



**HOW COMMUNITY PARTICIPATION AND STAKEHOLDER INVOLVEMENT CAN
IMPROVE RECYCLING: AN INVESTIGATION OF INITIATIVES AND OPPORTUNITIES
IN SIMUNYE**

by

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AUTHOR'S DECLARATION

I Jabu R Myeni declare that the dissertation hereby submitted for the Masters in Business Administration at the Rhodes Business School, University of Rhodes, is my own independent work, all reference sources have been accurately reported and acknowledged and that I have not previously, in its entirety or in part, submitted this work for a qualification in or at another university or faculty.

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DEDICATION

This dissertation is dedicated to my family; your social life for the past three years was disrupted to allow me to focus on my studies and you had to endure many days without me as I was attending the lectures at Rhodes Business School.

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LIST OF ACRONYMS

CBSM	Community-based social marketing
DETR	Department of Environment, Transport and the Regions, UK
E	Emalangen (E1 = 1 Rand)
ISWM	Integrated solid waste management
MSW	Municipal solid waste
PSD	Property Services Department
RSSC	Royal Swaziland Sugar Corporation (Pty) Ltd
SEA	Swaziland Environment Authority
SWM	Solid waste management
UNEP	United Nations Environment Programme
USEPA	United States Environment Protection Agency

INTEGRATIVE SUMMARY

This report presents the findings of a research project whereby the initiatives and opportunities for municipal solid waste (MSW) recycling were investigated in the town of Simunye, in Swaziland with a view to establish how recycling, in particular household waste recycling, can be improved through stakeholder involvement and community participation during the planning and implementation of a sustainable system for household waste recycling in Simunye.

The reason for focusing on household waste was because source separation of household waste was identified as a potential area for improving efficiencies and cutting costs by the local authority. It was deemed necessary to conduct research because there was a history of failure in respect of household recycling. In 2006 an initiative, by the local authority, for separating household waste at source had ended up in failure. The participation rates of the households turned out to be very low even though they had been issued, free of charge, some plastic bags for sorting the waste. Some of the households were found using the bags for other purposes rather than recycling. As a result, the initiative had to be suspended (White, 2010). There is a new move to revive the project in order to cut costs and minimize wastages. This time around the local authority is determined for the new project to be a success story. Since the underlying causes for the failure of the previous initiative were never investigated formally (Khumalo, 2010), the starting point would be to identify and try to eliminate all the potential barriers to recycling through a consultative process to start with.

Suttibak and Nitivattananon, (2008:48) and Yau (2012:116) explained that the starting point to enhance community participation in recycling schemes is to establish the factors that might encourage or discourage the community members from participating. Phillips *et al.*, (2002: 6) in agreement with them by asserted that “awareness campaigns, designed on the basis of rigorous academic research have produced marked increases in public participation in respect of recycling”. Read (1999:230) summed it up by saying “it is important to try and understand who recycles, how they recycle and why they recycle”.

Drawing from community-based social marketing, the information gathered during the research will be utilised in future to develop targeted promotional materials for the proposed scheme for recycling household waste. The research findings will also assist during the decision-making process concerning improving the efficacy of the municipal

solid waste management system so that it is responsive or well adapted for the local context and socially acceptable.

The theoretical framework inspiring the study is the concept integrated solid waste management, United Nations Environment Programme (UNEP), (2009:1-77) operationalised through stakeholder involvement and community participation (Margerum, 1999:152 cited in Krogstrup, *et al.*, 2009:5; UNEP, 2009:1-77)

The scope of this research was limited to stakeholder involvement and community participation in the planning and implementation of a sustainable system for recycling household waste. The reason for focusing on stakeholder involvement and community participation was because the failure of many sustainability initiatives, including recycling, was usually attributed to inadequate consultation, participation and involvement during the planning and implementation phases of the initiatives (Oakley and Marsden 1984 cited in Karl, 2000:1). The main concern of the research was the management aspect of an upcoming solid waste system for recycling household waste in Simunye.

This report is divided into three sections. Section 1 is the academic paper, Section 2 is the literature review and Section 3, is the methodology. Section 1 was designed to be a concise presentation of the research report which could serve as a stand-alone journal article. It covered the following elements: introduction to the research and why it was necessary to conduct the research, background about the study area, a concise presentation of the literature review, results and discussion. In Section 2 the comprehensive literature review is presented. The literature review covers the concepts and a conceptual analysis of solid waste, solid waste management, integrated solid waste management and recycling. The same section also covers a discussion on stakeholder involvement and community participation as a tool for operationalising the concept of integrated solid waste management. Section three basically covers the methodology.

The research was designed as a mixed methods (Johnson and Onwuegbuzie, 2004:14; Spratt *et al.*, 2004:7) comprising a quantitative questionnaire-based community survey, qualitative key informant interviews as well as document analysis. During the community or household survey, the householders' perceptions, attitudes, motivations, willingness to participate with respect to the recycling of the household waste were investigated. Through the household survey and the key informant interviews, the current solid waste management system and an awareness of the local initiatives of recycling were assessed.

The respondents were able to make recommendations or suggestions for improving the recycling.

House type						No of respondents
One room only						2
Small two bedroom house with inside ablutions						6
Small two bedroom house with outside ablutions						0
One bedroom flat plus courtyard						3
Two bedroom flat plus carport and courtyard						16
Three bedroom house with courtyard						1
Three bedroom house with yard, without carport						20
Three bedroom flat, semi-detached, without carport or courtyard						2
Three bedroom house with large yard and carport						33
Four bedroom house with large yard, carports						7
Other						0
ND						0

Table 1 House type of the respondents

While some effort was made to distribute the questionnaires widely to get fair representation, it was noted that most of the completed and usable questionnaires were from respondents who were the permanent employees of RSSC, living in big houses and inherently affluent (Table 1). The response rate from the residents who are not permanent employees of RSSC was less than 5 percent. This confirms the findings of Timlett and Williams' (2009:498-506) study in that the seasonal employees, for instance in this case the sugarcane cutters, were less interested to participate in the survey because they constituted a transient population. Besides being transient, living in smaller houses meant that storing the source separated waste would pose a challenge because they had very limited space to begin with. Affluence has been suggested to influence recycling behaviour (Vining and Ebreo, 1990 cited in Takiyama, 2008:25).

The community survey suggested that a majority of the respondents were: passionate about a clean environment, convinced that recycling was beneficial for the environment (Figure 1).

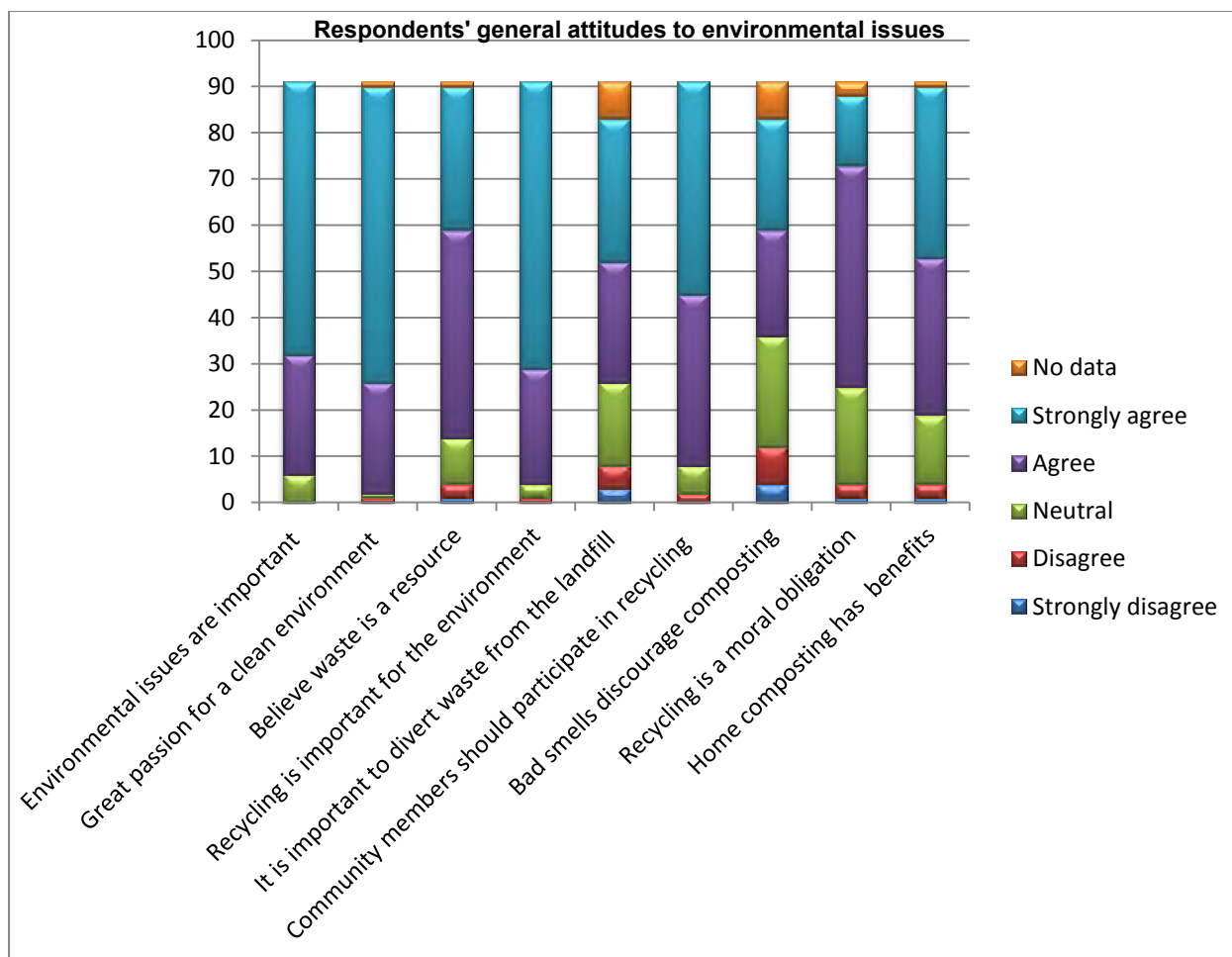


Figure 1 General attitude to environmental issues

The respondents reported that they would certainly participate in recycling if presented with a dustbin for storing the sorted waste; the motivation would come from within, not based on financial incentives. They also indicated that they would recycle if the recyclables would be collected separately (Figure 2).

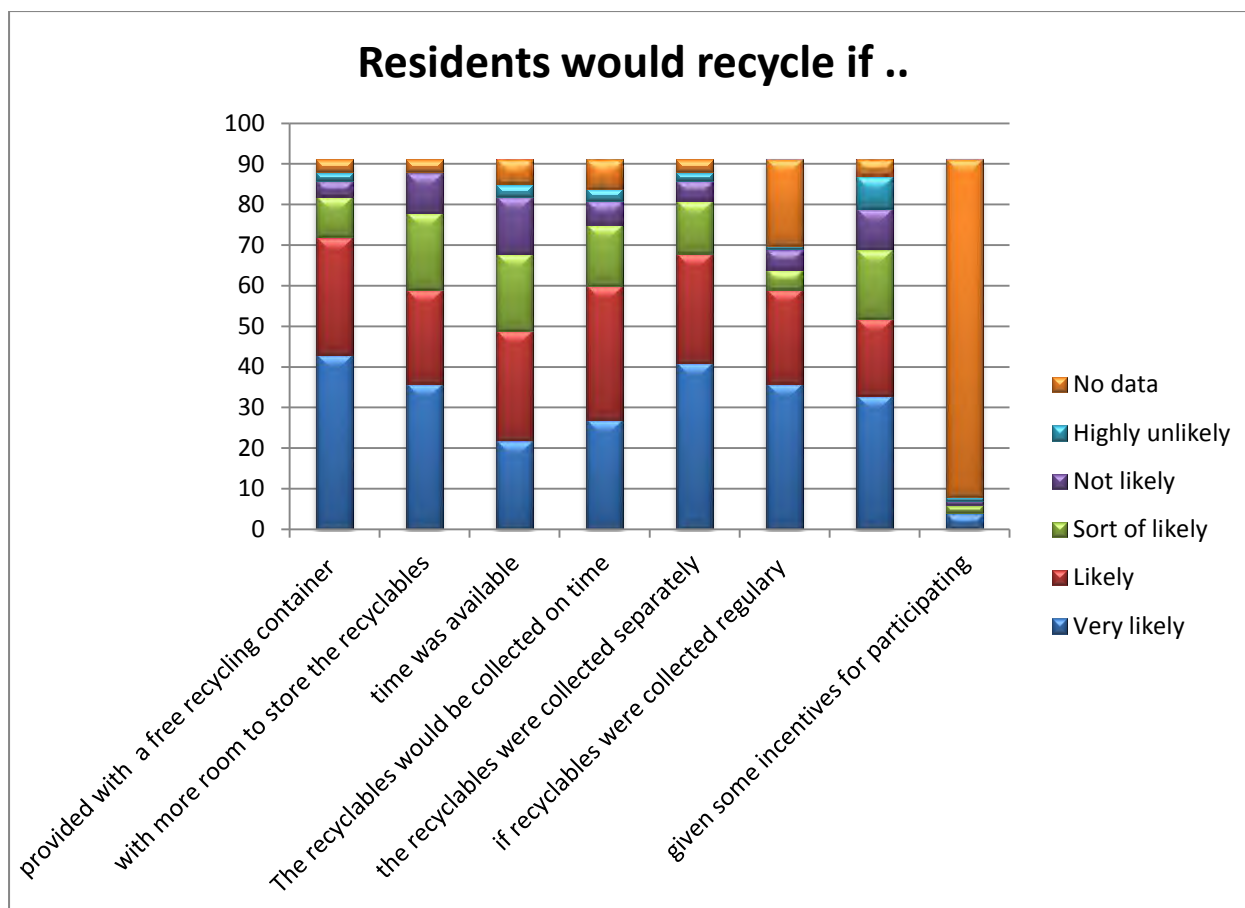


Figure 2 Desire for future recycling

With respect to the responsibility for recycling, 66 percent did not believe that recycling was the women's responsibility. There were mixed responses concerning rinsing the recyclable containers. 45 percent of the respondents were neutral while 18 percent reported that it was a hassle (Figure 3)

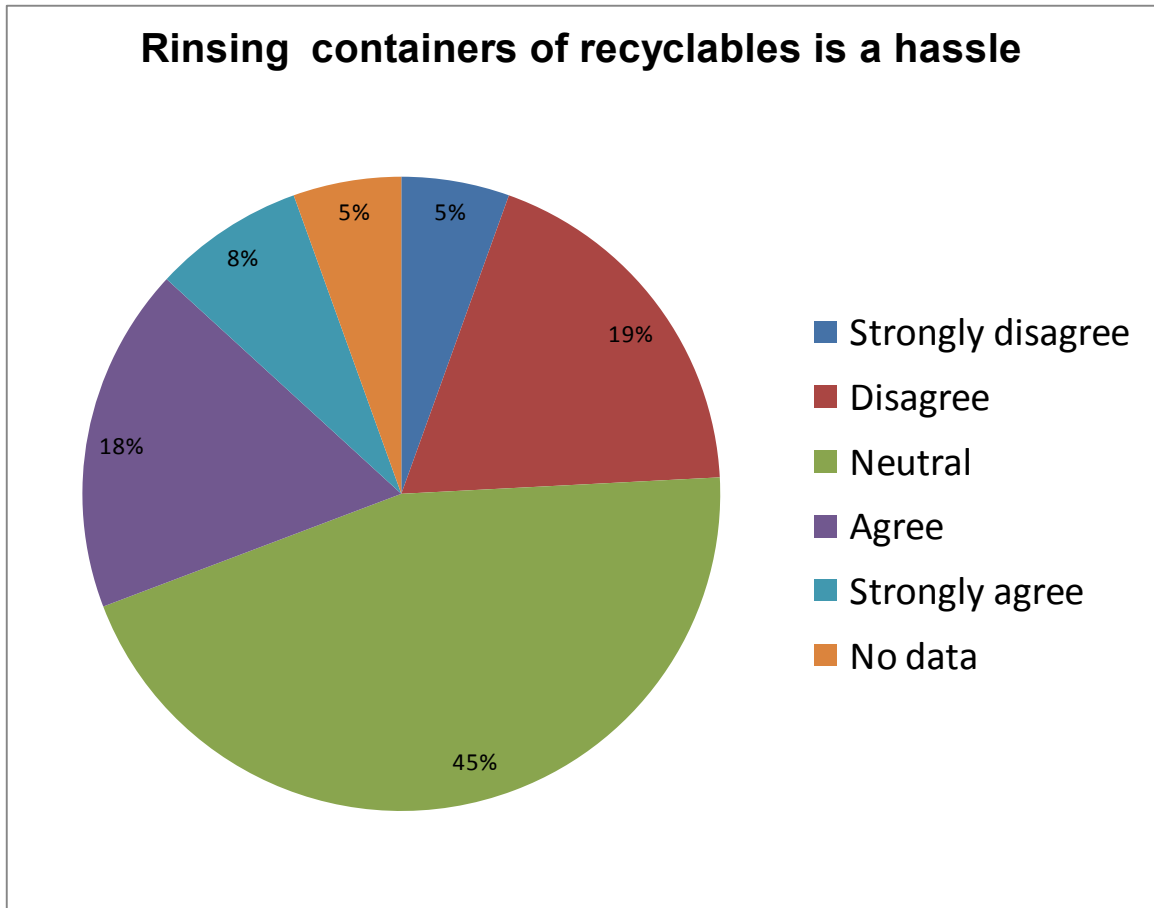


Figure 3 Respondents' attitude towards rinsing containers

The results suggested that main barrier for recycling was that there was no proper kerbside recycling scheme in place in Simunye. A majority of the respondents revealed that they were not participating in recycling because they did not know where to take the recyclables (Figure 4).

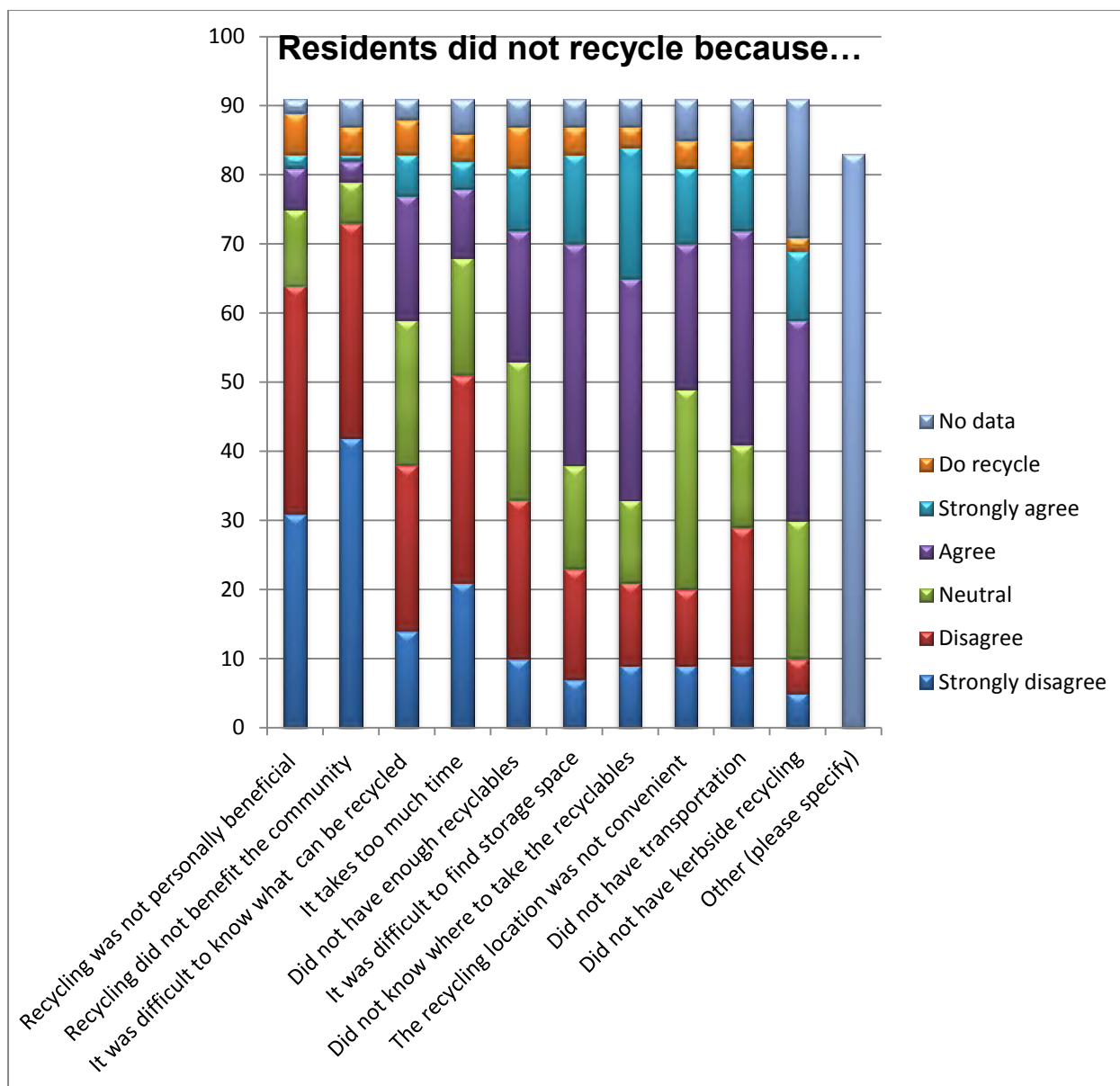


Figure 4 Reasons for not recycling

In terms of publicity of the recycling initiatives, a staggering 68% of the respondents reported that they were not aware of any recycling programs in Simunye (Figure 5). This seemed to tie in well with the previous finding whereby the households declared lack of knowledge about the local recycling centres. Hence it is recommended that the upcoming recycling scheme be publicized.

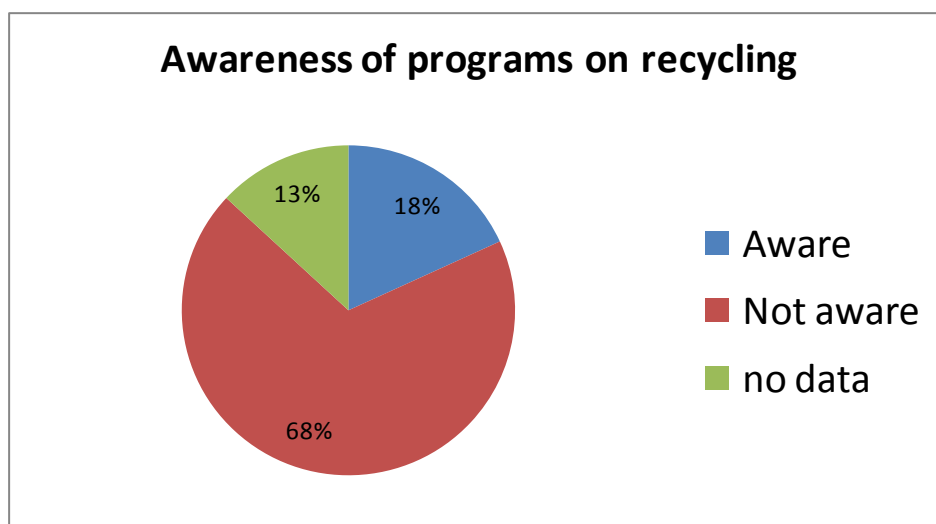


Figure 5 Awareness of programs on recycling

When planning the awareness raising campaign, it should be taken into account that most of the respondents were found to be literate during the household survey, having completed senior secondary school (Figure 6).

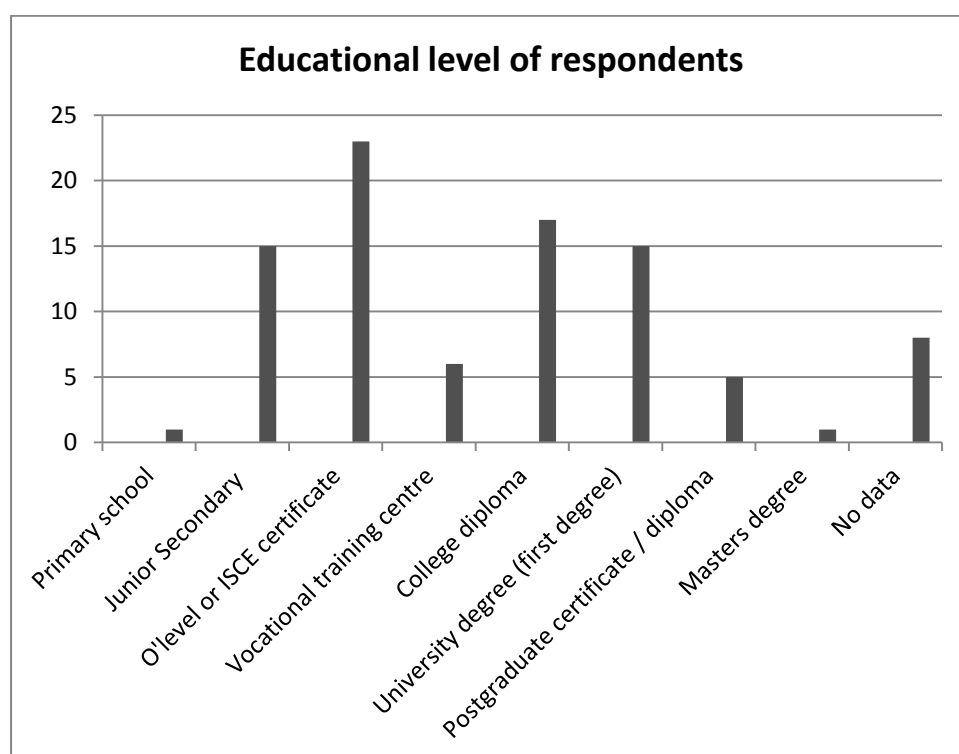


Figure 6 Educational level of the respondents

The respondents reported that the predominant constituent of their household or domestic waste was food (Figure 7), which means there might be an opportunity for generating energy from waste and reducing the volumes of waste which end up at the landfill. Further research is recommended to actually estimate the quantities involved as well as the rate of generation of the waste in order to ascertain if this would be a viable option.

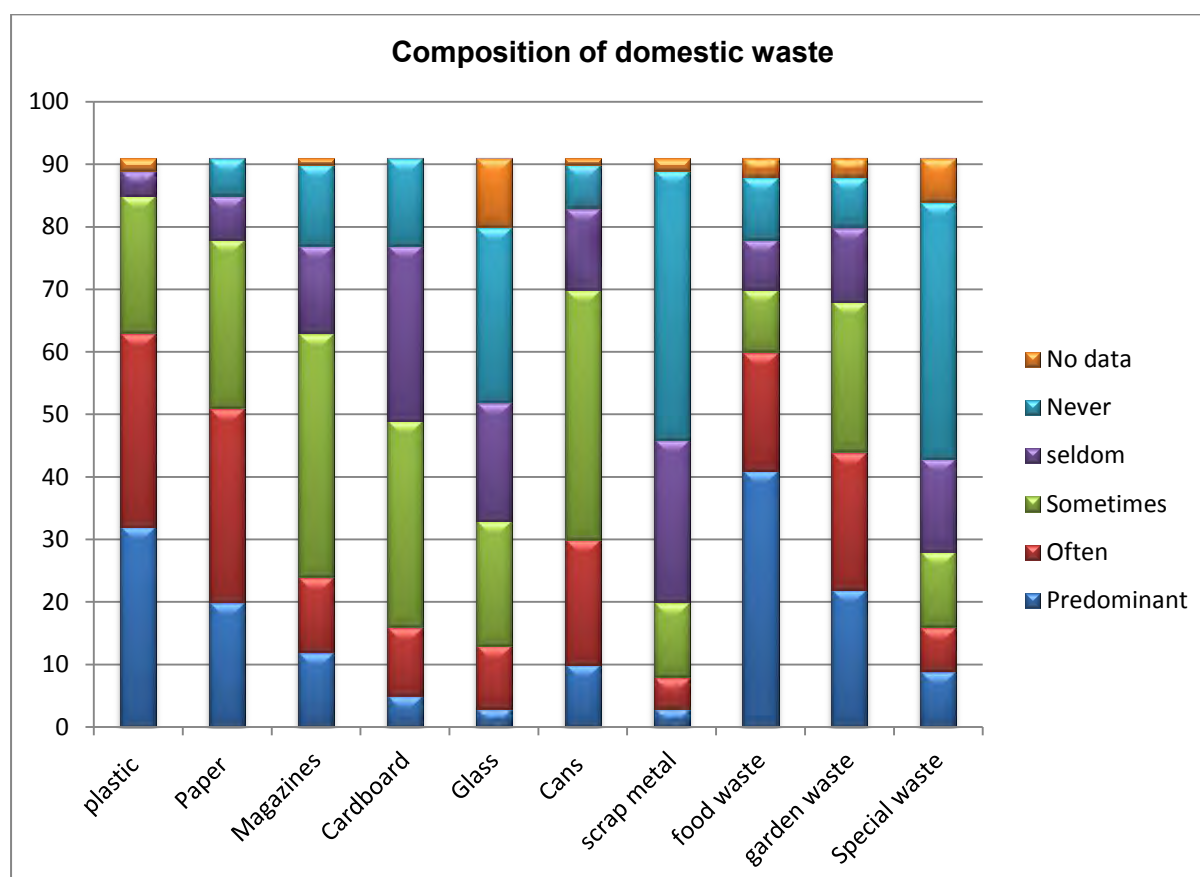


Figure 7 Constituents of household waste, self- reported

The main constituent of MSW was ash from the boilers' furnaces situated at the distillery and the sugar mill (Figure 8). During the time of the research, the ash served as cover material for the town's sanitary engineered landfill for municipal solid waste.

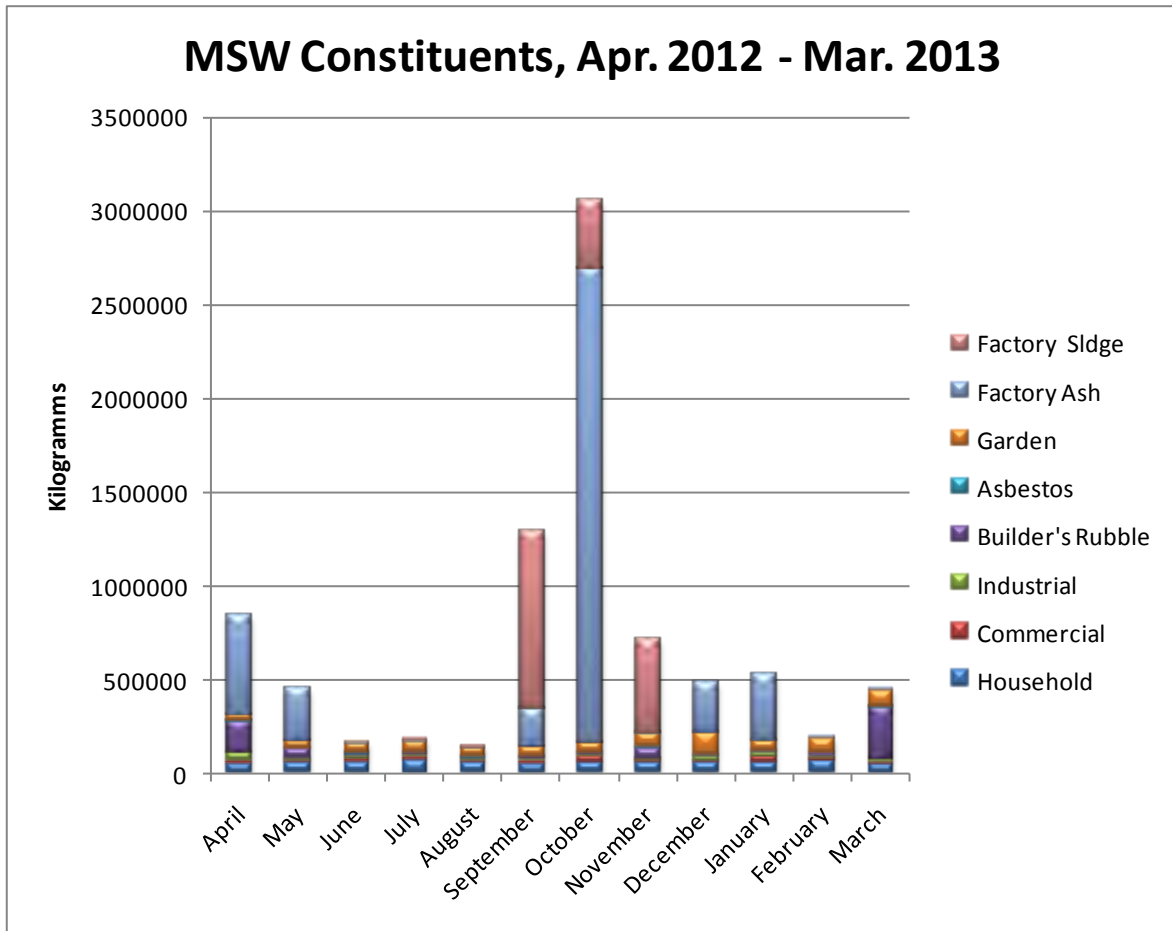


Figure 8 The composition of Simunye's municipal solid waste

The average tonnage of household waste for the 12 month period starting in April 2012 to March 2013 was 50 tons (Figure 9) probably because Simunye is a small town with approximately 1000 households. Between April 2012 and March 2013 it was noted that in July 2012 and in February 2013 that the monthly tonnage exceeded the monthly average. It was not established what might have caused the increase.

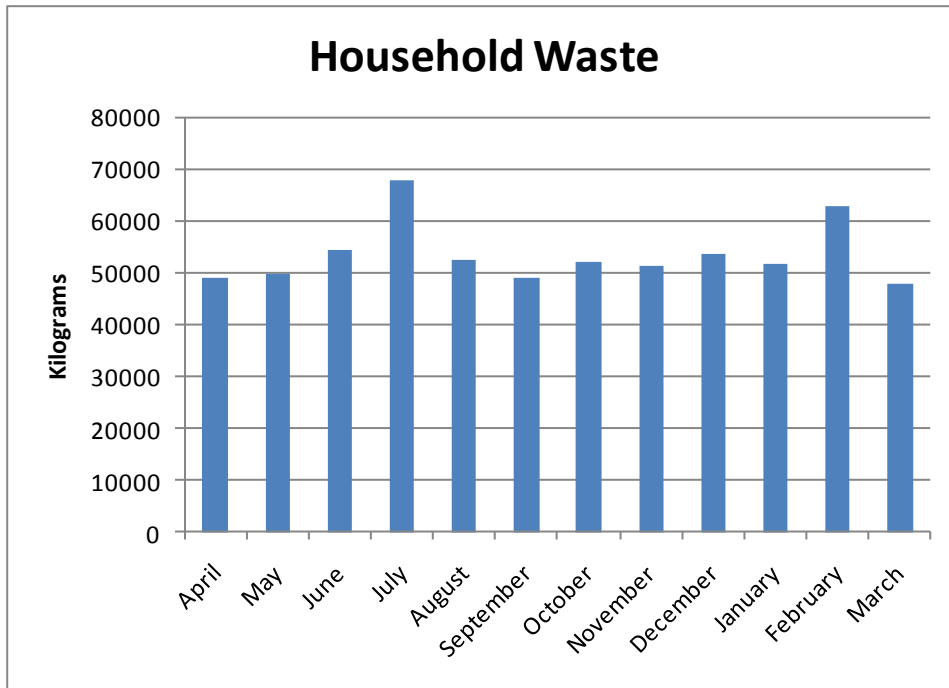


Figure 9 Household waste quantities, April 2012 to March 2013

When the data from the landfill was analyzed, it was found that household waste accounted for an average of 7 percent of the annual statistics (Figure 10). While municipal waste constitutes a small fraction of the total, the interest to study it is because it reflects the behaviour of community members in terms of consumption and behaviour.

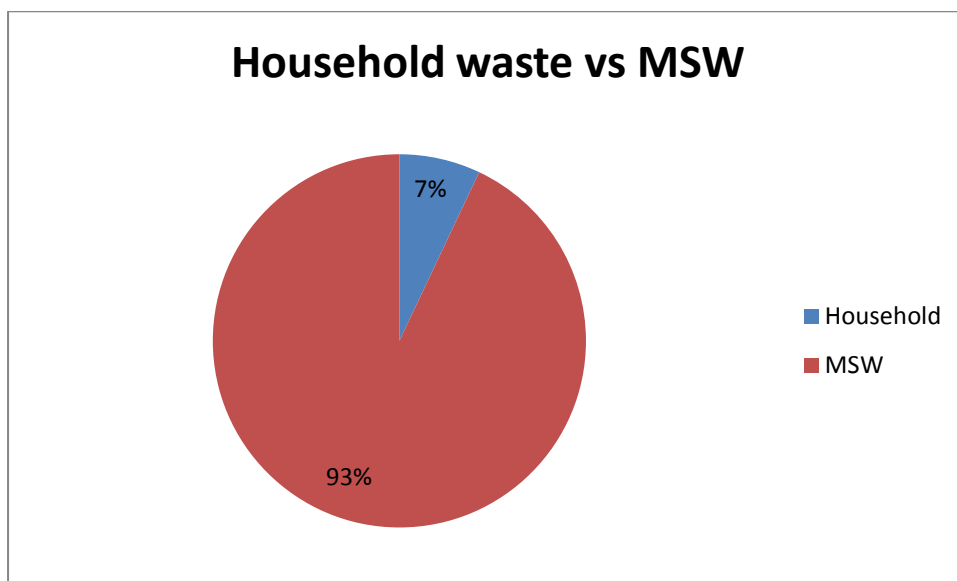


Figure 10 Household waste versus municipal solid waste

The key informant interviews highlighted the importance of co-ordination, awareness raising and responsible leadership / institutionalisation. It was emphasized that the transport for hauling the source-separated waste should be compatible. Confirming the suggestions of the household survey, the key informants recommended strongly that the waste collectors must comply with the waste collection schedule.

A big awareness raising campaign was recommended to re-gain the trust of the community, create awareness about the recycling program and to foster behaviour change amongst the public. Some of the key informants who were present in 2006 emphasized that the initiative should be institutionalised so that even if the current manager responsible for solid waste management were to be replaced by somebody else the initiative would continue. They recalled that one of the causes for the failure of the previous recycling initiative was the redeployment of personnel. In this regard, community and stakeholder involvement, as per the integrated approach was recommended as to assure continuity of the initiative.

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Abstract

Municipal solid waste (MSW) collection and haulage presents a very huge budget item, amounting to at least 50% of the total budget MSW management, for the municipalities of the developing countries forcing them to depend on subventions for the running costs. Integrated solid waste management, in the form of recycling, operationalised through stakeholder involvement and community participation, is a sustainable solution which can alleviate the costs of municipal solid waste management.

This report presents the findings of an investigation which was conducted to find out how community participation and stakeholder involvement can improve recycling, in particular of household waste, in the town of Simunye in Swaziland. The focus was on household waste because it is a potential contaminant of municipal solid waste. The scope of the research was limited to stakeholder involvement and community participation in the planning and implementation of a proposed system for sustainable recycling household waste in Simunye. The research was designed as a mixed methods research; comprising a quantitative household survey, qualitative key informant interviews, as well as document analysis to collect data.

The results of the household survey suggested that the very low income group had significant barriers to recycling in respect of space and time. The group was also disabled in terms of literacy. The household survey revealed that in general, the householders were desirous of recycling, with or without incentives, if presented with a kerbside recycling bin, the main barrier, however, was the absence of a functional kerbside recycling scheme. The key informants recommended that the service provider for waste haulage should provide appropriate vehicles so that the efforts of the residents are not wasted. Validating the findings of the household survey, they emphasized that it would be crucial for service provider to comply with the waste removal schedule. Through the document analysis it was revealed that the prospects of generating energy from household waste and composting should be explored because the waste was reported to contain significant amounts of food waste and garden waste.

Key words: integrated solid waste management, recycling, stakeholder involvement

SECTION 1: THE ACADEMIC PAPER

1.1 Introduction

Solid waste production is one of the leading environmental challenges bothering municipalities or local authorities (LAs) throughout the world (Omran *et al.*, 2009:275). Municipal solid waste (MSW) refers to the solid waste which is produced in urban areas. It includes household waste, street sweepings, office waste and commercial waste (Al-Khatib and Arafat, 2010:481; Hester and Harrison, cited in Memon, 2010:31). Due to its heterogeneity, MSW is more challenging manage in comparison with agricultural or commercial waste (Wang and Nie, 2001 cited in Troschinetz and Mihelcic, 2009:915).

There is a continuing rise in MSW production across the globe and this is normally attributed to population growth and affluence. Global MSW production has almost doubled in the last decade and is envisaged to double within the next 15 years (Hoornweg and Bhada-Tata, 2012 cited in Courtois, 2012:1). In 2006, the United Nations (UN) estimated that by 2030 at least fifty percent of the African population shall be dwelling in urban areas (Sanneh 2011:1066). In Swaziland, the urban population constituted 21 percent of the entire population, while the rate of urbanization was estimated to be 1.2 percent per annum in 2011(Central Intelligence Agency [US], 2013:3). As the country of Swaziland continues to urbanise there shall be an accompanying increase in MSW production.

The term solid waste management (SWM) refers to —thecontrol of waste generation, storage, collection, transfer and transport, processing and disposal of solid wastes consistent with the best practice of public health, economics and financial, engineering, administrative, and legal and environmental considerations” (Omran *et al.*, 2009:275). However, in many developing countries’ urban areas, including Swaziland, solid waste management means waste collection, transportation and disposal at the dumpsite (Zarate *et al.*, 2008:2543). Thus SWM turns out to be very expensive for the developing countries’ municipalities, the main contributing factors being waste collection and transportation. The municipalities often rely on subventions to maintain their normal MSW management operations (Memon 2010:33).

It was reported that in the developing countries, waste collection and transportation accounted for up to 90% of the total recurrent budget for MSW management whereas in

the developed countries only about 10% is spent on waste collection (World Bank cited in the United Nations Environment Programme (UNEP) 2009:2 and in Memon 2010:33). According to the World Bank report, the difference is attributable to “upfront community participation” in the developed countries. The participation of the community causes a reduction in SWM costs which in turn allows for the re-allocation of funds to enhance the more productive SWM activities such as recycling and recovery (UNEP, 2009:2). The UNEP, therefore, argues that community participation is beneficial to the solid waste management operations since by diverting some of the waste to recover secondary material, significant savings in cost are realised (UNEP, 2009:2). The developing countries, including Swaziland have started mobilising to reduce the costs associated with managing MSW.

During the past two decades some of Swaziland's proactive municipalities, including the local authority of Simunye, have, in a bid to become more efficient, started outsourcing the municipal services such as waste collection, haulage and landfill management to the private sector. Whilst some benefits have been realised in terms of receiving competitively priced services, the costs of MSW management have not been reduced significantly. This is because the volumes of solid waste that require transportation to the dumpsite have remained virtually the same because no recovery of secondary material happens upstream at the residential areas and community centres. One of the service providers remarked that the situation is compounded by the ever rising fuel costs due to inflation and the resultant the unfavourable US dollar – rand exchange rate (Sigwane, 2011).

Evidently, the dumpsite-based strategy, predominantly utilised by the developing countries is not a sustainable method for managing solid waste (Ngoc and Schnitzer, 2009:1982). The main problem is that it does not get to address the root cause of the problem, the problem being an escalation in global MSW production. Writers and researchers have pointed out that the source of the solid waste problem is consumerism or the ‘throw-away’ mentality of the current generation which was brought about by the era of industrialisation (Read 1999:218–219; Chalmin and Gaillochet, 2009:1). From a business point of view, a sustainable solution which would cause a reduction on MSW production is required.

The past few decades have witnessed a worldwide move for reducing material consumption and aligning waste management systems toward sustainability (Bortoleto

and Hanaki, 2007:276; Shekdar, 2009:1438; Sanneh *et al.*, 2011:1071). Sustainability means —the waste management system is appropriate to the local conditions, and feasible from a technical, environmental, social, economic, financial, institutional and political perspective; It can maintain itself over time without exhausting the resources upon which it depends” (Dorvil, 2007:54).

At international level the move was launched in the 1990s during the United Nations Conference on Trade and the Environment, or Earth Summit, held at Rio de Janeiro in 1992, wherein serious deliberations were held, at international level, on how to manage solid waste sustainably. The specific goals that were set for attaining sustainability in respect of solid waste management included to (i) minimise waste generation (ii) maximise environmentally sound waste re-use and recycling (iii) raise public awareness and (iv) promote environmentally sound waste disposal (Read, 1999:220). The modern strategies of solid waste management therefore emphasize waste reduction, reuse recovery and discourage disposal (Zhuang *et al.*, 2008:2022; Ngoc and Schnitzer, 2009:1982) as shown on Figure 11.

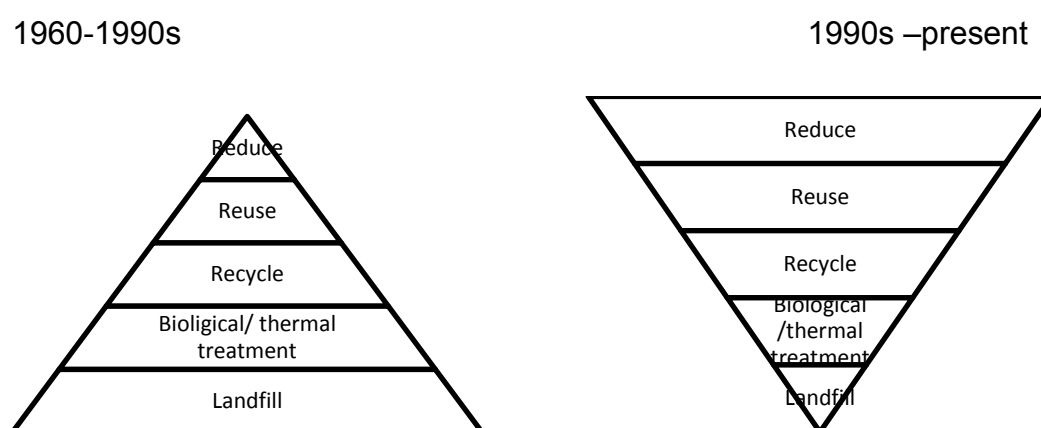


Figure 11 Change in strategy over the years
(Source: Zia and Devadas, 2008:59)

Within the Swaziland context, the framework law governing environmental management in the country as well as the regulations for waste management were aligned with the principles of sustainable development as outlined on Agenda 21 of the Rio conference of 1992. The Environment Management Act (EMA), 2002 (Government of Swaziland,

2002:7) promotes waste avoidance. The EMA spells out that “waste should, in order of priority, be re-used, recycled, recovered and disposed of safely in a manner that avoids creating adverse effects” (Government of Swaziland, 2002:7). The Waste Regulations, 2000 gives the responsibility of promoting and facilitating waste recovery at source to the municipalities (Government of Swaziland, 2000:5).

The National Solid Waste Management Strategy of Swaziland (NSWMS) of 2003 encourages the local authorities to explore the potential of recycling and it says that the segregation of household waste at source must be introduced as a best practice (Swaziland Environment Authority, 2003:36). Household waste is waste “from a home; premises forming part of a university or school or other educational establishment; premises forming part of a residential home, hospital or nursing home but does not include commercial, industrial or hazardous waste, sand, earth, effluent or garden waste” (Government of Swaziland, 2000:2). The reasons for addressing household waste are valid because it is one of the main constituents of MSW (Read, 1999:218). Due to its heterogeneous nature household waste is one of the problematic waste streams to deal with (Waite, 1995 cited in Read, 1999:218). There is a widespread realisation among the municipalities and corporations that household waste contains valuable matter and can be a source of income if managed properly (Tremblay *et al.*, 2010:422).

In the developing countries, household waste comprises a large fraction of putrescible organic waste which is a potential contaminant of the other constituents of household waste (Troschinetz and Mihelcic, 2009:915). Conversely the organic waste can be contaminated by the other constituents for example the heavy metals such as lead or mercury found in batteries or incandescent fluorescent tubes which can in turn render the organic waste not suitable for composting. By separating the household at source, the public has a huge role to play in terms of minimising the cross-contamination.

1.2 Literature review

Integrated solid waste management (ISWM) is a concept for reducing waste at its source and recovering secondary material from produced waste (Mosler, *et al.*, 2006:850; Ngoc and Schnitzer, 2009:1982; Memon, 2010:31). ISWM includes the elements of waste separation at source, source reduction, collection and transportation, storage and transfer stations, material recovery, recycling, treatment and disposal (Memon, 2010:30; Sanneh *et*

al., 2011: 1065 -1070). Thus ISWM differs from conventional SWM in that emphasis is placed on waste reduction at source (UNEP, 2005:6). The difference between solid waste management and ISWM is shown on Figure 12.

There is consensus among writers and experts that an integrated approach is requisite for sustainable solid waste management (Phillips *et al.*, 2002:3; Visvanathan *et al.*, 2004 cited in Joseph, 2006:863; Troschinetz *et al.*, 2009:915; UNEP 2009d:23; Memon, 2010:33; Joseph *et al.*, 2012:2-3). The purpose for integrated waste management systems is to derive “environmental benefits, economic optimization and societal acceptability” (McDougall *et al.*, 2001 cited in Kollikkathara *et al.*, 2009:983).

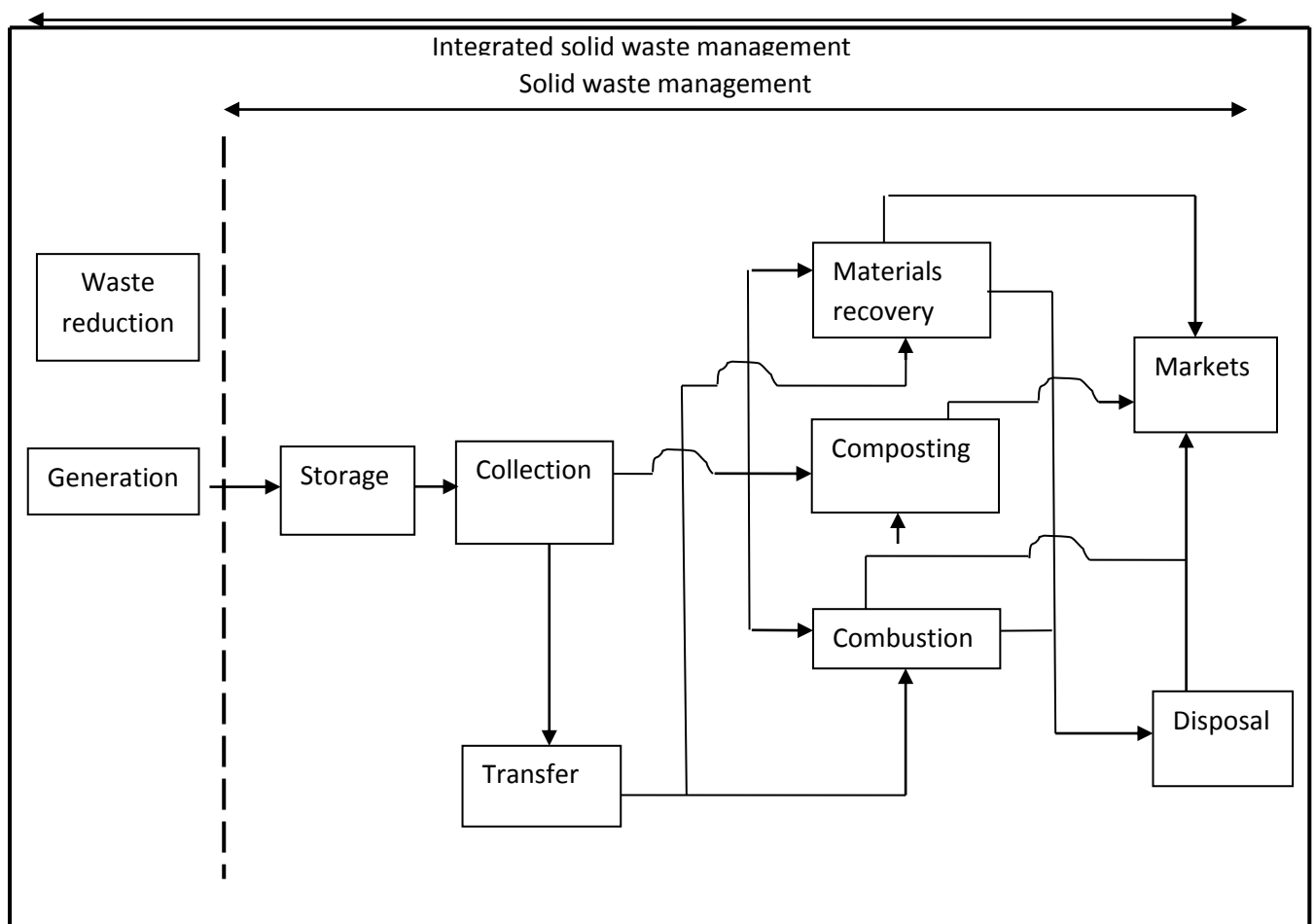


Figure 12 Difference between solid waste management and integrated solid waste Management

(Source: Hickman 1999 cited in United Nations Environment Programme, 2005:6)

To operationalise ISWM onto the local context requires stakeholder involvement and community participation (Margerum 1999 cited in Krogstrup, *et al.*, 2003:5). Sarkis, 2000 cited in Contreras *et al.*, (2008:971) defined stakeholders as —the people and organizations having an interest in good waste management, and participating in activities to make it possible. This includes enterprises, organizations (such as nongovernmental organizations), households and all others who are engaged in some solid waste management activity”. It is crucial for the stakeholders to fully comprehend and commit to the roles that they are expected to play (Joseph, 2006:864; Bortoleto and Hanaki, 2007:277); otherwise the solid waste management system would not be efficient.

One of the sustainable methods of dealing with MSW is recycling (Bolaane, 2006:731; Suttibak and Nittivatananon, 2008:45; Sudhir *et al.*, 1996, Kaseva and Mbulingwe, 2000 all cited in Uiterkamp *et al.*, 2011:344). Recycling is —a collective term for the recovery as well as the utilization of secondary material” (Uiterkamp *et al.*, 2011:345). According Waite, (1995 cited in Read 1999:222) during recycling, waste material is converted into a useful material, with economic value. Recycling was lauded by the United States Environment Protection Agency (USEPA), (2004 cited in Argawal *et al.*, 2004:74 as —the most environmentally sound method of solid waste management following only the preventative strategy of reduction and re-use”.

Literature mentions that recycling is effective for: diverting substantial amounts of waste material from landfill disposal and hence reducing waste collection and haulage costs (Folz, 1991 and Muttamara *et al.*, 1994 both as cited in Suttibak and Nittivattananon, 2008:45; World Bank, 2004 cited in UNEP, 2009:2 and in Memon 2010:33; Heidrich *et al.*, 2009:966) is environmentally beneficial in terms of resource and energy conservation and increasing the longevity of landfills (Kaseva and Gupta, 1996 cited Uiterkamp *et al.*, 2011:344; Seik, 1997:284; Landis, 2005:13; Timnaz and Demir, 2006 cited in Yau 2012:116) and; is socially beneficial with respect to job and wealth creation (Halla and Majani, 1999:357; Landis, 2005:13; UNEP, 2009:2; Tremblay *et al.*, 2010: 422).

1.2.1 Stakeholder involvement

Stakeholder involvement or collaboration is overarching and is vital for the success of recycling initiatives (Joseph 2006:863; Zhuang, *et al.*, 2008:2024; Troschinetz and Mihelcic, 2009:920; Sanneh, *et al.*, 2011:1073; Yau, 2012:115). Empirical studies proved that MSW recycling initiatives which are started by municipalities are set to fail if they are not complemented by appropriate behaviour or collaboration from the key stakeholders (Bolaane, 2006:735; Omran, *et al.*, 2009:276). Bolaane (2006:735) reported that in Gaborone, Botswana, the community became reluctant to continue with waste separation at source after noticing that the recyclables were not collected on time thereby resulting in nuisance conditions for the community. In Malaysia the recycling initiative by the municipality failed despite massive campaigns for recycling due to poor public participation (Omran *et al.*, 2009:276-7). Conversely, community led initiatives cannot succeed without collaboration from the other stakeholders. In Simunye, Swaziland an initiative by the factory employees to separate waste at source came to an abrupt end when they noticed that the source separated waste was being loaded and mixed up with all sorts of MSW onto a compressor truck by the service provider who was tasked with collecting the MSW (Mahlalela, 2010).

There are three types of stakeholders namely primary, secondary and external or tertiary stakeholders. The primary stakeholders are the individuals or groups who are directly affected by the project and have a specific role in the waste management system. Secondary stakeholders are in-between; they perform support functions to the primary stakeholders. They include dealers in waste. The external or tertiary stakeholders do not have a part to play in the waste management system but may have an effect on it. They include government and donor agencies (Karl, 2000:2; Krogstrup *et al.*, 2003:53).

Householders or the members of the community constitute the largest category of primary stakeholders in respect of municipal solid waste management (Joseph, 2006:867). The community members play a significant role in terms of separating the waste into the different fractions, storing properly and taking it out on the designated days for collection by the municipalities or its agents (Joseph, 2006: 867). Read (1999:228) asserted that without the participation of the households it would be nearly impossible to recover any

useful material from household waste, –as only dirty MRFs and WtE plants would allow any form of energy or materials recovery”.

Kerbside recycling refers to the manual separation of household waste at source by householders and storing the different types of fractions in different waste receptacles to allow for separate collection so as to facilitate re-use or processing of secondary raw materials. Large volumes secondary materials can be recovered through kerbside recycling. In general the municipalities that record high levels of recovery practice kerbside recycling (Timlett and Williams, 2009:498). The success of a kerbside recycling scheme is measured by how many community members participate in the scheme (participation rate), their continued and consistent participation (diversion rate) as well as on the efficiency of the kerbside recycling scheme (cost effectiveness) (McCarty and Shrum, 1994:53; Read, 1999:217; Suttibak and Nitivattananon, 2008:46; Omran, *et. al.*, 2009: 278).

Several municipalities in developed countries have successfully implemented kerbside recycling schemes. Austria was reported to recycle a staggering 50% of its household waste, Netherlands 43% and Denmark 29% (Tsiboe and Marbel, 2004 cited in Saungweme 2012:28).

Walkabout surveys which were conducted by the author in August 2012 throughout the country's landfills and suburbs located in Matsapha, Mbabane and Simunye established that household waste was not being separated at source as it was observed that mixed waste was placed by the residents along the kerbside, subsequently picked up by compressor trucks to be scoured through manually by some scavengers based at the landfill.

One should bear in mind, however, that household waste recycling is largely a voluntary activity (Timlett and Williams, 2009:498); which necessitates significant behavioural change from the households (Read, 1999:228; Joseph 2006: 867; Omran *et al.*, 2009: 278) and; that attaining behavioural change is difficult process which requires considerable time and effort to achieve (Kollmuss and Agyeman, 2002:241; Phillips *et al.*, 2002:6). Jones *et al.*, (2010:533) therefore asserted that sustainable management of household waste is challenging since it entails behavioural change.

Literature emphasizes the importance of investigating the perceptions, attitudes and environmental knowledge of the key stakeholders, especially the householders', in order to be better positioned to promote the recycling initiatives. Yau (2012:116) asserted that the starting point to enhance community participation in recycling schemes is to establish the factors that might encourage or discourage the community members from participating. Phillips *et al.*, (2002:6) remarked that —awareness campaigns, designed on the basis of rigorous academic research have produced marked increases in public participation in respect of recycling”. Read (1999:230) summed it up by saying —it is important to try and understand who recycles, how they recycle and why they recycle”.

1.2.2 Factors influencing recycling behaviour

While undoubtedly awareness raising and training on recycling is important as a starting point for behaviour change, some authors highlighted that possessing a positive attitude about environmental issues does not necessarily lead into a manifestation of pro-environmental behaviour (Kollmuss and Agyeman 2002:252; Thomas *et al.*, 2004:7). In fact Kollmuss and Agyeman (2002:252) asserted that there was a weak correlation between attitudes and pro-environmental behaviour. In Malaysia, Omran *et al.*, 2009 (275 – 288) noted that despite the high publicity campaigns coupled with government support for municipal solid waste recycling, the participation rate of the householders remained low. On the other hand Timlett and Williams, (2008:623) asserted that when householders were simply presented with a kerbside recycling bin, they start recycling, regardless of attitudes.

In a study conducted by Barr and others in 1999 at Exeter, United Kingdom (UK) it was found that the recycling behaviour was not only influenced by knowledge about local recycling services but was also determined by the availability of a kerbside recycling scheme and availability of space for storing the recyclables (Barr *et al.*, 2010:419). Numerous other studies have suggested, even though attitudes and environmental knowledge are fundamental, in reality the actual factors which influence recycling behaviour are those which pertain to ‘situational factors’ (Hines *et al.*, 1986-87 cited in Kollmuss and Agyemen, 2002:244; Boldero, 1995 cited in Omran, *et al.*, 2009:278).

The situational factors include the logistical issues bordering around the actual process of recycling for instance the distance to the recycling facility (Ando and Gosselin, 2005 and Farrell, 1996 both cited in Schwebel, 2012:9); the availability of space for sorting and storing the recyclables neatly (Seik 1997 cited by Yau, 2012:120; Timlett and Williams, 2006:133); the time and effort required to prepare the recyclables (Farrel, 1996 cited in Schwebel, 2012:3) or sheer laziness for instance —do not like to wash out bottles” (McCarty and Shrum, 1994:56; Singhirunnusorn, 2012:38). An investigation carried out by Nixon and Saphores, (2009 cited in Singhirunnisorn *et al.*, 2012: 38) highlighted that larger households which are affluent, with ample space for sorting and storing the waste were more likely to participate in recycling. Martin *et al.* (2006:357-395), found out the issues pertaining to the logistics, time, space constraints as well as age and affluence rather than the socio-cultural backgrounds were the main determinants of recycling behaviour.

In a study conducted by Timlett and Williams, (2009:498 – 506) in Portsmouth, UK, it was found that population transience has a bearing on recycling behaviour, in that the transient populations were less likely to participate in recycling. This is of particular relevance in Simunye because some housing blocks are normally allocated to seasonal workers, engaged as casual employees, for instance the sugarcane cutters.

Besides the situational variables, the previous empirical studies were able to establish that recycling behaviour can be directly to socio-demographic factors such as age (Vining and Ebreo, 1990 and Belton, 1994 cited in Yau, 2012:119);the size of household, (Judge and Becker,1993 cited in Yau, 2012: 120); the number of children living in the households, (Lebersorger, 2005 cited in Schwebel, 2012:3); and level of education (Becker, 1993 cited in Yau, 2012: 119).

Since there is a myriad of factors which can influence the recycling behaviour of individuals, some authors have concluded that the decision to recycle is “likely to be complex” (Omran, *et. al.*, 2009:278). Kollmuss and Agyeman, (2002:239) argued that no single model be it from psychology, sociology or economics can adequately be used to predict pro-environmental behaviour (Kollmuss and Agyeman, 2002:239).

Participatory techniques, with a focus to advance behaviour change, have found widespread use amongst municipalities, on on-going recycling programs, to improve

community participation in the recycling initiatives (Landis, 2005:9-10). One such technique is community-based social marketing (CBSM). This technique has proved to be effective in fostering behavioural change McKenzie-Mohr and Smith, (1999 cited in Kollmuss and Agyeman, 2002:240). CBSM has been successfully exploited in a range of sustainability projects in Canada to achieve behavioural change (McKenzie – Mohr, 2000:546-549).

CBSM works backwards in that it starts by setting out to discover the actual or potential barriers to pro-environmental behaviour be it the contextual, economic or socio-demographic factors. The information is gathered by using participatory techniques such questionnaire surveys, interviews, focus groups and meetings. Based on the information, the appropriate mechanisms for getting the required behavioural change are put in place by removing the identified barriers (McKenzie-Mohr and Smith, 1999 cited in Kollmuss and Agyeman, 2002:240; Landis, 2005:9-10). The information gathered during the exercise of identifying the barriers is also useful for developing the materials for the targeted promotional campaigns which accompany the recycling initiative. After uncovering the actual or potential barriers to community participation, a pilot project is implemented. If the pilot project is successful, the full-scale programme is implemented. The four steps of community based social marketing are shown on Figure 13. CBSM proved to be an effective tool for changing behaviour in the UK, at Royal Borough of Kensington and Chelsea (Read, 1999:217– 249).

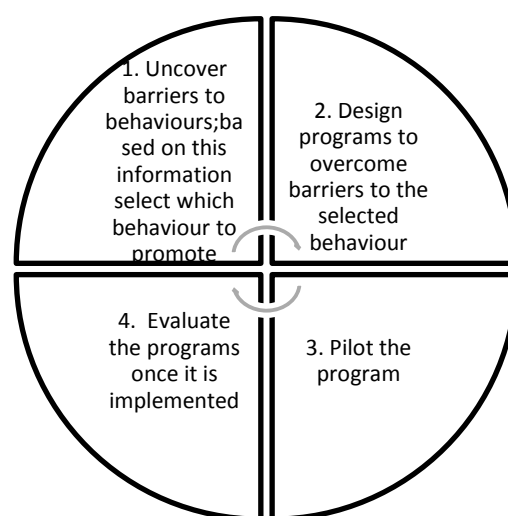


Figure 13 Schematic for community based social marketing
(Adapted from McKenzie-Mohr, 2000:546)

It is documented in literature that waste management systems tend to benefit, financially and environmentally, through stakeholder involvement and community participation (Dowie *et al.*, 1998; Kulkarni, 2000; Sharratt and Choong, 2002; Buysse and Verbeke, 2003; Delmas and Toffel, 2004; Argandoña, 2004 all cited in Heidrich *et al.*, 2009:965; World Bank 2004 cited in UNEP, 2009:2 and in Memon 2010: 33).

Although the term of participation is a common word, the definition varies from author to author (Karl, 2000: 2; Krogstrup *et al.*, 2003:7; *et al.*, 2012:213). The World Bank (1996, cited in Luyet *et al.*, 2012:13) defined participation as —a process through which stakeholders influence and share control over development initiatives and the decisions and resources that affect them”. The distinction between public involvement and stakeholder participation is not always clear either; however there is general consensus in literature that the community or public constitutes one specific set of stakeholders (Joseph, 2006: 867; Luyet *et al.*, 2012:213). In this report the term —stakeholder involvement” rather than —stakeholder participation” will be used because participation is a form of involvement. On the same vein, —stakeholder involvement” rather than —public involvement” will be adopted because as earlier alluded to the term —stakeholder” is broader.

There are many nuances of stakeholder involvement. The different levels of stakeholder involvement are presented in Table 2. The first two levels are ‘shallow’ in that the decision making function rests with the initiator of the project such as for instance the municipalities. As one moves up, the stakeholders become more influential and the process of participation becomes lengthier and the benefits of participation get bigger (African Development Bank, 2001:2).

This research can be considered a consultative exercise in that a questionnaire-based household survey and key informant interviews were utilised as data gathering tools, in order to determine ways of improving community participation in the recycling project and to identify the loop-holes in the waste management system. Some researchers have pointed out that stakeholder involvement should go beyond ‘consultation’ or ‘information dissemination’ but should empower the community to partake in the decision-making process (Read 1999:2422; Ling *et al.*, 2009:235). This is particularly important for project continuity.

The stakeholders can be involved at the different stages of the project. However, it is generally recommended that the stakeholders be involved early during the planning stage of the project (Reed, 2008:2417) in order to allow for incorporation of wider perspectives into the project design, to reduce conflict and create community ownership and hence enhanced social acceptability and sustainability of the project or initiative.

In the Swaziland context, stakeholder involvement is mentioned in the draft National Environmental Policy which is implemented through the Environmental Management Act, 2002 (Government of Swaziland, 2002) which is effected through the Environmental Audit, Assessment and Review Regulations, 2002 and the Waste Regulations, 2000.

Different levels of stakeholder involvement		
1.Information sharing	Dissemination of documents, public meetings, information seminars	Consultation
2.Listening and hearing	Field visits, interviews, consultative meetings	
3.Joint assessment	Participatory needs assessment, beneficiary assessments	
4.Shared decision making	Public review of draft documents, participatory project planning, workshop to identify priorities, resolve conflicts, etc	Participation.
5.Collaboration	Joint committees or working groups with stakeholder representatives, stakeholder responsibility for implementation	
6. Empowerment	Capacity-building initiatives, self- management support for stakeholder initiatives	

Table 2 The levels of stakeholder involvement
(Adapted from African Development Bank, 2001:2)

Barr and Gilg (2007:365) came up with a conceptual framework for understanding and analyzing attitudes towards environmental behaviour. The framework is shown on Figure 14. According to the model, the connection between pro-environmental behaviour and attitudes is not easy to explain, however it is influenced by environmental values, situational variables and psychological variables. Recycling behaviour is more influenced by the situational and psychological variables rather than the environmental values (Barr and Gilg, 2007: 363).

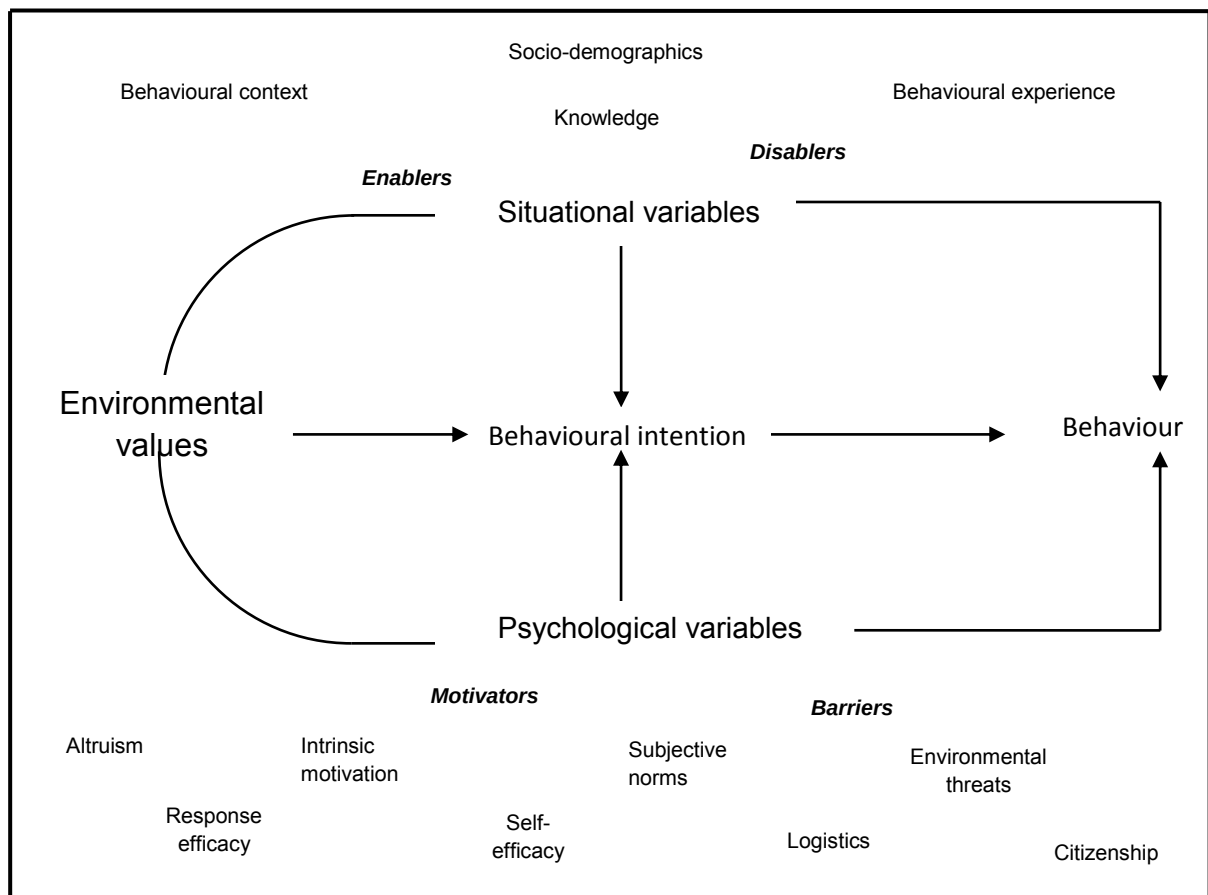


Figure 14 Conceptual framework of environmental behaviour
(Barr and Gilg, 2007:365)

On this research, through community based social marketing, the Barr and Gilg's model was used to identify the potential or actual enablers, disablers, motivators and barriers to recycling in Simunye.

1.3 Background about the study area

The locality of the town of Simunye is on the north-eastern part of Swaziland. The town lies within the Lowveld region, with a hot and sunny climate suitable for sugarcane plantations. It is different from the conventional towns in that it is a company town. Company towns are equivalent to urbanised areas but are autonomous in that they do not fall under the jurisdiction of Swaziland's Ministry of Housing and Urban Development. —These towns are mostly specific with regard to a specific industry for example sugar, forestry etcetera; they have industrial, commercial, residential and medical facilities that

resemble both the formal urban settlement as well as an industrial site or estate environment” (Swaziland Environment Authority, 2003: 16). Simunye, together with two other adjacent towns, is ‘owned’ by the Royal Swaziland Sugar Corporation (RSSC), under a 100-year leasehold agreement between the Government of Swaziland and the RSSC. RSSC is a grower of sugarcane and a manufacturer of sugar, alcohol and associated products.

Simunye is a miniature town with 1362 company owned houses excluding the houses that are used by the police force (Zwane, 2012). According to the records at the Housing Managers’ office, the official occupancy rate for the company owned houses was 93 percent when the survey was conducted in July 2012. Municipal solid waste management at Simunye is the responsibility of the Property Services Department – a department within RSSC of which is equivalent to a local authority or municipality. In relation to waste removal, all the households of the town are serviced and the services are offered free of charge. The households are also given some dustbins for storing the MSW, free of charge, as and when necessary. A majority of the households, except the seasonal workers such as the sugarcane cutters are issued with free black garbage bags, for household waste storage, on a weekly basis. The full cost of solid waste management and associated operations is borne by RSSC (Shongwe, 2010). It was established through document review by the author, that during the past financial year, starting on 01 April, 2012, the estimated costs of collecting and transporting municipal solid from the company-owned towns to the sanitary landfill, accounted for approximately 65% of the total budget for MSW management.

Household waste is collected twice per week. The kerbside method is employed to collect the household waste. A waste removal schedule is utilised by the service provider to remove waste, by geographical or physical location. The households are expected to comply with the schedule and to co-operate with the local authorities by taking out the waste receptacles to the kerbside (Shongwe, 2010). The waste is transported to the landfill whereupon arrival the waste is weighed at the weighbridge before being deposited on a sorting area. The waste is sorted by hand by labourers in order to extract recyclables such as aluminium cans, cardboard, glass, plastic, ferrous and non-ferrous metals as well as paper. The materials recovered at the landfill are sold to dealers in waste by the service provider on behalf of RSSC. The residual solid waste is land-filled (Nkonyane, 2011).

1.3.1 Quest to improve sustainability by reducing operational costs and wastages

RSSC being a business entity, with an interest to maximize shareholder profits is always looking to reduce the operational costs especially for the non-core business units. Thus the collection, transportation and disposal of waste is an outsourced function which is conducted by service providers. The state-of-the-art sanitary engineered landfill is operated and maintained by a private contractor.

In June 2009, RSSC launched a company-wide strategic initiative to improve the sustainability of RSSC. This was in response to the uncertainty in the sugar industry of which was caused by increased competition in the overseas sugar markets and the looming European Union sugar reforms. The strategy was dubbed *Vusumnotfo* 12/12 since its purpose was that by the end of March 2012 all RSSC Divisions and Departments were to have achieved a 12% reduction in the unit cost of their operations by improving on efficiencies and minimizing wastages (Royal Swaziland Sugar Corporation (Pty) Ltd, 2010:12).

Like all large corporations around the globe (Tremblay *et al.*, 2010:422), the RSSC is: conscious of the huge costs associated with MSW management and; aware that household waste can serve as resource and that it is possible to minimize costs and make some recoveries from recycling. At the Property Service Department (PSD), household waste separation at source was identified as one of the potential areas for improving efficiencies as part of the *Vusumnotfo* initiatives. By implementing source separation of household waste, PSD envisages that substantial quantities of household waste will be diverted from landfill disposal. This should in turn result in reduced costs of MSW management. Recycling will also serve to enhance the longevity of the sanitary landfill by being facilitating efficient use of the precious airspace. Apart from the aforementioned benefits, it is envisaged that by implementing household waste segregation at source, PSD will be advancing its occupational health and safety agenda in terms of reducing workers exposure to the risks associated with collecting and sorting waste.

In accordance with the National Solid Waste Management Strategy of 2003 and in pursuit of the *Vusumnotfo* strategic initiative, the Property Services Department (PSD) had been mobilising to introduce an initiative to separate waste at source across the three company-towns owned by RSSC.

1.3.2 Value of the study

The initiative for household waste separation at source has a record of failure. In 2006, the Property Services Department, in its pursuit of household waste recycling, led an initiative for household waste sorting. The households were given some plastic bags, for free, to store the source-separated recyclables. The participation of the residents in the initiative turned out to be very low; some of the residents were actually spotted using the plastic bags for other purposes besides recycling. After some few weeks the initiative succumbed to a natural death (White, 2010).

Due to the past experience of failure, the Property Services Department is treading carefully this time to design a fool-proof project, which would be accepted by the community. The project will be piloted in Simunye and thereafter rolled out at Mhlume and Tshaneni which are the two company-owned towns. The primary aim for PSD is to eliminate as much as possible all the potential and actual barriers to community participation, right at the onset, and prior to rolling out the programme to the other sites.

The Department found it befitting for a research to be conducted in order to unearth what may hinder or promote household participation in the proposed kerbside recycling scheme; especially so because no post-mortem or formal investigation was ever conducted to determine why the community failed to partake in the previous initiative (Khumalo, 2010). Simunye has been selected for its size, close proximity to the landfill as well as to derive lessons from the previous experience. The information gathered from this research should assist in designing the targeted promotional materials for the initiative, addressing the inefficiencies (barriers to recycling) of the current MSW management system and identifying other opportunities for recycling.

This study therefore served to fill the knowledge gap by setting out to investigate the householders' attitudes, situational and other factors that can have a bearing on the community uptake of the proposed household waste recycling initiative within the context of a company-town owned by RSSC in Swaziland. The other objectives of the research were to collect data on the household's waste reduction and recycling behaviour, their desire to recycle or compost waste, their awareness of solid waste issues, their assessment of the current recycling activities, the common constituents of the MSW as

well as demographics data since these are crucial for community based social marketing and for integrated solid waste management planning.

1.4 Methodology

The research utilised surveys to (i) ascertain, from households, the main factors (such as demographic, socio-economic and situational) likely to influence, positively or negatively, their participation in the proposed kerbside recycling scheme for household waste (ii) find out from key informants and the households how the operational efficiency of the current solid waste management system can be improved to enhance recycling (iii) analyse, through document review of the landfill records and feedback from the households, the composition of the MSW generated in Simunye with a view to identify any opportunities for recycling.

The research was designed as a mixed methods study (Johnson and Onwuegbuzie, 2004:14; Spratt *et al.*, 2004:7) in order to support validity through triangulation. Mixed research has been used in similar research by several authors including Saungweme (2012:7) and Conrad *et al.*, (2012:14 -16). The quantitative methodology comprised a questionnaire-based household survey while qualitative component comprised of key informant interviews. The questionnaire for the community survey was made up of a numerous statements expressed as questions. Some questions from research articles written by Tonglet *et al.*, (2004:33 - 34), Mbeng *et al.*, (2009:562 – 564) and Conrad *et al.*, (2012:54 -61) were extracted and used to compile the questionnaire.

All the potential participants were informed that their participation was voluntary, their right to anonymity and that that their responses would be treated with confidentiality. The researcher being aware of the inherent weaknesses of the key informant technique with respect to sensitive or classified information (Marshall, 1996:92) took every precaution not to publicise or publish such information. A professional relationship between interviewer and the interviewees was maintained to minimize emotional attachment to the research.

1.4.1 Quantitative survey – Questionnaire-based household survey

The representative sample of the 1362 company-owned housing units in Simunye was selected using a stratified sampling approach in order to cover a wide spectrum of

householders. The stratification was based on the house size or invariably income since the houses allocation is income-based. The potential participants were selected using housing occupancy list supplied by RSSC's Housing Manager. Based on a 95 percent confidence level, with a 5% margin of error and assuming a 50% response rate distribution and a housing occupancy rate of 93%, the sample was calculated to 531 households. 96 of the potential participants were selected from the high income group (rent value of allocated house > R3, 500 per month), 126 from the middle income group (R2, 000 < rent value of allocated house ≤ R3, 499.99 per month), 38 from the upper low-income group (R1, 000 < rent value of allocated house ≤ R1, 999.99) and 271 (R0.00 < rent value of allocated house ≤ R999.99 per month) from the low income group (Table 3).

Household occupancy rate June 2012								
Simunye								
House Type	Income group	Rent per month (R)	Total No of Houses /Blocks	Total No Houses Occupied by RSSC Employees	Total No. of Houses Occupied by Third Parties	Total houses occupied	Group Total	Sample size
F (four bedroom (two ensuite)with walk-in closets, big yard, carports plus pantry)	High Income group	6170	6	6	0	6	127	96
E (Four bedroom (1 ensuite) house with large yard,carports plus pantry)	High Income group	4980	30	21	5	26		
UD (Three bedroom house with study, large yard, carport, without pantry)	High Income group	4170	25	22	1	23		
D (Three bedroom house with large yard and carpot)	High Income group	3900	79	67	5	72		
SMQ (three bedroom flat, semi-detached flat without carport or courtyard)	middle income group	2700	2	0	2	2	187	126
UB2 (Three bedroom house with small yard, without carport)	middle income group	2500	56	48	5	53		
C (Two bedroom house with carport and court yard)	middle income group	3380	68	55	11	66		
B2 (three bedroom with court yard)	middle income group	2050	67	62	4	66		
SSQ (two bedroom flat plus carport and court yard)	upper low income group	1920	8	3	3	6	42	38
SQ (one bedroom flat plus court yard)	upper low income group	1500	15	0	15	15		
MQ (two bedroom flat plus courtyard)	upper low income group	1640	21	19	2	21		
A (small two bedroom house with outside ablutions)	Low income group	600	672	398	216	614	917	271
B1 (small two bedroom house with courtyard and inside ablutions)	Low income group	890	294	179	105	284		
B/Block (one room only)	Low income group	500	19	5	14	19		
total			1362	885	388	1273	1273	531

Table 3 Calculation of sample size

On the questionnaire survey, structured questions were used because they are easy to answer, quick to analyse and are less susceptible to interviewer bias (Bateman *et al.*, 2003:160). The attitudes, motivations, awareness, behaviour, desire for future recycling, etc, were measured using Likert scale type questions. On some occasions dichotomous questions were used. At the end of each section there was a provision for the respondents to include any other answers not on the list. There was also a section on demographics. There are several documented cases whereby questionnaires have been used to gather information on attitudes, perceptions, social and cultural influences as well as other factors that might impact the recycling behaviour of community members (Boolane, 2006:733; Omran *et al.*, 2009:281; Jones *et al.*, 2010:535). The demographics section included questions on sex, age, highest level of education attained and income. A prototype of the questionnaire is appended to this document on Appendix 1.

The survey was conducted in July 2012 and it lasted for three and a half weeks with the three weeks dedicated to the full-fledged survey and ½ a week to the pilot phase. The questionnaire was distributed by hand by two university interns; means were made to target the originally selected households, if a person old and knowledgeable enough to complete the survey was found at the household the questionnaire would be left behind, to be collected the next day.

Initially the plan was to distribute the questionnaire to the preselected households but as it became apparent that some of the pre-selected houses were always unpopulated, the “~~contact~~ contact and collect” method (Barr, 2007:449) was adopted in order to get the next similar person to complete the questionnaire and achieve the target. This meant that if contact with the preselected household was not successful, the next residence on the same group would be approached. The process was repeated to try and achieve the required sample size. Notwithstanding that the contact and collect method is a bit slow and requires a lot of labour, the main advantage is that it has a big potential for achieving high response rates (Barr, 2007:449).

At the end a total of 225 questionnaires were distributed. A total of 103 out of 225 questionnaires were returned; of these, only 91 were usable. The data for the household survey was analysed using simple descriptive statistics based on Microsoft Excel.

1.4.2 Qualitative survey – key informants interviews

To facilitate the speedy collection of data from interviewees with diverse backgrounds (Marshall, 1996: 93), the qualitative survey made use of key informants to gather the data. The key informant technique has been applied widely on research projects in respect of recycling. Examples include Bolaane (2006:733), Saungweme (2012:125-140) and Conrad *et al.* (2012:53).

The initial list of the potential key informants was generated by the author. The participants were picked based on their positions, their involvement with solid waste management issues and their first-hand experience of recycling. They comprised of RSSC Environmental Officer, Parks and Sanitation Inspector (Simunye), Parks and Sanitation Supervisor (Simunye), the integrated management systems (IMS) officer - HR, IMS Manager - Simunye Factory, IMS officer - Corporate, the Landfill Manager and two dealers in recyclable waste. The key informants were in turn asked to suggest the names of additional key informants. Unfortunately, they were not able to submit the names.

A questionnaire with open ended questions was e-mailed to key informants to allow them enough time to familiarise themselves with the questions and consult records if necessary. The key informants were asked one set of questions. There were 15 questions. They were asked to give observations on the performance of recycling municipal solid waste at Simunye; give suggestions on what could be done to change the attitudes of the households and to improve the households' up-take of recycling; make recommendations how the solid waste management system should be improved. The key informant protocol is appended to this document.

The key informants were each given up to three weeks to respond to the questions. Six out of nine key informants were able to complete questionnaires and returned them to the author. Follow up face-to-face interviews were scheduled to get further insight on the some of the answers. In some instances, due to time constraints, these were substituted by telephonic interviews. The two dealers in waste did not complete the questionnaires but one of them was able to share some of the required information verbally. The technique of thematic coding was used to analyze the qualitative data.

1.4.3 Quantitative methodology: Desktop study

To achieve the objective of identifying further opportunities for recycling, a desk top study was conducted. Sanneh *et al.*, (2011:1055) asserted that —knowledge of municipal solid waste composition is essential for the determination of waste management options such as recycling”. To generate data about the recycling potential of the MSW that is generated in Simunye, the records from the landfill for the 12 month period starting on 1 March 2011 to 1 March 2012 in conjunction with data from the household survey were used. The reason for using the 12 month period was to accommodate seasonal variations on the waste quantities. The data from the landfill was analysed through descriptive statistics to identify trends. This approach of using data gathering was used by Chakrabarti *et al.*, (2009:128). The recyclables were classified into the categories of paper/cardboard, plastics, metals (ferrous and non-ferrous), glass and rubber. The data from the household survey was used to identify the constituents of household waste in order to find out more about the waste composition.

1.5 The results and discussion

The research had three components, a household survey, key informant interviews and a document review. The results and discussion are presented in this section of the report.

1.5.1 Household survey

A total of 225 questionnaires were issued to the potential respondents. The target number of 531 could not be achieved in the end. Firstly with the official occupancy rate reported by the Housing Manager to be at 93%, a technical glitch emerged as it was discovered when the survey was conducted that some of the company employees were not residing full-time in the company-houses they had been allocated. The main reason for not achieving 531 participants, however, was that it was not easy to access the fourth group (very low – income group) which was to be represented by 271 survey participants. Upon noticing that accessing or contacting some of the pre-selected candidates, the survey team then opted for the contact and collect method to try and reach the target number.

The fourth and largest group of the survey was to comprise mainly of non-company employees. Notably most of them were either casuals or seasonal employees (for example the sugarcane cutters with a term of 9 months per annum or the gardeners /maids who are very transient) or third party (RSSC's service providers') employees most of which have a maximum term of three years employment contract with their employers. It proved to be a challenge for the survey administrators to breakthrough or penetrate this group, as a result very few questionnaires were distributed to them.

The main reason was that for the most part, this group had nobody left at home (in the form of gardener or maid) to receive the questionnaire. An explanation for this is probably that due to their low-income status, the group can hardly afford the services of gardeners. The situation was compounded by the fact that due to the nature of their work, which is physically demanding and out there in the field (as sugarcane cutters, grounds men, gardeners, helpers, labourers, etc.) it was not easy for these people to find time to sit down and complete the questionnaire. Some of them suggested that they needed assistance with completing the questionnaire. A handful of them pointed out that they were semi-literate. Others displayed downright lack of interest in completing the questionnaire. The few individuals who received the questionnaire did not return the survey on time, so that at the end of the survey the usable questionnaires from that group represented less than 5% of the targeted sample.

Previous research have suggested that transient populations or frequent movers have a challenge in respect of participating in recycling (Timlett and Williams, 2009:498; Jesson and Stone, 2009:18).

A total of 225 potential respondents were successfully contacted. The response rate was 46 percent in that 103 completed questionnaires were returned. However, only 97 were usable; 60 percent of the respondents were male, while forty percent were female. Some of the gardeners or maids reported that their bosses had taken the questionnaires to the workstations to write the responses but eventually most of these were not returned to the administrators of the survey.

Concerning the reliability of the data, it was noted that a significant number of the questionnaires were completed by scholars, who were assisting their parents or guardians

to complete the questionnaires. Some of the parents were not in a position to disclose their income and hence some of the information on income was either inaccurate or totally missing. It was also observed that 17 of the respondents did not disclose their occupations. Some respondents were not willing to give information on their literacy levels. The aforementioned scenario was a challenge with respect to performing a full-scale correlation analysis. Further research is therefore recommended to perform correlations, factor analysis or cluster analysis.

A large number of the usable questionnaires were completed by the respondents who lived in the big houses and inherently affluent (Table 4). A staggering 40 of usable questionnaires were from first group.

House type						No of respondents
One room only						2
Small two bedroom house with inside ablutions						6
Small two bedroom house with outside ablutions						0
One bedroom flat plus courtyard						3
Two bedroom flat plus carport and courtyard						16
Three bedroom house with courtyard						1
Three bedroom house with yard, without carport						20
Three bedroom flat, semi-detached, without carport or courtyard						2
Three bedroom house with large yard and carport						33
Four bedroom house with large yard, carports						7
Other						0
ND						0

Table 4 House type of the respondents

The results in Table 4 suggested that the affluent residents were more responsive to the survey despite that a majority of the village houses were occupied by the less affluent employees (see Table 3). A research report published by the Strategy Unit, Cabinet Office, UK, (2002:19) found that recycling was considered a peripheral issue by the less privileged individuals since they had more pressing issues.

This outcome is not surprising because previous empirical studies have shown that time, availability of space and literacy can be linked with the attitudes of the householders towards recycling (Tonglet *et al.*, 2004:27). The site visits to the residential areas confirmed that the barriers in respect of recycling for the lower-most income groups recycling were the availability of space (since the houses they lived in were small) and time.

Based on the information obtained, there were fewer respondents from the householders who make less money than from the affluent ones (Figure 15). Previous empirical studies have suggested that affluent people are more likely to recycle than people who are poor (Gamba and Oskamp, 1994, and, Vining and Ebreo, 1990, as cited in Schultz *et al.*, 1995:108)

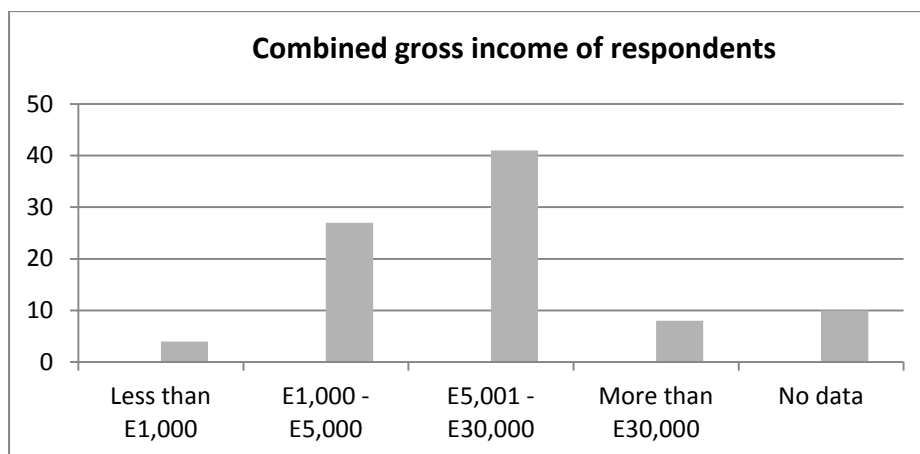


Figure 15 Combined gross income

The literacy levels of the respondents were above average since some of them had done some undergraduate studies (Figure 16). Noteworthy is that the less educated residents of Simunye such as the sugarcane cutters were less willing to complete the survey questionnaire. Level of education has been shown to be positively correlated with a pro-environmental attitude (Judge and Becker, 1993; Owens *et al.*, 2000 and; Blake, 2001, all cited in Yau 2012:119). Meneses and Palacio, (2005 cited in Oliver, 2010:2) profiled the reluctant recyclers as the less educated individuals.

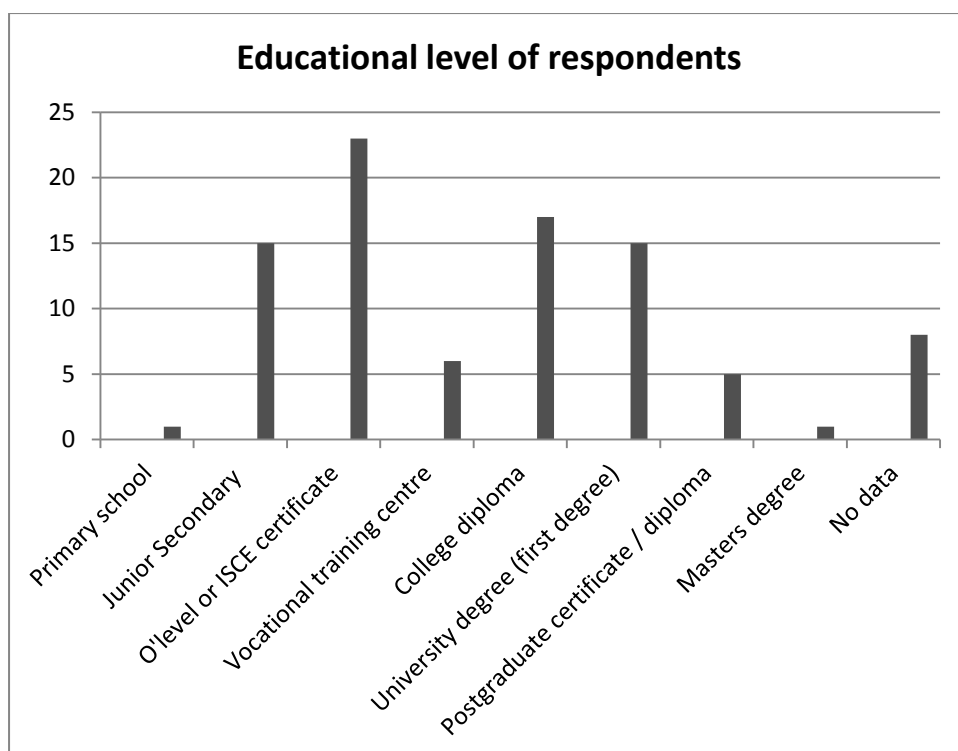


Figure 16 Educational level of the respondents

The respondents' occupation ranged from scholars right up to medical doctors. Notably none of them were pensioners (Table 5). This is probably because the school were closed when the survey was conducted and the school children had ample time to assist with completing the survey questionnaire. It is not surprising that there were no pensioners involved with completing the survey because this is a company town with very rare sights of retired people. This information will be useful when designing the targeted promotional material for the recycling campaign.

Job title	Number
Artisan	6
Scholar	13
Engineer	6
Senior executive	3
Housewife	9
Clergy	1
Pensioner	0
Shop assistant	1
Domestic worker	1
Teacher	7
Other professional	12
Driver	1
Counsellor	1
No data	17
Self employed	1
Accountant	2
Doctor	1
Supervisor	4
Technician	1
Head chef	1
Mobile crane operator	2
Security co-ordinator	1

Table 5 Occupations of the respondents

The average number of persons per household was not small since a majority of the respondents reported that they came from households with at 4 least members (Figure 17). This shows that the prospects of recycling are good since (Nixon and Saphores, 2009 cited in Yau, 2012:120) reported that bigger households were more likely to participate in recycling.

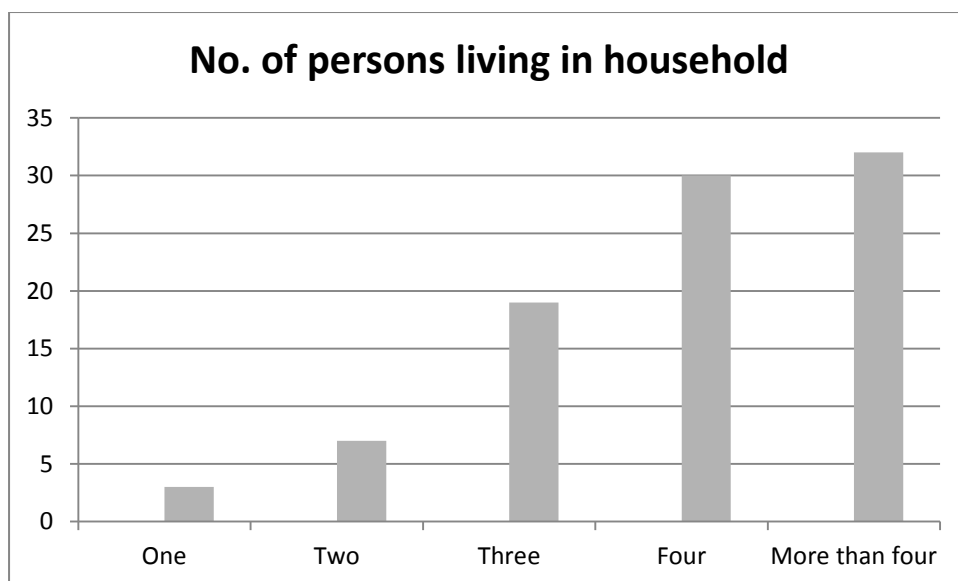


Figure 17 Number of persons living in household

93 per cent of the respondents claimed that environmental issues were important to them (Figure 17). This finding is not exceptional since previous researchers have highlighted that the literate individuals have a better appreciation of environmental appreciation of environmental problems (Kolmus and Agyeman, 2002:248, Blake 2001 cited in Yau, 2012:120)

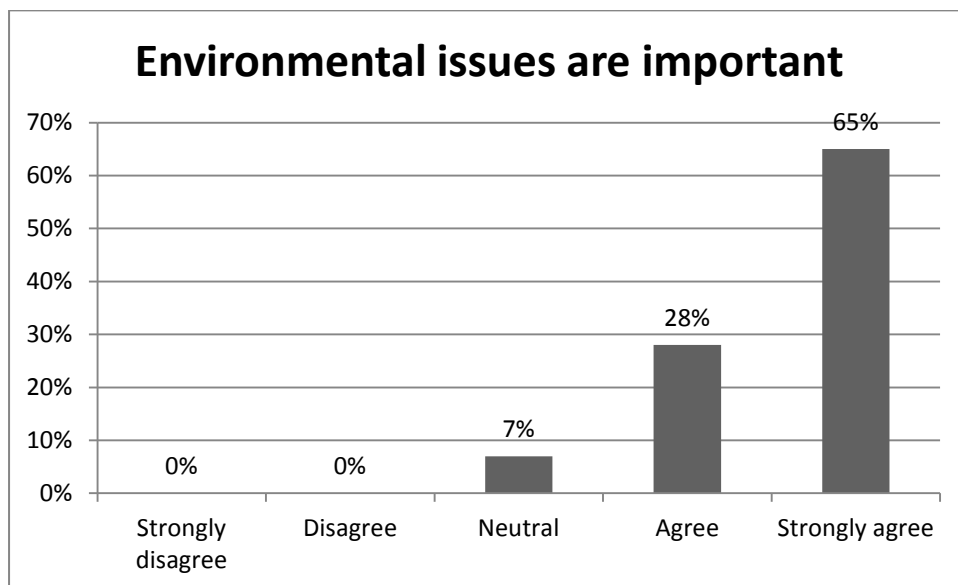


Figure 18 Importance of environmental issues to respondents

On the specific issues related to the environment, the respondent stated that they “had a passion for a clean environment”. The next predominant response was that recycling was good for the environment (Figure 18).

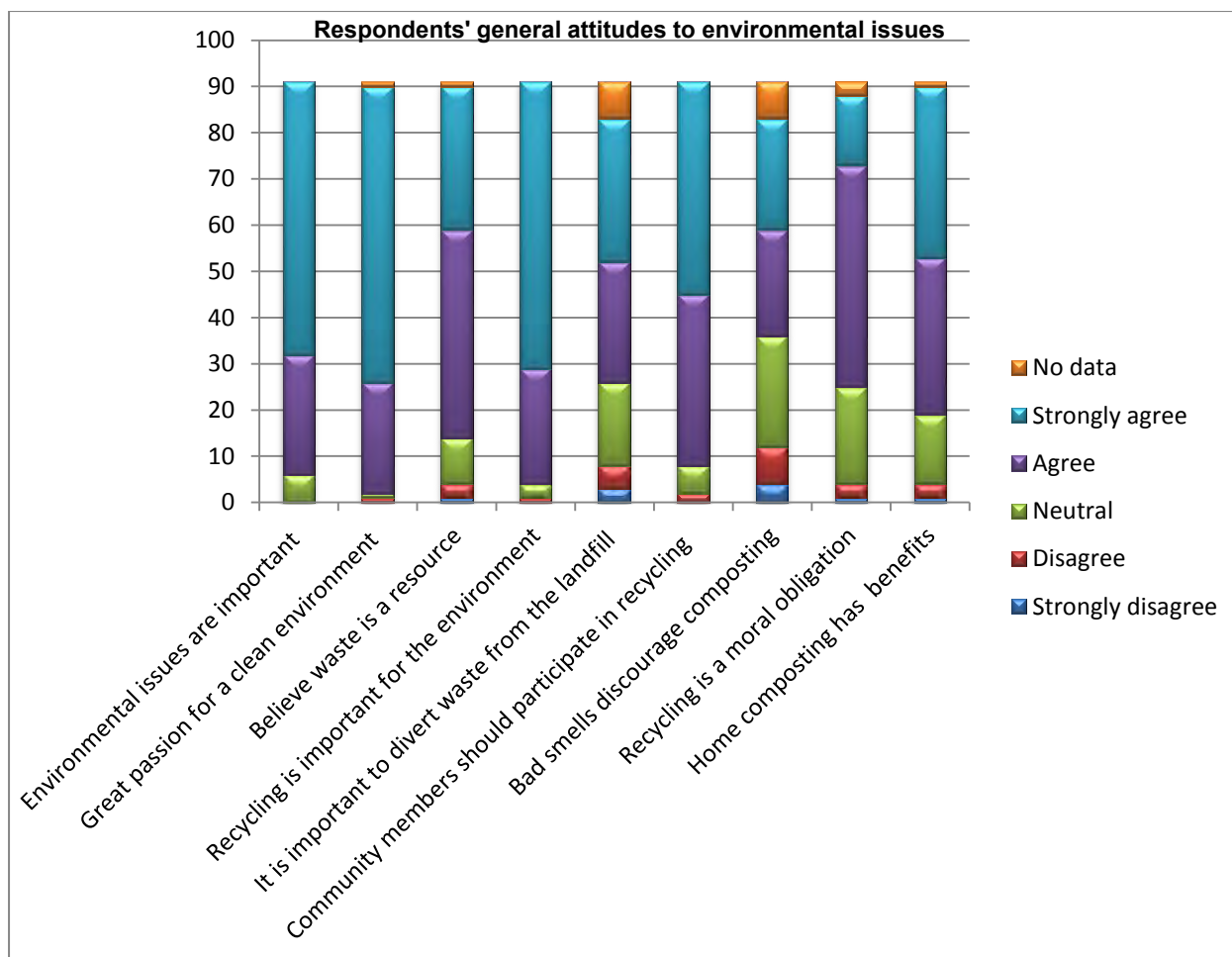


Figure 19 General attitude to environmental issues

Recycling was believed to be a collective responsibility, not just women's responsibility. According to Figure 20, sixty percent of the respondents negated the view that recycling was a women's thing. This is despite that only 40 percent of the respondents were female.

Previous empirical studies have suggested that sex cannot be used as a predictor of pro-environmental behaviour because men and women tend to recycle equally (Vining and Ebreo, 1990 as cited in Ho, 2002:2). Some authors have found out that women tend to be more emotionally engaged and show more willingness to engage in pro-environmental behaviour (Kollmuss and Agyeman, 2002:248; Marquit, 2008:9)

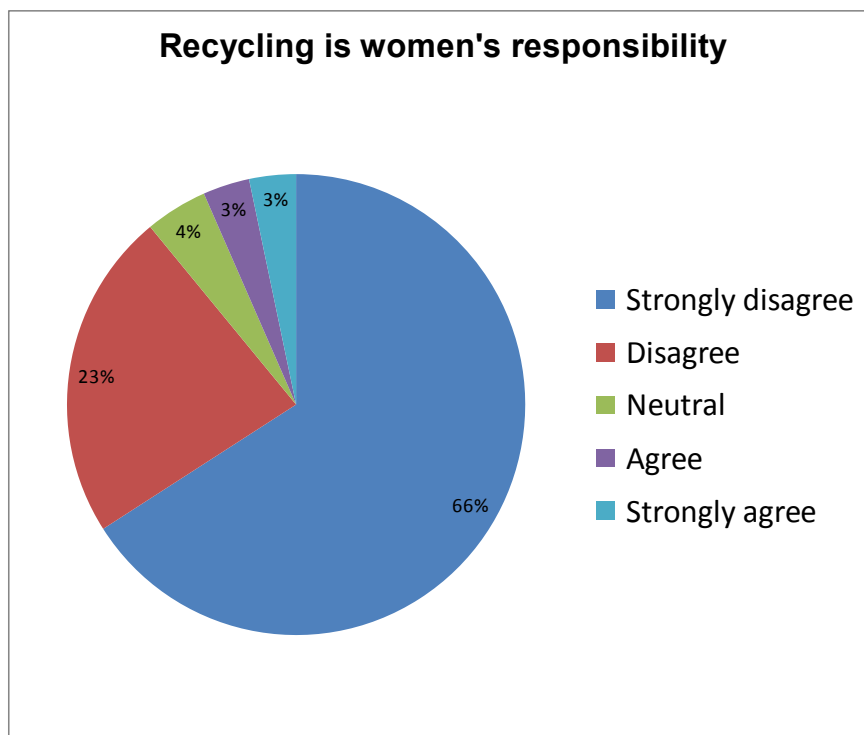


Figure 20 Responsibility for recycling

As shown in Figure 21, a high number of the respondents were silent about rinsing the recyclable containers, with 45% of them choosing to be neutral. This suggests that awareness-raising is required to educate the householders about the need for high quality recovered materials. Thomas, (2001:259) highlighted that while it is important to boost the community recycling rates, it is equally important that the recycling be done properly.

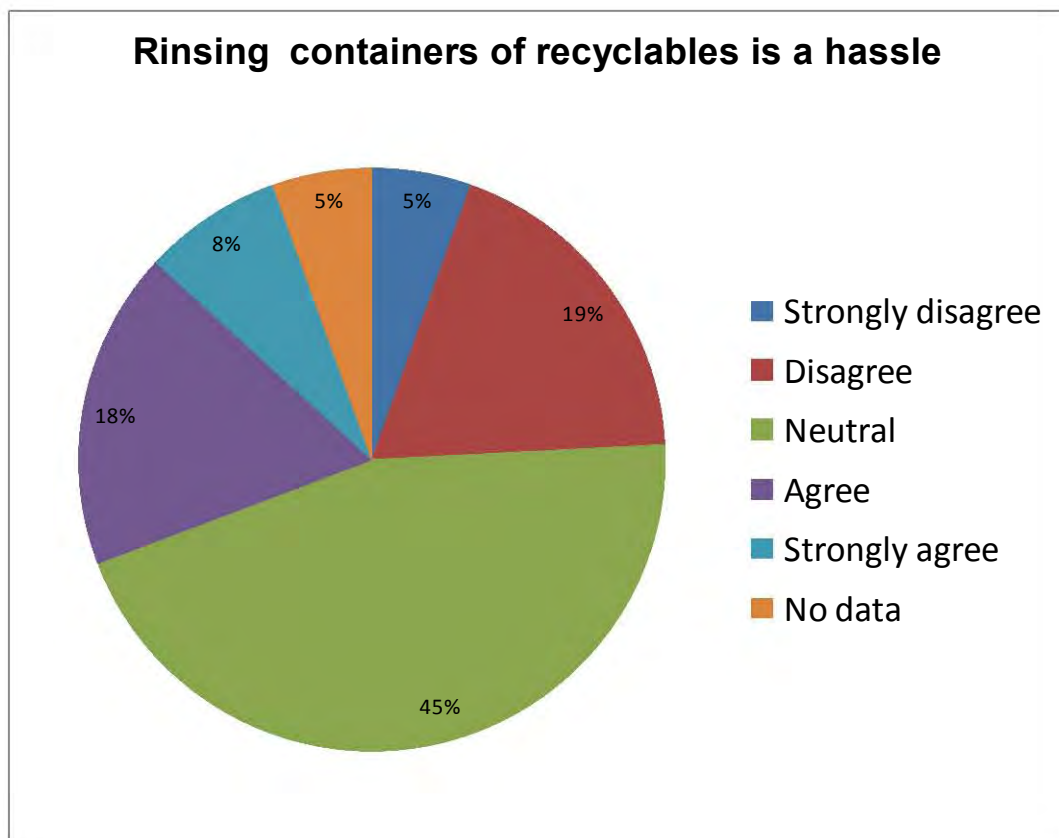


Figure 21 Attitude toward rinsing containers

The predominant reason for recycling was that it was good for the environment (Figure 22).

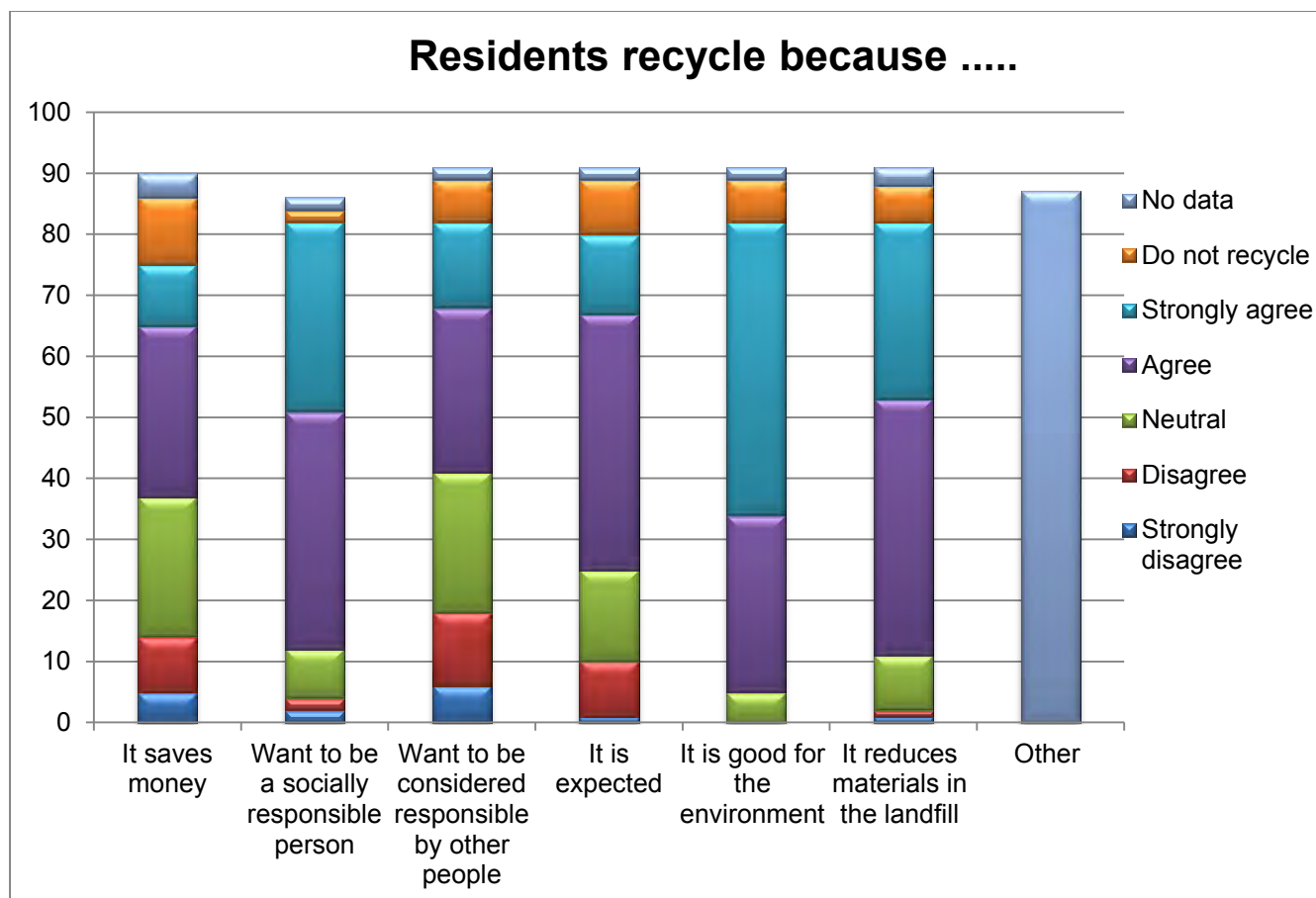


Figure 22 Reasons for recycling

When asked about the reasons for not recycling, the respondents indicated that they did not recycle because they “did not know where to take the recyclables” (Figure 23). This means that the local authority will have to publicise the information pertaining the proposed kerbside recycling scheme.

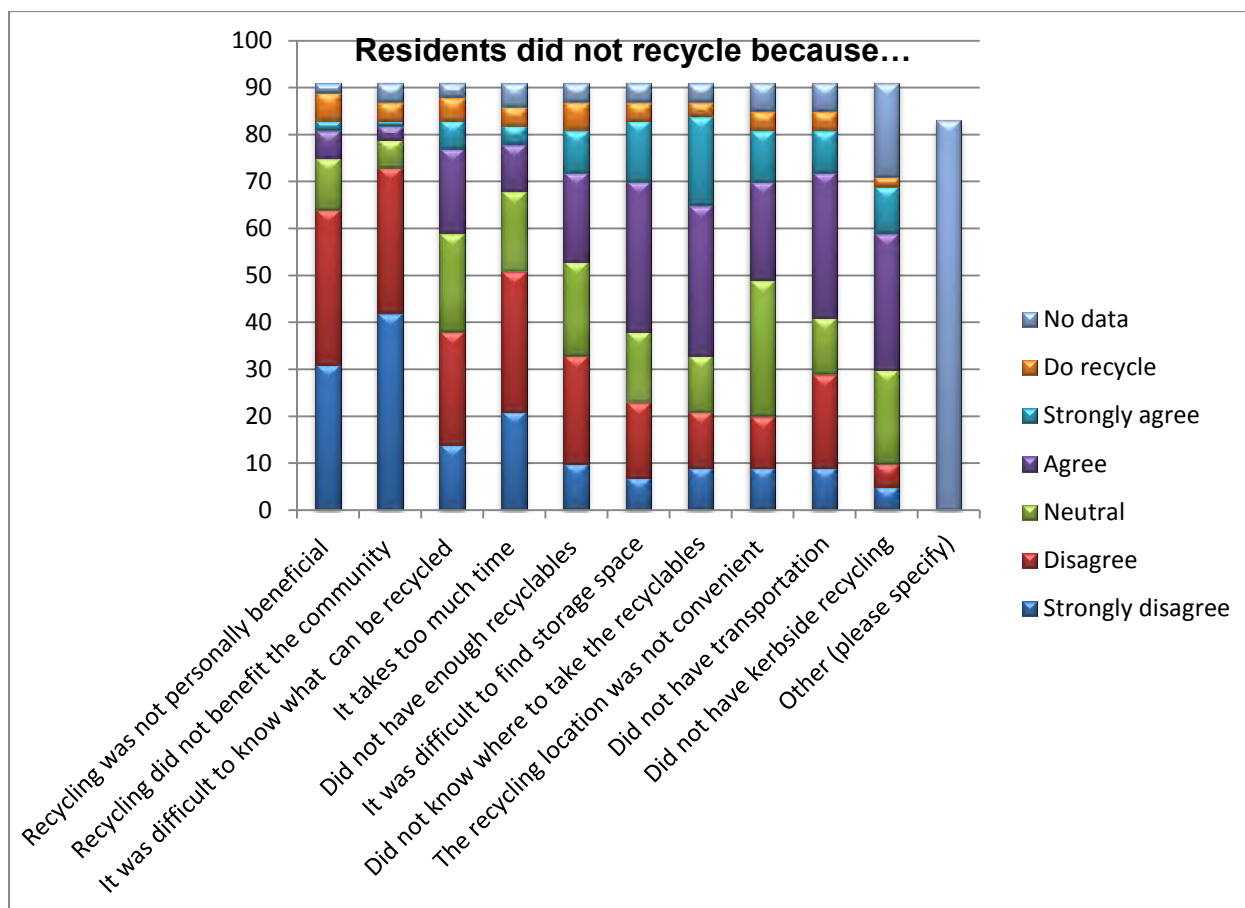


Figure 23 Reasons for not recycling

With respect to waste reduction behaviour, the respondents claimed that they composted their waste (Figure 24) This was not surprising because agriculture is one of the main activities at RSSC, and residents of the town of Simunye own backyard gardens.

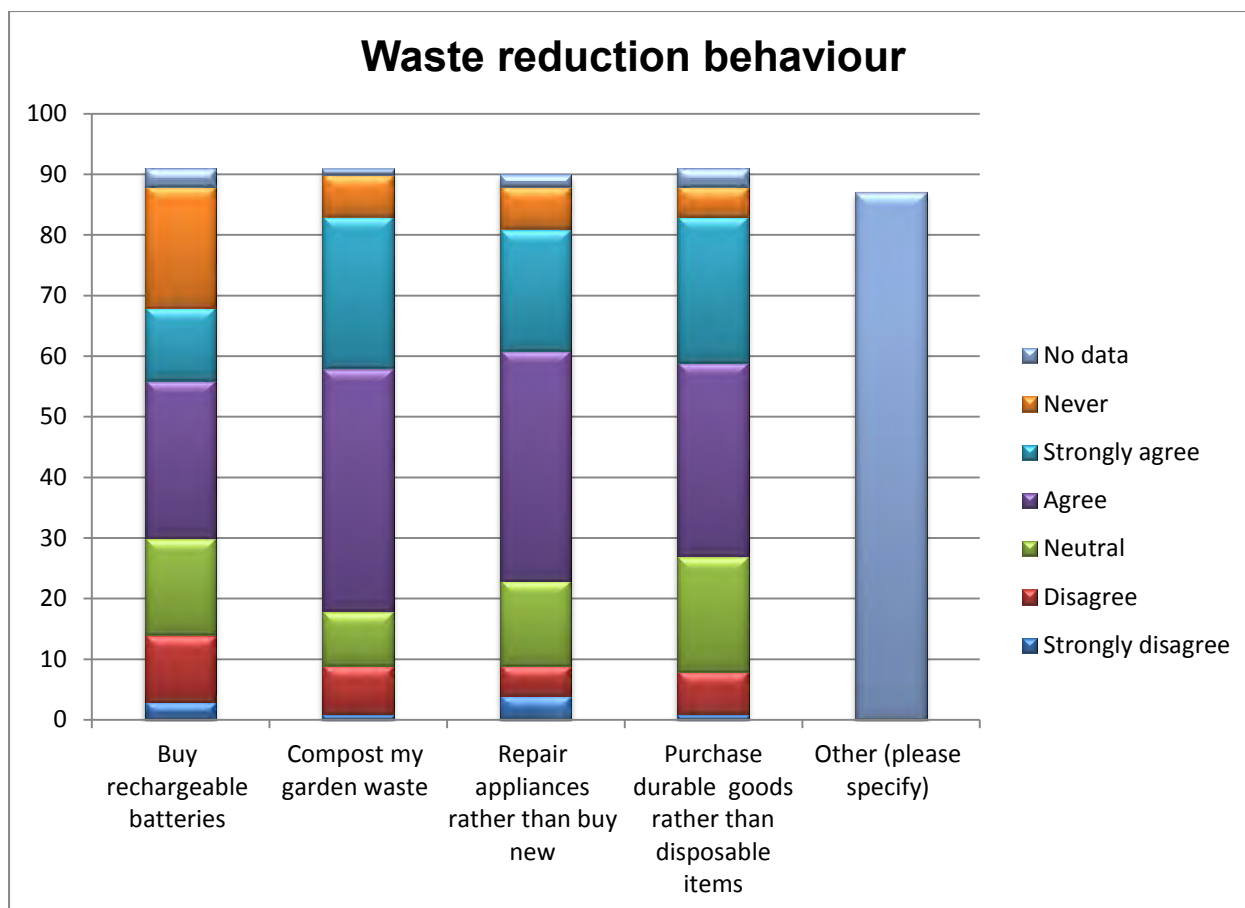


Figure 24 Waste reduction behaviour

One of the commonly recycled household waste items, were the plastic shopping bags. Second on the list were newspapers and glass (Figure 25).

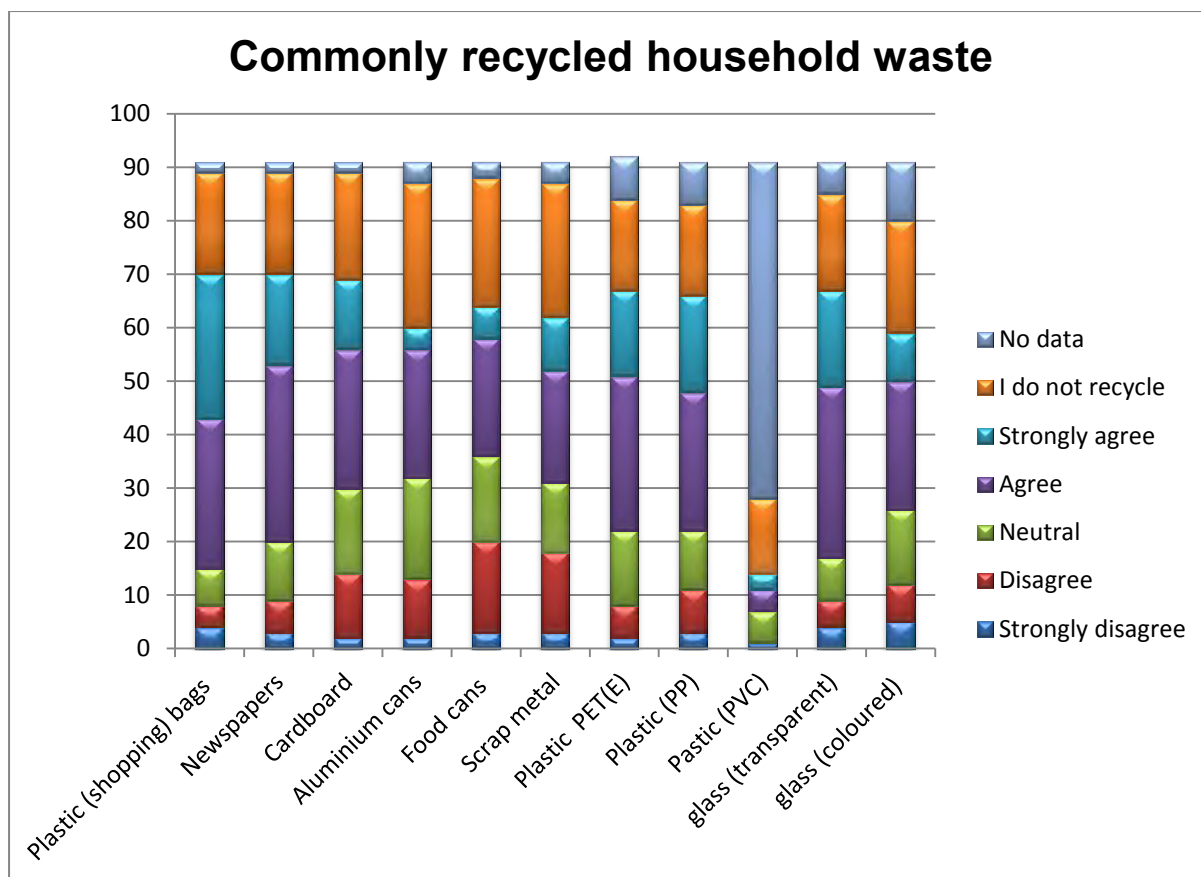


Figure 25 Commonly recycled household waste

A majority of the respondents indicated that they were likely to recycle in future; the issue of incentives was not important (Figure 25).

A study which was conducted by Timlett and Williams (2008:622-634), in the UK, showed that incentives can serve as a motivator for recycling. Some authors found out that the incentives produced short-term behavioural change in that as soon as the incentives were removed, the people resorted to their old habits (Schultz, *et al.*, 1995 cited in Ho, 2002:3). Rewards may also backfire with affluent people if they start comparing the cost *vis-a-vis* the benefits (Thogersen, 1996 cited in Ho, 2002:2).

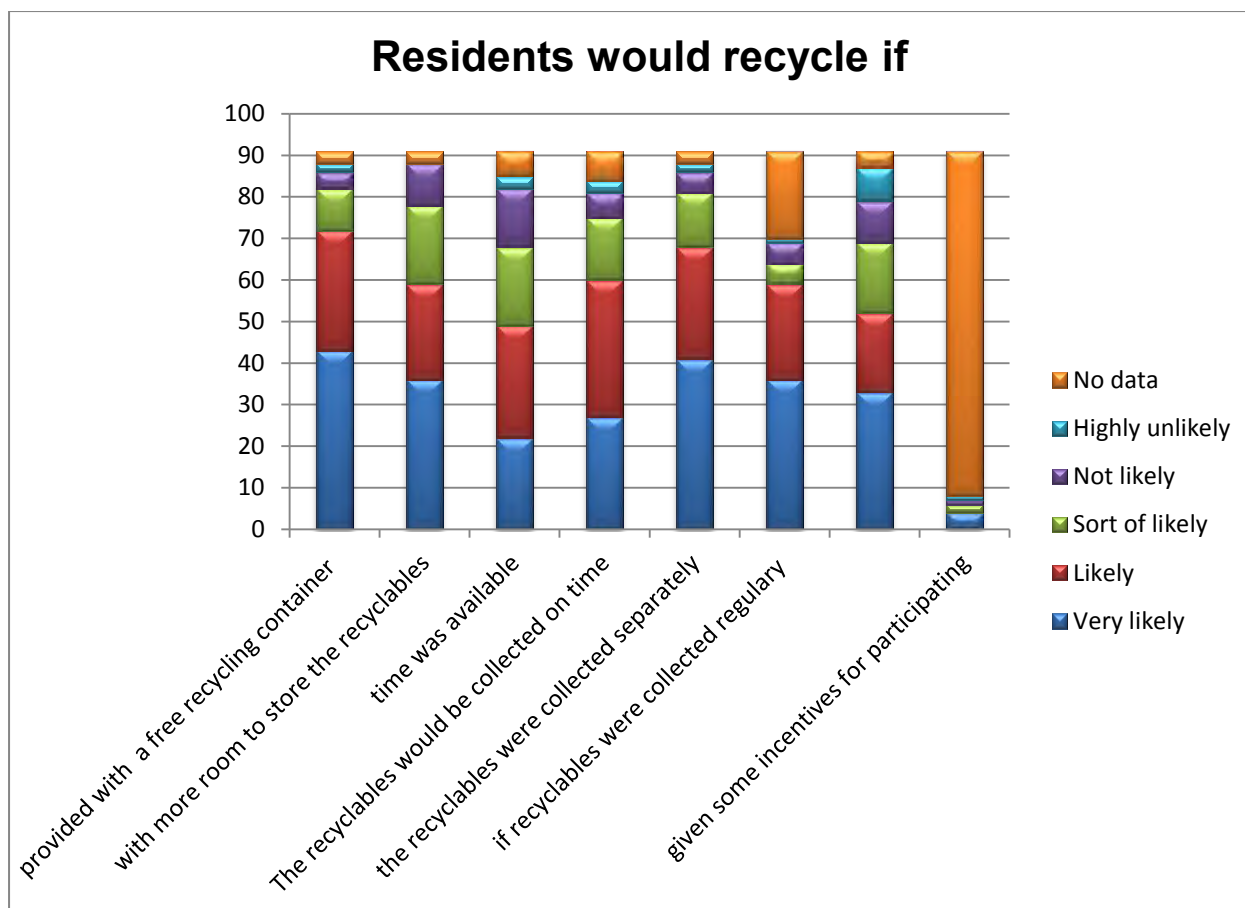


Figure 26 Desire for future recycling

The respondents indicated that they would compost, if they were taught (Figure 27). This is not unexpected given that most of the residents in Simunye have backyard gardens.

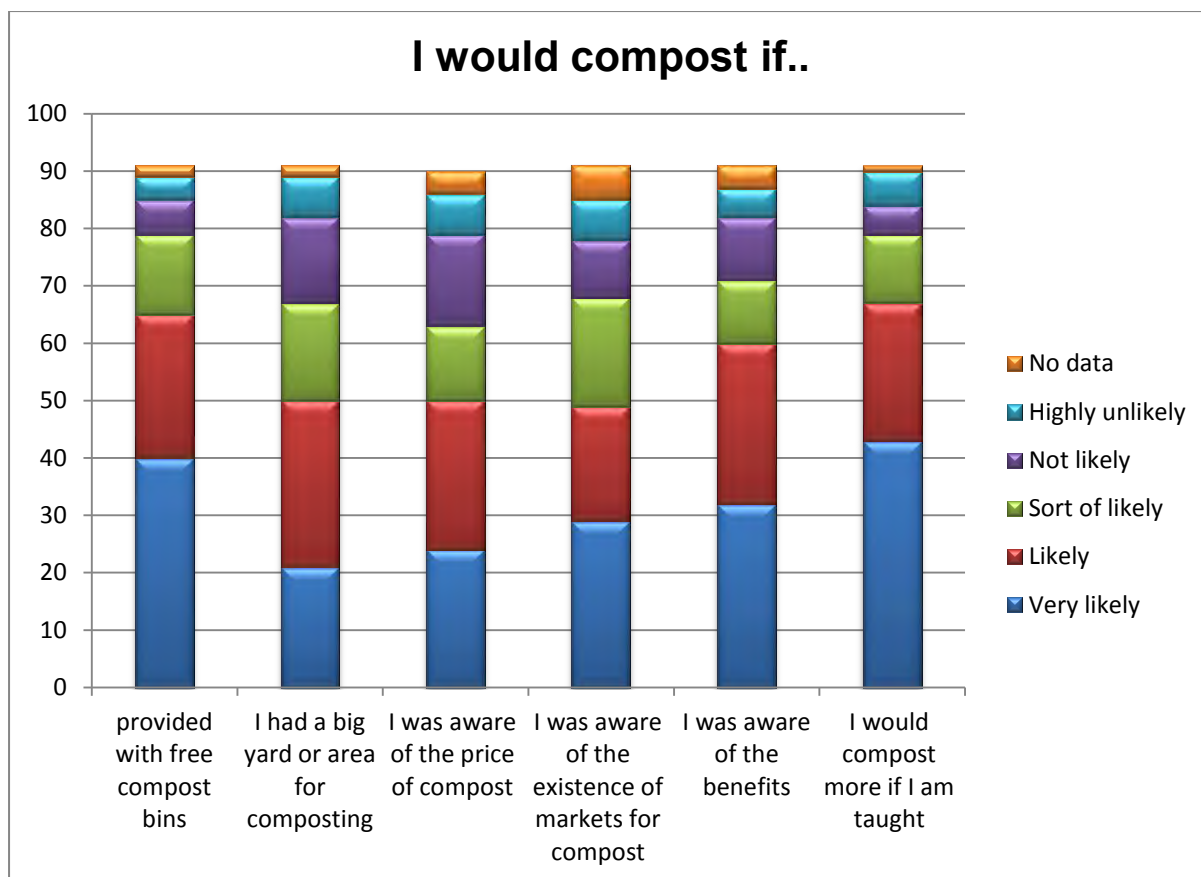


Figure 27 Desire for future composting

The household survey suggested that there was low awareness of programs on recycling amongst the community members. 68 percent of the residents indicated that they were not aware of programs on recycling (Figure 28). Omran, *et al.*, (2009:275) highlighted that the uptake of recycling initiatives by households depends on the extent of —awareness and understanding of recycling”.

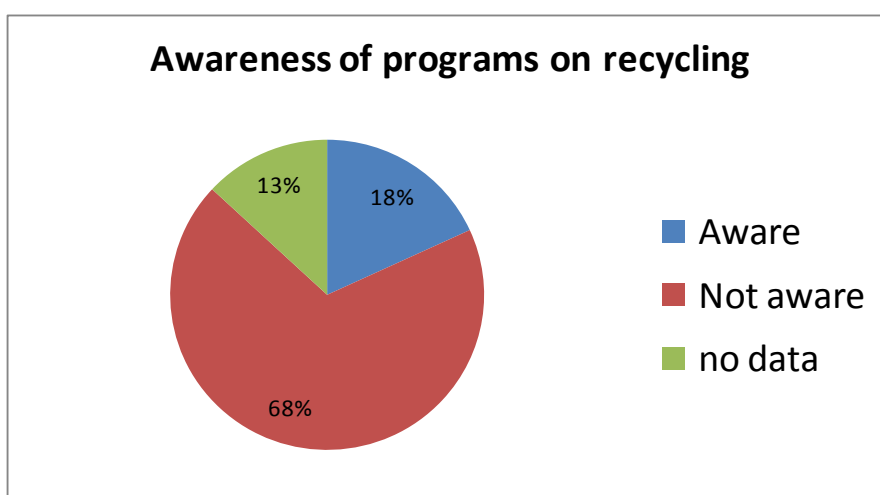


Figure 28 Awareness of recycling activities

The preferred mode of communication was flyers (Figure 29). The second popular options were road-shows and mail.

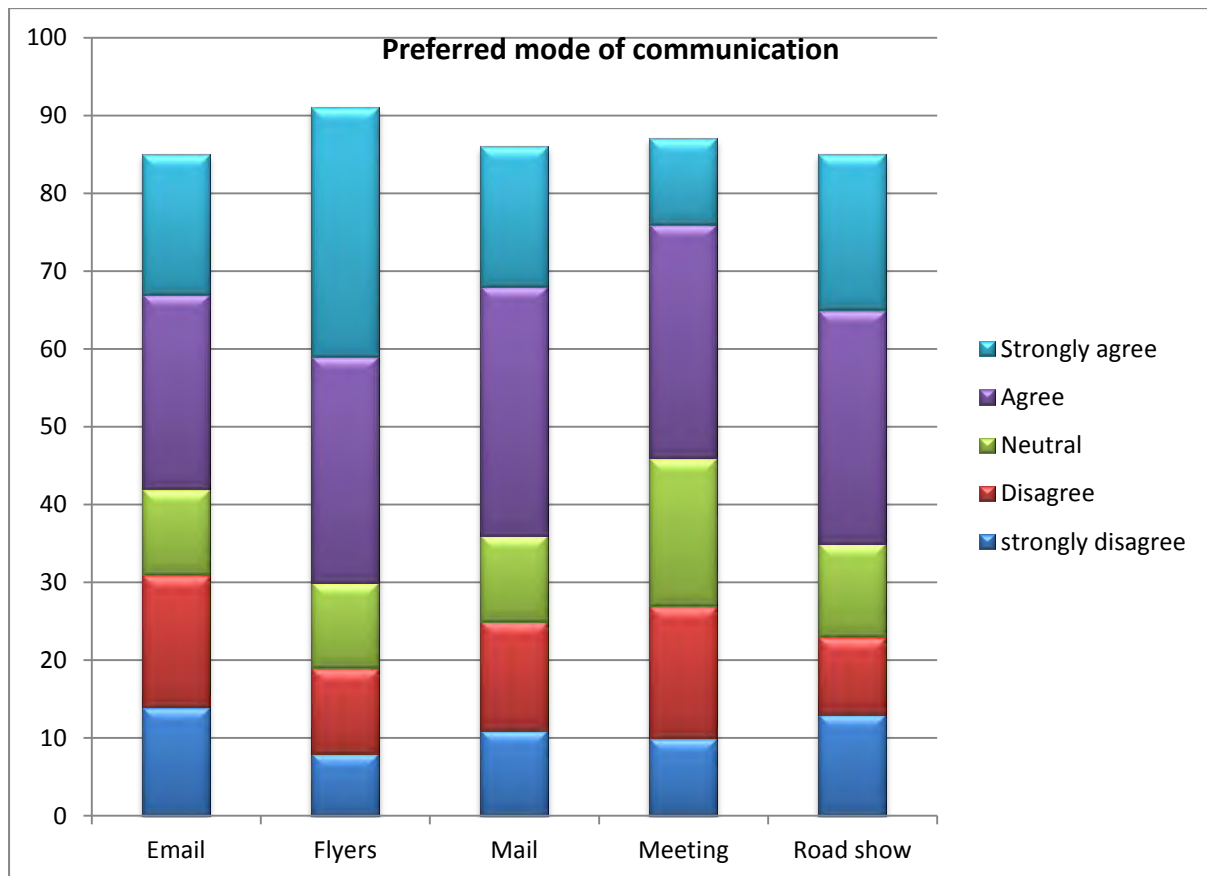


Figure29 Preferred mode of communication

Twenty six percent of the respondents were dissatisfied with the ‘on-going’ local recycling initiative (Figure 30). One of the respondents commented that there was no recycling program in place in Simunye, so it was difficult to make an assessment. This probably explains why 44 percent of the respondents gave a neutral assessment of the program.

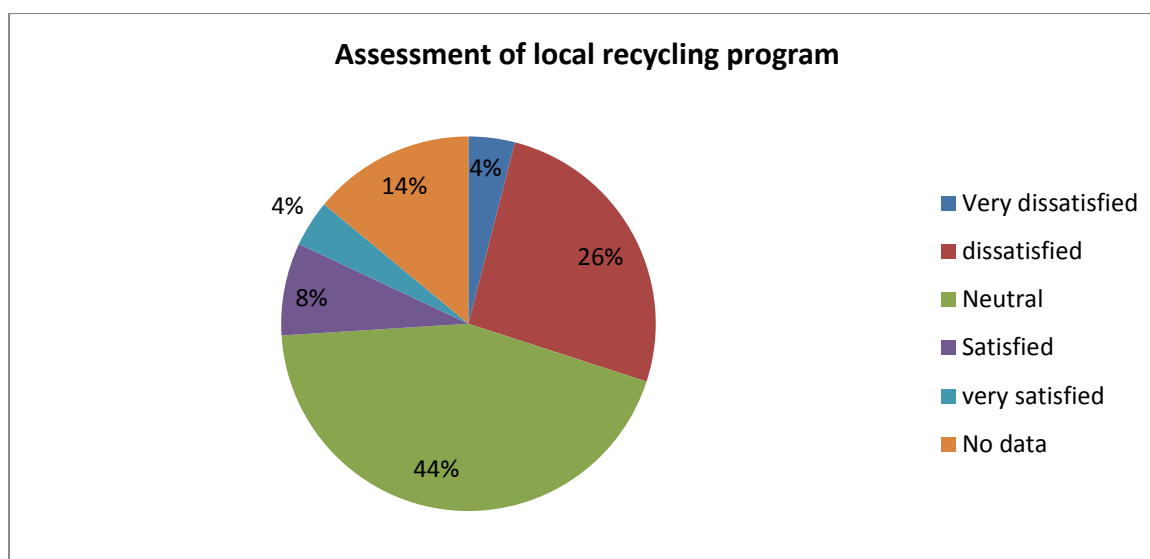


Figure 30 Assessment of local recycling program

1.5.2 Key informant interviews

The key informants were able to give insight to what probably led to the failure of the previous initiatives of recycling. Referring to the 2006 initiative for household waste recycling, it was revealed that there was neither proper marketing nor follow up on the residents; the residents were just given the bags and it was just assumed that they would naturally separate the household waste at source as requested by the local authority. There was neither close monitoring nor a forum to discuss any issues or challenges that the residents were having in terms of recycling the household waste. In terms of personnel, it also emerged that the manager who had initiated the project, was redeployed and nobody took over from where he had left. The initiative did not last long; it just died down after a few weeks.

The findings confirm the findings of previous empirical studies in that community-based social marketing rather than the traditional approaches of awareness-raising is more effective in achieving behavioural change amongst the residents (Rothwell and Walker, 1995, cited in Read, 1999:228-229; DETR, 2000 cited in Phillips *et al.*, 2002: 5; Thomas *et al.*, 2004:7; Landis, 2005: 9-10). Literature emphasizes the importance of targeted educational campaigns to promote recycling initiatives since recycling is a behaviour which necessitates behavioural change (Read, 1999:230; Owens *et al.*, 2000 cited on Phillips *et al.*, 2002:6). Empirical studies have suggested that recycling initiatives which are led by

municipalities are set to fail if they do not involve the community and take into consideration the levels of knowledge, comprehension, awareness attitudes and other factors pertaining the community members with respect to recycling (Thomas, 2001: 259 – 274; Omran *et al.*, 2009:275 -288). A study conducted by Timlett and Williams (2008: 634) in England suggested that a marked improvement in recycling behaviour can be accomplished if the local authority monitors the individual members and provides feedback on their performance. The importance of on-going interaction and support between community members and the local authorities was also suggested by the results of a research project by Read (1999:246) who noted that the two way communication allowed quick resolution of problems.

Citing the failed initiative of waste separation at source in Simunye Factory; the key informant emphasized the importance of collaborative efforts. It was stated that failure to provide compatible transport for the source separated waste probably led to the failure of the initiative. When the workers saw that what they were doing did not count because after all they had separated the waste at source, the waste was once more mixed with all sorts of waste, by the service provider, during collection and transportation. Similar results were observed by Bolaane (2006:735) who reported that as soon as the community members started noticing that the source separated waste they started showing unwillingness to continue separating waste at source because they felt that their efforts did not count. Previous studies suggested that when community members perceive recycling as effective, they are more motivated to participate (Gamba and Oskamp, 1994 and; Nigbur *et al.*, 2004 cited in Omran *et al.*, 2012:7).

Validating the findings of the household survey, the key informants also emphasized that the recyclables must be collected on time in order to keep the community members motivated. This is in line with Bolaane (2006:735) findings, who reported that soon after the community members started noticing that the recyclables were not being collected on time in Gaborone, Botswana, they were infuriated and stopped participating.

In terms of leadership for the recycling initiative, the key informants emphasized that, in line with the principles of integrated solid waste management, a steering committee comprising all the key stakeholders, such as the community members, waste removal service providers, the landfill operators, the dealers in waste and the local authority should be responsible for promoting the initiative. This would empower all the stakeholders in

terms of decision making and process ownership. It would also reduce risk in that if the project manager, who is RSSC employee, happens to be redeployed, the project would continue. It is widely documented in literature that inadequate stakeholder involvement during the planning process contributed to the failure of many sustainability initiatives (Oakley and Marsden 1984; Uphoff 1991 and; World Bank 1998 all cited in Karl, 2000:1; Weybrecht, 2010:276).

One of the dealers in waste pointed out that an attempt to improve the quality of the recyclables. He cited an example whereby the recovered aluminium cans were found to be contaminated with soil. The implications for this was that in order to be marketable, the recovered waste must be kept clean starting at the kitchen, moving to the point of collection at the kerbside down, during haulage and ultimately in the temporary storage area at the landfill.

Bearing in mind that the respondents of the household survey did not appear to be enthusiastic about rinsing the recyclables vessels, the challenge for the local authority would be to educate the residents about the importance of keeping the recovered items clean. The waste collection service providers as well as the landfill operator should also be educated because they also handle the waste.

1.5.3 Desktop study

From the landfill records it was established that significant quantities of garden waste end up being landfilled. The practice of landfilling organic waste is discouraged in the European Union (EU, 1999) because it does not constitute best practice. The recommendation for the local authority would be to support the backyard composting of garden waste (Figure 31).

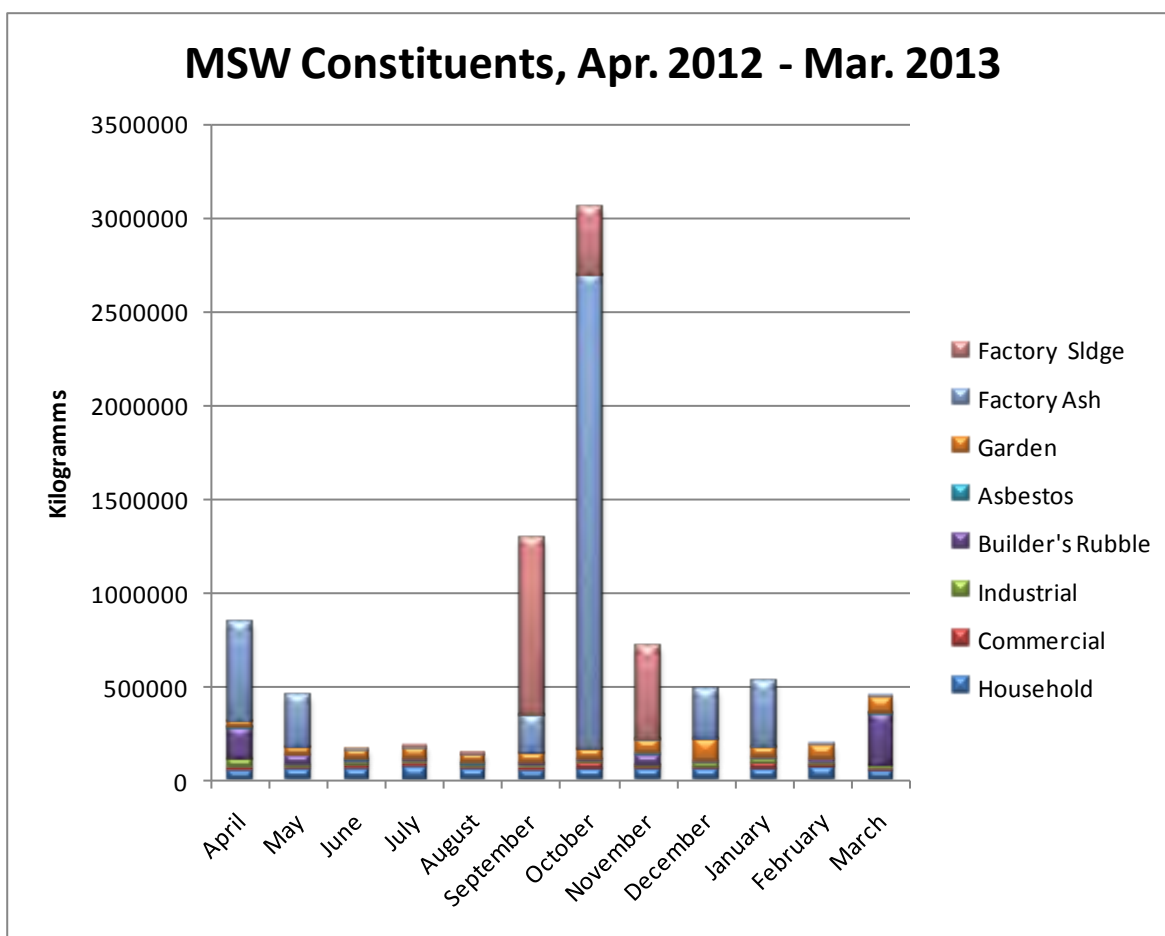


Figure 31 Composition of MSW, Apr 2012 - Mar 2013

Analysis of the records showed that paper / cardboard were the most commonly recycled materials (Figure 32). Glass from beer bottles was also common. The findings in terms of paper / cardboard being amongst the top three are in line with what is observed around the globe for instance in the United States. The statistics for the US are summarised below in Table 6

Product	Recycling rate
Auto batteries	96.2
Newspapers / mechanical papers	72.5
Steel cans	70.6

Table 6 US recycling rates statistics
(Source: USEPA, 2011)

Although initially there were some bits of scrap metal received at the landfill, the quantities had since decreased because it was being intercepted upstream either by the generators or the waste collection service providers to be sold to more lucrative markets outside Simunye (Nkonyane, 2011).

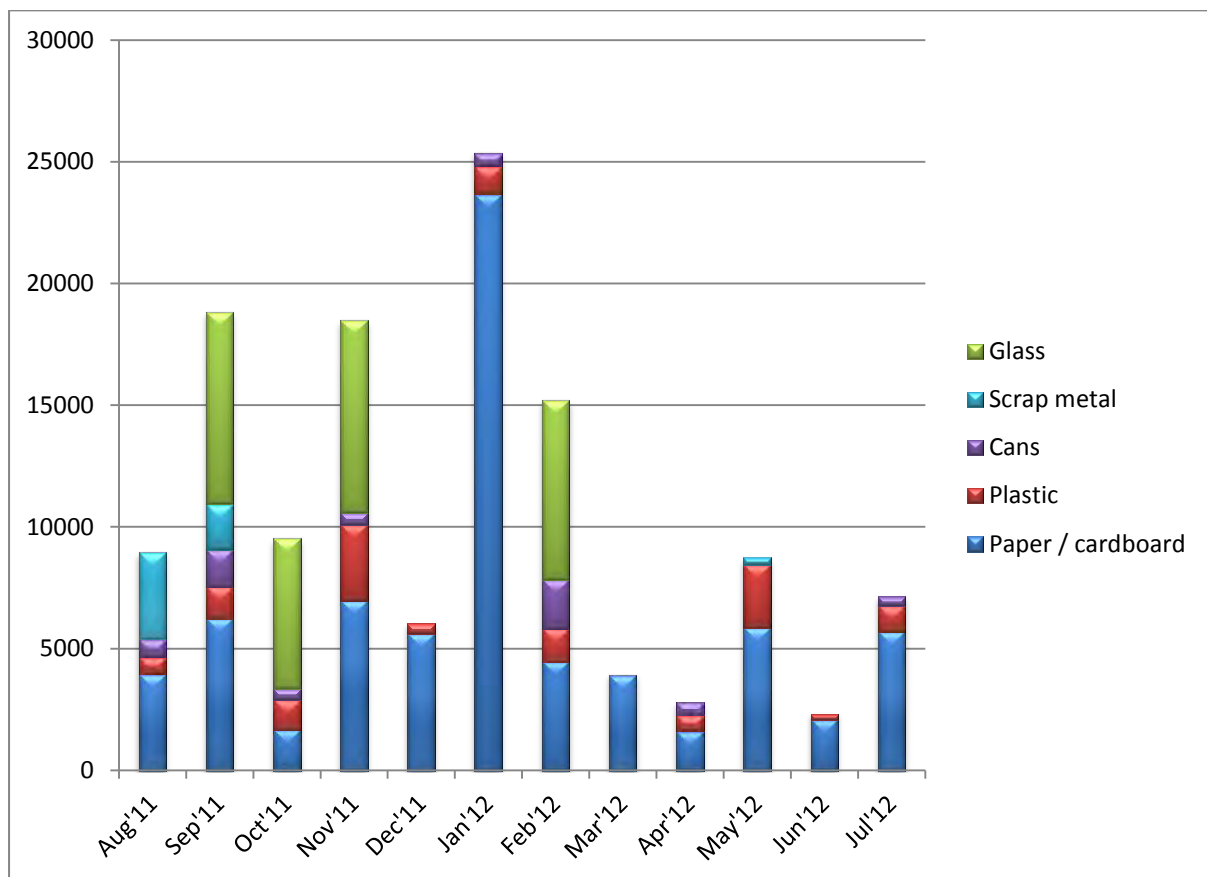


Figure 32 Quantities of recyclables sold to dealers in waste

From the household survey, food waste was reportedly the most prolific type of household waste (Figure 33). Literature records that food waste is normally a major components of household waste from the developing countries (Troschinetz and Mihelcic, 2009:915). Scrap metal was at the bottom, probably because it was being intercepted somewhere upstream since there were well established markets for recycling scrap metal in Swaziland. Discussion between the author and the IMS Manager of Simunye Factory confirmed that the factory had a separate arrangement to deal with scrap metal recyclers.

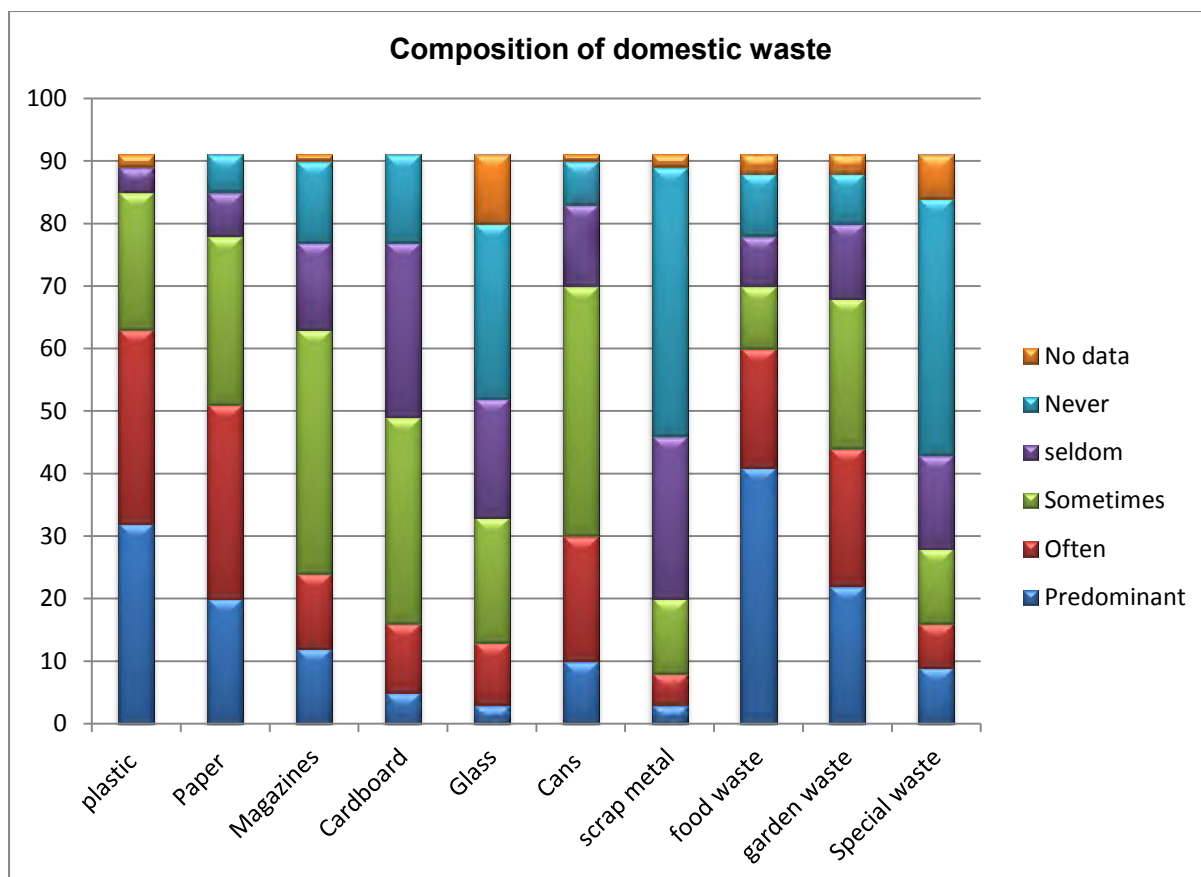


Figure 33 Composition of domestic or household waste

1.6 Conclusion

It was found that the recycling initiatives in Simunye were not well publicised since 68% of the respondents indicated that they were not aware of local recycling activities. This proved to be a valid statement because of one the major the reasons which the respondents cited for not recycling was that they did not know where to take the recyclables. In this regard it is recommended that the local authority should embark on an awareness-raising campaign for recycling. Although the majority of the respondents indicated that their preferred mode of communication was through flyers, it is also recommended that the local authority makes use of e-mails since some of the residents of Simunye are company employees who have access to the internet.

The key informant interviews suggested that poor communication between the community and the local authority, lack of stakeholder collaboration and involvement were responsible for failure of the previous initiatives for waste separation at source. This highlights the

importance of stakeholder involvement for the success of the recycling initiatives. The importance of two-way communication between the community and the local authority cannot be emphasized. With respect to collaboration, the waste collection service providers should not only comply with the waste removal schedule but they must use appropriate vehicles for the source separated waste so that the community is motivated to continue recycling.

The potential for energy recovery from household waste must be investigated because a majority of the household survey respondents indicated that food is a major component of their domestic waste. To reduce the amount of waste that requires transportation and subsequent landfilling, it is recommended that the option of backyard composting of garden waste be exploited by the municipalities more especially because the respondents indicated that they were willing to compost if taught how.

A fully integrated steering community to promote recycling should be formed to facilitate communication amongst the various stakeholders and to assure continuity of the proposed kerbside recycling scheme.

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SECTION 2: LITERATURE REVIEW

2.0 Introduction

The sustainable management of solid waste requires an integrated approach. The concept of integrated solid waste management is operationalised through community participation and stakeholder involvement during the planning and implementation of a sustainable system for recycling solid waste.

This section will explain among others the key concepts underpinning the study. A summary of the previous studies on the subject of stakeholder involvement and community participation in municipal solid waste management will be presented.

2.1 Definitions and context

Solid waste is —~~an~~ substance that the holder discards or disposes of, intends or is required to dispose of, irrespective of its value to anyone, and any substance or thing deemed by a regulation to be waste” (Government of Swaziland, 2000:3). From the definition above is obvious that what constitutes solid waste is very contextual. The key message here is clear; waste is made up of the same material which is found in useful products and can be a resource if placed at the right environment.

Solid waste generation is one of the top environmental problems which is a cause for concern for municipalities globally (Asase *et al.*, 2009:2780; Omran *et al.*, 2009:275). The global production of solid waste has nearly doubled over the last decade and the trend is expected to continue at an increased rate (Hoornweg and Bhada-Tata 2012 in Courtois, 2012:1). —The increasing volume of waste being generated would not be a problem if the waste was viewed as a resource and managed properly” (United Nations Environment Programme (UNEP), 2001 cited in Troschinetz and Mihelcic, 2009:915 – 923).

Solid waste can be generated from various sources such as residential areas, commercial areas, building and demolition sites, etcetera (Ngoc and Schnitzer, 2009:1983). Blowers, (1992 cited in Read, 1999:218) asserted —Whatever its origins, whether household, industrial or commercial, waste represents the imperfect utilisation of raw materials, fuel

and water, and hence financial loss for somebody". The solid waste which is generated in urban areas is commonly known as municipal solid waste (MSW). MSW typically comes from shops, households, offices, public areas, streets, institutions waste and may contain non-hazardous industrial waste and commercial waste. In urban areas the responsibility of managing solid waste and services lies with municipalities or local authorities. The services offered by the municipalities with respect to MSW management normally include waste collection, transportation, resource recovery, treatment and disposal (Zarate *et al.*, 2008:2543). In the developing countries, however, MSW management is normally limited to collection, haulage and disposal to the landfill (Zarate *et al.*, 2008:2543).

It is expensive to manage solid waste (Shekdar, 2009:1444; Memon, 2010:31), the main contributing factors being waste collection and transportation. A World Bank report published in 2004 suggested that in the developing countries, waste collection alone consumed up to 90% of the total budget for municipal solid waste management whereas in the developed countries about 10% is spent on waste collection (World Bank, 2004 cited in UNEP 2009:2). The main explanation for the difference is "upfront community participation" in the developed countries (UNEP 2009:2). The UNEP argues that cost reduction could be achieved by diverting some of the waste to recover secondary material and resource from it (UNEP, 2009:2).

Household waste is waste "from a home; premises forming part of a university or school or other educational establishment; premises forming part of a residential home, hospital or nursing home but does not include commercial, industrial or hazardous waste, sand, earth, effluent or garden waste" (Government of Swaziland, 2000:2). Due to its heterogeneous nature household waste is one of the problematic waste streams to deal with (Waite cited in Read, 1999:218). Special interest is on household waste because household waste production can be linked to economic growth and community lifestyles. Additionally household waste has a high potential to contaminate MSW and as such reduce the value of the recovered secondary materials.

Solid waste management (SWM) refers to "the control of waste generation, storage, collection, transfer and transport, processing and disposal of solid wastes consistent with the best practice of public health, economics and financial, engineering, administrative, and legal and environmental considerations" (Omran *et al.*, 2009:275).

The whole set of the aforementioned elements and the accompanying stakeholder roles, financing mechanisms, infrastructure, policies, legal, environmental, social, institutional and technological aspects is referred to as the waste management system (Krogstrup *et al.*, 2003:35; Joseph, 2006:865; Memon, 2010:35). A waste management system comprises several players (or stakeholders) with different roles, interests and agendas with respect to solid waste management (Brugha and Varvasovzky, 2000 cited in Krogstrup *et al.*, 2003:6). According to Krogstrup *et al.*, (2003:6) a waste management system comprises many stakeholders with various roles of which could be “individual, institutional or societal”.

The models of solid waste management have been evolving over time. In the past solid waste was mainly considered as a public health and safety problem (Stokoe and Teague, 1995:6; Bortoleto and Hanaki, 2007:276). The most favoured strategy of solid waste management was the landfill. The focus of municipalities then was to optimise waste collection and related infrastructure (Contreras *et al.*, 2010:78). But it is now accepted that the landfill-based strategy is not sustainable because it does not address the root cause of the solid waste problem. Continued reliance on the strategy meant that the municipalities would never be able to run their operations without external funding (Memon, 2010:33). Nowadays focus has shifted towards solutions that cause a reduction of waste production.

Integrated solid waste management is a concept for reducing waste at its source and recovering secondary material from produced waste (Mosler, *et al.*, 2006:850; Ngoc and Schnitzer, 2009:1982; Memon, 2010:31). The purpose of the principle of the integrated approach to waste management is to “find the most environmentally effective, economically efficient and socially acceptable way to manage waste of any given region” (Nordone *et al.*, 2002:3).

An integrated strategy differs from the traditional approaches of SWM in that that it looks beyond the technical and environmental aspects of municipal waste management (Seadon, 2006:1329; Shekdar, 2009:1445; Memon, 2010: 31; Sanneh, *et al.*, 2011:1072) to include the elements of sustainability and stakeholder involvement to facilitate the successful design and implementation of a sustainable system (Klundert and Anschutz, 2001:9; Joseph, 2006: 863; Zurbrugg, *et al.*, 2012:1). The stages of ISWM include sorting of waste at source, collection and haulage, material and energy recovery and ultimately final disposal of the residual waste (Memon, 2010:36).

Recycling is —a collective term for the recovery as well as the utilization of secondary material” (Uiterkamp *et al.*, 2011:345). Recycling is widely accepted as a sustainable method of managing solid waste (Bolaane, 2006:731; Suttibak and Nittivattananon, 2008: 45; Kaseva and Mbulingwe, 2000 cited in Uiterkamp *et al.*, 2011:344; Sudhir *et al.*, 1996 cited in Uiterkamp *et al.*, 2011:344). The benefits of recycling are well documented in literature by Kaseva and Gupta, (1996:303 cited Uiterkamp *et al.*, 2011:344); Seik, (1997: 284); Halla and Majani, (1999:357); Landis, (2005:13), Timnaz and Demir, (2006 cited in Yau 2012:116); Heidrich, *et al.*, (2009:966) but worth noting is that recycling causes significant quantities of MSW to be diverted from landfill disposal, as a result substantial savings in the costs of waste can be realised (Folz, 1991 and Muttamara *et al.*, 1994 cited in Suttibak and Nittivattananon, 2008:45).

2.2 Stakeholder involvement

Sarkis, 2000 cited in Contreras *et al.*, (2008:971) defined stakeholders as —the people and organizations having an interest in good waste management, and participating in activities to make it possible. This includes enterprises, organizations (such as nongovernmental organizations), households and all others who are engaged in some solid waste management activity”. Researchers and experts are in agreement that stakeholder involvement is overarching and is key for the success of recycling initiatives (Joseph 2006:863; Zhuang, *et al.*, 2008:2024; Troschinetz and Mihelcic, 2009:920; Zotos, *et al.*, 2009:1692; Sanneh, *et al.*, 2011:1073; Yau, 2012:115). The stakeholders play a crucial role during the planning and implementation phases of the waste management system (Suttibak and Nittivattananon, 2008: 48; Zia and Devadas, 2008: 71).

The concept of stakeholder involvement was borne out of necessity during the 1970's when it was realised that the low success rate for a majority of community development initiatives was attributable to lack of stakeholder and community involvement —in the design and implementation of programmes and projects” (Oakley and Marsden 1984; Cernea 1991; Food Agriculture Organization (FAO) 1990; Hinchcliffe *et al.*, 1995; Kottak 1991; Uphoff 1991 and; World Bank 1998 all as cited in Karl, 2000:2). Nowadays participatory planning approaches have become a norm especially for improving natural management, examples being in integrated water resources management' and integrated solid waste

management'. Dale (2001 cited in Ling *et al.*, 2009:228) asserted that it is impossible for any single sector to implement sustainable community development. Several authors are in agreement with this view (Accountability, 2005 (i); Reed, 2008:2417) arguing that finding a sustainable solution to environmental problems requires the integration of diverse knowledges, values, perspectives and resources.

Empirical studies have shown that the MSW recycling initiatives which are started by municipalities are set to fail if they are not complemented by appropriate behaviour or collaboration from the key stakeholders (Bolaane, 2006:735; Omran, *et al.*, 2009:276). Bolaane (2006:735) reported that in Gaborone, Botswana, the community became reluctant to continue with waste separation at source after noticing that the recyclables were not collected on time thereby resulting in nuisance conditions for the community. In Malaysia the recycling initiative by the municipality failed despite massive campaigns for recycling due to poor public participation (Omran *et al.*, 2009:276-7). Conversely, community led initiatives cannot succeed without collaboration from the other stakeholders. In Simunye, Swaziland an initiative by the factory employees to separate waste at source came to an abrupt end when they noticed that the source separated waste was being loaded and mixed up with all sorts of MSW onto a compressor truck by the service provider who was tasked with collecting the MSW (Mahlalela, 2010).

The success of a MSW recycling scheme is however largely determined by how many members of the community participate in the recycling scheme. Without the participation of the public no proper secondary materials would be recovered (Read, 1999:228). There is general consensus in literature that perhaps the greatest challenge is to change the attitudes of the households and hence the behaviour of the community members (Read 1999:228; Phillips, *et al.*, 2002:3). Jones *et al.*, (2010:533) therefore asserted that sustainable management of household waste is challenging since it entails behavioural change.

Household waste recycling calls for marked behavioural change from the householders (Read, 1999:228; Joseph 2006:867; Omran *et al.*, 2009:278). Timlett and Williams (2008:622) noted that in the UK, the municipalities who recycled more quantities of waste have kerbside recycling schemes. This required the community members to separate waste at source. During the source separation of waste the public is normally expected to wash and rinse used material such as glass, cans, plastic containers; fold cartons and

squash the voluminous items such as cans and cardboard etc., before putting storing these items (McCarty and Shrum, 1994:56; Bruvoll *et al.*, 2000:26 -27).

The householders are required to find suitable space, within their residential areas, to store the recyclables before it is collected by the waste removal service provider. In literature many writers and experts are of the view that the participation of households in this activity is largely influenced by the availability of room for storing the recyclables, arguing that if there are some space constraints, the households may not partake (Thomas, 2001:261; Vining and Ebrero, 1990 and; Boldero, 1995 all cited in Omran, *et al.*, 2009:278; Seik, 1998 cited in Yau 2012:120).

The householders or members of the community must place the sorted waste at designated sites on time; otherwise there would be no recyclables to be collected by the waste removal service providers. It is important that there households comply fully with the waste removal schedule for their locality. Bolaane, (2006:735) highlighted that it is important to maintain a pro-recycling attitude amongst the members of the community otherwise the recycling initiative will not be successful.

Building the positive attitudes about recycling among the households is important but it is not sufficient to foster behavioural change (Blake 1999 cited in Kollmus and Agyeman, 2002: 246; Mc Kenzie- Mohr, 2000 cited in Thomas *et al.*, 2004:7; Timlett and Williams, 2008: 623). Although the correlation between attitudes and pro-environmental behaviour is not clear (Kollmuss and Agyeman, 2002:252), nonetheless the attitudes can be used to predict the intention to recycle.

2.3 Factors influencing recycling behaviour

Many factors have been suggested to influence the recycling behaviour. The factors include internal factors such as perceptions, attitudes, values, awareness, knowledge, priorities, motivation (Kollmus and Agyeman, 2002:240); demographic, cultural, social, economic factors (Kollmus *et al* , 2002:240; Troschinetz and Mihelcic, 2009:916; Yau, 2012:119-120), situational factors, that is, the time, storage space, amount of effort required, inconvenience, access to the recycling scheme, available options (Hines *et al.*, 1986-7 cited in Kollmus *et al* , 2002:240; Vining and Ebreo, 1990 cited in Oliver, 2010:2; Boldero 1995 cited in Omren, *et. al.*, 2009: 278; Tonglet, *et al.*, 2004:27); the performance

of the solid waste management system (Refsgaard and Magnussen, 2009:760; Boolane 2006:735) and; incentives (Hormouth *et al.*, 1993 cited in Omran *et al.*, 2009:278). Omran *et al.*, (2009:278) therefore asserted that the decision to recycle is “likely to be complex”. Some writers have suggested that no single model, be it from psychology, sociology or economics, can be used to predict recycling behaviour (Kollmuss and Agyeman, 2002:239).

Positive attitudes can easily be created by educating the households about recycling, creating a conducive environment for recycling and by making recycling more convenient (Tonglet *et al.*, 2004:27). Barr and Gilg (2007:365) developed a conceptual framework for understanding and analyzing attitudes towards environmental behaviour. The model is shown on Figure 34. According to the model, the connection between pro-environmental behaviour and attitudes is not easy to explain, however there are some variables which have been found to have some influence. The variables fall into three broad categories namely environmental values, situational variables and psychological variables (Barr and Gilg, 2007:363).

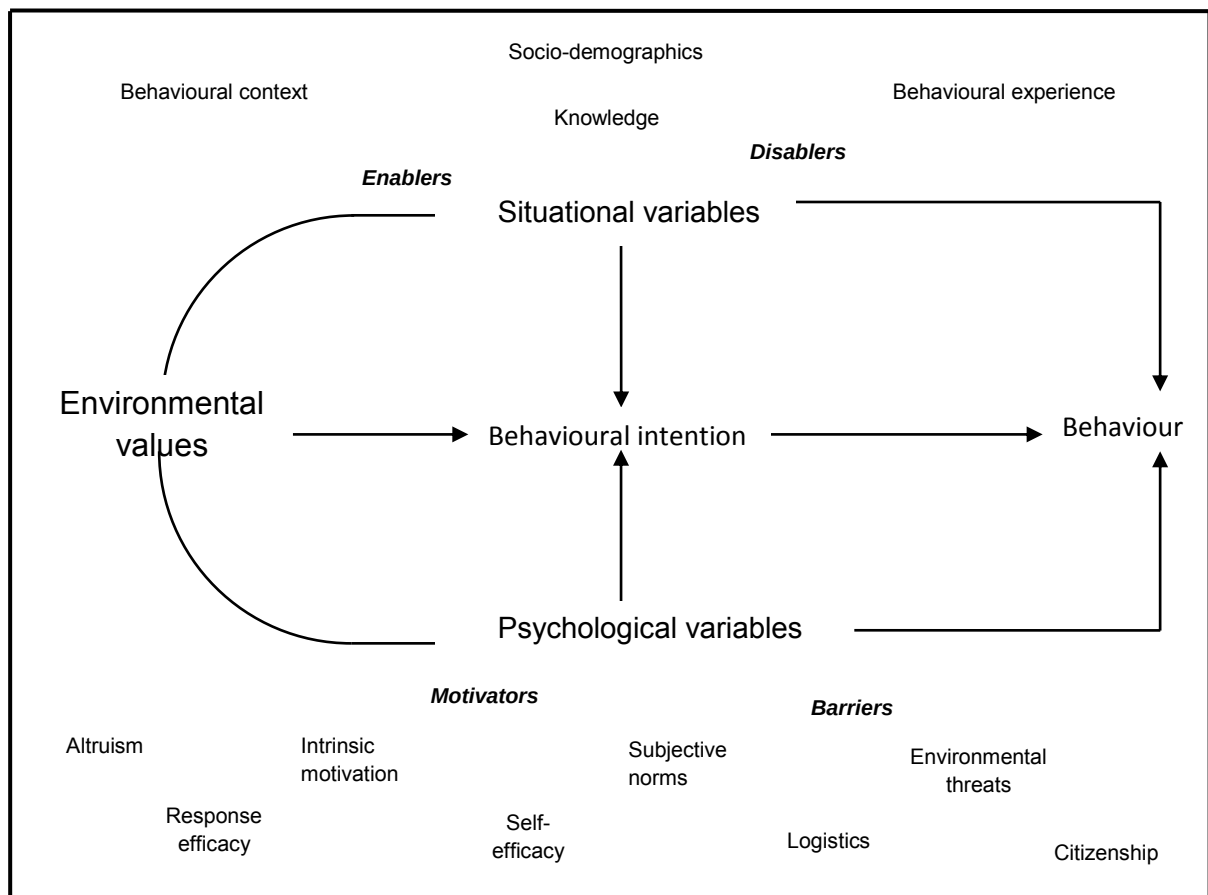


Figure 34 Conceptual framework of environmental behaviour
(Barr and Gilg, 2007:365)

The situational variables include: —service provision; social, economic and demographic factors; behavioural experience; policy interventions / instruments; global environmental knowledge; waste knowledge; policy knowledge and knowing where/ how to recycle” (Barr, 2007:469). The psychological variables include: —perception of the environmental problem; outcome beliefs of behaviour; active concern and obligation; logistics of behaviour; subjective norms; ascription of responsibility to act; citizen beliefs and; intrinsic motivation and response efficacy” (Barr, 2007:469). As a determinant of recycling, the influence of the environmental values is not much since the situational and psychological variables become more influential (Barr, 2007:467). To demonstrate that there is negligible correlation between possession of environmental knowledge and pro-environmental behaviour between Kollmus and Agyeman (2002:252) referred to the Diekmann and Preisendoerfer model of 1992 which shows that if persons perceive that the pro-

environmental behaviour will be costly and very inconvenient they will not be willing to make a sacrifice.

Some empirical studies have shown that the traditional methods of awareness raising are not effective in respect of fostering behaviour change (Omran *et al*, 2009:275 - 288). Focus has now shifted to methods that foster behaviour change amongst community members (Timlett and Williams, 2008:622). Through the use of participatory methods such as community based social marketing (CBSM) on on-going recycling programmes community participation in the recycling initiatives has improved markedly (Landis, 2005: 9-10). CBSM has been successfully exploited in a range of sustainability projects in Canada to achieve behavioural change (McKenzie – Mohr, 2000:546-549). In the Royal Borough of Kensington and Chelsea (Read, 1999:217 – 249) highly targeted marketing campaigns proved to be very effective in raising community participation in recycling.

CBSM works backwards in that it starts by setting out to discover the actual or potential barriers to pro-environmental behaviour be it the contextual, economic or socio-demographic factors. The information is gathered by using participatory techniques such as questionnaire surveys, interviews, focus groups and meetings. Based on the information, the appropriate mechanisms for getting the required behavioural change are put in place by removing the identified barriers (McKenzie-Mohr and Smith, 1999 cited in Kollmuss and Agyeman, 2002:240; Landis, 2005:9-10). The information gathered during the exercise of identifying the barriers is also useful for developing the materials for the targeted promotional campaigns which accompany the recycling initiative. After uncovering the actual or potential barriers to community participation, a pilot project is implemented. If the pilot project is successful, the full-scale programme is implemented. The four steps of community based social marketing are shown on Figure 35. CBSM proved to be an effective tool for changing behaviour in the UK, at Corby Royal Borough of Kensington and Chelsea (Read, 1999:217– 249).

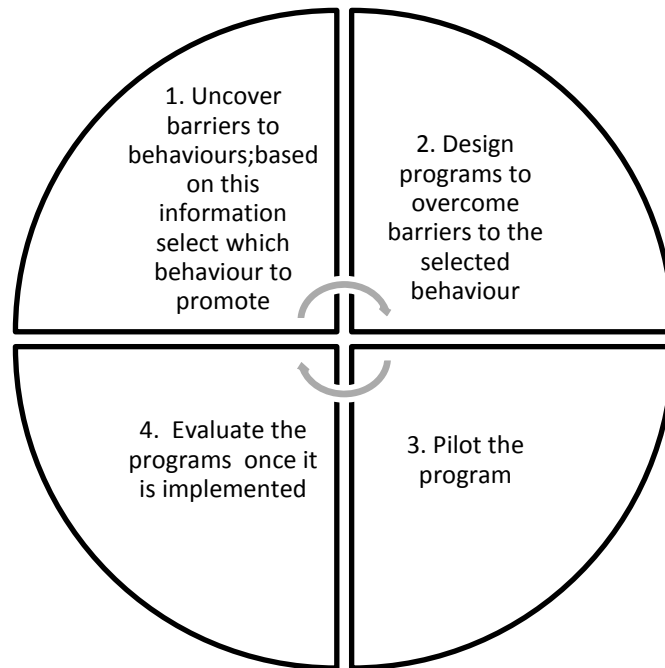


Figure 35 Schematic for community based social marketing

(Adapted from McKenzie-Mohr, 2000:546)

2.4 Value of the study and conclusion

Plentiful studies have been conducted in many countries to identify the actual and potential barriers to recycling behaviour. The published studies include Oskamp, (1991: 494-519) conducted an investigation in the United States to identify the factors encouraging or preventing community members from recycling, Bolaane (2006:731- 740) studied the constraints to recycling in Gaborone Botswana; Jasson and Stone, (2009:1-49) conducted a comprehensive literature review of the barriers to household waste recycling in the UK and; Omran *et al.*, (2009:275-288) conducted a study in Malaysia, focusing on the attitudes of the households.

Many researchers and experts emphasize that the barriers, motivators, enablers or disablers should be studied on a case-by-case basis because the local contexts and requirements differ from place to place (Troschinetz and Mihelcic, 2009:917; Jha *et al.*, 2011:124). The purpose of the current piece of work was to identify the barriers to household waste recycling in Simunye, a company town. The setting in the company towns is markedly different from the conventional towns in that the residents do not pay for

the municipal services and they are provided with the waste receptacles free of charge; all they need to do is to comply with the waste removal schedule. Company towns are also different socially in that all the residents are tenants of the host company, which means that there is a bit of scope for the company to influence how they behave within the company owned residential areas.

The value of the study is that very few, if at all, studies of this nature have been conducted in Swaziland. The results of the research can be used to develop the promotional targeted awareness raising materials and to develop a system for a pilot scheme for household waste recycling in Simunye.

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SECTION 3: METHODOLOGY

3.0 Introduction

The findings of the research project were presented in the format of an academic research report since a lot comparison was made with previous empirical studies' reports drawn from academic journals. The research was designed as a mixed methods study (Johnson and Onwuegbuzie, 2004:14; Spratt *et al.*, 2004:7) in that positivist and phenomenological research paradigms were blended. The benefits and advantages of using mixed methods are well documented Johnson and Onwuegbuzie, (2004:21) and Bamberger *et al.*, (2010:11). Johnson and Onwuegbuzie, (2004:21) asserted that mixed research —can add insight and understandings that might be missed when only a single method is used". According to Bamberger *et al.*, (2010:11), mixed methods can support validity through triangulation.

Literature review shows that mixed research has been used previously by many researchers to studies of recycling. The researchers include Bolaane (2006:733), Martin *et al.*, (2006: 370), Suttibak and Nitivattananon (2008:47- 48), Conrad *et al.*, (2012:14 -16) and Saungweme (2012:7). In all the aforementioned studies, the qualitative research was conducted through semi-structured key informant interviews and the quantitative research comprised of self-reported questionnaire based household surveys.

The mixed method design employed a convergent approach, shown on Figure 36, allowing simultaneous collection of data from key informants and community members. The field work research was phased into two. The surveys involving the community members and key informants marked the first phase of the data gathering exercise. The second phase was essentially a desktop study comprising a document analysis of mainly the sanitary landfill's weighbridge records. The purpose of the desktop was to identify further opportunities for recycling at Simunye by scrutinising the Towns waste streams.

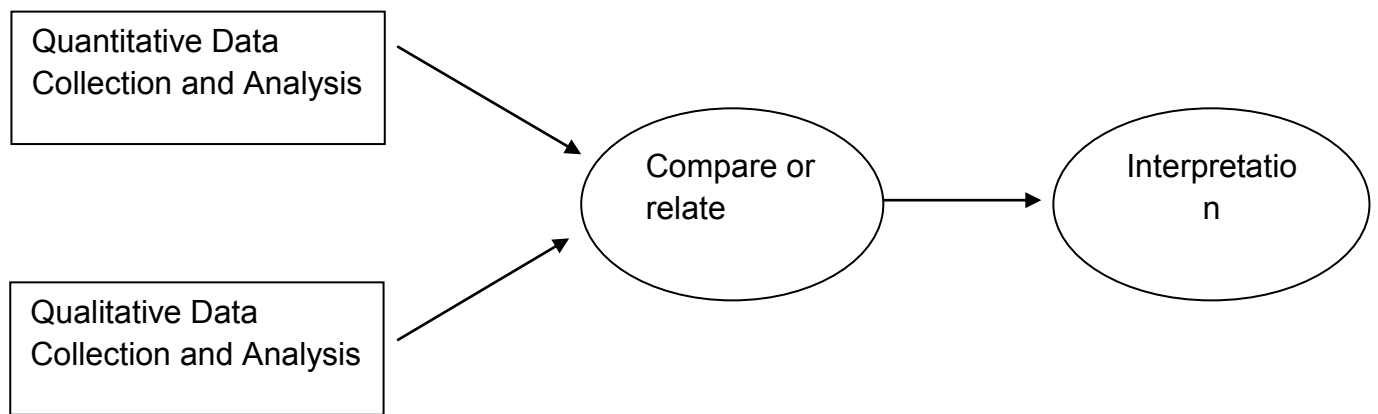


Figure 36 The convergent parallel design

Source: NOVA Southeastern University, (2012:20)

The assumed ontological assumption for the positivist paradigm was naive realism and the epistemological position was objectivist utilising a deductive approach to draw conclusions. The ontological assumption for the phenomenological research paradigm was constructivist and the epistemological stance was subjective utilising an inductive approach to draw conclusions.

3.1 Quantitative methodology: self-reported questionnaires

a. Design of the test instrument

The quantitative method comprised of a questionnaire-based household or community survey. The survey technique was utilized to gather the data, from members of the community, as it is a widely accepted method (Omran *et al.* 2009:281) and used in social studies having individual people as subject of the analysis, Babbie, (2011:242).

The questionnaire for the community survey comprised a number of statements expressed as questions. The questions were inevitably subjective because they were derived from researcher's opinion rather than facts (Capdevila and Stainton, 2000 cited in Mbeng *et al.*, 2009:559). Some of the questions were derived directly from previous research articles by

Tonglet *et al* (2004:33-34), Zhuang *et al.*, (2008:2029), Mbeng *et al.*, (2009:562 – 564) and Conrad *et al.*, (2012:54 -61) .

The design of the questionnaire was influenced by the design and content of previous investigations such as that of Barr (2007: 446-449) and Conrad *et al*, (2012: 54-61) who utilised the mixed methods approach. The questionnaire was 10 pages long and divided into ten sections. The Sections were:

Section A - General attitude to environmental issues;

Section B - Motivations and barriers for recycling;

Section C – Waste reduction behaviour;

Section D – Waste recycling behaviour;

Section E – Desire for future recycling;

Section F – Awareness of solid waste activities;

Section G - Recommendations for awareness raising;

Section H – Waste composition;

Section I – Assessment of recycling program; and,

Section J - Demographics.

The households were asked to respond to structured questions because such questions are easy to answer, quick to analyse and are less susceptible to interviewer bias (Bateman *et al.*, 2003:160). There are several documented cases whereby questionnaires have been used to gather information on attitudes, perceptions, social and cultural influences as well as other factors that might impact the recycling behaviour of community members. Examples include Boolane, (2006:733) who conducted a study in Gaborone, Botswana, Omran *et al.*, (2009:281) who carried out an investigation of households' attitudes in Malaysia and Jones *et al.*, 2010:535) who investigated the effect of social factors on recycling behaviour in Mytilene, Greece.

The attitudes, motivations, awareness, behaviour, desire for future recycling, etc, were measured using Likert scale type questions. On some occasions dichotomous questions were used. At the end of each section there was a provision for the respondents to include other options that might have been omitted by the author or make suggestions. The demographics section included questions on sex, age, highest level of education attained

and income since this has been found to have a profound effect on recycling behaviour (Kollmus and Agyeman, 2002:240; Tonglet, 2004:27; Yau, 2012:119 –121) .

b. Sampling method

Community members were identified as the target population for the quantitative survey because they are the largest group and key primary stakeholders for recycling. Community members play a crucial role in separating the waste at source and placing it outside for the waste collectors to remove. Without the contribution of community members, the quality and quantity of the recovered materials would remain low.

The sample of community members was selected randomly using housing occupancy list (shown in Table 2) from RSSC's Housing Manager. A stratified sampling approach, based on the commercial value of the monthly rent, was used. The aim was to select representatives from each of the four categories of houses currently available at Simunye.

Group 1 comprised of high income earners, occupying top class houses with monthly rent estimated to exceed R3, 500. Group 2 were the households occupying the houses of rent value ranging from R2, 000 to R3, 499.99 per month. Group 3 were the households living in the houses that are estimated to have a rental value from R1, 000 to R 1, 999.99. The fourth group comprised of households occupying houses of rental value less than R1, 000.00. Table 3 below shows how the four groups were categorised.

Name of Group	Estimated rent of house (Rands /per month)
Group 1	> R3,500 per month
Group 2	R2000 < rent value of allocated house ≤ R3499.99 per month
Group 3	R1000 < rent value of allocated house ≤ R1999.99
Group 4	R0.00 < rent value of allocated house ≤ R999.99 per month

Table 7 Stratification of sample using income

The reason for the stratification according to income, and hence available space (since the bigger houses in Simunye are normally allocated higher income earners) is that the previous empirical studies suggested that availability of space for storage had an effect on recycling behaviour (Omran *et al.*, 2009:278, Tonglet *et al.*, 2009:27; Yau, 2012:119).

The sample size for each group was calculated, using an electronic sample size calculator, based on a 95% confidence level with a 5% margin of error. A 50% response distribution was assumed. According to the Housing Manager, the official occupancy rate of Simunye Town as at the 30th June 2012 stood at 1273 houses. According to the sample size calculator, a total of 531 households were found to be eligible to participate in the survey with 96 from the high income group (rent value of allocated house > R3, 500 per month), 126 from the middle income group (R2, 000 < rent value of allocated house ≤ R3, 499.99 per month), 38 from the upper low-income group (R1, 000 < rent value of allocated house ≤ R1, 999.99) and 271 (R0.00 < rent value of allocated house ≤ R999.99 per month) from the low income group. This same information is presented on Table 8.

Household occupancy rate June 2012								
Simunye								
House Type	Income group	Rent per month (R)	Total No of Houses /Blocks	Total No Houses Occupied by RSSC Employees	Total No. of Houses Occupied by Third Parties	Total houses occupied	Group Total	Sample size
F (four bedroom (two ensuite)with walk-in closets, big yard, carports plus pantry)	High Income group	6170	6	6	0	6	127	96
E (Four bedroom (1 ensuite) house with large yard,carports plus pantry)	High Income group	4980	30	21	5	26		
UD (Three bedroom house with study, large yard, carport, without pantry)	High Income group	4170	25	22	1	23		
D (Three bedroom house with large yard and carpot)	High Income group	3900	79	67	5	72		
SMQ (three bedroom flat, semi-detached flat without carport or courtyard)	middle income group	2700	2	0	2	2	187	126
UB2 (Three bedroom house with small yard, without carport)	middle income group	2500	56	48	5	53		
C (Two bedroom house with carport and court yard)	middle income group	3380	68	55	11	66		
B2 (three bedroom with court yard)	middle income group	2050	67	62	4	66		
SSQ (two bedroom flat plus carport and court yard)	upper low income group	1920	8	3	3	6	42	38
SQ (one bedroom flat plus court yard)	upper low income group	1500	15	0	15	15		
MQ (two bedroom flat plus courtyard)	upper low income group	1640	21	19	2	21		
A (small two bedroom house with outside ablutions)	Low income group	600	672	398	216	614	917	271
B1 (small two bedroom house with courtyard and inside ablutions)	Low income group	890	294	179	105	284		
B/Block (one room only)	Low income group	500	19	5	14	19		
total			1362	885	388	1273	1273	531

Table 8 Calculation of sample size

c. Survey distribution method

Initially, a map from the office of the Housing Manager was used to physically locate the pre-selected houses of different house categories. An e-mail was circulated to all company employees to inform them about the survey. A team of two interns from the University of Swaziland then embarked on the survey distribution mission. The questionnaires were delivered by hand to the 531 houses and collected it on the next day.

However upon realising that a significant number of the pre-selected houses were forever empty decided to change the strategy. The team, in a bid to reach the target of 531 respondents, then adopted the “~~contact~~ contact and collect” (Barr, 2007:449) method. This means an attempt was made by the interns to contact the pre-selected households from the various groups, if a person to complete the survey was found at the household the questionnaire would be left behind and collected the next day. If contact is not successful, the next residence in the group would be approached. The cycle was repeated to try and achieve the required sample size. Notwithstanding that the contact and collect method is a bit slow and requires a lot of labour, the main advantage is that it has a big potential for achieving high response rates (Barr, 2007:449). A few questionnaires were e-mailed to the company employees who requested for such.

At the end a total of 225 questionnaires were distributed. It was very hard to reach some seasonal workers and the third parties for instance the sugarcane cutters. Additionally a significant number of the houses that were reported to be occupied were found to be without somebody at home because some houses did not have gardeners or maid servants. It was also discovered that though the occupancy rate was high on paper, in that some of the company employees did not reside in the houses on a full-time basis. The response rate was 48%. Some of the householders reported that they had taken the questionnaires to the workstations to complete them but they never got to return them to the administrators. A total of 103 papers out of 225 questionnaires were returned of which only 91 was usable.

d. Data analysis

Simple descriptive statistics was used to analyse the different sets of data.

3.2 Methodology: Qualitative – Key informant interviews

a. Design of the test instrument

The key informant method is an ethnographic research which was initially utilised in the field of cultural anthropology but has since found widespread use in social science research (Marshall, 1996:92). —A key informant is an expert source of information”, (Marshall, 1996:92). Key informants are different from informers since they are not expected to have ulterior motives for participating in the survey. According to a book published by Burgess (1989 cited in Marshall 1992:2) a key informant has the following four attributes: a well-defined role in the community, knowledge about the subject at hand, ability to communicate in a clear and coherent manner to the interviewer and should be capable of maintaining neutrality or impartiality without prejudice or bias. Using key informants is one way of quickly getting information about what the people in a community think, in a relatively short span of time. When key informants from various backgrounds are interviewed it is possible to gather a lot of data quickly (Marshall, 1996: 93). The use of key informants in this research is relevant because the aim of the study is to improve recycling through stakeholder engagement.

Key informants have been used previously in studies of recycling to get deeper insight of recycling challenges. Examples include (Bolaane, 2006:733; Suttibak and Nitivattananon, 2008:48; Omran *et al.*, 2009:275; Conrad *et al.*, 2012: 53; Saungweme, 2012:125-140).

Data from key informants may be gathered through focus groups or interviews. In the current study, interviews were used to collect the data from the key informants. This is because it was envisaged that there would be very few key informants. A questionnaire with the interview questions was e-mailed to the respondents, ahead of the interviews to allow the key informants enough time to prepare the responses. They were given a total of three weeks to complete the questions.

The key informants were asked one set of questions. The questionnaire is shown in Appendix B of this document. There were 15 questions. The questions were open ended to allow the respondents to express themselves freely. The respondents were asked to answer questions which covered amongst the following: factors or variables which the key

informants think impeded or encouraged recycling at Simunye, that is barriers and motivators for recycling; assessment of the quality and quantity of the recyclables recovered at the landfill; markets for the recyclables; potential areas for improvement. The informants were also asked to assess the performance of the system of recycling that is currently used at Simunye, the challenges thereof and hence make suggestions on how the challenges could be overcome.

Most of the questions for the key informants were extracted from the research articles of Conrad *et al.*, (2012:53) and Saungweme (2012:125–140). The two sources were particularly useful because they were recent and they had used the mixed methods approach on the same field of recycling, particularly municipal solid waste.

The response rate was high in that 6 out of the 9 recipients of the questionnaire were able to complete the questionnaires and send them back to the author within the stipulated time. Sadly none of the dealers in waste were able to return the completed form despite repeated reminders from the author. The two dealers in waste did not complete the questionnaires but one of them was able to share information verbally.

Formal dates for the interviews were set with each of the key informants. Although the original intention was to conduct face-to-face interviews, this was for the most part eventually substituted with written answers supplemented by telephonic interviews or even e-mails, due to the busy schedule of some of the respondents. To get clarity on some answers, the author made follow-up calls to the respondents either by telephone or e-mail.

b. Sampling method

The initial list for the potential key informants was generated by the author. The participants were picked based on their positions, their involvement with solid waste management issues and their first-hand experience of recycling. They comprised of RSSC's environmental officer, the Parks and Sanitation Inspector, Parks and Sanitation Supervisor, the Integrated Management Systems (IMS) Practitioners (from the human resources division, Simunye Factory, and head office), the landfill manager and two

dealers in waste. The key informants were asked to suggest the names of additional key informants; however they failed to submit the names.

c. Survey distribution method

The questionnaire for the interviews were prepared in advance and e-mailed to the respondents to allow the informants to prepare some of the responses ahead of time. This is because some of the informants needed to refer to their records to answer some of the questions.

d. Data analysis

The data was analysed using thematic coding. This means that the responses were categorised into themes and codes which were developed by the researcher.

3.3 Quantitative methodology: Desktop study

To achieve the objective of identifying further opportunities for recycling, a desk top study was conducted. Sanneh *et al.*, (2011:1055) asserted that “knowledge of municipal solid waste composition is essential for the determination of waste management options such as recycling”. To generate data about the recycling potential of the MSW that is generated in Simunye, the records from the landfill for the 12 month period starting on 1 March 2011 to 1 March 2012 in conjunction with data from the household survey were used. The reason for using the 12 month period was to accommodate seasonal variations on the waste quantities. The data from the landfill was analysed through descriptive statistics to identify trends. This approach of using data gathering was used by Chakrabarti *et al.*, (2009:128). The recyclables were classified into the categories of paper/cardboard, plastics, metals (ferrous and non-ferrous), glass and rubber. The data from the household survey was used to identify the constituents of household waste in order to find out more about the waste composition. Simple descriptive statistics was applied.

3.4 Ethical considerations

The author informed all the potential participants that their participation was voluntary. The participants were also assured that their responses will be treated with confidentiality.

The author being aware of the problems of the key informant technique, such as the potential for some of the informants to divulge ‘sensitive’ or politically unacceptable information (Marshall, 1996:92) took every precaution to desist from publishing such information.

To avoid the problem of the key informants being too emotionally attached to the research, Spradley (1979, cited in Marshall, 1996:93) the interviewer maintained a professional relationship between interviewer and the interviewees.

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APPENDICES

Appendix 1: Household survey questionnaire

Research Survey: Recycling of Municipal Solid Waste

July 2012

Date:.....

You are receiving this survey because you are a resident of Simunye and the Property Services Department (PSD) is responsible for providing you with solid waste collection and disposal services. PSD is committed to the sustainable management of waste according to best environmental practice guidelines. One of the widely acknowledged and sustainable methods to manage solid waste is recycling. PSD wants to design and implement a municipal solid waste recycling program at Simunye.

This study is being undertaken in order for the Property Services Department to have a better understanding of the households' awareness, perceptions, attitudes, potential barriers, motivators and other factors likely to influence participation in the proposed scheme for recycling. Your opinions and ideas are important to us and we encourage you to participate in this short survey. Your responses will be treated with the highest confidentiality. If you are uncomfortable with answering any question then please leave it blank.

The survey will take a maximum of fifteen minutes to complete. A representative from the Property Services Department will return within 24 hours to collect your completed survey.

Thank You

Joe Khumalo

Property Services Manager

Quantitative – Self-reported Questionnaire

Section A: General attitude to environmental issues

Please circle your level of agreement with the following statements

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Environmental issues are important to me	1	2	3	4	5
2. I have a great passion for a clean environment	1	2	3	4	5
3. I do believe waste is a resource	1	2	3	4	5
4. Recycling is important for the environment	1	2	3	4	5
5. It is important to divert waste from the landfill	1	2	3	4	5
6. Community members should participate in household waste recycling	1	2	3	4	5
7. Bad smells discourage composting	1	2	3	4	5
8. I think recycling is a moral obligation	1	2	3	4	5
9. I think home composting has economic and environmental benefits	1	2	3	4	5
10. Any comment?					

Please circle your level of agreement with the following statements

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
11. Rinsing used vessels such as glass bottles and soft drinks cans for recycling is a hassle?	1	2	3	4	5
12. Recycling is the responsibility of women.	1	2	3	4	5

Section B: Pro-environmental behaviour - 'Recycle, re-use and reduce' behaviour

Please circle your level of agreement with the following statements

(i) Waste re-use

13. I reuse	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I do not reuse
a. Plastic bags	1	2	3	4	5	0
b. Newspapers	1	2	3	4	5	0
c. gift bags	1	2	3	4	5	0
d. plastic containers (margarine tubs, ice-cream containers)	1	2	3	4	5	0
e. plastic bottles (water, soft drink, Oros, etc.)	1	2	3	4	5	0
f. glass jars , glass bottles	1	2	3	4	5	0
g. Other (please specify) -----	1	2	3	4	5	0
h. Other (please specify) -----	1	2	3	4	5	0

(ii) Waste reduction behaviour

14. I do the following to minimize producing waste	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I do not
a. I buy rechargeable batteries	1	2	3	4	5	0
b. I compost my garden waste	1	2	3	4	5	0
c. I repair appliances rather than buy new where I can	1	2	3	4	5	0
d. I purchase durable goods rather than disposable items	1	2	3	4	5	0
e. Other (please specify)	1	2	3	4	5	0

(iii) Waste recycling behaviour

Please circle your level of agreement with the following statements

15. I recycle	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I do not recycle
a. Plastic (shopping) bags	1	2	3	4	5	0
b. Newspapers	1	2	3	4	5	0
c. Cardboard	1	2	3	4	5	0
d. Aluminium cans	1	2	3	4	5	0
e. Food cans	1	2	3	4	5	0
f. Scrap metal	1	2	3	4	5	0
g. Plastic	1	2	3	4	5	0
(i) Polyethylene (water bottles, soft drink bottles, Oros, etc)	1	2	3	4	5	0
(ii) Polypropylene (margarine tubs, ice-cream containers, etc.)	1	2	3	4	5	0
(iii) Other (please specify) -----	1	2	3	4	5	0
h. glass jars & bottles	1	2	3	4	5	0
(i) transparent	1	2	3	4	5	0
(ii) coloured	1	2	3	4	5	0
i. Other (please specify)	1	2	3	4	5	0

Section C: Motivators / Barriers

A. Recycling

16. Please circle your level of agreement with the following statements

	Very likely	Likely	Sort of likely	Not likely	Highly unlikely
a. I would recycle if I was provided with a free recycling container	1	2	3	4	5
b. I would recycle more if I had more room to store the recyclables	1	2	3	4	5
c. I would recycle more if I had the time	1	2	3	4	5
d. I would recycle more if the recyclables would be collected on time	1	2	3	4	5
e. I would recycle more if the recyclable waste would not be mixed with biodegradable waste during transportation to the landfill	1	2	3	4	5
f. I would recycle more if I was assured that the waste collectors would collect the recyclables regularly	1	2	3	4	5
g. I would recycle more if I was given some incentives for participating	1	2	3	4	5
h. Other (please specify)	1	2	3	4	5

B. Composting

17. Please circle your level of agreement with the following statements

	Very likely	Likely	Sort of likely	Not likely	Highly unlikely
1) I would compost more if provided with free compost bins	1	2	3	4	5
2) I would compost more if I had a big yard or area for composting	1	2	3	4	5

3) I would compost more if I was aware of the price of compost	1	2	3	4	5
4) I would compost more if I was aware of the existence of markets for compost	1	2	3	4	5
5) I would compost more if I was aware of the benefits	1	2	3	4	5
6) I would compost more if I am taught	1	2	3	4	5
7) Other (please specify)	1	2	3	4	5

Please circle your level of agreement with the following statements

18. I do not recycle because	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I do recycle
a. Recycling does not benefit me personally	1	2	3	4	5	0
b. Recycling does not benefit the community	1	2	3	4	5	0
c. It is difficult to know what materials can be recycled	1	2	3	4	5	0
d. It takes too much time	1	2	3	4	5	0
e. I do not have enough recyclables cans	1	2	3	4	5	0
f. It's too difficult to find room for temporary storage of recyclable items	1	2	3	4	5	0
g. I do not know where to take the recyclables	1	2	3	4	5	0
h. The recycling location is not convenient	1	2	3	4	5	0
i. I do not have transportation to take the recyclables to a drop off location	1	2	3	4	5	0
j. I do not have curbside recycling	1	2	3	4	5	0
k. Other (please specify) ----	1	2	3	4	5	0

19. What would be the best way to encourage your household to recycle?

Statements	(please tick one)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a. Introduce competitions or incentives	1	2	3	4	5
b. Introduce buyback centres	1	2	3	4	5
c. Increase the awareness of the benefits of recycling	1	2	3	4	5
d. Collect the recyclables at the door	1	2	3	4	5
e. Clear instructions are provided on how to recycle my household waste	1	2	3	4	5
f. Other (please specify)	1	2	3	4	5

Section D: Awareness

20. Are you aware of any community programs you know about that educate or encourage recycling.

[] Yes [] No

21. Please circle your level of agreement with the following statements

Statements	(please tick one)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a. I am aware of the products that can or cannot be recycled	1	2	3	4	5
b. I am well informed about local recycling services	1	2	3	4	5
c. I am aware the benefits of recycling	1	2	3	4	5
d. I am aware of the benefits of composting	1	2	3	4	5

22. Information dissemination

Please circle your level of agreement with the following statements

the best ways to inform me about solid waste recycling programs is via	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a. E-mail	1	2	3	4	5
b. Flyers at my door	1	2	3	4	5
c. Residential mail delivery	1	2	3	4	5
d. Community meeting	1	2	3	4	5
e. Road-shows	1	2	3	4	5
f. Other (please specify)	1	2	3	4	5

23. Overall, how satisfied are you with your current recycling program in your area?
(Please circle one)

Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
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Section E: Waste composition

24. Please tell us about the typical composition of the waste you generate at your household

a. the components of waste generated in my household are	Predominant	Often	Sometimes	seldom	Never
b. plastic (bags, bottles, containers)	1	2	3	4	5
c. Paper (newspapers, junk mail, office paper)	1	2	3	4	5
d. Magazines	1	2	3	4	5
e. Cardboard	1	2	3	4	5
f. Glass	1	2	3	4	5
g. Cans (food cans & cold drinks)	1	2	3	4	5
h. scrap metal	1	2	3	4	5
i. food waste	1	2	3	4	5
j. garden waste / yard trimmings	1	2	3	4	5
k. Special waste (e.g. disposable nappies)	1	2	3	4	5
l. Other (please specify) -----	1	2	3	4	5

Section B -demographics

1. What is your sex?

☐ Male ☐ Female

2. What is your age group

☐ Under 18yrs ☐ 18 – 24 ☐ 25 – 35 ☐ 35 – 45

☐ 45 – 60 ☐ above 60 years

3. House Type or Residence

- a. One room only
- b. Small, two bedroom-house with courtyard and inside ablutions
- c. Small, two bedroom-house with courtyard with outside ablutions
- d. One bedroom flat plus courtyard
- e. Two bedroom flat plus carport and courtyard
- f. Three bedroom house with courtyard
- g. Two bedroom house with carport and courtyard
- h. Three bedroom house with yard, without carport
- i. Three bedroom flat, semi-detached, without carport or courtyard
- j. Three bedroom house with large yard and carport
- k. Four bedroom house with large yard, carports
- l. Other (please specify).....

4. What is your occupation?

- | | | |
|---|--|---------------------------------------|
| ☐ Artisan | ☐ Scholar | ☐ Professional |
| ☐ Senior Executive | ☐ Housewife | ☐ Clergy |
| ☐ Pensioner | ☐ Shop assistant | ☐ Clerical |
| ☐ Labourer | ☐ Domestic worker | |
| ☐ Other (please specify) ----- | | |

5. How many people live in this household including you

☐ One ☐ Two ☐ Three ☐ Four
☐ More than four

6. Combined gross household income per month

- ☐ Less than E1, 000 ☐ E 1,000 – E5, 000 ☐ E5,001 – E30,000
- ☐ More than E30, 000

7. What is your highest attained level of education?

- | | |
|---|---|
| ☐ Primary School | ☐ Secondary School Certificate |
| ☐ O' Level or ISCE Certificate | ☐ Vocational training centre |
| ☐ College Diploma | ☐ University Degree (first degree) |
| ☐ Post-graduate Certificate/ Diploma | ☐ Master's degree |
| ☐ Doctorate College Diploma | |
| ☐ Other (please specify) | |

Thank you for completing the questionnaire.

Appendix 2: Key informant protocol

Section One – Quantitative Survey

(Section One is to be completed by the households of Simunye only. If you do not live in Simunye proceed to Section Two on page 10)

Section A: General attitude to environmental issues

Please mark (with X) your level of agreement with the following statements

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Environmental issues are important to me					
2. I have a great passion for a clean environment					
3. I do believe waste is a resource					
4. Recycling is important for the environment					
5. It is important to divert waste from the landfill					
6. Community members should participate in household waste recycling					
7. Bad smells discourage composting					
8. I think recycling is a moral obligation					
9. I think home composting has economic and environmental benefits					
10. Additional information or comments?					

Please mark (with X) your level of agreement with the following statements

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
11. Rinsing used vessels such as glass bottles and soft drinks cans for recycling is a hassle.					
12. Recycling is the responsibility of women.					
Please explain your answers?					

Section B: Motivations and Barriers for Recycling

Please mark (with X) your level of agreement with the following statements

13. I recycle because	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I do not recycle
a. It saves me money						
b. I want to be a socially responsible person						
c. I want other people to think of me as a responsible person						
d. I feel it is expected of me						
e. It is good for the environment						
f. It reduces materials in the landfill						
g. Other (please specify) -----						

If you do not recycle, what is the main reason?

14. I do not recycle because	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I do recycle
a. Recycling does not benefit me personally						
b. Recycling does not benefit the community						
c. It is difficult to know what materials can be recycled						
d. It takes too much time						
e. I do not have enough recyclables cans						
f. It's too difficult to find room for temporary storage of recyclable items						
g. I do not know where to take the recyclables						
h. The recycling location is not convenient						
i. I do not have transportation to take the recyclables to a drop of location						
j. I do not have kerbside recycling						
k. Other (please specify) ----						

Section C: Waste reduction behaviour

15. I do the following to minimize producing waste	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I do not
a. I buy rechargeable batteries						
b. I compost my garden waste						
c. I repair appliances rather than buy new where I can						
d. I purchase durable goods rather than disposable items						
e. Other (please specify)						
f. Please explain your answer if you do not minimize waste production.						

Section D: Waste recycling behaviour

Please mark (with X) your level of agreement with the following statements

16. I recycle	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I do not recycle
a. Plastic (shopping) bags						
b. Newspapers						
c. Cardboard						
d. Aluminium cans						
e. Food cans						
f. Scrap metal						
g. Plastic						
(i) Polyethylene bottles(water bottles, soft drink bottles, Oros, etc.)						
(ii) Polypropylene (margarine tubs, ice-cream containers, etc.)						
(iii) High density polyethylene						
(iv) Other (please specify)						
h. glass jars & bottles						
(iii) transparent						
(iv) coloured						
i. Other (please specify).....						

Section E: Desire for future recycling or composting

C. Recycling

17. Please mark (with X) your level of agreement with the following statements

	Very likely	Likely	Sort of likely	Not likely	Highly unlikely
a. I would recycle if I was provided with a free recycling container					
b. I would recycle more if I had more room to store the recyclables					
c. I would recycle more if I had the time					
d. I would recycle more if the recyclables would be collected on time					
e. I would recycle more if the recyclable waste would not be mixed with biodegradable waste during transportation to the landfill					
f. I would recycle more if I was assured that the waste collectors would collect the recyclables regularly					
g. I would recycle if clear instructions are provided on how to recycle my household waste					
h. I would recycle more if I was given some incentives for participating					
i. Other (please specify)					

D. Composting

18. Please mark (with X) your level of agreement with the following statements

	Very likely	Likely	Sort of likely	Not likely	Highly unlikely
1) I would compost more if provided with free compost bins					
2) I would compost more if I had a big yard or area for composting					
3) I would compost more if I was aware of the price of compost					
4) I would compost more if I was aware of the existence of markets for compost					
5) I would compost more if I was aware of the benefits					
6) I would compost more if I am taught					
7) Other (please specify)					

Section F: Awareness of solid waste issues

19. Are you aware of any community programs you know about that educate or encourage recycling.

☐ Yes ☐ No

If so, which ones – please specify:

20. Please mark (with X) your level of agreement with the following statements

Statements	(please tick one)				
	Strongly disagree	Dis-agree	Neutral	Agree	Strongly agree
a. I am aware of the products that can or cannot be recycled					
b. I am well informed about local recycling services					
c. I am aware of the benefits of recycling					
d. I am aware of the benefits of composting					
e. I am aware of the solid waste removal schedule for my area					
f. If you are not aware of the waste removal schedule, do you comply with it?					
g. If you do not comply with it, kindly explain what your challenges are.					

Section G: Recommendations for awareness-raising

21. Information dissemination

Please mark (with X) your level of agreement with the following statements

The best ways to inform me about solid waste recycling programs is via	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a. E-mail					
b. Flyers at my door					
c. Residential mail delivery					
d. Community meeting					
e. Road-shows					
f. Other (please specify)					

Section H: Waste composition

22. Please tell us about the typical composition of the waste you generate at your household

a. the components of waste generated in my household are	Predominant	Often	Sometimes	seldom	Never
b. plastic (bags, bottles, containers)					
c. Paper (newspapers, junk mail, office paper)					
d. Magazines					
e. Cardboard					
f. Glass					
g. Cans (food cans & cold drinks)					
h. scrap metal					
i. food waste					
j. garden waste / yard trimmings					
k. Special waste (e.g. disposable nappies)					
l. Other (please specify) -----					

Section I: Assessment of recycling program

1. Overall, how satisfied are you with your current recycling program in your area?
(Please circle one)

Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
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Please provide comment in this regard. -----

Section J: Demographics

8. What is your sex?

☐ Male ☐ Female

9. What is your age group

☐ Under 18yrs ☐ 18 – 24 ☐ 25 – 35 ☐ 36 – 45
☐ 46 – 60 ☐ above 60 years

10. House Type or Residence

- a. One room only
- b. Small, two bedroom-house with courtyard and inside ablutions
- c. Small, two bedroom-house with courtyard with outside ablutions
- d. One bedroom flat plus courtyard
- e. Two bedroom flat plus carport and courtyard
- f. Three bedroom house with courtyard
- g. Two bedroom house with carport and courtyard
- h. Three bedroom house with yard, without carport
- i. Three bedroom flat, semi-detached, without carport or courtyard
- j. Three bedroom house with large yard and carport
- k. Four bedroom house with large yard, carports
- l. Other (please specify).....

11. What is your occupation?

☐ Artisan ☐ Scholar ☐ Engineer
☐ Senior Executive ☐ Housewife ☐ Clergy
☐ Pensioner ☐ Shop assistant ☐ Clerical
☐ Labourer ☐ Domestic worker ☐ Teacher
☐ Other professional
☐ Other (please specify) -----

12. How many people live in this household including you

☐ One ☐ Two ☐ Three ☐ Four
☐ More than four

13. Combined gross household income per month

- ☐ Less than E1, 000 ☐ E 1,000 – E5, 000 ☐ E5,001 – E30,000
- ☐ More than E30, 000

14. What is your highest attained level of education?

- | | |
|---|---|
| ☐ Primary School | ☐ Secondary School Certificate |
| ☐ O' Level or ISCE Certificate | ☐ Vocational training centre |
| ☐ College Diploma | ☐ University Degree (first degree) |
| ☐ Post-graduate Certificate/ Diploma | ☐ Master's degree |
| ☐ Doctorate College Diploma | |
| ☐ Other (please specify) | |

Section Two – Qualitative Survey

(Please leave out question 3, 4, 5 or 6 if they are not applicable to you)

1. What is your job or position?

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2. How does your position relate to recycling?

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3. Please tell me about the common types of municipal solid waste generated at Simunye.

Waste type	Yes / No	Proportion (high / medium / negligible)
Paper and cardboard		
Glass (i) coloured		
(ii) transparent		
Plastic		
(i) Poly ethylene bottles (water bottles, soft drink bottles, Oros, etc.)		
(ii) Polypropylene (margarine tubs, ice-cream containers, etc.)		
(iii) High density polyethylene		
Aluminium cans		
Food cans		
Scrap metal		
Tyres		
Other (please specify)		

4. Which types of waste are currently recovered and set aside for recycling at the Simunye landfill?

Waste type	Yes / No	Proportion (high / medium / negligible)
Paper and cardboard		
Glass (i) coloured		
(ii) transparent		

Plastic (i) Poly ethylene bottles(water bottles, soft drink bottles, Oros, etc.) (ii) Polypropylene (margarine tubs, ice-cream containers, etc.) (iii) High density polyethylene		
Aluminium cans		
Food cans		
Scrap metal		
Tyres		
Other (please specify		

5. Please tell me the name of the buyers of the recyclables?

Waste type	Name of buyer
Paper and cardboard	
Glass (i) coloured (ii) transparent	
Plastic (i) Poly ethylene bottles(water bottles, soft drink bottles, Oros, etc) (ii) Polypropylene (margarine tubs, ice-cream containers, etc) (iii) High density polyethylene	
Aluminium cans	
Food cans	
Scrap metal	

Tyres	
Other (please specify)	

6. Are you happy about the quantity and quality of the recyclables that you buy and / or sell?

i).

7. Please explain your answer to 6.

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8. (i) What is your overall view on the effectiveness of the current recycling program?

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(ii) What improvements would you like to see?

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9. What do you see as gaps and weaknesses of recycling residential solid waste recycling at Simunye?

i). Attitudes of community members

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ii). Pro-environmental behaviour of community members

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iii). Motivators of recycling

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iv). Barriers of recycling

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v). Other

(a)

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(b)

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10. How do you think the aforementioned challenges could be resolved?

i). Attitudes of community members

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ii). Pro-environmental behaviour of community members

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iii). Motivators of recycling

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.....

iv). Barriers of recycling

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v). Other

(a)

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.....

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(b)

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11. Please tell me about any community programs you know about that educate or encourage recycling.

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12. Please outline the types of campaigns and methodologies used

	TYPE
Brochures/ leaflets	
E-mail notifications	
Residential mail delivery	
Meetings	
Road-shows	
Radio	
Other (please specify)	

13. What impact have the campaigns had, if any, so far?

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14. Is there anything else you would like to mention?

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15. Could you please tell me of any other stakeholder that I should talk to?

Name of stakeholder	Role in recycling

Thank you for participating in the survey.

Appendix 3: Instructions for publication

Name of Journal: Habitat International

Name of Article: How community participation and stakeholder involvement can improve recycling: an investigation of initiatives and opportunities in Simunye

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