and fuel our growing industrial economy. Our goals have somewhat changed over previous years but we still need to alter our goals as we notice so that the outcomes of our behaviours’ will change. This behaviour alteration is needed, to be on par with the changes in our environment and the stresses that come with it.

This behaviour alteration may be measured and compared over time, against the levels of the developed Recycling Behaviour Model.

It may easily be noted that there is a lot of work and information needed in order to adapt our behaviour change methods for the better. It is not just externally where the alteration is needed but internally from the heart, is where it matters the most. This is most important to ensure that the methods are sustainable in the long run. It may also be said that over the long run, these techniques need to reach a happy medium for everyone

involved, as to gain some kind of accumulated sense of good spirit in what is being done throughout the various communities and societies.

This internally derived satisfaction of conserving for future generations may eventually be enjoyed by those doing the conserving (De Young, 1993: 501).

To conclude, it only takes a few important people who have an appreciation for the environment and recycling in general, and they could pressure their local community to recycle and change their mindset about it. They could then encourage the adjoining greater communities to recycle too, though various social pressures (Shackelford, 2006: 1555). Start from the ground and work your way up to where it matters the most states Shackelford (2006: 1555).

From this investigation, international and local recycling behaviour can be identified and understood. Including, having good comprehension of South Africa's waste management plans and policies.

Results found from the analysis reveal that all groups and demographics are unified with similar ideas, throughout all the questions and variations. All recipients, residential or commercial, have the most common principal in mind, all are very pro-recycling and waste management in general but that are only willing to perform if the municipality pulls their weight and sponsors/ initiates programmes, methods and facilities. Recycling would like to be done but all recipients, who need to be informed about how to be efficient. Unfortunately, one thing that all recipients have in common is the use of landfills, but this may be because of the lack of other options and facilities, even though their knowledge is sufficient on topics concerning the environment. From this explanation it may be deduced that an acceptable profile of recycling attitudes and behaviours of Westdene recipients', commercial and residential, exists.

## 5.2 Recommendations

After careful consideration and analysis of all collected data and interviews, these are the proposed recommendations.

Firstly, on a personal level, as an individual, we need to figure out or determine what sort of level of education we are currently at, concerning waste management and recycling. There will always be some people who will remain oblivious to the seriousness of not recycling. We need to determine whether we may need additional knowledge in order to fulfill our moral obligation to the environment, even though some are blissfully unaware of this concept all together.

This will enrich our lives and those of others and even if it feels like a one sided relationship to start with, by leading by example, others will hopefully follow suit soon enough. Our attitudes and behaviours are very powerful persuaders in our everyday decisions and those of others. A strong person who leads the way will be a very effective source of motivation, strength and understanding. We have a long way to go in South Africa until we are on par with the rest of the world, but we are recognised by the world as being a strong, willful and resourceful nation.

Secondly, Bloemfontein as a whole community has a few options to assist us in our recycling/separation efforts. Rat Race Waste no longer fetches separated waste from private homes as it no longer economically viable to do so but they accept waste which is dropped off at their premises in Douglas Street. This may be a better option as the recycler is not rushed as one is with a weekly collection. The down side could be that you have to separate the waste on your private household property until you are ready to take all these recyclable items to Rat Race Waste. Thereafter, they will weigh your items and pay you accordingly bearing in mind it will be a small amount for a small household amount of waste.



On a larger scale, if there is a commercial business that produces large amounts of waste, the owner may organise that Rat Race Waste will collect the separated waste.

Both ideas mentioned above may be applied to Master Recyclers as well, although they might fetch from the private household on occasion, only if it is economically viable to do so.

Thirdly, Bergvliet High School. This school, even though it is in Cape Town, is a great example to schools in Bloemfontein, to show what a proper recycling program can accomplish. Bergvliet High School should be an inspiration to everyone, especially to other schools. However small and helpless a child might feel, getting them involved at a young age will assist in conditioning good environmentally friendly habits later on. This small contribution will hopefully become exponentially bigger.

Bergvliet High School won 1st place for collecting the most amount of cans from a school in February and March 2011, they also gained 3<sup>rd</sup> place in February and 5<sup>th</sup> place in March for the most cans collected by the students (Bergvliet High School, 2011: Online).

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## APPENDICES

### Appendix A

UNIVERSITEIT VAN DIE VRYSTAAT  
UNIVERSITY OF THE FREE STATE  
YUNIVESITHI YA FREISTATA

Departement Geografie  
Department of Geography  
Lefapha la Jeografi



Enquiries: A. Marchand  
Tel: 0846068746  
Fax: 051 401 3816  
E-mail: ashleighmarchand@gmail.com  
28 May 2010

To whom it may concern

#### RESEARCH ON THE RECYCLING BEHAVIOUR OF WESTDENE RESIDENTS

I am a registered student at the University of the Free State and am currently undertaking research for my Master's degree.

I am researching the recycling behaviour of people in order to identify what recycling is currently done and how recycling can be enhanced by identifying common problems and providing better facilities to recycling. I have chosen Westdene, Bloemfontein as my study area as it is a diverse and complex community representative of Bloemfontein.

It would be greatly appreciated if you could complete the following questionnaire and return it to the Geography Department of the University of the Free State. All questionnaires will be handled confidentially and your complete honesty is appreciated.

Kind regards

A. Marchand

E. Kruger

Research supervisor



339, Internal Box 53, Bloemfontein 9300, (051) 401 2255, (051) 401 3816, geo.sci@mail.uovs.ac.za,  
Republiek van Suid-Afrika, Republic of South Africa

Cover letter for questionnaires

**University of the Free State**  
**Department of Geography**  
**Westdene**  
**Recycling Survey 2010**  
**City of Bloemfontein**

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(OFFICE USE ONLY)

*Recycle Reduce Re-use!*

Instructions: Indicate answers in block provided on the right hand side of the page

**RESIDENTIAL**

**(1) Flat/Townhouse                      (2) House**

1. What is your Gender?

- (1) Female                                      (2) Male

2. Which of the following best describes your race/ethnicity?

(Check all that apply)

- (1) Asian.                                      (4) Coloured.  
 (2) European/ Caucasian              (5) Other: \_\_\_\_\_  
 (3) Black/African

3. Which of the following ranges best describes your age?

- (1) 18 – 24yrs                              (5) 55 – 64yrs  
 (2) 25 – 34yrs                              (6) 65 – 74yrs  
 (3) 35 – 44yrs                              (7) 75+ yrs  
 (4) 45 – 54yrs

4. What is your current level of education?

- (1) Primary                                      (3) Tertiary  
 (2) Secondary

5. Approximately how many years have you lived in Westdene?

- (1) Less than 5 years                      (3) 11 – 20yrs  
 (2) 5 – 10yrs                                  (4) More than 20yrs

6. Which of the following best describes the general range of your household monthly income?

- (1) Less than R5 000.00                  (4) R15 000.00 – R20 000.00  
 (2) R5 000.00 – R10 000.00          (5) More than R20 000.00  
 (3) R10 000.00 – R15 000.00

7. Do you currently recycle? (check ONE)

- (1) YES --- answer 7a & 7b  
 (2) No --- go to answer 7c  
 (3) Sometimes --- go to answer 7a & 7b

7a If YES/SOMETIMES to #7, how do you recycle? (Check all that apply)

- (1) I take recyclables to a "drop off" location.  
 (2) I use a private recycling service  
 (3) Separate waste into appropriate bins.  
 (4) Other: explain \_\_\_\_\_

7b If YES/SOMETIMES to #7, what do you recycle? (Check all that apply)

- (1) Aluminum cans                      (5) Paper and/or cardboard  
 (2) Plastics                                  (6) Glass products  
 (3) Newspapers                          (7) E. Waste eg: old computers  
 (4) Food Waste                              (8) Other: explain \_\_\_\_\_














7c If NO to #7, Are the reasons that you DO NOT currently recycle a matter of ....

(Check all that apply)

- (1) Convenience
- (2) Space
- (3) Time
- (4) Opportunity
- (5) Lack of infrastructure
- (6) Lack of information on recycling
- (7) Interest level
- (8) Other, explain \_\_\_\_\_


8. Do you think you would recycle more if facilities were provided in your area?

- (1) Yes
- (2) No

9. What facilities do you think should be provided for homes in your area?

- (1) Coloured recycling bins
- (2) Coloured recycling bags
- (3) More frequent collection of waste
- (4) More collection points
- (5) Other: \_\_\_\_\_

10. If the local municipality paid for recycling bins and the collection of such waste, would you recycle more?

- (1) Yes
- (2) No

11. Your perception is that, in terms of conserving the environment recycling is ...

- (1) Extremely important
- (2) Somewhat important
- (3) A waste of time

12. If you feel that your individual recycling makes a difference, would you recycle more?

- (1) Strongly agree
- (2) Agree
- (3) Neutral
- (4) Disagree
- (5) Strongly disagree

13. If you were given more information about why recycling is important, would you recycle more?

- (1) Strongly agree
- (2) Agree
- (3) Neutral
- (4) Disagree
- (5) Strongly disagree

14. Are there waste items that you do not know how to recycle?

- (1) Strongly agree
- (2) Agree
- (3) Neutral
- (4) Disagree
- (5) Strongly disagree

15. Indicate what items typically go into your garbage

- (1) Cans, aluminum and/ or tin
- (2) Paper
- (3) Styrofoam (containers/ packaging material)
- (4) Cardboard
- (5) Disposable Diapers
- (6) Plastic containers
- (7) Batteries
- (8) Household electrical appliances
- (9) Food Waste
- (10) Glass bottles
- (11) Aluminum foil
- (12) Newspapers
- (13) Grocery bags (plastic or paper)
- (14) Egg cartons
- (15) Old clothing
- (16) E.waste. eg. Old computers
- (17) Fluorescent light bulbs
- (18) Garden refuse


16. Which Items (of those listed above) could be recycled – by you or someone else

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17. Which of the following items would you consider as a priority to recycle?

List in order of highest priority first.

- (1) Paper/cardboard
- (2) Electronics
- (3) Lead Acid batteries
- (4) Plastic shopping bags
- (5) Glass bottles
- (6) Hazardous Chemicals, eg. Motor Oil

18. Does your suburb (Westdene) have a place to recycle any of the above items?

- (1) Yes
- (2) No
- (3) I don't know

If yes, what items and where? \_\_\_\_\_

19. Would you use a garden refuse/ food waste recycling facility?

- (1) Yes
- (2) No

20. What do you do with most of your food waste?

- (1) Put in the garbage
- (2) Home compost bin
- (3) Donate
- (4) Feed the dog/Pet
- (5) Do not generate any
- (6) Other, Specify: \_\_\_\_\_

21. What are benefits and drawbacks of recycling to your family?

Benefits

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Drawbacks

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

22. What is the estimated amount of waste produced by your home daily?

- (1) 5 – 10kg
- (2) 10 – 15kg
- (3) 15 – 20kg
- (4) More than 20kg

23. Do you think landfills are a good idea?

- (1) Yes
- (2) No

24. Which would you consider as the most important reasons to recycle?

List in order of highest priority first.

- (1) Reducing pollutants
- (2) Reducing energy use
- (3) Decreasing landfill volumes
- (4) Reducing green house gas emissions

This concludes the survey. Thank you for your time! Regards Ashleigh Marchand

*Recycle Reduce Re-Use!*

**University of the Free State  
Department of Geography  
Westdene  
Recycling Survey 2010  
City of Bloemfontein**

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(OFFICE USE ONLY)

*Recycle Reduce Re-use!*

Instructions: Indicate answers in block provided on the right-hand side of the page

**COMMERCIAL/ BUSINESS**

(1) Service Provider      (2) Retail      (3) Entertainment

Please state business type: .....

- 1. What is your Gender? 
  - (1) Female (2) Male
- 2. Which of the following best describes your race/ethnicity? 
  - (1) Asian. (4) Coloured.
  - (2) European/ Caucasian. (5) Other: \_\_\_\_\_
  - (3) Black/African
- 3. Which of the following ranges best describes your age? 
  - (1) 18 – 24yrs (4) 45 – 54yrs.
  - (2) 25 – 34yrs (5) 55 – 65yrs
  - (3) 35 – 44yrs
- 4. What is your current level of education? 
  - (1) Primary (3) Tertiary
  - (2) Secondary
- 5. Approximately how many years have you owned a business/ worked in Westdene? 
  - (1) Less than 5 years (3) 11 – 20yrs
  - (2) 5 – 10yrs (4) More than 20yrs
- 6. Which of the following best describes the general range of your monthly income? 
  - (1) Less than R5 000.00 (4) R15 000.00 – R20 000.00
  - (2) R5 000.00 – R10 000.00 (5) More than R20 000.00
  - (3) R10 000.00 – R15 000.00
- 7. Does your business have a recycling protocol? (check ONE) 
  - (1) YES --- answer 7a & 7b
  - (2) No --- go to answer 7c
  - (3) Sometimes --- go to answer 7a & 7b
- 7a If YES/SOMETIMES to #7, how do you recycle? (Check all that apply) 
  - (1) I take recyclables to a "drop off" location.
  - (2) I use a private recycling service
  - (3) Separate waste into appropriate bins.
  - (4) Other: explain \_\_\_\_\_
- 7b If YES/SOMETIMES to #7, what do you recycle? (Check all that apply) 

(1) Aluminum cans <span style="margin-left: 100px;">(5) Paper and/or cardboard</span>	<input type="checkbox"/>
(2) Plastics <span style="margin-left: 100px;">(6) Glass products</span>	<input type="checkbox"/>
(3) Newspapers <span style="margin-left: 100px;">(7) E. Waste eg: old computers</span>	<input type="checkbox"/>
(4) Food Waste <span style="margin-left: 100px;">(8) Other: explain _____</span>	<input type="checkbox"/>


7c If NO to #7, what are the reasons that you DO NOT currently recycle?

(Check all that apply)

- (1) Convenience
- (2) Space
- (3) Time
- (4) Opportunity
- (5) Lack of infrastructure
- (6) Lack of information on recycling
- (7) Interest level
- (8) Other, explain \_\_\_\_\_

8. Do you think you would recycle more if facilities were provided in your area?

- (1) Yes
- (2) No

9. What facilities do you think should be provided for businesses in your area?

- (1) Coloured recycling bins
- (2) Coloured recycling bags
- (3) More frequent collection of waste
- (4) More collection points
- (5) Other: \_\_\_\_\_

10. If the local municipality paid for recycling bins and the collection of such waste, would you recycle more?

- (1) Yes
- (2) No

11. Your perception is that, in terms of conserving the environment recycling is ...

- (1) Extremely important
- (2) Somewhat important
- (3) A waste of time

12. If you feel that your individual recycling makes a difference, would you recycle more?

- (1) Strongly agree
- (2) Agree
- (3) Neutral
- (4) Disagree
- (5) Strongly disagree

13. If you were given more information about why recycling is important, would you recycle more?

- (1) Strongly agree
- (2) Agree
- (3) Neutral
- (4) Disagree
- (5) Strongly disagree

14. Are there waste items that you do not know how to recycle?

- (1) Strongly agree
- (2) Agree
- (3) Neutral
- (4) Disagree
- (5) Strongly disagree

15. Indicate what items typically go into your garbage

- (1) Cans, aluminum and/ or tin
- (2) Paper
- (3) Styrofoam (containers/ packaging material)
- (4) Cardboard
- (5) Disposable Diapers
- (6) Plastic containers
- (7) Batteries
- (8) Household electrical appliances
- (9) Food Waste
- (10) Glass bottles
- (11) Aluminum foil
- (12) Newspapers
- (13) Grocery bags (plastic or paper)
- (14) Egg cartons
- (15) Old clothing
- (16) E.waste. eg. Old computers
- (17) Fluorescent light bulbs
- (18) Garden refuse

16. Which items (of those listed above) could be recycled - by you or someone else

---

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---




17. **Which of the following items would you consider as a priority to recycle?**

List in order of highest priority first.

- (1) Paper/cardboard
- (2) Electronics
- (3) Lead Acid batteries
- (4) Plastic shopping bags
- (5) Glass bottles
- (6) Hazardous Chemicals, eg. Motor Oil

18. **Does your suburb (Westdene) have a place to recycle any of the above items?**

- (1) Yes (2) No (3) I don't know

If yes, what items and where? \_\_\_\_\_

19. **Would you use a garden refuse/ food waste recycling facility?**

- (1) Yes (2) No

20. **What do you do with most of your food waste?**

- (1) Put in the garbage (4) Do not generate any
- (2) Compost bin (5) Sell (for animal feed)
- (3) Donate (6) Other, Specify: \_\_\_\_\_

21. **What are benefits and drawbacks of recycling to your business?**

Benefits	Drawbacks
_____	_____
_____	_____
_____	_____

22. **What is the estimated amount of waste produced daily by your business?**

- (1) 5 – 10kg (3) 15 – 20kg
- (2) 10 – 15kg (4) More than 20kg

23. **Do you think landfills are a good idea?**

- (1) Yes (2) No

24. **Which would you consider as the most important reasons to recycle?**

List in order of highest priority to lowest priority.

- (1) Reducing pollutants (3) Decreasing landfill volumes
- (2) Reducing energy use (4) Reducing green house gas emissions

This concludes the survey. Thank you for your time! Regards Ashleigh Marchand

*Recycle Reduce Re-Use!*


Appendix D

Institution: University of the Free State, Department of Geography

Interviewer: Ashleigh Marchand

Interviewee: Andre' van Zyl (0824489955 / 051 4489955)

Company: Rat Race Waste

Address: 54 Douglas Street, Bloemfontein

Date: 11 October 2011

Time: 14:00

Thank you very much for taking the time to chat to me!

1. How did you get into the waste management industry?

---

2. What type of separating bins do you provide?

---

3. What do you collect?

---

- 3.1 What about e waste?

---

4. What is the rand per kg of paper, plastic, metal and glass?

---

5. Do you collect the separated waste or can it be dropped off?

---



5.1 How often do you collect the separated waste?

---

6. What does Rat Race Waste do with the separated waste once you have collected it?

---

7. Do private separators at home or business need to compact their own items?

---

8. Does Rat Race Waste encourage any household composting?

---

8.1 Do you provide a bin that clients can purchase for composting?

---

9. How many residential and commercial clients do you currently collect separated waste from?

---

10. How many of these clients are from the Westdene area?

---

11. How do you fund the workings of the company? (Main sources of income)?

---

12. Does Rat Race Waste have any drop-off sites in Bloemfontein?

---

12.1 If no, would you in the future?

---

13. How do you feel about landfills?

---

14. How do you feel about waste to energy plants in South Africa?

---

15. Does Rat Race Waste collaborate with Mangaung Local Municipality on any projects or initiatives?

---

16. What do you think are the reasons why people do not recycle or separate their waste?

---

17. Do you think that individual recycling makes a difference?

---

18. Do you think that a person's attitude affects their behaviour, in terms of recycling?

---

19. Do you get a lot a phone calls and emails from people looking for information about recycling and separating waste?

---

20. On a scale of 1 – 10 where do you think South Africa is, in relation to the rest of the world, in terms of general waste management?

---

20.1 Why?

---

21. What are the main items that go into an average residential homes garbage bin?

---

21.1 Average weight per home?

---

22. What are the main items that go into an average commercial businesses garbage bin?

---

22.1 Average weight per commercial business?

---

23. What age group do you think recycles the most?

---

Appendix E

Institution: University of the Free State, Department of the Free State

Interviewer: Ashleigh Marchand

Interviewee: Abri Kruger (0514475926/ 0824468173)

Company: Master Recyclers

Address: Rhodes Street, Bloemfontein

Date: 20 October 2011

Time: 08:00

Thank you very much for taking the time to chat to me!

1. How did you get into the waste management industry?

---

2. What do you collect?

---

- 2.1 What about e waste?

---

3. What is the rand per kg of paper, plastic, metal and glass?

---

4. Do you collect the separated waste or can it be dropped off?

---

- 4.1 How often do you collect the separated waste?

---

5. What does Master Recyclers do with the separated waste once you have collected it?

---

6. Do private separators at home or business need to compact their own items?

---

7. Does Master Recyclers encourage any household composting?

---

7.1 Do you provide a bin that clients can purchase for composting?

---

8. How many residential and commercial clients do you currently collect separated waste from?

---

9. How many of these clients are from the Westdene area?

---

10. How do you fund the workings of the company? (Main sources of income)?

---

11. Does Master Recyclers have any drop-off sites in Bloemfontein?

---

11.1 If no, would you in the future?

---

12. How do you feel about landfills?

---

13. How do you feel about waste to energy plants in South Africa?

---

14. Does Master Recyclers collaborate with Mangaung Local Municipality on any projects or initiatives?

---

15. What do you think are the reasons why people do not recycle or separate their waste?

---

16. Do you think that individual recycling makes a difference?

---

17. Do you think that a person's attitude affects their behaviour, in terms of recycling?

---

18. Do you get a lot a phone calls and emails from people looking for information about recycling and separating waste?

---

19. On a scale of 1 – 10 where do you think South Africa is, in relation to the rest of the world, in terms of general waste management?

---

19.1 Why?

---

20. What are the main items that go into an average residential homes garbage bin?

---

20.1 Average weight per home?

---

21. What are the main items that go into an average commercial businesses garbage bin?

---

21.1 Average weight per commercial business?

---

22. What age group do you think recycles the most?

---

2.3. Do the employees of Master Recyclers try to recycle at home too and generally be more environmentally aware?

---

## Appendix F

Institution: University of the Free State, Department of Geography.

Interviewee: Mrs. Willy Webb (Chief Recycling Coordinator)

Interviewer: Ashleigh Marchand ([ashleighmarchand@gmail.com](mailto:ashleighmarchand@gmail.com))

Location: Bergvliet High School, Cape Town

Date: 21 October 2011

Time: 10:00

Thank you for taking the time to assist me in my research!

1. When was the project started?
2. Who funded the start up of the recycling project?
3. Who collects the sorted recycling?
4. How often is the Recycling collected?
5. How much is collected?
6. What are the attitudes and behaviours of the pupils towards recycling?
7. Who contributes?
8. What is the annual income from the recycling for the school?
9. What is the money used for?

Interview 3

Page 1



## Appendix G

### Commercial Data

#### Level 1

- **Question 1: C: What is your gender?**

	<b>Commercial</b>
Female	60.0%
Male	40.0%

Table 1: C: Question 1

- **Question 2: C: Which of the following best describes your race/ ethnicity?**

	<b>Commercial</b>
Asian	1.6%
European/Caucasian	56.3%
Black/African	24.2%
Coloured	8.6%
Other	9.4%

Table 2: C: Question 2

- **Question 3: C: Which of the following ranges best describes your age?**

	<b>Commercial</b>
18 -24yrs	7.7%
25 - 34yrs	43.1%
35 - 44yrs	30.0%
45 - 54yrs	15.4%
55 - 64yrs	3.8%
65 - 74yrs	
75+yrs	

Table 3: C: Question 3

- **Question 4: C: What is your current level of education?**

	Commercial
Primary	1.6%
Secondary	27.3%
Tertiary	71.1%

Table 4: C: Question 4

- **Question 5: C: Approximately how many years have you owned a business/ worked in Westdene?**

	Commercial
Less than 5yrs	52.3%
5 - 10yrs	35.4%
11 - 20yrs	7.7%
more than 20 yrs	4.6%

Table 6: C: Question 5

- **Question 6: C: Which of the following best describes the general range of your monthly income?**

	Commercial
Less than R5000.00	11.2%
R5 000.00 - R10 000.00	30.4%
R10 000.00 - R15 000.00	16.8%
R15 000.00 - R20 000.00	15.2%
More than R20 000.00	25.6%

Table 7: C: Question 6

- **Question 7: C: Does your business have a recycling protocol?**

	Commercial
Yes	18.1%
No	67.7%
Sometimes	14.2%

Table 12: C: Question 7

- **Question 7a: C: If yes/sometimes to #7, how do you recycle?**

	<b>Commercial</b>
Recyclables to drop off	35.6%
Private recycling company	31.1%
Separate waste in bins	22.2%
Other	11.1%

Table 13: C: Question 7a

- **Question 7b: C: If yes/sometimes to #7, what do you recycle?**

	<b>Commercial</b>
Aluminium Cans	4.5%
Plastics	10.4%
Newspaper	17.9%
Food Waste	3.0%
Paper and/ or cardboard	38.8%
Glass	11.9%
E.Waste	9.0%
Other	4.5%

Table 14: C: Question 7b

- **Question 7c: C: If no to #7, what are the reasons that you do not currently recycle?**

	<b>Commercial</b>
Convenience	7.7%
Space	15.7%
Time	22.6%
Opportunity	6.4%
Lack of Infrastructure	15.3%
Lack of information on Recycling	19.1%
Interest level	11.1%
Other	2.1%

Table 15: C: Question 7c

- **Question 11: C: Your perception is that, in terms of conserving the environment, recycling is...**

	Commercial
Extremely Important	76.2%
Somewhat Important	23.8%
A waste of time	0.0%

Table 16: C: Question 11

- **Question 12: C: If you feel that your individual recycling makes a difference, would you recycle more?**

	Commercial
Strongly agree	57.7%
Agree	30.0%
Neutral	12.3%
Disagree	
Strongly Disagree	

Table 17: C: Question 12

- **Question 15: C: Indicate what items typically go into your garbage.**

	Commercial
Cans, aluminium and or tin	11.1%
Paper	16.0%
Styrofoam containers/packaging	6.4%
Cardboard	6.4%
Disposable Diapers	1.3%
Plastic Containers	9.0%
Batteries	2.0%
Household electrical appl.	1.0%
Food Waste	11.3%
Glass Bottles	5.6%

Aluminium Foil	2.1%
Newspapers	9.3%
Grocery bags(plastic or paper)	7.0%
Egg Cartons	2.8%
Old Clothing	0.9%
E. Waste	1.0%
Fluorescent Light bulbs	2.7%
Garden Refuse	4.3%

Table 18: C: Question 15

- **Question 18: C: Does your suburb (Westdene) have a place to recycle any of the above items?**

	Commercial
Yes	3.2%
No	27.0%
I don't Know	69.8%

Table 19: Question 18

- **Question 20: C: What do you do with most of your food waste?**

	Commercial
Put it in the garbage	71.8%
Compost Bin	3.2%
Donate	3.2%
Do not Generate any	15.3%
Sell ( for animal feed)	1.6%
Other	4.8%

Table 20: C: Question 20

- **Question 22: C:** What is the estimated amount of waste produced by your home/business daily?

	<b>Commercial</b>
5 - 10kg	61.5%
10 - 15kg	25.4%
15 - 20kg	8.5%
More than 20kg	4.6%

Table 21: C: Question 22

- **Question 24: C:** Which would you consider as the most important reasons to recycle?

		Reduce pollutants	Reducing Energy Use	Decreasing Landfill Volumes	Reducing Green House gas Emissions
<b>Commercial</b>	<b>1st</b>	55.9%	24.3%	16.2%	7.1%
	<b>2nd</b>	4.7%	37.8%	31.4%	25.5%
	<b>3rd</b>	15.0%	16.2%	35.2%	33.7%
	<b>4th</b>	24.4%	21.6%	17.1%	33.7%

Table 22: C: Question 24

## Level 2

- **Question 13: C:** If you were given more information about why recycling is important, would you recycle more?

	<b>Commercial</b>
Strongly agree	47.7%
Agree	38.5%
Neutral	12.3%
Disagree	1.5%
Strongly disagree	

Table 23: C: Question 13

- **Question 14: C: Are there waste items that you do not know how to recycle?**

	Commercial
Strongly Agree	23.8%
Agree	50.0%
Neutral	17.5%
Disagree	6.3%
Strongly Disagree	2.4%

Table 24: C: Question 14

- **Question 23: C: Do you think landfills are a good idea?**

	Commercial
Yes	57.6%
No	42.4%

Table 25: C: Question 23

### Level 3

- **Question 8: C: Do you think you would recycle more if facilities were provided in your area?**

	Commercial
Yes	86.0%
No	14.0%

Table 26: C: Question 8

- **Question 9: C: What facilities do you think should be provided for homes/businesses in your area?**

	Commercial
Coloured recycling bins	41.3%
Coloured recycling bags	11.9%
More frequent waste collection	23.8%
More collection points	23.0%

Table 27: C: Question 9

- **Question 10: C: If the local municipality paid for recycling bins and the collection of such waste, would you recycle more?**

	Commercial
Yes	93.0%
No	7.0%

Table 28: C: Question 10

#### Level 4

- **Question 16: C: Which items could be recycled – by you or someone else?**

	Commercial
Cans, aluminium and or tin	9.3%
Paper	16.1%
Styrofoam containers/packaging	4.3%
Cardboard	6.6%
Disposable Diapers	2.0%
Plastic Containers	8.1%
Batteries	4.3%
Household electrical appl.	2.7%
Food Waste	4.1%
Glass Bottles	5.9%
Aluminium Foil	2.5%
Newspapers	9.5%
Grocery bags(plastic or paper)	5.9%
Egg Cartons	4.1%
Old Clothing	3.6%
E.Waste	3.8%
Fluorescent Light bulbs	3.4%
Garden Refuse	3.8%
Other	0.0%

Table 29: C: Question 16



• **Question 19: C: Would you use a garden refuse/ food waste recycle facility?**

	<b>Commercial</b>
Yes	58.3%
No	41.7%

Table 30: C: Question 19

• **Question 21: C: What are the benefits and drawbacks of recycling to your business?**

<b>Benefits</b>	<b>Number of comments</b>	<b>Drawbacks</b>	<b>Number of comments</b>
Environmentally Beneficial /Cleaner Environment	21	Time Consuming	12
Safety.eg.	11	None	7
Cost recovery	6	Space needed	7
Reducing Waste and Pollution	6	Be an Effort	4
Business/Office remains clean & tidy	5	Lack of Recycling Facilities	4
Recycle to cut costs, thus spend less	4	Foul Smell	2
Less Rubbish to dispose of	3	Lack of Interest	2
Reusing Paper	3	Costs	1
None	3	Don't know where collection point are	1
Will educate staff more on recycling	2	Injuries	1
Create more space in office	2	Lack of Bins and Bags for separating	1
Leaving a smaller carbon footprint	1	Piles of Rubbish	1
All medical waste professional disposed of	1	Unhygienic due to late collections	1
Keeps town clean and healthy	1	Waste of Time	1
Making a small contribution	1		

Table 32: C: Question 21

## Appendix H

### Residential Data

#### Level 1

- **Question 1: R: What is your gender?**

	<b>Residential</b>
Female	41.8%
Male	58.2%

Table 1: R: Question 1

- **Question 2: R: Which of the following best describes your race/ ethnicity?**

	<b>Residential</b>
Asian	5.1%
European/Caucasian	51.0%
Black/African	27.6%
Coloured	13.3%
Other	3.1%

Table 2: R: Question 2

- **Question 3: R: Which of the following ranges best describes your age?**

	<b>Residential</b>
18 -24yrs	20.4%
25 - 34yrs	37.8%
35 - 44yrs	27.6%
45 - 54yrs	7.1%
55 - 64yrs	6.1%
65 - 74yrs	6.1%
75+yrs	1.0%

Table 3: R: Question 3

- **Question 4: R: What is your current level of education?**

	<b>Residential</b>
Primary	6.4%
Secondary	24.5%
Tertiary	69.1%

Table 4: R: Question 4

- **Question 5: R: Approximately how many years have you lived in Westdene?**

	<b>Residential</b>
Less than 5yrs	55.1%
5 - 10yrs	29.6%
11 - 20yrs	11.2%
More than 20yrs	4.1%

Table 5: R: Question 5

- **Question 6: R: Which of the following best describes the general range of your monthly income?**

	<b>Residential</b>
Less than R5000.00	18.0%
R5 000.00 - R10 000.00	21.3%
R10 000.00 - R15 000.00	13.5%
R15 000.00 - R20 000.00	22.5%
More than R20 000.00	24.7%

Table 7: R: Question 6

- **Question 7: R: Do you currently recycle?**

	<b>Residential</b>
Yes	14.4%
No	80.4%
Sometimes	5.2%

Table 8: R: Question 7

- **Question 7a: R: If yes/sometimes to #7, how do you recycle?**

	<b>Residential</b>
Recyclables to drop off	36.0%
Private recycling company	16.0%
Separate waste in bins	44.0%
Other	4.0%

Table 9: R: Question 7a

- **Question 7b: R: If yes/sometimes to #7, what do you recycle?**

	<b>Residential</b>
Aluminium Cans	13.0%
Plastics	13.0%
Newspaper	20.4%
Food Waste	9.3%
Paper and/ or cardboard	22.2%
Glass	18.5%
E. Waste	3.7%
Other	

Table 10: R: Question 7b

- **Question 7c: R: If No to #7, are the reasons that you do not currently recycle a matter of...**

	<b>Residential</b>
Convenience	13.5%
Space	14.3%
Time	18.6%
Opportunity	11.8%
Lack of Infrastructure	12.7%
Lack of information on Recycling	13.1%
Interest level	15.6%
Other	0.4%

Table 11: R: Question 7c

- **Question 11: R:** Your perception is that, in terms of conserving the environment, recycling is...

	<b>Residential</b>
Extremely Important	58.8%
Somewhat Important	36.1%
A waste of time	5.2%

Table 16: R: Question 11

- **Question 12: R:** If you feel that your individual recycling makes a difference, would you recycle more?

	<b>Residential</b>
Strongly agree	35.4%
Agree	44.8%
Neutral	15.6%
Disagree	3.1%
Strongly Disagree	1.0%

Table 17: R: Question 12

- **Question 15: R:** Indicate what items typically go into your garbage.

	<b>Residential</b>
Cans, aluminium and or tin	8.3%
Paper	10.4%
Styrofoam containers/packaging	5.1%
Cardboard	5.5%
Disposable Diapers	3.9%
Plastic Containers	7.1%
Batteries	3.9%
Household electrical appl.	3.1%
Food Waste	9.5%
Glass Bottles	8.1%
Aluminium Foil	3.6%

Newspapers	8.9%
Grocery bags(plastic or paper)	5.8%
Egg Cartons	6.2%
Old Clothing	2.3%
E. Waste	1.5%
Fluorescent Light bulbs	3.0%
Garden Refuse	4.0%

Table 18: R: Question 15

- **Question 18: R: Does your suburb (Westdene) have a place to recycle any of the above items?**

	Residential
Yes	2.1%
No	12.8%
I don't Know	85.1%

Table 19: R: Question 18

- **Question 20: R: What do you do with most of your food waste?**

	Residential
Put it in the garbage	65.6%
Home Compost Bin	9.4%
Donate	2.1%
Feed the Pet	19.8%
Do not generate any	3.1%
Other	

Table 20: R: Question 20

- **Question 22: R:** What is the estimated amount of waste produced by your home/ business daily?

	<b>Residential</b>
5 - 10kg	81.3%
10 - 15kg	14.6%
15 - 20kg	4.2%
More than 20kg	

Table 21: R: Question 22

- **Question 24: R:** Which would you consider as the most important reasons to recycle?

		Reduce pollutants	Reducing Energy Use	Decreasing Landfill Volumes	Reducing Green House gas Emissions
<b>Residential</b>	<b>1st</b>	56.3%	26.8%	9.6%	11.5%
	<b>2nd</b>	11.5%	34.1%	28.9%	23.1%
	<b>3rd</b>	11.5%	20.7%	34.9%	34.6%
	<b>4th</b>	20.8%	18.3%	26.5%	30.8%

Table 22: R: Question 24

## Level 2

- **Question 13: R:** If you were given more information about why recycling is important, would you recycle more?

	<b>Residential</b>
Strongly agree	30.9%
Agree	46.4%
Neutral	15.5%
Disagree	6.2%
Strongly disagree	1.0%

Table 23: R: Question 13

- **Question 14: R: Are there waste items that you do not know how to recycle?**

	<b>Residential</b>
Strongly Agree	30.9%
Agree	43.3%
Neutral	15.5%
Disagree	9.3%
Strongly Disagree	1.0%

Table 24: R: Question 14

- **Question 23: R: Do you think landfills are a good idea?**

	<b>Residential</b>
Yes	66.3%
No	33.7%

Table 25: R: Question 23

### Level 3

- **Question 8: R: Do you think you would recycle more if facilities were provided in your area?**

	<b>Residential</b>
Yes	78.4%
No	21.6%

Table 26: R: Question 8

- **Question 9: R: What facilities do you think should be provided for homes/businesses in your area?**

	<b>Residential</b>
Coloured recycling bins	36.8%
Coloured recycling bags	16.8%
More frequent waste collection	23.2%
More collection points	23.2%

Table 27: R: Question 9



- **Question 10: R: If the local municipality paid for recycling bins and the collection of such waste, would you recycle more?**

	<b>Residential</b>
Yes	87.6%
No	12.4%

Table 28: R: Question 10

#### Level 4

- **Question 16: R: Which items could be recycled – by you or someone else?**

	<b>Residential</b>
Cans, aluminium and or tin	7.7%
Paper	11.9%
Styrofoam containers/packaging	4.0%
Cardboard	5.5%
Disposable Diapers	2.4%
Plastic Containers	6.8%
Batteries	4.4%
Household electrical appl.	3.3%
Food Waste	4.6%
Glass Bottles	9.0%
Aluminium Foil	4.4%
Newspapers	7.5%
Grocery bags(plastic or paper)	5.3%
Egg Cartons	6.2%
Old Clothing	4.6%
E.Waste	4.2%
Fluorescent Light bulbs	3.7%
Garden Refuse	4.0%
Other	4.0%

Table 29: R: Question 16

• **Question 19: R: Would you use a garden refuse/ food waste recycle facility?**

	<b>Residential</b>
Yes	62.4%
No	37.6%

Table 30: R: Question 19

• **Question 21: R: What are the benefits and drawbacks of recycling to your family?**

<b>Benefits</b>	<b>Number of comments</b>	<b>Drawbacks</b>	<b>Number of comments</b>
Environmentally Beneficial /Cleaner Environment	9	Time Consuming	8
Reduce Waste and Pollution	5	None	4
Don't know	5	Don't know	3
Keeps area/home/yard clean	4	Not cost effective	2
Self Gratification	2	Opportunity	1
Make extra money	2	Space needed	1
Prevents air pollution/Greenhouse gases	2	Lack of recycling facilities/drop off	1
Saving money	1	Throw food away	1
Saves Time	1	Inconvenient	1
Composting	1	Lack of bins for separating	1
Children/next generations future	1	Unhygienic storage conditions	1
Tree Conservation	1	Need info on composting	1
Don't Recycle	1	Foul smell	1
		Cost of private recycler	1
		Destroying the planet	1

Table 31: R: Question 21

