

Assessment of Household Waste Minimisation Practices in Orange Farm: Effects and Opportunities for Low Income Households

ZS Thabethe and LB Mzini
North-West University, South Africa

Abstract: The study is founded on the premise of waste management with reference to waste minimisation. Waste minimisation is undertaken either at the point of purchase, or within the home by re-using or repairing products rather than replacing them. The researchers assess waste minimisation practices at household level in Orange Farm, City of Johannesburg. Municipal waste minimisation at household level has been relatively neglected as compared to industrial waste minimisation. The Gauteng province is classified as the most economical dominant province in the country. However, there are concerns about the lack of managing waste from the source. Effective waste management determines the sustainability of the environment and ensures the health of the society. The study observed disorderly disposal of waste. The households in Orange Farm rarely practice other means of waste minimization such as to reuse, recycle, and compost. The respondents' knowledge on waste minimisation is relatively poor. The main problem expressed by respondents with respect to waste disposal is that collection schedules are not adhered to by the collectors. The role of waste minimisation and public participation programmes in educating the community so that the latter can play their role effectively is very crucial. A qualitative approach and a questionnaire was preferred to understand the context of household waste minimisation. The study found that waste management has changed to more sustainable waste minimisation methods. Despite the innovations created, the households still dispose waste illegally and this put strain on the landfills as they become too full than anticipated. In addition, the news ways of recycling were introduced even though the households remain unenthusiastic about sustainable measures. We recommend that a Waste Stream Analysis or Waste Audit may be effective in minimizing household waste when waste is disposed at household level. We further recommend for the sorting and of household waste.

Keywords: Household, Orange Farm, Waste minimisation, Waste management, Waste disposal

1. Introduction

Waste minimisation and waste management is a huge challenge more specifically on residential households as most of the waste generated by households is disposed in landfills. The reduction of household waste has been identified as a key component of waste management strategies throughout (Fahy & Davies, 2007). Municipal waste minimisation has been relatively neglected as compared to industrial waste minimisation. The theoretical framework for understanding householders' waste management behaviour has been looked at on a broader scale. Interested and affected stakeholders are concerned over the assimilative ability of the natural and human environment to absorb increasing volumes of solid waste in landfill (Department of Environment, Forestry and Fisheries (DEFF) (DEFF, 2021). Waste management has changed over years, even the traditional methods have changed to more sustainable waste minimisation way.

Reducing household waste has become an area of prime concern for national governments, policy-makers and local communities across the globe. There are concerns about the lack of managing waste from the source. South Africa still has a huge responsibility to fulfil integrated waste management. These concerns resulted in a number of international protocols and convention in which municipalities agreed on a strategy for sustainable development. To achieve this goal, local municipalities must play an important role in making sure that sustainable waste management services are enforced to minimise household waste. New ways of waste management have evolved to introducing communities to reduce waste. Programmes to drive recycling behaviour were on top of the list as compared waste minimisation (Tonglet, Phillips & Bates, 2004). The City of Johannesburg introduced programmes such as the S@S to encourage residents to separate and recycle their waste. This programme also promoted job creation through

exchanging recyclable waste with cash. This study reviews the practices of household waste minimisation. In the next section the background on the context of waste minimisation is presented. The concept of waste minimization is explained with the Theory of Planned behaviour to understand household behaviours on waste minimisation. In the method section the research design will be explained. The theoretical analysis and implications of the study will be discussed. The results of the study are presented. The concluding section considers the advantages of applying household waste minimisation.

Waste minimisation programmes emerged in the 1970s and 1980s. The challenge to reduce household waste has become a priority for policy makers at a global scale (Fahy & Davies, 2007). The management of waste in South Africa falls within the mandate of the Department of Environment, Forestry and Fisheries (DEFF) (DEFF, 2021). This mandate is derived from Section 24 (Environment) of the Constitution of the Republic of South Africa (Act 108 of 1996). Waste management has changed over years, even the traditional methods have changed to more sustainable waste minimisation way. The South African government introduced numerous

programmes to address these issues. In 2011, the Department of Environmental Affairs introduced the National Waste Management Strategy (NWMS). The NWMS was updated, revised and published on 28 January 2021 by the Minister of Forestry, Fisheries and the Environment as the National Waste Management Strategy 2020 (The 2020 strategy) The strategy is aligned and responsive to the Sustainable Development Goals (SDGs) of Agenda 2030 and South Africa's National Development Plan (NDP): Vision 2030 (DEFF, 2021).

The 2020 strategy is premised on three (3) pillars: namely (i) Waste Minimisation; (ii) Effective and Sustainable Waste Services; (iii) Compliance, Enforcement and Awareness. The strategy 2020 moves towards a zero waste in landfills: cleaner communities, well managed and financially stable waste services, and a culture of zero tolerance of pollution, litter and illegal dumping (DEFF, 2021). Collectively, the outcomes, strategic pillars, interventions and actions consolidate and build on the eight (8) overarching goals of the 2011 strategy. The 2011 and 2020 strategy are presented in Table 1.

The concept and context of waste minimisation is discussed in the following section.

Table 1: National Waste Management Strategy 2011 and 2020

National Waste Management Strategy 2011	National Waste Management Strategy 2020
<ul style="list-style-type: none"> • Promote waste minimisation, re-use, recycling and recovery of waste. • Ensure the effective and efficient delivery of waste services. • Grow the contribution of the waste sector to the green economy. • Ensure that people are aware of the impact of waste on their health, well-being and the environment. • Achieve integrated waste management planning. • Ensure sound budgeting and financial management for waste services. • Provide measures to remediate contaminated land. • Establish effective compliance with and enforcement of the Waste Act. 	<ul style="list-style-type: none"> • Addressing the role of vulnerable groups, waste pickers and the informal sector and supporting women, youth and people living with disabilities in the circular economy. • Promoting approaches to the design of products and packaging that reduce waste or encourage reuse, repair and preparation for recycling, support markets for source separated recyclables. • Investigating potential regulatory or economic interventions to increase participation rates in residential separation at source programmes. • Investing the economies associated with transporting of recyclables to waste processing facilities. • Addressing the skills gap within the sector with a special focus on women, youth and people living with disabilities; and • Engagement with the National Treasury regarding the operational expenditures for municipalities associated with implementing the NWMS and the Waste Act

Source: Department of Environment, Forestry and Fisheries (2021)

1.1 Waste Minimisation

Waste minimisation is defined as the actions taken by householders to minimise their household waste, either at the point of purchase, or within the home by re-using or repairing products rather than replacing them (Tonglet, Phillips & Bates, 2004).

1.2 Waste Minimisation Interventions

The National Environmental Management Act, 2008 as amended (NEMWA) places a duty on State to place uniform measures that seek to reduce the amount of waste that is generated and, where waste is generated to ensure that waste is re-used and recovered in an environmentally sound manner. The reduction of household waste has been identified as a key component of waste management strategies throughout (Fahy & Davies, 2007). Municipal waste consists of valuable resources that are discarded during waste disposal (Van der Werff, Vrieling, Van Zuijlen & Worrell, 2019). The promotion of waste minimisation activity is geared towards having less waste and more value for money on resource innovation. The simplest and most effective way of dealing with waste is to ensure that it does not arise in the first place. The new waste strategy will address whether and how to expand and develop such measures and will consider how waste minimisation for households can be encouraged (Tonglet, Phillips & Bates, 2004). It is indicated that the average citizen of the European Union (EU) disposes 480 kg of municipal waste per year (Van der Werff et al., 2019).

1.2.1 Separation@Source Programme (SoS)

The SoS was rolled out in 2017-2018 financial year as an ongoing and concerted drive to significantly reduce the amount of waste reaching landfills and contribute to a cleaner environment. The programme earmarked households to separate their waste at source.

1.2.2 Receptacles to Collect Waste

The CoJ issued:

- A traditional black wheelie bin for non-recyclable refuse.
- A clear durable plastic bag for glass, cans and plastic; and
- A white reusable bag for paper and cupboards.

Many of the waste minimisation programmes have focussed upon Reduce, Re-use and Recycle messages (Tonglet, Phillips & Bates, 2004). Recycling programmes and informal recycling clubs and non-governmental organisations were introduced to communities. Such clubs have been shown to have made a significant contribution to developing a culture of sustainable waste management in UK industry through correcting information and market failures (Tonglet, Phillips & Bates, 2004).

2. Literature Review

An in-depth study of public actions and attitudes towards waste in Ireland was conducted in response to this paucity of information. The research revealed a complex landscape of attitude-action relationships influenced by factors ranging from personal characteristics to social and institutional contexts (Davies, Fahy & Taylor, 2005). Van der Werff et al. (2019) also tested if an informational strategy to minimize waste can influence the variables from the norm activation model. Their study comprised of a field study in collaboration with a waste collection company. The outstanding part on their study was to assess whether households changed their purchase behaviour and if they reduced the volume of residual waste (Van der Werff et al., 2019). Their findings suggested that informational strategies may be effective in minimizing household waste when awareness of consequences and outcomes efficacy are increased by the information (Van der Werff et al., 2019).

Fahy and Davies (2007) also investigated the relationship between attitudes and actions in relation to household waste management in four case study areas in Ireland. Their study found that the existence of a value-action gap was established and the reasoning behind this mismatch explored. Barr, Gilg & Ford (2001) emphasised the complex link between environmental attitudes and environmental actions. The Barr et al. (2001) study produced a conceptual framework with three predictors as to behaviour, namely: environmental values, situational variables and psychological variables. In Ireland, Davies et al. (2005) embarked on research findings from a 3-year study that investigated household attitudes and actions towards waste.

So, Cheng, Cheung, Chen, Chow, Fok and Lo (2021) used the extended theory of planned behaviour model to explore the relationships between

situational and psychological factors of Hong Kong citizens' plastic waste management (PWM). Their study used a structural equation modelling for surveys data analysis. The results revealed that situational factors had a direct and positive effect on PWM intention. The literature indicates that environmental attitudes and situational and psychological variables are likely to be important predictors of recycling behaviour (Davis & Morgan, 2008). The results of the survey are presented in the subsequent section.

3. Theoretical Approaches

There has been recent interest in exploring the use of models from social psychology to provide a theoretical framework for understanding householders' recycling behaviour (Davies, Foxall & Pallister, 2002). Several theoretical approaches and research methods have been employed to investigate why people behave the way they do as the first step towards improving household waste behaviour (Fahy & Davies, 2007).

3.1 Theory of Planned Behaviour

The theory of planned behaviour (TPB) is a psychological theory that links beliefs to behaviour (Kan & Fabrigar, 2017). The TPB is used to understand and predict behaviours. Behavioural intentions are determined by a combination of three factors: attitudes toward the behaviour, subjective norms, and perceived behavioural control (Davies, Foxall & Pallister, 2002). The theory of planned behaviour has been applied to several research areas including health-related behaviours: environmental psychology and voting behaviour. Generally speaking, actions that are environmentally friendly carry a positive normative belief. Individuals' behaviour may be influenced by internal and exterior constraints. This means that behaviours that are consistent with environmental sustainability are widely promoted as positive behaviours. For example, if an individual intends to behave in an environmentally responsible way but recycling infrastructure is absent in the individual's community, perceived behavioural control is likely to be low (Masud, Al-Amin, Junsheng, Ahmed, Yahaya, Akhtar & Banna, 2015). The application of TPB in these situations helps explain contradictions such as individuals having positive attitudes toward sustainability but engaging in behaviour that is antithetical to the idea of sustainability (Masud et al., 2015).

3.2 Theory of Reasoned Action

The theory of reasoned action (TRA or ToRA) is also used for explaining the relationship between attitudes and behaviours within human action. The primary purpose of the TRA is to understand an individual's voluntary behaviour by examining the underlying basic motivation to perform an action (Doswell, Braxter, Cha & Kim, 2011). It is mainly used to predict how individuals will behave based on their pre-existing attitudes and behavioural intentions (Gillmore, Archibald, Morrison, Wilsdon, Wells, Hoppe, Nahom & Murowchick, 2002).

3.2.1 Informational Intervention Strategy

One way to promote waste minimization is by using informational intervention strategies. Information provision is probably the most widely used intervention to promote behaviour change (Abrahamse & Matthies, 2018). Waste minimisation is all about human action. The informational intervention strategy seeks to provide households with information on how to recycle waste. It is intended to influence the extent to which people think their behaviour can help solve the problem (Van der Werff et al., 2019).

4. Research Design

The main aim of the study was to investigate waste minimisation practices in the households of Orange Farm in the City of Johannesburg. A qualitative research method is used to enable the researchers to interact with participants and collect data about how participants behave on a studied situation. A questionnaire survey was used consisting of four sections. 5-point rating scales were used throughout the questionnaire. The first section seeks the background information of the respondents, duration living in the household, type of household residence building, tenancy, business operation in the household/yard and access to basic services. The second section focused on respondents' level of awareness on waste management including public participation on clean-up campaigns. The third section looks at waste disposal at household level in order to understand the practices involved especially with the aim of minimizing waste. The last section deals with waste collection services and the level of satisfaction on service provision by government.

The sampling frame of this study covers households residing in Orange Farm, City of Johannesburg. A total of 7 households were sampled. The questionnaires

were distributed by WhatsApp and email. Respondents were given a few days to answer the questionnaires.

Data collection occurred between July 2021 and September 2021. The desktop research is used for conceptualizing the content and gathering related information. An observational study is applied measure the actual behaviour among the household and the area of study. In terms of the limitations, one block of households was selected. The researchers were conscious of several challenges involving the Covid-19 pandemic and in particular an administered survey instrument was used.

5. Results and Discussion

This section presents the main findings from the interviews. The names of the participants are not

used so to protect interviewee confidentiality. This section below discusses the household waste management practices by residents of Orange Farm. The results comprise of the following sections:

- Household details.
- Household awareness on waste management.
- Disposal of household waste.
- Garbage collection services.

5.1 Household Details and Basic Services

The waste minimisation practices of seven (7) households were observed over the period of August to September 2021. The demographic composition of the sample is shown in Table 2.

Table 2: Summary of Sample Profile

Value	Frequency (7)	Percentages
Period living in the household in Orange Farm		
0-5 years	1	14%
6-10 years	-	-
11-15 years	4	57%
16 years or more	2	28%
Type of household residence building		
Wood	-	-
Brick or/cement houses	7	100%
Cardboard	-	-
Tenants in your yard		
Yes	1	14%
No	6	85%
Business operation in the household/yard		
Yes	1	14%
No	6	85%
Access to water		
Piped water from the tap	7	100%
Piped water from the block (communal) tap	-	-
Own well (borehole)	-	-
Source of energy for lighting and cooking		
Electrical appliance	7	100%
Kerosene (paraffin)	-	-
Gas	-	-
Firewood	-	-
Others	-	-

Source: Authors

A majority of the respondents (57%) have lived in Orange Farm for over 35 years. In terms of the type of household residence building, the respondents (100%) indicated that their houses are built on bricks and they owned the house. This is a good indication of decent housing and sustainable livelihoods. All respondents (100%) indicated that they do not have tenants in their yards. It was important to find out if the households had tenants in their yards. Only one (14%) respondent informed that there is business operation in their yards. In terms of the household composition, the respondents have adequate members in the household.

All respondents have access to basic services such as water (Piped water from the tap) and electricity. In terms of the source of energy for cooking, all respondents indicated that there is access to electricity and they use on daily basis. Although, there are challenges of power outages in the selected sections of Orange Farm caused by exploded transformers. Energy sources such as gas and Kerosene (paraffin) and wood are used as an alternate during power outages. A solar panel are also used as a back-up for lighting and charging cellular phones. that automatically goes on when the load shedding starts.

5.2 Household Awareness on Waste Management

The results show that public participation is the key to increasing household recycling levels. Respondents were asked to indicate how waste management is important and if their household members participated in any community clean-up activities or other voluntary clean-ups campaigns. The results also show that public awareness played a role among the residents of Orange Farm and across the City of Joburg. The households view the process as "very important", because waste management reduce the risks associated to human health. The households indicated that they do participate during clean-up projects. Based on participant observation, youth are seen participating in the environmental cleaning projects initiated by the municipality. The respondents also indicated that cleaning campaigns implemented enabled them to have knowledge about sustainable waste management.

5.3 Disposal of Household Waste

This section aimed to identify the level of waste generated by households. For this section, only two

questions were posed to the respondents, which aimed to understand if the households do separate waste generated in the household and how waste is disposed.

5.4 Waste Separation

We found that the separation of different types of waste at household level is not conducted effectively. The results show that there is lack of buy-in by communities. Respondents (100%) indicated that all waste generated is kept in refuse bins and plastic for disposal. The only waste items separated are plastics bottles, which are placed in separate plastics for waste pickers.

5.5 Waste Disposal

The question in this section enquired about the provision of waste disposal material by the municipality. The respondents indicated that the City of Joburg with the Pickit-up services provided the residents of Orange farm with plastic bins to use to dispose waste. See Table 3 on the following page.

With respect to waste disposal problems, respondents express mixed opinions.

5.5.1 Collection Service and Dump

Waste items such as the kitchen waste, plastic, paper, solids were identified. All respondents (100%) said their waste is disposed through collection services scheduled by the municipality. This includes leftover food, plastic bottles, papers, tins and boxes. One respondent who is an educator indicated that he separates his waste because and he also educates learners to participate in the environmental management competitions.

The respondents (50%) indicated that they sometimes dispose the waste generated on open land. Normally this is caused by lack of service from the providers who are either on dispute resolutions (labour union matters). The respondents also indicated that the waste truck do not show up due to theft or damaged trucks. Normally, households do not have space to keep the waste generated. Respondents resorted to illegal dumping by sneaking at night to dump waste in open spaces. In terms of paper items, the respondents indicated that they sometimes burn at night.

Table 3: Waste Disposal

Type of Waste	Frequency	Collection service	Reuse/ recycle	Compost	Burn	Dump in drain
Organic						
Kitchen	7	7 (100%)	-	-	-	-
Grass	7	2 (28%)	1 (14%)	-	3 (42%)	-
Wood/leaves	7	2 (28%)	1 (14%)	-	3 (42%)	-
Animal Waste	7	4 (57%)	1 (14%)	2 (28%)	-	-
Paper	7	2 (28%)	3 (42%)	-	2 (28%)	-
Non-organic						
Plastics bag	7	4 (57%)	3 (42%)	-	-	-
Plastic bottles	7	4 (57%)	3 (42%)	-	-	-
Glass bottles	7	4 (57%)	3 (42%)	-	-	-
Tin cans	7	3 (42%)	4 (57%)	-	-	-
Textile	7	3 (42%)	-	-	-	-
Rubble	7	5 (71%)	1(14%)		-	-
Tyres	7	2 (28%)	1 (14%)	1 (14%)	-	-
Health: Sanitary/ Medicine						
Sanitary (diaper)	7	7 (100%)	-	-	-	-
Pills	7	4 (57%)	-	-	-	3 (42%)
Potentially hazardous (needles)	7	5 (71%)	1 (14%)	1 (14%)	-	-

Source: Authors

5.6 Burn/Bury in the Backyard

The survey indicates that households do not understand the notion of waste separation at source activities. The results also show that organic waste is either burnt or buried in the backyard in order to minimize the amount of waste in their households. Mostly waste items are burnt or buried in the backyard as there is ventilated space to burn waste. Some houses are built in the corner and they experience bad odour coming from the illegal dumping from open spaces. It was indicated that uncollected household wastes, resulted in a disgusting phenomenon and nauseating smell and welcomed unwanted flies and garbage worms. This phenomenon can always be spotted during long public holidays, school holidays or during festive seasons.

5.7 Reuse/Recycle

Globally, several waste recycling campaigns have been launched by the government to involve the participation of different community groups and non-governmental organizations. Some items can

be used for compost and recycling however such endeavours are far from being attained. Recycling attitudes are the major determinant of recycling behaviour. Disposal of waste emphasizes elements of recycling. This determines whether the waste generated from household is recyclable waste or not. Recyclable waste is any waste that can be easily reused for meaningful practice. The results show that the recycling is less common in the households as compared to business premises. Attitudes to recycling seemed to be negative among respondents since there are barriers to translating intentions of government into sustainable actions. A positive outcome noted during the survey was that the resident living next to the open space exposed to illegal dumping resorted to open a carwash as a solution to eradicate illegal dumping.

5.8 Waste Collection Services

Waste collection forms part of the local municipalities' responsibility. The Pikitup is responsible for waste collection in Orange Farm. Municipalities around the world have issued waste bins for collecting waste. To understand the behaviour of

household on waste minimization, the availability of waste bins, the consistency of waste collection and household attitudes and satisfaction were also observed.

5.9 Availability of Waste Bins

Every household in Orange Farm was issued with a waste bin for storing waste. Several measures have been taken to promote waste management and collection. Plastic wheelie bins were developed on a global scale. An ideal durable and lightweight mobile wheelie bin was introduced. Wheelie bins comes in different colours to separate waste items, such as paper, plastic, tin, glass, food, hazardous or general waste. Prior 2005, the municipality issued metal dustbin, thereafter plastic wheelie bins were issued. A wheelie bin was seen as a flexible resource to allow the elderly and the disabled household to pull through the gate on waste scheduled days. The municipality also issue plastic refuse bags for waste collection. Recently, the municipality embarked on a project to "Keep Jozi Clean" with the theme #KleenajoburgReloaded. The sad part is that all plastics are not used to its purpose.

5.10 Consistency of Waste Collection

In terms of the frequency in waste collection service, the municipality either collects waste once or twice on weekly basis.

5.11 Household Attitudes and Satisfaction of Waste Collection Service

The residents were asked how satisfying the collection of waste services is to them. Residents normally have different attitudes and views about waste management particularly on waste disposal and separation of waste in their residential area. One of the respondent informed that:

"she is not satisfied with the services we receive from the municipality, especially when waste is collected".

Another response given was that the waste collection services do not have specified time schedules for collecting waste:

"I am not satisfied with the Pikitup services because they don't have the straight time to come and collect waste in our area, sometimes the trucks

come at night around 18:30pm and it happens that sometimes we just take out bins back to the yard cause it is not safe to leave the bin outside the yard"

6. Discussion

The results outlined in this paper provide empirical data identifying the practices of household on waste minimisation. The results presented above show unpredictable patterns towards waste reduction. The findings paint a picture of semi environmentally aware and environmentally concerned group of respondents.

6.1 Household Behaviour

Barr et al. (2001) argue that waste minimisation and re-use behaviour are influenced by knowledge of environmental issues. Up until now waste minimisation has taken place within industry and commerce (Tonglet, Phillips & Bates, 2004). There is limited action by householders to reduce their consumption footprint (Davies et al., 2005). Although, some are respondents were keen to learn and improve their waste management behaviour. Based on the literature it is evident strategies for minimising waste do not always offer value for money. Most of the respondents still dispose all waste generated in their households. This does not provide a sufficient foundation for achieving the SDG Goals. Studies that examined the causes of high levels of waste generated in the landfills and open spaces failed to understand a person's capabilities and personality traits as well as their beliefs on environmental ethics.

6.2 Municipal Interventions

Inclusion of the waste minimisation programmes in the CoJ has not improved the status quo. There is evidence of environmental awareness programmes have been introduced through media and on physical basis through local ward committees. These informational strategies attempted to change people's knowledge for promoting sustainable waste behaviour. The waste minimisation intervention seems to be effective on selected households. The Norm Activation Model hypothesised that anticipated pride and guilt cause individuals to behave themselves in a manner that is in line with personal norms. Gradually, some household behaviour has changed. The CoJ published a list of suburbs which

are forced to segregate their waste at household level. The results reveal that municipal interventions may have a direct and positive effect on waste minimisation intention. However, waste minimisation remains at a much lower level (40%) (Tonglet, Phillips & Bates, 2004).

6.3 Waste Minimisation vs Recycling Behaviour

The increase in urban population and rapid economic growth lead to the increase in solid waste generation (Tarmiji, Usman & Hassan, 2011). The complex relationship between waste minimisation and recycling behaviour has also been explored by Ebreo and Vining (2001). It is reported that minimisation behaviour is not strongly connected to recycling behaviour and that to stimulate minimisation a new and dynamic approach to designing projects based upon cognitive psychology is required. The results indicated that waste minimisation behaviour is fundamentally different from recycling behaviour. In Orange Farm the households only use one wheelie bin for storing waste. It is a one size fits all approach for waste disposal.

6.4 Purchasing Behaviour

The purchasing behaviour is not adhered to. On a daily basis the households purchase a plastic at the supermarket at a cost of R0.80 cents. This will depend on the amount of grocery bought in the store.

6.5 Separation at Source Programme

In Johannesburg, the availability of landfilling space is a huge challenge to the city's authority. There is a low level of participation for the application of the S@S. This is because the practice of S@S takes place in a private space (households). It requires much effort to convince residents to take part in waste separation within their own private spaces since residents have different perceptions and attitudes towards S@S of household waste. The findings from this study suggest that the TPB provides a useful theoretical framework for investigating recycling and waste minimisation behaviour.

6.6 Mandatory Waste Separation at Source

The CoJ introduced the Mandatory Waste Separation at Source programme on 1st of July 2018. The

programme is implemented in selected areas whereby residents are issued with clear plastic bags or a blue bag to place recycled materials on a weekly basis. In this regard, residents are required to drop-off their household generated waste at the Pikitup's drop off site for composting or for further processing.

6.6.1 Communication

Effective solid waste management is very crucial in every nation as it determines the sustainability of the environment and ensures the health of the society (Abdullah, Salleh & Ismail, 2017). A desktop study revealed that the CoJ has a wide framework for communication when it comes to its services. There are seven Call Centres for waste services, which also have a share contact person in the respective seven (7) regions. In one region there are three (3) alternate contact persons that can be contacted for waste management inquiries or for reporting discontinued services. In terms of telecommunication, there is an inbound and outbound form of connecting with the community. An inbound call centre is operated by an institution to administer incoming enquiries from consumers. Every customer in CoJ has access to 24/7 live support and receives a dedicated contact person, as there are three per region. The residents are afforded with a ShareCall number (preceded by 086). The cost for the call is incurred by the caller and the institution that is called. The CoJ's website the name of the waste management manager and his/her contact details and the email address. The website also has contact details for reporting illegal dumping.

6.6.2 Implications

In a seminal paper Maycox (2003) demonstrates that understanding behaviour is the key to taking solid waste minimisation forward, but that there are very significant barriers for the general public, such as lack of knowledge, motivation and influences, via social norms. The findings from this study have several implications for the development and implementation of waste minimisation programmes. For example, the respondents indicated that they often dispose waste at open spaces and landfills, because of inconsistent waste collection services in Orange Farm. Inconsistent waste schedules cut across the nine provinces of South Africa. In Vanderbijlpark the households dispose their waste at the gate of the Emfuleni Local Municipality. In Sebokeng the residents also disposed waste next to the municipal community infrastructure.

7. Conclusion and Recommendations

Effective solid waste management is very crucial in every nation as it determines the sustainability of the environment and ensures the health of the society. The results from the interviews indicated that a recycling program is possible in the community. This paper displays some of the central elements for action research. The study found that the management of municipal solid waste is an ongoing problem for municipalities. Adoption of Informational Intervention Strategy for enhancing public participation may be useful towards achieving the National Waste Management Strategy 2020. The results above indicate that attention needs to be given to a wide range of factors such as environmental concern variables, situational variables and psychological factors. The authors propose for the application of a waste stream analysis or a waste audit for ensuring adequate planning of resources to deliver waste management services at household level and the organisational level. A waste stream analysis has other benefits such as:

- It will indicate the potential for the establishment of a buy-back centre or the establishment of a Materials recovery facility (MRF).
- Will determine the current waste practices i.e. whether there is recycling taking place or illegal dumping.
- Assist in improving the current state of affairs with regards to waste management.

From the participant observation point of view, the receptacles issued at the CoJ are not used appropriately by households. Most of organic waste still ends up in waste collection trucks and the landfill. Effective waste minimisation programmes may contribute to the municipal waste management vision. The municipal landfilling costs can be reduced and even global warming challenges. Turning recyclables into valuable commodities may also create jobs for the unemployed whereby industries will be employing people to produce sustainable receptacles. The complex relationship between waste minimisation and recycling behaviour has also been explored by Ebreo and Vining (2001). The results reveal that municipal interventions may have a direct and positive effect on waste minimisation intention. Businesses and governments need to play a part in reducing waste, a significant role can

also be played by individuals across the various contexts in which they consume and use materials (Whitmarsh, Haggard & Thomas, 2018). The team implementing an intervention should specify the action, target, context, and time (Glanz, Rimer & Viswanath, eds., 2015).

Several theoretical approaches and research methods have been employed a quantitative survey to investigate why people behave the way they do as the first step towards improving household waste behaviour (Fahy & Davies, 2007). It is important to undertake a qualitative study for understanding the rationale for lack of waste management practices. Effective solid waste management is very crucial in every nation as it determines the sustainability of the environment and ensures the health of the society. The results from the interviews indicated that a recycling program is possible in the community. This paper displays some of the central elements for action research.

References

- Abdullah, Z., Salleh, S.M. & Ismail, K.N.I.K. 2017. Survey of household solid waste management and waste minimization in Malaysia: Awareness, issues, and practices. *International Journal of Environmental & Agriculture Research*, 3(12):38-48.
- Abrahamse, W. & Matthies, E. 2018. Informational strategies to promote pro-environmental behaviour: Changing knowledge, awareness, and attitudes. *Environmental psychology: An introduction*, 261-272.
- Barr, S., Gilg, A.W. & Ford, N.J. 2001. A conceptual framework for understanding and analysing attitudes towards household-waste management. *Environment and Planning A*, 33(11): 2025-2048.
- Corsten, M., Worrell, E., Rouw, M. & van Duin, A. 2013. The potential contribution of sustainable waste management to energy use and greenhouse gas emission reduction in the Netherlands. *Resour. Conserv. Recycl.* 77:13-21.
- Davies, A.R., Fahy, F. & Taylor, D.M. 2005. Mind the gap! Householder attitudes and actions towards waste in Ireland. *Irish Geogr.* 38(2):151-68.
- Davies, J., Foxall, G.R. & Pallister, J. 2002. Beyond the intention-behaviour mythology: An integrated model of recycling. *Market Theory*, 2:29-113.
- Davis, G. & Morgan, A. 2008. Using the Theory of Planned Behaviour to determine recycling and waste minimisation behaviours: A case study of Bristol City, UK. *Special Edition Papers*, 20(1).
- Department of Environment, Forestry and Fisheries (DEFF). 2021. National Waste Management Strategy. Pretoria: Department of Environmental Affairs.

- Doswell, W.M., Braxter, B.J., Cha, E. & Kim, K.H. 2011. Testing the theory of reasoned action in explaining sexual behavior among African American young teen girls. *Journal of Pediatric Nursing*, 26(6):e45-e54.
- Ebreo A. & Vining J. 2001. How similar are recycling and waste reduction? Future orientation and reasons for reducing waste as predictors of self-reported behaviour. *Environ Behav*, 33(3):424-48.
- Fahy, F. & Davies, A. 2007. Home improvements: Household waste minimisation and action research. *Resources, Conservation and Recycling*, 52(1):13-27.
- Gillmore, M.R., Archibald, M.E., Morrison, D.M., Wilsdon, A., Wells, E.A., Hoppe, M.J., Nahom, D. & Murowchick, E. 2002. Teen sexual behavior: Applicability of the theory of reasoned action. *Journal of Marriage and Family*, 64(4):885-897.
- Glanz, K., Rimer, B.K. & Viswanath, K. 2015. (Eds) *Health behavior: Theory, research, and practice*. John Wiley & Sons.
- Kan M.P.H. & Fabrigar L.R. 2017. Theory of Planned Behavior. In: Zeigler-Hill, V., Shackelford, T. (eds) *Encyclopedia of Personality and Individual Differences*. Springer, Cham.
- Masud, M.M., Al-Amin, A.Q., Junsheng, H., Ahmed, F., Yahaya, S.R., Akhtar, R. & Banna, H. 2015. "Climate change issue and the theory of planned behaviour: relationship by empirical evidence". *Journal of Cleaner Production*, 113:613-623.
- Maycox, A. 2003. The Village Initiative Project: achieving household waste minimisation in the rural locale. *Chartered Institution of Wastes Management Journal*, 4(3):10-17.
- Smith, E. 2016. The History of the Call Center Explains How Customer Service Got So Annoying. *Vice*. Available at: https://www.vice.com/en_us/article/xyg4mn/the-history-of-the-call-center-explains-how-customer-service-got-so-annoying. 10 Aug 2021.
- So, W.W.M., Cheng, I.N.Y., Cheung, L.T.O., Chen, Y., Chow, S.C.F., Fok, L. & Lo, S.K. 2021. Extending the theory of planned behaviour to explore the plastic waste minimisation intention of Hong Kong citizens. *Australian Journal of Environmental Education*, pp.1-19.
- South Africa. 1996. Constitution of the Republic of South Africa (Act 108 of 1996).
- Tarmiji M., Usman Y. & Hassan N.K. 2011. Pertumbuhan Penduduk dan Pembantaran di Semenanjung Malaysia 1911-2000.
- Thompson, A. 2021. Calling a SA business from a cell phone? You may be paying more than you think. Available at: <https://www.businessinsider.co.za/calling-a-sa-business-hotline-from-a-cell-phone-heres-what-you-need-to-know-2021-4>.
- Tonglet, M., Phillips, P.S. & Bates, M.P. 2004. Determining the drivers for householder pro-environmental behaviour: Waste minimisation compared to recycling. *Resources, Conservation and Recycling*, 42(1):27-48.
- Van der Werff, E., Vrieling, L., Van Zuijlen, B. & Worrell, E. 2019. Waste minimization by households – A unique informational strategy in the Netherlands. *Resources, Conservation and Recycling*, 144:256-266.
- Whitmarsh, L.E., Haggard, P. & Thomas, M. 2018. Waste reduction behaviors at home, at work, and on holiday: What influences behavioral consistency across contexts? *Frontiers in Psychology*, 9:2447.