

**UNIVERSITY OF THE WESTERN CAPE**



**AN ASSESSMENT OF HOUSEHOLD FOOD WASTAGE: A STUDY OF  
WALLACEDENE IN KRAAIFONTEIN, CAPE TOWN**

**S'CELO EZRA MADONDO**

3876213

A Mini Dissertation submitted at the Institute for Social Development (ISD), Faculty of Economic and Management Sciences (EMS) in partial fulfilment of the requirements for the award of Master of Development Studies degree at the University of the Western Cape (UWC)

**Supervisor: Dr Elaine Sinden**

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## DECLARATION

I, S'celo Ezra Madondo, hereby declare that this dissertation titled: *An assessment of household food wastage: A study of Wallacedene in Kraaifontein, Cape Town*, has not been previously submitted for the award of any degree. It is my own work. All contributions and quotations in this dissertation have been acknowledged and referenced.

*Signed:*

**Student: S'celo E. Madondo**



## DEDICATION

This work is dedicated to all starving and poverty-stricken people of the world, mostly in sub-Saharan Africa (SSA), particularly in the Southern African Development Community (SADC). Much respectful thanks go to my entire nucleus family with roots EMndeni/Zola (Soweto – Gauteng Province) and all my immediate, extended and self-made families in Gauteng, Cape Town and elsewhere across the country and globally. I commend all individuals and groups driven by Ubuntu in various cultures, structures and organisations, in particular the Rural Development Network (RUDNET) and various professional institutions, public and private entities, society in general and all who keep showing faith, trust and undoubtedly continue backing my abilities and vision.

A lot of honour also goes to all the loving hearts and souls across all sectors of the globe and various regions of the world who continue to support endeavours of food security and poverty eradication, true emancipation and development, conservation of natural resources and curbing food wastage and an equitable food system programme in all its forms. This, starting from the smallest of children in whatever their food awareness and nourishment activities, to households, schools, soup kitchens, institutions of higher learning, the corporate world and all sincere public officials of food schemes and food parcel distributions, to local initiatives aimed towards curbing food wastage at all levels as well as the most global and multi-national of contributions, including progressive governments and all with well intent at the likes of SADC-Food, FAO, IFAD, UNICEF, WFP, WHO and many others globally.

*“Throwing away food is like stealing from the table of those who are poor and hungry.”*

*Pope Francis – St Peter’s Square: The Vatican, Italy, Wednesday, 5 June 2013.*

*(Max Rossi, 2013)*

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## ACRONYMS AND ABBREVIATIONS

CCT	City of Cape Town (Metropolitan Municipality)
COVID-19	Corona Virus Disease 2019 Global Pandemic
CSIR	Council for Scientific and Industrial Research
CT	Cape Town
EPWP	Expanded Public Works Programme
FAO	Food and Agriculture Organization (of the United Nations)
FVC	Food Value Chain
IFAD	International Fund for Agricultural Development
SA	South Africa
SADC	Southern African Development Community
SDG	Sustainable Development Goals
SSA	sub-Saharan Africa
STATA	Statistics and Data (Computer Software)
UN	United Nations
UNICEF	United Nations Children's Fund
USA	United States of America
UWC	University of the Western Cape
WC	Western Cape Province
WCHC	Western Cape High Court – Cape Town
WCG	Western Cape (Provincial) Government
WFP	World Food Programme
WHO	World Health Organization
WRI	World Resources Institute
WWF	World Wide Fund for Nature

## ABSTRACT

Several studies identify food wastage as a global challenge which has a major negative impact on poverty reduction and addressing food insecurity. Food wastage also poses many challenges in terms of food security to South Africans, including residents in Cape Town. As a result, the people who are disadvantaged the most when food is wasted, are poor and destitute communities. For these reasons, this study assesses household food wastage, food waste patterns and people's behaviour towards food wastage in Wallacedene, Kraaifontein. The study discusses patterns of food wastage, together with its social, economic, environmental and subsequent infrastructural impacts, using household demographics and respondents' contributions. The thesis was undertaken using a triangulated quantitative and qualitative case study examination that employed questionnaires and a focus group discussion.

The research found that the majority of participants admitted to wasting food, with vegetables as the largest type of food wasted. The study also revealed that most unconsumed or unused food is thrown into municipal waste, public open spaces and sewer-drainage pipes, with some food used as animal feed and garden compost. All respondents indicated that they were aware when they wasted food. Lastly, the study shows how food wastage affects wellbeing through contributing to ground infrastructure damage in sewer blockages, occasioning the overflow of unhealthy pathogens into the streets as well as water eutrophication. Outcomes of the study are pragmatic towards Ubuntu values and ethics, and engender a process to leveraging on the goodwill of participants and residents at large, to further spread food security education and curbing food waste at their respective households and across their neighbourhoods. Among the recommendations in this report, the researcher presents advice for strengthening household and neighbourhood networks to teach/learn and share knowledge to minimise food wastage. This includes, parents engaging school governing bodies and teachers to reinforce the education at school level; behaviour on food acquisition, storage, preparation and manner of handling leftover and unwanted food items, all of which the study advises should be treated with utmost respect in line with the morals and ethics of Ubuntu. Business consumers and state institutions are also included in the recommendations.

**Keywords:** consumption, food wastage, hunger, poverty, Ubuntu

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## CHAPTER ONE: INTRODUCTION TO THE STUDY

*Hunger is the face of poverty. But it is also the face of government failure. The face of government unaccountability. When a child is hungry, he/she cannot have a future. A hungry child cannot be productive and be but a burden on family and society.*

(Getachew, 2003: 4).

### 1.1 OVERVIEW AND BACKGROUND

The United Nations (UN, 2015) Sustainable Development Goals (SDGs) Goal 1 indicates that more than 10% of the world population is living in extreme deprivation, among which are people struggling to fulfil the most necessary needs like nutrition, health, education, and those who have no access to basics such as water and sanitation. Goal 1 further states that the majority of people living on less than \$1.90 a day, live in sub-Saharan Africa. Thus, in recent times food wastage has been identified as an important theme throughout the world, across nations and community development platforms, particularly concerning food security and the poverty reduction agenda (Matinise, Roos, Oelofse and Muswema, 2018; Oelofse, 2015).

On a global scale, food wastage is measured to account for about 26.8% of hungry people, while across sub-Saharan Africa (SSA) it has become a rife phenomenon (FAO, 2019). Food waste is described in this research as the discarding or alternative (non-food) use of food that is safe and nutritious for human consumption. It also refers to any food that is lost in the supply chain between the producer and the market. Food wastage includes both terms as alluded to by Stancu, Haugaard and Lahteenmaki (2015) as well as Stuart (2009). Broader definitions of food wastage are outlined in Chapter Two. Here, statistics show that humanity all over the world has neither a workable surplus food strategy nor a moral will to promote ethical food handling approaches to curb food wastage, as observed by authors like McCain (2018), Page and Pande (2018) and Hoballah and Averous (2015).

According to Page and Pande (2018) and Stuart (2009), food waste is regarded as one of the vital elements contributing to food insecurity, as well as to different socio-economic and environmental sustainability issues. It is also problematic for ecological, climatic and various other reasons, including loss of potentially valuable food sources and shrinking of natural resources (Matinise et al., 2018; Oelofse, 2015). Food waste also contributes significantly to greenhouse gas emissions, in

addition to many other environmental impacts such as increased water eutrophication, as highlighted by Katajajuuri, Silvennoinen, Hartikainen, Heikkilä and Reinikainen (2014: 327). South Africa (SA) is estimated to lose 10.3 million tons a year of edible food earmarked for human consumption, and this is comparable to 34% of local food production, according to a food waste prevention and management guide by the Department of Environment, Forestry and Fisheries (DEFF) and the Council for Scientific and Industrial Research (CSIR, 2021).

Since SA is a net exporter of food, the losses and waste, according to Pheto (2021), may be equivalent to 45% of the available food supply in the country, and it is unsustainable. Drawing from the General Household Survey conducted by Statistics South Africa in 2017, “the reality is that South Africa is neither food secure at a household nor at a national level”, according to Morifi (2021: 1). This survey reveals that during the year under review, 6.8 million people experienced hunger and 10.4 million people had inadequate access to food. In this study then, an attempt is made to sway the household food waste discourse locally, to drive a narrative, based on the principles and values of Ubuntu<sup>1</sup> and to sketch outlines of the food wastage in Wallacedene – a settlement in Kraaifontein, located in the northern suburbs of Cape Town (CT) in SA. This is done through assessing food wastage in the area, examining people’s actions and behaviours, and in part evaluating the dimensions and nature of food items discarded, together with the normality, results and possible solutions to food wastage. Hence, this research demonstrates the exorbitant amounts of food produced globally and that is not used for human nutrition. This is also experienced across SSA and in poor areas similar to Wallacedene in CT. In my opinion, this behaviour is completely against true humanity; it is not Ubuntu or Botho.

## **1.2 BACKGROUND TO THE CASE STUDY**

According to Alvesson and Deetz (2000: 147), a researcher cannot take for granted the area situation and research context, which calls for careful listening to subjects, in interviews as well as in everyday life talk and action. Thus, in the following section, the chapter outlines the area and research setting, the founding history of Wallacedene and its ground-breaking Western Cape High Court (WCHC) decision 6826/99 of the Grootboom case that changed the future of spatial planning in the region and

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<sup>1</sup> Ubuntu (Botho) in this study is understood and defined from the author’s family background and oral history: it is explained as indigenous-traditional and the historical African ways of living as exercised in the pre-slavery and pre-colonial era. Such cultural life principles are founded in the spirit of humanity, of prioritising others and the wider community for the greater good of society and nature.

the country (Davis, 1999). In addition, Figure 1 displays the geographical location of Wallacedene. Population demographics and related socio-economic characteristics and information on the study area are also presented through sources including, Statistics SA (Stats SA, 2011), the City of Cape Town (CCT, 2017), the University of Stellenbosch (US, 2015), and City Population (2011).

### 1.2.1 Wallacedene area setting

Wallacedene started in the spirit of Ubuntu as an informal housing settlement located at the north-eastern suburb of Cape Town. Groups of homeless people came and settled communally, as the very first informal inhabitants, at an abandoned Kraaifontein farm, Uitkyk, and gradually established themselves as a community (US, 2015: 12). During the late 1980s, the relaxation of pass laws allowed rural populations to migrate more readily to urban centres. I have vast personal experience in the region as I lived in several areas very close to the location and its surrounds since 1998, including Brackenfell, Scottsdene, Scottsville, and De Novo. By 2004, Wallacedene had an estimated population of 21,000 people, most of whom lived in tin-shacks and other makeshift structures, were unemployed and impoverished, and numerous others were homeless (Stats SA, 2011). Many people continued to migrate to urban settlements of CT like Wallacedene, from rural and farming areas and former Bantustans (Muzondo, Barry, Dewar and Whittal, 2004). Wallacedene is located about 14 kilometres from Bellville, the nearest town (Google Maps, 2021). It occupies a locality radius of 0.60 km<sup>2</sup> land space and is situated 30 kilometres in the north-east periphery of CT, adjacent the Old Paarl Road and N1 route-north (City Population, 2011).

#### 1.2.1.1 Geographical location of Wallacedene

**Figure 1: Wallacedene – geographical location**



Source: Google Maps (2021)

### ***1.2.1.2 Founding of Wallacedene***

On 17 December 1999 the Western Cape High Court (WCHC) case number 6826/99, ‘The Grootboom Case’, became a landmark case in SA on land occupations and government services to landless squatters. The housing rights activist Irene Grootboom and other Wallacedene residents disputed a City of Cape Town (CCT) eviction order. The matter was contested, and the Constitutional Court ruled in 2000 that residents could not be evicted without being offered alternative accommodation (Joubert, 2008). This case was highly significant regarding eviction matters in SA. According to Davis (1999: 1), the CCT and others were ordered “to provide adequate and sufficient nutrition, shelter, health and care services and social services to all of the applicants and children”, instead of enforcing an eviction. Muzondo et al. (2004) demonstrate how the community was sprouting to consist of more people with a wider and endless spread of land occupations. A University of Stellenbosch study on the Transitional Relocation Area (TRA) confirms this assertion that the expansion of land grab activities continued to no end (US, 2015). Even today, with deteriorating socio-economic conditions, the growing unemployment in SA deepens, homelessness grows and more poor people choose ‘illegal’ land invasions instead of renting backyard rooms. This is illustrated in Figure 2 below, which is a 16 July 2020 picture from a *Times Live* article (Hyman, 2020).

**Figure 2: Wallacedene – 2020 land invasions**



Source: Hyman (2020)

### ***1.2.1.3 Wallacedene area population demographics***

The gender composition of the community of Kraaifontein is reported by City Population (2011) as a 50/50 split between female and male. Statistics SA (2011) indicates that during 2004 Wallacedene had an estimated population of 21,000 people, the majority of whom were Black, followed by Coloured people. According to the TRA (US, 2015: 12) the area accommodated 36,583 people, comprising over 10,000 households. The official average household size at the time was said to be 3.5 people (Statistics SA, 2011). The contention by the CCT, according to Zweig (2017) put the figure around four to five people per unit. On the other hand, random dwelling visits conducted during 2015/6 suggested more household densities of around 6 to 8 persons per household (US, 2015). In this regard, Zweig (2017) also posits that this has serious effects on the delivery of basic services like toilets, water and waste collection.

Furthermore, acrimony between the CCT and residents of Wallacedene, under the leadership of the SA National Civic Organisation (SANCO) over the 1990's low-cost housing delivery, brings "a legacy that calls for restoration to normal the tenuous relationship Wallacedene has with the City today, asserts Zweig (2017: 3). This hostile legacy lingers, reports Hyman (2020: 1), "as invaders recently destroyed playgrounds to make space for homes" at Matobyele and Gumede Streets; and this was among numerous land grabs in the area and across the CCT. Residents raised issues of hunger, poverty, homelessness, food insecurity and crime, while they regularly protest over lack of community wellness and service delivery, and that the CCT does not maintain cleanliness of public open spaces that end up becoming dumping sites.

Hyman (2020) further reports that a CCT official downplayed concerns around joblessness, hunger, poverty, hygiene and related issues impacting the local community's wellbeing such as crime and indicated that in the end, "what determines whether a park will deteriorate or flourish is how the community values and utilises the park". This official also stated that as a local municipality, the city "acknowledges the need for housing, but we cannot sacrifice the few recreational spaces available". This then resulted in illegal land grabs and a spread of squatter areas (Hyman, 2020).

#### ***1.2.1.4 Socio-economic conditions in Wallacedene***

The motivation for using this area as a case study was driven by existing and widespread poverty, crime, high unemployment, school drop-outs, and non-school going children. This study may help heal fragile CCT links with residents of Wallacedene, while also eradicating certain social ills. Gustavsson, Cederberg, Sonesson, Van Otterdijk and Meybeck (2011) maintain that food waste assessments of this nature are crucial, particularly for areas where people live at lower ends of the formal economy. The target population in this study were farm workers, domestic workers, general cleaners, supermarket tellers, informal traders (e.g., in clothing), taxi marshals, car washers, etc. Some residents are also semi-formal business owners, e.g., taxi owners, restaurateurs, tavern/shebeen owners, and motor mechanics. Some community members are active in non-governmental organisations (NGOs), civic groups, early childhood and youth development, sports and cultural programmes, churches, and other sectors (Love, Da Silva, Olson, Fry and Clay, 2017). As a resident of the northern suburbs, I can confirm that the area has all the above groupings amongst its residents as well as a network of the underworld and criminal gangs.

Personal observations of the area show growing signs of negligent food handling, with tendencies of food wastage rising throughout the community, especially in dumping sites and public open spaces. Therefore, it was important that an assessment of household food waste, food wastage patterns and people's behaviour towards food is conducted in the Wallacedene area. A study of this nature may be useful to find ways for the area residents to curb food wastage, thus contributing to poverty reduction, food availability and nutrition security. This can assist the United Nations Sustainable Development Goals (SDGs) target 12.3 of Agenda 2030, to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses (UN, 2015).

### **1.3 PROBLEM STATEMENT AND RESEARCH PURPOSE**

#### **1.3.1 Problem statement**

Close to a billion inhabitants around the world do not have enough food to lead a healthy active life and over three-quarters of a billion members of humanity are living below the international poverty line, which is said to be less than US\$1, 90 per person per day (Page and Pande, 2018). It is estimated that more than 60% of the almost one billion people who are malnourished in the world are in Asia

(FAO et al., 2020). Yet, even though that is the case, in recent decades various well-placed sources indicate a global increase in undernourishment and more hunger appears to have incrementally taken place in sub-Saharan Africa (Parfitt, Barthel and McNaughton, 2010). According to The State of Food Security and Nutrition in the World (UN, 2018) report, evidence continues to show that the number of hungry people in the world is increasing, reaching 821 million in 2017, or one in every nine people. The report also shows little progress being made in addressing the multiple forms of malnutrition, ranging from child stunting to adult obesity as well as that hunger has been on the rise over the period 2015–2017.

Meanwhile, large quantities of food produced are lost along the food production and distribution chains, and are wasted across consumer and household circles (Lee, Sönmez, Gómez and Fan, 2017). According to the FAO (2019), all-inclusive, communities of industrialised countries waste practically 222 million tons of food per year – almost the complete annual net food production of SSA, which is 230 million tons (FAO, 2019). One crucial ethical dimension, as asserted by Williams, Wikstrom, Otterbring, Lofgren and Gustafsson (2012: 141), shows that a large part of the world’s population is starving. It is reflected in the United Nations Sustainable Development Goals (UN, 2015) that gradually, humanity broadly is now awakening to the reality of nature’s finite endowments on earth (Hoballah and Averous, 2015; UN, 2015). As the world grows in acknowledging the harmful upward trends in food wastage and as the discourse spreads widely, food supply and food value chain activities must therefore be aligned with the crafting of food systems and government policies as recommended by Love et al. (2017), Thyberg and Tonjes (2016), and Parfitt et al. (2010).

In SA, the Council for Scientific and Industrial Research (CSIR) estimates food waste of edible and inedible food generated locally to be 12.6 million tons per year (Nahman and De Lange, 2013). Consequently, SDG 12.3 is an admirable global framework that sees humanity commit to halving per capita global food waste along with all food value chain (FVC) activities by 2030 (Hoballah and Averous, 2015: 1). Such a global initiative can only be made practical when grassroots communities are galvanised, especially high-density urban sprawls like Wallacedene, with overpopulation, urban poverty, and other societal ills (Frayne, Battersby-Lennard, Fincham and Haysom, 2009). It is particularly crucial in SA in light of the massive racial-economic inequality.

Problems of food waste and food loss are vastly regarded as adding to elements of food poverty and food insecurity in SA (Oelofse, 2015; 2019). Globally, this is underscored by EU Fusions (2019), McCain (2018) and UN (2018) inter alia. Such phenomena project wider socio-economic, climatic, environmental, and even political challenges today. Hoballah and Averous (2015), Gustavsson et al. (2011), Stuart (2009: 7) assert that the reduction in food waste behaviour patterns and practices, through the recovery and recycling of food – including food waste education and spreading information – will fill a general void in most societies and improve wellbeing. This embraces all nations, both in less developed and prosperous economies. Throughout the food value chain, democratic SA has not attached much value to the amounts of discarded food items and lawmakers assume a snail's pace on food waste policy formulation and legislation (Oelofse, 2015).

Stancu et al. (2015: 7) contend that, on average, household-level food wastage among industrialised nations does not set a good global example, as it characterises over half of food items, particularly in the United States (US) and all over Europe. Stuart (2009) raised this concern over a decade ago. Parfitt et al. (2010) argue that there is a dearth of food wastage data, specifically in non-affluent economies. These authors concur that over decades it is clear that humanity indeed does waste food, hence the worldwide subject research. Evidence of this can be found, post-World War II, as Parfitt et al. (2010: 3066) confirm, that when the United Nations (UN) Food and Agriculture Organization (FAO) was established in 1945, reduction of food loss was within its mandate. Studies also indicate that by 1974, the initial World Food Conference recognised a 15% reduction of post-harvest losses as a crucial part of the solution in addressing world hunger.

### **1.3.2 Purpose of the study**

The latest data indicators measured since 2014 on global demographics, food consumption, and undernourishment show that the number of hungry people across the world continues to rise (FAO, IFAD, UNICEF, WFP, and WHO, 2020). In SA, 12 million people do not know where their next meal will come from (Oelofse, 2015). At the same time, several contemporary studies identify food waste as a global challenge that has a major negative impact on poverty reduction and addressing food insecurity, particularly with climate change and plagues like COVID-19 that worsen and “negatively affect poor people’s quality of diet and make healthy diets less accessible”, as alluded to by the FAO et al. (2020: 64).

In another CSIR estimate, only 13 out of 284 SA municipalities have some form of data on food waste, says Oelofse (2019: 9). Moreover, this CSIR “Waste for Development” data reveals that national food waste estimates for 2012 and 2013 point to the fact that whatever little data documented at the time may be valuable, but outdated (ibid., 2019: 9). Hence, as part of its foundation theme, this study adopts the principle of Ubuntu or Botho in SeSotho, to assess household food wastage in a small impoverished, yet high-density area. It assesses patterns of food wastage concerning residents’ behaviour and the types of food items discarded. Also, it looks at the behaviour of participants towards their own as well as their neighbourhood food wastage, and in part, the regularity, outcomes, and possible solutions to the problem of food wastage.

## **1.4 STUDY OBJECTIVES AND RESEARCH QUESTIONS**

### **1.4.1 Study objectives**

The objectives of the study are as follows:

- to analyse household food wastage in Wallacedene;
- to determine household food waste patterns within Wallacedene;
- to assess people’s behaviour towards household food wastage in Wallacedene;
- to formulate recommendations to reduce household food wastage to improve food and nutrition security in Wallacedene.

### **1.4.2 Research questions**

The study attempts to answer the following research questions:

- Are residents in Wallacedene wasting household food?
- What types of food items are wasted by residents of Wallacedene?
- How regularly do residents of Wallacedene waste food?
- What do residents do with unused or unconsumed food?
- How do residents of Wallacedene feel when they waste food?

## **1.5 SIGNIFICANCE OF THE STUDY**

This research is driven by the spirit of Ubuntu and its inclination is more affixed towards SDG target 12.3 (UN, 2015) that aims to halve global food waste and loss. While it may be too aspiring, SDG target 12.3 is possible to achieve in poverty-stricken areas such as Wallacedene and surrounding poor

settlements of the CCT, and indeed throughout SA and SSA. In its idea of departure, is a view of widespread food waste in many areas, including impoverished community settlements where people live under comparable conditions like Wallacedene, as outlined earlier in this chapter and also confirmed in numerous studies. For example, a World Wide Fund for Nature (WWF) study conducted in Rustenburg, North West province of SA, found that as a percentage of the total weight of domestic waste collected at various households, the extent of food waste was 27% in low-income areas, 13% in middle-income areas, and 17% in high-income areas (*Farmer's Weekly*, 2017).

This case study thus resolutely implants a novelty in the area history, in the public domain, and across the locality, about an inclusive/communal, emotional, and behavioural analysis of food wastage and possible solutions from the views of locals. Beyond tangible items, Ubuntu highly promotes behavioural modelling and the sharing of values, interests, experiences, and even feelings (Metz, 2011; Metz and Gaie, 2010). This study therefore serves to recognise community actions, and possibly instil, at least from the vantage point of respondents, the necessary education and awareness training on food waste. As sections of Wallacedene reflect real food waste incidences, as seen in municipal solid waste across most big cities in the Southern African Development Community (SADC) region (Dladla, Machete and Shale, 2016), sustainable food-handling behaviour can indeed be realised, if residents can be brought back to Ubuntu methods of food handling.

## **1.6 DELIMITATION OF THE STUDY**

Food waste is a worldwide phenomenon and available data shows it is on the rise in SSA, in SADC, and also in SA and across all the country's provinces, including the Western Cape Province (Dladla et al., 2016; Oelofse, 2015, 2019). The 2016 Community Survey, a research study done by Small (2017), indicates that Cape Town in particular, is home to over 1,264,849 households and these are sparsely located in a 2,461 km<sup>2</sup> space (CCT, 2017). Before land invasions associated with COVID-19, the metro of CT had over 437 pockets of informal areas or settlements comprising hundreds of thousands of informal households and millions of residents who are mainly poor people (Ndifuna Ukwazi et al., 2018).

Wallacedene is an area of CT in Kraaifontein which, over ten years ago, consisted of more than 146,000 households (City Population, 2011). Some of the participants in this study are land activists,

with a few in active land-grab leadership activities, which confirms the continued sprouting of the area as they were often on the move, in constant land tussles with the CCT law enforcement during the study's research interviews. Due to limited capacity, more households of Wallacedene could not be included, especially the latest informal residential developments. Although delays were experienced because of land grab activities in 2021, they did not hamper the study.

The limitations did not prove insurmountable, and the study was able to make a concerted effort to collect useful, rich, and varied data. This includes conducting fieldwork under strict COVID-19 health regulations, as outlined in Chapter Three.

## 1.7 STRUCTURE OF THESIS

**Chapter 1 – Introduction:** This chapter contains the introduction and background to the case study area, as well as the problem statement, study purpose, objectives, and research questions. This includes demographics and socio-economic conditions that presented compelling reasons why the area was chosen. In addition, the chapter highlights the significance of the study and presents research limitations, including COVID-19 protocols, and also provides the thesis structure.

**Chapter 2 – Literature review:** This chapter presents definitions and the meaning of food wastage, as well as a review of a wide range of contemporary and relevant literature on food wastage, to allow for a foregrounding and a proper understanding of the study topic. The chapter examines and discusses national legislative and policy regulations with core relevance to the food wastage under scrutiny, using the 1996 South African Constitution and Bill of Rights as the basis for departure. This is followed by inspecting salient points in key universal guidelines on food systems from global bodies and their affiliates, based mainly on the working arms of the UN as the foundation. An overview of significant discussion areas is then also presented from a local as well as a cross-border context.

**Chapter 3 – Theoretical framework:** This chapter outlines the structural underpinnings of the theoretical framework in this study. The discussion details the theory of planned behaviour and maintains the framework with the grounded theory to dissect and relate both theories' significance to food wastage. This is done together with a logical discussion on how the chosen two triangulated

theories create a conceptual base and have relevance to influence, guide and thereby anchor the case study.

**Chapter 4 – Research methodology:** In this chapter, the presentation of the research methodology and design of the field study activities as well as a detailed discussion of the sampling procedure, serve to draw the study's empirical data events towards the aims and objectives of the research. Moreover, this area also addresses data collection and the data analysis process, to empower the research to adequately answer the research questions. Together with the highlighted elements of the study, the validity and reliability of the process are also included in this chapter. It then discusses the ethical considerations that serve to protect and show respect to the research process and its participants. In conclusion, the chapter outlines the research limitations experienced by the researcher.

**Chapter 5 – Data presentation and discussion of the findings:** This chapter encompasses the presentation of the themes and sub-themes that emerged from the data analysis, as well as the interpretation of the results of the empirical study. Participants' answers are used to unearth area food waste results and information is discharged through a foundation of local demographics, charts, and narrations. Various participant opinions and ideas from the ground are then sourced and delivered on the research issue and how to curb food waste. Thereafter, the chapter presents a discussion of the data findings, followed by a chapter summary to contextualise the presented data.

**Chapter 6 – Conclusion and recommendations:** This chapter presents the conclusion of the study. It provides a summary of the findings and outlines recommendations based on the findings of the study. Thereafter, a concluding summary closes the research report.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 INTRODUCTION

This chapter discusses and interrogates different global and local perspectives and views in the literature on food waste, starting with a synopsis and the clarification of concepts. The literature reviewed on food waste relates to human nutrition, the environment, natural resources and the economy, issues of food sustainability and food handling culture as well as human behaviour and local-foreign food waste implications. Also, the chapter presents limitations to the South African legal stature on the food waste challenge plus various policy guidelines and legislation pertaining to food waste locally and abroad.

#### 2.1.1 Definitions – food loss and food waste

The Economic Research Service (ERS) of United States of America's Department of Agriculture (USDA) says food waste is a specific category of food loss, defined as food discarded by retailers due to colour or appearance and plate waste by consumers (Thyberg and Tonjes, 2016). Food waste includes the half-eaten meal left on the plate at a restaurant, food scraps from preparing a meal at home and the sour milk a family pours down the drain, says Buzby, Farah-Wells, and Hyman (2014). According to Parfitt, Barthel and McNaughton (2010), food waste is wholesome edible material intended for human consumption, arising at any point in the food supply chain that is instead discarded, lost, degraded or consumed by pests. Stuart (2009) also incorporates to this definition of food waste any edible material that is intentionally fed to animals or any by-product of food processing diverted away from the human food chain.

Papargyropoulou, Lozano, Steinberger, Wright and bin Ujang (2014: 108), draw from Smil (2004) on the above definitions but add that food waste is, "over-nutrition, the gap between the energy value of consumed food per capita and the energy value of food needed per capita". In general, there are two main kinds of wasted food, namely, food loss and food waste (Thyberg and Tonjes, 2016). Food loss, they argue, is the bigger category, and incorporates any edible food that goes uneaten at any stage added to food not eaten in homes and stores. This includes crops left in the field, food that spoils in transportation, and all other food that does not make it to a store. Some amount of food is lost at nearly every stage of food production (ibid., 2016). As stated early in chapter one, food waste in this

study describes the discarding or alternative (non-food) use of food that is safe and nutritious for human consumption. It also refers to any food that is lost in the supply chain between the producer and the market. Food wastage includes both terms.

## **2.2 OVERVIEW OF FOOD WASTE**

### **2.2.1 Synopsis of food waste**

Food waste is regarded as one of the vital elements contributing to food insecurity (Page and Pande, 2018). Moreover, as indicated earlier, added to different socio-economic and environmental sustainability issues, food waste is also problematic for ecological, climatic and various other reasons like loss of potentially valuable food sources and shrinking of natural resources (Matinise et al., 2018; Oelofse, 2015). Globally, there is a sizable body of work presenting vast empirical data on food wastage, however, almost all of it centres on the developed nations (FAO, 2019). Included here is research piloted at different food pyramid levels, hence the drive for further local examination of household food waste is widely alluded to, as stated by Porpino (2016). Also, because food is treated as a disposable commodity with 30% to 50% of food wasted globally and SA averaging 31.4% from its magnitude of annual production (Oelofse, 2015). The wasted food production in SA equals 10.4 million tons with food imports, minus export produce, Oelofse asserts further.

On a farm to fork scale across the food pyramid i.e., from production and manufacturing to all processing, wholesale and retail activities, down to household and consumer levels, the big sustainability effects of food wastage are visible, such as towards natural resources like water, the environment and to food security (EU Fusions, 2019; McCain, 2018; Oelofse, 2015). In particular, food waste affects poor people globally as well as citizens here in SA, including poor residents in Cape Town (CT) as analysed by Battersby and Peyton (2014) and Battersby (2011). The focus is on surplus food recovery through values of Ubuntu (Botho in SeSotho), in accordance with the SDGs (UN, 2015) and South Africa's National Development Plan (NPC, 2013). This is also in line with the original post-World War II mandate of the Food and Agriculture Organization (FAO) when the United Nations was formed in 1945 (Parfitt et al., 2010: 3066). The primary concern for world leaders of the time was not only preventing future world wars, but also to inspire a justifiable and ecological world food systems programme through “sustainable agriculture and food development that is a long-term strategy for food production and food security” (Getachew, 2003: 8).

### **2.2.2 Food waste as a sustainability issue**

The historical absence of a global sustainability framework or guideline on wastage of resources has made it difficult to conceptualise the environmental benefits from prevention of avoidable food waste (Stancu et al., 2015: 225). For very long this void remains harmful to wide spectra of life spheres such as socio-economic wellbeing and sustainable food systems (Nahman and De Lange, 2013). Without some universal standard to curb food waste, it will lead to the continued inefficient use of natural resources and unlimited amounts of greenhouse gas emissions, together with increased global hunger (Thyberg and Tonjes, 2016). According to Oelofse (2015), almost one in seven people globally are estimated to be undernourished while in South Africa, Battersby (2011) shows how needy Cape Town (CT) informal areas are hunger exposed and deprived.

Further, Oelofse (2015) and the DEFF and CSIR (2021) assert that the country loses an equivalent of about 22% of all crop production water from food waste, which essentially limits the agricultural sector. In addition, Oelofse (2015) and the DEFF and CSIR (2021) argue that while SA is the 30th driest country globally with 30% crop production and 90% fruit, vegetables and wine produced under irrigation, the country uses 62% of available water for irrigation purposes. Oelofse also states that SA's water footprint of crop production indicates around 45,000 million m<sup>3</sup> water, of which 6,000 million m<sup>3</sup> and about 3,000 m<sup>3</sup> is blue (kitchen) water and grey (bathroom) water respectively. In the process, food waste is measured to account for an estimated 13,000 m<sup>3</sup> of water loss, according to Oelofse (2015). Food waste also results in multiple ecological, climatic and other challenges, including substantial greenhouse gas emissions, shrinking of natural resources and water eutrophication, as stated earlier (Katajajuuri et al., 2014; Matinise et al., 2018).

#### ***2.2.2.1 Sustainability initiatives to curb food waste***

Food waste is intricate, in that beyond its direct impact on human livelihood, it has far-reaching social, economic, environmental and climatic dimensions and implications (Gustavsson et al., 2011; Thyberg and Tonjes, 2016). Thus, in 2000, the United Nations Millennium Declaration (UNMD) set a bold initiative towards its fight (UN, 2000). The initiative however, was lacking in support and did not achieve much results. That was until an extraordinary UN General Assembly session was held in

2015 with participation from civil society, where 193-member states agreed on the outcome document meant to constitute the global agenda for a new sustainable development path (UN, 2015).

In this assembly, the universal family of humanity approved an ambitious agenda that endorsed 17 new Sustainable Development Goals (SDGs) (UN, 2015). The SDG's aim is to end poverty by 2030, promote prosperity and wellbeing of all people, while protecting the environment. Hoballah and Averous (2015: 1) state that in its focus contribution, Goal 12 aims to bring about sustainable consumption and production patterns and it includes among its objectives, to halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains by 2030. Beyond natural resource sustainability issues, food waste has thus been additionally identified as an important theme, particularly concerning food security, poverty reduction and the livelihoods agenda throughout the world, across nations and community development platforms (Matinise et al., 2018; Oelofse, 2015; Stancu et al., 2015). The ultimate aim is curbing the over-use of natural resources, in order to do more and better with less (UN, 2015). In particular, the ideal is to cultivate and produce enough food for today and for future generations, likely to be nine billion by 2050 (Parfitt et al., 2010: 3065). The UN (2018) indicates that more than 11% of the present world population is living in extreme deprivation. Among these, as noted, are households and communities struggling to fulfil their most basic needs like nutrition, health, education, and who lack access to water and sanitation, inter alia. This SDG and its focus on sustainable consumption thus aims at a better quality of life with the enhancement of resources and efficiency in energy use and sustainable infrastructure, as well as environmental and climatic improvement (UN, 2015).

#### ***2.2.2.2 Sustainable livelihood in society and food waste***

Human and societal wellbeing are primary foundation pillars of sustainability. Both are linked to the environment and the economy, which in turn rely on human labour. The Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD), United Nations Children's Fund (UNICEF), World Food Programme (WFP) and World Health Organization (WHO) (2018) calculate that US\$3.2 billion is needed per year to reach all 66 million hungry school-age children, while 40% of food produced globally is wasted. On average, the annual value of food thrown out by a US family is estimated to be \$1,600.00 according to the World Resources Institute (WRI, 2019). The FAO et al. (2018) estimate that over 66% of almost one billion people who are

malnourished in the world are in Asia, yet even though that is the case, these well-placed sources also lately attest to increases in undernourishment and hunger appears to have worsened in sub-Saharan Africa (SSA). Many poor communities go hungry on a daily basis globally (Page and Pande, 2018). These levels of poverty and hunger are spread across Asia, Africa and elsewhere, as studies show that even in SA it is rampant, as stated by Frayne et al. (2009). CT in particular is also not immune to this dearth of food security, according to Battersby (2011). On the other hand, Parfitt et al. (2010) posit that consumption habits are largely noted to influence a rise in food waste and Oelofse (2015) asserts that this is especially so in urban SA.

According to Parfitt et al. (2010: 3067), in 2010 about 50% of people globally were located in urban environments, and this figure was projected to rise to 70% by 2050; the ongoing decline in labour in agriculture bears testimony to this trend. It is then vital at this point to improve resource efficiency in the food supply chain and consumption, as advised by Katajajuuri et al. (2014: 322). It is also advisable in light of the added and continued human population increases and rising numbers of settlements and households in various urban settings (Page and Pande, 2018). Undeniably, the adage of measuring in order to manage holds very true indeed, as some multilateral institutions have proposed a global accounting and reporting standard to quantify food wastage across all continents (EU Fusions, 2019; FAO et al. 2018).

As the world exposes the detrimental upward trajectory of food waste to society, to livelihoods, the environment and nature, all food supply and entire value chain activities must therefore be aligned with the crafting of policy (FAO et al., 2020; Love et al., 2017; Thyberg and Tonjes, 2016). Locally in SA, the cost of food waste to society is similar to most European countries, as South African food value chain market prices determine the food waste costs (Oelofse, 2015). This figure in SA is R61.5 billion, which equates to 21% of the gross domestic product (GDP) and does not include food waste disposal costs. Instead, Oelofse (2015) asserts that it covers the South African food value chain costs of various commodities from agricultural production through various stages to consumption. This is utterly unsustainable and certainly has long-term impacts on resources and climate change.

### ***2.2.2.3 Economic sustainability and the environment***

Sustainability of any economy is underpinned by the health of both the environment and its society. As a result, Papargyropoulou et al. (2014: 109) highlight that when allowing for economic implications of food waste, and in order to achieve substantial real monetary or financial cost savings, the sustainability of the environment should be prioritised. When looking across the food supply chain and at the household level primarily, the elimination of avoidable food waste and the reduction of its unavoidable component, directly impact the final waste disposal expenses which are borne predominantly by the environment (Stancu et al., 2015). A good example is the cost of landfills to environmental health, nature and global conditions causing climate change.

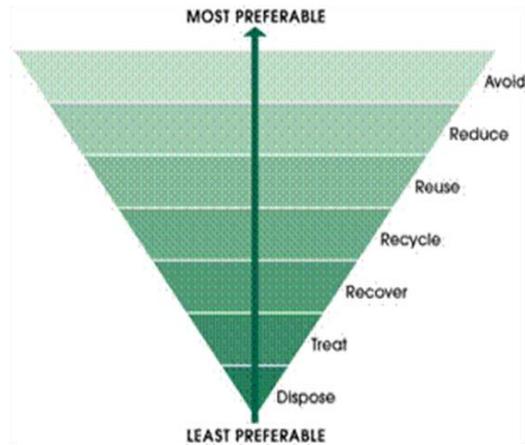
### ***2.2.2.4 Methods of food waste disposal and sustainable livelihoods***

Among the wider detrimental effects of discarding food waste in landfills is the methane and carbon-dioxide produced from natural food decay processes, resulting in more atmospheric heat containment and thus global warming (Matinise et al., 2018). Furthermore, food production has a broader negative environmental impact from greenhouse gas (GHG) emissions, starting from farm undertakings of plant and animal production to transport, storage, distribution and retail activities (Papargyropoulou et al., 2014; Stancu et al., 2015). All outcomes impact sustainable livelihoods.

In fact, the list of climatic damages from food waste is growing exponentially and recently includes human health. In a Southern Sweden study for example, an assessment of potentials and environmental impacts attached to household food wastage was conducted by Schott and Andersson (2015: 219), who sorted through waste composition to run an analysis of many avoidable and unavoidable disposed food items. The scrutiny reveals that waste in general is presently either incinerated or biodegraded (anaerobic digestion) and they propose the use of these methods only for unavoidable food waste, and to fully curb avoidable food waste.

A life-cycle food waste handling framework comparable or similar to Figure 3 below, was assumed by Schott and Andersson (2015) in the Southern Sweden study. This framework suggests that food waste ought to be treated naturally, in line with South Australia's Waste Strategy, as outlined below in Figure 3 when it comes to the most preferable to the least preferable waste handling methods.

**Figure 3: Preferable waste handling framework (waste hierarchy)**



Source: South Australia's Waste Strategy 2015–2020 (EPA, 2010).

The Southern Sweden study area is set primarily at household level since food waste is generated, and is said to represent about half of the total food waste in high income countries (Stancu et al., 2015: 8). Equally, Katajajuuri et al. (2014: 324) posit that the economic value of household food waste under normal circumstances is measured on country level, or through area-specific retail prices for food products. Both Stancu et al. (2015) and Katajajuuri et al. (2014) highlight however, that little cost-benefit data analysis is available globally for numerating the true value of economic production to the environment and nature.

In SA for example, the National Waste Management Strategy (NWMS) (DEFF, 2020: 11) indicates that the 2018 State of Waste Report reveals that during 2017 South Africa generated 55 million tons of general waste, with only 11% being diverted from landfill. The FAO estimates that an average South African consumer throws away between 6 to 11 kilograms of food each year, while overall per capita food loss in sub-Saharan Africa (SSA) is on a consistent rise (Morifi, 2021). Statistics give no waste reuse model and no figures on production-consumption to the cost on the environment. Surely, this behaviour contradicts both the Southern Sweden study of Schott and Andersson (2015) and the adaptive framework outlined by Papargyropoulou et al. (2014: 108-110) for the prevention of avoidable food wastage and the management of non-avoidable food wastage. In the latter case, there

is a five-step life-cycle model to deal with waste, from: (a) prevention; (b) re-use; (c) recycle; (d) recover; and (e) disposal, when compared to the seven-step Australian pattern, as shown in Figure 3.

The Schott and Andersson (2015: 219) food waste management framework on the other hand, denotes an appropriate life-cycle allied model, a model that is far-reaching and undeniably a more viable and desired waste handling model. A hypothetical contrast is tested in this study by Schott and Andersson (2015), between using the outlined existing waste treatment methods of incineration and anaerobic digestion to treat unavoidable food waste, and an imaginary scenario of households generating zero avoidable food waste. This is done with limits only to the scrutiny of global warming potential (GWP) i.e., study delineation. Outcomes from Schott and Andersson's (2015) research that considers household waste composition, show that about 35% of food waste can be avoided. In addition, this can be done with a drastically rigid lessening that can bring down greenhouse gas emissions of 800–1,400 kilogram per ton of avoidable food waste. In piloting the study, it was found that the GWP can be extremely reduced even beyond both foremost food waste treatment methods combined, which are incineration and anaerobic digestion (Schott and Andersson, 2015: 219).

The priority for humanity across the world is to eliminate avoidable food waste, properly recycle unavoidable food waste and to work on other environmental detriments associated with various types of excess food and surplus nutrition, in order to create sustainable livelihoods through preferable food waste solutions (Schott and Anderson 2015). This view is anchored and clearly displayed in Figure 3 – South Australia's Waste Strategy (2015–2020), that complements Australia's original 2010 Waste to Resources Environmental Protection Policy (EPA, 2010). In line with other subject opinion, the model's emphasis is on the impact of food waste to household food security plus the ecological, socio-economic, climatic and value implications of this adverse cross-border food loss pandemic.

Parfitt et al. (2010: 3077) affirmed a few years ago, that when considering different global value systems of nations, there remains some indication that culture partly determines food wastage. Schott and Anderson (2015) together with Papargyropoulou et al. (2014) also include belief systems, morality and ethical dimensions to food waste. Stancu et al. (2015) in the Danish study as well as Katajajuuri et al. (2014) in the Finnish food waste assessments, add certain elements of communal

behavioural tendencies to food waste, which link to cultural values. This is exactly where the philosophy of Ubuntu/Botho comes into effect, particularly in the SSA and SADC regions.

### **2.2.3 Food waste and local water challenges**

According to Oelofse (2015), SA loses an equivalent of about 22% of all crop production water from food wastage annually, which limits the agricultural sector. Additionally, SA is a water scarce country and the 30th driest country globally, and for practically the entire vegetable stock, fruit and wine produced under irrigation, the country uses 62% of available water for irrigation. Further, Oelofse notes that SA uses around 45,000 million m<sup>3</sup> water for crop production, of which 6,000 million m<sup>3</sup> water is blue (kitchen) water and about 3,000 m<sup>3</sup> is grey (bathroom) water, and food waste accounts for an estimated 13,000 m<sup>3</sup> of water loss; and this demands a change in citizens' way of life (2015).

### **2.2.4 Household food waste and cultural dynamics**

Russell, Young, Unsworth and Robinson (2017: 108) remind us of the dearth in types and forms of data that accentuates the non-cognitive determinants of food waste behaviour, particularly at household level. Many researchers have proven that imperceptive domestic behaviour is largely clouded by a handful of variables like beliefs, habits, emotions and value systems in ways of life, and hence these are important drivers of action (Matinise et al., 2018; Russell et al., 2017). Further, Russell et al. (2017: 108) assert that no quantifiable data exists, scrutinising the relative importance of consumers' cultural and emotional determinants in the context of household food wastage.

Parfitt et al. (2010) also address the consumerism culture of food waste. Additionally, according to Metz and Gaie (2010), values of Eurocentric modernisation and the commercial culture of consumerism, utility and commodities have all steered human families to mass production intake and insatiable consumption, as presently entrenched and observed to have spread globally. This now is prevalent across regions of many Native peoples, including poor communities in SSA and SADC. This western outlook of life and its values compete with a suitably refined historical African intimate spirit of Ubuntu, and other lifestyles and systems of indigenous communities across the world, argue Metz and Gaie (2010: 273). Ubuntu as defined in this study, is from the researcher's isiZulu communal and family household indigenous-traditional background and the historical African ways of living, as exercised in the pre-slavery and colonial eras. Such cultural life principles are founded

in the spirit and philosophy of humanity, of prioritising others and the wider community for the greater good of society and nature. Hence the old age Nguni adage that says, ‘Umuntu nguMuntu ngaBantu’. Loosely, it translates to mean that no human being is an island, since one can only be, because of others.

The relationship between materialistic values, environmental awareness and sociable behaviour is thus a dichotomy clearly established in various studies, especially on ethics (Metz and Gaie, 2010; Richins, 2004). Materialism as a value, attaches importance to the pursuit of personal wealth and material possessions (Richins, 2004). From an indigenous perspective of Ubuntu and based on various ethnic researchers’ views, the foreign culture and values of mass production, economic development, financial wealth and the profit motive as introduced by settlers to the African continent, are at the core of global and local food waste, predominantly in urban food supply settings and commercial agricultural food systems. Parfitt et al. (2010: 3067) argue that urbanisation results in contraction of the agricultural sector, whereas natives historically lived subsistent lives within nature. Sadly, as world populations increase, particularly in urban areas of the Global South, humanity can expect more consumerism and increased waste generation, according to the World Bank (2016).

According to Stuart (2009), end-user food wastage tendencies are driven by utility instead of moral human conduct; this kind of decision-making thus has a sizable impact on contemporary food wastage. These and various unsustainable human behavioural outcomes are often stimulated through mass media and advertising (Williams et al., 2012). Honest correction of modern-day challenges mainly relating to food waste by some and food scarcity for others, as Metz and Gaie (2010: 277) declare, calls for a true indigenous approach that adopts ethical roots as prescribing actions and policies, in order to legislatively govern people’s moral behaviour at household level. Thus, original ways of life among numerous indigenous global communities and indeed native SADC clans and families, all reflect ethical and moral principles to espouse. This is a social consciousness, engendering the spirit of humanity in all circles of food supply, from production to consumption. Thus advocating a local African food systems model of handling food according to community needs and in harmony with all species, particularly within local surroundings (Metz and Gaie, 2010: 276).

From the above, it is clear how the wastage of human nourishment and the pollution of nature are harmful to environmental sustainability, while also causing emissions that impact on global warming, resulting in climate change. Evidently, in SA the added essence of food waste at household level is the resultant hunger, livelihood impact and waste of precious natural resources for society, especially poor communities in the poverty-stricken settlements of Cape Town, as indicated by Battersby and Peyton (2014) and Battersby (2011). For purposes of this study, Wallacedene and the surrounding informal households are included in these concerns. In the main, these challenges have become even more pronounced, particularly after the COVID-19 pandemic. This impact stretches across cultural, socio-economic and political lines as well as a variety of professions, and is growingly showing the strain on natural resources and even on social relations.

According to Katajajuuri et al. (2014: 327) vast resources are required to cultivate, produce, store and distribute food that is not consumed. These authors maintain that all these resources, such as land, fertilisers, fuel, materials, transportation, water and electricity, result in significant greenhouse gas emissions and also have other environmental impacts, such as increased water eutrophication. In this regard, Morifi (2021) highlights the critical role of all stakeholders in the food trade, together with households, in aligning initiatives to educate everyone about the prevention of food wastage, and for food manufacturers, alongside regulators in government, to calibrate consumer perceptions on expiration dates, including the disparity in the ‘sell-by’ and ‘best-before’ dates.

## **2.2.5 Income levels, infrastructure and food waste**

### ***2.2.5.1 Income levels and food waste***

In the developed economy of Finland, Katajajuuri et al. (2014) led a descriptive study of dwellings and licenced restaurants, measuring the bulk and contents of avoidable food waste, from farm to fork. It was discovered that household-generated food waste accounts for nearly 130 million kilograms annually i.e., 23 kilograms per capita. Licenced restaurants churned out about 18–20 million kilograms per year of food waste, in the form of fresh, nutritious yet perishable foodstuffs, largely leftovers from cooked foods and dining tables (Katajajuuri et al., 2014: 325). The authors reveal that if transfigured into greenhouse gas emissions, such food wastage equals 365 days of carbon dioxide emissions from roughly 100,000 combustion-engine cars of average make and model. Whereas, in

low-income areas, the World Wide Fund for Nature (WWF) illustrates that poor households may even be more complicit in the food waste plague, as reported in *Farmer's Weekly* (2017).

The WWF study in Rustenburg, North West province (SA), found that the weight of food waste as a percentage of the total weight of domestic waste collected at various households was 17% in high-income areas, 13% in middle-income areas and a massive 27% in low-income areas. Any middle- and low-income nation, with many millions of people in poverty-stricken households and ever rising unemployment, cannot have citizens afford to be wasting food, argue Frayne et al. (2009).

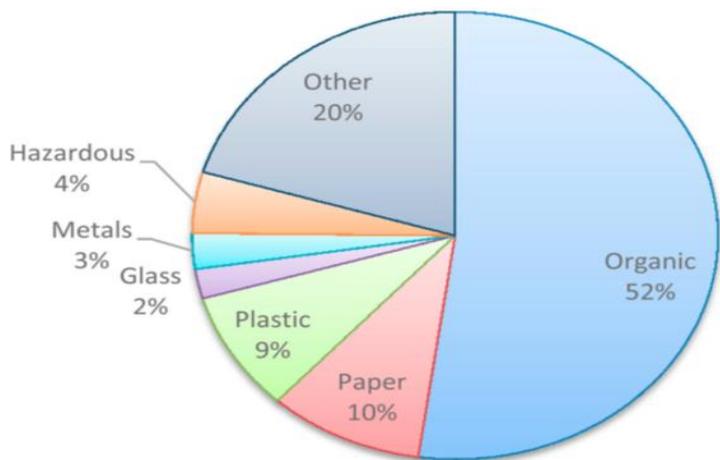
Conditions of poverty directly impact livelihoods, according to McCain (2018), particularly now with the advent of COVID-19 and its consequent lockdowns and economic meltdown, rising joblessness and an uncertain future. Human wellbeing is not only impacted locally, but across SADC and the SSA region as people are continuously on the brink of hunger and starvation (FAO et al., 2020; 2019; Frayne et al., 2009). In particular, the ever-growing urban communities are laced with significant numbers of poor households who lack financial revenue, especially those located in the informal settlements, where many are living in conditions of substantial food insecurity (Battersby, 2011; Battersby and Peyton, 2014; Nahman and De Lange, 2013; Oelofse, 2015). As regards food wastage in the SADC region, present household income and livelihood standards considered in relation to traditional African food values would be frowned upon by ancestors – according to Metz (2011) – as they leave much to be desired.

In SA, a recent National Waste Management Strategy (DEFF, 2020: 9) affirms that large quantities of organic waste are currently disposed at landfill sites. Such challenges to the food systems of the country and the region, are addressed in the PGWC Household Food and Nutrition Security Strategic Framework (WCG, 2016) on food governance, aimed at reducing organic waste at landfill sites. This framework addresses, in particular, food security, proper food handling awareness, food safety, sensitive food planning, and food resources management for the future, including use of land, water, energy, infrastructure and other resources.

To elucidate this view broadly, Dladla et al. (2016: 476) add that organic food waste is often found to be on top of the list in the material composition of municipal solid waste, ahead of paper and card,

plastic, metal, glass, textile and other biodegradable and non-biodegradable wastes, all which largely end up in landfill sites. Figure 4 below illustrates the study result and how organic waste constitutes a large proportion of general solid waste, in comparative percentage proportions.

**Figure 4: Nature of solid waste in comparative percentage proportions**



Source: Dladla et al. (2016: 476)

### **2.2.5.2 Infrastructure and food waste**

Contrary to Global North economies, diverse scales of food wastage in various locations of developing economies are largely tilted high in the commercial agricultural sector, predominantly during post-harvest stages, according to Russell et al. (2017) and Stancu et al. (2015). Global scholars, including Parfitt et al. (2010: 3067) ascribe such wastage to developing nations' individual capability as regards technology, bulk warehouses, storage facilities and amenities for modern cold-rooms and other services like packing-houses, food distribution services including transport and roads. All this pertains to unique levels of post-harvest food handling, processing, supply chain infrastructure and logistics such as transportation, warehousing and related amenities and services (Parfitt et al., 2010). According to Page and Pande (2018), the vast majority of the world's masses facing starvation live in developing countries with poor infrastructure, and this is where many among the populations are undernourished. Papargyropoulou et al. (2014: 108) estimate that variances of food loss and waste in developing economies across SSA together with South and Southeast Asia ordinarily produce 120-to-170-kilogram per capita food loss per year. SSA countries thus exhibit growing food wastage while the phenomenon accounts for about 26.8% of hungry people globally (FAO, 2019). In the SADC

region, added to infrastructure issues, studies show increases in urban food poverty, with 70% of poor households being food insecure (Frayne et al., 2009). In this regard, scholars such as Battersby and Peyton (2014) contend that the food systems pyramid is thus in dire need of revision. It is noteworthy that, before the advent of the COVID-19 pandemic, of the nearly 14.2 million learners in SA, about nine million learners were fed daily by the national school nutrition programme (Morifi, 2021).

### **2.2.6 Food waste and surplus food recoveries**

On a continental scale, Dou et al. (2016) show that less than 2% of edible food waste is recovered to feed poor people. From their substantive data records of respondents showing assertiveness to nature, product price, awareness of food expiry dates and packaging concerns, Williams et al. (2012: 142) confirm that food wastage disadvantages many households and it is not good for society. At times, categorical data may not be conclusive as Parfitt et al. (2010) reveal. Williams et al. (2012: 147) argue that food-handling behaviour of people with environmental education often portrays a friendly and considerate attitude to natural, human, social and economic resources. In such behaviour circles, less prepared food is wasted, showing how nutritional value, food ethics and morality link to some communities' ways of life (Schott and Andersson, 2015).

Studies by Stancu et al. (2015) and Richins (2004) suggest that materialistic values, financial norms and emotions, economic attitudes and food waste trends as well as generally irreverent food-handling behaviour, dispose attributes not apt to food sharing. Metz and Gaie (2010) point out that, under all circumstances and for the greater good of fellow citizens in society, a substantive essence is prioritising humanity and all other animal creatures. To this end, material possession, greed and all individualistic values of singular wealth and avidity should thus be neither upheld nor glorified (Richins, 2004). Among some food recovery behavioural views, therefore, is the correlation between household size and amounts of food waste produced, according to Katajajuuri et al. (2014: 327).

The cardinal point in the African view of human interdependence, harmony and morality among native Africans and the human family, according to Metz and Gaie (2010: 274), is a direct contextual detail of "I am because we are". The authors simplify Ubuntu (or Botho in SeSotho) by citing the Kenyan scholar, John Mbiti (1969) and other key African scholars who favour sharing food resources instead of wastage. This behavioural aspect that is taught, developed and performed in a predictably assured way, is in line with the theory of planned behaviour (Ajzen, 1991). Russell et al. (2017: 107)

express similar views on the moral sentiments of food recovery behaviour: “Less well-studied variables of habits and emotions were important determinants of participants’ intentions to reduce food waste and their current food waste behaviour”.

According to Stancu et al. (2015: 8), there is a clear dual path of intentional and routinised food waste with leftovers reuse (2016: 11). Hence, this researcher is of the view that entrenched food saving techniques can only be realised through early childhood learning and adult supervision, in true Ubuntu style. It is crucial to note that Metz and Gaie (2010: 278) remind us that every moral agent (person) has above all, weighty duties to care for others, mostly family and those of extended relations, which by implication is the immediate community. The authors highlight an example that in traditional SeTswana society – and indeed across the Nguni people and all native tribes of SA and many related cultures of Southern Africa – it would be considered theft if one slaughtered an animal and kept the meat for oneself or gave it only to one’s nucleus family (ibid., 2010: 278).

Discarding of nutritious food when some in the community go hungry, is thus deeply frowned upon among historical and indigenous societies; this is in line with Richins (2004), who argues against personal greed and accumulation. It is worth noting that various methods exist to promote sustainable food consumption and resources recovery aimed at sharing excess food. Papargyropoulou et al. (2014: 110) suggest that frugality is one way, just as Japan and other Asian countries promote the ‘3Rs’ option i.e., reducing, re-using and recycling food waste. In other countries, like Afghanistan, to avoid waste and lessen post-harvest food losses from grain farmers’ surpluses, the Food and Agriculture Organization (FAO) provided simple innovative and effective solutions in the form of sealed storage drums (Parfitt et al., 2010: 3068). There are instances where food repackaging, storage or even timeous charity and giving food to the poor, as Williams et al. (2012) argue, can be the only real solution for later use of items, specifically those bought in bulk and at high risk of going to waste. Williams et al. (2012: 142) maintain that conditionality of food value maintenance is crucial, since lack of knowledge about how to store food at home often results in the reduction of the shelf-life of food. Surplus food and all nutritional produce, including edible material deliberately fed to animals or any food processing by-products channelled away from human food value chains, should be available to the starving masses (Stuart, 2009). Cutting avoidable food waste through food recovery and redistribution however, should not be misconstrued as promoting free riding. This fact is stressed

by Metz and Gaie (2010), who assert that making resources available to impoverished people in the spirit of Ubuntu/Botho is contingent on them not letting such bestowed value go to waste:

*Ubuntu's focus on harmony is that membership in the community is, by and large, sufficient to be entrusted with an adequate portion of its land or other major kinds of wealth (traditionally cattle), supposing one continues to make good use of it and does not let it go to waste.* (Metz and Gaie, 2010: 277).

### **2.2.7 Comparative generation of food waste in SA**

Table 1 below illustrates a serious need to properly delineate sources of food wastage which scholars such as Oelofse (2015), and Nahman and De Lange (2013) estimate food waste in SA to be between 10 to 13 million tons annually. At various stages of the food value chain, numerous product items contribute to food wastage, as asserted by Chauvin, Mulangu and Porto (2012). This is based on societal handling behaviour for each food commodity, according to Dladla et al. (2016) and Oelofse (2015), as portrayed in the table below. Converted to monetary terms, Oelofse (2015) estimates that the annual cost of all food wastage in SA amounts to R2, 012 billion. Oelofse gives an unprecedented study depth of a wide range of categories of wasted food, together with attached costs, as summarised in Table 1. The items as listed below are analysed throughout the entire food pyramid, from agricultural production to post-harvest handling and storage, processing, packaging, distribution and consumption levels.

**Table 1: Proportional representation of food waste generation and cost**

<b>PRODUCE</b>	<b>% Waste</b>	<b>% Cost</b>
Fruit and vegetables	44	36
Meat	7	28
Cereals	26	7
Roots and tubers	9	5
Fish and sea food	2	13
Milk	8	6
Oil seeds and pulses	4	5
<b>Commodity Food Groups</b>	<b>100</b>	<b>100</b>
	<b>Total %</b>	

Source: Adapted from Oelofse (2015)

In SA, the food value chain market prices determine the food waste costs, says Oelofse (2015), and this covers food value chain prices of various commodities in SA, as reflected in Table 1, from agricultural production through various stages to consumption. This is highly unsustainable.

### **2.3 CONSUMER BEHAVIOUR AND HOUSEHOLD FOOD WASTE SCRUTINY**

In most advanced economies, households generate about half of the total food waste (Stancu et al., 2015), and very little categorical evidence exists showing causes of such consumer behaviour (Parfitt et al., 2010; Russell et al., 2017). There are numerous reasons for possible food wastage forwarded by people (Williams et al., 2012). Even so, not enough knowledge exists on consumer behaviour and determinants of decisions leading to food waste by the end-user (Stancu et al., 2015: 8). Deficiency in this form of food waste data, is particularly extensive in developing countries, notably in SSA (Oelofse, 2015). This presents broad challenges of the dearth regarding consumer feelings on food wastage (Gustavsson et al., 2011; Russell et al., 2017), especially with rising urban populations (Love et al., 2017; Parfitt et al., 2010) and growing figures of people discarding nutritious food (FAO, 2019;

Katajajuuri et al., 2014). The deficiency in behavioural knowledge of subjects impacts on policy formulation and implementation (Love et al., 2017), particularly in the less-developed countries (Hoballah and Averous, 2015). In its link to the literature, this study uncovers the behavioural patterns of food wastage as well as the types of food wasted in the case study.

### **2.3.1 Habits, emotions and attitudes to food waste**

Stancu et al. (2015: 8) agree that there is currently very little recorded data available, pertaining to household and consumer behaviour towards food wastage, compared to data measuring amounts and results of food waste. In the universal food supply chain, substantial gaps in knowledge systems need robust filling (Hoballah and Averous, 2015). This is particularly so in SSA, as confirmed by Oelofse (2015; 2019). According to Katajajuuri et al. (2014: 323), among some of the food waste influences and variables are many socio-demographic, behavioural and attitudinal causes, features and underlying reasons. Stancu et al. (2015: 8) further suggest a theoretical and empirical dual basis linking several psycho-social factors such as attitudes, norms, and self-efficacy, to food waste behaviour. Moreover, Stancu et al. (2015) show that food wastage is at the tail end of domestic food provisioning, however embedded it is in the process. Therefore, the authors argue that food choice scripts easily assimilate and convert to become routines, thus impacting acts linked to development of food waste. Nevertheless, routines are said to vary from habits (ibid., 2015: 8).

### **2.3.2 Habitual behavioural control and food waste**

A habit is a non-cognitive reflex action, usually from a pattern of behavioural responses and follows explicit prompts from automatic processes (Russell et al., 2017; Stancu et al., 2015). However slim, Russell et al. (2017: 109) demarcate routine and habit, explicit evidence of an important role played by a strong habitual element in food waste behaviour. In this regard, emotional components of behaviour to food wastage cannot be discounted, as a varied subject literature suggests. According to Stancu et al. (2015), moral norms and attitudes are crucial stand-alone variables also demanding more attention. Porpino (2016) advocates for opening possibilities in local domestic food waste studies – as in this study and similar rooted projects – to assess food-handling behaviour patterns. As outlined earlier in this chapter and confirmed also by Papargyropoulou et al. (2014), cultural attributes and food cost implications deliver considerable influence on food behaviour. Russell et al. (2017: 108)

express the view that, “research on pro-environmental behaviour more generally has shown that the non-cognitive variables of habits and emotions are important drivers of behaviour”.

Over generations, these variables customarily assimilate to a way of life. However, the authors indicate that in their experience, “there have been no quantitative studies to date that have investigated the relative importance of these determinants as they relate to food waste behaviour”. Conversely, Williams et al. (2012) expand the discourse in an altered dimension to say that inter alia, food packaging with all its functions and associated branding, may have a direct and crucial impact on the types, nature and sizes or amounts of food waste in households. These are indeed among the complexities of food wastage in Wallacedene, that this study seeks to uncover, starting with policy.

## **2.4 FOOD WASTE POLICY**

Undoubtedly, further food waste research is needed on an all-round food pyramid scale, from farm to fork. Firstly, this shall allow for a foundation of evidence that anchors a more sustainable handling of food surplus and waste management, according to Papargyropoulou et al. (2014: 114). Secondly, authors such as Love et al. (2017) argue for an extensive examination of the food waste phenomenon, in order to inform proper policy crafting, including its implementation, monitoring and evaluation. Minutely, in its limited input found in Cape Town households in SA, this study serves to break open, examine, and grow the understanding of some local determinants of food waste behaviour, together with any linked variables, as suggested by Russell et al. (2017: 107). The hope is that the insights from this inaugural area research should fill some gaps and provide a much stronger basis for food waste decline, as Russell et al. (2017) indicate. Equally, this should help reduce hunger and poverty at household level and improve livelihoods in the community (Page and Pande, 2018).

The initiative will also bolster local education to curb food wastage and reduce GHG emission, protect the climate and the environment, as well as enhance sustainable use of natural resources (Matinise et al., 2018; McCain, 2018; Papargyropoulou et al., 2014; Parfitt et al., 2010). This research effort could potentially enhance the economic worth of the community and improve household spending. The determinants of food waste behaviour are thus shown to be highly varied, intricate and diverse, hence the need for added and ongoing research to comprehensively appreciate the challenge,

to bolster energies that stimulate food waste decline, primarily at household level (Russell et al., 2017: 107). Such research is necessary on all fronts, including at conceptual and empirical levels.

## **2.5 SA FOOD WASTE MANAGEMENT: POLICY GUIDELINES AND LEGISLATION**

Food waste is controlled under the legislation for waste and general waste management, and functions close to food wastage in SA fall under the National Environmental Management Act (NEMA), Act 107 of 1998 (RSA, 1998), according to Oelofse (2019). Thus there is no exclusive legislation in SA to regulate food waste and loss. Although this vacuum in legislation may be conspicuous, this section explores how variety local legal frameworks together with endorsed international and multilateral links in this regard may relate to matters of food waste and loss. The supreme law of the land, the South African Constitution together with the Bill of Rights usher in this part of the literature review.

### **2.5.1 Constitution of the Republic of South Africa**

The Constitution of the Republic of South Africa, Act 108 of 1996 (RSA, 1996) is regarded as the supreme law in the country. It contains the rights to which all citizens are entitled and which all are required to uphold; it is one of a few constitutions in the world that guarantees socio-economic rights. Chapter 2, section 7 (1) of the Constitution is the Bill of Rights, which enshrines the fundamental rights of all people in the land. Overarching in legislative stature, the SA Constitution (RSA, 1996) recognises a human being's entitlement to basic goods and services that are necessary for a decent standard of living. Included here, are rights to education, housing, healthcare, food, water and social security (RSA, 1996). The South African Constitution (RSA, 1996) specifies that everyone has the right to have access to sufficient food and water. Thereafter, an extension of state obligation to this Section 27(2), indicates that the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights. These rights however are, according to Love et al. (2017: 6) neither realistic nor can they be extendable pragmatically from a policy standpoint, as they relate to societal inequalities and citizens' access to certain types of food. Besides, the legislation is not consumption-focused, since locals' responsibilities are vague (Love et al., 2017: 5-6), particularly regarding the curbing of waste, as well as feasible and dutiful behaviour towards nature that lays emphasis on respect for food, nutrition and all other associated living creatures. The Constitution (RSA, 1996) thus has no special alignment of legislative tools, policies and monitoring practices towards food wastage.

Still, Section 28(1)(c) of the Bill of Rights states that every child has the right to basic nutrition, yet no responsibility is bestowed upon adults (parents/guardians) to curb food wastage in the process of providing nutritional content. As a result, this goes against the old indigenous and natural laws and teachings of Ubuntu that are attuned to favour oneness with nature, the universe and the forces of creation (Metz, 2011). Such tendencies of non-restraint and lack of accountability towards food and the need for communal wellness in food security are symbolic of foreign cultures and alien ways of life imposed upon ethnic communities (Dladla et al., 2016; Metz and Gaie, 2010; Richins, 2004).

According to Metz (2011: 534), even though the concept of Ubuntu “does not feature explicitly in the Constitution that was ultimately adopted in South Africa”, the conviction from the author is that “a philosophical interpretation of values commonly associated” with Ubuntu as a way of life and as it is known and has been practiced for centuries, “can entail and plausibly explain this document’s construal of human rights”. Concisely, Metz (2011) declares the aim of such testimony as being “to make good on the assertion made by the South African Constitutional Court that Ubuntu is the underlying motif of the Bill of Rights”.

### **2.5.2 National Waste Management Strategy**

In 2019 the Department of Environment, Forestry and Fisheries (DEFF) presented a draft National Waste Management Strategy (NWMS) that had since been updated regularly, since the 2011 original document, (DEFF, 2020). This strategy document currently addresses food waste and food loss, albeit minutely. This strategy, which is a statutory requirement of the Waste Act of 2008 (RSA, 2008) – discussed below – endorses a circular economy, promotes a culture of zero tolerance of the misuse and/or overuse natural resources, prohibits pollution, litter and dumping, and encourages, inter alia, a strategy of waste minimisation. For the first time in the country’s history, a government strategy document distinctly addresses food waste, albeit in a limited manner. The NWMS (DEFF, 2020) that addresses food waste, is dealt with in Section 2.4.1.4(iii), in its minimalist focus on this very broad food wastage phenomenon. In this regard, this research also drives to expedite and inform processes towards this statutory future, particularly in light of global developments and obligations on the sustainable food systems discourse, food wastage and all areas associated with food security.

A lot more work is still needed since only as recently as 03 December 2019 has the government published the draft National Waste Management Strategy (DEFF, 2020) that directly addresses food waste, after the original document (NWMS, 2011) and multiple others produced over ten years. The espoused document is said to bring the concept of the circular economy at its centre, promoting a culture of zero tolerance of pollution, littering and illegal dumping (DEFF, 2020: 7). Three pillars anchor the strategy, namely: waste minimisation; effective and sustainable waste services; compliance, enforcement and awareness (ibid. 2020: 7). Here, now is a new opportunity and novel path to redirect waste from one production process to function as a resource for another production activity. It is about time authorities took responsibility for human activity in relation to the climate and environmental pollution, urges the recently published NWMS (DEFF, 2020: 8), which is a statutory requirement of the Waste Act of 2008. Thus, in its acknowledgement of population growth and urbanisation plus the resultant resource intensive production routes as main drivers of food waste, Section 2.1.4 of the NWMS (DEFF, 2020: 14) calls for the recognition of the food waste problem and its broader classification of general waste, to effect constant and regular appraisals of the material composition of biodegradable items within solid waste.

Food wastage accounts for about one-third (33%) of food produced for human consumption, and beyond its negative impact to natural resources and the environment, the phenomenon occurs when an estimated 26% of SA's population go to bed hungry (DEFF, 2020: 14). The urgency to curb food wastage then and to deter its associated behaviour is noted with ease and severe anticipation. It is however, disturbing that unlike in point 17.4.1.2 of the draft 2019 NWMS, in this latest 2020 update no measure is bestowed on the waste producer's responsibility to irrefutably prevent food waste, considering sizes of organic waste produced annually. This is particularly important since "organic waste contributes to more than 50% of the total of general waste disposed in the country and has a comparative recycling rate of 49%. This waste stream should therefore be prioritised for waste prevention and diversion from landfill. Research indicates that "almost one third of all organic waste consists of food waste" (DEFF, 2020: 12), which is all dumped in landfills.

In 2016, the NWMS specified a target to minimise landfill waste by 25% through reduction and diversion of food waste from landfill sites. It also allowed for the waste pyramid approach similar to the South Australia Waste Strategy in Figure 3, and allocated waste management officers to

coordinate and oversee activities and ensure schematic vertical and horizontal execution of performance. The latest offer has absolutely no update on work done or targets reached in this regard.

Nevertheless, with all listed South African legislation and regulations in unison (DEFF, 2020; Oelofse, 2015), there are several other policies and laws that may partially or holistically impact and could help govern and manage food waste (Love et al., 2017). Yet, like the Constitution, all are silent on food wastage, save for the latest NWMS (2020). Contextually, all policies, regulations and legislation are enforceable through a range of state agencies and government offices. These may be Departments of Water and Sanitation, Environmental Affairs, Provincial and Municipal authorities, plus environmental health practitioners and staff and can even be monitored as high up in power such as in the National Planning Department and the Office of the Presidency, among others. One can add to all the above the National Policy on Food and Nutrition Security document of August 2014, crafted under the auspices of the former Department of Agriculture, Forestry and Fisheries (DAFF) together with the Department of Social Development. In addition, there were also some food regulations under the Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972 and the Health Act 63 of 1977; however, no progress was ever achieved from both, in enacting a national Bill on food wastage.

The National Environmental Management: Waste Act 59 of 2008 (RSA, 2008) and the National Environmental Management: Waste Amendment Act 26 of 2014 (RSA, 2014), stipulate controls for the management and recording of waste, including the issuing of licences. For purposes of food loss and waste, the crucial element is that the law requires municipalities to develop integrated waste management plans (Oelofse, 2015).

### **2.5.3 National Environmental Management: Waste Act**

As an off-shoot from the above legislative root, the National Environmental Management: Waste Act (NEMWA), No 59 of 2008 (RSA, 2008) regulates waste management in order to protect health and the environment through averting pollution and ecological degradation and promoting sustainable development (RSA, 2008: 2). It further determines the formal rules and planning matters, general norms and standards towards regulating the management of waste and subsequent compliance and enforcement in this regard, including licensing and related matters. Again, it contains no information or guidelines on food waste. Dually, the NEMWA (RSA, 2008) and the National Environmental

Management: Waste Amendment Act 26 of 2014 specify management functions, controls and recording of holistic waste, plus issuing of waste licences and landfill contracts (RSA, 2014). However, in these legislative documents, it is sad to note that nothing substantive is specified on food waste, as outlined in Sections 2.4.1.1(i)&(ii); 2.4.1.3; 2.4.1.4; 2.4.1.4(i); and 2.4.1.4(ii). In all areas, the only call is for municipalities to develop integrated waste management plans, with no acknowledgement of the food waste problem.

#### **2.5.4 National Development Plan (NDP) Vision 2030**

In 2012, the National Cabinet adopted the National Development Plan (NDP) to serve as a blueprint for the work required in order to substantially reduce poverty and inequality in SA by 2030. The plan recognises the importance of building an equitable future for SA, particularly for youth, and that currently young people bear the huge burden of unemployment. The plan presents an opportunity for business, growth, competitiveness and measures to boost economic development and employment creation to reduce poverty and food insecurity (RSA, 2011: 191). In line with food security constitutional imperatives, the NDP further entrenches the need for SA to continue addressing the challenge, through identification of food production and nutrition security as key elements of poverty and inequality, both as a consequence as well as a cause. However, not a word in the vision document is spoken exclusively on food wastage and its multiple and detrimental impact on e.g., food security, sustainability of resources, the environment and its ruin as well as climate change. A gap thus exists and fast action is needed to adjust waste policy and legislation accordingly in SA.

#### **2.5.5 Provincial and local government waste management powers**

In terms of provincial and local waste regulation, the two NEMA Acts above purposely outline some waste-linked principles e.g., avoiding waste and minimising it where it is unavoidable, and the Acts are often cited in provincial and local municipal by-laws. A socially disposed and citizens-inclined angle in the legislation also notes that citizens must take reasonable measures to avoid pollution and degradation of the environment (NWMS, 2020; DEFF and CSIR, 2020).

At a provincial level, the nine South African provinces have their respective legal frameworks on waste management based on national policy. This includes the administration of the Western Cape Government (WCG) that essentially has a few publications that relate directly to waste. First, there

is the September 2016 Draft Western Cape Government Household Food and Nutrition Security Strategic Framework. The draft has reportedly been approved by the provincial cabinet. The document is however, silent on any substantive aspect of food waste, save only to highlight what it titles, ‘household food and nutrition security’. To its credit, according to parts of the PGWC (WCG, 2016: iv) document, the aim is the creation of governance mechanisms to attend to challenges in the food systems, with a focus on six pillars, including food awareness and safety, sensitive food planning, and food resources management for the future. Issues such as use of land, water, energy and infrastructure by 2040 are addressed together with general food governance (ibid.). The prospect for food waste indulgence thus exists, as the language here is direct and food waste can be dealt with properly and consistently.

Secondly, the WCG has the December 2006 Hazardous Waste Management Plan for the Western Cape Province. The plan was published by the Directorate of Pollution and Waste Management Environmental Affairs and Development Planning. This overlooked document addresses the safe and integrated management of hazardous waste with abattoirs’ waste linking directly to food produce. The plan indicates that its successful implementation is dependent on the commitment of all responsible entities and the provision of funding to municipalities for monitoring and evaluation of what it is named after, ‘Hazardous Waste’ (WCG, 2006:20). Here also, lies another angle to leverage abattoir activities in relation to the food wastage phenomenon. Lastly, the WCG (2020) in the Western Cape Province also has a ‘2WISE-2WASTE’ leaflet on Reducing Food Waste and Loss on the internet site, as titled.

Regarding the communities, as outlined in the discussed Acts, local government is also empowered to handle waste matters and various municipalities may decree by-laws in this regard. The City of Cape Town (CCT) for example, also has some guidelines on the food waste in the form of a 2017 single-page brochure. Also, because COVID-19 has further blown the pendulum of poverty deeper into unprecedented levels for the poor, numerous local authorities have taken conscious strides in attending to food insecurity, including curbing food wastage. This means directing resources towards adaptability to new ways of living. A number of experts allude to the need for humanity to change, suggesting that, should we not learn sustainable ways of living now, the future will have harsher lessons for mankind, even beyond COVID-19. Global organisations are thus key to a ‘new normal’.

## 2.6 INTERNATIONAL AFFILIATIONS

SA is part of the global community of nations and is signatory to numerous global agreements, statutes, programmes and activities. These have immense significance for the conservation of natural resources, sustainable development, guaranteeing citizens' food security and more crucially, curbing food wastage. During September 2021, as announced by UN Secretary General, the world assembled for a discourse at the Global Food Systems Summit (UN, 2021). The event aimed to raise global awareness and solicit global commitments and actions that transform food systems to resolve not only hunger, but to reduce diet-related disease and heal the planet. The event also aimed to transform food systems, leverage global shifts, and deliver progress to all SDGs. It also made efforts to magnify the stature of the food waste crisis, and drew attention to this food waste pandemic (UN, 2021).

The key UN bodies with the strongest influence to address global food wastage, include: the Children's Fund (UNICEF), the Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD), the World Food Programme (WFP) and the World Health Organization (WHO). Recently for example, some of these stakeholders published the State of Food Security and Nutrition in the World (FAO et al., 2020). This report addresses the theme, Transforming Food Systems for Affordable Healthy Diets. It is part of the State of the World Series of the Food and Agriculture Organisation of the UN. The "transformation of existing food systems", according to FAO et al. (2020: 60), will make them "resilient and sustainable". The FAO also underscores the need to focus "on nutritious foods for healthy diets, to reduce food losses, create opportunities for vulnerable small-scale producers and others working in food systems, and to enhance efficiencies". This emphasis is not enough however, because reduction of food waste, which according to Stuart (2009: 2) characterises about 50% of food produce across the Global North, "would considerably improve the environmental and social impacts of the whole food system", including ensuring food security and healthy diets.

In September 2015, the UN declared 17 Sustainable Development Goals (SDGs) to end poverty, promote wellbeing and prosperity of all people and save the environment by 2030 (UN, 2015). The member states agreed on the outcome document meant to constitute the global agenda for a new sustainable development path (UN, 2015). Lauded as an extraordinary session with participation from civil society, 193 countries of the universal human family approved this ambitious agenda and SA is

indeed part of this programme with local ongoing activities in this regard. SDG12 aims to “ensure sustainable consumption and production patterns”, and includes amongst its objectives, to “halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains by 2030” (Hoballah and Averous, 2015: 1).

In 2002 SA hosted the World Summit on Sustainable Development (WSSD), where food wastage, inter alia, was a crucial theme of the symposium (DEFF, 2020: 10), with strong input from then UN General Secretary, Kofi Annan. The event was a follow-up to 1992 Rio ‘Earth Summit’ or UN Conference on Environment and Development. UN systems and its various groups, representatives and members aroused awareness resulting in hundreds of voluntary pledges globally towards new partnerships to advance sustainable development and reduce greenhouse gas emissions. In 2000, the General Assembly adopted Resolution 55/2 of 8 September, committing world leaders to cut extreme poverty by 2015. Phrases like ‘common humanity’, ‘diversity’, ‘globalisation’, and a future that is ‘inclusive and equitable’, were adopted to guide a new path for citizens of the human family into the new millennium toward this goal (UN, 2009).

SA has acceded to various organs and agreements on waste with various global affiliates and associates through a number of non-binding conventions and protocols attached to waste management. In all their waste approaches, these South African world deals hardly speak about food waste. Sadly, this includes, among others, (a) the Basel Convention of 1989 for hazardous waste and their disposal; (b) the Montreal Protocol Treaty, revised in 1999 to protect and recover the ozone layer by 2050; (c) the Rotterdam Convention on transparency in the importation and bans of hazardous chemicals; (d) the Stockholm Convention of 2004 on phasing out and preventing manufacture, use, import and export of persistent organic pollutants; (e) New Mercury Convention negotiations initiated in Stockholm in June 2010 covering all mercury uses and emissions; and (f) International Maritime Organisation regulations that are long-standing to banish the discharge and dumping of all forms of shipping waste into the oceans. By and large therefore, no words are spoken on food waste in all these global transactions, while SA has endless cases of surplus food loss (DEFF and CSIR, 2021; Oelofse, 2015; Oelofse et al., 2018) as well as tons of nutrition dumped into oceans and loads of methane gas emanating from several landfill sites countrywide because of food waste,

plus many environmentally unfriendly forms of human food-handling behaviour, as illustrated later, in discussing methods of food waste disposal.

## **2.7 SUMMARY**

This chapter reviewed the literature, to foreground the food waste study. The review of documents is important in research as it enables us to acquire an understanding of the topic, what has already been researched and what the key issues are (Hart, 2001). The literature review here presented material at the heart of the drive against food wastage as well as the dimensions and intricacies, such as costs to the economy and cultural dynamics in society. Also demonstrated are innumerable amounts of natural resources expended to produce food that is ultimately not consumed, resulting in waste. These concerns include the impact of food waste on water resources, particularly in SA as a water scarce nation. The chapter also outlined current global and local efforts to curb food wastage, including sustainability issues relating to humanity, society, the environment, the economy as well as related infrastructural challenges. Numerous official state organs, policies and strategies related to the food systems discourse were highlighted, including NWMS, NEMWA, and NDP. It also discussed waste management powers for local and provincial authority, together with how these may be useful in the formulation of food waste policy. Furthermore, the chapter discussed methods to curb food wastage and the need for a cross-boundary accounting and assessment system for food across the value chain. Invariably, large sections of the literature show how food waste does not support the ethics and values of Ubuntu as defined in this study, as it is against universal morality. The discussion of Ubuntu in this chapter also bears significance regarding surplus food or food recovery and food sharing, as well as food packaging and its influence on food waste. The following chapter presents and discusses the theoretical framework underpinning this study.

## CHAPTER THREE: THEORETICAL FRAMEWORK

### 3.1 INTRODUCTION

This chapter introduces and triangulates two theories to lay the conceptual foundation. Firstly, it is Ajzen's (1991) Theory of Planned Behaviour (TPB) which serves to strengthen quantitative aspects of the research. TPB contends that three main components, namely, attitude, subjective norms and perceived behavioural control, together shape an individual's behavioural intentions. This theoretical base is then combined with a systemic methodology largely applied to qualitative research, namely Grounded Theory (GT) formulated by Glaser and Strauss, cited here from Krueger and Carsrud (1993). As a concept, GT serves to reinforce the qualitative operational pillars of this study in that it involves building hypotheses and theories from collecting and analysing data using inductive reasoning with ideas, concepts and coding. GT also enriches a qualitative scrutiny of motivation and barriers to minimise food waste, and assesses underpinning emotions in line with contemporary literature. A multiplicity of diverse conceptual methods (dualism) is then also proven vital, mainly as different paradigms are introduced theoretically to broaden mindfulness on miscellaneous features of reality, thus deepening knowledge of the research topic. The chapter closes with a brief summary.

#### 3.1.1 Theory of Planned Behaviour (TPB)

In 1985 a social psychologist, Icek Ajzen proposed the theory of planned behaviour (TPB), a psychological theory that links beliefs to behaviour. Ajzen particularised the TPB for the purpose of improving the predictive power of the theory of reasoned action (TRA). Ajzen's idea was to include perceived behavioural control in the TPB. Ever since the TPB's proposition, predictability of intention has drastically improved in various fields of social science, particularly as it involves human behaviour (Krueger and Carsrud, 1993; Oelofse, 2015). The TPB attaches a person's beliefs to their behaviour, inferring that attitude, subjective norms, and perceived behavioural control, together shape an individual's behavioural intentions, subsequent human action and thereby their actionable outcomes (Ajzen, 1991; 2011). It is noteworthy that the attributes of this theory are particularly pertinent during the current unprecedented, ongoing global COVID-19 pandemic which, according to Amato, Verneau, Coppola and La Barbera (2021: 1), has "rapidly and dramatically disrupted household behaviours in almost all areas", including sourcing of agricultural produce as well as related "eating behaviours and daily food patterns" that have "radically altered".

In an attempt to deliver a scientific product focusing on study objectives and answering the research questions, this study considers food waste activities in Wallacedene, Cape Town, through adopting the concept of TPB, as it has the appropriate theoretical framework. It is widely recognised in the human psycho-social sciences, particularly to explain and even predict people's conduct or actions, mainly regarding environmental situations (Russell et al., 2017). The TPB was further developed by Ajzen (2011), as many scholars find it a suitable base concept in food waste, "to explain behaviours of interest", as stated by Stancu et al. (2015: 8) as well as Russell et al. (2017), among other studies.

Van der Werf, Seabrook and Gilliland (2019: 478) administered a survey to households in London (UK) and Ontario (Canada), where the TPB was used to better understand food waste and its related behaviour. The survey asked participants "to choose one of three possible motivators to reduce food wasting behaviour (and) 58.9% selected reducing monetary loss as their first choice". This option came significantly "higher than both reducing environmental impact (23.9%) and reducing social impacts (17.2%)". By this means and through TPB the study is able to represent the area magnitude of lost utility and food management inefficiency.

In order to evaluate human action and analyse household food waste in Wallacedene as well as determine its patterns, this study thus also opted to apply the TPB. Hence it (TPB) becomes a base for its rooted capacity to assess people's behaviour towards household food waste, as well as its historical clout in delivering a mirror between one's beliefs and behaviour. According to Russell et al. (2017: 108), citing a recent meta-analysis by Klöckner (2013), evidence "showed that approximately 40% of all papers published in the environmental psychology domain used TPB as theoretical underpinnings of their research and it has been successfully used to predict household behaviours, including water conservation, public transportation, and recycling".

Amato et al. (2021) and Van der Werf et al. (2019) maintain that poor food literacy or lack of knowledge, skills, and behaviour related to food provisioning in relation to meal planning, selection and management, together with food preparation and eating, all have an impact on food waste. Consequently, any study rooted in the TPB socio-psychological framework, can expect to provide meaningful findings of several respondents and establish a causal relationship between cognitive as well as social demographics (Ajzen, 2011; Nahman et al., 2012; Oelofse, 2015). In this food waste

study, a good sample size of 85 questionnaire respondents was established, and it presents a broadly quantitative aspect with a contextual qualitative view of the study area.

There is contention that the TPB is not enough to predict household food waste behaviour, as opined by Russell et al., (2017: 109) and others such as Papargyropoulou et al. (2014). These scholars advocate for a wider foundation for an expansive theoretical analysis that is deeper and embraces broader qualitative scrutiny of behaviour and action, a condition that is sensible and benefits the research process. Porpino (2016) notes that the literature identified on food waste submit that further theorising is required, to include the measurement of discarded food items, as well as additional research and analysis of the impact of messaging campaigns on behavioural change.

In this study therefore, the TPB is used, together with the interpretivist Grounded Theory (GT) of 1967, as formulated by Glaser and Strauss and cited by Krueger and Carsrud (1993). The latter two theorists are somewhat uninspired, apathetic and in need of more from TPB. In their criticism hence, they argue that TPB is parsimonious and strong in theory to forecast deliberate and scheduled action. They reason that intention, attitude, and largely belief and perception are key drivers of behavioural outcomes; thus, they contend that this angle calls for theory triangulation, as the following section on GT below outlines.



### **3.1.2 Grounded Theory (GT)**

Among the variety of theoretical models upon which research is built, the Grounded Theory (GT) is a prominent one, using qualitative research methods. It was formulated in 1967 by a pair of sociology researchers, Barney Glaser and Anselm Strauss and broadly considers inquiries pursuing the GT qualitative research designs. Creswell, Hanson, Clark Plano and Morales (2007: 249) agree that when using the GT, the investigator generates a general explanation (a theory) of a process, action, or interaction shaped by the views of a large number of participants in describing their real-life, day-to-day experiences. Furthermore, Porpino (2016), Corbin and Strauss (2015), Papargyropoulou et al. (2014), and Graham-Rowe, Jessop and Sparks (2014) affirm that, when using GT, a researcher can elicit thematic categories of a holistic contextual value to comprehensively aid in-depth research outcomes from a wide audience.

In this study, the area demographics duplicated multi-fold, compared to the 36,583 people and just around 10,000 households, as reported by Statistics SA (2011) when Wallacedene started; the area currently has far more people and households. GT has particular relevance for this study, as the views expressed here are from a sizable number of sampled participants (85 questionnaires and seven focus group discussion respondents from the total) who contributed to the data collection process by describing their real-life, day-to-day experiences of food waste, its types, forms/sizes and its impact on their lives.

Papargyropoulou et al. (2014: 107) report on the use of GT, drawing on interviews from food waste specialists and identifying key themes from the dialogue, informing and shaping “the development of a comprehensive framework for the management of food surplus and food waste”. The authors contend that such a framework enables the conceptualisation of food waste and the application of the waste hierarchy. Porpino (2016) supports this view and suggests that different dimensions of food abundance affect food waste. This study therefore maintains that a grassroots approach is needed to elicit the foundations of the food waste problem.

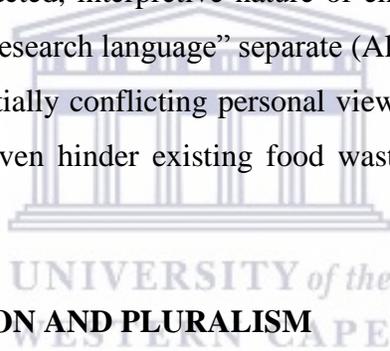
Taking a leaf from Strauss and Corbin (1990), Alvesson and Deetz (2000: 27) agree that GT offers the necessary quality standard for doing credible research. They assert that GT is significant and attuned with theory-observation in a broad-spectrum, and can be duplicated as it is precise, thorough and verifiable. Furthermore, aside from a deductive hypothesis testing, GT centres on qualified accounts and pragmatic theory development, wherein corroboration is a vital necessity for excellent research (ibid. 2000: 62). Although there are neo-empiricist divisions to neo-positivist research, adding to the intricacy of realising impartiality, this theory’s proponents argue that the accrued knowledge of science as an absolutely rational project, is dually valued in GT (Creswell et al., 2007).

Papargyropoulou et al. (2014) maintain that the influences of GT on research are extensive and pragmatic. In this regard, Creswell et al. (2007: 249) emphasise that theories should be rooted in data from the ground, particularly “actions, interactions, and social processes of people through interrelating categories of information based on data collected from individuals”. To this end, the GT opened up prospects for participants in this study to declare their subject convictions openly and freely, without inhibition. Also, participants could recommend possible ways to reduce household

food waste and improve food and nutrition security in Wallacedene, using their comprehensive and multiple influences, backgrounds and individual contexts to interrogate their behaviour causing or curbing the food wastage phenomenon.

Krueger and Carsrud (1993) concur that GT opens creative and new approaches to research, allowing for a better understanding of various influences and backgrounds or context, together with how these influences occur. This, they say, delivers a precise grasp of phenomena and even enable the prediction of individual actions and outcomes.

On the other hand, GT also has its fair share of disparagement. From its days of growth, its authors themselves tended to disagree on perspectives, with Strauss's tactical approach to GT regarded as being "too prescribed and structured" by Glaser (Creswell et al., 2007: 249). Also, beyond the intricate understanding of constructed, interpretive nature of empirical material, is the unbearable task of keeping "data and theory/research language" separate (Alvesson and Deetz, 2000: 27). Since GT and its critiques reveal potentially conflicting personal views and goals, even from its origins, this may complicate, delay, or even hinder existing food waste reduction attempts, as noted by Graham-Rowe et al. (2014).



### **3.2 THEORY TRIANGULATION AND PLURALISM**

As debates rage around which theoretical framework appropriately suits what area, field or subject of examination, consensus is growing on the importance of pluralistic paradigms in research (Mingers, 2001). Several examples of theory pluralism – as used in this food waste study – are noted in past and present scenarios, such as in medicine with Tuberculosis, HIV-AIDS, and indeed the present global COVID-19 pandemic, and also in other fields of study like information technology (IT) and data systems analysis. IT is a relatively new, yet highly matured industry with relevance to all fields, e.g., economic-social-political, education, health, science, history, religion, etc. Scholars like Schoonenboom and Johnson (2017), Richins (2004), and Mingers (2001) demonstrate how "different research methods" are vital, particularly when introduced "from different paradigms", to bring about awareness on diverse "aspects of reality", resultantly deepening comprehension of any research topic (Mingers, 2001: 241). This multiplicity is termed pluralism or triangulation; it is also known as a mixed theory approach.

Triangulating the theory of planned behaviour with grounded theory in this study to examine food behaviour, the researcher sought to blend the quantitative-positivist and qualitative-interpretivist strengths of both theoretical approaches, with the overall goal of blending the dual mechanisms for heightened research knowledge and validity, as indicated by Schoonenboom and Johnson (2017: 110). Collectively, the benefits are: the depth and strength of study conclusions; adding non-monetary but highly significant value to published literature; and contributing key pointer solutions to the food wastage phenomenon (Richins, 2004; Schoonenboom and Johnson, 2017). In line with Creswell et al.'s (2007) views on the TPB, participants in this study presented the data on their normal, habitual and daily planned behaviour, which the researcher gathered and preliminarily scanned. The initial sifting adopted basic GT principles, as the data must guide the researcher through the primary content analysis of the qualitative-unrestricted data received.

A full dissection of the gathered data using GT was based on inductive reasoning for triangulation purposes and was thereafter followed by prediction and forecasting participants' behaviour, and forming a conclusion from harmonious wordings (Morten et al., 2018). The researcher also took side notes, to enhance deductive thinking, with records of questionnaire feedback as well as FGD transcripts, to give substance to the filtering process of the analysis from both guiding theories. The study concurrently used the GT systematic analysis drawn from Krueger and Carsrud (1993), to combine with Ajzen's (1991; 2011) TPB. Such a technique is known as the "constant comparative method", as noted by Gardner and Abraham (2007: 189). This method of relentless and perpetual comparison of collected data was also preferred by this study's researcher, as it allows for repeat reviews and coding of data, with codes grouped into concepts, then into categories. This study was guided by the insights of several key scholars in this area, notably, Morten et al. (2018), Krueger and Carsrud (1993), Gardner and Abraham (2007), and Glaser and Strauss (1967).

This study's pluralistic theoretical approach, using TPB and GT, allowed for data to be holistically analysed. In the repetitions of elements, concepts and ideas that came through, the researcher then labelled these with titles that were data extracted, as proposed by Gardner and Abraham (2007). The researcher then grouped information categories to establish participants' views on food waste and food behaviour; this formed the basis of both theoretical frameworks. Together, the qualitative and

quantitative theoretical research tools used in this study empowered a cross-analysis of research outcomes, with the literature at hand, resulting in the ease of understanding the findings and achieving reliable results, as affirmed by scholars such as Pathak and Intratat (2016), and Glaser and Strauss (1967). In sum, this method allowed for a more focused approach to the study objectives and to conclusively respond to the research questions, in accordance with Frayne et al.'s (2009) suggestions.

While the debates continue about the most suitable theoretical frameworks, the significance of pluralistic paradigms in research remains uncontested (Mingers, 2001). This theory triangulation, or mixed method of research, allows for the processing of both qualitative open-ended data, and closed-ended predetermined and largely enumerative answers, and it shines the light on two or more potencies in the underpinning theories (Richins, 2004; Schoonenboom and Johnson, 2017). In this regard, Mingers (2001: 241) points out how different research methods are vital, particularly when introduced from different paradigms, to assist awareness on diverse aspects of reality, resultantly deepening comprehension of any research topic.

### **3.3 SUMMARY**

This chapter discussed the dual theoretical framework underpinning the study. The Theory of Planned Behaviour (TPB) was presented with its overall strength of quantitative analysis, widening the conceptualisation of food waste in tandem with humanities-associated cognitive behaviour. The chapter explained why this theory was adopted in this study, as a base for its embedded capacity to assess people's behaviour towards household food waste, plus its world-renowned and long-standing influence in reflecting people's beliefs and behaviour. Furthermore, the chapter discussed the combined use of the TPB with the Grounded Theory (GT), explaining how the latter's strengths supplement the qualitative interrogation and scrutiny of the challenge of minimising food wastage. In addition, the GT was shown to be greatly useful to occasion thematic classes of grounds for a holistic, contextual and widespread research outcome with full value, and depth, from a wide audience. The presentation of the two theoretical frameworks was followed by a detailed critique of each theory. Lastly, the chapter reflected on the triangulation of the TPB and the GT, both of which are used in a pluralistic approach to this study, which benefits from the combined strengths of concept basis and analysis.

## **CHAPTER FOUR: RESEARCH METHODOLOGY**

### **4.1 INTRODUCTION**

This chapter examines food wastage in Wallacedene, Cape Town, and provides the methodological information from which the data is obtained. The methodology includes research design, quantitative (questionnaires) and qualitative (focus group discussion) data collection methods, as well as a brief triangulation strategy to blend both research methods. The chapter also outlines the study population, sampling procedures, and data analysis techniques. It then highlights the steps, processes, and challenges faced before and during the study. The various processes include primary data collection during deliveries and gathering of research questionnaires and the subsequent focus group discussion when there were land invasion conflicts and associated issues across the study area, as well as during the 2021 winter taxi violence in the Cape. The validity and reliability of the study are also included in the discussion, together with the study's ethical considerations and research limitations.

### **4.2 RESEARCH METHODOLOGY**

The research methodology represents the kinds of tools and procedures used to collect data, as put forward by Babbie and Mouton (2001: 75). This centres on the research process, together with all decisions followed to accomplish the study objectives and to answer the research question (Pathak and Intratat, 2016). Abbott and McKinney (2013) indicate that this phase of research subsequently calls for a research build-up or research design. According to Creswell et al. (2007), the significance of establishing a research architecture or design is the first step when taking on a research project. Designing one's research serves to outline the 'what', 'how', 'when', and 'where' of the research project, as well as all related research methodology to be employed, including tactical approach, style, and research attitude. Babbie and Mouton (2001) explain that this is a blueprint or a plan of how one will conduct the study. The research methodology process involves depicting anticipated techniques of data collection and measuring instruments to be used, together with a sketch and procedure for data analysis (Pathak and Intratat, 2016). A research design is thus a description of the overall plan to initiate, conduct and complete the study and its final analysis (Creswell et al., 2007).

This food wastage study adopted a case study method of research, using a qualitative design together with elements of quantitative analysis. Creswell et al. (2007) place case studies under empirical forms

of inquiry, which investigates any phenomenon within its real-life context. According to Alvesson and Deetz (2000: 192), case studies are typically based on an in-depth qualitative investigation of individual or group activity and behaviour in real settings of an event and its related occurrences, to explore empirical material causes supporting the fundamental principles underpinning occurrences.

## **4.2.1 Quantitative and qualitative data collection methods**

### ***4.2.1.1 Quantitative research***

In this study, quantitative data was collected from both secondary and primary sources and includes data from Statistics South Africa (Stats SA), local metrics, literature relating to the study, and Wallacedene households, who constituted a sample of the population. Creswell et al. (2007) explain quantitative research as analysis to validate objective theories, wherein the relationship among variables is examined by the researcher, using numbers or statistics. Information from the primary sources from which data was collected, using questionnaires, is statistically analysed in the subsequent section to describe and explain the food waste phenomenon under investigation.

#### ***4.2.1.1(a) Questionnaires***

According to Alvesson and Deetz (2000: 60), practitioners in many fields generally perceive questionnaire studies as superficial and the abstractions of enumerable matter, items, objects, and statistical correlation as somewhat far from everyday practice. Hence, they argue, that such figures are of little value when dealing with human aspects of how life is organised and progresses (ibid. 2000). De Vaus and De Vaus (2001) however, assert that the value of normative research is part of a larger agenda in the examination of the phenomenon and unrestricted exploration in pursuance of objective reality. In this study, the idea was to craft a positivist approach that will not overburden the research techniques and tools with idealistic purposes and unsophisticated expectations (Abbott and McKinney, 2013; Creswell et al., 2007). Ample portions of qualitative feedback were thus also sourced using these questionnaires, such as, participants' feelings on food waste issues and practical suggestions on how the community may help curb food wastage.

#### ***4.2.1.2 Qualitative research***

Alvesson and Deetz (2000: 60) state that qualitative research makes possible broader and richer descriptions, sensitivity to the ideas and meanings of the individuals concerned, increased likelihood

of developing empirically supported new ideas and theories, together with increased relevance and interest for practitioners. With its many qualitative traits, the focus in this study is on real-life experiences and the outlook of participants in their situation under review. Authors such as Creswell et al. (2007), and Alvesson and Deetz (2000) indicate that at this qualitative level of research, the study should aim to explore and understand feedback and answers to the set of questions as forwarded by questionnaire recipients. De Vaus and De Vaus (2001) conceive of qualitative data collection as encompassing both primary and secondary sources, intending to influence the social outcome and have a practical effect to guide reality on the ground.

Practically, after a thorough pursuit, the researcher discovered that there appears to be no report that is accessible with food waste as a key discussion topic from the City of Cape Town (CCT) Ward 111 and CCT Sub-Council II. Most documents on the study area, accessed by the researcher only covered community surveys, social protection nets under social services auspices (as discussed by Small, 2017), or informal areas and land conflict issues, such as documents by Hyman (2020), TRA (2015), and Muzondo et al. (2004). Various other official publications and documents related to the CCT squatter relocations when new housing settlements were built in Wallacedene (US, 2015; Zweig, 2017) as well as service delivery, education, transport, small business, and socio-cultural issues related to sports, crime, and matters of faith.

Consequently, qualitative food security information for the study, particularly on the Wallacedene foundations, was sourced from a Western Cape High Court (WCHC) judgment of Davis (1999), together with evaluating participants' questionnaires regarding their food waste behaviour and wider food handling experiences. Also, the study conducted a Focus Group Discussion (FGD) and used dialogue recordings and empirical discussion results to source insightful qualitative data in this regard. In addition, the research also includes legislation and policies as well as information from various national and international reports and publications.

#### ***4.2.1.2(a) Focus group interview***

These types of interviews are currently popular and some researchers consider them as the only key exploratory tool. Usually, a focus group interview is a broad and free-flowing interview that is unstructured and flexible to encourage discussion with no rigid questions and answers, among a small

group of people, with a researcher or an outside facilitator moderating the event (Khan, Anker, Patel, Barge, Sadhwani and Kohle, 1991). To probe household food wastage in Wallacedene, the study assembled a small group of residents, by randomly choosing the fifth of every ten questionnaire respondents. Chosen participants came together to discuss their true actions, feelings, frustrations, anxieties, and related food waste concerns. This qualitative research aspect from the FGD, according to Alvesson and Deetz (2000: 67), works to augment and fortify neo-positivist data gathered during questionnaire interviews, while accepting dualism norms, to retain the dream of triangulation and provide added insights into the same phenomenon.

#### **4.2.2 Mixed method research/triangulation approach**

Triangulation, the mixed-method approach to research, as outlined in Chapter Two, serves to draw strengths from two or more research routes, techniques, and/or research process systems. The long-drawn conflict between quantitative and qualitative research is unwarranted. According to Alvesson and Deetz (2000: 61), the arbitrary distinction distracts attention from valuable and fundamental ontological, epistemological, and axiological concerns. These authors argue that in sociology, the core of the variance of these two research methods largely promotes ambiguity and misinforms the theoretical situation. According to Alvesson and Deetz (2000: 61), the distinction “focuses our attention on the techniques through which social life is represented in the course of research as opposed to the process of representing social reality”.

Benefits in triangulating research methods, according to Creswell et al. (2007), come as qualitative data tends to be open-ended, while quantitative data typically includes a multiplicity of closed-ended answers. The former is regularly without fixed reaction, and Hart (2001: 153) argues for extracting detailed qualitative techniques employed in the study, whereas the latter sources quantifiable feedback from questionnaires in the form of numerical data, like demographics.

#### **4.3 RESEARCH POPULATION AND SAMPLE SIZE**

A population is a total group, the number of people or an entire list of entities from whom information is required, according to Wiid and Diggins (2015: 186). A sample is a subset or a comparatively small fraction of the entire group of elements in the population, according to Zikmund (2003: 402).

A research sample is selected from among the population based on certain characteristics, to represent and make conclusions regarding the population.

#### **4.3.1 Research population**

To aid knowledge on household food wastage, the targeted population comprised firstly a purposive selection and subsequently, random selection (Creswell et al., 2007; De Vaus and De Vaus, 2001; Porpino, 2016) among households of Wallacedene, within area Phase 1 to Phase 8. Certain criteria are applied to determine eligibility for participation in any study, according to contentions from Brynard and Hanekom (2006: 55). In this study, the criteria had to be people who are willing to participate, to discuss and declare their food-handling behaviour, in particular, the discarding of unwanted food, as well as their food waste patterns. Consideration was given to COVID-19 as well as other socio-economic and societal conditions, such as ever-increasing joblessness and indigent households. The cost and nutritional value of food, as well as environmental alertness and interest in the sustainability of natural resources were also considered.

#### **4.3.2 Sampling size**

Sample size refers to the number of participants in a study (Pathak and Intratat, 2016; Zikmund, 2003), of which in this study, there were 100 questionnaires. These were distributed to 100 households, from 08 to 29 June 2021, and participants were selected based on the indicators in the sampling technique section (4.4) below. For ease of distributing and collecting questionnaires under strict COVID-19 protocol adherence, prearranged logistics with strategic key informants were identified across all areas in Wallacedene, from Phase 1 to Phase 8. WhatsApp was often used as a communication tool and questionnaires were circulated at the sampled sections in Wallacedene. During the distribution of questionnaires, the researcher also considered the high prevalence of waste dumping sites and areas where animals like dogs, cats, goats, sheep, pigs, cattle, horses, birds, mice, and others often feed on discarded food.

Details of how the study proceeded from distributing and collecting questionnaires to the preliminary analysis of feedback and eventually to the FGD invitations, are outlined further in this chapter. Of the 100 issued questionnaires, 85 participants gave feedback and a random sample of 9 instead of the initially planned 10 FGD participants were chosen through selecting every fifth of ten questionnaires.

The chosen participants were included in the FGD list of invitees. After finalising the list of participants with an interest to contributing and consulting with them in line with tentative FGD dates, 31 July 2021 – a Saturday – was confirmed and official notices were issued on WhatsApp. When FGD invitees had confirmed their attendance, final venue arrangements were confirmed and logistics were prepared to host the event from 17h00 to 18h00 at a venue in Gow Street, Kraaifontein – a local household venue offered to the study. During the dissemination of the official FGD invitations and feedback thereof, the researcher again took time to emphasise to each participant the research aim, FGD process, ethics of the study, and access to the final study report if they wished to view the document, after publication. Also, explanation to invitees included confidentiality issues and/or partaker privacy, voluntary input of participants, and the use of numbers only in a sequence of 1–9 to be used to identify participants.

The researcher also took all practical aspects of the research into account, including explaining to participants the expected length of discussions, the need for signed consent forms, the use of voice recorders during interviews to ensure collection of accurate data, and adherence to all COVID-19 health regulations. On the day, sadly, 2 of the 9 participants who were invited could not participate in the FGD due to logistical reasons associated with the July 2021 Cape Town taxi violence.

#### **4.4 SAMPLING TECHNIQUE**

According to Zikmund (2003: 382), judgement or purposive sampling, a non-probability sampling technique, entails the purposeful selection of particular elements from a population to represent and inform the study about the topic of interest. Areas with high incidences of waste dumping sites were prioritised because this is where animals are regularly feeding on discarded food items. It was important to select participants who are likely to align with good environmental practices and who sounded willing and may be open to talk about their food behaviour, the nutritional value of food, and conservation of natural resources generally. Lastly, participants had to be residents of Wallacedene and be available and willing to participate, but also be able to articulate their experiences and ideas clearly as far as possible. A benefit of these employed techniques is the provision of resourceful information, enabling the study to gain a deeper indulgence of the topic, to address the purpose of the research, as posited by De Vaus and De Vaus (2001).

Participants who were purposively sampled to partake in this study had to fall into one of two categories: (a) resident member(s) of families who have a considerable history of living in Wallacedene – if possible be among the first core units of the community and lived at informal settlements before the building of government Reconstruction and Development Programme (RDP) houses; (b) individuals who could articulate their experiences and ideas clearly to provide the desired information, from a perspective of local food-handling behaviour. The researcher then proceeded to randomly sample FGD participants to collect qualitative data from a small group among the questionnaire respondents. Conditions and methods as outlined below were adopted in the study.

#### **4.5 METHODS AND INSTRUMENTS OF DATA COLLECTION**

This study employed an inclusive approach using secondary literature as the base, with a specific focus on the area, together with core subject topics and related themes. Observation of unsavoury local waste dumping sites at public open spaces, dirty roads, and flooded sidewalks plus over-spilling sewerage from overloaded and busting sewer-water reticulation pipes, as well as comments received during preliminary and informal dialogue with residents, essentially led to the study. Primary data was then collected through questionnaires and from a small follow-up focused sample group.

##### **4.5.1 Secondary data collection**

###### ***4.5.1.1 Review of publications and documents***

According to Creswell et al. (2007: 180), document review is one of the methods that can be used to collect qualitative data. A review of documents is often the entry point. It saves time, is convenient and the material for reviewing is usually easily accessible, particularly in this day and age with online search engines e.g., Google Scholar, Amazon, Google, Apple, Microsoft, Firefox, etc. Evaluation of publications and other written material therefore involves a researcher collecting and reviewing documents to obtain useful information. The documents, according to Hart (2001: 19), may range from “search sheets, records”, company and other entities’ reports, and all forms of administrative documents, “databases”, minutes of proceedings of events, memorandums, agendas, “references located, items obtained” or any written communication that may shed light on the phenomenon under investigation. Alvesson and Deetz (2000: 166) declare a document review process to entail “persistence in finding sources and providing empirical documentation”. According to Hart (2001:

19), persistence “also means being thorough in your search, by making detailed records of how you managed the administration of the activity”.

In this study, the researcher reviewed official documents and publications about the Wallacedene area, such as the Cape High Court Grootboom case and other related adjudication (Davis, 1999). Documents also included articles and reports on the settlement of Wallacedene and adjoining suburbs. Over and above the preliminary set of documents, the researcher also sourced various documents and materials relating to food wastage and municipal solid waste across the City of Cape Town (CCT), the Western Cape Government (WCG), South Africa (SA), the Southern African Development Community (SADC), and other African countries. These documents were reviewed to collect secondary qualitative data required to establish the day-to-day food waste and general food-handling behaviour. Other key documents reviewed as part of data collection, were national and international publications and reports on the subject.

#### ***4.5.1.2 CCT, WCG, and SA national food wastage data analysis***

South Africa – in particular the CCT and the WCG – has a respectable record as far as solid waste management is concerned. However, very little to no information is available with regards to food wastage. Deficiency in local food waste data is emphasised by local experts, researchers, and scholars in food security, sustainable development, and environmental waste circles, including Oelofse (2015; 2019), McCain (2018), Ramukhwatho, Du Plessis and Oelofse (2018), Dladla et al. (2016), Nahman and De Lange (2013), Nahman et al. (2012), Chauvin et al. (2012), Frayne et al. (2009), and several media/online publications and social media.

Several scholars have commented on the scarcity of data on food waste data across the Global South, including studies by Porpino (2016), Thyberg and Tonjes (2016), Hoballah and Averous (2015), Papargyropoulou et al. (2014), Parfitt et al. (2010), and Stuart (2009). A review of South African-based studies on food waste data proved to be equally sparse. For example, the CCT has an obsolete one-page food waste awareness leaflet which never reached many households nor did much in this regard. In September 2016 the WCG delivered a “Household Food and Nutrition Security Strategic Framework” with hardly any substantive content on food waste. This strategic working document is still stagnant. Only during April 2021 did the CCT finally cobble together a multi-site public

participatory plan aimed at diverting organic food waste from landfills (CCT, 2021). This CCT recycling online site consists of topics linked to households, family, home, green living, and recycling at home, and thus far, its uptake or feedback is not clear.

This researcher maintains that both local and provincial authorities have never had the political will to prioritise strategies to curb food wastage, since elsewhere, there are also trivial allusions to food waste in a few sparsely located official publications, none of which have been decreed either as by-law or legislated as a policy guideline. Nationally, only as recently as late-2019 has SA seen a sentient effort to firmly include food waste in a draft policy report (DEFF, 2020). Even then, food waste is mentioned and reflected only in a few inadequate sentences. To close this gap with qualitative data, on this note, a resolute step is taken through this study to expand local subject knowledge, using Ubuntu as a central theme.

#### **4.5.2 Interviews**

In research, interviews are often face-to-face conversations with people to obtain large amounts of relevant information about their experiences, collected directly by dialogue (Alvesson and Deetz, 2000). This is one data collection method choice in which the interviewer asks questions and the respondent gives feedback, usually in person or by telephone, as Babbie (2007: 267) indicates. With the advent of advanced technology today, interviews can be done online through various social media platforms using voice and/or video capacity, e.g., Zoom, Skype, WhatsApp, Google Meet, etc. In this study, WhatsApp was primarily used as the form of interaction with participants, as most of them use this form of communication. According to Pathak and Intratat (2016), when using interviews, data is collected directly from talking to subjects for an extensive probe, to attain substantive sizes of information with relevance to behaviour and experiences. The value of interviews generally is that the subject under scrutiny can be explored to solicit a more complete answer to questions, thus collating enough data.

##### ***4.5.2.1 Unstructured interviews and consultation/discussions with locals***

Free-flowing live dialogue such as a discovery interview, unlike a structured interview, will unearth and bring research practices that may be labelled as qualitative, based on the researcher's experience. This flow also delivers forms of loosely structured conversation as well as relatively open interaction

between researcher and research subjects (Alvesson and Deetz, 2000: 70). On a random and informal basis then, the researcher took the initiative and had various contacts and interface meetings with locals during early preliminary fact-finding sessions of the study. This was before the local advent of the COVID-19 pandemic of March 2020. Out of these early interactions and based on unsightly scenes of food waste dumping at public open spaces, grounds for further primary data collection were formed. Questionnaires were crafted, repeatedly revised, and then circulated under strict observation of COVID-19 health protocols. A few weeks thereafter, these were gathered and assessed, before a FGD of nine participants was assembled. On the day of the FGD, due to logistical area transport issues, only seven people successfully took part in the study and details are outlined below.

#### ***4.5.2.2 Questionnaire interviews***

A questionnaire is a research instrument consisting of a series of questions to gather information from respondents and can be regarded as a kind of written interview. In addition to face-to-face and telephonic answers to a questionnaire, Babbie (2007: 260) states that they can also be carried out by post or by mail. Lately, with technological developments, written questionnaires can also be answered using computers, e.g., e-mail and cellular phones, through a variety of online and social media platforms, as indicated above. Accordingly, the feedback will then aid the research to attain a more complete description and systematically interpretive clarification when following a particular aspect of life. Hence, revealing methods of data collection in research are employed in this study using numeric as well as “thematic analysis of the qualitative data” for analytic responses to questionnaires, as outlined by Pathak and Intratat (2012: 4).

Starting from 10 June to the first week of July 2021, the researcher distributed 100 questionnaires in Wallacedene (Phase 1 to Phase 8), using purposive sampling based on clearly outlined criteria. The study triangulation model of questions allowed for a bulk quantitative inquiry, with some questions aimed at eliciting descriptive feedback from respondents, like participants’ feelings on food waste issues. Alvesson and Deetz (2000: 80) ratify a combination of different research methods, which aims to reduce reliance on a single tactic.

On Thursday 08 July 2021, of the 100 questionnaires issued, the researcher collected 69 from participants, and subsequently did a preliminary scrutiny between 9 and 15 July 2021 from the

questionnaires received. As the study proceeded, the researcher collected the remainder of the questionnaires and conducted a sampling of FGD participants. WhatsApp message invites were sent to the identified participants to work with them in a small follow-up focused sample group. Some logistical complexities experienced during this process are outlined under research limitations.

The methodical distribution of the questionnaires during mid-year 2021 saw an arbitrary interflow when the final quarter of questionnaires delivered overlapped with a random receipt and haphazard collections of feedback. Feedback of questionnaires was not received in the sequence through which they were distributed and the inflow of responses was parallel to the ongoing distribution of final questionnaires, which was a little complex and tiresome; however, this did not prove impossible. An ideal research strategy allows for an in-depth qualitative understanding of local food waste behaviour, which is what the study should seek to achieve, as asserted by various professionals in the subject field like Porpino (2016), Oelofse (2015), Papargyropoulou et al. (2014), Creswell et al. (2007), and Brynard and Hanekom (2006). Further details on these activities and ensuing processes like the FGD and beyond, are outlined further in the study.

#### **4.5.2.3 Focus Group Discussion (FGD)**

Characteristically, a FGD is a free-flowing interview that is unstructured and flexible to encourage discussion with no rigid questions and answers, among a small group of people, with the researcher or an outside facilitator moderating the event (Khan et al., 1991). FGD, as stated earlier are popular lately and various academics consider them as the most prominent exploratory tool (Nyumba, Wilson, Derrick and Mukherjee, 2018). To reflectively probe household food wastage in the Wallacedene area, this study randomly assembled a small group of residents from a host of questionnaire respondents. Participants came together in the mid-late afternoon of Saturday 31 July 2021 at Kraaifontein, Cape Town, to discuss their true and in-depth opinions, actions, feelings, frustrations, anxieties, and related food waste behaviour and topical concerns, from a descriptive standpoint. The elucidative aspect of the FGD data augments and strengthens content gathered from questionnaire interviews, in a factual combination of styles, since it allows the researcher to obtain both qualitative and quantitative information, as Nyumba et al. (2018: 23) indicate. Using this path, shall end up leading to mixed content analysis, often called triangulation or a mixed-method approach (Creswell et al., 2007; Nyumba et al., 2018; Zikmund, 2003).

On the day of the FGD, unfortunately only seven participants were able to attend the discussion due to logistical transport issues, in particular, the mid-2021 violence among taxi association members in Bellville and across the Cape flats, including Kraaifontein. One FGD participant who had kindly volunteered to collect another participant from work that afternoon was sadly stopped and accused of offering a taxi service by one of the association members. Resultantly, they were unable to make it to the discussion. Fortunately, besides slight damage to their car, they escaped the ordeal unharmed.

### **4.5.3 Data collection tools**

According to Nyumba et al. (2018: 23), the cardinal “methods of data collection during a focus group discussion include audio and tape recording, note-taking and participant observation”. The authors further indicate that “each of these methods presents different advantages and disadvantages and researchers should consider context-specific issues in selecting a method of data collection”.

#### ***4.5.3.1 Audio and tape-recording equipment***

The devices used at the FGD comprised two smartphones with the latest, state-of-the-art technology that can capture crisp, clear voice-sound recordings. The researcher positioned the cellular gadgets used, at two strategic locations in the discussion room, at a 1.5-meter-high distance from the ground. These were programmed to capture audio and tape-recorded accounts of proceedings from start to end of the FGD. The first minute of the introduction at the beginning of the FGD was not captured due to a technical glitch in connecting the gadgets to a computer. Thereafter, the issue was fixed and the phones were set to record independently; hence, the recording starts when the researcher reads out the FGD rules to the participants. The researcher then gave a summary overview and introduction, to recapture and emphasise the missed introductory moment.

Recorded audio is usually transcribed at a later date and as Nyumba et al. (2018: 23) explain, the pictures and tape footage capture “non-verbal interactions and the impact of the group dynamics”. It also records the content of the general discussion to enhance data through capturing participants’ actions and behaviour before, during, and post-focus group discussion. These authors argue that such footage allows for denser portrayals and interpretations instead of solitary use of verbal data. Moreover, amid various non-verbal conduct of interest from FGD participants, Nyumba et al. (2018:

23) allude to “body displacements and postures (kinesics); use of interpersonal space to communicate attitudes (proxemics); temporal speech markers such as gaps, silences, and hesitations (chronemics); and variations in volume, pitch, and quality of voice (paralinguistic)”.

All the FGD participants gave consent for the recording of the proceedings, to enable the study to explore the food waste topic of discussion in depth. To ensure confidentiality, participants were informed of their numeric tagging instead of using their real names, although occasionally, since some among the participants know each other so well as community members, some names do reflect on the audiotape. These names were however, not transcribed into the document version of the transcripts. Also, to enable the participants to engage freely, honestly, and openly in the FGD, participants were made aware that all records would be kept confidentially and in a safe place. The two smartphone devices’ difficulty in linking with a computer almost presented a danger of non-recording of equipment. However, the glitch was quickly sorted and the risk of losing information was averted. The recordings were accordingly saved in both devices’ memory cards to allow the researcher to repeatedly listen to the naturally recorded audio, and to re-trace proceedings numerous times for clarification during the transcribing process.

#### **4.5.4 Personal protective equipment**

The ongoing COVID-19 global pandemic with its health recommendations from the World Health Organization (WHO) and the South African government, brought new international and local ways of social interaction. In particular, this is more pronounced in human face-to-face engagements. During interaction with participants in Wallacedene, the researcher adhered to all specified COVID-19 protocols, by using the required personal protective equipment (PPE). At every street and household interface with participants and the general public, the researcher used a fresh face mask every few hours. The researcher also distributed over 180 disposable masks to participants, their families, and other residents during data collection. This was done in the spirit of Ubuntu and to encourage general adherence to specified regulations of COVID-19. In addition, all human contact was done within the social distancing space of 1.5 meters and more, to avoid possible transmission of COVID-19. Also, a hand sanitiser was used in line with stated health prescripts and the washing of hands was done regularly. Throughout the entire study until the culmination of the FGD, the researcher used the prescribed forms of PPE material, in line with COVID-19 health protocols.

## **4.6 DATA ANALYSIS**

According to Zikmund (2003: 21), data are simply facts, or recorded measures of certain phenomena that require interpretation, whereas information is a body of facts that help to facilitate decision-making. When gathered over a period from numerous sources, data can be huge, vast, complex, and hard to interpret, later demanding systematic organising and matching, i.e., data analysis. This is a process of reducing the size of the data, identifying themes and matching patterns in the data, and bringing about order and structure. Creswell et al. (2007) define data analysis as the process of breaking up data into fitting themes to build relations, trends, and patterns. Hart (2001: 145) regards it as classifying and placing ideas into categories.

For this study, the primary base analysis of the data used Microsoft Office Excel software, as it is often used by many researchers, e.g., in the fields of sociology, economics, health, politics, biomedicine, computer science, information technology, etc. To boost the software scrutiny, the researcher carried out a thematic content analysis, together with a grounded analysis of patterns and themes, as well as data similarities in this study. In all instances, the report reflects data analysis as validated by the software, and incidences of discrepancy with explanatory reasons are provided.

### **4.6.1 Data analysis memoire**

The process of data collection and analysis for the study employs a trilaterally segmented mixture of scrutiny. It starts with volumetric and some non-text material and casual discussion notes, and is followed by quantitative analysis in the main, and later a fully-fledged qualitative examination.

#### ***4.6.1.1 Comments from locals in casual preliminary interactions***

Initially, inquiry on the local food waste situation and opinions came from the researcher observing waste dumping grounds, dirty sidewalks, and unsightly public open spaces as well as blocked sewer and water pipes. This led to sporadic interaction and discussions with some residents. The observation and casual-verbal accounts, driven by the researcher's innate spirit and Ubuntu grooming, planted a seed for a study on holistic issues of waste discarded by residents, including organic food items dumped and lost nutrition. This led to a research proposal and consequently, a formal academic study.

#### ***4.6.1.2 Quantitative data analysis***

Analysis of the wider and larger quantitative content comprised of feedback to the disseminated questionnaires. These responses and accompanying handwritten notes embraced a process to scrutinise mainly arithmetical information. According to Babbie (2007: 405), such representation involves unpacking and clarifying data converted from a numeric form into statistical analysis. The data breakdown in this study was computed using Microsoft Office Excel software and findings are presented, inter alia, through graphs, various charts, and table distributions. Together with supplementary notes from the researcher's notebooks, mobile phone records and social media (WhatsApp) chats with participants relating to the study, all the statistical data gave a descriptive foundation in preparation for the FGD meeting, data analysis, findings, and recommendations.

#### ***4.6.1.3 Qualitative data analysis***

In this form of scrutiny, the aim is to analyse non-numeric information such as interview transcripts, audio and picture recordings, text documents and images, to form categories of information (Creswell et al., 2007: 251). In advancing the rationale, authors draw from Strauss and Corbin (1998) who explain that the data sets then become a grouping of the statements into broad ideas called open coding, with the goal being to identify a core phenomenon, a general and central notion of themes upon which the entire occurrence – in this instance, food waste behaviour – is rooted. The questions for analysis are the types, disposal methods, and sizes of the wasted food, the environmental impact of such food wastage, as well as how locals feel when food is wasted. An added subject theme included suggestions from participants on how to curb food waste. Qualitative data for this research was thus analysed in line with identified themes consequential to the study objectives and the research questions. The themes are influenced by the socio-economic and demographic profile of the households of Wallacedene, based on sampled participants' recurring answers.

After the FGD, the researcher acquainted himself with the recorded interviews, prudently listening to the participants' contributions, translating and transcribing from isiXhosa to English. Then the transcript was repeatedly read, summarised, and logically arranged by codes and into groups of comparable information for a better sense of understanding. From their importance to the research questions, the coded groups were noted and linked to similar or comparable answer groups from the questionnaire feedback. Out of this result, related themes emerged, such as those aligned with high

rates of vegetables discarded, by disposing of leftover food (a) in the waste bin; (b) in the open field; (c) in the sink or sewer drain; (d) by feeding it to the animals; and (v) by offering it to the poor people such as those at informal settlements or street kids. On emotions, these answer categories were fitted into respective themes, e.g., landfill, water pipes, animal feed, compost, and feeling guilty.

After identifying codes, groups, and patterns of data, the analysis process of naming and defining themes led to broader themes, after a lengthy process of filtering sub-themes. The themes were named and defined based on their meaning and how they aligned with the research objectives; they were revised to regulate their sensibility and to ensure that they aligned and supported the data at hand. A few of the initially chosen themes became irrelevant and were rejected as new themes emerged. Soon thereafter, the ultimate stage was to convert the qualitative data into usable information that can be interpreted and related to the research questions and the literature. The researcher was thus able to explain the qualitative part of the study using the interpreted data as presented in detail and analysed.

#### **4.7 RELIABILITY AND VALIDITY**

To ensure reliability and to validate research tools that served as instruments for data collection, the researcher conducted informal exploratory discussions with residents of Wallacedene on food wastage and waste dumping across public open spaces. From the aggregate residents' comments, as noted, the study tools in the form of a research questionnaire and FGD schedule were developed and accordingly adjusted over time. Finally, these instruments were respectively used to collect data.

##### **4.7.1 Reliability**

Brynard and Hanekom (2006: 48) declare that reliability denotes accuracy, soundness, as well as consistency of any research instrument used for measuring. In an ideal examination, the researcher engenders the counterfactual anticipation, to appreciate and comprehend what the study seeks to step aside from, in order to thoroughly gauge the flow of everyday action and deeply inspect problematic areas of phenomena postulations (Alvesson and Deetz, 2000: 91). The administered instruments selected for this study accordingly present elasticity to avoid incorrect and irrelevant data, while they also ought to produce similar data results at a later stage, under comparable conditions. So, the variance in yardstick features should not then impact its ability to be consistent, while the population

feedback should also remain similar, irrespective of who conducts the study and when, as indicated by Nyumba et al. (2018), Babbie (2007), and Creswell et al. (2007).

#### **4.7.2 Validity**

To be valid and demonstrate rationality, a chosen research instrument must measure what it is meant to measure; this includes the degree to which it precisely accounts for what it purports to calculate and measure (Brynard and Hanekom, 2006; Creswell et al., 2007). The researcher developed a range of validity checks, to ascertain the validity of questionnaires and other research instruments (Hoaeane, 2020: 71). These tests include a few methods, namely: (a) face validity; (b) content validity; (iii) construct validity; and (d) criterion validity methods. In addition to the face validity test of internal validity, for research reasons, this food waste examination used the content validity method, to scrutinise the self-administered questionnaire intended mainly for data collection in numeric form, as well as the FGD schedule designed to collect qualitative data. The face validity method calls for the researcher to extract the personality of self, from the present research context, and assess observations from a common-sense view, as to whether the investigation has reached the correct conclusion. Hoaeane (2020: 72, citing Pietersen and Kobus, 2016) indicates that the content validity test denotes the “degree to which the research instrument completely and accurately measures variables it aims to measure”.



#### **4.8 RESEARCH LIMITATIONS**

The study identified a few key limitations. Due to the study focusing on food and the resultant waste thereof based on participants' behaviour, a great deal of related issues pertaining to solid waste, could not be addressed, including the broader municipal management of the dumping of waste at various public open spaces across Wallacedene. Regarding the study itself, the researcher experienced difficulties in retrieving feedback from questionnaires since more than a third of questionnaire recipients did not return the forms on time, i.e., within the allocated two-week period or immediately thereafter. Resultantly, the researcher had to make repeated follow-up household visits, to collect the research questionnaires and to include these for the preliminary data analysis. Some questionnaires were returned with a few blank spaces or some unanswered questions, while four were returned completely unanswered, with 11 forms not returned. Local land occupation protests and CCT forced removals impacted on a handful of respondents. These events only delayed the research events but

did not prevent the research from continuing. Another challenge was that a few questionnaire respondents were sceptical to take part in the FGD for various and mostly personal reasons, while a handful of them made it clear in advance that they decline participating. In particular, there was one participant who agreed to participate in the FGD, only to ‘bail out’ at the eleventh hour, and was replaced. These developments, compounded by arranging a suitable date and venue for all invitees to participate in the FGD, resulted in some minor delays in the study. Nevertheless in sum, the restrictive conditions and eventualities did not prove insurmountable, and the study was, therefore, able to collect and make use of some rich and varied sources of research data.

#### **4.9 ETHICAL CONSIDERATIONS**

Universal principles of ethical social behaviour are critical for any research; this applies in the social sciences as well (Alvesson and Deetz, 2000). Before the study commenced, ethical clearance was obtained from the UWC Senate – Ethics Committee, through the Economic and Management Sciences Higher Degrees Committee (Institute for Social Development: School of Government). All possible efforts to protect the rights and welfare of the participants were adhered to in this research. The study also provided willing participants with research information and consent forms to read and sign. The documents contained an explanation of the nature and purpose of the study, what was expected from the participants, and clear guidelines on what to do. The research information together with consent documents notified participants of their rights during the study, that their participation was voluntary and that they could withdraw from the study at any time. Confidentiality and anonymity were guaranteed to FGD participants by ensuring that collected data shall not be linked to participants by name; instead, numeric numbers were used to identify participants. Respondents were informed about the protection of their personal information, that it would be safely stored electronically, and would only be accessible to the researcher and his supervisor, and that no unauthorised person(s) would be given access to the data. The study exercise protected and respected the participants’ desires, wishes, and wellbeing while being treated with fairness and ensuring to communicate results to participants, for verification purposes and to avoid misinterpretation of research findings. The researcher thus adhered to all the ethical guidelines specified by the Higher Degrees Committee of UWC and the Faculty of Economic and Management Sciences.

#### **4.10 SUMMARY**

This chapter outlined the research methodology employed in the study. It further discussed the study population, sampling techniques used and the justification for using these techniques, showing a blueprint or plan of how the study was conducted to extract both quantifiable and qualitative data. The chapter explained how a mixed-method (triangulation/dualism) approach to this case study research is also justified, together with allowing both open-ended plus a diversity of closed-ended answers. Furthermore, the chapter discussed the criteria for the sampled population of 100 households, including the sampling techniques used, such as categories on area historical occupancy and residents' ability to articulate information clearly. It gave a clear exposition of the manner in which methods and instruments of data collection align to the study and its objectives, based on the feedback received from 85 completed questionnaires.

The section covering research tools, equipment, and data analysis in this chapter brought value to offer the study capacity for both numeric and observational scrutiny. This section also reported on cell phone technology used to capture discussion during the FGD, as well as challenges encountered such as absent FGD participants due to taxi violence, and area land conflicts between the community and authorities, together with data collection processes, in spite of such trials. The chapter subsequently discussed the study's reliability, validity, confines, and limitations, including limited resources to include more residents in the study. It also highlighted the difficulties in recovering feedback data, in contrast to the researcher's actual regular repeat follow-up household visits, often after sunset, to collect questionnaires from participants to include as much qualitative data for preliminary and auxiliary analysis as possible. The chapter concluded with an outline of the study's adherence to all ethical considerations to protect and respect the rights and welfare of the participants.

# **CHAPTER FIVE: DATA PRESENTATION, INTERPRETATION AND ANALYSIS**

## **5.1 INTRODUCTION**

The study sought to assess household food waste and types of food items wasted in Wallacedene, and how regularly the food is wasted as well as what happens to the unconsumed food. Also captured, are the feelings and attitudes of participants when food is wasted. The main objectives of the study include an analysis of food waste and its patterns in the area and assessing people's behaviour towards food waste. This chapter aims to revisit the research objectives and research questions and to determine the degree to which the views in the literature are substantiated by the study's findings. The research questions are used to guide the structure and layout of this chapter. Study participant demographics are provided, including their broad household variables. Also, a diverse array of food waste research results is presented in the form of data graphs, tables, charts, and direct quotations.

## **5.2 DATA PRESENTATION**

This study considers food waste in light of the United Nations Sustainable Development Goal (SDG) target 12.3 of Agenda 2030 (UN, 2015) and more specifically in the context of SA, with its food insecurity landscape, the broadly prevalent food wastage across all communities as well as hunger and poverty alleviation goals, as conveyed recently by the CSIR report (CSIR, 2021). In this study, data was collected at Wallacedene, an informal housing settlement on the outskirts of Cape Town, in SA, to spread awareness and to educate participating households on the ground about food wastage while closing some scholarly and literature gaps in exploring food waste locally and internationally.

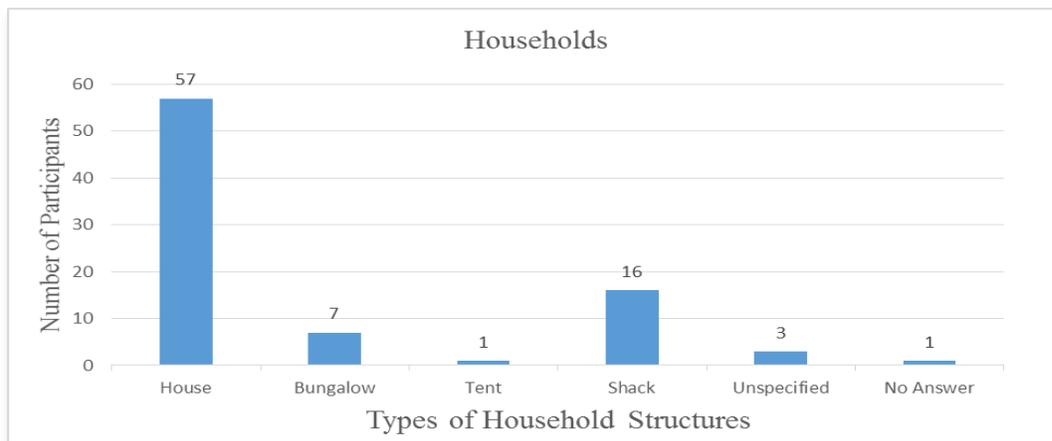
### **5.2.1 Demographics of respondents in the Wallacedene study**

In this study, the variables describing the demographic profile of participants include household types, sizes, and occupancy, as well as the numbers of people regularly handling food per household. Inclusive, 85 people took part in the study. The respondents were Black and Coloured African men and women who are residents of Wallacedene. All 85 respondents completed the questionnaire and seven among them took part in the subsequent focus group discussion (FGD). The study did not consider race, religion, gender, income, etc. in identifying participants; however, only adults took part in this research. Part of the objective of this study is to formulate recommendations to reduce

household food waste and improve food and nutrition security in Wallacedene. The majority of families in this community are suffering enormously from food waste because many are poor underprivileged families and are affected by joblessness and food insecurity. From a microcosm of such a small Cape Town settlement, a contextual South African situational view is highly crucial.

### 5.2.1.1 Household types

**Figure 5: Types of households**



Source: Own data, 2021

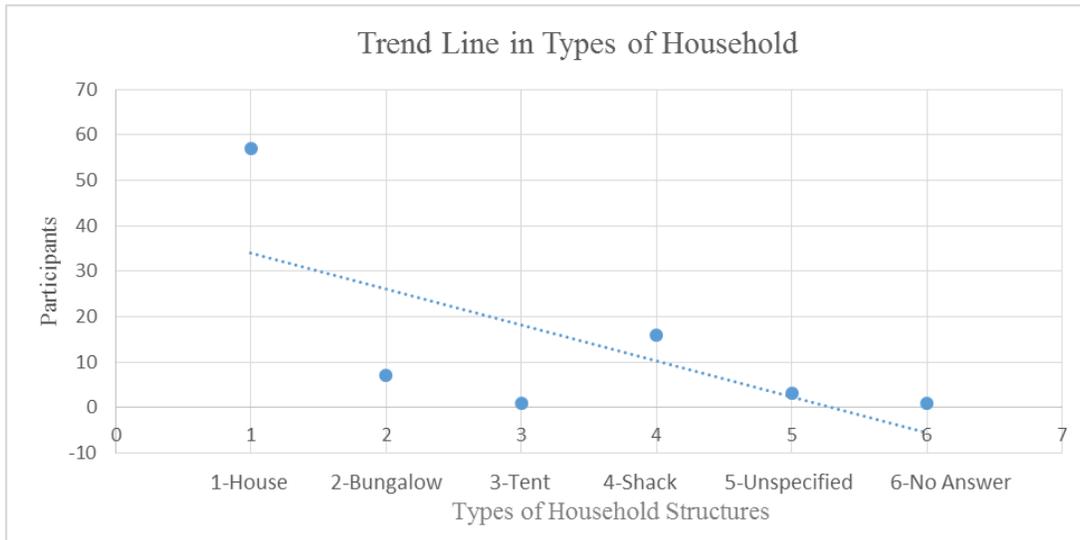
Figure 5 represents the different types of households from where the 85 participants originate. The data shows that 57 participants (67.05%) live in a formal house, 7 (8.24%) reside in a bungalow, 1 respondent (1.18%) resides in a tent, 16 (18.82%) live in a metal shack, while 3 (3.53%) of the respondents only wrote ‘residence’ without being specific and 1 (1.18%) did not answer. This data as well as data from Figures 6 and 7, together with Table 2, all serve to position the sampled households concerning the study area. As the discussion of study findings progresses, the information contextualises and reflects respondents’ feedback per dwelling type, size, occupancy, and the number of persons who regularly handle food at each of their places of residence.

The results in Figure 5 show that a considerable number of households occupy formal houses. This means that 67.05% of resident households are connected to the municipal bulk infrastructure in the form of storm water drainage and potable water plus sewer reticulation. Further on in the study, this information bears considerable significance, as questionnaire and FGD respondents highlight an

important challenge in the community resulting from food waste contributing to the congestion of sewer and water infrastructure.

### 5.2.1.1(a) Household variables relationship

**Figure 6: Household multiple linear regression chart**



Source: Own data, 2021

This data shows a single trend line that denotes the relationship between the scalar responses of participants living in the sampled 85 households. It reveals in numbers 1 to 6 the forms of household structure occupied by respondents, starting with a house, then a bungalow, a tent, and a shack. One of the last two did not specify the type of structure and the other did not answer. The data reflects feedback per type of household and how multiple independent variables are related to one dependent variable, which is a dwelling structure in this case. As such, it also explains how the variables are framed and in what context. For example, this is a township RDP settlement which still has shacks/tin-structures and tents etc. This is completely different to an upmarket suburb and is also opposed to a rural set-up with a scenario of multiple rondavels (round-thatch-roofed structures) located in a single homestead etc. The data relevance connects when analysis centres on various methods used per individual household to discard food waste. This information is important because unlike Schott and Andersson (2015: 219) who sort through waste composition in Sweden to run an analysis of food waste, or the WWF study (*Farmer's Weekly*, 2017) in Rustenburg, North West

Province, this research relies on home occupants to declare information for the study to collate data, starting with singular households and how each one deals with its respective food waste.

### 5.2.1.2 Household sizes

**Table 2: Sizes of participants' residences**

STRUCTURE	Number of household rooms										Answer
	One	Two	Three	Four	Five	Six	Seven	Eight	Nine	No	
House	2	5	5	7	7	1	2	2	1	25	
Bungalow		5								2	
Tent		2									
Shack	2	3	2	2	6						
Other										4	
Total number of participant households = 85											Inclusive number of declared household rooms = 183

Source: Own data, August 2021

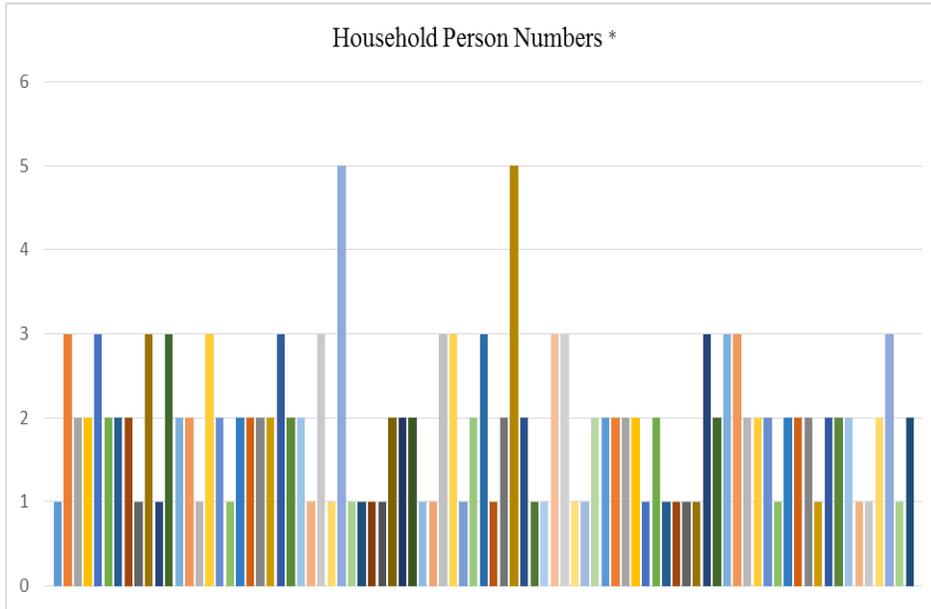
The data presents the different sizes of dwellings occupied by participants. Information on household sizes, types, and the number of people living in each household as reflected in Figure 7 below, directly connects to the study, as food waste is “becoming an important issue in light of population growth and global food security concerns”, according to Oelofse et al. (2018: 1). Of the total number of 85 people who participated in this study, around 63.53% declared their household number of rooms. This numeric from the sampled population concerning the area residences reflects the study reach, particularly regarding contemporary locality numbers. This is comparable to an earlier Wallacedene area and its former square kilometre radius as well as the number of its inhabitants then, at the time of the previous household count, when there were about 146,000 households, as stated by City Population (2011).

Contextually, these figures are reflected and clearly outlined in Chapter One. Hence, the relevance is the data weight to expose the volume of household capacity concerning occupancy, to conceptualise dwelling sizes and the participant numbers. This statistic, as well as Figure 7 below on people's

occupancy per household, are very crucial for the connection of types and amounts of food wasted and to correlate these with methods of how each household disposes of all such unwanted food items.

### 5.2.1.3 Number of persons in each household

**Figure 7: Household people numeric**



\* Legend for household person numbers chart

1	Households with between one and three persons	28
2	Households with four, five, and six persons	38
3	Households of between seven and nine residents	17
4	Households with ten to fifteen persons	0
5	Households consisting of sixteen or more persons	2

Source: Own data, 2021

The question about the number of persons in each household is the only question that was answered by all 85 respondents. Eventually, it gives a comprehensive and contextual picture of the stratified sample size, about the area population, as described in Chapter One and the preceding section, point 5.2.1.2. On this question of household occupancy, 2 respondents (2.36%) reported each having a maximum of 16 or more family members, while no household (0%) recorded occupancy of between 10 to 15 persons. Furthermore, 17 respondents (20%) indicated having between 7 and 9 persons each; 28 respondents (32.94%) reported having their homes inhabited by 1, 2, or 3 persons, while 38

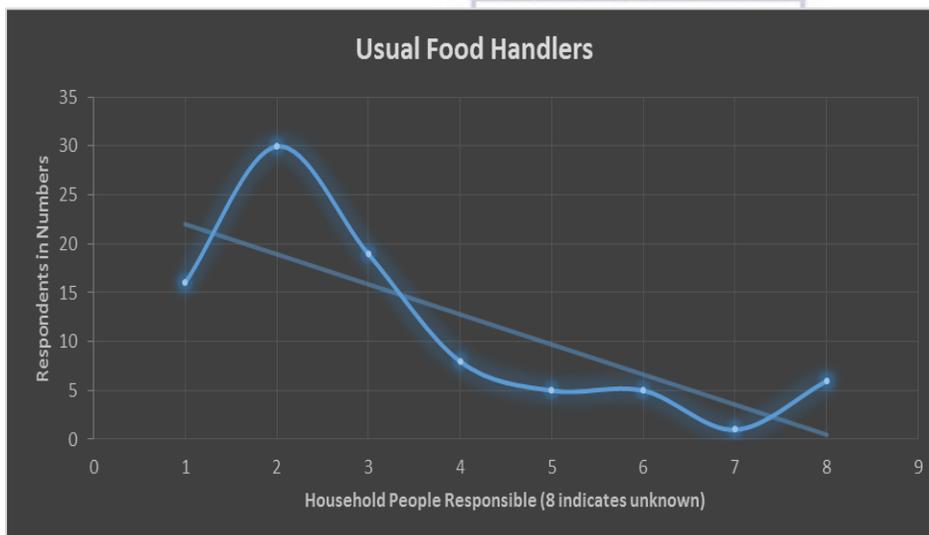
respondents (44.71%) indicated having between 4 and 6 residents. The data gives ample circumstantial depiction of the population sample size, in contrast to the area population.

According to Williams et al. (2012), household occupancy has a direct link to sizes and amounts of food waste. This connection is confirmed by Katajajuuri et al. (2014: 327) who posit that, “the size of the household was directly correlated with the (food) waste produced”, and hence therefore “the more people there were in a household, the more (food) waste was produced”. This data also allows for appropriate dimensions as the study proceeds to reveal types and sizes of food waste in households. More importantly also, it provides to scale the impacts of the wasted food as it is discarded at various places and in different forms, methods, and quantities.

## 5.2.2 Regular food handling numbers

### 5.2.2.1 Consistent household participant food handlers

**Figure 8: Household regular food handling indicator**



Source: Own data, 2021

The question in this section wanted to determine the number of people often responsible for handling food at the 85 participant households. According to Stancu et al. (2015: 13), a sizable impact on food waste is from “stronger planning routines” which are linked to less waste. This has particular relevance on planning and is often influenced by the number of people usually responsible for food handling in the household, as related to specific roles in line with food harvesting, shopping, storage,

cooking, serving, and cleaning after meals. From this question, 16 respondents (18.82%) reported that only one person was responsible for regular household food handling, while 30 (35.29%) said that two people regularly handle their household food. Furthermore, 19 respondents (22.35%) reported that three family members regularly handle their household food, while 8 respondents (9.41%) indicated four and 2 respondents (5.88%) answered five, with another 2 participants declaring that six persons were responsible for regular household food handling, while 1 respondent (1.18%) answered seven, and 6 participants (7.07%) did not declare the information.

These results indicate actual proportions of food handlers and the trend line thereof. Results from the data chart show a graph pitch where two persons are often responsible for handling food, with both one person and three persons closing in. When analysed in comparison with feedback data from the subsequent section on methods of food waste disposal, the data reveals a food waste spike where there are more than three persons handling food. It is noteworthy that among the 85 participants, 63 respondents (74.12%) from households with one, two, or three persons who regularly handle food reported discarding unwanted food, primarily through garden compost and animal feed.

On the other hand, only 18 respondents (21.17%) in the category of households with two persons responsible for regular household food handling, cited their choice of discarding unwanted and leftover food as using the waste bin, sewer, and water drainage systems or throwing food waste in the open field. In the same category, 4 among the studied group (4.71%) did not answer the question. This data indicates, therefore, that households with minimal hands responsible for regular food handling may be lesser prone to mishandling food and hence better equipped to curb food wastage. This is a true representation of an old proverb in isiZulu that says, “*Iningi liyabona ubende*”, which loosely translates to the old English adage, “Too many cooks spoil the broth” or “Too many hands spoil the pot”. These are historical sayings that are as old as humanity, reflecting the protection of nutrition, sustainable livelihoods, and food security through the preservation and proper use of natural resources, with awareness of food education being the main pillar to eliminate poverty and hunger.

According to FAO et al. (2020: 16), “projections on extreme poverty” globally show an upward trajectory “with sub-Saharan Africa” and its lesser advanced and “fragile economies of the region”, particularly poverty-stricken communities, “becoming home to a large share of the world’s poor

people in 2030". This study thus considers food waste in a holistic view, from household food sourcing to the discarding of unwanted food. Hence, no specific area is distinctly emphasised or another disregarded in wasted food observation and measurement, relative to others, although some respondents did not clearly understand this question about household numbers of people usually dealing with food within each household. Also, on a deeper food waste level, exact numeric on different areas such as harvesting, shopping, storage, cooking, serving as well as after-meal food behaviour like cleaning, the roles may be duplicated since household individuals may be responsible for taking on more than one role. Thus, a future in-depth study focusing on each of the areas may be an added data advantage, to fully grasp the phenomenon of food wastage at each level.

### **5.2.3 Understanding of food wastage, and food waste disposal routines**

This section centres on respondents understanding of food wastage, and food waste routines in the various tangible methods of disposal of unused and unwanted food, together with municipal waste collection patterns. Frequently wasted food types and categories are also outlined in detail, including their amounts. The section then discusses how participants feel when food is thrown away, and is rounded off with suggestions to curb food wastage.

Respondents in this study, both from Questionnaires and the Focus Group Discussion (FGD) had some idea of the meaning of food wastage, though not formal. When assessing feedback from the 85 respondents, 48.24% admitted to wilfully throwing food away in waste bins, and throwing leftover food in the sewer drains or outside in the open field. Only 2.35% said they use food remains as compost and others did not declare. However only 3 among the group spoke closely to defining food waste. Participant 4 exclaimed, during the FGD (2021) of this study: "If you look at the amount of food that is thrown out and the gain (nutritional value) in that food, especially in the peels?" Participant 3 admitted also that from observing rubbish dumps across public open spaces, one can notice vast amounts of variety edible items thrown out in the open. Another said she stands to learn a lot about the subject topic in that it never crossed her mind to take food for animals like pigs since Wallacedene has urban farms nearby. She added that such conversations are not happening and yet food wastage does not only happen where there is abundance (food security), it also happens where there is lack of knowledge and lack of understanding of one's situation (Participant 6: FGD, 2021).

Of the 85 participants in this study, only 5 of the respondents (5.88%) declared that they do not waste food at all, that they ensure full use of food that is procured either through purchasing, harvesting, or by any other means. During the FGD there was an affirmation that someone digs a hole in the ground to bury skeletons, carcasses, skins, and mandibles, which Schott and Andersson (2015: 220) categorise as unavoidable food waste, in line with “peels, bones, shells, etc.”. This line of thought may be under contention from various sections, in particular from poor communities, since fruit and vegetable peels are highly endowed with nutrition. This was also noted during the FGD interview transcripts when one of the respondents commented:

If you look at the amount of food that is thrown out and the gain (value) that is in that food that is thrown out, especially in the peels ... (Participant 4: FGD, 2021).

### 5.2.3.1 Methods of food waste disposal

**Figure 9: Disposal of unwanted food**



Source: Own data, 2021

When assessing the feedback in this section, it shows that 41 respondents (48.24%) of the 85 admitted to throwing food away consciously or intentionally in the municipal waste bin, as well as using other methods described further in the study, such as throwing leftover food in the sewer drains or outside in the open field. Meanwhile, 2 of the respondents (2.35%) indicated their choice of using food remains as compost, and 12 respondents (14.12%) chose not to reveal their preferred ways of

discarding unwanted food, as shown in the chart. Authors such as Dladla et al. (2016) and Stuart (2009) underscore the value and benefits of food re-use and food recycling. In this regard, this study discusses the responses of the 27 respondents (31.76%) who highlighted animal feed and composting as their choice of alternative use of leftover and unwanted food, more expansively, as the study progresses (see point 5.2.3.1(b) below).

Among the 48.24% of respondents who admitted to throwing food away, together with nearly 15% whose unwanted food destination is unclear, some respondents disclosed their habits of discarding food remains at public open spaces and local fields or public parks, for unclear reasons, possibly such as lack of a municipal waste bin. The researcher, as noted in earlier chapters, has first-hand grassroots experience of the study area and can attest to high incidences of municipal bin theft, for alternate uses in the informal economy, e.g., for use during building and construction activities, street vendor business activities, brewing traditional beer, and recycling of scrap and other profitable waste materials like plastic, cardboard, etc.

In the study, 5.88% among the 85 respondents sadly acknowledged their contributions to the increased blockage of storm water and sewer drainage systems by using the water reticulation infrastructure as disposal channels for all their unwanted food. In addition, among this group, words such as “Throw in the drain” or “Throw in the sink” and “Flush in the toilet” were used, when referring to methods of unwanted food disposal. This aspect was comprehensively discussed during the FGD (31 July 2021) and thereafter, all FGD input from respondents is reflected with each participant number after each of their responses. On the question of the ecological as well as the infrastructural impact of food waste, in the blockage of storm water and sewer drainage systems, and how the community reacts to the environmental challenge, one FGD respondent observed as follows:

For instance, if like all of us are based here in Wallacedene. So, I always question. Like Saturdays, you know a manifestation is that you know we normalise wrong things. So, first of all, it's how we define a park? You know, we have a place there referred to as though it's at the park. You know, and people go sit there to relax their minds, but there's [dirty] water, there's drain sewer water, there are faeces, but we drink a bottle of Hennessey [expensive

whiskey] and we braai meat and two meters away there are faeces, there's sewer drain water. And it is fine, we're relaxing, we're happy and having a nice time (Participant 7: FGD, 2021).

Such a “manifestation” is a concerning phenomenon on its own, that a community will normalise the overflow of excretion on their streets and continue as if nothing is wrong. Another FGD participant expressed frustration at the status quo that includes the discarding of food waste at public open spaces, as well as dumping of numerous items and objects like dead animals, carcasses, and associated animal products, and general solid waste. The participant expressed that:

Because it goes to a point whereby people even throw dead dogs just there. Even dead animals, yeah, cow heads. Yho! Animal brains and skins, all that one can think of, they just throw it there. So, that has a negative social and environmental impact on the community at large, not only to certain individuals but the community at large. Because once the food and other organic material are thrown there, it becomes rotten, the municipality takes its own time to come, to clear the space, to clean it up (Participant 4: FGD, 2021).

The extensive nature and impact of discarded food added to other solid waste forms is further outlined in this FGD as various respondents expressed opinions, while reflecting on the issue:

Sometimes when it rains, there is water and then the whole place is wet and pathogens then develop out of such dirt and waste and then kids can get sick. It's a sad state of affairs (Participant 6: FGD, 2021).

As other participants agreed with the preceding observations, it became increasingly clearer that there are vast implications to throwing away food items and other related organic material in the open. The researcher has work experience in the roads, storm water and sewer reticulation, and construction sector and can confirm that local street-storm water catchment and sewer pipes (usually 1 meter in diameter) can only absorb a certain amount of water/sewer before flooding, especially during heavy rains. Immediately when there are non-water and non-sewer objects such as animal skin, cow heads, dead dogs, food and fatty waste, plants, vegetation and other items like old clothes and disposable

nappies, etc., the infrastructure collapses. Another participant added her view on the matter and stated:

The other thing also, because of this food waste thrown in the drainage system, for the mere fact that it's blocked, the whole system then blocks and all the sewer starts overflowing. Now, you can imagine if that thing has to be like that for almost over two months. It has a way of affecting the child's mentality, and the way the child thinks. Because the child may take that environment to be normal but in fact, it is an environmental dysfunction and challenge for their health as well. Yes, it's very sad. It manifests itself mentally and, you know, psychologically. To see that thing, you know, to see sewer waste, you know, all the time, things are broken, nothing is like ok (Participant 7: FGD, 2021).

It is clear from the discussion that huge quantities of naturally palatable produce and highly needed nutrition find their way through storm drains and sewer pipes. This causes pipe blockages and sewer flooding into the streets and walking paths as well as into yards and open fields. The needless over-spills ultimately flow into rivers and to the ocean. Katajajuuri et al. (2014) state that such acts lead to water eutrophication and this is even more important in SA due to our water situation. Oelofse (2015; 2019) and various local water authorities have cautioned that SA is a water scarce country; hence, citizens are required to avoid wasting resources like water.

Moreover, almost 50% of respondents in this study who confessed to food waste causal behaviour and many from the remaining half, admitted that the waste bin plays an even bigger role in contributing to the loss of edible sustenance among the assessed group of local community members. Participants, including those who may not have fully answered the questionnaire, noted that the waste bin in all its types and sizes, is a recipient to a lot of food waste as well as various forms of packaging and containers like plastic, that are used for unwanted food items.

The most repeated word in the questionnaire feedback is 'bin', and while it is used in different ways, the refrain persisted: 'Throw in the bin'. Venturing into the Wallacedene municipal waste bin contents, was not possible during this study, even though it is a logical step to follow going forward. But for purposes of this study, the contents of waste bins were not examined. Therefore, the researcher

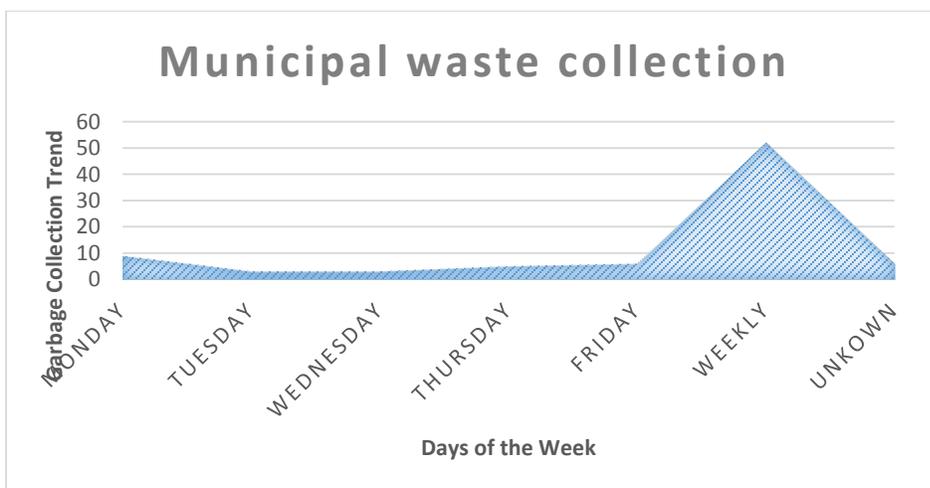
considered the municipal waste collection days or trends and movement of waste bins as the bin is repeatedly mentioned and often referred to by respondents as an item of household interest and, as mentioned, a foremost recipient of huge amounts of food waste.

According to the data presented, the municipal bin is used primarily as a receptacle of discarded unwanted food. It therefore means, based on information from studied households that all food that is thrown away in bins will end up in landfill sites, as per municipal waste collection routine. Many waste management experts, backed up by numerous scholars (see for example, Dladla et al., 2016; Ramukhwatho et al., 2018; Simelane and Mohee, 2012; Song, Li and Zeng, 2015; Williams et al., 2012) are vehemently of the opinion that landfills should be of minimal use, because detrimental gases like methane, emanating from landfill sites also contribute hugely to global warming and climate change.

The following section assesses the area trends in terms of municipal waste bin collection, since the unpacking of waste bin contents was not within the ambit of this study. Thereafter, the study analyses the available data from participants who use unwanted food to feed animals and for composting, instead of feeding the waste bin.

### 5.2.3.1(a) *The waste bin and its role in food waste*

**Figure 10: Household municipal waste collection days**



Source: Own data, 2021

The municipal waste collection days are generally from Monday to Friday, with Saturday being an odd but occasionally used day. From Figure 10 it is evident that 9 respondents (10.59%) reported that their municipal waste bin is emptied on Mondays, 3 respondents (3.53%) said Tuesdays, with another 3 saying the waste collection is on Wednesdays. Another 5 respondents (5.88%) said their waste bins are emptied on Thursdays and 6 respondents (7.06%) said Fridays. In answering this question, a majority 52 respondents (61.18%) used phrases such as “once a week”, “end of the week” or answered by saying “during weekends”, with 6 others not indicating when their waste is collected by the municipal solid waste division. The graph in Figure 10 thus appears low and stable during the week and shows an enormous spike when the weekend arrives. During analysis of the municipal waste collection trends in this study, it was apparent that as Gustavsson et al. (2011) state, further research and measurements of surrounding suburbs’ food waste are needed, for a fuller understanding of the loss of nutrition at a municipal waste bin level in Cape Town’s informal housing settlements and surrounds.

A new local perception of how residents interact with the waste bin is thus urgently required and this chart analysis (Figure 10) may be a start. The emphasis on redirecting food waste is overwhelming in this informal housing settlement, and the data presented in Figure 10, may be a useful guide for future research, as Porpino (2016) and other experts in the field also advocate. In this study, it seems that Fridays or Mondays would be the most appropriate days on which waste may be collected, for intense analysis of waste bin contents, to determine the nature of the food that is thrown away. This will be in contrast to almost 30% of participants in the Wallacedene study who reported feeding animals with leftover food. As things stand, Mondays could be more ideal, as most waste accumulation happens at the end of the week, into the weekend. However, a significant element in this proposal, is that 60% of respondents having merely stated that their municipal waste collection takes place once a week, end of the week, or during weekends, without specifying a particular day of the week. Also, as a local inhabitant in the area, the researcher can attest and confirm the sight and knowledge of animals seen feeding in waste bins and public open spaces, especially during Fridays and on weekends.

When trying to find the foundations of the philosophy of Ubuntu, in line with principles of a locally suitable and “environmentally beneficial treatment alternative for food waste”, as Schott and

Anderson (2015: 219) indicate, some community members in Wallacedene opt to feed animals as a substitute. Those residents who are working with small-scale farmers, do this by placing a 25-litre container next to the municipal waste bin, anywhere in the vicinity of the household entrance gate or along the fence line, and in it, they regularly throw all unwanted food instead of discarding items in the municipal waste bin. Once a day or so, local urban livestock farmers come and collect the food remains from buckets lined on the street, and use this bounty to feed their flock.

Porpino (2016: 42), an advocate of a research agenda regarding household food waste and who believes it is a neglected topic within the field of consumer behaviour, says “if a family, for instance, chooses to feed pets with leftovers, an appropriate means to discard food might have been reached, but waste itself was not avoided”. In the FGD, views show that the academic logic does not always hold on the ground, as shown in the subsequent sections of the study. Ultimately, it is worth pointing out that the community of Wallacedene does indeed waste food, and this example from one FGD participant partly shows how it is happening:

I stand to also learn a lot. For instance, it never crossed my mind that I can take food – we have farms nearby – and take it for the pigs, you understand. So, such conversations are not happening and wastage does not necessarily need to happen [only] where there is abundance. It can also happen where there is lack of knowledge and lack of understanding of your situation (Participant 6: FGD, 2021).

Therefore, the Rustenburg WWF study cited earlier in Chapter One, published in *Farmer's Weekly* (2017) cannot be adjudged as misplaced on its findings and what it reveals. Specifically, that household food waste as a total weight of domestic waste is high (27%) in low-income areas, and low (13%) in middle-income areas while averaging (17%) in high-income areas of the group studied. In the Wallacedene study, the contents of municipal waste bins were never scrutinised, as stated, and only respondents' feedback was used and analysed to ascertain the types and sizes of food discarded in bins. The results, however, show a similarity in terms of low-income household food waste, as many participants in this study admitted throwing nutritious food in bins and elsewhere. Hence in this study, a seed is planted not only for local research purposes but also to aid small-scale urban

farmers who, from day-to-day go out to collect household food leftovers to stabilise and sustain their animals' food security.

Theories such as one used in this study, the grounded theory, endorsed by Papargyropoulou (2014), Gardner and Abraham (2007), Creswell et al. (2007), Krueger and Carsrud (1993) as well as many others, show that established and systematic methods to examine occurrences are characterised by extrapolation of general laws from particular instances or phenomena. Also, that research work should deliver a broadly absorbed, abstractly local, and conceptually weighty view to explain the studied empirical phenomena. In this light, Creswell et al. (2007: 249) also stress that theories should be rooted in data from “actions, interactions, and social processes of people”.

Scholars such as Metz (2011) allude to the morality of theories on Ubuntu and human rights, while Metz and Gaie (2010) emphasise consequences for research on morality. Thus, in this work, priority cannot only be social science and academic investigation while food insecurity is a matter of life and death in poor South African communities. If the local small-scale livestock farmer can also benefit from this research, its field operations, and its publication, it will help many families to end hunger while advancing not only the discourse but also residents' action on curbing food waste through forwarding unwanted food to Wallacedene animal farms and using it for garden compost, as indicated. In context then, such acts as feeding animals, particularly livestock, may therefore be more pragmatic than ‘feeding bins’, as highlighted earlier, where waste is collected weekly to heap landfills and harm the environment. In the next section, the study discusses the participants' choice to feed animals with excess food instead of resorting to other methods of food disposal.

### ***5.2.3.1(b) Animal feed and compost as forms of curbing food waste***

#### ***5.2.3.1(b)(i) Animal feed***

On the question of food waste disposal methods and what alternatives participants regularly use as discussed above, instead of the waste bin, the open fields, and water pipes, almost 30% of respondents declared that they chose to feed animals with their unwanted food. Others opted to use such food as garden compost. Here is one local view expressed during the FGD showing that scholarly reason is distant from the grassroots:

Well, I mean being in Wallacedene for quite some time now, we've got a situation where people would throw food into the drains and all the sewer pipes, even if it's food that can still be used for feeding farm pigs. Do you understand? Like, if there is a way of collecting food to feed maybe the animals in the farms, especially pigs, which most of the people in Wallacedene, that's where they benefit from, because most of them they would buy meat – pork – and slaughter it and begin to sell it ... let it rather be going for a useful purpose, like feeding the pigs in the farms. We've got farms around the Wallacedene area that can be [used]. That food can be channelled, instead of going into the drains and the dustbins, it [that food] can go to feed the pigs in the farms (Participant 4: FGD, 2021).

Papargyropoulou et al. (2014: 107) present an interesting calculation “of food produced at field level globally and estimates of the losses and wastage in the food supply chain”, which includes animal feed. This is in line with Stuart (2009), when “stating that food waste should also include edible material that is intentionally fed to animals”, as posited also by Papargyropoulou et al. (2014: 108). Porpino (2016) similarly shares this view, as reflected above. However, due to limitations, this study could not measure the weight of food waste from animal feed drums or waste bins. The researcher therefore used information as presented by participants to conclude that under the outlined area, social conditions and circumstances, and seeing levels of unemployment and food insecurity in Wallacedene and SA generally, when collecting food remains to feed their local urban farming livestock, the participants in this community of Wallacedene who feed animals with leftover food cannot be seen to be wasting food. This view is backed up by the assertions by Porpino (2016), Papargyropoulou et al. (2014), Stuart (2009) and other experts. Furthermore, given the principle of Ubuntu and how its guiding ethics demand a societal paradigm to serve other creatures, as well as taking care of one’s own family and community, this study maintains that all respondents who feed animals with food waste should indeed be encouraged.

### ***5.2.3.1(b)(ii) Composting***

Composting is also reported by a sizable group in this study as a viable option used to curb food waste, in that, as food provides essential nutrients for humans when absorbed, the soil can also use those nutrients from leftovers. Dladla et al. (2016: 5) assessed “composition of the waste streams from” eleven “African countries” and report that it “consists mainly of organic” material, which

“clearly indicated that the organic waste is the most produced waste”, as Figure 4 shows. Less than 2% of edible food waste is recovered to feed poor people, according to Dou, Ferguson, Galligan, Kelly, Finn and Giegengack (2016). All food waste not fed to animals should logically therefore be used for composting. This is what was said by participants during the FGD when the issue of composting was under scrutiny:

Such waste then makes the bin smell filthy, whereas here we have a garden and one can take your butternut peelings or whatever skins and throw them there to serve as compost or manure for the soil (Participant 1: FGD, 2021).

Supporting this view, another participant made input on practical food regeneration and alluded thus:

To add on this item of peeling. Like, if after you peel off a potato’s skin and you take it and moisten it [gesturing a squeezing hand sign] and plant it in lines in the garden, you have again made a potato seed because another potato is born out of that, therefore making another potato (Participant 2: FGD, 2021).

### 5.2.3.2 Reasons for food wastage and discarding of food

**Figure 11: Throwing edible food away**



Source: Own data, 2021

**Figure 12: Regularly wasting food**



Source: Own data, 2021

The questionnaire purposefully planned two comparable questions, and these were asked in different ways to elicit authentic and rich data, as reflected in the above pie charts. Participants in this study were first asked if it ever happens that they throw food away, and in a similar inquiry, they were asked if each of them as individuals thought that they waste food at given points in their daily lives. Of the 85 participants in the study, the initial question was answered by 82 respondents and 3 abstained, while in the follow-up question 80 participants responded and 5 did not answer. Figure 11 illustrates that 70 respondents (85%) agreed that it does happen and that they throw food away and 12 respondents (13%) answered no, with 3 respondents (2%) not answering.

In Figure 12, it is noteworthy that the number of individuals who think they waste food at given points in their daily lives, decreased to 51 respondents (60%), with 29 respondents (34.12%) indicating they do not, and 5 respondents (5.88%) did not answer. This shift in disparity in how respondents answered may have been influenced by the latter question requiring an explanation, as opposed to a 'yes' or 'no' answer. Nevertheless, despite the minority of Wallacedene community households' efforts to recycle unwanted food – using it as animal feed and for composting – the verdict is out and clear, as one FGD participant said:

I think we do waste food. Because whenever we eat it, sometimes we don't finish the food, so we just throw it away. So, we do waste the food (Participant 3: FGD, 2021).

Another FGD participant echoed this sentiment:

Yes, we do waste food, because some of us do not think that we should perhaps go and give food to, for example, the dogs, or take this leftover food and find someone to offer it to. We take all that food and pour it in a plastic bag, tie it up and throw it in the bin, without even thinking there are people in need of such food. So, we do indeed waste food (Participant 2: FGD, 2021).

Feedback from respondents was very interesting and revealed an overwhelming ‘yes’ to the fact that respondents in this Wallacedene study do indeed waste food. The 37.09% variance reflected between the two data sets in Figures 11 and 12, is likely ascribed to the fact that Question 3 of the questionnaire required a straight yes or no answer, whereas Question 4 asked respondents to explain their answer briefly; hence, fewer participants answered the latter question or admitted to wasting food.

If the study results are an adequate barometer for now, they have demonstrated conclusively that food is indeed wasted in Wallacedene and participants cited various reasons for throwing food away. These reasons include:

- Lack of food education and no food security awareness among participants and the community at large, together with lack of facilities, like a refrigerator.
- Feeling full during a meal, for a variety of reasons, including (but not limited to) meals often not very appealing or appetising due to some families not being very skilled in preparing food.
- Inadequate meal planning and buying the correct amounts and types of ingredients, to limit waste, are skills that many households lack; this invariably leads to various food waste precipitating factors.
- Over-cooked or burned cooking that leads to meals not being enjoyable.
- Food spoiling from bulk buying, as shops sell some items packaged in larger quantities than the families can consume before it spoils.
- The lack of interest in reusing leftovers, coupled with not knowing what to do with leftover food or who to give it to.

- Random shopping as well as impulsive buying and making the wrong shopping choices, including purchasing takeaway food and not enjoying it.
- Electricity cuts and load shedding that result in food spoiling in the refrigerator.

Addressing the electricity supply problems, one FGD participant commented as follows:

Yes ... [regarding] the wasted items that we buy. I think at Wallacedene, in my view, I think the types of other food items that often go to waste are refrigerated food items or food that stays in the fridge. This is because in Wallacedene we have regular electricity cuts [load shedding] to the point where your meat or vegetables, or anything in the fridge like *amasi*, milk, or any of the other refrigerated items then go to waste. In my case, we once had a power cut for the whole week, so I had to take my entire food or grocery supply in the fridge and throw it away. So, when electricity cuts occur, it's not only once, it's a common occurrence, these power cuts. So, refrigerated food in Wallacedene is usually wasted (Participant 5: FGD, 2021).

In addition to electrical power outages and various other reasons for food waste as opined by participants, there was an angle uncovered from both interviews about the role of children in the increased amounts of food waste. A few respondents emphasised the influence of children, for example when children refuse outright to finish their meal or to eat leftover food, complaining that it is not fresh. Williams et al. (2012: 145-146) also note the matter about children in a study of reasons for food waste conducted in the United Kingdom and some Scandinavian countries. This issue of children's refusal to finish eating their food is a matter so familiar to every adult, especially parents.

Food packaging, however, which is a primary area of special attention in Williams et al. (2012) and their quest to find reasons for household food waste, was not raised in this study, except only for matters relating to storage of food and refrigeration of leftover food. It was noted here that both aspects also have a contributing role to food spoiling, if done improperly, and may influence the types and amounts of food waste. A classic example was given by one of the questionnaire respondents regarding their horrifying experience when they placed bananas in a refrigerator overnight, aiming to

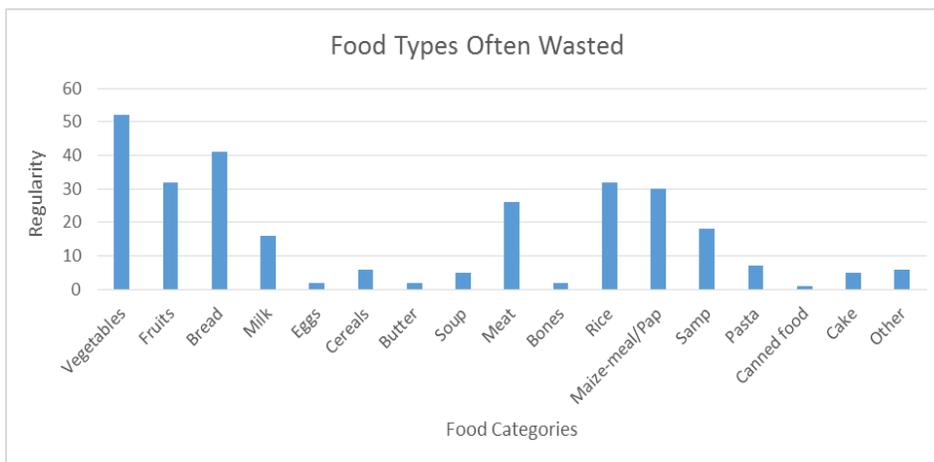
preserve the freshness of the fruit to use the following day. To their dismay, the next day the fruit had spoiled and the texture changed from yellow to brown/black.

#### 5.2.4 Types and amounts of food items wasted by residents

In a Finnish study, Katajajuuri et al. (2014: 325) found that “the principal discarded foodstuffs” in many areas that handle food items, “were vegetables”. This view is echoed in SA from a study by Oelofse (2015) on the proportional representation of food waste generation and cost (See Table 1). In the Table 1 data, which is adapted from Oelofse (2015), vegetables and fruit comprise 44% of discarded food items, with cereals, milk, and meat at 26%, 8%, and 7% respectively. During the FGD in this study, when the conversation moved to answer this question about the types of food items wasted, Participant 6 confirmed what Oelofse (2015) and Katajajuuri et al. (2014) uncovered in their respective studies and this is reflected as the discussion progresses.

##### 5.2.4.1 Types of food frequently wasted

**Figure 13: Categories of food waste**



Source: Own data, 2021

To contextualise Figure 13 and its numeration, one looks at the 17 categories of food types identified in this chart, out of which the study recorded a total of 283 food waste mentions from all items combined. Every time a respondent listed or identified a specific kind of food as wasted, discarded, or thrown away, it was recorded in each specific category and all listings were numbered and calculated. Vegetables are at the chart summit, with 52 (18.37%) allusions and bread is mentioned

41 (14.48%) times, followed by fruits, listed 32 (11.31%) times, as well as rice, also with 32 (11.30%) citations. Mealie-pap is mentioned 30 (10.60%) times and meat 26 (9.19%) times. Next, it is samp, mentioned 18 (6.36%) times ahead of milk, cited 16 (5.65%) times, then pasta, with 7 (2.47%) mentions, cereals, mentioned 6 (2.12%) times, soup at 5 (1.77%) mentions and cake similarly at 5 (1.77%) mentions, followed by eggs at 2 (0.71%), butter also at 2 (0.71%) and similarly bones at 2 (0.71%) mentions. Lastly, canned food was mentioned only once (0.35%). The category 'Other' is referenced 6 (2.12%) times and accommodates all non-specified and unfamiliar items, such as traditional food types that could not be classified or are less meaningful when explained in isiXhosa. Each food item or category was measured by the number of times it was mentioned by participants.

From the data in Figure 13, vegetables emerged at the most wasted food category, followed closely by bread. The next categories of regularly wasted items, were fruits, rice, and mealie-meal (which includes pap and soft-porridge). Meat is also frequently wasted, and this includes red meat, chicken, and pork, with fish listed only twice in the study. Meat appears ahead of samp, milk, and pasta in the chart. This is surprising, since one would imagine poor communities to be mindful of not only the protein and nutritional value, but also the monetary cost of meat products. As can be seen, without doubt, this chart confirms the South African findings by Oelofse (2015), as well as the contentions from Katajajuuri et al. (2014) in Finland that inter alia, vegetables are often wasted far more than other food items.

In this regard, Participant 6 also alluded to this point, saying:

On my side, I would say the most common types of food that are wasted are vegetables. There are a lot of people who do not like eating vegetables. As a result, vegetables can stay in the refrigerator and spoil. I think that is a waste of food. And, as you guys have already mentioned that we peel vegetables, when we shouldn't, you know. We can consume vegetable skins because I think there are more nutrients exactly there in the skins of vegetables. Also, if that is not a person's [preferred] option, one can use it as organic compost, you understand. So, I think in the main, vegetables are the most common types of food that go to waste (Participant 6: FGD, 2021).

Another FGD participant confirmed this opinion:

Yeah, there's one thing that I also want to highlight with regards to people that are selling the veg [vegetables]. If you are selling veg and days pass by and you have not sold certain items, they would take all those cabbages, carrots, and whatever, and throw them in the street. I think you might still remember the Masakhane crèche, right in front of the crèche, people would come with cabbages and carrots that are already spoilt and just come and throw them, just there (Participant 4: FGD, 2021).

Furthermore, various soup types, different cakes including fat-cakes, as well as food-on-the-go, colloquially called 'takeaway food', all located very low on the rankings of wasted food items together with eggs, butter, and canned food. The category 'Other' includes various food items not classified with the rest, such as unfamiliar traditional food. The presence of bones on the list may partly be a sign of the levels of available livestock meat that is slaughtered for sale from local urban farmers and can be found at local meat stalls and street 'braai' (barbeque) areas in Wallacedene e.g., pork, cow, sheep, goat and chicken meat. This may explain the high amounts of wasted meat as well. Other participants listed items like steam-bread and home-canned food as well as seedlings as other types of food noted as being wasted. Eggshells were listed but were not considered as food. In total then, this finding suggests that most food items may contribute to generating food waste.

Many questionnaire respondents alluded to the fact that they do share food with family, friends, visitors, neighbours, or even strangers. However, during the FGD, participants expressed their views on an appropriate approach to be adopted by the benevolent giver, and hostility that may arise when a would-be recipient is offered food and feels the offer is not good enough, as well as some who feel ashamed and politely refuse the food offered. Moreover, throughout the assessed group of participants, just as Stancu et al. (2015: 16) assert that, "food-related routines (i.e., planning, shopping, and leftovers reuse) are main drivers of food waste in addition to perceived behavioural control", many are acutely aware of their behaviour about the value of food and nutrition, and that wasting food is wrong. This is evident from many responses, some of which are carefully crafted around general food behaviour. However, there is still a wide range of substantive waste of food in the area, as one participant observed during the FGD:

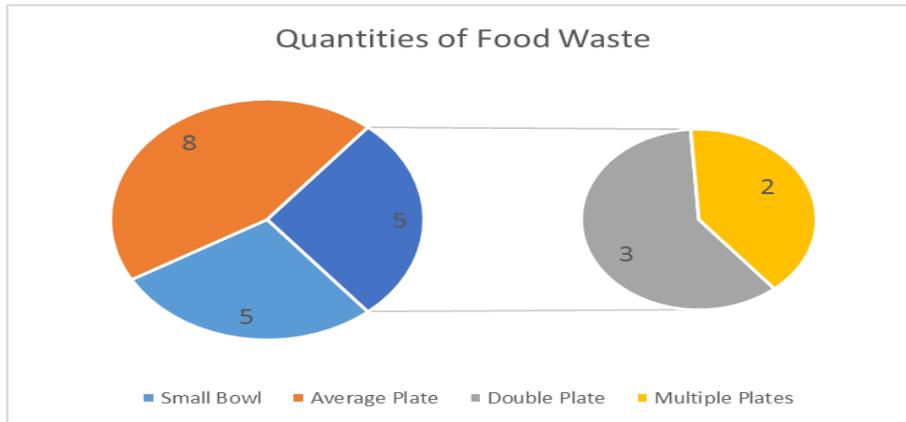
I think the wastage of food also occurs in the manner in which food is handled. From the process of cooking food, there are peelings [skinning] that we do, when we do not need to. For example, potatoes. You do not even need to peel potatoes. The more you peel potatoes, those are the more nutrients required to the dietary body, for the health of your system. This is when more waste happens because we throw away the most important nutrient that the body requires. That is wastage; and then wastage also takes place since the skins that we peel off, as someone said earlier, people throw all such food skins away instead of saving it for organic compost. Instead of keeping leftover food for street kids and animals, people discard food. So, many people do waste food, in so many ways (Participant 5: FGD, 2021).

#### ***5.2.4.2 Amounts and frequency of food waste***

Generally, this section was well-answered as only 2 participants did not answer, although the majority of answers focused on the frequency aspect of food waste, and some were vague, especially on the amounts, if answered at all. The study used the overwhelming response to drive and organise interpretation of study outcomes as well as bring the context from among the minimally answered questionnaires. Moreover, confidence anchored on the fact that respondents were ultimately going to give and discuss their views and suggestions regarding curbing food waste. Respondents freely expressed responses in their own words and 19 respondents here declared “no waste whatsoever”. The researcher then used data coding and thematic analysis to categorise the feedback of 66 responses, to analyse and present the study findings.

#### 5.2.4.2 (a) Quantities of food wasted

Figure 14: Quantities of food waste

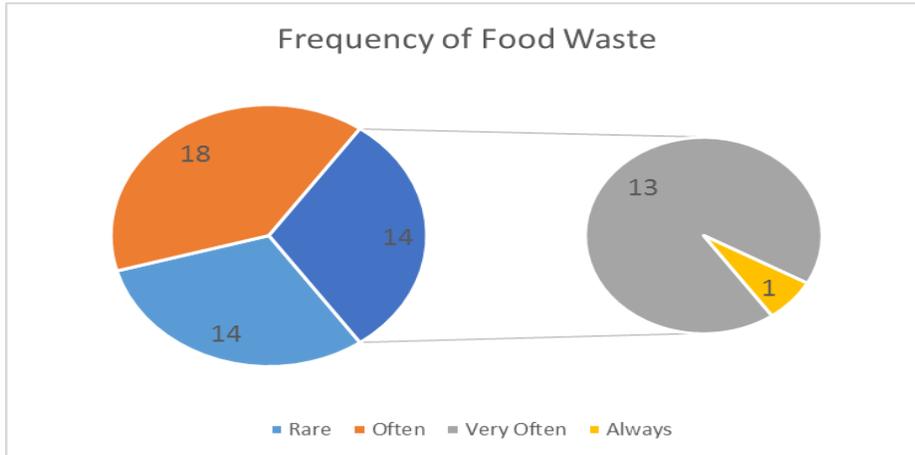


Source: Own data, 2021

In Figure 14 above, it shows that 5 respondents (5.88%) reported usual food waste in a *small bowl*, while 8 of them (9.41%) indicated that *one standard size plate* of food normally goes to waste, as 3 respondents (3.53%) alluded to *double standard size plates* and 2 respondents (2.35%) reported *multiple plates* of edible and nutritious food being wasted. Household occupancy, as indicated earlier in the study, has a high degree of influence in this area. Largely, the participants with limited household members typically reported smaller quantities of food waste. However, households with more members do not necessarily show more or added sizes of wasted food. In addition, these sample sizes come at different times, as shown in the frequency section, making this feedback highly inconclusive. Furthermore, some of the respondents indicated that “it is small amounts day-to-day”, some wrote statements like, “half a bowl of cereal”, “slices of old bread”, “little very often”, “every morning soft porridge is leftover – rice in the evening”, with one saying, “twice a week when the food is old”. Under these circumstances, more data should then be sourced to comprehensively answer this part. Hence, as Gustavsson et al. (2011) recommend, further studies are needed to intensely explore kitchen food remains and bin contents of households in the area, to conclusively get richer information.

**Figure 15: Frequency of food waste**

**5.2.4.2 (b) Frequency of food waste**



Source: Own data, 2021

Added to the 19 participants who declared no food waste at all, feedback data in this frequency section shows 14 respondents (16.47%) saying it is *rare* that their food is wasted. On another side, a vast number of 18 respondents (21.18%) granted that they waste food *often*, while 13 others (15.29%) admitted that they waste food *very often*, as 1 respondent (1.18%) said in their household, food is *always* wasted. Similarly, as in the food waste quantities section, the study found it impossible to measure exact days on which the behaviour can be attributable. It is thus safer to settle as indicated above that further research is needed, although with time margins for data collection to obtain an in-depth view of food waste regularity in this space.

Further research in this regard can help descriptively instruct and empower feedback phrases as shown above like, “day-to-day”, “little very often”, “every morning”, “in the evening”, and “twice a week when the food is old”. Moreover, there are some instances where a handful of responses provided confusing answers to the question. Examples are answers such as, “Maybe 2 or 3 times a day”, “Sometimes not at all in a day”, or “Either 3 times a month, I think”. Thus, the researcher views this area as a crucial stand-alone segment to be open and explored through area waste bin contents analysis, as recommended by Katajajuuri et al. (2014) in the Finnish study as well as Schott and Anderson (2015) in Sweden and the WWF Rustenburg study (*Farmer’s Weekly*, 2017).

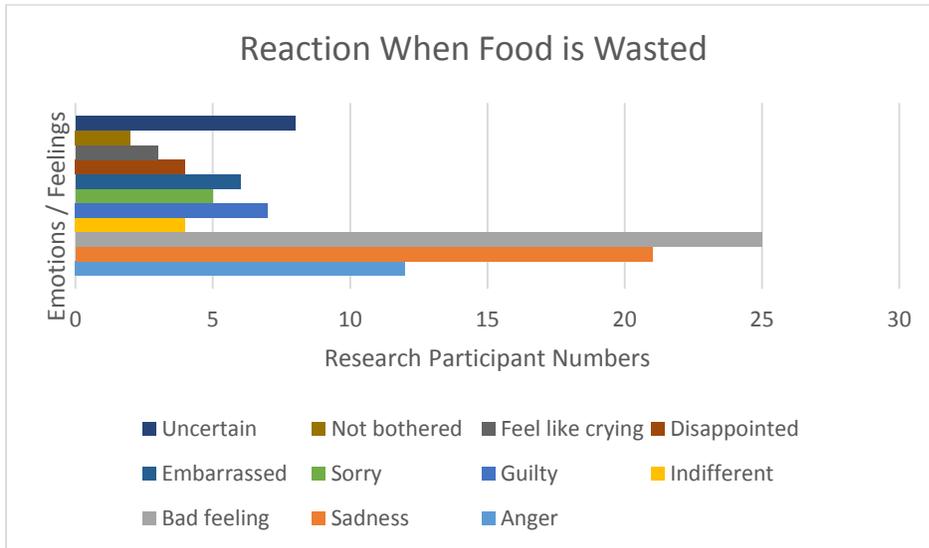
During the sustained questionnaire data analysis and arrangement, some additional food waste reasons kept surfacing from the study, and these included: shopping impulsively and overbuying of groceries, overcooking, lack of space in the fridge and lack of relevant containers to keep food fresh, as a result, food spoiling because it is too much and also because respondents do not know who to offer excess food to. In addition, some alluded to food losing its appealing smell and taste, as well as when respondents are full and food is left over. Subsequently, they do not want to eat leftover food later, as they consider it not fresh and argue that no one wants to eat leftover food.

In an unsurprising but very peculiar situation within such environments, from the view of the researcher, one other respondent mentioned food waste resulting from food infested with rodents/mice/rats and small insects like ants, spiders, locusts, beetles and some dying inside the food, thus food becoming poisonous. Basically, the majority of these instances are issues that relate to food packaging and storage, as opined by Williams et al. (2012).

These matters that link to reasons why food is wasted, are often issues that relate to the planning of food purchases and cooking sizes, as Stancu et al. (2016) advocate, together with controlling habitual behavioural intent and adjusting one's feelings and emotions when acting on curbing food wastage. According to Russell et al. (2017), the variables of habits and emotions are highly crucial determinants of consumer intention to reduce food waste and to curb associated actions. Further, negative feelings about food waste from participants in the study by Russell et al. (2017), appear to be associated with a positive feeling to reduce food waste, while those studied tended to show more food waste tendencies and more actual food waste in action and behaviour.

### 5.2.5 How residents feel when food is thrown away

**Figure 16: Participants’ feelings when edible food is thrown away**



Source: Own data, 2021

The cluster of 11 emotions and feelings in Figure 16 as conveyed by participants when food is thrown away, are expressed 97 times altogether. During the analysis it was clear that in a recurrent feeling of 25 times (25.77%), respondents expressed a bad feeling, 21 times (21.65%) some said they felt sadness, 12 times in the study (12.37%) others associated their feelings with anger, 8 times (8.25%) some said they were uncertain, 7 times (7.22%) some felt guilty, 6 times (6.19%) others linked their feelings with embarrassment, 5 times (5.15%) others felt sorry while 4 times (4.12%) a few stated feeling indifferent and 4 times also (4.12%) some felt disappointed, while 3 times (3.09%) some said they felt like crying, and only on 2 occasions (2.06) did respondents say they were not bothered. This latter indicator of 2 citations, showing a nonchalant feeling, confirms, as stated earlier, that almost all the respondents are very much aware of their food waste conduct relative to values of proper food and nutrition behaviour. Even the ones who declared 4 indifferent and 8 uncertain emotions, may if informed properly, improve on behaviour aimed at curbing food waste.

According to Russell et al. (2017) and Stancu et al. (2015), these responses show that direct efforts to change consumer attitude and behaviour towards food waste can potentially lead to a decline in its linked behaviour through intentional processes. Single-worded types of moods and such kinds of emotions as articulated by respondents in this study to describe how they feel when edible and

wholesome food is thrown away, are a testimony to the plausible future scenario when community members are afforded food waste education and food security information. After all, Williams et al. (2012: 141) confirm that in general, about 50% and more of household and consumer food waste occurs due to the food not being used in time. This scenario is alluded to, as one participant observed when the phenomenon was dissected during the FGD:

When I look at food waste, it is a bit broad. It is a broader concept because we either are talking about usable food or food that cannot be consumed. If it is food that can still be consumed, then we can say that is food waste. If it is food that cannot be consumed by an individual, it depends (Participant 4: FGD, 2021).

Figure 16 highlights this complex fact governing food varieties and the surrounding emotions as expressed, and presents these in a cluster chart comprising of various colours, showing that the greatest emotion among participants when food is thrown away, is feeling bad. This is followed by feelings of sadness and then anger. Some participants indicated feeling embarrassed, sorry and a sense of guilt, the latter of which appears prominently in Russell et al. (2017: 109). Other respondents stated that they felt indifferent or were just outright not bothered. Some were uncertain, with a handful of others expressing feelings in multiple descriptions or emotional expressions, as some used words like “Unsettling” and “Spoiled”. Three participants declared it in dual wording, e.g., “Heartbroken and angry” or “Heartbroken and sad”, with one strangely saying, “Good but sad”. All three are grouped under “Feel like crying”.

Here is a very emotional response from one contributor during the FGD:

I wanted to say, I feel bad when I see food thrown away. This is because, when you think as a breadwinner, looking there at that food and seeing your money. Or seeing these carefree kids [irresponsible children] and you then think, “No man, this is really waste” [of food]. When you start questioning and talking about the waste, then you hear them say you are grumpy for food, when deep down, you know this difficult thing of working. You work hard for it, you know? You have worked so hard for this and these people [kids] cannot see this. For example, now we even have lost Ubuntu, our humanity to receiving visitors. We have

become unwelcoming to extended relatives [family] and strangers. We cannot even allow our families' child [sister/brother] to come visit from the rural areas (Participant 2: FGD, 2021).

Another participant bared her inner emotion, when food is thrown out in the open, thus polluting the environment and expressed herself thus:

I think on the environmental impacts, it makes our open spaces filthy. In Wallacedene it is embarrassing and a shame how our spaces are so full of rubbish that includes food items. Everywhere one goes, we find discarded items that contain food and other organic material; it's a shameful feeling (Participant 3: FGD, 2021).

As the discussion progressed, other participants also reacted to the emotional dialogue with one respondent sharing her personal and passionate interaction with her 9-year-old son on food waste, saying:

You see, it hurts me. My son, Miso is not an eater. He is a light eater – if there is anything like that. Every time I give him food, I make sure he has his plate. He wants to choose, [saying], “Mommy, I want bread with cheese” ... while I have prepared a full meal and everything. Yesterday, I was telling him, “My boy, it pains me that your plate of food, to another child who has no food, this meal will mean everything. This food that you have to eat, is in a high-class category-meal and in your eyes, it means nothing or is less valuable.” So now, I take it he does not understand, since he is age 9 and is still young. I mean to say, you know me, if I were to see a piece of a chicken wing, some meat in my plate, and when I offer it to you and you hold it and say, “I don't want this meat”, it breaks my heart (Participant 1: FGD, 2021).

Finally, a further sensitive response came from another FGD participant, who observed:

So, it hurts and is painful honestly, to see a full pot of food thrown out by someone. For example, a full pot of rice is thrown out there. The very person would then come back and wash the pot and scoop another big portion of rice from the container and they pour it in the pot to prepare it for cooking on the stove. Then you ask yourself, “Haaibo! What is this?” Just

today during the day, I was saying to someone, “You know, I feel such pain because we used to have stacks of meat that you found, placed there.” I would come from work and find chicken breasts and meat pieces lying there in the kitchen area and someone would tell you they do not eat *umkhwephe* (chicken breasts). You would then ask yourself, “Does this person know how hard I have worked for us to have this meat?” So, this thing of food waste hurts and gives me pain, honestly. I feel as if that is the reason. Hence, I say to them, I tell them at times, “If you guys knew where I originally grew up, I never had a proper chance to eat feeding [nutritious] food.” (Participant 2: FGD, 2021).

All this qualitative data as presented and discussed, is a step ahead in solving far-reaching trials of scarcity regarding consumer feelings on food waste, particularly at communities and the developing economies of the Global South, as stated by Russell et al. (2017) and Gustavsson et al. (2011).

### **5.2.6 Suggestions on how to curb food waste**

This section considers some of the methods suggested by respondents to assist the community to avoid food waste, like keeping small portions of food frozen, in preparation for cooking. Also, ahead of a handful of thoughts like offering excess food to old-age homes, the homeless and to informal settlements, the idea to supply children on the street with leftover food is among the prominent views in the assessed group and came out strongly in feedback from questionnaires, as well as in the FGD.

One participant specifically said:

... take this leftover food and find someone to offer it to. Or, since we know children are playing on the side of the street, we could offer such food to the kids (Participant 2: FGD, 2021).

Another refined and robustly mutual idea observed was the need to teach people about food security at home and at primary school level, to encourage the education department to start a curriculum in this regard, as recommended at the end of this study. This saw a few partakers in the study who are conscious about nature and its resources, drifting towards this education angle, when asked for an

opinion to help the research craft a route to curb food waste. Much food security and food waste awareness work in the community is thus needed, as was echoed by another participant in the FGD:

I think, just like my sister says, that they need to be educated on food waste. Not only food waste, but also food security, so that they will know that food should not be wasted. As I indicate, that food security, I mean it centres on the issue of the peeling of food. Because, if they know about food security, they would know that it covers and addresses issues of access to food, availability of food. Food security speaks to the types of food and nutrition that are of value to the body of a person when food is available. This is whereby they would learn that they do not [need to] peel all their vegetables and what kind of fruit and vegetable as well. So, yes, the education on food waste is important and also, food security education is a necessity or people have to receive awareness on food security. It is something that they must be made aware of or must receive (Participant 5: FGD, 2021).

Lastly, in addition to suggestions that were made by a handful of questionnaire respondents in the FGD, a suggestion to start a door-to-door campaign to educate locals was mooted and discussed, with other respondents proposing online and social media platforms, while another proposed TV and radio advertising. One elderly FGD respondent took time to explain how senior citizens used natural methods while living in a rural area as children, to preserve food. This was presented in a very eloquent and nostalgic manner and demonstrated how people employed ingenious techniques to survive before the advent of electricity and the use of refrigerators. Furthermore, beyond participants' views on the subject and contrary to what rules and regulations demonstrate, food industry insiders view the sector instead as being highly regulated, and often it is said that this leads to nutritious and edible food products being condemned (NWMS, 2020).

Given the holistic global and local cost of food waste, various institutions, scholars, academics, and programmes are activating their participation in the discourse, such as DEFF and CSIR (2021) as well as Oelofse (2015) in SA and various global players like the UN and many others. Such food waste and disposal costs go beyond the economic realm into environmental, social, and climatic concerns, into wider food security imperatives. All have legal implications and call state obligations into question. It would seem that the role of the state at all levels is drastically vital for monitoring,

incentivising, coordinating, and implementing the minimisation and diversion of holistic food wastage from landfill sites to the starving masses. This should be ahead, among various appropriate value chain food recovery and behavioural empathies associated with curbing food wastage approaches. Analysts, critics, and some food industry players, scholars, and academics argue that it is all the above non-symmetrical regulations and lack of assertiveness that contribute to food wastage. Rather than including the food waste phenomenon and its management in the broader environmental laws through the presently scattered regulations across the spectrum, this study argues for a formidable approach i.e., an inclusive national government-led structure to discuss and assume leadership towards a White Paper on the discourse and a standalone initiative on the issue. Thereupon, after public information and consultation, the government should craft and gazette legislation towards ending avoidable and curbing unavoidable food waste. Such a policy and subsequent legislation will need concrete monitoring tools and intrusion penalties, as well as curriculum development through the education sector and other aligned fraternity and food value chain stakeholders.

### **5.3 SUMMARY**

As noted by one of the participants in the FGD contributions, food waste is a very deep and broad phenomenon. It is as broad as food categories and as profound as food varieties themselves. In this study, food waste is expressed through the exhibition of empirical data findings in support of the local and global discourse on the subject, using analysis of themes emanating from participants' written and spoken feedback. In answering the research questions that are directly connected to the study objectives and holistic research goals, this chapter set out firstly to unearth food wastage in Wallacedene by presenting, unpacking, and discussing the area demographics. To contextualise respondent numbers to area population, included are household numbers, types, sizes and occupancy. Inter alia, evidence shows that 67.05% of the total households studied occupy formal dwellings or brick-houses, as opposed to 28.24% who live in shacks, bungalows or even residing in a tent. This section also showed a multiple linear regression chart representing the dwelling variables relationship as well as a comprehensive picture of regular food handling numbers at the analysed households. Methods of food waste disposal plus a vibrant takedown and dialogue with the various food waste approaches, together with a general weekly trend of municipal waste bin collection were presented to set parallels between food discarded in landfills and that thrown out at public open spaces. This link was also shown adjacent to the use of food waste for animal feed and compost, a food behaviour

type chosen by 31.76% of respondents to curb food waste. The data also revealed how among various types of food items, vegetables are at the top form of food wasted due to various reasons, including their perishability and lack of storage facilities. Using visuals, the study then also depicted its ventures into locals' psychology on their habits and actions. Furthermore, it interrogated the types and amounts of food items wasted, including additional reasons together with feelings of residents as a waste of food occurs.

According to Pheto (2021: 1), the “CSIR urged businesses and households to significantly reduce food losses and waste to address the country’s hunger problem, while also addressing the associated economic and environmental effects, including climate effects (sic)”. Simultaneously, Morifi (2021) advises all food industry role players to align their community social investment initiatives towards educating households and consumers on food waste prevention. Furthermore, Morifi (2021) adds that food manufacturers, together with authorities in government have to publicise information to improve consumer views around food expiration dates, in particular, the difference between the ‘sell by’ guide and ‘best before’ date. Moreover, in line with the global food systems dialogue, the above views align with those in the UN Food Systems Summit deliberations of 23 September 2021 (UN, 2021). It is in this backdrop henceforth that participants’ views on how to curb food waste were then explored as outlined, this is followed by a concluding discussion of the research findings.

## **CHAPTER SIX: FINDINGS, RECOMMENDATIONS AND CONCLUSION**

### **6.1 INTRODUCTION**

This study explored household food wastage in the Kraaifontein area of Wallacedene in Cape Town, South Africa. This chapter delivers a summary of the study findings that reflect the research objectives, showing numbers of respondents who admit to wasting food as well as patterns of and behaviour towards food wastage. Knowledge sharing at household and community levels appears strongly as a possible tool to use to help reduce food wastage. The summary also outlines substantive research recommendations which prominently feature the need for food waste education and pragmatic methods to curb the challenge. Inter alia, strategies for school visits to educate residents and learners emerge, evidently from the data as suggested by respondents. Finally, the study provides a contextual and brief conclusion to round off the research report presentation.

### **6.2 SUMMARY OF FINDINGS**

#### **6.2.1 Analysis of household food waste in Wallacedene**

Of the 100 questionnaires issued, 85 were received as feedback and a follow-up focus group discussion of 7 participants made inputs to the study. As presented in the preceding chapter, study respondents from Wallacedene interrogated, discussed and gave feedback on food waste in their area. Overwhelmingly, participants asserted that large quantities of food items are indeed wasted in Wallacedene. This outcome closely resembles confirmation from the study by Dladla et al. (2016) who is supported by the CSIR (2021) in asserting that food waste incidences, as seen in municipal solid waste across most big cities in the Southern African Development Community (SADC) region, are indeed on an upward trajectory.

As per the data analysis many households who contributed to this research, include people living in formal brick houses to inhabitants of informal housing structures such as bungalows, shacks and even two occupants of tents who made their contribution to the study. This shows the diversity of participant households who assisted in giving information from the broader informal settlement. Also, it is in light of all City of Cape Town (CCT) neighbourhoods, suburbs and rural outskirts, as well as the Western Cape Government (WCG) provincial towns that, incidentally, have very little to no preceding food waste examination of this or similar format, nature and magnitude, including the

Kraaifontein area. The researcher then reviewed primary data and literature with regards to food wastage and the fact that 85% of participants admit to throwing food away, caused concern. Only 5.88% of participants stated that in their households, they make all possible efforts not to waste food, meaning that they consciously ensure to elude avoidable food waste.

### **6.2.2 Patterns of food waste in Wallacedene**

In this study of responses from 85 questionnaires and 7 focus group discussion (FGD) members, of their own volition, participants admitted that they indeed do waste food, as depicted in Figure 11 and Figure 12, and as can be seen in all end destinations where the food may end up. Vegetables emerged as the largest types of food wasted among the participants at 18.37%, supporting evidence from studies in Finland by Katajajuuri et al. (2014) and in SA by Oelofse (2015), inter alia. Thereafter, comes bread, that includes rolls and steam-bread at 14.48%, with fruits as well as rice positioned at the same tally of 11.30%; mealie-meal, which makes ‘pap’ and soft-porridge, is at 10.60%; and meat, which includes red-meat, chicken and fish, is at 9.18%. All these food types appear ahead of samp (6.36%), milk (5.65%) and pasta (2.47%). Cereals, a variety soups, cakes, canned food, and bones all fall under 2% of types of food wasted, as displayed in Figure 13 of this study.

The investigation on the amounts and frequency of food waste in this study was a challenge. Some responses, especially on amounts of food wasted, were either vague or not answered; this issue is inconclusive and should be further examined. Further, on what residents do with unused or unconsumed food, the result shows that 2.35% use left-over and unwanted food for garden compost. A large 29.41% offer unwanted food items to either urban farmers to feed their livestock or give it to domestic and stray animals like cats, dogs, birds, etc.

Participants, over 14% of food waste is unaccounted for, and still, based on thematic content analysis of other answers among the questionnaire, the probability is that most of this untraceable but wasted food is extra to nearly 50% destined either for landfills or water channels. The study thus holistically finds that as things stand among many of the respondents, the loss of the historical African traditional values of Ubuntu is growing in the handling of nourishment and in their methods of discarding unwanted food, particularly also in how they recycle food waste, their use of the waste bin as well as their use of public open spaces.

This in itself is an area of huge concern to the researcher. Over and above, when analysed cumulatively, some sizeable component of the wasted food is partly confirmed to be a likely predisposing factor for blockage of sewerage and storm-water pipes. It is for this and preceding other reasons as well as in view of the area context, that in this study, the researcher wishes to highlight that *ceteris paribus*, the feeding of animals using unwanted and excess food cannot be adjudged as food waste. In particular, for those households who make a conscious choice to support local small-scale farmers to feed their livestock in order to ensure access, availability, utilisation and stability of food for their families' and households' food security.

In another separate but parallel area of this study, likewise when the issue on regular food wastage is examined, 62% among the same sample group acknowledged wasting food on a day-to-day basis. Such findings confirm the August CSIR (2021) report, which determines that 45% of the available food supply in SA is wasted, and consequently accentuates what is said by Dladla et al. (2016), Oelofse (2015), as well as Nahman et al. (2012). This concerning occurrence of food waste behaviour from many households among the participants in this study seems to render the community helpless, as noted and discussed during the FGD. This problem contributes to unhealthy storm-water drainage and sewer blockages, resulting in an unhealthy state of sewerage water flowing into the streets and a list of resultant ailments, particularly among children and their state of mental wellness.

The findings in various categories of this research such as types, amounts and frequency of food waste surely therefore, call for an explicit in-depth study to attain conclusive results, particularly on waste bin contents and all the types and forms of animal feed that are redirected from the kitchen table to animals. This means that more data should in future be sourced from the actual waste material that can be accessed directly from households.

Lastly, it is crucial to emphasise that the food wastage phenomenon has become rife throughout sub-Saharan Africa (SSA), as noted in this study, while globally, food waste is measured to account for an estimated 26.8% of hungry people (FAO, 2019). According to a DEFF and CSIR (2021) report, SA lost R71.4 billion to inedible food waste during 2013. Experience shows therefore that across all starving, indigent and poverty-stricken communities in SA and elsewhere, societal ills such as illegal

survival means, crime and gangsterism, misconduct, drugs and abuse of substances, all which manifest violence, can easily result in high murder rates, gender-based violence and many other challenges in communities, as purported by Keramati (2013). Moreover, although this study was not geared towards the analysis of household occupancy in Wallacedene, it may be partly helpful to illuminate issues on the dichotomy, as was discussed earlier in this research regarding official Statistics SA (2011), CCT and other domestic habitation and related reports, such as the TRA (US, 2015) and Zweig (2017).

### **6.2.3 Behaviour and feelings towards household food waste**

Almost all participants in the study displayed consciousness to action, which is contrary to the life principles of Ubuntu and sustainable food-handling behaviour. The study accentuates this from various reasons for food wastage forwarded by participants. Inter alia, these reasons emanate from feeling full during a meal to food spoiling from bulk/over-buying, to the lack of interest in reusing leftovers. Others claimed not knowing what to do with the food or who to give the food to, as well as over-cooked or burned food during cooking, all resulted in wasted food. Also, impulsive or random shopping and electricity cuts from load shedding were blamed for resulting in food spoiling in the refrigerator.

When further assessing participants' behaviour towards household food waste in Wallacedene, their awareness to sustainable food behaviour is evident, as only 4 times they expressed feeling indifferent and twice they said they felt not bothered when food is wasted. On 8 occasions participants indicated feelings of uncertainty when food is wasted. These sentimental indicators represent 14.43% of overall 97 times that a group of 11 different emotions and feelings were expressed by respondents when food is thrown away. Such declared emotions range in varying degrees from feeling bad to feeling sad, anger, disappointment and feeling to cry, feeling uncertain, guilty, embarrassment and feeling sorry, while, as indicated, a few times other respondents said they felt indifferent and not bothered. Such expressions are partly linked to studies by Russell et al. (2017) in their measurement of emotions and self-reported food waste behaviour, together with the research in Denmark by Stancu et al. (2015) on inter alia, psycho-social determinant factors of food waste, consumer intentions that include injunctive and moral norms as well as attitudes, feelings and perceived behavioural control towards food waste.

#### **6.2.4 Participants' suggestions on how to curb food waste**

In this regard, the main suggestion presented in the study was for households with excess food to supply poor children on the streets and to offer the edible wasted food to poor people living at informal settlements. Other suggestions were to freeze small amounts of food and to only cook these as needed, and also to offer excess food to old-age homes and the homeless. According to Papargyropoulou et al. (2014), the distribution of food surplus to poor people is a key to curbing food waste, followed by the feeding of animals with excess food. In Wallacedene, the respondents' data in the study shows that almost 30% of the participant households, in different ways and varying degrees, are already feeding animals with excess food. Other suggested ways offered by respondents through which communities may be taught on how to curb food waste and about food security at home and at schools, is to start a door-to-door campaign and conduct school visits to educate residents and learners. This was mooted in addition to creating online and social media platforms as well as mainstream media campaigns for advertising. This calls for a new paradigm among communities and authorities as well as in the education system. It would help this situation if the Department of Education included food security and food system education as part of the curriculum, as this will ultimately bring awareness and increase human wellbeing.

### **6.3 RECOMMENDATIONS**

The findings of this study reveal that for households to reduce the amount of food waste, several recommendations can be made which will lead to better management of households' food wastage in Wallacedene, as well as other areas and sectors in the food value chain. In order to curb food wastage, the outcomes of this study have led to the recommendations as presented in the next section.

#### **6.3.1 At household level (homes/settlements)**

- The establishment and strengthening of family relationships and neighbourhood household networks to teach each other about food waste at home, is important. Such knowledge sharing at household level should help every household member to understand and appreciate internal domestic as well as wider social, economic, environmental and climatic implications of food waste. This is in addition to broader food security dynamics; hence, there is a need for all food industry players to also inform households in food management skills to reduce food wastage.

- Citizens, at all household levels, should be encouraged to do a shopping list before food shopping. This will help them to plan their meals and they will know what to purchase when they get to the supermarket instead of just buying unnecessary food that will end up generating unnecessary waste. They should be encouraged to use a shopping list and stick to it during shopping for food. This will stimulate and encourage a good attitude to food behaviour through proper planning for shopping and meal preparation.
- Households should be advised and stimulated to pack smaller portions of food – refrigerated or frozen – to cook just enough for a meal. It is thus recommended that households prepare only the amount of food that they can consume and finish. In many instances, food waste is caused by cooking too much food, which results in the general tendency among many people of throwing leftovers into the garbage bin or elsewhere, as outlined in the study.
- Unwanted leftover food should regularly be used by households to help street kids and residents who do not have food, instead of throwing food away. This should be the norm and a usual way of life, as African communities lived traditionally, in order to deliver food-handling behaviour with a strong background of the historical rooted ways of Ubuntu.

### **6.3.2 At schools and other types/levels of institutions**

Education towards curbing food waste should be reinforced at school level through parents engaging School Governing Bodies and teachers. This can lead to recognition at school, district, and provincial levels, and thus propel the education department to devise the relevant subject curriculum in this regard. This is an opportunity for the spheres of government to raise awareness of reducing household and consumer food waste and to educate people at various institutions on the impacts of food waste. Additionally, the authorities need to raise awareness to encourage households, society in general and the entire value chain to recycle food waste and to familiarise themselves with the benefits thereof. Food waste awareness campaigns therefore need to be launched in communities, schools, companies, institutions and all sectors of life.

### **6.3.3 At consumer level (supermarkets/restaurants)**

At consumer level, particularly in profitable shopping and dining places like restaurants, supermarkets, hotels etc., business owners have to continuously ensure that refrigeration/freezing equipment is in good working order and properly set to prolong the life of food items. A refrigerator

setting of 40 degrees F or below is generally advised to extend the shelf life of fresh produce. Electrical supply should be consistent, as it is also a primary requirement to guarantee reliable working of machinery, which means business owners may need to acquire electrical generators, in particular because SA has ongoing Eskom (power supply) load shedding schedules. In addition, before restocking foodstuff, businesses have to check and audit perishable items and if possible, place older food products to the front of the freezer/fridge/cupboard/storeroom and keep just-purchased products to the back. This strategy is useful also at household level and state institutions and makes it more likely that foods will be consumed before they go bad. Businesses should also encourage patrons to take leftover food home and to use it within a reasonable period of time or to give it to poor people, as much as they (businesses) should regularly donate safe, nutritious food to food banks, food pantries, food rescue programmes and other food security initiatives.

#### **6.3.4 Spirit of Ubuntu and recycling**

As reflected in many of the sections in this study, when considering options of unwanted food disposal, households and humanity in general have to predispose behaviour towards the ethics and morality of Ubuntu. This is a single-minded spirit driven by humanity's care for other creatures and for nature, to ensure that human dignity is always at the core of one's actions, thoughts and deeds when interacting with all of creation. Added here, is avoiding food waste in all its forms through the 3R's i.e., **Reduce** food waste, **Reuse** leftover food and **Recycle** whatever remains of unwanted food items whenever we can as communities, particularly in poverty-stricken areas. Lastly, food waste awareness demands making resources available to impoverished people in the spirit of Ubuntu and concurrently teaching them that it is contingent on them not to allow such bestowed values to go to waste.

#### **6.4 CONCLUSION**

This study foregrounded food waste as it occurs in the informal housing settlement area of Wallacedene, on the outskirts of Cape Town, South Africa, from the perspective of residents themselves. The research focused on food wastage by a selected group of locals through a triangulated quantitative and qualitative examination that employed questionnaires and a focus group discussion to conduct the case study. In-depth information about area demographics and quantitative household

variables relationship, from types to sizes and occupancy, are attended together with household regular food handling numbers.

The researcher collected data from the participants, to answer questions on the research problem. Within the discussion, there are five methods of food waste disposal, with almost 15% of respondents not declaring how they discard their unwanted food. The study analyses the municipal waste collection trends and afforded prominence to the significance for research on morality regarding the use of leftover and unwanted food, in this case for animal feed. It also examines and quantifies the behaviour of throwing food away and regularly wasting food. The respondents' admission to such actions came forth in the interviews, with vegetables and bread being discarded in large numbers, ahead of other listed food categories and items.

Findings in this research report are relevant to the study's chosen theories and objectives. These findings illuminate food-handling challenges, resulting in the continued and upward trajectory in the loss of nourishment among the Wallacedene community, but also impacting on their wellbeing through damage to infrastructure in sewer blockages and the overflow of unhealthy pathogens into the streets. The outcomes of this research relate directly to the study's theoretical framework and the recommendations are pragmatic towards leveraging on existing goodwill among studied households and establishments such as schools, to help curb household food wastage to craft future possibilities for ending food insecurity and hunger.

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# ANNEXURES

## ANNEXURE A: Consent Form



Private Bag XIV, Bellville 7535, Cape Town, South Africa  
Telephone: (021) 959 3858/6 Fax: (021) 959 3863  
E mail: [pkiope@uwc.ac.za](mailto:pkiope@uwc.ac.za)



### FOOD WASTE RESEARCH: QUESTIONNAIRE CONSENT FORM

I....., have had the opportunity to ask any questions related to this study, and received satisfactory answers to my questions, and any additional details of importance. I agree to take part in this research and understand that my participation is voluntary. I am free not to participate and have the right to withdraw from the study at any time, without having to explain myself. I am aware that the information I provide on this questionnaire might result in research which may be published, but my name will not be used.

I know that my signature on this form indicates that I understand the information on the questionnaire sheet regarding the structure of the questions. Also, that respondents to this questionnaire may be selected to be part of the focus group. I have read the information regarding this research study regarding food waste and I agree to answer the questions to the best of my ability. I am at liberty to refuse to answer any questions that I don't want to answer.

By signing this letter, I give free and informed consent to participate in this research study.

#### PARTICIPANT

#### RESEARCHER

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

This research is being conducted by **S'celo Madondo**, a student at the University of the Western Cape. Contact details are: Cell - 065 955 6020 (WhatsApp) and Email: [3876213@myuwc.ac.za](mailto:3876213@myuwc.ac.za)

If you have any questions about the research study itself, please contact **Dr Elaine Sinden** at Institute for Social Development (ISD), University of the Western Cape. Her contact details are as follows: Tel: (021) 959 4050 Email: [esinden@uwc.ac.za](mailto:esinden@uwc.ac.za)

This research project has received ethical approval from the Humanities & Social Sciences Research Ethics Committee of the University of the Western Cape, Tel. 021 959 2988, email: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)

INSTITUTE  
SOCIAL  
DEVELOPMENT

## ANNEXURE A1: Questionnaire – Food waste research

Dear Resident

Researcher Contact 065 955 6020 (WhatsApp)

This questionnaire is an instrument to collect data for the Development Studies Student Research of the University of the Western Cape (UWC), EMS Faculty: Institute for Social Development (ISD). The case study research is titled ‘**An assessment of the household food wastage: A study of Wallacedene in Kraaifontein, Cape Town**’ and will collect data through this questionnaire and focus group discussion. *Respondents to this questionnaire may be selected to be part of the focus group.* All information is handled confidentially, anonymously and with integrity, for strict use towards growth of food waste knowledge.

Kindly describe details for food categories e.g., protein, starch, vegetable, fruit etc. Where possible, please forward pictures of your Food Waste story on the WhatsApp contact provided and ensure to sign documents. Feel free to offer additional information on a separate page if needed. Thank you for your consent to participate. Your feedback will be useful to the study and you may be invited for further focus group discussions towards more assessment of the food waste topic on a date to be announced.

### SECTION ONE

1. **Household type:** House\_\_ Bungalow\_\_ Tent\_\_ Shack\_\_ Other\_\_ **Size** \_\_\_\_m x \_\_\_\_m

1.1 (a) **Number of persons in household** 1-3\_\_ 4-6\_\_ 7-9\_\_ 10-15\_\_ 16+\_\_

(b) **Number of waste bins** \_\_\_\_ **Type(s): Municipal** \_\_\_\_ **Other: Size(s)** \_\_\_\_\_

(c) **Number of people usually responsible for food handling** \_\_\_\_\_

Harvesting\_\_\_\_ Shopping\_\_\_\_ Storage\_\_\_\_ Preparing/Cooking\_\_\_\_ Serving\_\_\_\_ Cleaning\_\_\_\_

Briefly describe cross-responsibilities \_\_\_\_\_

2. **Food waste disposal methods** \_\_\_\_\_

2.1 (a) **Municipal waste collection (p/week)** \_\_\_\_\_

(b) **Explain other household methods of food waste disposal (how often?)** \_\_\_\_\_

3. **Does it ever happen that you throw food away? Yes** \_\_\_\_ **No** \_\_\_\_

3.1 **List types and sizes of food waste generated (please describe food categories in detail).**

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

(d) \_\_\_\_\_

(e) \_\_\_\_\_

4. **Do you think you waste food at given points in your daily life? Yes** \_\_ **No** \_\_ **Please explain.**

(a) \_\_\_\_\_

(b) \_\_\_\_\_

**4.1 Do you share food? Explain briefly please.**

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

**4.2 How often and why do you and/or your family throw away food that can still be used?**

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

**4.3 Give the types and amounts of food remains (left over meals) on average.**

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

**4.4 Describe methods and periods of food disposal including surplus/excess and out of date food.**

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

**4.5 Explain how you feel when you (or someone else) throw away edible/wholesome food?**

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

**5. Give any other detail(s) that may, in your opinion help the data collection process of this study.**

(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

### **Participant's Signature**

.....

All information is handled absolutely confidentially and is for strict study-use towards analysis of food waste to grow research knowledge

## ANNEXURE A2: Questionnaire Information Sheet



University of the Western Cape

*Private Bag X17, Bellville 7535, Cape Town, South Africa  
Telephone : (021) 959 3858/6/4050 Fax: (021) 959 3865  
E-mail: [pkippie@uwc.ac.za](mailto:pkippie@uwc.ac.za) or [esinden@uwc.ac.za](mailto:esinden@uwc.ac.za)*

### FOOD WASTE RESEARCH

### QUESTIONNAIRE INFORMATION SHEET

#### **Project Title:**

An assessment of household food wastage: A study of Wallacedene in Kraaifontein, Cape Town

#### **What is this study about?**

This research project is being conducted by S'celo Madondo, a student at the University of the Western Cape. The project focuses on area household food wastage, its patterns and levels, and residents' feelings – attitudes and behaviour towards food waste. The purpose of this study is to generate a better understanding of the phenomena, while highlighting the economic, social and environmental impacts of food waste locally, within the broader and global development challenges posed by problems of food waste.

#### **Participation**

Persons that are invited to participate in this project must be citizens of Cape Town and Wallacedene community members. All who answer the study questionnaire agree to take part in this research freely and understand that participation is voluntary. After feedback from all respondents to the questionnaire forms is collected, the study will select ten (10) contributors to participate in a Focus Group Discussion (FGD) as follow-up. As such, *any participant may expect to be selected and invited as one of the ten (10) contributors to form part of the FGD* at a later date to be announced. All research participation will be treated with confidentiality and integrity, and all personal information will be kept private and will remain anonymous.

### **Questionnaire consent form**

In order to answer the questionnaire, participants will be offered an opportunity to ask questions related to this study and receive satisfactory answers. In addition, participants are expected to sign a 'Consent Form' of approval and agree to take part in this research. The form will outline information about the study and researcher biographic details, including supervisor information and educational institution particulars and contacts.

### **What if I have questions?**

This research is being conducted by **S'celo Madondo** a student at the University of the Western Cape with the contact number: 0659556020 (WhatsApp).

If you have any questions about the research study itself, please contact **Dr Elaine Sinden** at Institute for Social Development (SOG), University of the Western Cape. Her telephone number is (021) 959 4050 and her email is [esinden@uwc.ac.za](mailto:esinden@uwc.ac.za) Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact her:

Dr Elaine Sinden (ISD)  
University of the Western Cape (School of Government)  
Private Bag X17  
Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee. HSSREC, Research Development, UWC.  
Tel: 021 959 2988, email: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)



**ANNEXURE B: FGD Consent Letter**

**LETTER OF CONSENT: TO PARTICIPATE IN FOCUS GROUP DISCUSSION  
FOOD WASTE RESEARCH**

I....., have had the opportunity to ask any questions related to this study, and received satisfactory answers to my questions, and any additional details I wanted.

I agree to take part in this research.

I understand that my participation in this study is voluntary. I am free not to participate and have the right to withdraw from the study at any time, without having to explain myself.

I am aware that the information I provide in this focus group discussion might result in research which may be published, and that my name will NOT be used.

I understand that my signature on this form indicates that I understand the information on the information sheet regarding the nature and structure of the questions to be discussed.

I have some views/information for this research study regarding food waste and its impact.

I agree to answer the questions to the best of my ability.

I understand that the researcher will guarantee that my name will NOT be used in any manner. Also, that researcher will guarantee that all COVID-19 health regulations will be adhered to during the FGD session, including wearing of face masks, social distancing and use of hand sanitisers.

I may also refuse to answer any questions that I do not want to answer.

**I agree to the audio recording of my response and its use in this research.**

By signing this letter, I give free and informed consent to participate in this research study.

Date: \_\_\_\_\_

Participant's Name: \_\_\_\_\_

Participant's Signature: \_\_\_\_\_

Focus Group Facilitator's Name: \_\_\_\_\_

Focus Group Facilitator's Signature: \_\_\_\_\_

This research is being conducted by **S'celo Madondo**, a student at the University of the Western Cape, EMS Faculty - Institute for Social Development. His contact details are as follows: Mobile: +27 (0)65 955 6020 (WhatsApp)      Email: [3876213@myuwc.ac.za](mailto:3876213@myuwc.ac.za)

If you have any questions about the research study itself, please contact **Dr. Elaine Sinden** at Institute for Social Development (ISD), University of the Western Cape. His contact details are as follows: Tel: +27 (0)21 959 4050      Email: [Esinden@uwc.ac.za](mailto:Esinden@uwc.ac.za)

**This research project has received ethical approval from the Humanities & Social Sciences Research Ethics Committee of the University of the Western Cape, Tel. 021 959 2988, email: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)**

## **ANNEXURE B1: Food waste study questions – Focus Group Discussion (FGD)**

This instrument outlines questions to collect primary data for the Development Studies Research of the University of the Western Cape (UWC), EMS Faculty - Institute for Social Development (ISD). The research project is titled '*An assessment of household food wastage: A study of Wallacedene in Kraaifontein, Cape Town*'. The focus group discussion is conducted as a follow-up to data collected earlier through questionnaires. All information is handled confidentially, anonymously and with integrity, for strict use towards the growth of food waste knowledge. Participants are selected from respondents of Annexure A, the initial study questionnaire and participate as per invitation. Focus group activities will aim to afford all who are present the opportunity to freely and voluntarily supply detailed data on the food waste subject.

### **QUESTIONS**

1. Are residents in Wallacedene wasting household food? Yes\_\_\_ No\_\_\_ Please give reasons.
2. What types of food items are wasted by residents of Wallacedene? Kindly give details.
3. What do residents do with unused or unconsumed food? Discuss in detail.
4. How do residents of Wallacedene feel when they waste food or throw food away? Explain.
5. Are you aware of the social, environmental and economic impacts of food waste? Discuss.
6. Why is saving food relevant all the time, especially in recent times? Explain.
7. Discuss alternative methods to save food.

All information is treated absolutely confidentially and is for the strict use of the food waste study to grow research knowledge. Formal consent is needed from all persons involved to record discussion sessions for research purposes. All participants are encouraged to discuss freely and to indicate when feeling uncomfortable. Estimated period of the session is about 1 hour.

## ANNEXURE B2: FGD Information Sheet



University of the Western Cape

*Private Bag X17, Bellville 7535, Cape Town, South Africa  
Telephone : (021) 959 3858/6/4050 Fax: (021) 959 3865  
E-mail: [pkippie@uwc.ac.za](mailto:pkippie@uwc.ac.za) or [esinden@uwc.ac.za](mailto:esinden@uwc.ac.za)*

### **FOOD WASTE RESEARCH FOCUS GROUP DISCUSSION (FGD) INFORMATION SHEET**

#### **Project Title:**

An assessment of household food wastage: A study of Wallacedene in Kraaifontein, Cape Town

#### **What is this study about?**

This research project is being conducted by S'celo Madondo, a student at the University of the Western Cape. You are invited to participate in this project as a Wallacedene community member and a citizen of Cape Town. The project focuses on area household food wastage, its patterns and levels, and residents' feelings – attitudes and behaviour towards food waste. The purpose of this study is to generate a better understanding of the phenomena, while highlighting the economic, social and environmental impacts of food waste locally, within the broader and global development challenges posed by problems of food waste.

#### **What is the Focus Group Discussion (FGD) about?**

The focus group proceedings will present questions that will be answered honestly and in detail through a discussion. It seeks to find out if local residents do indeed waste food and if so, how often and how much food is being wasted, including the types of food wasted. Also, the research seeks to establish local residents' attitudes and feelings towards food waste. From the food waste behaviour trends in the area, data will be documented and analysed in accordance with the broader context of studies conducted on the subject, locally and abroad.

#### **Would my participation in this study be kept confidential?**

All participation will be treated with confidentiality and integrity. All personal information will be kept confidential and will remain anonymous. You will be required to sign a consent form before partaking in the study to protect your privacy and confidentiality. Also, the researcher shall NOT reveal the identity of the participants and will safeguard the confidential information obtained in the course of the study. Contrary to the use of participants' names, the study will use numbers to identify/list and record respondents' contributions.

**What are the risks of this research?**

There are no risks involved in participating in this research project. From the beginning, aims and objectives will be clear.

**What are the benefits of this research?**

There are no material benefits for the interviewee. However, the researcher hopes that participants will find value in the study through growing of knowledge on the food waste subject that is acknowledged to have social, economic and financial impacts on a local and global scale.

**Do I have to complete focus group discussions and may I stop participating at any time?**

Your participation in this research is completely voluntary. Should you feel the need to withdraw from the study, you can do so at any time.

**How long will it take to complete the focus group discussion?**

The focus group discussion will last for one hour and the researcher will guarantee all COVID-19 health regulations will be adhered to during the FGD session – including the wearing of face masks, social distancing and use of hand sanitiser.

**Do I need to bring anything to the discussion?**

Yes. Please ensure to bring a face mask.

**Is any assistance available if I am negatively affected by participating in this study?**

There are no negative effects that could happen from participating in this study.

**What if I have questions?**

This research is being conducted by **S'celo Madondo** a student at the University of the Western Cape with the contact number: 0659556020 (WhatsApp).

If you have any questions about the research study itself, please contact **Dr Elaine Sinden** at Institute for Social Development (SOG), University of the Western Cape. Her telephone number is (021) 959 4050 and her email is [esinden@uwc.ac.za](mailto:esinden@uwc.ac.za) Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact her:

Dr Elaine Sinden (ISD)  
University of the Western Cape (School of Government)  
Private Bag X17  
Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee. HSSREC, Research Development, UWC.

Tel: 021 959 2988, email: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)

**This research project has received ethical approval from the Humanities & Social Sciences Research Ethics Committee of the University of the Western Cape, Tel. 021 959 2988, email: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)**

## ANNEXURE C: UWC Ethical Clearance Certificate



UNIVERSITY of the  
WESTERN CAPE



07 June 2021

Mr S Madondo  
Institute for Social Development  
Faculty of Economic and Management Sciences

**HSSREC Reference Number:** HS21/3/30

**Project Title:** An assessment of household food wastage: A study of Wallacedene in Kraaifontein, Cape Town.

**Approval Period:** 02 June 2021 – 02 June 2024

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

**Please remember to submit a progress report by 30 November each year for the duration of the project.**

*The permission to conduct the study must be submitted to HSSREC for record keeping purposes.*

The Committee must be informed of any serious adverse events and/or termination of the study.

A handwritten signature in black ink, appearing to read 'Patricia Josias'.

*Ms Patricia Josias  
Research Ethics Committee Officer  
University of the Western Cape*

NHREC Registration Number: HSSREC-130416-049

Director: Research Development  
University of the Western Cape  
Private Bag X 17  
Bellville 7535  
Republic of South Africa  
Tel: +27 21 959 4111  
Email: [research-ethics@uwc.ac.za](mailto:research-ethics@uwc.ac.za)

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