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Organic Food Systems and Sustainable Consumption Behaviour in Johannesburg, South Africa

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A research report submitted to the Faculty of Science, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Science.

Johannesburg, 2018

DECLARATION

I declare that this research report is my own, unaided work. It is being submitted for the Degree of Master of Science at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



_____

(Signature of candidate)

_____8_ day of _August__ 2018__at_ University of the Witwatersrand

ABSTRACT

Aim: The aim of the study was to examine the buying practices and consumptive behaviours of organic food consumers in Johannesburg. This was done in order to understand the extent to which consumers' practices and behaviours, based on Di Guilio et al. (2014) framework, were sustainable and pro-environmental.

Methods: The study made use of a questionnaire, which was adapted from various similar studies. Basic statistics was used to analyze the consumers' behaviours. In addition, the Rasch model, a quantitative statistical package, was used to explore the extent of the sustainability of respondents' consumption, which shed light on their pro-environmental rationales.

Results: The results indicated that the organic food consumers were not sustainable in their buying and consumption behaviours as many of their actions were inferred to suit self-interests such as health, lifestyle, and convenience. Their purchasing and consumption behaviours although having sustainable impacts on the environment were coincidental. Highlighted in the outcomes of this study was that consumption behaviours were not based on a conscious environmental citizenship or pro-environmental rationales.

Conclusion: In general, the organic food consumers were classified as unsustainable consumers and it is recommended that a number of interventions be put in place in order to encourage sustainable consumption.

KEYWORDS: Organic Food Systems, Sustainable Consumption, pro-environmental behaviour, sustainable intentions, Sustainable Development

DEDICATION

I would like to thank my two amazing parents who donated their whole life's worth for this journey. I could never thank you enough for the financial, emotional and structural support you gave me. I am a very lucky person to have such phenomenal parents.

I would also like to thank Dr John Fletcher for guiding me through the Rasch and Prof. Martie Sanders who helped me polish the instrument.

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Table of Contents

1. INTRODUCTION 12
1.1. Background of the Study 12
1.2. Statement of The Problem 16
1.3. The significance of the Study 18
1.4. Research Objectives 18
1.5. Concluding Remarks 18
2. LITERATURE REVIEW 20
2.1. Introduction and Chapter overview 20
2.2. Sustainable Development and Food Systems 20
2.3. Organic Food Systems Potential role in Sustainable Development 25
2.3.1. Environmental Considerations for Organics as Sustainable Food Systems 26
2.3.2. Social Considerations for Organics as Sustainable Food Systems 28
2.3.3. Economics Considerations for Organics as Sustainable Food Systems 31
2.3.4 Organic Food Systems as Sustainable Food Systems 32
2. 4. Distribution of Organic Produce 33
2.5. Certification of Organic food 35
2.6. Organic food systems in South Africa 36
2.7. Sustainable Consumption Evolution 38
2.7.1 Sustainable Consumption as a part of Sustainable Production 39
2.7.2. Sustainable Consumption as a behaviour 40
2.8. Sustainable Consumption and Organic Food Systems Studies 42
2.8.1 Accelerants of Organic Food Systems 43
2.8.2. Hindrances of Organic Food Systems 43
2.8.3. Organic Food Systems and Sustainable Consumption Research Gaps in South Africa 45
2.9. Sustainable Consumption: A Definition For This Study 46
2.10. Concluding Remarks 48
3. METHODOLOGY 50
3.1. Introduction And Chapter Overview 50
3.2. Research Approach 50
3.3. Location/ Context of Study 50
3.4. Subject Selection And Sampling Procedure 52
3.5. Instrument Design 53
3.6. Data Analysis 54
3.6.1. Selective and Responsive Questions 54

3.6.2. Likert Scale Questions: Rasch Analysis 54
3.7. Validity And Reliability 58
3.8. Limitations 58
3.8.1. Specific target group 58
3.8.2. Non-Randomization of population or site 59
3.8.3. Social desirability 59
3.8.4. Questionnaire as the only form of instrument to gather research 59
3.8.5. Researcher bias 60
3.9. Chapter Concluding Remarks 60
4. RESULTS 61
4.1. Introduction and Chapter Overview 61
4.2. Basic Demographics 61
4.3. Organic Market Visits 62
4.4. Purchasing from Supermarket Stores 63
4.5. Travelling To The Market 64
4.6. The frequency of Organic food intake 66
4.7. Type of Organic Food Intake 67
4.8. Sustainable Consumption Measures 69
4.8.1. Summary statistics and reliability 69
4.8.2. Person Measure 70
4.8.3. Item Measure 72
4.9. Sustainable Consumption 74
4.10. Concluding Remarks 75
5. DISCUSSION 77
5.1. Introduction 77
5.2. Purchasing and Consumption Behaviours 77
5.2.1. Duration of purchasing from the organic market 77
5.2.2. Age group 79
5.2.3. Purchasing from supermarkets 81
5.2.4. Mode of transportation to purchasing organic food 81
5.2.5. The frequency of organic food purchase 82
5.2.6. Type of food purchased 84
5.2.7. The conclusion of the purchasing and Consumption Behaviours 85
5.3. Intentions of Purchasing and Consumption Behaviours 86
5.4. Sustainable Consumption 88
6. CONCLUSION AND RECOMMENDATIONS 91
6.1. Summary of the key findings related to the research objectives 91

6.2. Recommendations 93
6.2.1. Sampling and data collection 93
6.2.2. Analytical Framework 94
REFERENCE LIST 97
APPENDICES 107
APPENDIX 1: The Survey Administered 107
APPENDIX 2: Fit Statistics Before Item Removal 109
APPENDIX 3: Summary Statistics Of Person And Item Measures 110
APPENDIX 4: Rankings Of Highest And Lowest Person Measures 111
APPENDIX 5: Item-Person Map 112
APPENDIX 7: Coded Words For Likert Scale Questions 113

LIST OF FIGURES

Figure 1: Diagram Depicting Weak (Left) and Strong (Right) Sustainability (Rosen & Kishawy, 2012; Moir & Carter, 2012).....24

Figure 2: Sustainable Consumption defined as sustainable diets adapted from Auestad and Fulgoni, 2015 41

Figure 3: The sustainability of consumption behaviours from the intent-and-impact-perspective by Di Giulio et al. (2014) pg 55.....48

Figure 4: Map of the location of the two organic markets chosen (Google Maps, 2018). 51

Figure 5: (a) Basic demographics including age, (b) gender and (c) educational level. 62

Figure 6: (a) The duration period of buying from both organic food markets and (b) frequency of buying from the organic food markets 63

Figure 7: Themes and frequencies of the reasons why respondents purchase organic food from supermarkets 64

Figure 8: Transportation means to the market including (a) how far they travel to the market (b) what mode of transport they use and (c) the prominent themes around why their chosen form of transport is utilized. 65

Figure 9: (a) The figures representing the frequency of eating organic food and (b) the most likely reasons influencing the frequency of eating organic food 67

Figure 10: (a) The figures representing the types of foods organic food consumers' purchase and (b) the various themes that came up when asked to provide reasons for the type of organic food purchase along with the frequencies of the themes. 68

Figure 11: The person measures against the standardized fit statistics (Z-std) 70

Figure 12: The item measures against the standardized fit statistics (Z-std) 71

LIST OF TABLES

Table 1: Interpretation associated with MNSQ values (Winsteps, 2018) 56
Table 2: Summary Statistics of person and item measures 69
Table 3: A summary of the interpretation of the organic food consumer's impacts and intentions based on their behaviours 74
Table 4: The difference between the highest ranking and lowest ranking individuals responses consumptive behaviour 75

DEFINITION OF TERMS USED IN THIS STUDY

Consumption

Is not merely the purchase of a good but the interaction and physical eating of the goods too.

Food Systems

A food system is defined as a number of activities ranging from production, processing, distribution right through to consumption of food (Schumilas, 2011).

Organic Food Systems

These are defined as food production systems that can maintain and sustain the health of soils, ecosystems, and people (Willer & Lernoud, 2015). They are the life cycle of foods from production to distribution to consumption where the interactions between and within the bio-geophysical, human (consumers and distributors) and environment are sustainable from the start of the system until the end (Blignaught, 2014; Erickson, 2007; Strassner *et. al*., 2015).

Conventional food system

A capitalized food system is one that follows industrial agriculture, non-localized distribution and maximizes on food consumption, quantity, and profit.

Sustainability

Is said to be in operation when things can be maintained over time so that they can meet the needs of today without compromising the needs of tomorrow (Drexhage & Murphy, 2010).

Strong Sustainability

Strong sustainability is assumed when natural capital forms the basis of all other three pillars of production. This means that natural capital must always be maintained before the economic or human capital because unlike the other capitals, it cannot be created or maintained by using other capitals except by itself (Husain, 2003; SANZ, 2009).

Weak sustainability

Occurs where natural capital can be used up or can be converted to the economic or human capital of equal value (Rosen and Kishawy, 2012).

Sustainable consumption

These are behaviours, which have sustainable impacts on the environment and are carried out because of explicit pro-environmental intentions (Di Giulio et. al., 2014).

Sustainable impact

Is an impact of a behaviour or action that does not destroy the natural environment quality or resources now or in the future (Di Giulio et. al., 2014).

Sustainable intention

These are explicit intentions aimed at contributing to the environmental quality and thus sustainability.

Sustainable consumptive behaviours

- Sustainable product choice (choosing organic food)
- Plant and based diet with fresh produce
- Meat reduction in diet or curtailment
- Choosing locally produced food
- Choosing seasonal food over non-seasonal

(Reisch, 2013 and Power, 2010)

Youth

National Youth Policy (2015) defines youth as persons between the ages of 15-34 years old.

1. INTRODUCTION

1.1. Background of the Study

Sustainable Development issues have mainly been brought about by the unsustainable consumption and production of goods and from an adoption of economic systems such as the Neoclassical Economic Theory[1]. Such systems have disregard for human life and the environment in order to maintain economic growth. James Gustave Speth[2] (2009) wrote in his book [3] "these economic systems of the world, where there is an obsession with Gross Domestic Product growth at all costs, must be abandoned and emphasis on human welfare must be heightened" p12. In fact, Peters (2017) explains that these economic systems promulgate the Worlds Wicked Problems[4]. These problems, in addition to growing consumerism[5], create adverse complicated intertwined problems that are increasingly difficult to solve. Scott (2011) adds that concentrating solely on economic outputs could put pressure on the existence of the earth due to its biophysical limits. A disregard of these limits could potentially end any production of food, which is desperately needed for survival by all living organisms (Peters, 2017).

Issues of industrial food production have been one of the biggest Wicked Problems yet to be solved. Scott (2011) explains that a part of the problem is that within the current economic system of the world, food is made a commodity sold to people for profit when it is, in fact, a fundamental physiological human need (as explained by Maslow's Hierarchy of Needs). When food is made a commodity and not a necessity it presumes that food is an optional item that a consumer can opt not to purchase if they don't have enough money. This is further promulgated by the fact that almost half of the world lives on less than $2.50 US a day and 1.3 billion people live in

---

[1] An approach to economics focusing on the determination of goods, outputs, and income distributions in markets through supply and demand (Campus, 1987)

[2] Dean of the Yale School of Forestry and Environmental Studies 1999-2009

[3] "The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing"

[4] A wicked problem is a social or cultural problem that is difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other problems.

[5] A social and economic order and ideology that encourages the acquisition of goods and services in order to be economically desirable

extreme poverty with less than $1US a day (Atkinson, 2016). The resulting problem is that of poverty with people not having access to food due to both financial inability to purchase and physically being unable to afford transport to reach the supermarkets which are usually centralized in urban areas. This is often a place where poverty-stricken people cannot afford to reside (Barrow 2006; Reganold & Watcher 2016; Scialabba & Hattam 2002).

Affordability and accessibility problems of food are similar in South Africa. Peyton et al. (2015) explains that although some supermarkets have been successful in penetrating some low-income communities, they are often incompatible with the consumption strategies of the poorest households. Financial limits and physical access to supermarkets also results in these people not having a choice on what they can eat. For these people it means having a limited variety of cheaper less nutritive foods which thus bring about health consequences (Peyton et al., 2015).

These problems on a global scale create food insecurity[6] and the result is 22 000 people worldwide die from hunger every day. Amidst a growing population increase from 8.7 billion to 9.7 billion by 2050 and growing consumerism, the survival of the earth and its people seems to have an ill-fated outcome. Such issues and limitations are thus the reasons why many countries of the world made food security such an imperative Wicked Problem to attempt to reverse (Atkinson, 2016).

Blewit (2012) explains that there has been global acceptance that such ill-fated incidents need to be reduced. It was realized that solving such major food security issues problems needed a change in food production and consumption. These have been recognized and formed part of the Sustainable Development Goals (SDGs) (Blewit, 2012). SDG's are a universal call of action to end poverty (Goal 1[7]), protect the planet and ensure that all people enjoy peace and prosperity. They tackle the root causes of poverty and unite us together to make a positive change for both people

[6] Food security is a term used where there is availability of food at all times which is adequate, nourishing, diverse, balanced and moderate. It also means there is steady consumption of food and offset fluctuations in production and prices (FAU & UN, 2002)

[7] Goal 1 seeks to end poverty in all its forms everywhere

and planet (Kumar et al. 2016). Goal 2.4[8] of the SDG's indicates the reasons why alternative food systems have thus formed part of the discussion on solving food insecurities and creating sustainable agriculture. Letting go of the conventional food systems[9], which have been argued to heighten food insecurity[10] is one of the reasons for the existence of Sustainable Development Goal 12, which specifically seeks to ensure sustainable consumption and production of food.

Schnitkey & Miranda (1993) explain that conventional food systems are based on the low cost of fossil fuels, the manufacturing of chemical fertilizers, the processing of food, and the packaging of food. Records indicate that the above mentioned processes of conventional food systems have an impact on ecological processes as well as people's health which are all done at a price for a high yield of produce for sale. Their effect impacts negatively on society and the environment at large and creates poverty. Kuhnlein & Receveur (1996) continue by stating that other negatives associated with conventional food systems are the globalization of food production that results in the loss of traditional food systems[11].

Conventional food systems are often counter-opposed with "alternative food systems", which usually refer to local or regionally based food procurement aiming to support local farmers and communities (Regonald & Watcher, 2016). Alternative food systems seek to correct issues of sustainability and are more aligned with perspective of SDG's. Organic food systems, sometimes called biological or ecological agriculture, have thus come up in research as being one kind of alternative food system that can change the fate presented by the case of the conventional food systems. Although there are debates and no full consensus regarding the true benefits and sustainability issues of conventional and alternative food systems there is some credit regarding how organic food systems may offer an alternative approach towards sustainability as per the SDGs. Many studies on organic agriculture suggest that

[8] Goal 2.4 specifically looks at sustainable agriculture

[9] Conventional food systems are food production systems which aim to maximize economies of scale, lowering overall consumer costs and maximizing production and maximizing organizational profits especially with global trade (Schnitkey & Miranda, 1993)

[10] The argument that conventional food systems are capitalistic and exclusionary and thus create inequality system of inequality

[11] Traditional food systems are defined as composed of items from the local, natural environment that are culturally acceptable.

organic practices are less harmful to the environment than conventional agriculture and can create an inclusionary system that can potentially uplift society and better reach SDG's (Kremen & Miles, 2012).

Lawrence (2017) writes that any food system presents their own "pros and cons" so much so that the UN (2016) in the "Zero Hunger Challenge" summarizes that all food systems whether conventional or alternative (i.e. organic traditional[12], community or ecologically modernized[13]) can be sustainable as long as the production, processing, distribution, retailing and consumption (i.e. all activities in a food system) can equally be sustainable. The result is that agricultural production alone (the most considered aspect of sustainable development in the food security issue) cannot be the only basis of ensuring the sustainability of a food system.

Distribution and consumption are thus equally important aspects of creating food security. In the case of organic farming however, research is limited in the production side compared to the conventional food system and is equally under-researched in the distribution or consumption side (Willer & Lernoud, 2015). In order to fully advocate for organic food systems as an "alternative food system" with all of its sustainability claims it is important that the current sustainability claims of organic food be further interrogated. This would help analyse how truly feasible organic food is as a solution for solving sustainable production and consumption as well as sustainable agriculture. This is one major research gap in general terms. A number of factors have limited research on organics such as the number of organic farms available, the extent of organically farmed land, research funding devoted to organic farming and the relatively small market size for organic foods (Willer & Lernoud, 2015).

However, with the growing interest and market size growth[14] of organic food coupled with international reports[15] recognizing organic agriculture as an innovative

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[12] Community-based food systems define prescriptive goals but oppose many elements of the globalized corporate food system

[13] Ecologically modernized food system seek to reform certain aspects of globalized corporate food systems such as environmental impact and labor standards, while not altering the main features of the modern global system

[14] Organic foods and beverages increased almost fivefold between 1999 and 2013 to US$72 billion and projections to double by 2018.

farming system that balances multiple sustainability goals it is important that a few questions be interogated. Firstly, with limited cases reported on the sustainability of organic farming how sure can researchers be on the accuracy of the sustainability claims of organic food production, distribution and consumption? Secondly, it raises the question of what do organic distribution channels look like in order for them to be sustainable? Finally, it also raises the question of whether the mere consumption of organic food is a sustainable exercise?

With South Africa having the third largest proportion of land in Africa designated to the production of organic food behind Tunisia and Uganda (Kisaka-Lwayo & Obi, 2013) as well as being one of Africa's richest countries with increasing urban migration the country makes for a special case for the observation of organics as a sustainable food system. Futhermore, it presents a special case for the researching of the sustainability of organic food systems.

1.2. Statement of The Problem

With the growing problems of food security, production and advocating for alternative food systems there are a few problems, which exist. Firstly, with the rapid growth of organic agriculture, there has been an increasing number of studies on organic production studies and their environmental and social benefits over conventional food systems (Engel, 2008; Seyfang, 2010) . However, there has generally been little understanding of organic food consumption and distribution (Seyfang, 2007) which are imperative because the unsustainable consumption and production of food is a growing threat to achieving sustainable food systems and food security. There is thus a need to gain knowledge regarding organic food systems in their entirety.

Secondly, the knowledge that exists around organic consumption is not with regard to sustainability matters but rather for marketing purposes to stimulate organic market growth and to increase consumption. Investigating the sustainability of

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[15] International Assessment of Agricultural Science and Technology for Development (2009) and Research Council (2010)

organic consumption patterns is thus a vital aspect of gaining knowledge for sustainable organic food systems (Engel, 2008; Seyfang, 2010).

The third problem is that framing sustainable consumption has been an inconclusive exercise for world leaders (Di Guilio et al., 2014). This is an important concept that needs resolution in order to reach SDG's and understanding the full potential for organic food systems as a part of the sustainable food system. Although Di Guilio et al. (2014) proposed the impact–intent framework [16] for defining sustainable consumption, this framework still remains a concept which has not yet been tested and if done could potentially be useful.

The question of how to face the growing problem of food insecurity in Africa becomes more and more imminent, especially with increased poverty in urban areas of developing countries. The fourth problem exists in this context in that increased urban migration with people in search of a better life, and responding to their basic needs will put pressure on food security issues (Frayne et al. 2010). It is important to look into the consumption behaviours of urban citizens, especially those claiming to be consuming organic food, because organic food consumption in the urban African context is generally less understood (Ractliffe, 2015).

Based on the available South African records, studies in Kwa-Zulu Natal, Eastern Cape (Kisaka-Lwayo & Obi, 2016) as well as Western Cape (Ractliffe, 2015) have been done. It would seem that the Gauteng province is a special case that has not been researched thoroughly when it comes to organic food consumption and sustainable consumer behaviours. It is important to get more information on Gauteng and particularly Johohannesburg because of the cosmopolitan society Johannesburg presents and the growing threat to urban food security arising from urban migration.

[16] Defines sustainable consumption as when people's consumption behaviours lead to environmentally enhancing impacts and the intention behind the behaviour was based on direct consciousness of the environment.

1.3. The significance of the Study

Firstly, this study will be significant as it will add value to the ongoing definition of sustainable consumption. Secondly, the study will provide a case for the sustainable consumption of organic food consumers in South Africa in an effort to bring the research at par with other research initiatives on the subject worldwide. Thirdly, it will test practically the definition of sustainable consumption based on the impact-intention theory presented by Di Guilio et al. (2016). All of this information will, therefore, guide a concerted strategy to make it easier for people to behave more sustainably which could enable access to choices that propel sustainability and SDG's. The study can thereafter give some directions on what is needed for the desired changes within governments own policies and practices with regard to sustainable consumption behaviour (Seyfang, 2007). Furthermore, the study has the potential to reveal what is causing people to behave sustainably or not when consuming food. This study will, hopefully, present future researchers with what is needed to explore the characteristics of different sustainable food consumer segments to support their potential use in promoting sustainable development.

1.4. Research Objectives

The objectives of the research study were thus:

1. To identify the purchasing and consumption behaviours displayed by Johannesburg organic food consumers.
2. To determine the purchasing and consumption intentions displayed by Johannesburg organic food consumers.
3. To establish the sustainability of Johannesburg organic food consumers' acts and practices from an intent-and-impact orientated perspective (Di Giulio et al., 2014).

1.5. Concluding Remarks

The production of organic food needs to be supported by sustainable consumption in order for it to be justified as a sustainable food system. It is for this reason that the consumption of organic food needs to be assessed more in order to make gains on the

Sustainable Development Goals and defining sustainable consumption more precisely. The next chapter focuses on the problems associated with defining sustainable consumption, the evolution of the definition, which forms the basis and the conceptual framework of this study and contributes to its importance.

2. LITERATURE REVIEW

2.1. Introduction and Chapter overview

The ongoing concern for Sustainable Development Goals (SDG'S) requires comprehending the idea of sustainable development well. In the case of alleviating hunger, sustainable production and consumption also needs further consideration. It is equally important to look into the sustainability of alternative food systems such as organics as sustainable food systems. The following chapter thus firstly traces the evolution of sustainable development and how that translated into SDG's. Secondly, this chapter looks into what consumption and production mean in terms of sustainable development and the reasons organic food systems are advocated for sustainable food systems. Thirdly, the chapter will divulge the challenges with defining sustainable consumption and the implications thereof for sustainable food systems. Fourthly, key examples of sustainable food systems, such as organic food systems, are explored in order to showcase how sustainable consumption is embedded in behaviour change in food consumption. I will finally explain how sustainable consumption based on both environmental actions and pro-environmental intentions as described by the framework of Di Guilio et al. (2014) is used in the study.

2.2. Sustainable Development and Food Systems

Rau, (2017) indicates that sustainable development is a concept, which arose through various distinctive multinational conferences[17], which took place worldwide. Contemporary notions of sustainable development, however, were largely attributed to the efforts of the World Commission on the Environment (WCED) also known as the Brundlandt Commission, which took place in December 1987 (Lele, 1991; Merbatu, 1998; Redclit, 2005). At that time there was a realisation by the United Nations (UN) that the human environment and natural resources were rapidly being deteriorated. Under these circumstances, the UN aimed to rally countries together to

[17] Brundtland Commission (1983), United Nations (UN) Conference on the Human Environment in 1972, The International Union for Conservation of Nature's (1980) and the Earth Summit (1992).

pursue sustainable development. “Our Common Future” (UN, 1987) was the document derived from this commission, which took sustainable development into global policy circles and became the focus of collective international action. Sustainable development today is classified as development that “meets the needs of today without compromising the ability of future generations” (UN, 1987). In other words, Sustainable Development is seen in worldview as a principle of meeting human needs while sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depend.

The outcomes of sustainable development discussions were formally agreed upon and encapsulated in the September 2015 adoption of the Sustainable Development Goals (SDG) by 193 countries (UN, 2016). It was through these above-mentioned commissions and conferences that there was finally a consensus that sustainable development was a concept that identified and linked topics of sustainable production as well as sustainable consumption within any system and that these existed together in a sustainable system. Rebitzer, et al. (2004) indicated that the ideologies were brought about by the concepts of "Life Cycle Thinking" (LCT), which is an objective method of evaluating, and quantifying the energy and potential environmental impacts associated with a product, process and activity along the whole life cycle. LCT meant being cognizant of the energy consumption and environmental impacts from raw material acquisition to the end of life product lifecycle. Such life cycle concepts are what contributed to the idea of thinking about sustainable food from production through to consumption.

Understanding that food systems needed to be sustainable from production to consumption also gave thought to interrogate every aspect of the food system through three main elements such as the economy, environment, and society. It was imperative to consider these elements because they all play a role in ensuring the livelihoods of people and had compounding effects on one another. What followed was the idea that economic facets could no longer be considered the main focus of people’s livelihoods, as this was a major cause of poverty creation. These three elements thus became known as the three sustainability pillars (Drexhage and Murphy, 2010). It was important to start interrogating which element was creating

poverty and food insecurity and thus prioritizing these three pillars. It became evident that the financial implications to development were not as constrained to as large a degree as the environmental limitations of the earth. Hart, Laville and Cattani (2010) explain that it was also apparent that economic systems of the world and capitalism had continually overshadowed environmental and social concerns because the capitalistic behaviour was the engine of economic growth at the cost of an equal society and environment.

Drexhage and Murphy (2010), Reish (2016) and Ractliffe (2015) explain that while economic interests are an important part of how the world works, environmental resources are equally and if not more important. What was evident through research was that the continued exploitation of natural resources to create economic opportunities could no longer be achieved indefinitely as environmental resources are often not infinite. There is a realization that natural resources can be exhausted and their quality compromised which could be of considerable detriment to biodiversity and the natural environment.

In the world of "production at all costs" there was an ironic problem in that should natural resources be depleted then there would be nothing left for wealth creation or survival of human life for that matter (Drexhage and Murphy, 2010). Hart et al. (2010) argue that perhaps the first step to sustainable development needed to be changing capitalistic behaviour and turn to a more ecological economy whereby both ecology and economics are considered. Cotstanza (1989) conceptualized ecological economics as the need to make economics more cognizant of ecological impacts and dependencies; the need to make ecology more sensitive to economic forces, incentives, and constraints; and the need to treat integrated economic-ecologic systems with a common (but diverse) set of conceptual and analytical tools. As a result of today, there is a greater need to look into sustainability in light of environmental issues and dissolving the predominantly capitalistic view.

A perspective presented by Costanza and Daly (1992) in achieving sustainable development through changing capitalistic views is today known as strong sustainability, which is contrasted to weak sustainability. The researchers conceded

that sustainability includes three pillars including the natural, social and economic capital. However, the relationships between these capitals have been debated resulting in the concepts of weak and strong sustainable development. W*eak* sustainable development implies that natural capital can be used up for as long as it can be converted to the economic or human capital of equal value (Neumayer, 2003). Costanza and Daly (1992), El Serafy (1991) and Ekins et al. (2003) explain that weak sustainability is the idea that all three capitals are valued in the same light and that they can contribute equally to wealth creation and as such should be maintained equally.

Weak sustainable development is opposed to strong sustainable development. Here, strong sustainable development implies that natural capital must be maintained over economic or social capital because unlike the other capitals it cannot be duplicated or created by any other capital (Neumayer, 2003; SANZ, 2009). In contrast to weak sustainability, strong sustainability indicates that these capital are not of equal proportion and that natural and social capital are not perfect substitutes for economic capital.

Rosen and Kishawy (2012) showed weak sustainability diagrammatically in Figure 1. Here, weak sustainability is shown with the three pillars or capital interacting with one another to an equal extent. The dotted region shows the common area where all three pillars interact indicating where they do not contend and thus were sustainable development can be achieved. However, this misleadingly suggests a conflict-free, unambiguous consensus, based on the assumption that trade-offs can be made between the three pillars. The suggestion that each concern is of equal importance fails to capture its complexity and neglects the reality of conflicting and variable perspectives (Rosen and Kishawy, 2012).

Based on the limitations of weak sustainable development Moir & Carter (2012) diagrammatically represented strong sustainability through the nested circles diagram also indicated in Figure 1. In the nested circles model, all the pillars rest on natural capital because they are not perfect substitutes for each other. The environment is the biggest capital that needs to be maintained. Each pillar is bound within the

environmental pillar and thus circumscribed. The model illustrates how the environment can survive without society and that in general, at least at some scales, society can exist without an extant economy. However, no model goes without faults and this model can present limitations. Firstly, Hopwood et al. (2002) argue that the model does not consider the various environments, societies and economies existing over time and spaces (on a macro and micro scale). Secondly, the model does not consider how economic markets can meet human needs therefore not differentiating between the benefits and detriments of economic activity. And finally another limitation is that the model fails to show how materials received from the environment are linked to culture and thus the compartmentalization does not indicate how each of these pillars compounds on one another.

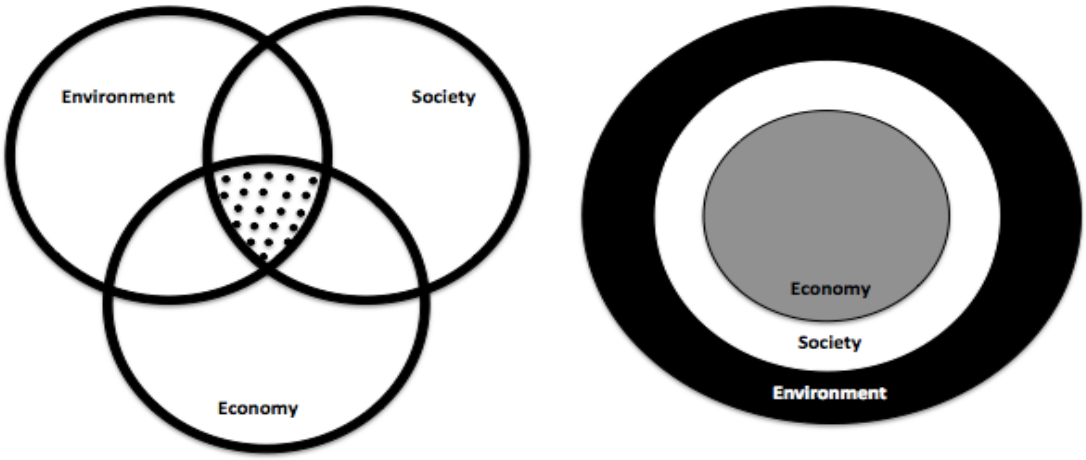

Figure 1: Diagram Depicting Weak (Left) and Strong (Right) Sustainability (Rosen & Kishawy, 2012; Moir & Carter, 2012)

These diagrams, therefore, indicate that virtually all industries, including the food production industry, show major signs of employing weak sustainability because in general, they exploit the environment in return for economic benefits. The industrial food sector as a whole is a significant contributor to unsustainable development especially because of the negative effects it has on natural capital. A study conducted by Trucost which looked into the monetary equivalent of environmental degradation showed just how exploited the environment has been. The cost to the environment from industrialized farming was seen at $3 Trillion per year with Crop production costing the environment $1.3 Trillion p.a, Livestock farming cost the environment R1.8 trillion p.a with beef production contributed $596m p.a as a result of

deforestation for clearing to make pastures and emissions from production (FOA et al. 2015).

In contrast to industrial farming practices, the FAO et al. (2015) study found that alternative farming practices had significantly fewer impacts on the environment. For example, through specific alternative cattle farming in Brazil, alternative rice farming in India, soybean farming in the USA and wheat farming in Germany could cost the environment significantly less. For example, holistic grazing management in Brazil where cattle are penned to smaller paddocks to allow grassland recover could reduce the environmental impacts by 11% and Soybean farming in the US and wheat farming in Germany could benefit from organic agricultural practices which utilize crop rotation, cover crops and manure instead of applying manure.

Alternative food systems such as organic food systems, which aim to preserve biodiversity, soil quality and ecosystems, are often presented as having stronger sustainability qualities than their conventional counterparts and have been heavily discussed in light of the future of food production (UNEP, 2016). There has however been much debate regarding the feasibility of such food systems and hence these require further interrogation (Kremen & Miles, 2012).

2.3. Organic Food Systems Potential role in Sustainable Development

Organic farming practices are rooted in traditional farming so much so that organic agriculture as we know it today involves a combination of traditional conservation-minded farming methods with modern farming technologies (Regonald & Watcher, 2016). Organic farming emphasizes rotating crops, managing pests naturally, diversifying crops and livestock, and improving the soil with compost additions and animal and green manures (Regonald & Watcher, 2016). Although requirements vary slightly between certifying agencies, they generally promote soil quality, crop rotations, animal and plant diversity, biological processes, and animal welfare, while generally prohibiting irradiation, sewage sludge, genetic engineering, the prophylactic use of antibiotics, and virtually all synthetic pesticides and fertilizers (Regonald & Watcher, 2016).

Erickson (2007) describes organic food systems as having properties, which could help enhance food production linked to SDGs as they have the potential to benefit all aspects of the sustainability pillars. This means that they have the potential to improve environmental, social and economic aspects of human life. Reganold & Watcher (2016) in their meta-analysis of organic food research revealed that organic food systems could be seen to be more environmentally friendly, more economically sustainable and achieve greater human well-being than conventional food systems. However, there are various criticisms of these benefits, which need to be considered and are the reasons why literature does not show a consensus to organic food systems being sustainable food systems. These debates are shown in the upcoming sections.

2.3.1. Environmental Considerations for Organics as Sustainable Food Systems

Organic food systems have been predominantly known for their environmental benefits of increasing biological diversity. Kremen and Miles (2012) found that biologically diversified farming[18] generally employed in organic farming has the potential to increase biodiversity which increases soil quality, carbon sequestration, and water-holding capacity in surface soils, energy-use efficiency, as well as resistance and resilience to climate change. However, some studies indicate that crop rotation and biologically diversified farming may equally threaten biodiversity. Siddique et al. (2014) explained that this threat emanates from the fact that some species of animals require special conservation of intact habitat that is very specific in order to survive. This would threaten biodiversity in such special cases because the constant rotation of crops or diversification of the environment may constantly change the habitat resulting in reduced biodiversity.

Similarly, issues of biodiversity can be seen in debates regarding land sparing (high-yielding agriculture on a small land footprint) or land sharing (low-yielding, wildlife-friendly agriculture on a larger land footprint). Kremen (2015) describes how conservation biologists are devoting an increasing amount of energy debating which

[18] Includes (1) genetic diversity within crop or livestock varieties or (2) diversity variety of a single crop or livestock species or (3) growing two or more crops close together and (4) non-crop plants and semi natural communities

of these two agricultural strategies have better capabilities of conserving biodiversity. When it comes to alternative food systems, such as organic food production, the debate focusses on which strategy organic food systems would need to employ in order to fully ensure local and global biodiversity (Kremen, 2015; Fischer et al. 2011). These questions have not yet been fully answered and need more research in general in order to see whether organic food systems would still produce similar biodiversity results within these two cases (Fischer et al. 2011). However, it remains unclear whether an either-or- approach is the best solution or that possibly a mixed case-specific approach to farming is necessary (Kremen, 2015).

Siddique et al. (2014) also identified other ecological benefits of organic farming practices. Some of these beneficial properties of organic farming include the control of weeds, diseases and arthropod pests that increase pollination services and produce much less environmental harm across ecological, spatial and temporal scales. However, it must be noted that in some studies the environmental benefits which have commonly been observed were not as pronounced and in some cases even absent when measured per unit of production (Siddique et al. 2014). . This is a cause for concern considering the general research which encourages organic food production due to its biological benefits. However it is clear that this results should be treated with caution (Siddique et al. 2014).

Studies in organic food research dating up to the 21st century have shown that although there were significant biological advantages witnessed in organic food production there was still a problem in the quantity of food yields (Crinnion, 2010;. Kremen & Miles, 2012; Regonald & Watcher, 2016). Organic food production was found to be between 8-25% lower than conventional food production and this was due to fewer stimulant fertilizers and pesticides that fast-track growth. Less food yield in the bottom line, could worsen food security and even lead to higher environmental and social impacts. However, a study by Ponisio et al. (2015) recorded that in some cases the organic yield gap was not as big as what had been reported. In some instances, the organic food yield gap was recorded as only 3% lower than conventional food indicating no significant difference between organic and conventional food yields. Some studies depending on the type of crop grown had

higher yields in organic foods and in other cases, the same crop elsewhere in conventional production had lower yields (Lee et al. 2015). An example of such a scenario is seen in Ponisio et al. (2015), which indicated that organic crop yields where diversification practices (multi-cropping and crop rotations) were utilised decreased the yield gap substantially (4 to 9% lower).

Organic food systems by being resilient have also been projected to play a positive role under climate changes. Lotter et al. (2003) described that under severe drought conditions, which are expected to increase with climate change in many areas, organically managed farms have frequently produced higher yields than their conventional counterparts due to the higher water-holding capacity of organically farmed soils. These are promising results that indicate that more robust analysis of organic food systems and a larger pool of metadata could improve organic management systems. These examples indicated that a case-specific summary of various food yields needed to be developed before writing off organic production for its yield low capabilities because no single farming system or practice works best everywhere (Regonald & Watcher, 2016).

Another climate change benefit attributed to organic food systems is that they use up less energy than conventional food systems. The employment of human labour results in less utilisation of fewer irrigation systems. These take up large amounts of fossil fuel generated energy (Lee at al. 2015). The use of human labour in organic food systems thus means that less energy is consumed in the food system making them as possible blueprints in addressing climate change (Regonald & Watcher, 2016).

2.3.2. Social Considerations for Organics as Sustainable Food Systems

Organic food systems have been seen to foster various aspects of social well-being and community building (Kisaka-Lwayo & Obi, 2015). Firstly, organic food systems have the potential to increase rural development. When organic food systems are grown in the home (subsistence farming) it gives people an opportunity to self-serve their wealth, health and food needs. These benefits have been well demonstrated in rural areas where Kisaka-Lwayo & Obi (2015) showed in their study that organic

production had the potential to decrease obesity and illness. The access to fresh foods was one of the reasons for decreased obesity and illness. In this particular case, the rural folks did not have to rely on cheaper ultra-processed food products (UPPs) which are often energy-dense but nutrient-poor (Claasen et al. 2016) and in the long run been seen to cause a health problems.

Although research does not show that organic fresh produce has higher nutrients than conventional fresh foods there are benefits to having access to fresh foods which organic food presents when used in subsistent farming (Kisaka-Lwayo & Obi, 2015). Consuming conventional foods also meant exposure to pesticides and preservatives which are rife in such tinned and dried foods in order to increase their shelf life. Some of these tinned foods also have huge doses of sugar added to improve their shelf life whilst others have chemicals that increase carcinogenic risk in humans.

Conventional subsistence farming is usually not a viable option with rural people as it would require pesticides, which are often too expensive, and thus would be unaffordable to them. Typically though, people who employ subsistence farming would not use conventional ways of farming and would resort to organic methods, which includes using organic matter as fertilizer. This is why subsistent farming is associated with organic farming. Kisaka-Lwayo & Obi (2015) explain that one of the positive consequences of self-service farming is that it ultimately relieves governments from providing food and medication (whether in the form of grants or food stamps) to low-income earners who cannot afford food and healthcare.

The consumption of organic food grown in the home could prospectively decrease the exposure many rural people have to cheap alternatives, which they have to buy from supermarkets. These are often limited to the staple foods, which are untaxed (hence cheaper) such as maize, brown bread or beans in the South African context. The outcome is that fresh fruits and vegetables become innaccesible and unaffordable (Classen et al. 2016). Subsistence organic farming in both communal or within personal vicinity can increase the fresh natural foods of poorer peoples diets, improving their food diversity and adding value nutritionally (alleviating hidden hunger). Subsistence farming becomes financially feasible as non-expensive fertilizer

from organic waste and animal faeces are used thus avoiding exposure to expensive artificial fertilizer and pesticides.

The downside however is that organic fertilizer may take considerably longer to make (especially use of organic food matter which has to be to built up from other organic waste) as well as the longer time organic crops take to grow may ultimately negatively impact yield (van Opheusden et al. 2012; Connor, 2013). These factors increase the potential to affect the nutritive quality of the food being grown and their availability seasonally thus compromising peoples livelihoods (Connor, 2013).

Another problem is that teaching people how to farm organically and create organic fertilizer in time may come at a cost not only financially but also through temporal labour costs as people have lost the traditional knowledge of growing food (Regonald & Watcher, 2016). However, if governments focused their energy and resources in these rural areas and provide knowledge and start-up capital then subsistence organic farming as self-serve agriculture could be of much benefit to such communities. The above mentioned resources supplemented by wild foods which rural people often depend on could be a powerful mix in increasing food security (Kisaka-Lwayo & Obi (2015). The mix of modern organic farming and wild food attainment equally has the potential to provide new food systems together with land sharing mentioned earlier could provide further environmental solutions to food production. However, land sharing provides its own problems because it often times need a stable unchanged environment to sustain the biodiversity (Kremen, 2015).

Urban migration, however, is something that can stifle self-service farming. This is because in urban areas there are often issues of land and space whereby there is an insufficient arable land area for people to grow their own food organically. Although people may have the skill set to do so, urban homes are growing smaller and more vertical with less gardening areas (van Opheusden, 2012). However, larger community food gardens can be a solution to these problems, which is another form of urban subsistence farming observed in South Africa (Makhura & Kinyeki, 2014). Subsistence organic farming in urban areas has been successful in many countries such as Japan and Indonesia which have contributed to the food baskets and livelihoods but needs more investigation in South Africa (Altman et al. 2009).

While organic food systems seem to show an ability to improve peoples quality of life Reganold & Watcher (2016) describes that wellness issues such as social equity and quality of life between conventional and organic farming are somewhat understudied and there is a need to get more information regarding these issues. Organic food systems have been seen to increase positive shifts in communities such as improve rural income, increase rural development, increased employment and less exposure to carcinogenic pesticides.

2.3.3. Economics Considerations for Organics as Sustainable Food Systems

Organic food systems have been argued to have increased economic benefits than conventional foods. These benefits have been mainly due to the higher price premiums. Escribano (2016) explains that price premiums are usually imposed by organic producers who seek to compensate for the higher labour costs due to the organic transition period[19] (usually 3 years to become fully organic). Higher production costs (utilizing human labour is more expensive than machinery) is another reason for an increase in the price premium of organic food. Furthermore, the growth period and turnover time to see returns are longer for organic foods than conventional foods, which thus increase the monetary value of organic food.

Although most observed consumers have been witnessed to have a willingness to pay a price premium due to its association with prestige, status and quality (Petje, 2018) it does, however, mean that the world's poorest are not able to afford organic food (Roy et al., 2015). This presents a negative case for strengthening food security and thus this is one element of organic food systems that may be seen as reducing the strength of sustainability in the system.

The higher cost of producing organic agriculture means that it is also possible to lose economic value thus making them unaffordable especially for low-income earners (Kremen & Miles, 2012) which poses a risk of creating more inequality and poverty. However a positive is seen in Regonald & Watcher (2016) who explain that a closer look at the total costs (excluding labour costs) of producing on an organic system

[19] Time it takes for a land, animals plants to be considered fully organic (Roy et al, 2015)

was found to be insignificantly different compared to conventional food systems. This suggests that organic agriculture may have the potential to continue to expand even if the price premiums are eradicated and the farmers were just to break even. This of course is not economically ideal for any producer but may be beneficial for a subsistence organic farmer versus a subsistence conventional producer. Due to the fact that labour costs are much higher in organic food production, the addition of labour in a community have the ability to provide rural employment and development opportunities (Prihtanti et al. 2014).

Putting a monetary value on the negative[20] and positive[21] externalities could make organic food more profitable than conventional food thus closing the total cost gap (Gomiero et al. 2011). An example of this is seen when it was estimated that switching from conventional to organic agriculture in the United Kingdom would lower total costs by 75% from £1,514 million yr–1 to £385 million yr–1 (Pretty et al. 2005) due to the lower costs of environmental impacts and higher ecosystem services.

2.3.4 Organic Food Systems as Sustainable Food Systems

Reganold & Watcher (2016) indicate that there is a growing concern that an increase in organic food production through scaling up the organic land area to increase yields may take away from the environmental gains associated with organic food systems. However, Reganold & Watcher (2016) specify that if the yield is put aside (although an essential part of sustainable food systems) organic environmental degradation, public health problems, loss of crop variety and genetic biodiversity, and severe impacts on ecosystem services have been associated with conventional farming systems. Only 1% of the earth accounts for organic farming which has a significant impact on organic food potential and with organic food having multiple sustainability benefits organic food can have a greater possibility of feeding the world over conventional food systems (Reganold & Watcher, 2016) .

Although there are also significant barriers from farmers adopting organic farming

[20] Environmental costs i.e. soil erosion, nitrate leaching into ground water
[21] Ecosystem services i.e. storm water management

practices such as infrastructure and economic barriers such as certification, access to markets, loans and insurance increased funding going into organic food system research and development could see a more solid perspective on the benefits of organic food systems. Regardless of the barriers, there is strong evidence pointing towards the performance of organic food systems balancing multiple SDGs and leaning toward strong sustainable development than its conventional counterparts because organic food systems do not exploit the earth to as much a degree as conventional food system (Reganold & Watcher, 2016).

The biggest worry however in understanding how well organics contend as sustainable food systems are the lack of research on the distribution and consumption of organic food in a sustainable system. Distribution and consumption are highly dependent on peoples knowledge and behaviours. Ingram et al. (2012) suggest that the success of the organic food systems lie in people changing to sustainable diets, which there is an increase in plant-based diets and reduced food waste. However, sustainable consumption need to encompass more than just changing diets and thus it becomes important that researchers agree as to what is defined as "sustainable consumption" (Ingram et al. 2012).

2. 4. Distribution of Organic Produce

In Europe, 70% of consumers get their organic food from supermarket stores however in Germany, Italy and France distribution of organic food is mainly in natural food stores and health stores and farmers markets (Willer and Lernoud, 2014). Farmers markets, natural food stores and buying directly from the farm are however increasingly becoming more popular organic distribution outlets (Willer and Lernoud, 2014).

Interestingly, organic markets or farmers markets originated due to a growing mistrust for supermarket foods and trying to fill the gap of growing concern of the need for people to know where their food was coming from thus strengthening relations between farmers and consumers (Barrow, 2006). However, with growing organic markets, more people have started having the perception that buying from organic farmers markets is an advantage over conventional food for a number of

reasons. Firstly, one key reason is that of purchasing local, fresher food that has travelled less distance and thus reducing their carbon footprint[22] while supporting the local economy (Dodds et al. 2016). Secondly, consumers also believe that the food is more flavorful as the producers bring the organic food fresher from the farm thus retaining more crunch and water. Consumers perceived that less chemical preservatives sprayed to increase shelf life also contributed to the taste factor. Finally, they have more options because some foods such as green garlic and red carrots do not travel well and keep well so supermarkets may not store them (Dodds et al. 2014).

Parallel to the increase in organic markets, supermarkets also introduced local organic food to their stores as they soon begun to realise that they needed to adapt to working with local organic farmers to gain back their market share especially on fresh produce. A study by Dodds et al. (2014) indicated that 32% of consumers said that their monthly groceries was being supplemented by organic foods at markets. Dodds et al. (2014) thus indicated that conventional supermarkets were losing market share of their fresh produce to local organic markets.

Naicker & Jane (2017) explain that the main difference between organic food sold at farmers markets and supermarkets is that often times farmers markets have strict agenda to sell fresh, variety and quality of the food products; its local character; a fun environment for family; its emphasis on seasonally and locally grown produce; high proportion of products which are home-made and home-grown (such as preserves, baked goods and meat) The vendors are seen as primary producers and more value is provided to the products; The markets sometimes take place in the open-air, and often this is once or twice a week. They are supported by local residents and generally provide an organic experience for visitors. They often serve as information-exchange venues for good nutrition and health issues (Holm et al., 2013). Often times farmers markets have a quota for the number of local produce, which supports healthy living and communal advances.

[22] The mount of carbon dioxide released into the atmosphere as a result of the activities of a particular individual, organization, or community.

Supermarkets however unlike organic markets serve more as a middleman between producer and farmer and do not supply informative information on produce but rather a hub for brands to market themselves. The highest bidder receives the best placement of the supermarket space. In the fresh produce sector, there is often very little information about where produce is cultivated. Many supermarkets, for example, sell non-local and non-certified organic food, which is problematic to the local food cycle (Naicker & Jane, 2017).

Farmers' markets are therefore arguably one of the best examples of a local food system as is evidenced in countries such as the USA, New Zealand and Canada due to their ability to sharpen local food security (Naicker & Jane, 2017). However according to Hall & Sharples (2008), there are many problems with farmers markets because several markets advertise themselves as farmers' markets, but in reality, they are not functioning as such and thus takes away these observed benefits (Hall & Sharples, 2008; Silkes, 2012)

Although there are some disputes with regard to the essence of what true farmers markets represent as mentioned above, they have been seen as a more of a sustainable approach to the distribution of food. This is especially true within the organic food system because of their association with shorter food miles, local empowerment and development, which grows the local economy and it, has been associated with positive social, economic and environmental capabilities. This is also the case for both rural and urban scenarios.

2.5. Certification of Organic food

Certification of organic food has proven to be arguably an important facet of organic food systems (Roy *et al.* 2015). A certification is a form of validation that organic food is in fact produced in an acceptable way for it to carry the title of being organic. Certification aims to standardize the production methods of organic food being produced however this has proven to be difficult as in different areas various ways of producing organic food is necessary for that environment (Barrow, 2006). Certification however can only validate to consumers that the food being produced holds most of the organic values and thus act as a guideline to consumers indicating

the origin or where the food comes from and the distance it has travelled which in most conventional food systems is rarely known and certainly one of the reasons which leaves consumers to mistrust of the food they eat. Certification is, therefore, a tool to fill the mistrust gap experienced in the food industry (Barrow, 2006).

The problem with certification arises because it is an expensive process. Farmers also consider certification an expensive exercise and with the low literacy rates impacts on the ability to register rural farmers (Roy et al. 2015). This leaves many rural organic farmers to have to either collaborate with big cooperatives to sell their produce (as they can not work alone) and ultimately has an impact on the control they have on their businesses and the potential to be exploited as they are often are swallowed by big business (Roy *et al.* 2015) or lose out on the economic share.

There have been suggestions that governments should develop local certification bodies and finalise the draft organic standards, which cater to smaller rural farmers. However, studies by Petrescu & Petrescu-Mag, (2015) and Grunert et al. (2014) indicate that even labeling is not enough for consumers as their study found that in Romania, UK, France, Germany, Spain, Sweden, and Poland, there is mistrust of organic food labels due to the fact that there is no one single certification body or there is no universal labeling body. Roy et al. (2015) and Grunert et al. (2014) indicate that the fact that the term organic means different things in different countries aggravates mistrust especially for exported goods. An alternative suggestion by Petrescu & Petrescu-Mag (2015) is that governments should rather help small farmers by subsidizing certification costs to small farmers who cannot afford these costs.

2.6. Organic food systems in South Africa

An international boom in the organic food market has predominantly been due to the Internet connectivity, technology and understanding the growing concern for the environment and health within the Holocene (Schumilas, 2011). The organic food trend in South Africa is growing due to similar reasons as those noted abroad (Engel, 2008; Kisaka-Lwayo & Obi, 2015) especially with the growing middle class which is slowly becoming aware of the health and environmental benefits of pursuing an

organic lifestyle (Kisaka-Lwayo & Obi, 2015).

Most of South Africa's organic produce is exported and this has led to local farmers maximizing their profits by imposing price premiums on organic food (Kisaka-Lwayo & Obi, 2015). This does, however, mean that organic food does not serve the interests of local food security and all the while exports increasing the carbon footprint of the country. The possibility of higher premiums for organic food, however, does make the case appealing for rural consumers, as they would be able to make profits from the sale of organic food. However, due to certification, financial and land inaccessibility, these people miss out of these nation-building opportunities due to bureaucracy (Bravo et al. 2012). Some suggestions for solving some of these problems would be to develop national standards, which restrict price premiums of local organic produce and instead ensure these only to international exports (Bestbier, 2016).

It has also been suggested that in order to solve local food issues to decrease price premiums is that South Africa can trade food with other poorer local African countries, which have weaker economies such as Lesotho, Swaziland and Botswana (Musila, 2007). Not only would this begin solving international food security problems (which ultimately affect South Africa) it would help in contributing to the benefits of a united Africa. Moreover, this plan could be beneficial in starting to shape the definition of what is meant by local food (Ingram et al. 2012).

Distribution channels for organic produce in most countries are through supermarkets. In South Africa, the supermarkets which started retailing organic produce were Pick n Pay then Shoprite-Checkers and then Woolworths after the National Department of Agricultural released draft Organic Standards and after the two local bodies including Ecocert International commenced inspections and certifications in 2001 and gave validation to organic produce (Barrow, 2006).

Organic farmers markets, such, as the Bryanston Organic and Natural Market as well as Jackson's Real Food Market in Johannesburg are markets growing phenomenally even though the Bryanston organic farmers market has existed for more than 30 years (Engel, 2008). In the Cape Town and Stellenbosch (Western Cape Province)

organic food markets are a much greater movement for organic food markets and organic food in general based on the international culture, which is quickly being adopted there (Lim Tung, 2016). This is different from Johannesburg where there is a deficit of organic markets and translates into poor academic research regarding organic food markets in Johannesburg (Lim Tung, 2016).

Another problem with certification can be seen in South Africa where there are no local certification bodies except those who have adopted international standards of certification. These are not specially adapted to the South African circumstances and thus leave out many farmers who produce organically out of the economic benefits that they could potentially gain from (Roy et al. 2015).

2.7. Sustainable Consumption Evolution

The definition of sustainable consumption was first defined at the Oslo Symposium in 1994 as using services and products which respond to basic needs and bring about a better quality of life which simultaneously minimize the use of natural resources, toxic materials as well as waste and polluting emissions over the life cycle of the service or product so that it does not jeopardize the needs of the future generations (IISD, 1994). However, this definition was met with a lot of criticism, as it was perceived to be vague as it failed to define terms such as “basic needs” and “better” and “quality of life” (Redclift 2005; Mebratu, 1998).

It was however argued by Wilbanks (1994) that it was better to have a loosely defined definition than to debate for a long period of time for a tightly defined notion of the definition. Daly, (1996, in Mebratu, 1998) further argued that this vague definition was necessary for global consensus. In the long run, however, Sneddon et al. (2006) warned against settling for a vague definition permanently and that in due time it would be necessary to have a concrete definition in order to shape policies and ensure cooperative action.

The early definition also had issues in that the “use of products” raised the idea that utilizing sustainable products was being encouraged. However, this was fundamentally flawed because it made it seem as if the current consumption rate was acceptable for as long as the goods or services were sustainable. The high consumption rates, especially in more developed countries, certainly showed that the

use of products needed to be changed or reduced and not to continue being used at the current rate which needed to be altered (UN, 1987).

2.7.1 Sustainable Consumption as a part of Sustainable Production

Problems from the first working definition of sustainable consumption are the reasons why Sustainable Consumption and Production (SCP) emerged at the World Summit on Sustainable Development held in Johannesburg in 2002. During that summit sustainable consumption was defined in part with production because it became a reality that what is produced will most likely be consumed and vice-versa. SCP meant that in a life cycle of a product or service there should be a reduction in resource use, degradation, and pollution (Heiskanen & Pantzar, 1997).

The "Jevons paradox" was a term coined which meant that while the production side may be made more efficient[23] it could increase the actual consumption of the product or service. For example, creating environmentally friendly products such as solar panels may encourage people to start using more electricity because of the perceived notion that it is not harmful (Dauvergne, 2010). However, what is overlooked is that the production of solar panels still requires and affects natural resources and thus increasing their production would increase environmental problems thus counteracting its use. This example illustrates that rather there is a clear need to reform consumption in a way that would ultimately reduce consumption and lead to sustainable consumption (Dauvergne, 2010).

The case in point in the context of organic food systems is that even though people may be aware of the environmental benefits it has led to an increase in the consumption (Charter et al. 2008). The "Jevons paradox indicated that in order to achieve sustainable consumption there needs to be a fundamental change in the socio-political and economic systems where unsustainable consumption patterns do not continue to exist (Charter et al. 2008; Dauvergne, 2010). This paradox thus established that consuming organic food did not automatically mean that sustainable consumption was being realized.

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[23] Through bettering ecosystem/environmental interactions due to less invasive or harmful production

2.7.2. Sustainable Consumption as a behaviour

The "Jevons paradox" became a reminder that whilst sustainable production and consumption were defined as one entity they had to equally be regarded separately. This lead to the concept of increasing 'green' values in that consumer needed to be aware that consumption of anything had an effect on the environment and that it was necessary to downscale consumption in order for consumption to be sustainable (Terlou & Hirsch, 2011).

One of the problems with changing consumption behaviours is that in general behaviours are embedded in individual acts values, beliefs trends, availability of socio-technical, socio-spatial and financial capacity (Di Giulio et al, 2014). The question to be asked was what kind of behaviours would deem consumption sustainable? The answer would have to take into consideration that people do not behave the same even in the similar environments or scenarios or contexts. The display of their behaviours could, therefore, be due to varying values and beliefs (Gatersleben, 2016).

Considering strong sustainable development which states that the environment should be at the base of all considerations it is clear that in this way too sustainable consumption requires that consumption behaviours be based on environmental considerations (Gatersleben, 2016). This requires an individualistic realization and responsibility to note that the earth has a limit and thus consuming beyond your maximum requirement or wastefully or choosing to consume food, which has a negative impact on the earth, would have negative environmental impacts. An example can be seen in the consumption of beverages such as soft drinks, beer or wine. These commodities have little nutritional value, they utilize precious resources such as vast areas of land to grow wheat or grapes and water and still present social and health risks once consumed (Gatersleben, 2016).

Figure 2 summarizes what is considered as sustainable consumption food behaviours, which are also known as sustainable diets (Auestad and Fulgoni, 2015). Some of the sustainable food consumption behaviours that have been described in Figure 2 over the years include choosing sustainably produced food such as organic food, partial or

complete curtailment of beef meat[24], choosing a predominantly plant-based diet, and choosing food that has not been transported over long distances. Eating locally, seasonally produced foods are considered sustainable (Reisch, 2013 and Power, 2010).

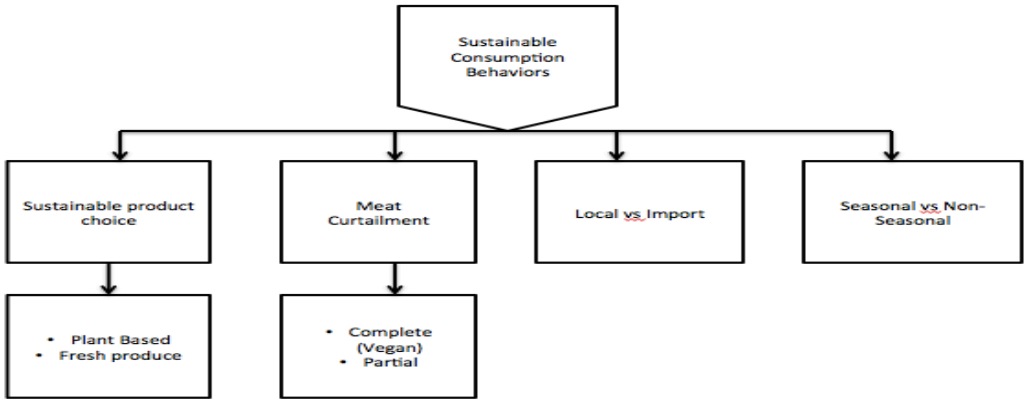


Figure 2: Sustainable Consumption defined as sustainable diets adapted from Auestad and Fulgoni, 2015

Over the years these consumption behaviours (Figure 2) have been seen as sustainable because of their minimal impacts and sensitivity on the environment as a natural capital. This means less degradation of ecological systems, less methane production from curtailment, fewer carbon emissions and less fossil fuel required to transport goods. Furthermore, it means less demand for food that is unavailable through consuming localized seasonal foods, which thus decrease the carbon emissions from transportation. Carbon emissions contribute to global warming while decreased demand for food puts less pressure to increase food production, which causes environmental degradation (Terlou & Hirsch, 2011).

The above-mentioned behaviours have similarly been coined as a part of "pro-environmental" behaviours based on the positive impacts that they have on the earth. While pro-environmental behaviour is highly dependent on the knowledge that individuals have about environmental issues it also has to be about the individual's actions (Terlou & Hirsch, 2011). The knowledge-action gap phenomenon indicates that knowledge alone will not change the consumption behaviours of individuals in a

[24] Beef production is the second largest contributor to global warming gas methane (Auestad and Fulgoni, 2015).

way that will be deemed as sustainable (Terlou & Hirsch, 2011).

Dobson (2000) and Terlou & Hirsh (2011) indicated that sustainable consumption is framed in light of the notion of "environmental/ecological citizenship" which stems from the term "planetary citizenship" coined by Henderson and Ikeda (2004). Planetary citizenship is about people identifying with the earth as a whole and the whole of humanity. This requires working towards a collaborative instead of a competitive world, with a re-shaped economy driven by social and environmental need rather than financial pressures. As such these are behaviours that individuals carry out that are in line with the "common good". It thus suggests that self-interest is counter-productive to sustainability (Terlou & Hirsch, 2010) requires a moral obligation to do the right thing for the environment. Environmental/ecological citizenship indicates a matter of justice (not charity), which needs to be embedded deeper into peoples' reasoning to do the right thing and hence consume sustainably in the long run. The obligation to do the right refers to both public and private activities including consumption patterns (Terlou & Hirsch, 2011). Dobson (2000) indicated however that moral obligations could be passive, non-distinctive and are complexities in which they themselves are individualistic and are dependent on the circumstances and the era, which people lived in.

Pro-environmental behaviour, environmental/ecological citizenship and planetary citizenship are all terms which began shaping sustainable consumption as a moral compass which had to contribute to demoralising politics and economic systems of the world which meant disrupting the standard way of life and begin architecting a new era which emphasized citizen duties over rights.. It became clear that sustainable consumption required interdisciplinary research and not just pure science-based research as it might have commonly taken route. However, these concepts began adding value to the growing definition of sustainable consumption and create new opportunities in addressing sustainable consumption (Terlou & Hirsch, 2011).

2.8. Sustainable Consumption and Organic Food Systems Studies

In pursuit of understanding sustainability, it became clear that sustainable consumption was not merely about choosing and eating organic food or adhering to sustainable diets. In addition to this it needed to be shaped in a way that people could

value doing so, and at the same time understanding consumption dispositions and impacts on themselves, as well as the community and world at large (Seyfang, 2006). The studies below began research which specifically looked into the behaviours of organic food consumers. They revealed accelerants and hindrances to reaching sustainable consumption within consumer's values and decision-making processes.

2.8.1 Accelerants of Organic Food Systems

A UK study by Seyfang (2004) found that three competing aspects motivated people's consumption of organic food from localized farmers markets. Firstly organic food consumption was seen as a tool for creating green localized economies. Secondly, it was a health-conscious decision for supermarket shoppers who had mistrust for supermarket food. Thirdly, getting organic food from farmers markets was a reactionary fare for status-driven traditionalists meaning that it was a form of entertainment for people who believed they had a certain status or felt it trendy to engage in traditional forms of shopping. Another study by Seyfang (2006) helped to identify that moving consumption values from health and status to adopting a more pro-environmental or environmental citizenship would be a powerful motivating factor for sustainable consumptive behaviours' and simultaneously give more meaning to sustainable consumption definition (Seyfang, 2006).

Another study by Seyfang (2007) solidified this phenomenon. The study evaluated the effectiveness of community-based initiatives in achieving sustainable consumption objectives. It found that institutions which supported localization, reducing ecological footprints, community building, collective action and creating new socio-economic driven institutions rather than self-invested capitalistic institutions such as supermarkets could help people change their consumptive behaviours. This was especially the case if the institutions that penetrate the community values to be more ecologically driven (Seyfang, 2007). Goggins (2016) indicated that context and culture play a major influence on sustainable consumption. In a similar vein, Seyfang's (2007) findings show how large organizations can bear influence on consumers and the entire food systems in general.

2.8.2. Hindrances of Organic Food Systems

A study by Reisch et al. (2013) in Europe alternatively examined what was currently making sustainable food consumption unattainable. They identified that there was a lack of policies such as information-based instruments, market-based initiatives, direct regulations, and "nudges" which would steer people into thinking more ecologically and socially in light of sustainable development. They prescribed that these were necessary in order to shape and solve sustainable consumption issues. They realized that a good policy requires an understanding of the entire food system and all its interactions and dependencies rather than to view single aspects of sustainability as unrelated. Reisch et al. (2013) indicated that dissociating food production from nutritional behaviour, economic aspects from social aspects, health aspects from environmental aspects, and everyday meal planning from other life areas like employment, housework, and leisure is responsible for the limited success of many approaches tried so far. The definition should equally take recognition of these major issues of current food-consumption practices (Reisch et al. 2013).

Another hindrance to attaining sustainable consumption was the phenomenon of the attitude-behaviour gap as explored in a study by Terlou & Hirsch (2011). The study conducted in Denmark found that even though some people displayed green initiatives they did not necessarily act or consume in an ecological or pro-environmental way, which thus undermined sustainable consumption. Rather, the consumption of organic food was influenced by price, lack of immediate availability, sensory criteria, lack or overload of information about sustainability as well as the low-involvement feature of food products in conjunction with well-established consumption routines, lack of transparency and trust towards labels and certifications which are mostly psychological issues. Similar attitude-behaviour gaps were reported in other studies including Liu et al. (2015), Zhai et al. (2009) and in South Africa Engel (2008) and Petje (2013).

From the studies reviewed, it is clear that sustainable consumption cannot be reduced to the mere eating of organically produced foods or following sustainable diets. It could also not be reduced to knowledge of green citizenship but rather a strong conscious decision to advocate for ecological or green citizenship and the implications thereof. These should be lead by policies, which nudge people to be environmental conscious citizens hence Terlou & Hirsch (2011) contend that to solve

the sustainable consumptive definitions one needed to be multi-disciplinary.

2.8.3. Organic Food Systems and Sustainable Consumption Research Gaps in South Africa

In the South African context, the majority of the studies on organic food were done for marketing and economic purposes (Mhlophe, 2015) i.e. to expand the financial force of a growing organic food market. Such studies are seen in Engel (2008) and Kisaka-Lwayo & Obi (2013) who studied the determinants of organic consumption. Engel (2008) found that consumers believe organic food is more nutritious and tastier than conventional food, organic agriculture benefits both small-scale and local farmers and that consumers require a guarantee of the organic origin of organic products.

Similarly, Kisaka-Lwayo & Obi (2013) found that in both rural and urban towns in South Africa namely Ciskei and Transkei respectively consumption was based on healthier and more nutritious food with better appearance and taste as well as affordable and safe to consume. In addition, gender, education, employment, location, price and the person responsible for shopping are important factors in consumer awareness and choice of organic products. These studies, therefore, did not look into any environmental consideration of the consumption of food.

It was clear that there was a gap in sustainable consumption research within the organic food system and that no research in South Africa (to the best of our knowledge) attempted to look at whether organic consumers were sustainable consumers. Some research did, however, attempt to look at the environmental relationships in organic food consumers in an urban area (Johannesburg). Mhlophe (2013) in this research found that there was a positive relationship between environmental concern and organic consumption.

Simillarly, Ractliffe (2016) explored the relationship between environmental knowledge, environmental concern and pro-environmental behaviour including the barriers and situational factors in the food retail environment, which can inhibit the practice of sustainable consumption. This was one study that attempted to link organic food consumers and the sustainability of this group of peoples behaviours and starting to evaluate if their organic consumption was linked to sustainable

behaviours. The study found that South African citizens of Cape Town lacked pro-environmental behaviours most likely due to low levels of environmental concern and a general lack of specific knowledge of environmental concern and a very underdeveloped organic food markets in South Africa

2.9. Sustainable Consumption: A Definition For This Study

The concepts of "pro-environmental behaviour", "environmental/ecological/green citizenship", knowledge-action-gap, "sustainable diets" and "green-values" have all helped in progressing the concept of sustainable consumption. In Di Giulio et al.'s (2014) framework of sustainable development, these terms form the foundation of or the beginnings to conceptualizing sustainable consumption. The framework by Di Giulio (2014) considers the multi-faceted embeddedness of consumer acts and the multidimensionality of sustainability.

Di Giulio et al. (2014) explains that sustainable consumption is achieved when individual consumption behaviours have a sustainable impact on the earth while being made with a sustainable intention; for example, the consciousness for environmental concerns. Approaching sustainable consumption from such an impact-intent perspective was created from an interdisciplinary approach acknowledging that consumption and sustainability are two very complex terms, which are interpreted differently by various disciplines.

Di Guilio et al. (2014) framework on sustainable consumption behaviour is seen depicted in Figure 3. Quadrant II would rank as the most optimal type of sustainable consumer where the impacts and intentions are sustainable. In this case, the consumer's behaviour has limited ecological damage and they behave in that way because of the direct and conscious thought for the environment. An example of this person, for example, is someone who walks to school because they realise that it will decrease their ecological footprint by consciously walking. This person displays an intention to do good by the environment and the impact on the environment is, in fact, the good which a scientific fact.

Conversely, quadrant IV would rank the least sustainable consumption because both impacts and intentions are unsustainable. An example of this is someone who drives in a motorcar to school because they do not consider walking to be fashionable or cool. This person's behaviour of driving to school every day has an impact on the earth and the intention (unlike the person in quadrant II) for behaving this way is for a self-interest non-environmental reason and thus theoretically indicates that they have no consciousness around green behaviours.

The person's behaviour in quadrant III and I are thus intermediaries of the quadrant II and quadrant IV respectively. The person in quadrant I would be someone whose behaviours have an unsustainable impact but green intentions. Following the initial scenario, a person going to school by motorcar who indicates that they drive to school because they have no options in there to take a communal bus. They are willing to do so but have no options and are aware of the implications of not taking communal transport which is increasing their carbon footprint. In this example, the person's action of driving a car to school has negative impacts on the environment however, because there is a lack of availability of public transport they still display signs of having green motives even though they cannot act in that way.

Lastly person in quadrant III would be someone whose behaviour creates sustainable impacts but they do not have green motives behind their actions which is simply coincidental. An example is someone who walks to school but does so because they can walk with his school friends, as it is entertaining. This person walking to school has a positive impact on the environment but shows no signs of doing so for an environmental reason, therefore, her contribution to sustainability acts is completely coincidental and not by conscious pro-environmental behaviour.

Shaping sustainable consumption in this way was considered a fresh approach to convey this twofold perspective on consumption acts. This framework follows that both approaches are needed to consolidate consumer actions. The focus on *intentions* (and the development of competencies) is vital so that individuals can become empowered to act sustainably even if they do not know all the possible impacts of their actions. Simultaneously, the focus on the *impacts* of consumer acts is necessary

to make sustainable consumption a societal goal that can actually be politically charged. This kind of information assists in answering "how can changes of individual consumption be motivated" because it gives more detail to why people have a challenge in retaining sustainable values. If some peoples behaviours are having negative impacts on the environment but they are unaware then it will follow that education regarding pro-environmental behaviour and consciousness is required. It also allows for engagements with governments and policymakers in putting forward what is needed to be adopted in order for these group of people to impact more pro-environmentally impactful.

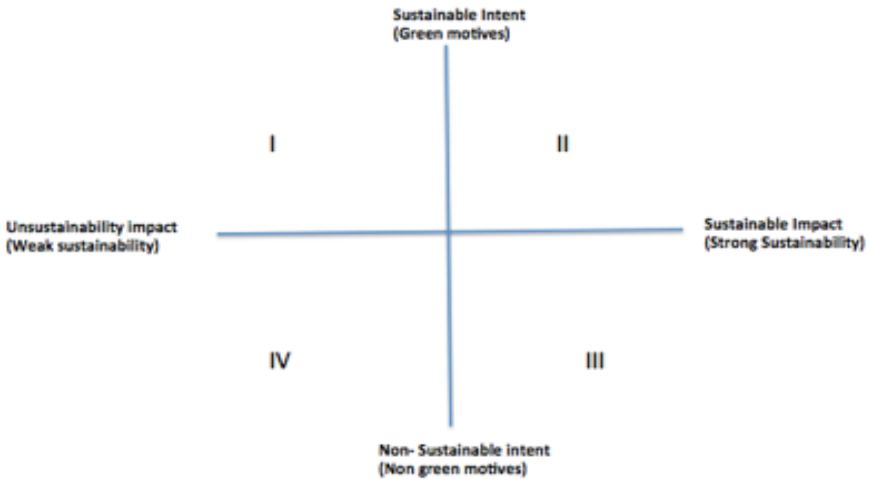


Figure 3: The sustainability of consumption behaviours from the intent-and-impact-perspective by Di Giulio et al. (2014) pg 55.

2.10. Concluding Remarks

Through this literature review, it is evident that there is some feasibility in organic food production having some strong characteristics for ecological consideration over conventional food systems. In addition, it has a strong potential to grow and restore communities economies as well as display positive social narratives. However, the limitations in the definition of sustainable consumption limit knowledge on whether organic food systems as a whole are truly sustainable. It indicates therefore that the Di Guilio et al. (2014) framework can aid in framing this definition. The next chapter will indicate how this framework can be used to assess the sustainable consumption

of Johannesburg organic food consumers who are generally poorly researched and as a result contribute to the pool knowledge around the sustainability of organic food systems, which contributes to SDG's.

3. METHODOLOGY

3.1. Introduction And Chapter Overview

This chapter provided details of the research design, approach, methods and data analysis adopted for the study. The research aimed to understand organic food consumers in Johannesburg and to ascertain the sustainability of their consumption behaviours and intentions. The study used a questionnaire to collect data. Quantitative analysis of the data using the Rasch analysis was done to measure the extent of the sustainability of organic food consumers. Rasch person measure was used on the most and least sustainable consumers of the sample. The quantitative analysis was used in conjunction with a descriptive analysis of the responses of the social behaviours and intentions of consumers. This chapter also considered potential limitations arising out of the methods and sampling procedures used and consideration was given to issues of bias and ethics in the context of this research.

3.2. Research Approach

It was decided that the best approach to understanding organic food consumers purchasing and consumption behaviours was by administering a questionnaire. The reasoning behind this was that individuals could be reached in a relatively short period of time (Etikan, 2016). Surveys are also generally cost efficient which was appropriate for this study, but it had no sponsorship or external funding.

A questionnaire is also a convenient way of getting information (Etikan, 2016) from consumers and in the context of shoppers in an organic market, it was important not to take the time available to shoppers who are often on the move and might not have the time for lengthy sit-down type interviews.

3.3. Location/ Context of Study

The study was carried out in two locations namely the Bryanston Organic Market as well as Jackson's Real Food Market in Bryanston north of Johannesburg, Gauteng (see Figure 4) and are 2.7km away from each other. These are the only two prominent organic food markets in Johannesburg that are fully functional (Naicker &

Jayne, 2017). Both have strict and intensive inspections of their organic food supply, and thus considered a suitable preference over supermarkets. Furthermore, Barrow (2016) discusses that organic markets are believed to assume a sustainable distribution in that they supply mostly localized foods.

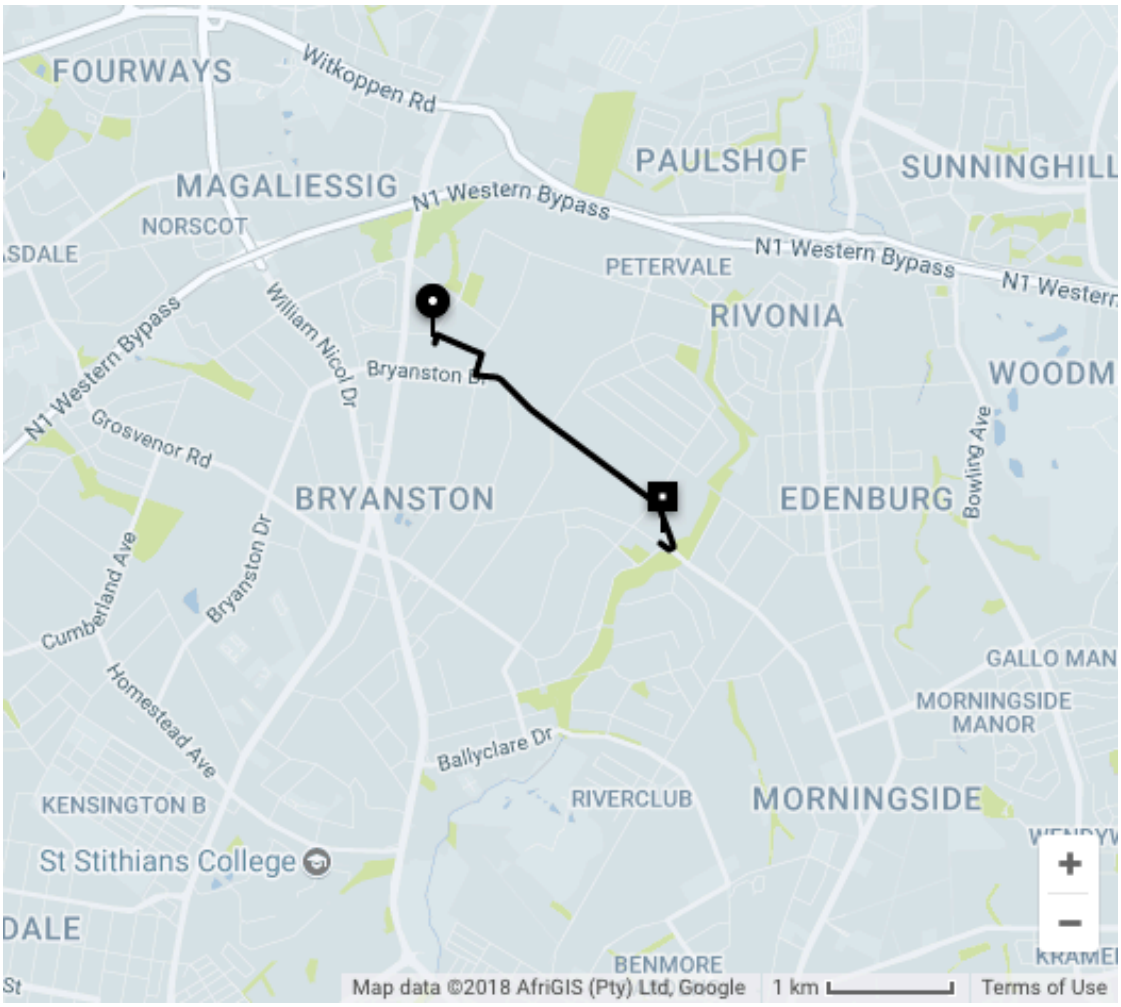


Figure 4: Map of the location of the two organic markets chosen (Google Maps, 2018).

Sustainable distribution assumes that these organic marketplaces are based on the value of supporting local produce and local farmers. Keupper (2010) explains that organic markets are meant to presume sustainable distribution because of their support and stock of local foods meaning that the distance the food has travelled is much shorter than some imported foods. Supermarkets by virtue of their capitalistic food systems tend to be in the business of increasing economic capital and not necessarily sustainability and thus may store non-local foods (Barrow, 2006). The organic markets were thus chosen on the presumption that they are more concerned

about sustainability issues and thus have an impact on the consumers' behaviour (Seyfang, 2006) over economic concern. This would also enable us to see if there was a sense of environmental citizenship influencing consumption. Supermarkets were therefore not used as a place for conducting interviews as the true point of the study was to specifically access those people who consumed from places where sustainable distribution was more prominent, which is organic food markets. There were other malls around the Bryanston area, which had other supermarkets.

3.4. Subject Selection And Sampling Procedure

For the purposes of this research, it was assumed that most people who visited an organic market were either interested in organic food or probably purchased and consumed organic products. Consumption, for the purposes of this study, was defined as per McCracken (1989) as including purchasing, possessing, or using of organic products. The target sample was individuals of all genders who were over the age of 18[25]. Participants who were casual visitors and not regular organic consumers were not considered in this study as their contribution would possibly cause outlier results based on the aims of the study.

Participants were selected using convenience-sampling technique meaning that they were randomly approached at a market (Etikan et al. 2016). This was employed for the simplicity of sampling and due to the availability and accessibility of participants. In addition, given the exploratory nature of the study, it was important to target as many types of people from age, gender, race, regulars and newcomers to the markets. There was no focus on any specific type or group of people. It is interesting to see that both of the markets are based in the North of Johannesburg. As there were no other prominent organic markets that operated regularly in Johannesburg, our choices were limited to these markets only. Ultimately, sixty-one participants took part between the two organic markets. Similar research indicated that this was a good sample size for a significant statistical accuracy (Guest et. al, 2006).

[25] Minors were excluded based on the assumption that they stayed with a guardian or parent and would not exercise much food choices.

3.5. Instrument Design

The items on the questionnaire[26] were adopted and modified from previous studies such as Seyfang (2004), Vittersø et al. (2015) and Ratcliffe (2015). A number of concepts and issues such as sustainable diets (seen in Figure 2) and pro-environmental behaviour were considered in the design and development of the questionnaire. Furthermore, some items on the questionnaire were aimed at interrogating consumers' eating and buying behaviours as well as the intentions or rationale for such behaviours. The reasons behind the behaviours were to be used to shed light on the sustainability of consumer's consumption based on Di Giulio et al. (2014) theoretical model.

Nine respondents were used to pilot the survey to ensure the reliability and clarity of the questions being asked. The questionnaire was then face validated by Prof. Martie Sanders who is an expert in human ethics and instrument design from the University of Witwatersrand. The final instrument had 3 sections. The first section looked into the demographics of the consumers. The second part administered selective and responsive type questions. The survey was structured to include responsive type questions in order to allow the consumers to answer questions freely. Ultimately, this provided a means of overcoming social desirability bias (SDB), generally defined as providing responses that are perceived as more acceptable than the responses that the participant would have made under neutral conditions (Matthews et al., 2003). The third section had Likert type questions where the respondents had to choose statements they felt best represented their stance on the statement.

The University of The Witwatersrand granted ethical clearance (Protocol HA1613) for the research study to be conducted. The Organic Markets also granted permission for the study to be conducted with the provision that they were protected regarding the types of questions that would be asked for instance, question that would not, upset their customers. During the administration of the questionnaire, all respondents were asked to sign a consent form, which outlined the terms of the research around confidentiality and privacy. The participants did not have to write their names on

[26] See Appendix 1

their questionnaire in order to ensure anonymity and they did not have to answer any questions they did not feel comfortable disclosing information on.

3.6. Data Analysis

3.6.1. Selective and Responsive Questions

Key phrases from section 1 and 2 of the questionnaire, which emerged from the selective and responsive questions, were taken and grouped into clustered themes. Descriptive analysis on Microsoft Excel was used, to sum up, the responses into frequency distributions. Emerging percentages of the responses were then reported. No correlations or regressions were necessary for this type of data. No chi-squares between the markets were done, as the objective was to have a pool of data around as many organic food consumers who purchase organic food from the markets. The aim was not to compare the data but rather to present summaries of their behaviours and intentions. At a later stage in follow-up research, the pool of information revealed in this study could be taken and developed into more specific and integrated objectives. This study by nature was exploratory to pave the way for follow up studies.

3.6.2. Likert Scale Questions: Rasch Analysis

Rasch analysis was used replacing traditional forms of analyzing Likert scale type of questions. Instead of using the raw score totals from the respondent's answers, the Rasch analysis log transforms these raw scores into measures because raw scores are always target-based and sample-dependent as seen in the classic test theory approach (Wright, 1997). We, therefore, used the Rasch model to convert ordinal data to interval scales otherwise, we would not be able to interpret the size of the differences between people's ability to behave (Bond & Fox, 1991) or consume in a sustainable way.

The way the Rasch analysis works is that it creates a detailed and informative picture of the construct under the measure, in this case, the construct of a sustainable consumer. It also paints a picture of the respondents who are taking part in the study (Boone et al., 2014). Specific to rating scale data, the Rasch model allows for the

connection of observations of respondents and statements in a way that indicates how a person endorsing a more extreme statement or less extreme statements. An easy-to-endorse item is always expected to be rated higher by any respondent (Wright, 1997).

In contrast to some of the traditional approaches to data analysis such as Factor analysis or the classic test theory, the Rasch analysis starting point is that a set of items intends to measure a single construct and is not designed to measure multiple constructs (Wright, 1997). Factor analysis, which is also, an analysis used for questionnaires differs from the Rasch analysis in that it requires for the items to load onto a factor to be correlated as it is more of a correlational model. In factor analysis, endorsing one item would imply that you would also endorse another (Sick, 2011). This is contrasted to the Rasch analysis, which works as a hierarchical implication model where those persons will only endorse statements, which are harder to endorse, with a high degree of the trait being measured (Bond & Fox, 2001). The Rasch model is thus directional from hard to easy while factor analysis is non-directional (Sick, 2011).

In the case of this investigation, the Rasch model is thus a more appropriate form of analysis to be used (Sick, 2011). This is because based on our conceptual model of the construct of a sustainable consumer; there are various items, which are shown to the respondent in order to see how well some of their attitudes or behaviours fit into the construct of a sustainable consumer. The higher the person measures, the more of a sustainable consumer the individual is. The Rasch analysis thus further enables us to see which questions were easiest to endorse and which were not. This gives us depth as to the various attitudes or behaviours that these people possess (Sick, 2011).

In terms of the specifics of this study, the Rasch model gave information on how well each respondent faired as a sustainable consumer where a measure of 0 is completely unsustainable and a measure of 100 is a very sustainable consumer. The Rasch model was also able to give information about the items and tell how well the questions helped in measuring their sustainable consumption and which questions the participants were able to answer which made them favourable or unfavourable

sustainable consumers; which is what was being tested or measured. The next section is devoted to explaining the various constructs used in the Rasch model.

3.6.2.1. Item Misfits

Once the questionnaire and the piloting of the questions were done the questionnaires were administered to the participants. The data was collected and computed into Excel. The Likert scale type questions were coded into the Winsteps Ministeps program. The code names for the Likert scale questions can be seen in Appendix 7.

In order to establish if the items were fitting the Rasch model, the infit mean square statistics (MNSQ) was most crucial in doing so. The mean square statistic is a chi-squared statistic divided by its degrees of freedom (Boone, 2016). Its expectation is 1.0 although the type of questions asked as well as mixing item types can alter this range. However, acceptable ranges of the infit and outfit MNSQ can be seen in Table 1 (Winsteps, 2018).

Table 1: Interpretation associated with MNSQ values (Winsteps, 2018)

Value	*Meaning or associated interpretation*
>2.0	Off-variable noise is greater than useful information. Degrades measurement. Always remedy the large misfits first.
>1.5	Noticeable off-variable noise. Neither constructs nor degrades measurement
0.5 - 1.5	Productive of measurement
<0.5	Overly predictable. This misleads us into thinking we are measuring better than we really are. (Attenuation paradox.). Misfits <1.0 are only of concern when shortening a test

Infit statistic of the MNSQ are a more information sensitive statistic. According to Gustafson (1980), MNSQ is more sensitive to unexpected behaviour affecting responses to items *near* the person's measure level. This is thus the most important thing to check for in the case of the item misfit. This is different to the outfit statistic which are an unweighted statistic, more sensitive to unexpected behaviour by persons on items *far* from the person's measure level. This is why it's more common in a study to focus on the infit scores because outfit scores read more into the outliers whereas infit score focuses more on items that people could not get (Gustafson, 1980). The infit and the outfit MNSQ are helpful in establishing whether that item carries validity (Gustafson, 1980). The infit and outfit MNSQ give more weight to

the performances of the persons closer to the item value. The closer the person's ability to the item difficulty the more insight it should give to the sensitivity of the items performance (Gustafson,1980).

Another construct computed was the Point-measure correlation for all observations (PTMEASURE-AL), which as Boone & Yale (2014) explain computes the Pearson point-measure correlation coefficients between the observations and the measures (estimated from the raw scores including the current observation or the anchored values). The point measure correlation thus examines whether the items move in one direction with the construct. If the index were in the positive range then it would indicate that the measured item was parallel to the construct (Ariffin et al., 2010). A negative PTMEASURE-AL, however, suggests that the orientation of the scoring on the item, or by the person, may be opposite to the orientation of the latent variable. Item miskeying, reverse scoring, person special knowledge, guessing, data entry errors, or the expected randomness in the data may also cause this negative PTMEASURE-AL

The infit MNSQ and the PTMEASURE-AL were therefore used for the construct validity of the instrument and assessed whether the scores of the instrument were significant, meaningful, useful and purposive (Cronbach et. al. 1955). This helped to assess whether the various items helped in assessing the construct of a sustainable consumer well.

The Z- Standardized (ZSTD) reports on the standardized mean-square fit statistic. It reports on the probability of the chi-square (mean-square) statistics occurring by chance when the data fit the Rasch model (Boone, 2016). The acceptable range for the fit statistic is between -2 and +2 however since the ZSTD reports on the MNSQ then it can be ignored if the MNSQ value is within an acceptable range (Boone et al. 2014).

To ensure the best-fit, items which had both a higher infit MNSQ than 1.5 as well as a negative PTMEASURE-AL, were thus removed. These included the questions (i) "I completely cut out meat in my diet" and (ii) "I like consuming organic food in

order to avoid pesticides" (See Appendix 1). Removing the two misfits items improved the fit statistics on each item and although some ZSTD was out of range all the MNSQ was between 0.5-1.5. The validity of the items was also established through piloting the questionnaire.

3.7. Validity And Reliability

Construct validity is the degree to which a test measures what it claims, or purports, to be measuring (Gustafson, 1980). This was achieved by ensuring that the items were within PTMEASURE-AL and the Infit Outfit MNSQ statistics in the Rasch analysis. Reliability, which is a measure of internal consistency, was ascertained through the person Cronbach alpha values. A low Cronbach alpha indicated that there was a low probability that people measuring high are in fact high and those measuring low are actually low Ariffin et al. (2010). Generally, anything above 0.6 is considered good to excellent while below 0.6 is considered poor and anything less than 0.5 is unacceptable (Boone, 2016). Reliability of the items was achieved through the item reliability, which indicated that there was internal consistency in the items being used to measure the construct where again anything less than 0.6 was considered poor but anything above that was considered good to excellent. Piloting the items in the questionnaire assisted in establishing validity and reliability as it ensured the wording of the questions had as little errors as possible for good understanding of the questions.

3.8. Limitations

3.8.1. Specific target group

The study was only conducted on organic consumers who frequent northern suburbs organic food markets. This means that a large part of the population of organic food consumers will be excluded from the study. However, given that the point of this study was to use organic food systems as a starting point of reference for further research about sustainable consumption in South Africa, these omissions were considered acceptable.

The second limitation is that the results cannot be extrapolated to another area other than Johannesburg because the demographics are specific to that area only and no broad generalizations can be made about the subjects. However, the same study can be repeated elsewhere and thus draw comparisons between other areas and thus build a database of various areas responses.

3.8.2. Non-Randomization of population or site

A non-randomized sampling technique used in this study would mean that the target population could not be assumed to be normal. This thus means that the results would not be able to be extrapolated to another area outside of the two markets selected as the demographics are specific and may not match entirely to another area or store.

3.8.3. Social desirability

Rosenthal and Rosnow (1991) explain how systematic errors can limit the study and allow social desirability to take place. Social desirability is instances where people respond to a question in such a way that would make them appear in a certain light but in real life, they may not fully believe or practice those responses. In this study, having some follow up and triangulation questions in the second section of the questionnaire addressed this. It ensured that people wrote their own responses, which made their answer more private and hence more earnest as compared to being interviewed directly or ticking boxes (Bowling, 2005). However, it is unlikely that social desirability bias could be fully controlled in this study but minimized.

3.8.4. Questionnaire as the only form of instrument to gather research

The use of a questionnaire as a sole form of data collection can be limiting because respondents cannot elaborate further on their responses as they are limited by physical space on the questionnaire. Their answers are also limited to what they write and cannot be interrogated further if there are concepts they have explained which might not be fully expanded upon. However, the questionnaire was specifically designed to ensure that there was as much interrogation as possible and enough writing space available to answer the questions fully

3.8.5. Researcher bias

Researcher bias is a part of many research project problems that need to be identified. To ensure that the bias was eliminated an outside facilitator looked through the questionnaire (Professor Martie Sanders) to ensure bias was minimal. Further, the bias was eliminated by not having any form of communication with the respondents[27] during the administration of the questionnaire.

3.9. Chapter Concluding Remarks

In summary, in this study, a questionnaire was administered with the aim of exploring the research objectives. The data from these sections of the questionnaire were analyzed using descriptive statistics and quantitative methods. The next chapter presents the results of data collected and analyzed as outlined in this chapter.

[27] Except an introduction to prompt them to participate.

4. RESULTS

4.1. Introduction and Chapter Overview

In this section of the research report, the findings of the questionnaire are presented. First, the demographics of the 61 participants are presented. Next, the findings indicating the frequency of the organic market visits, the self-reported opinions about buying organic food from supermarkets, modes of transport used to the market, the frequency of consumption and food preference are also presented. The self-reported intentions behind these participants' behaviours are also presented and finally, the extent to which participants are sustainable consumers is addressed.

4.2. Basic Demographics

Figure 5 indicates the demographic profiles of the sixty-one respondents who purchased and ate organic food from the two organic markets investigated in this research. It can be seen that the largest age group was in the 26 - 35-year-old category, however, participants less than 35 years old (i.e. the youth; based on the National Youth Policy (2015) description of youth) made up 46% of all participants. The group, which was not classified as a youth, made up 52% of the participants, which revealed a small difference between the youth and non-youth group.

Probing further into the 26 - 35 age group divulged the fact that 44% of this group consumed largely fresh produce due to a vegetarian lifestyle; while 19% revealed that this behaviour was based on the perceived health benefits of eating organic fresh produce. A total of 75% of this group consumed organic food daily or weekly and of this 69% of the respondents believed it was for health reasons while only 19% indicated high cost as a reason for the frequent consumption of organic food.

Demographics in Figure 5 (b) revealed that majority of respondents were mostly female while Figure 5 (c) indicated that the respondents were well educated with most of them having a University degree or postgraduate degree.

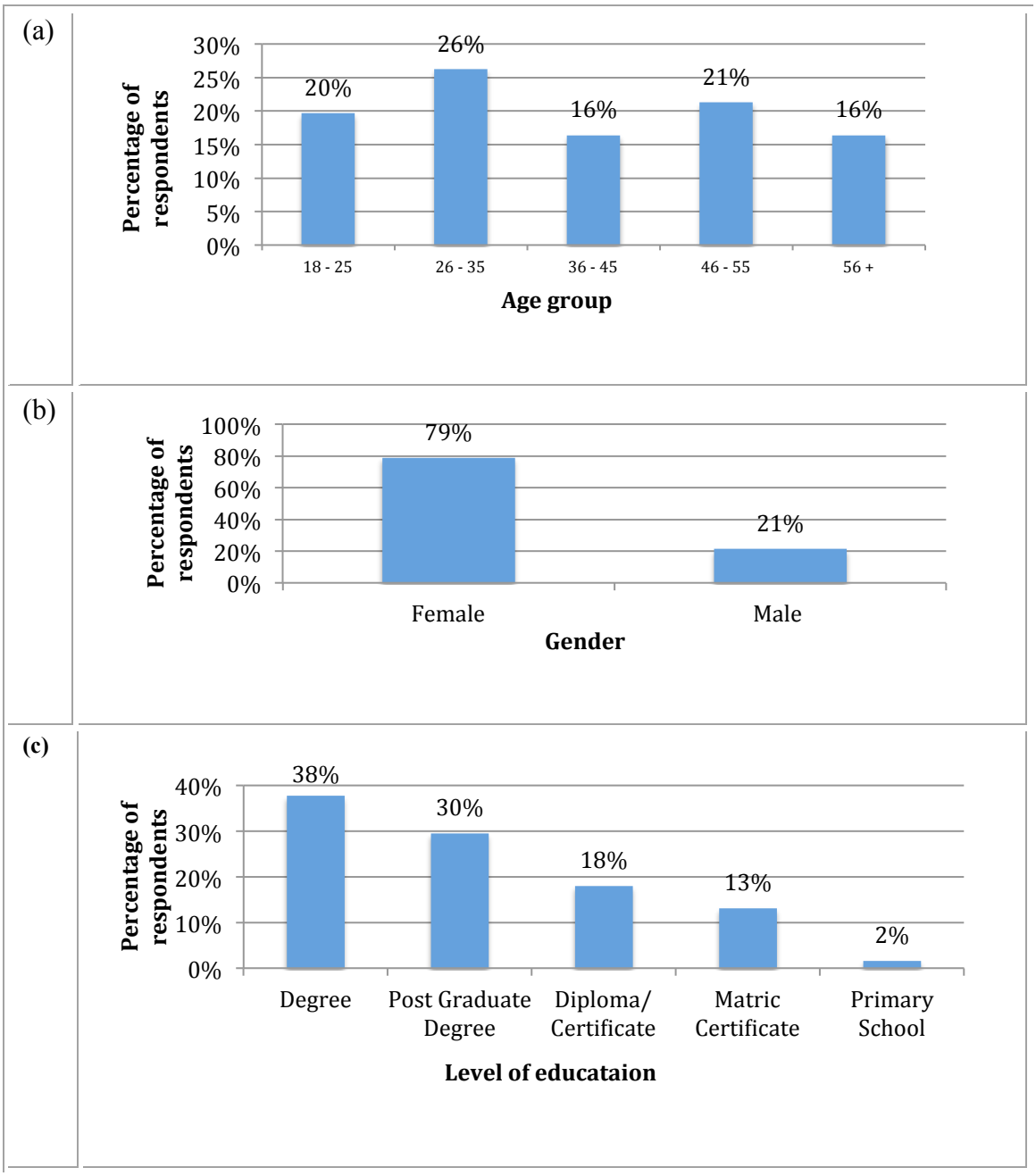


Figure 5: (a) Basic demographics including age, (b) gender and (c) educational level.

4.3. Organic Market Visits

Figure 6 (a) indicates that 72% of the respondents had mostly been purchasing from both organic markets for two years or less. Figure 6 (b) also indicates that the respondents made frequent visits to the market with the majority of them making at least weekly visits with a total of 77% of the respondents visiting weekly, fortnightly and monthly.

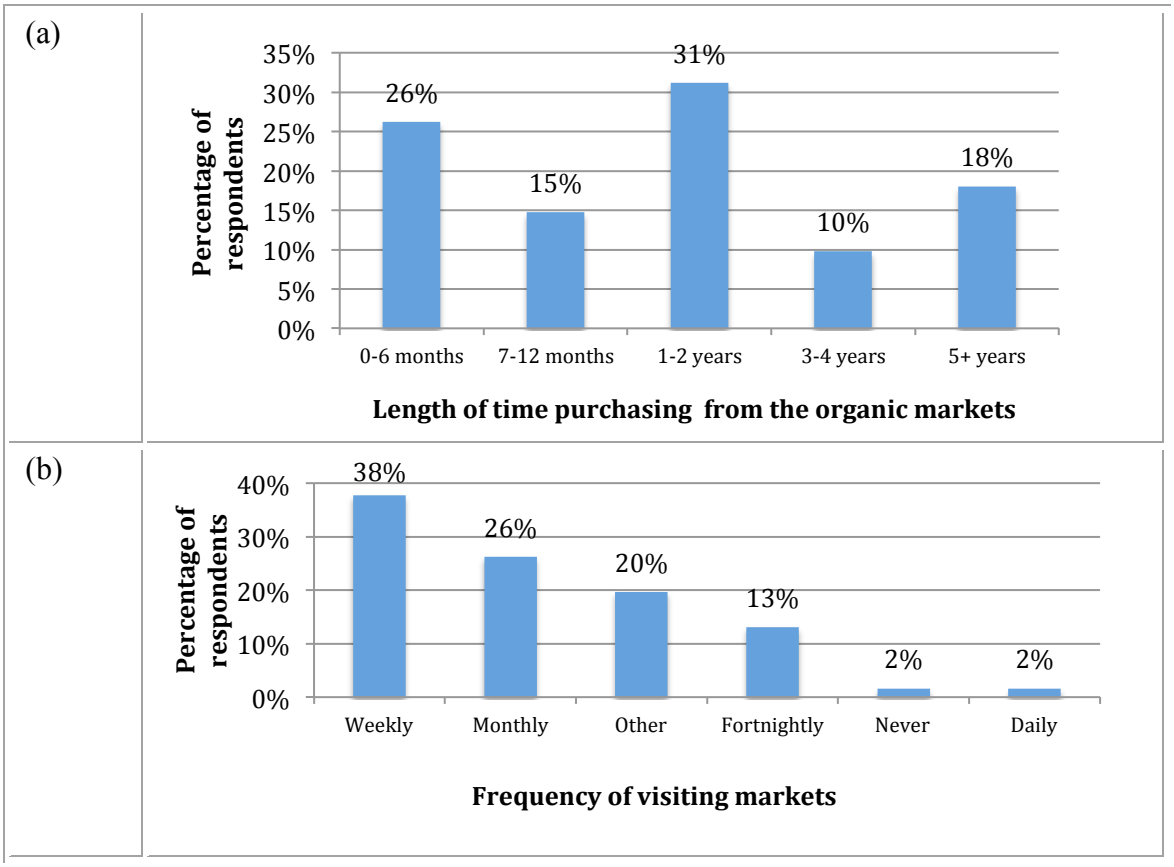


Figure 6: (a) The duration period of buying from both organic food markets and (b) frequency of buying from the organic food markets

4.4. Purchasing from Supermarket Stores

Seventy-eight percent of the respondents indicated that they also bought organic food from supermarket stores and only 22% bought their organic food purely from the organic markets. People who did not buy organic food from supermarkets had the opinion that they did not trust the supermarkets' organic food. One respondent wrote, "*I am not convinced about how real the organic food in supermarkets really is*". The price of goods at the organic food markets was also perceived to be lower than the prices at supermarkets.

The 78% of respondents who buy their organic products from supermarkets said that this decision was motivated by convenience including the longer supermarket trading hours, consistent availability of produce, and the easy layout of supermarket stores. However, most respondents did not specify what was meant by convenience. Other respondents did specify however that the limited availability of organic products at

organic markets was another reason for making organic food purchases at supermarkets (See Figure 7).

The perception that, organic food from the markets was similar to organic food in supermarkets was a recurring idea expressed by almost 8% of the 78% of respondents who said they made organic food purchases at supermarkets in the free text response. One of the respondents claimed that "*Organic is organic*" while another, responded that they purchase organic food from the supermarkets because "*it's organic*". Interestingly, price did not come up as a large issue in the rationales expressed for making supermarket purchases of organic food. However, this was in contrast to the 22% who had said they only bought organic food from organic markets that had said the price did influence why they did not purchase organic food from supermarkets. Figure 7 reveals the summary of the themes that came up in the survey regarding why respondents bought organic food from the Supermarket. Convenience and availability were the greatest motivation while health and price were the least.

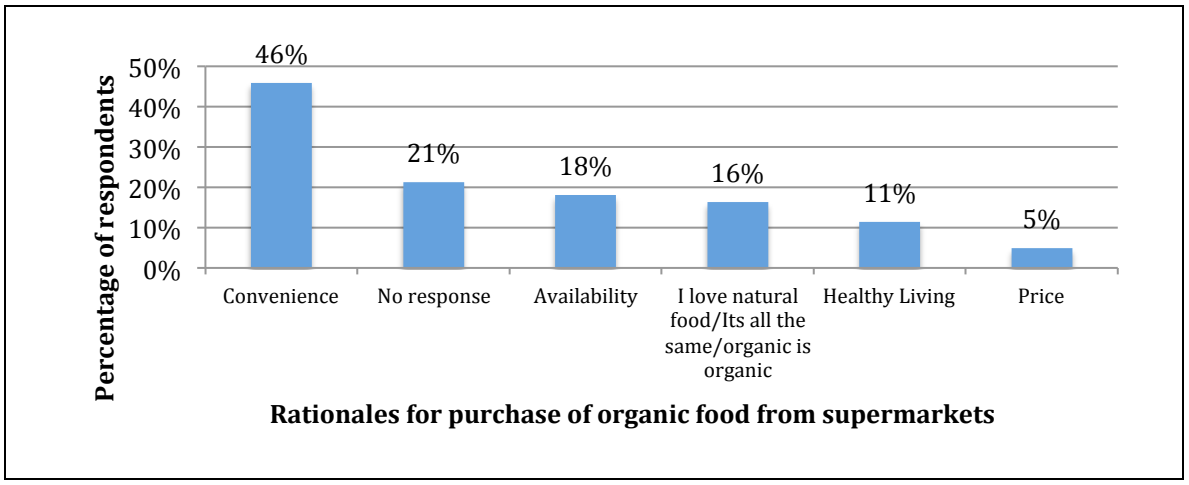


Figure 7: Themes and frequencies of the reasons why respondents purchase organic food from supermarkets

4.5. Travelling To The Market

Over half (61%) of the respondents indicated that they travel no more than 12km to either of the two organic markets (Figure 8 a). Almost all the respondents travelled to the markets by private car, none of them walked or used a bicycle, both of which are environmentally friendly options (Figure 8 (b). Figure 8 (c) indicated that the choice of transportation is predominantly due to convenience. The use of private cars was

not based on the perceived lack of safety nor did it seem to be due to the lack of availability of public transport by the respondents.

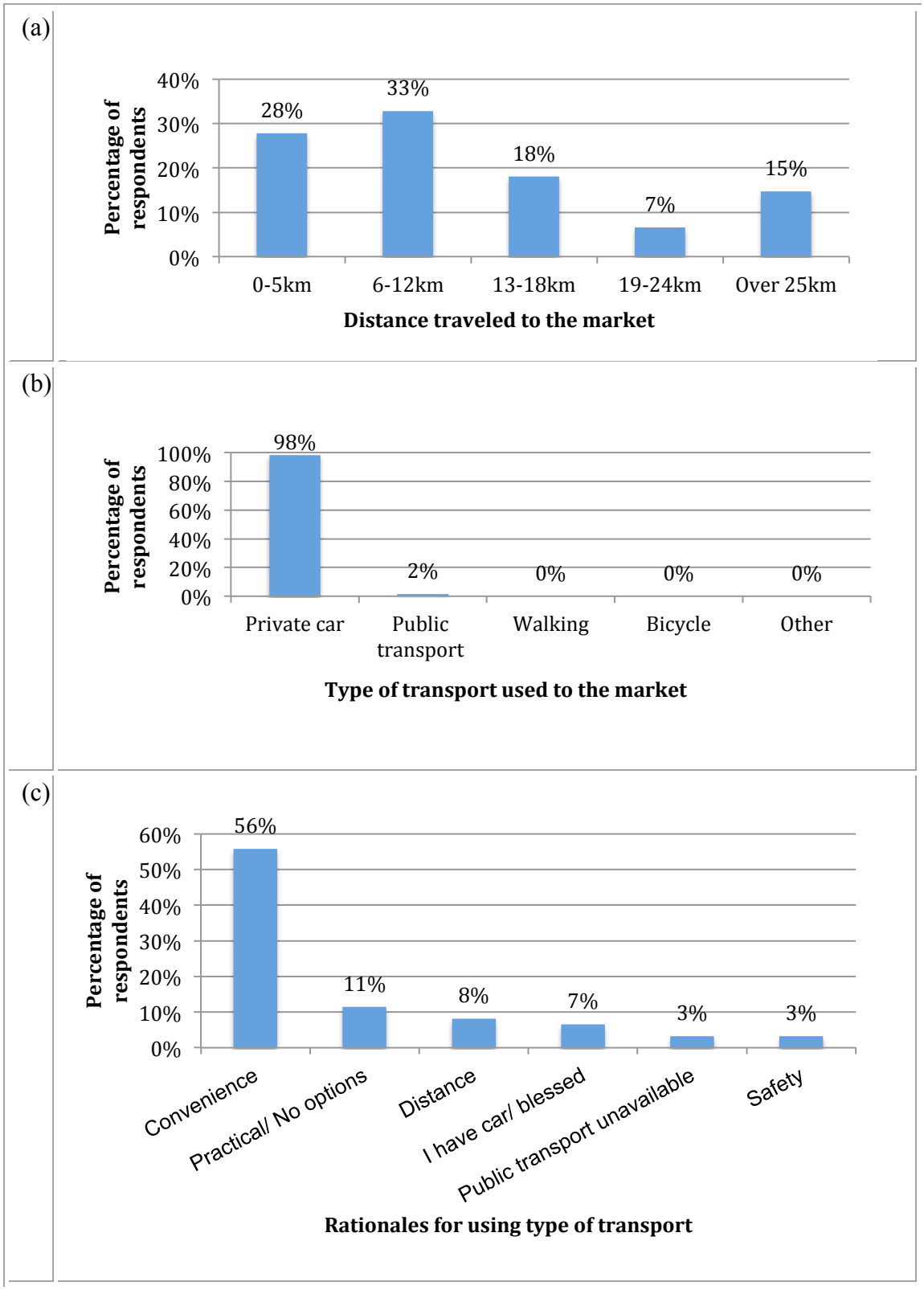


Figure 8: Transportation means to the market including (a) how far they travel to the market (b) what mode of transport they use and (c) the prominent themes around why their chosen form of transport is utilized.

4.6. The frequency of Organic food intake

Figure 9 (a) indicates that the respondents consume organic food daily and weekly, which is regular. This high frequency of consumption can be attributed to the perception that organic food is healthier, an option selected by 72% of the respondents (Figure 9(b)). Environmental concern ranked second as a reason for frequent consumption of organic food by the respondents. This was the first time in the study that the respondents mentioned a connection between organic food and the environment. However, in a question where environmental concern was an option, it was selected as a concern. This could potentially indicate that environmental concern is a secondary reason for organic food consumption.

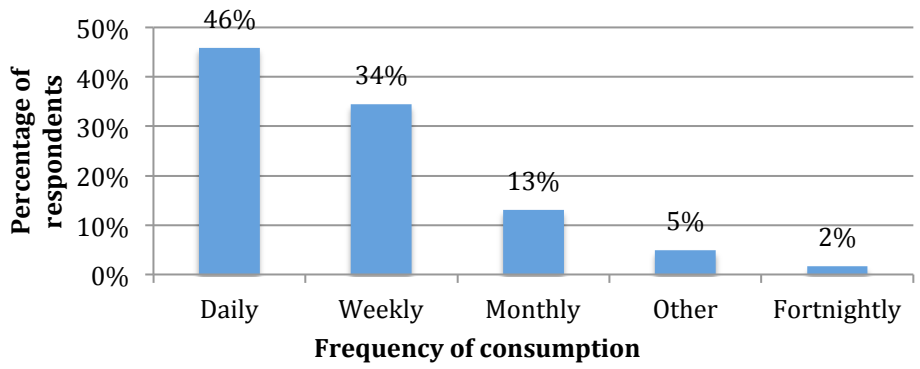
The results in Figure 9 (b) also suggest that the high frequency of consumption of organic food was equally not due to the accessibility of organic food. Considering that the majority of the respondents do shop at supermarkets for organic food, suggests that respondents had reasonable access to organic food and this had no effect on their regular consumption as seen in Figure 9 (a).

The rationale "*organic food is expensive"* behind the frequency of consumption, indicates one of two things. Firstly, that there is a high frequency of consumption even though it is expensive for the consumer. This may suggest that cost is compensated by the perception that higher cost is associated with prestige, status or quality hence the willingness to pay a higher price premium as per Engel (2008) and Petje (2013). The second thing that it may suggest is that expense decreases the frequency of organic food consumption because of budget constraints.

A probing into the 34% of the respondents (n=21) who indicated that *organic food is expensive* revealed that in total 67% (n=14) of them consumed organic food daily, weekly or fortnightly which would generally be considered frequent. This suggests that they will eat organic food regardless of the expenses and thus the willingness to pay the price premium. Secondly, 62% (n=13) of these respondents (from the 34% who indicated that organic food was expensive) bought their food from supermarket stores. Only 5% (n=2) of these consumer's rationales for buying at supermarket stores were related to price as seen in Figure 7. In conclusion, from Figure 9, it could

be seen that organic food consumption was consumed frequently because of perception of its health benefits and even though it is expensive there is still a willingness to pay the price premium.

(a)



(b)

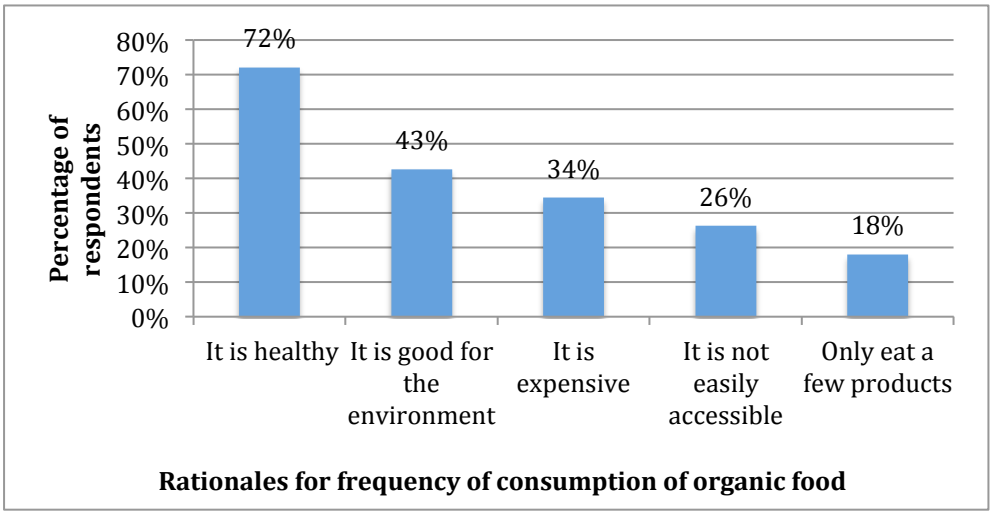


Figure 9: (a) The figures representing the frequency of eating organic food and (b) the most likely reasons influencing the frequency of eating organic food

4.7. Type of Organic Food Intake

Fresh produce was reportedly one of the prominent purchases from the organic food markets by the majority of the respondents, (Figure 10 (a)). When the respondents were further probed in the questionnaire[28] as to why they chose these food groups, health concern and vegetarian lifestyle ranked top as indicated in Figure 9 (b).

[28] See Appendix 1

Whether adopting a vegetarian diet was for religious, personal, health or animal ethical reasons was not mentioned by any of the respondents. Environmental considerations for purchasing mostly fresh produce from the market were only 5% of the respondents (Figure 10 (b)). As seen in figure 9(b) it seems that respondents mentioned environmental issues only when it existed as an option, however not mentioned by their own accord when writing freely about their intentions. In general, respondents chose health, vegetarianism and taste as the main reason for consuming mainly fruit and vegetables with little attention paid to environmental considerations. This indicates that self-interest was more likely to be the main rationale for consuming fresh produce

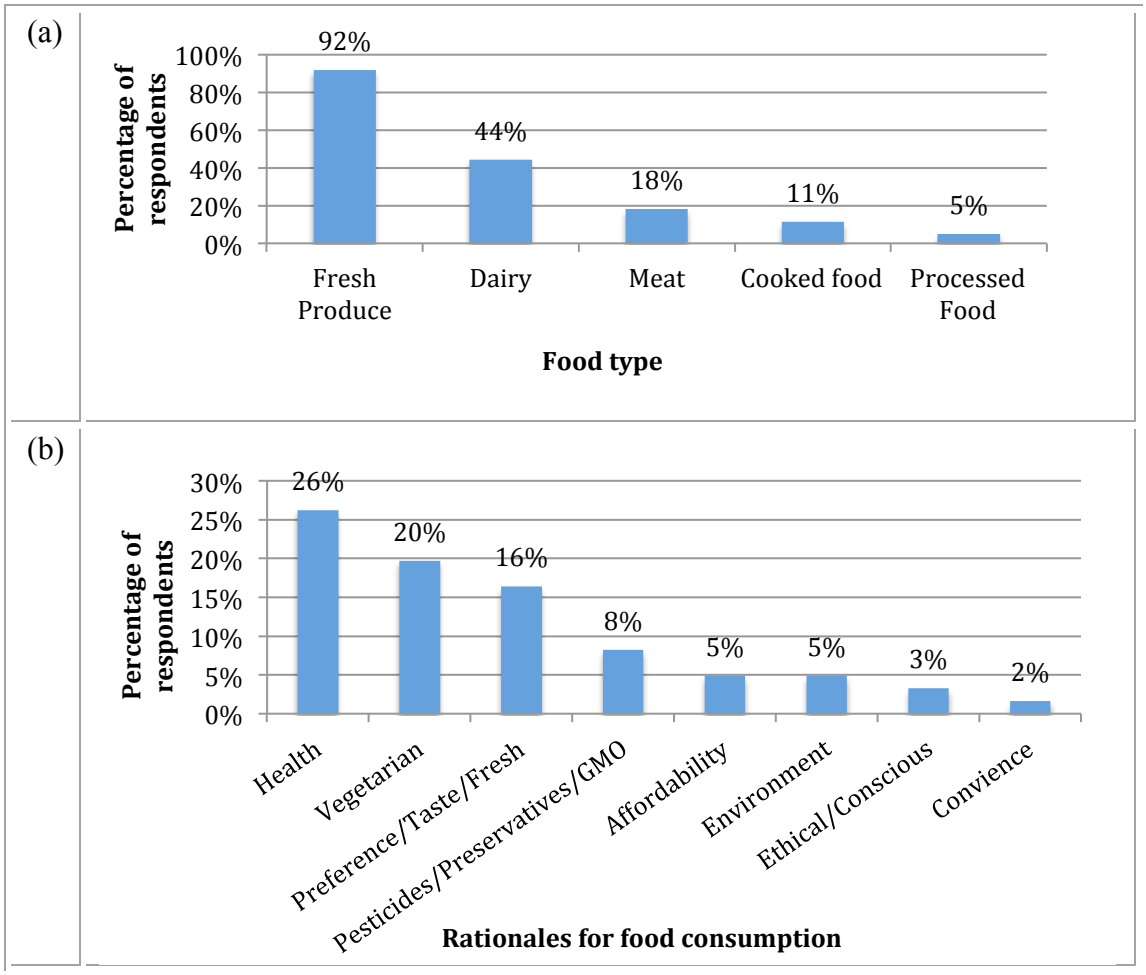


Figure 10: (a) The figures representing the types of foods organic food consumers' purchase and (b) the various themes that came up when asked to provide reasons for the type of organic food purchase along with the frequencies of the themes.

4.8. Sustainable Consumption Measures

4.8.1. Summary statistics and reliability

Table 2 indicates the summary of the Person and Item measures computed from Rasch analysis. It can be seen that the respondents scored on average a measure of 49.98[29] indicating that the respondent's ability to measure as sustainable consumers (the construct being measured) was low. The Cronbach alpha was low at 0.4 (less than 0.6) indicating that there was little internal consistency in the person measures (A low Cronbach alpha indicates that there is a low probability that people measuring high are in fact good sustainable consumers and those measuring low are actually poor sustainable consumers). This indicates that there is a narrow range of respondents who can be classified as having a great ability to measure as sustainable consumers. The bubble chart in Figure 11 supports this as it can be seen that the range of respondents person measures are almost all the same as they are condensed in one area.

Table 2: Summary Statistics of person and item measures

PERSON MEASURES	
	Measure
Mean	49.98
Max	57.86
Min	43.72
Cronbach Alpha = 0.4	
ITEM MEASURES	
Mean	48.13
Max	60.55
Min	32.4
Item Reliability = 0.97	

[29] See Appendix 3

The mean item measure (Table 2) was also low at 48.13 indicating that the difficulty of the item was high and that the respondents had a hard time choosing responses, which would measure them as sustainable consumers. The item reliability, on the other hand, measured 0.97[30], which indicated that there was strong reliability in the items measure of the construct (a sustainable consumer). The instrument is thus consistent in its ability to measure the construct of a sustainable consumer.

4.8.2. Person Measure

Table 2 indicates that the person who is the most sustainable consumer had a Person measure of 57.86 while the least sustainable consumer who had a Person measure of 43.7. A closer look at the data[31] indicates that these are person 015 and person 013 which can also be seen visually in Figure 11 as well as the person-item map (see Annexure 5). Although the low Cronbach alpha indicates that there is no statistical difference between the person measures it can be seen in Figure 11 that there are some differences between the most (person 013) and least (person 015) sustainable consumers. These small differences should not be completely discounted

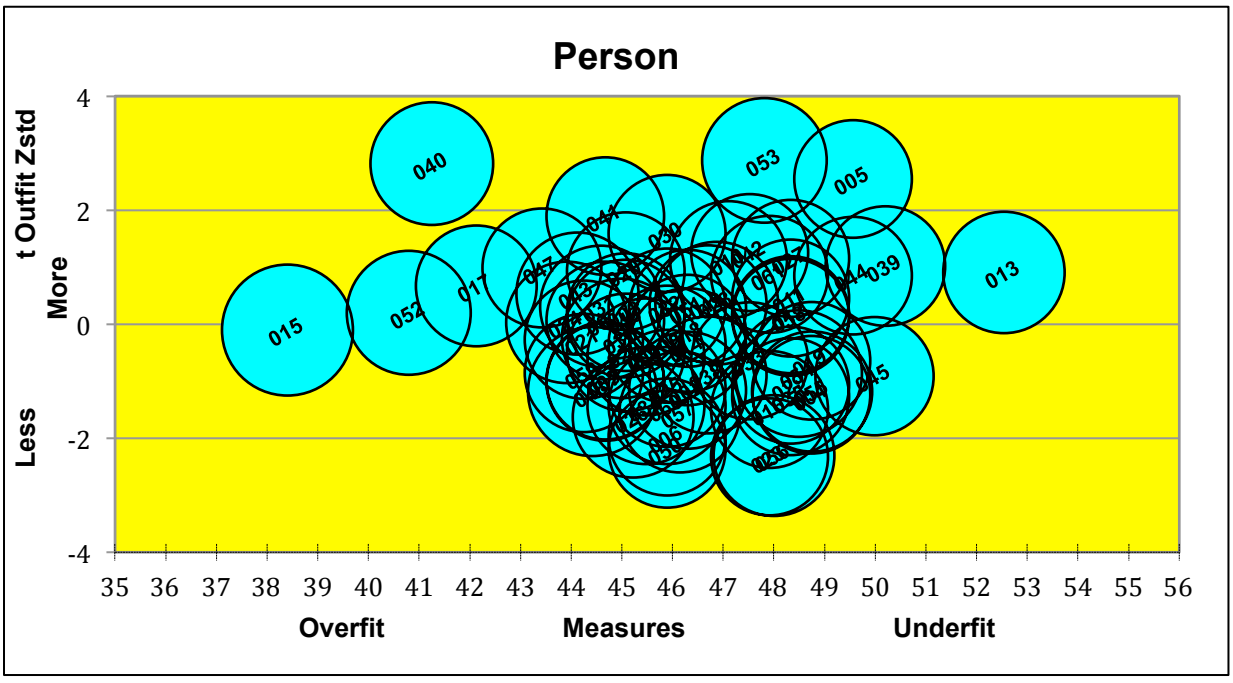


Figure 11: The person measures against the standardized fit statistics (Z-std)

[30] See Appendix 3
[31] See Annexure 4

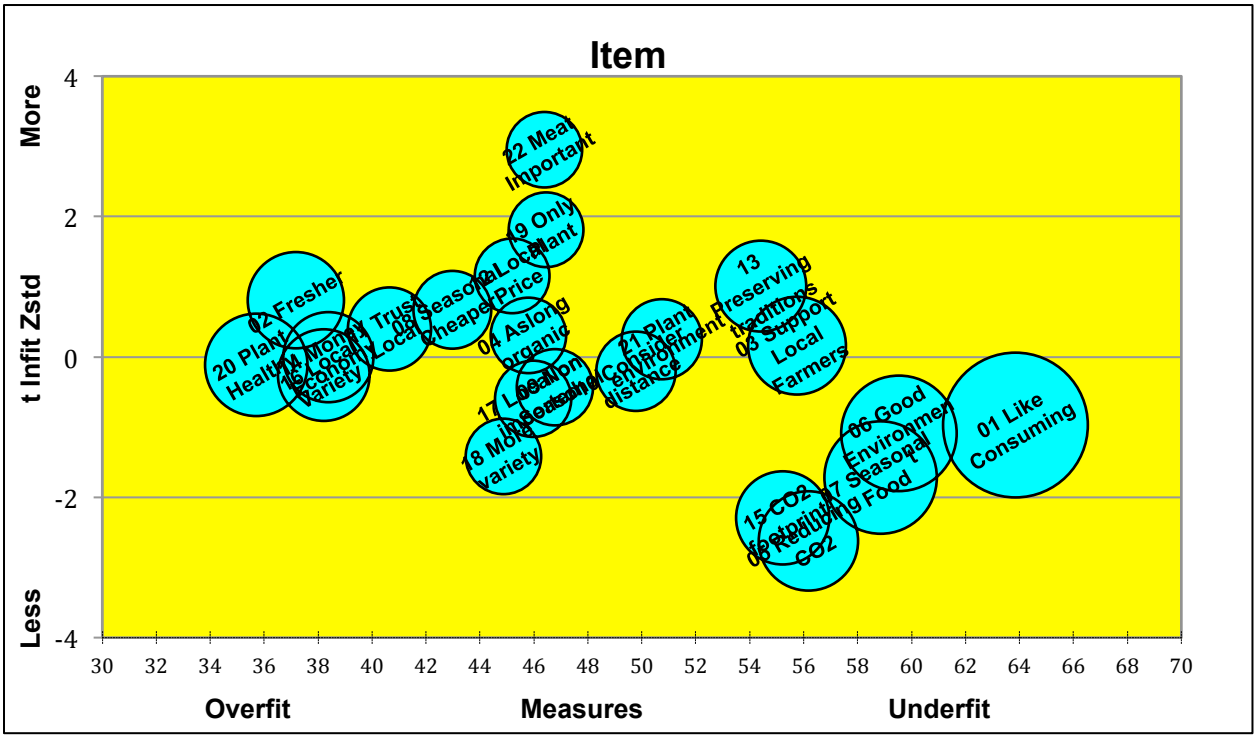


Figure 12: The item measures against the standardized fit statistics (Z-std)

Person 015 is the highest scoring person (most sustainable consumer) with a higher than average Rasch measure compared to the mean of 49.93. The raw data indicates that this person is a 56+ female whose highest level of education in primary school. This consumer buys purely organic, stating that she "*always aims for natural*" when making food considerations. She drives 25km+ to get to the market and it would seem she is not considering taking any other means of transport as she says she is "*blessed to have a car*". Furthermore this respondent mentioned environmental concern in relation to the rationale behind why she consumes organic food very frequently.

In contrast to the highest scoring consumer, the poorest sustainable consumer had a Rasch Person measure of 43.72. The respondent was in the 46 – 55 age category and thus not categorized as a youth. This person is male and has obtained a diploma as the highest form of education. Similar to person 015, the poorest sustainable consumer also travels more than 25km to get to the organic market and uses a private car based on the convenience of "*being able to be at the market anytime*". This person is also not a firm organic consumer who commented that he eats organic food

when he "*happens to buy them because they are not easily accessible*" even though he stated in his response that he goes to the market weekly.

The item-person map (Annexure 5) indicates that the lowest scoring person answered the first seven questions in accordance with the measure of being a sustainable consumer. These were mostly action filled statements that were expected to be answered closely to the construct of a sustainable consumer. These include the concepts of eating organic food due to reducing carbon footprint and CO_2 emissions, supporting localized foods, eating seasonal foods and preserving farming traditions.

However, since person 013 did not score highly on some of the reverse questions it indicated that this person was not much of a sustainable consumer as these items presented a difficulty for him to measure as a sustainable consumer. Person 015 however was more likely to have the ability to answer the items in accordance to a sustainable consumer as they scored higher on some of the reversed questions except for the last two ("*I eat organic food because it is fresher than conventionally grown food*" and *"I eat plant-based food because it is healthy").* It seems no one had the ability to score highly with those items as they agreed with the notions instead of disagreeing as a sustainable consumer would. This means that a good majority of the respondents did not have the ability to answer the questions in alignment with what a sustainable consumer would and thus failed the test of having strong consistent values, behaviours, and ideals of a sustainable consumer based on Di Guilio et. al. (2014).

A count of the raw data indicated that the top 10 persons who measured closely to the construct of a sustainable consumer were mainly older individuals. Only two of these respondents in the top 10 highest scoring people belonging to the youth age group (i.e. <35). This indicated that the most sustainable consumers are in the older age groups and not youth.

4.8.3. Item Measure

The item measure order (see Annexure 6) showed the questions, which the respondents were able to align with sustainable consumption. It could be seen that item 1 was the question *(I like consuming organic food)*, which most respondents

scored in a way that was anticipated, saying they strongly agreed with the statement and thus all scored highly.

Item 20 *(I eat plant-based food because it is healthy)* were the item, which the respondents could not align with the sustainable consumption concept. Most of the respondents agreed with this statement where it would be expected that a typical sustainable consumer would as they would eat plant-based foods to ensure the environment was healthy or ensuring there would be fewer methane emissions from less beef production etc. The response gives further support that respondent's consumption of organic food is mostly due to self-interest reasons as is also seen in figure 9 (b) and 10 (b).

The item measure rank order indicated that most people (i) liked consuming organic food (item 1), (ii) believed organic farming was good for the environment (item 6), that they (iii) like consuming seasonal organic food (item 7), (iv) liked consuming organic food because they believe it plays a part in reducing CO_2 emissions (item 5) and finally (v) they liked consuming organic food because they liked to support local farmers (item 3). Respondents displayed an agreement with these 5 questions indicated a positive response to the construct of a sustainable consumer.

Most respondents (n=50 indicated that they ate plant-based organic foods because it was healthy. However, from a sustainable consumption perspective, this does not align with being a sustainable consumer because based on the framework people should consume organic food for primarily environmental reasons.

The case for lower scoring items, which were scored in reverse, i.e. items that made people score negatively in their measure of the construct of being sustainable consumers indicated that (i) People ate organic food because it was fresher (item 2), that they (ii) eat locally produced food but the variety was limited (item 16), that they (iii) ate and consumed locally produced organic food because it kept money in the local economy (item 14) and (iv) chose seasonal organic food because it was cheaper (item 8).

While these are all acceptable reasons for supporting local or seasonal organic food and supporting the strengthening of the local economy, in terms of the theoretical framework, this does not tie up with sustainable reasoning but more to do with socio-economic interest. It was expected that the respondents should have, at least, answered with a 'not sure' or 'disagree' regarding these statements in order for them to have scored a higher measure for sustainability reasons.

4.9. Sustainable Consumption

The summary in Table 3 derived from the Figures 4-9 presupposes that some of the behaviours displayed by the respondents had a sustainable impact on the earth with 60% of the behaviours having sustainable impacts. However, all of the intentions such as buying organic food from the supermarket because of convenience or eating mostly plant-based foods due to health were some examples of the respondents having unsustainable intentions. Based on the Di Guilio et al (2014) sustainable consumption framework it indicated that in general, this sample fell mostly into Quadrant 3 and 4. This means that these respondents were generally not strong sustainable consumers however there was room for improvement as at least some of their behaviours had positive impacts on the earth such as eating organic food and choosing mostly vegetables and fruit. The respondent's intentions were based mostly on some self-interest rationale rather than environmental consideration.

Table 3: A summary of the interpretation of the organic food consumer's impacts and intentions based on their behaviours

BEHAVIOUR	IMPACT	INTENTION	QUADRANT
Visit to the organic market	Sustainable	Unsustainable	3
Purchasing from Supermarkets	Unsustainable	Unsustainable	4
Travel to the Market	Unsustainable	Unsustainable	4
The frequency of Organic food intake	Sustainable	Unsustainable	3
Type of Organic food intake	Sustainable	Unsustainable	3

When the behaviours and rationales of the highest and lowest scoring respondents from the Rasch analysis were considered in Table 4, the highest scoring person had more behaviours with sustainable impacts than the lowest scoring one. The highest scoring person also had more sustainable intentions whilst the lowest scoring person

showed no sustainable intentions in their rationales which was the mostly the case on average for most consumers also seen in Table 3.

Table 4: The difference between the highest ranking and lowest ranking individuals responses consumptive behaviour

	PERSON 015 (Highest scoring)			PERSON 13 (Lowest Scoring)		
Behaviour	**Impact**	**Intention**	**Quadrant**	**Impact**	**Intention**	**Quadrant**
Visit to the organic market	Unsustainable	Unsustainable	4	Sustainable	Unsustainable	3
Purchases from Supermarkets	Unsustainable	Sustainable	1	Unsustainable	Unsustainable	4
Travel to the Market	Unsustainable	Unsustainable	4	Unsustainable	Unsustainable	4
The frequency of Organic food intake	Sustainable	Sustainable	2	Unsustainable	Unsustainable	4
Type of Organic food intake	Sustainable	Unsustainable	3	Unsustainable	Unsustainable	4

It can be seen in Table 4 that while both consumers fall into quadrant 3 and 4 in their behaviours it is possible to see why person 015 has glimpses of being more of a sustainable consumer than person 013 who has been able to make some mention of the environment as a concern for their behaviours. There is evidence from person 015 rationales of being environmentally minded in some of her consumption rationales. Even though she buys organic food from the supermarket this person does think of the environmental implications hence she falls into quadrant 1 and 2 for some other behaviours. It is visibly seen that Person 013 (unlike person 015) has no sustainable intentions and hence reveals why they are less of a sustainable consumer than person 015. However, as the bubble chart in Figure 11 and the Cronbach alpha indicates these people are mostly very similar and it cannot be said that they are significantly different from the other.

4.10. Concluding Remarks

The demographics indicated that the largest category of the respondents is that of 26 – 35-year-old age group, which are considered as a youth. It was interesting to note that when classified as youth and adults the youth formed a sizeable 46% of the respondents. Females were the predominant respondents and in general, most of the

respondents were well educated with high academic qualifications. The top 10 respondents who measured strongly as sustainable consumers had a low representation of the youth group. The top 10 sustainable consumers were also not well learned even though the majority of the sample were well learned.

The consumption and purchasing behaviours indicated that majority of the respondents have only been coming to the market for the past 2 years although the rest majority of them come frequently to the organic market. Some of the respondents (n=49) make organic food purchases from supermarkets as well as from organic markets. A large majority of the respondents reside very near to the market (61% lived less than 12km) and hardly any of them used alternative greener modes of transport to get to the market. Most respondents consumed organic food frequently with fresh fruit and vegetables being the most consumed food group.

An examination of the consumers' rationales behind consumption and purchasing behaviours suggest that they were environmentally unconscious as the behaviours were mostly out of self-interest such as convenience, health concerns with no communal or environmental gains.

Interrogating the results from the Rasch analysis as well as their consumption and purchasing behaviours and rationales based on Di Guilio et al. (2014) impact-intent behaviour framework revealed that the consumers of organic food were currently not sustainable consumers. The next chapter provides possible prospects for these behaviours and rationales and the unsustainable consumption.

5. DISCUSSION

5.1. Introduction

The results indicated various self reported behaviours displayed by Johannesburg organic food consumers. Self-interest was the primary motivating factor for these behaviours. A deeper look at these results suggests possible reasons why these consumers may act in this manner as well as expanding on what these acts mean for sustainable consumption theory and the case for alleviating poverty as per the SDG's.

5.2. Purchasing and Consumption Behaviours

The first research objective was reached through the observation of the purchasing and consumption behaviours. The following subsections indicate these behaviours.

5.2.1. Duration of purchasing from the organic market

These behaviours indicated that firstly, a large majority of the respondents only started visiting the market for food as recently as two years ago. This is relatively recent considering that both the organic food markets have been operational for more than four years with the Bryanston organic market operation for more than 30 years (Naicker & Jayne, 2017).

This could signify that the consumption of organic food from organic food markets is either a new phenomenon for most of the respondents. Alternatively, it could suggest that consumers have been shopping in previous years from other retail spaces such as specialist health stores, wellness and other supermarkets stores as depicted by Ractliffe (2015). There is a reason to believe that the latter reason is the case as it was seen that 78% of respondents do make purchases of their organic food at supermarket stores. Their organic food consumption would, therefore, range longer than the 2 years identified in this study. It would, therefore, be unclear when they started shopping at these other places and whether it predates their start of visiting the organic food markets.

The idea that it could signify a new phenomenon can also not be ignored as Thørgerson (2010) supports the view that organic food consumption could be a new phenomenon in Johannesburg, South Africa. Their study indicated that the organic food market's share in developing countries has been immature for a long time due to some of the unattractive appeals of the organic food market. Thørgerson (2010) explains that these negative appeals include the difficulty of locating, limited varieties and the perception that they are exclusive commodities, as well as people undermining and not fully understanding their importance, especially within the alternative food system debate.

Schumilas (2011) also explains that such above-mentioned limitations could have also slowed the progress of knowledge about organic food a few years ago around the world, but specifically in developing countries, due to structural and macro factors. These factors include political regulations, legal definitions and standards, financial support to farmers, and national labelling systems, which have slowed down the popularity of organic food. The importance of organic food is increasing throughout the world, and this could explain a growing trend in the popularity of organic food over the past two years. However, in recent years, with intensified Internet access and globalization of information the trend of consuming organic food has contributed to the spread organic food knowledge in Johannesburg (Schumilas, 2011) and these could be reasons for the growth in organic food consumption as witnessed by the respondents in this study.

The issue of the limited variety of food seems to still persist with the current consumers of organic food. Respondents generally agreed in the Rasch analysis with the statements that (i) "*I like eating imported organic food because I have more variety*" and (ii) *"I like eating locally produced food but local food is limited*". Expressions such as these indicate the perceived unfavourable aspects of consuming organic food and further explains why there has been the slow and recent growth in organic food consumption.

In summary, it can be seen that considering all these potential reasons as to why the respondents have only consumed organic food from the past 2 years suggests that it is either due to the fact that they have been shopping for organic food before they came to the market. It could also be due to recent growing phenomena of purchasing organic food in South Africa which has been stiffled by various limitations.

5.2.2. Age group

The largest relative age group was represented by the 26-35-year-olds when compared to other age groups. However, the total difference in percentages between the youth versus non-youth was relatively small and therefore it could not be decided which age group was considered greater. It is possible that the reason why the largest represented age group is youth is due to a recent growing trend of interest in organic food by the youth. It would seem that the general trend in organic food consumption worldwide indicates how youth have become the most prominent consumer of organic food. A study by Askew (2018) in Australia, reporting for the Australian Agricultural Ministry, reported that 73% of young adults held organic foods in *"high"* or "*very high"* esteem.

Kracht and Shulz (1999) and Askew (2018) explain the reason for the youth having a high interest in organic food is because many urban youths have been raised as the "McDonalds generation". This generation of current youth who have been raised on overly processed foods is the same generation who have become increasingly knowledgeable about the consequences of eating these foods. They have also become increasingly aware of the unethical ways of food production, which threaten the environment. Mushkin et al. (2017) explain that an accelerant to this knowledge can be due to technological advances, which have made it easier and faster to access information and share it with others. This generation of youth is knowledgeable about various aspects of health, carcinogens in the processed food they eat and the environment.). As a result vegan or vegetarian lifestyles have been increasingly popular with the youth (Mushkin et al. 2017). These group of people considered as a youth or otherwise known as millennials' are generally aligned with the global "food movement". This is a possible reason this generation has embraced organic and

natural food movement and being the dominant consumers of organic food both in Johannesburg and worldwide.

However, the young are not the only age group considered as identifying with organic food. A contrasting study in Dublin and Athlone (in Ireland) by Bord Bia (2014) indicated that the majority of organic food consumers were mainly older people who were of the ages 65 years or older. Millennias were less likely to engage with organic food consciously but rather interacted with organic food accidentally.

These results indicate that age might not be a conclusive measure to characterizing organic food consumption in general and in South Africa too where the results were not clear whether the youth or non-youth group were the represented most of the group. The results further suggest that perhaps age should not be the key variable associated with the consumption of organic food because consumption trends have been found to be context specific as seen in the two contrasting examples mentioned above regarding the age in different countries. This is because age is a dynamic factor when grouping people because age can infer other variables than just simply years of living. In different countries, cities, areas and even neighbourhoods age translate into different things such as different life milestones, affordability of food as well as family planning stages which impact what people eat. These results suggest that perhaps age is a redundant variable to consider when looking into organic food consumption for sustainability factors and could be dangerous to cluster people into ages for research purposes.

Another factor is that the definition of youth changes across different countries and so based on definitions the grouping of individuals in studies could have an enormous inconsistent outcome for other studies.

Since this section reveals that the 26-35-year-olds were the largest relative age group being represented when compared to other age groups, it would follow that Johannesburg people in South Africa did follow global trends of being organic food consumers. However, this finding should be treated with caution.

5.2.3. Purchasing from supermarkets

Another consumption behaviour witnessed was that most of the respondents enjoyed purchasing organic food from supermarkets as a supplement to the organic food purchases they made at the markets. The study showed that when it comes to where their organic food is sourced most people did not really seem to have given much thought to it. Evidence from this study indicated that respondents believed that if the food was labelled organic then it was organic; they also were not concerned or interested in the origin of the food. This was contrary to the global phenomenon where people are becoming more concerned about the food that they eat and where it was sourced (McCarthy *et al.* 2015). The global trend shows that consumers are particularly demanding for their organic food to be certified organic with labels indicating origin and dates of production and shipping.

5.2.4. Mode of transportation to purchasing organic food

The behaviour of the respondents taking a private vehicle to the organic market even though the majority of them live relatively close to the organic markets could perhaps speak to the growing South African culture of utilizing and relying on the private vehicle (Hitge & Vanderschuren, 2016) instead of public transport. Public transport in South Africa has been dominated mainly by Taxies. The use of taxis has been controversial with high accident rates in the transport industry. This has deterred people from relying on taxis as a means of transport[32]. Buses and the recent Gautrain and Gautrain buses, as well as Rea Vaya buses, are another source of public transport recently offered in Johannesburg, however, these have limited routes and times of operations which further restrict the transportation use in Johannesburg and thus explaining the reliability on a private vehicle. The use of public transport could thus be a limitation for people using it as a means of transport.

The use of bicycle lanes is also underdeveloped in the Johannesburg City. The infrastructure that supports the use of bicycle such as bicycle lanes in the city is also poorly developed[33]. Ana et al. (2014) suggest that Bicycle parking bays, lanes, or

[32] Although the majority of the country still uses taxis as a means of transport
[33] Typically synonymous of developing countries as mentioned by Theøgerson (2010)

even rent bike services in and around the city integrated with public transport can make the option of using public transport more attractive as an option for people to use. Harris (2017) explains that in Johannesburg bicycle lanes were implemented however they failed to work because of the policymakers neglect of the integrating bicycle lanes with feasible transportation and adjust that to the local community. The problem was that the poor lived too far to reasonably cycle to work, while the wealthier who lived close to the city did not value the little they would be saving from cycling. These are the types of variables that should be well understood when city planning to ensure these more environmentally friendly options are in fact feasible to people. This is thus a major factor, which could be limiting people from travelling to the organic markets with their bicycles.

In South Africa, safety is another factor preventing people from taking other modes of transport due to the high crime rates (Statistics South Africa, 2017). Such problems have been the source of the increased reliance on private transport in South Africa, and thus could be the reason why the respondents do not make use of public transport to go to the markets, which respondents revealed they live relatively close to. Again even though this is a reality in South Africa the respondents did not blatantly express crime as being a major reasoning for why they travelled to the market by private vehicle.

Even though the above mentioned constituents regarding why the respondents could possibly choose private vehicle to get to the organic food markets it would seem that majority of the respondents did not blatantly express these as being a major reasoning for why they travelled to the market by private vehicle and would indicate that there was an unawareness of the need to take less environmentally harmful means of transport as their safety and accessibility to public transport or bicycle lanes were a non issue.

5.2.5. The frequency of organic food purchase

It is evident that Johannesburg organic food consumers purchase and eat organic food very frequently with the results indicating an interaction with the organic market and food at least weekly. The report by Askew (2018) indicates a similarity in

Australian youth where most of them responded by saying that “at least one organic product is included in my food often or always”. Since the 26-35-year-olds made up the greatest relative representation when considered to the other age groups it suggests that there is a close relationship between youth and frequent organic food consumption as shown in Australia and now Johannesburg South Africa.

This age group with the most representation also indicated that there could be a perception that the difference between supermarket and organic food prices may not be that different hence price was not frequently mentioned as to the reasons for purchasing organic food from supermarkets however the price issue did come up as a reason for the frequent consumption of food. This could indicate that maintaining an organic food lifestyle by eating it frequently might be where the expense is most likely to emanate. This may confirm that eating organic food from organic markets may be a status symbol, prestige or the perception of quality and health perspectives as shown in Smith and Paladino (2010) and thus willing to pay a higher price.

A study by Oths et al. (2016) indicated that young adults demonstrated greater attraction of a more festival-like market, even if the product was perceived as more expensive. Green values and the desire for a wide variety of items for purchase beyond fresh fruits and vegetables were other notable traits. Perhaps this study is an indication of this phenomenon in young people because even though most of them searched for variety through supermarkets they could also indicate that they shop at the organic market for the festival-like atmosphere, which is very evident especially at the Bryanston Organic and Natural Food market. This behaviour is similar to the one Seyfang (2004) described in their study whereby people visit organic markets as a ‘fun and reactionary fare for status driven traditionalists’ where there is a mixture of entertainment, a symbol of traditionalism and a status because they make these purchases even though it is expensive to some.

Probing into the 34% of the respondents who indicated that their consumption frequency was based on the expense of food suggested that to these individuals price was a factor for the frequency of consumption. Since there was generally a high frequency of consumption of organic food, the rationale that it was expensive

suggested that there was a willingness for consumers to pay a price premium. This was again standard with other international behaviours as seen in Engel (2008), Ngobo (2011) and Naicker&Jayde (2017). Looking into the results it was suprising to see that price was not a factor mentioned for making organic food purchases from supermarkets as opposed to organic markets. It was possible that partipants did not see the price difference between the supermarket and organic market prices but rather the price made up an issue into how frequently they could purchase food.

The willingness to pay a price premium carries a burden for the poor who would want to make organic food purchases however as they would not be able to afford this, however it could mean that they could sell the organic food at a slightly higher price and thus contribute economically to the community especially if governments could provide assistance to these small scale farmers as stated previously.

5.2.6. Type of food purchased

The final behaviour observed by the respondents in Johannesburg shows that the most consumed organic products are fresh produce and Dairy. This is similar to the behaviours observed in two European countries (England and Romania) by Oroian et al. (2017) who found that fresh produce was the most consumed organic food type.

However, the behaviour of buying mostly fruit and vegetables in this study could allude to the difficult and expensive processes involved in the production of organic meat. The expense involves ensuring the animals feed are also organic, that the animals are not treated with any antibiotics, hormones or synthetic pesticides. In addition, animal pastures must also have been chemical free for at least three years before the resultant feed can be claimed to be organic (Gillepsie and Nehring, 2012). The results are thus of a premium price on organic meat and may be burdensome for the average meat producer and too expensive for the average food consumer. This poses many restrictions on the availability of organic meat and similarly other farm produce that are not fruit and vegetables (Gillepsie and Nehring, 2012). The inaccessibility of organic processed food such as dairy, meat or dried food on the market could thus be a logical explanation as to why fruit and vegetables are the highest consumed food type within the context of this sample. However, cost did not

seem to play a large role in the respondents reasoning for mostly choosing fruit and vegetables.

5.2.7. The conclusion of the purchasing and Consumption Behaviours

The eating and purchasing behaviours of the organic food consumers in Johannesburg, with the exception to transport behaviours to the markets and labelling issues, seems to be very aligned with other trends observed by the international communities. In more developed countries where there is an integration of transport infrastructure, it is perhaps easier to use public transport than use private vehicle and this enables a greater reliance on the use of public transport. The study has thus highlighted a need for public cycling transportation and infrastructure to uplift the South African experience of consumers of organic food although in South Africa politics and policymakers are in the way of making such advances.

The growing knowledge of organic food consumers' needs to be considered and related back to the rest of the cities in South Africa in order to give more light to the various consumer behaviours within the country. There is also the need to accelerate the knowledge of organic food consumption among people of different income brackets given the various inequalities experienced in South Africa (Ractliffe, 2015). The sample was predominantly from people who lived around the Bryanston and surrounding areas within the Northern suburbs which suggests that only medium to high-income earners were actually in the sample which is a limitation to the study as not all Johannesburg consumers reside in these areas.

Most of the behaviours observed by the respondents in Johannesburg had positive impacts (sustainable impacts) such as eating organic food regularly, choosing organic fresh produce over more processed organic food and making purchases from localized organic markets and visiting the markets frequently. Some of their behaviours had negative impacts on the earth such as driving by a personal vehicle even though they live close to these markets and purchasing from supermarkets, which are non-localized or emphasized retail points.

5.3. Intentions of Purchasing and Consumption Behaviours

The second objective of the study was *to determine the purchasing and consumption intentions displayed by Johannesburg organic food consumers*. It was observed that most of the respondent's intentions behind their behaviours were mainly out of self-interested reasons (intentions were unsustainable) as it was seen that their intentions behind their behaviours were mostly due to convenience, health and lifestyle.

Convenience is seen as a rationale behind acquiring organic food from supermarkets. It was also seen as a rationale for using private cars as a means of getting their organic food from the organic markets. Johannesburg residents also expressed self-interest reasons when asked about the frequency of their organic food intake as well as when asked why they purchased and ate certain types of organic food. The underlying answer to both of these questions was observed to be for health reasons.

The fact that people eat organic food very regularly is not coupled with sustainable intentions. The respondents seemed to behave in this way in order to suit their personal health goals. A study by Oroian et al. (2017) seems to support our findings where they indicated that health concerns were the primary reasons why people in Australia engaged with organic food. While this is not bad (and very good that people want to take care of themselves) it is equally not sustainable for the environment if the rationale is not prompted by greater environmental concerns. These consumers are thus not fully connected to the environmental act of consuming organic food and in the long run, these acts are not truly sustainable.

The Johannesburg organic food consumers indicated environmental reasons as some of the rationales for their behaviours. However, this was only through a selection of respondents when the option was made available to them. This was seen when 43% of the respondents indicated that they consumed organic food frequently due to health concerns. However, only 5% raised the environment as a concern to this behaviour and in no other responsive questions. When prompted to explain some of their rationales with a written response they were mostly unable to mention the environment as a concern. However, when prompted by a tick box response these consumers were able to mention aspects of the environment as a rationale for their

behaviours. This raised concerns about whether these people ticked the environmental option for a rationale because they saw it there and knew that it is typically a correct answer. This was evidence of social desirability as explained by Rosenthal and Rosnow (1991).

While the high frequency of visits to the market is a good sign that people have invested in eating organic food the rationales for the high investment in organic food consumption is not sustainable as set by the model by Di Giulio et al. (2014) as the rationales for this behaviour were based on health reasons. According to Di Giulio et al. (2014) acts are not sustainable if intentions behind behaviours are not deliberate in addressing of environmental concern.

The fact that people specified that they consume mostly fruit and vegetables when making organic food purchases was coupled highly with the rationale of consumers being vegetarian which in this study was considered an unsustainable rationale as it was not linked to environmental concerns. It would be crucial as a continuation of this study to consider the reasons behind organic consumers being vegetarians as it could be due to ethical consideration such as the love for animals and religion or for strictly caring for the environment. If the latter were the case then we would deem this rationale more sustainable than the former motive.

Many people are however vegetarian due to religious reasons and further studies are needed to unravel whether vegetarianism for religious reasons is a sustainable act. Perhaps more so it would need more specifics about the type of religion. Questions regarding whether the religion is contributing positively to the environment need to be answered first instead of classifying religious reasons as an unsustainable or even sustainable act. As Altman et al. (2012) explain that some religions are very pro-environmental and are based on the respect for others and the environment that gives life. This would be the case of a religion contributing and moving towards sustainability. If the religion is based on money marketing and cults then this would be seen as contributing negatively to sustainability as this would have more self-interest virtues. The rationale of vegetarianism, therefore, needs to be probed deeper in order to classify it better under the notion of being sustainable or not.

5.4. Sustainable Consumption

The third objective of the study was to understand the extent to which organic food consumers in Johannesburg displayed signs of being sustainable consumers based on Di Guilio et al. (2014) framework. It was very clear that the respondents were not sustainable food consumers and this came from the observation that while some of their behaviours had positive and sustainable impacts on the environment others were merely circumstantial. This meant that while the behaviours had sustainable repercussions, the fact that they were done without deliberate consideration of the earth deemed them unsustainable. The research showed undoubtedly that most of the people's behaviours were actually due to a large extent for their own personal gain and self-interest. There was no sign of the consumers displaying signs that their intentions were, in fact, showing cases of environmental citizenship or pro-environmental behaviour. The Rasch analysis also proved that most of the respondents were not overall sustainable consumers as many did not measure close to the construct of a sustainable consumer.

Environmental citizenship or pro-environmental behaviour needs to be promoted through specific knowledge of sustainability issues (Terlou & Hirsch, 2011). Our study showed that the highest scoring sustainable consumer was more in tune with environmental issues than the others even though she was not highly educated. This person could understand and acknowledge the importance of their contribution to the environment as a consumer. This consumer thus indicates that sustainable consumption cannot only be reached through traditional forms of education but through very specific forms of knowledge of the subject matter. It is seen that, just like the organic consumers in Cape Town in Ractliffe (2016) study, the Johannesburg respondents also lack concerns of the environment and this could be due to lack of specific knowledge of the environment citizenship.

The strategic goal for supermarkets is always to maximize profits and would always want their stores to cater to a wide variety of customers as possible and the organic food found in supermarkets is often not rigorously checked (Lyons, 2007). The misuse of the labelling of "organic" in food has also come under fire as people

realize that some companies misguide consumers in an attempt to sell their product at whatever cost necessary (Lyons, 2007). However, for a small group of respondents (16%) in this study, this was not a concern as they revealed that their purchasing of organic food from supermarkets was perceived to be the same and stating that organic food is the same everywhere. This is unsustainable and is a characteristic that is very different in other parts of the world such as Chinese and Australian consumers who in Mc Carthy (2015), Liu *et al.* (2015) and Zhai et al. (2009) had a lot of mistrust for what is truly organic food. Although some respondents did mention that they either did not believe anything was truly organic or that they specifically only shop at organic markets out of mistrust for supermarket organic food it was seen that for a small number of consumers.

A strict labelling legislation may be the answer to enable an increase in environmental citizenship. In countries such as the United States and the UK (Soil Association Organic, 2016), the origin of the food must be stated on the packaging in order for it to be deemed truly organic or even local. This kind of labeling can thus make people more knowledgeable about the farms where their food comes from and thus be able to truly identify what is truly organic (Soil Association Organic, 2016) and thus give people knowledge of what it means for a food to be considered organic which would raise awareness of the sustainability of their consumption as seen in Seyfand (2007).

It must be considered however that labelling has been criticized as being a barrier for many who cannot afford the process. This could put a strain on organic production, which might propagate conventional ways of farming which could be more harmful and unsustainable. Simmone, et al. (2016) suggests that people all over the world in all different income brackets but especially in rural areas should be able to farm organically in order to increase economic value while sustaining the earth and contributing to society. Governments can intervene in the labelling process by subsidizing and regulating organic food labels especially those who might be compromised financially to do so (LimTung, 2016) and thus enabling more sustainable ways of organic food selection. However, in reality of a developing

world, this would be difficult to implement due to the high costs of training people, the slow returns from organic farming and lack of government funding.

The increased production of organic food has seen an increase in the consumption of organic food thus increasing its appeal and popularity. The study has shown that most Johannesburg consumers engaged in the consumption of organic food over the past two years. This suggests an increased trend in organic food consumption, which has progressed over the past two years. This explains that there could be the threat of the "Jenovus paradox" being present in Johannesburg and is, therefore, a threat to sustainable consumption because while organic food consumption is on the rise there is no sign of consumption being controlled through pro-environmental consumption intentions as reported by Charter et al. (2008) and Dauvergne (2010

Overall the consumers in Johannesburg showed that they did not display pro-environmental behaviours or environmental citizenship in their rationales. However the discussion did indicate some of the barriers which are potentially hindering this realisation, even though it was not mentioned by the respondents. The study signifies how through respondents not having a pro-environmental or environmental citizenship that they were indeed threatening sustainability. This shows signs of weak sustainability rather than the optimal strong sustainability in the context of Nilsen (2010).

6. CONCLUSION AND RECOMMENDATIONS

6.1. Summary of the key findings related to the research objectives

The general aim of this research was to investigate purchasing and consumption behaviours of organic food consumers in order to assess the environmental sustainability of such behaviours. The research outcomes, therefore, assisted in making advancements on the idea of sustainable consumption in the context of organic food systems. The key finding emanating from using the Di Guilio's et al. (2014) sustainable consumption framework as an analytical framework was that while the majority of the purchasing and consumption behaviours displayed by consumers in this research were mostly sustainable (sustainable impact) the behaviours were based on self-interest intentions (unsustainable intention) meaning that the consumers were not pro-environmental as their intentions showed little consideration for their actions. Furthermore, it was also evident from the Rasch analysis and the consideration of the sustainable behaviours impacts versus unsustainable intentions that the respondents in Johannesburg are altogether not sustainable consumers. Hence it can be concluded that these organic food consumers were overall not sustainable consumers.

Consumers' self-reported purchasing and consumption behaviours of frequent consumption of organic food based on a predominantly fruit and vegetable diet which cuts out meat, as well as short travelling distances to the markets indicate positive impacts on the earth and demonstrate sustainable acts. However, these positive impacts were coincidental because their intentions revealed that they were done for self-interest reasons (unsustainable intentions). Self-interest rationales behind consumption and purchasing behaviours, which included health, lifestyle and convenience, were found to be the main reasons for unsustainable intentions. The analysis of reasons provided by the consumers regarding their behaviours was not directly based on personal concern for the environment. In sum, consumers were regarded to have unsustainable organic food consumption and purchasing intentions and did not show any pro-environmental intentions or green citizenship.

Surprisingly, one key research finding was that even though consumers of organic food from organic food markets in Johannesburg were generally found to be highly educated they were less knowledgeable about environmental citizenship and pro-environmental behavioural acts. This was seen with the majority of the top 10 most sustainable consumers not having high levels of education. This meant that traditional forms of education did not substantiate a person's ability to be a sustainable consumer as it was seen that the most sustainable person in the study was not well educated and neither were most of the top 10 highest ranking sustainable consumers. More specific forms of education are necessary to induce people to think more pro-environmentally.

If these consumers are unsustainable consumers then it means that food security, in the long run, is under threat and that SDG's may not be achievable by the year 2030 as stipulated by the UN. The results show a lack in organic food systems being a good case for sustainable consumption and finally that consuming organic food alone does not make someome a sustainable consumer. Equally that buying organic food from an organic food market does not deem it sustainable especially if people travel long miles to reach the market or use unsustainable ways to reach the market even if they live near by (as seen in the participants).

It is crucial to try and overcome these barriers, which are not ensuring these global environmental goals so that the organic food system can have a good case as an alternative food system. Doing so will require knowledge specific education about sustainability issues. It means changing policy and ensuring that the modes of transport are green and thus contributing to the mind shift of the citizens. Finally, it will take institutions such as the organic food markets and other green organizations who do not centralize their business models around money (as supermarket business models usually do) in order to transfer pro-environmental and green citizenship values as Seyfang (2007) managed to do.

6.2. Recommendations

6.2.1. Sampling and data collection

Firstly, the Cronbach Alpha of the people measures in the Rasch analysis indicates that our sample had too many of the same type of people as seen in their responses and bubble chart (Figure 11). A bigger pool of people from different parts of the town across more ethnic and cultural and socio-economic groups should be considered and not just the urban people in Johannesburg who reside close to the organic markets as stated in the results. This would enable the study to encompass a greater range of the behaviours of South African organic consumers (Etikan et al. 2016).

Secondly, the use of the Rasch analysis enabled us to quantify what was seen as environmental citizenship or pro-environmental statements as a measure of sustainable consumption. If environmental citizenship is defined as a moral obligation in a matter of justice, there needs to be further analysis as to what is justice and morality in a changing world so that there are better measuring possibilities for what is truly sustainable consumption and what is not, based on the concepts of pro-environmental behaviours and intentions (Dobson, 2000). Conversations around morality is an important conversation to have in terms of nation-building and how governments, society and institutes can build moral capacity in an effort to enhance environmental or planetary citizenship. It is important for researchers to question if this is possible in a democratic and liberal society at large.

This study provided a snapshot account of the organic food consumption behaviours and intentions using a semi-structured questionnaire. Given some of the limitations of the questionnaire, it is clear that an in-depth interview will shed more light on the behaviours and intentions of individuals. Some insights into the behaviours, intentions and sustainability of the consumption of Johannesburg organic food consumers have been obtained. However, it is crucial to probe these further using qualitative methodological approaches such as the Theory of Planned Behaviour which is the idea that individuals make logical, reasoned decisions to engage in specific behaviours by evaluating the information available to them (Ajzen, 1991).

Behaviour is determined by the individual's intention. The theory of Planned Behaviour could be used to further interrogate the knowledge and the intentions hence helping to figure out possible reasons for the lack of sustainable consumption (Ryan & Carr, 2010). Probing people's rationales and behaviours is very important as it could change the status of them identifying as sustainable or not sustainable which was seen in the case of some behaviours such as being vegetarian were this behaviour could be deemed as being self-interested or pro-environmental depending on deeper probing into the intentions.

6.2.2. Analytical Framework

Redclift (2005) and Mebratu (1998) said that the criticism of the early definition of sustainable consumption was that it failed to define certain terms. It is grossly evident in this research study that defining someone's intentions as being sustainable or not sustainable can similarly be difficult. Intentions are based on many behavioural, social and economic aspects (Ryan & Carr, 2010; Di Guilio et al., 2014). While sustainable diets, through the behaviours mentioned by Auestad and Fulgoni (2015) can be quantified with regard to the effect the diets have on the earth; for example how meat curtailment or eating a plant-based diet can produce less carbon dioxide it is not easy to do so when it comes to peoples intentions.

As shown by the behaviour action gap that reveals that peoples intentions are not always clear and sometimes there is a gap between the intention and the behaviour (Sniehotta, 2005). Greater grasps into sustainable intentions need to be specified more clearly defined. In this study, the intention was classified as sustainable or unsustainable based on the guideline of the person mentioning something related to the environment however that could be misleading if not probed deeper.

Di Giulio's et al. (2014) framework merely serves as a concept of being able to judge sustainable consumption. There are a number of shortfalls evident in the conceptual framework. For instance, the framework does not account for the fact that there may be more than one rationale for the consumer's behaviour and therefore it would be difficult to prioritize rationales as motivating behaviour. While Di Giulio's framework helped in making reference to the ideas of what a sustainable consumer

sould act and think like it is important not to cluster people as if they are robots with having one layer of thinking or behaving capacity.

As Sneddon et al. (2006) said it is important not to settle for a vague definition and that in due time it would be necessary to have a concrete definition in order to shape policies and have cooperative action. The framework by Di Guilio (2014) is indicative of the vagueness of defining what is truly a sustainable intention and it does not take into consideration the problems with identifying what is considered an environmental intention in defining sustainable consumption.

In terms of quantifying the effects that behaviour would have on the earth, an intention is difficult to simply state as being sustainable or not sustainable. Sustainable consumption cannot only be bound to ecological rationales and impacts because there are some other important economic and social constructs, which need to be considered even if the earth must be considered as the most important aspect. There needs to be in-depth considerations of the behavioural aspects of consumption which are highly complex and multi-dimensional and thus as stated by Terlou & Hirsch (2011) need multidisciplinary approaches to solve these issues of sustainable consumption definition. This is something that Di Guilio's framework lacks and needs to further include these.

Education about environmental considerations is not only found in traditional education and so further probing of education with environmental considerations need to be strengthened. How do we educate consumers about the importance of being environmentally considerate over self-interest? Organic Markets could be the first place where this kind of education begins and guiding people in what it means to consume sustainably. This can be done by changing information provided at markets about organic food as well as changing their marketing strategies to stress environmental citizenship even more as seen in Seyfang's (2004) study. In this way, the idea of pro-environmental behaviours and environmental citizenship can spread to all prospective consumers. It is crucial for organic markets to begin the change in people's mindsets about organic food processes and consumption. This will aid in creating an organic food system that is altogether sustainable. These and other facilities such as transport systems that are more environmentally friendly,

subsidizing organic food labelling and having organic food labelling policies could also fast-track the change in organic food behaviours from what they currently stand now.

REFERENCE LIST

Ajzen, I. (1991). The theory of planned behaviour. Organizational Behaviour and *Human Decision Processes*, 50(2), 179-211

Altman, M., Hart, Tim. & Jacobs. P. (2009). Food Security In South Africa. *Human Science Research Council and the Center for poverty, employment and growth*. Retrieved from file:///Users/admin/Downloads/6274%20(2).pdf

Ana, S., Pinto, I., Ribeiro, D. and Delgado, J. (2014). Multicriteria Analysis For Evaluation Of Bike Lane Routes Integrated To Public Transportation. *Procedia - Social and Behavioural Sciences*, 162, 388 – 397

Ariffin, S.R., Asaria, S.M., Mohameda, S., Shahara, S.N., Ishaka, N.M., Dina, A.G., Yamata, H., Majida, R., Fatimah, S. & Yasina, S.F.M. (2010). Validity of UKM1 Intelligence Test using Rasch Analysis. *Procedia Social and Behavioural Sciences* 7(C), 205–209

Askew, K. (2018). *Youth Support for Organics Swell*. Retrieved from https://www.foodnavigator.com/Article/2018/01/18/Youth-support-for-organics-swells

Atkinson, A. (2016). Monitoring Global Poverty. *Report of the Commission on Global Poverty.* World Bank Group. Washington, DC. USA. Retrieved from https://openknowledge.worldbank.org/

Barrow, S. (2006). *South African Organic Market Study*. Epopa. Neitherlands

Bestbier, R.H. (2016). *Factors Influencing Trade Patterns of South Africa's Fresh Apple Exports, with a Focus on Non-Tariff Barriers*. (Unpublished Masters Thesis). Stellenbosch University, Stellenbosch

Blewit, J. (2012) *Understanding Sustainable Development*. London. Routledge

Blignaut, J.N., De Wit, M.P., Knot, J., Midgley, S., Crookes, D.J., Drimie, S. & Nkambule, N.P. 2014. Sustainable Agriculture: A Viable Option For Enhanced Food And Nutritional Security And A Sustainable Productive Resource Base In South Africa: An Investigation. Baseline Review. Prepared For The Development Bank Southern Africa. Pretoria: Asset Research.

Bond, T. & Fox, C. (2001). Applying the Rasch Model: Fundamental Measurement in the Human Sciences. Mahwah NJ: Lawrence Erlbaum Associates.

Boone, W. J. (2016). Rasch Analysis for Instrument Development: Why, When, and How? *CBE Life Sciences Education*, 15(4), 1-7

Boone, W.J., Staver, J.R. & Yale, M. S. (2014). *Rasch analysis in the Human Sciences*. New York; Springer

Bord Bia. (2014). *Organic Consumer Research Study. Paper presented at the dr, Food and the Marine*. Dublin, Ireland. Retrieved from https://www.bordbia.ie/industry/manufacturers/insight/publications/bbreports/Documents/Organic%20Consumer%20Research%20Study%202014%20Report.pdf

Bowling, A. (2005). Mode of questionnaire administration can have serious effects on data quality. *Journal of Public Health,* 27(3), 281–291

Bravo, C.P., Spiller, A. & Villalobos, P. (2012). Are Organic Growers Satisfied with the Certification System? A Causal Analysis of Farmers' Perceptions in Chile. *International Food and Agribusiness Management*, 15(4)

Campus, A. (1987). Marginal Economics. The New Palgrave: *A Dictionary of Economics*, 3, 323

Charter, M., Gray, C., Clark, T. (2008). *Review: the role of business in realising sustainable consumption and production.* In Tukker, A., Charter, M., Vezzoli, C., Sto, E., E. and Munch Anderson, (eds.) System Innovation for Sustainability: Perspectives of radical changes to sustainable consumption and production, Chapter 3, 46-69. Sheffield, United Kingdom: Greenleaf Publishing

Claasen, N., van der Hoeven, M., and Covic, N. (2016). *Food Environments, Health And Nutrition In South Africa, Working Paper 34*. Cape Town: PLAAS, UWC and Centre of Excellence on Food Security

Cotstanza, R. (1989). What Is Ecological Economics? *Ecological Economics*. 1, 1-7

Cotstanza, R. & Daly, H.E. (1992). Natural Capital and Sustainable Development. *Conservation Biology*, 6(1), 37-46

Connor, D.J. (2013). Organically grown crops do not a cropping system make nor can organic agriculture nearly feed the world. Field Crops Research, 144(20), 145-147

Crinnion, W.J. (2010). Organic foods contain a higher level of certain
Cronbach, Lee J.; Meehl, Paul E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52 (4), 281–302

Dauvergne, P. (2010). The Problem of Consumption. *Global Environmental Politics*, 10(2), 1-10

Di Giulio. A., Fischer. D., Schäfer, M. & Blättel-Mink, M. (2014). Conceptualizing Sustainable Consumption: Toward An Integrative Framework. *Sustainability: Science, Practice, & Policy*, 10, 1

Dobson A. (2000) *Ecological Citizenship: a Disruptive Influence*?. In: Pierson C., Tormey S. (eds) Politics at the Edge. Political Studies Association Yearbook Series. Palgrave Macmillan, London

Dodds, R., Holmes, M., Arunsopha, V., Chin, N., Le, T., Maung, S. and Shum, M. (2013). Consumer Choice and Farmers' Markets. Journal of Agriculture *Environment Ethics*, 27, 297-416.

Drexhage, J. and Murphy, D. (2010). *Sustainable Development: From Brundtland to Rio 2012: Background Paper prepared for consideration by the High-Level Panel on Global Sustainability at its first meeting, 19 September 2010*. Retrieved from http://www.un.org/wcm/webdav/site/climatechange/shared/gsp/docs/GSP1-6_Background%20on%20Sustainable%20Devt.pdf

Ekins, P., Simon, S., Deutsch, L., Folke, C. & De Groot. (2003). A framework for the practical application of the concepts of critical natural capital and strong sustainability. *Ecological Economics*, 44, 165-185

El Serafy, S. (1991), "The environment as capital " in: Costanza, R. (ed.) *Ecological Economics*, Columbia University Press, New York.

Engel, W.E. (2008). *Determinants of consumer willingness to pay for organic food in South Africa*. (Unpublished Masters Thesis). University of Pretoria, Pretoria

Erickson. P.E. (2007). *Conceptualizing food systems for global environmental change research. Environmental Change Institute*, Oxford University Centre for the Environment

Escribano, A.J. (2016). Organic Livestock Farming- Challenges, Perspectives, and Strategies to Increase Its Contribution to the Afrifood systems Sustainability- A Review. In Organic Farming- A Promising Way of Food Production

Etikan, I., Abubakar, S., Rukayya, M. & Alkassim, S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4

FAO, IFAD & WFP. (2015). *The State of Food Insecurity in the World*. Meeting the 2015 international hunger targets: taking stock of uneven progress. Rome, FAO

FAU & UN. (2003). *Chapter 2. Food security: concepts and measurement taken from Edward Clay of the Overseas Development Institute*, London, UK, for the FAO Expert Consultation on Trade and Food Security: Conceptualizing the Linkages, Rome,

Fischer, J., Batáry, P., Bawa, K.S., Brussaard, L., Chappell, M.J., Clough, Y.,…& Klein, A. (2011). Conservation: limits of land sparing. Science, 334(6056), 52-76

Frayne, B., Pendleton, W., Crush, J., Acquah, B., Battersby-Lennard, J., Bras, E.,…Zanamwe, L. (2010). *The State of Urban Food Insecurity in Southern Africa. Urban Food Security Series No. 2. Queen's University and AFSUN*. Kingston and Cape Town.

Gatersleben, B., Murtagh, N. & Abrahamse, W. (2014). Values, identity and pro-environmental behavior. *Contemporary Social Science*, 9(4), 374-392

Gillepsie, J. and Nehring, R. (2012). *The Economics of Organic Versus Conventional Cow-calf Production.* Southern Agricultural Economics Association (SAEA) 2012 Annual Meeting, February, Birmingham, Alabama

Gomiero, T., Pimentel, D. & Paoletti, M. G. (2011). Environmental impact of different agricultural management practices: conventional vs. organic agriculture. *Critical Review Plant Sci*ence 30, 95–124

Grunet, K.G., Hieke, S. and Willis, J. (2014). Sustainability labels on food products: Consumer motivation, understanding and use. *Food Policy*, 44, 177–189

Guest, G., Bunce, A., and Johnson, L. (2006) How many interviews are enough? : An experiment with data saturation and variability. *Field Methods*, 18, 59-82.

Gustafson, J.E. (1980) Testing and obtaining fit of data to the Rasch model. British *Journal of Mathematical and Statistical Psychology*, 33, 220

Hall, C.M. & Sharples, L. (2008). *Food and Wine Festivals and events around the world.* Oxford: Butterworth-Heinemann

Harris, C. (2017). *Social policies work best if they're bespoke solutions to local problems.* The Conversation. Retrieved from https://theconversation.com/social-policies-work-best-if-theyre-bespoke-solutions-to-local-problems-78539

Hart,K., Laville, J. and Cattani, A. (2010). *The Human Economy*. London: Polity

Heiskanen, E. & Pantzar, M. (1997). Toward sustainable consumption: Two new perspectives. *Journal of Industrial Ecology*, 9(1-2), 85-98

Henderson, H. & Ikeda, D. (2004). *Planetary Citizenship: Your values, Beliefs and Actions Can Shape a Sustainable world*. Santa Monica CA: Middleway

Hitge, G. and Vanderschuren, M. (2016). Comparison of travel time between private car and public transport in Cape Town. *Journal of South African Institute of Civil Engineering,* 57(3), 35 – 43

Holm, J., Pederson, L.M.B. & Sorensen, S. (2013). Experiencing organic farms and food by regional tourism innovation. *Soil and Plant Science*, 63(1), 85-93.

Hopwood, B, Mellor, M and O'Brien, G (2005) Sustainable Development: Mapping Different Approaches. *Sustainable Development*, 13(1), 38-52.

Husain, A. 2003. Integrated Power of desalination plants. In D. Al Gobaisi, Systems Sustainability (pp.549-597). Oxford, UK: Eoslss Publishers

Ingram, J., Ericksen, P.J. & Liverman, D. (2012). *Food Security and The Global Environmental Change*. Earthscan Publications. New York

International Institute for Sustainable Development (IISD). (1994). *Oslo Roundtable of Sustainable Production and Consumption.* Retrieved from http://www.iisd.ca/consume/oslo004.html

Kisaka-Lwayo, M. and Obi, A. (2015). *Analysis of Production and Consumption of Organic Products in South Africa, Organic Agriculture Towards Sustainability. Retrieved* from http://www.intechopen.com/books/organic-agriculture-towards-sustainability/analysis-of-production-and-consumption-of-organic-products-in-south-africa

Kisaka-Lwayo, M. and Obi, A. (2013). *Consumer Preference And Consumption Of Organic Products In The Eastern Cape Province Of South Africa*. (Unpublished Masters Thesis). University Of Fort Hare, East London, South Africa

Kracht, U and Schulz, M. (1999). *Food Security and Nutrition The Global Challenge*. New York: St Martin's Press

Kremen, C. (2015). Reframing the land-sparing/land-sharing debate for biodiversity conservation. *Annals of the New York Academy of Sciences*, 1355(1), 52-76

Kremen, C. & Miles, (2012). A. Ecosystem services in biologically diversified versus conventional farming systems: benefits, externalities, and trade-offs. *Ecological Society,* 17, 40

Kuepper, G. 2010. *A Brief Overview of the History and Philosophy of Organic Agriculture*. Kerr Center for Sustainable Agriculture, Poteau, Oklahoma

Kuhnlein, H. V., & Receveur, O. (1996). *Dietary change and traditional food systems of indigenous peoples*. Centre for Nutrition and the Environment of Indigenous Peoples, and School of Dietetics and Human Nutrition, McGill University, Quebec, Canada

Kumar, S., Kumar, N. & Vivekadish, S. (2016) Millenium Development Goals (MDGs) to Sustainable Development Goals (SDGs). Addressing unfinished Agenda and strengthening Sustainable Development and Partnership. *Indian Journal of Community Medicine,* 41 (1) 1-4

Lawrence, G. (2017). Re-evaluating food systems and food security: a global perspective. *Journal of Sociology*, 53, 4, 774-796

Lee, K. S., Choe, Y. C. & Park, S. H. (2015). Measuring the environmental effects of organic farming: a meta-analysis of structural variables in empirical research.organic farming: a meta-analysis of structural variables in empirical research. *Journal of Environmental Management*. 162, 263–274

Lele, S.M. (1991). Sustainable development: a critical review. *World development*, 19(6), 607-621

Lim Tung, O.J . (2016). Organic Food Certification in South Africa: A Private Sector Mechanism in Need of State Regulation? *PER / PELJ*, 19, 1-48

Liu, W., Oosterveer, P. and Spaargaren, G. (2015). Promoting sustainable consumption in China: a conceptual framework and research review. *Journal of Cleaner Production*, 1-9

Lotter, D., Seidel, R. & Liebhardt, W. (2013). The performance of organic and conventional cropping systems in an extreme climate year. *American Journal of Alternative Agriculture,* 18, 146–154

Lyons, K. (2007). *Supermarkets as organic retailers and impacts for the Australian organic sector.* Burch, D. & Lawrence, G., Supermarkets and agri-food supply chains: transformations in the production and consumption of foods. United Kingdom, Cheltenham: Edgar Elgar

Makhura, S. & Kinyeki, S. (2014*). Case Study: The Life of a Sustainable Subsistence Farmer in An Informal Settlement* (Published Thesis). University of Cape Town, Cape Town. Retrieved from http://www.knowledgeco-op.uct.ac.za/sites/default/files/image_tool/images/155/176_research%20paper_Gugulethu%20farmer.pdf

Matthews, B.A., Baker, F. and Spillers, R.L. (2003). How True Is True? Assessing Socially Desirable Response Bias. *Quality & Quantity*, 37, 327–335

McCarthy, B., Hong-Bo, L. and Chen, T., (2015) Trends in Organic and Green Food Consumption in China: Opportunities and Challenges for Regional Australian Exporters. *Journal of Economic and Social Policy*, 17(1), 1-24

McCracken, G. (1989). Culture and Consumption: A Theoretical Account of the Structure and Movement of the Cultural Meaning of Consumer Goods. *Journal of Consumer Research,* 13(1), 71-84

Mebratu, D. (1998). Sustainability And Sustainable Development: Historical And Conceptual Review. *Environmental impact assessment review,* 18(6), 493-520

Mhlophe, B. (2015). *Antecedents of Consumer Purchase Intentions towards Organic Food Produces: A Case Study of the Johannesburg Municipality* (Unpublished Masters Thesis), University of The Witwatersrand, Johannesburg, South Africa

Moir, S & Carter, K. (2012). *Diagrammatic Representations of Sustainability – a Review and Synthesis.* in SD Smith (ed.), Proceedings 28th Annual ARCOM (Association of Researchers in Construction Management) Conference, Edinburgh, UK.

Mushkin, S., Garfeild, D., Vitaro, R., Cullinane, B., Wrede, T., Otway, M. & Schater, M. (2012). Teouble in Isle 5. *Equity Analyst*, 212, 708-2628

Musila, M. (2007). *United States of Africa Positioning the Pan-African Parliament and Court in the political union debate*. Paper 142 Institute for Security Studies. Retrieved from https://www.files.ethz.ch/isn/98930/PAPER142H.pdf

Naicker, S. & Jayne, M.R. (2017). Urban Food Markets: A New Leisure Phenomenon in South Africa. *African Journal of Hospitality, Tourism and Leisure*, 6 (3), 1-17

National Youth Policy. (2015). National Youth Policy 2015 – 2020. Retrived from file:///Users/admin/Downloads/NYP%20Policy%202020%20Report.pdf

Neumayer, E. (2003). *Weak versus strong sustainability: exploring the limits of two opposing paradigms* (2nd edition). Cheltenham, UK: Edward Elgar

Ngobo, P.V. (2011). What Drives Household Choice of Organic Products in Grocery Stores? *Journal of Retailing*, 87(1), 90-100

Nilsen, H.R. (2010). *From Weak to Strong Sustainable Development. An analysis of Norwegian economic policy tools in mitigating climate change*. (Unpublished Doctoral dissertation). University of Noordland, Norway

Oroian, C.F., Safirescu, C.O, Harun, R., Chiciudean, G.O., Arion, F.H., Muresan, I.C. and Bordeanu, B.M. Consumers' Attitudes towards Organic Products and Sustainable Development: A Case Study of Romania. *Sustainability*, (9), 1-14

Oths, K.S.. Manzella, F.J., Sheldon, B. & Katy M. Groves (2016) Who Will Be Served? Farmers Market Variability and the Expectations of Young Adults. *Human Organization*, 75(4), 346-357

Peters, B.G. (2017). What is so wicked about wicked problems? A conceptual analysis and a research program. *Policy and Society*, 36:3, 385-396

Petje, F.K. (2013). *Assessing Consumers' Willingness To Pay Premium Prices For Organic Food At The Bryanston Organic And Natural Market*. (Unpublished Master's Thesis). Tshwane University Of Technology, Pretoria, South Africa

Petrescu, C. and Petrescu-Mag, R.M. (2015). Organic Food Perception: Fad, or Healthy and Environmentally Friendly? A Case on Romanian Consumers. *Sustainability*, 7, 12017-12031

Peyton, S., Moseley, W. Battersby-Lennard, J. (2015). Implications of supermarket expansion on urban food security in Cape Town, South Africa. African Geographical Review, 34:1, 36-54

Ponisio, L. C., M'Gonigle, L. K., Mace, K. C., Palomino, J., de Valpine, P., & Kremen, C. (2015). Diversification practices reduce organic to conventional yield gap. *Proceedings of the Royal Society B: Biological Sciences*, 282(1799)

Power, K. 2010. Introducing behavior changes towards sustainable food consumption. Available: http://www.scp-knowledge.eu/sites/default/files/Power%202010%20Introducing%20behaviour%20changes%20towards%20sustainable%20food%20consumption.pdf [Accessed 3 April 2016

Pretty, J. N., Ball, A. S., Lang, T. & Morison, J. I. L. (2005). Farm costs and food miles: an assessment of the full cost of the UK weekly food basket. *Food Policy*, 30, 1–19

Prihtanti, T. M., Hardyastuti, S., Hartono, S. & Irham (2014). Social-cultural functions of rice farming systems. *Asian Journal of Agricultural Rural Development*, 4, 341–351

Ractliffe, T. (2015). *Environmental Concern, Knowledge, and the Enactment of Environmental Citizenship in a Retail Food Environment: An Investigation into the Perceptions and Behaviours of Cape Town Consumers*. (Unpublished Masters thesis). University of Cape Town, Cape Town

Rebitzer G., Ekvallb T., Frischknechtc R., Hunkelerd D., Norrise G., Rydbergf T., Schmidtg W.-P., Suhh S., Weidemai B.P & Pennington D.W. (2004). Life cycle assessment: Part 1: Framework, goal and scope definition, inventory analysis, and applications. *Environment International*, 30(5) 701–720

Redclift, M. (2005). Sustainable development (1987-2005): an oxymoron comes of the age. *Sustainable Development*, 13(4), 212-227

Reganold, J.P. and Watcher, J.M. (2016). Organic Agriculture in the 21st Century. *Nature Plants*. 2(2)

Reisch, L., Eberle, U. and Lorek, S. (2013). Sustainable food consumption: an overview of contemporary issues and policies. Sustainability: *Science, Practice, & Policy,* 9(2)

Rosen, M. A., & Kishawy, H. A. (2012). Sustainable manufacturing and design:Concepts, practices and needs. *Sustainability*, 4(2), 154–174.

Rosenthal, R., and Rosnow, R.L. (1991). *Essentials of Behavioural Research: Methods and data analysis* (Vol.2). New York: McGraw-Hill

Roy, D., Verplanken, B. and Griffin, C. (2015). Making Sense of Sustainability: Exploring the Subjective Meaning of Sustainable Consumption. *Applied Environmental Education & Communication*, 14, 187–195

Ryan, S. & Carr, A. (2010). Applying the biopsychosocial model to the management of rheumatic disease. *Evidence-Based Practice for Physiotherapists and Occupational Therapists*, 63-75

Schnitkey, G. D., & Miranda, M. (1993). The impact of pollution controls on livestock crop producer. *Journal of Agricultural and Resource Economic*, 18 (1), 25-36

Schumilas, T. (2011). An Exploration of the Local & Organic Food System in Perth-Waterloo-Wellington. Retrieved from

https://www.cog.ca/pww/documents/PWWLocalOrganicFoodSystem_ExplorationReport.pdf

Scialabba, H. E. and Hattam. C. (2002). *Organic agriculture, environment and food security.* Retrieved from www.fao.org/docrep/005/y4137e/y4137e00.htm

Scott, B.R. (2011). *Capitalism*. Chapter 2 The concept of capitalism. Publisher Springer New York

Seyfang, G. (2006) Ecological citizenship and sustainable consumption: Examining local organic food networks. *Journal of Rural Studies*, 22, 383–395

Seyfang, G. (2007). Growing Sustainable Consumption Communities: The Case of Local Organic Food Networks. *International Journal of Sociology and Social Policy* 27(3/4), 120-134

Seyfang, G. (2004). *Local Organic Food: The Social Implications Of Sustainable Consumption.* Economic And Social Research Council. University Of East Anglia, Norwich

Sick, J. (2011). Rasch Measurement Rasch Measurement and Factor Analysis. *SHIKEN: JALT Testing & Evaluation SIG Newsletter*, 15(1), 15-17

Siddique, S., Hamid, M., Tariq, A. & Kazi, A. (2014). *Organic Farming: The Return to Nature.* Improvement of Crops in the Era of Climatic Changes. New York: Springer

Silkes, C.A. (2012). Farmers' Markets: A Case for Culinary Tourism. *Journal of Culinary Science and Technology,* 10(4), 326-336

Simonne, A., Ozores-Hampton, M., Treadwell, D. and House, L. (2016). Organic and Conventional Produce in the U.S.: Examining Safety and Quality Economic Values, and Consumer Attitudes. *Horticultura*e. 2 (5) 1- 5

Smith, S. & Paladino. A. (2010). Eating clean and green? Investigating consumer motivations towards the purchase of organic food. *Australasian Marketing Journal (AMJ)*, 18(2), 93-104

Sneddon, C., Howard, R. and Norgaard, R.B. (2006). Sustainable Development in a post-Brundtland world. *Ecological economics*, 57(2), 253-268

Soil Association Organic. (2016). *Soil Association organic standards food and drink.* Retrieved from https://www.soilassociation.org/media/7207/food-and-drink-v17-5-august-2016.pdf

Statistics South Africa. (2017). *Victims of Crime. Statistics South Africa*. Pretoria: StatsSA

Sustainable Aotearoa New Zealand Inc (SANZ). (2009). *Strong Sustainability For New Zealand*. New Zealand : Nakedize Publications.

Thøgerson, J. (2010). Country Differences in Sustainable consumption: The case of Organic Food. *Journal of Macromarketing,* 30 (1), 171 – 184

United Nations (UN) (1987). *Our Common Future. Report of the World Commission on Environment and Development* (WCED). New York: United Nations. Retrieved from http://www.un- documents.net/wced-ocf.htm

United Nations Environment Programme (UNEP). (2016). *Trade in Certified Organic Agriculture – Challenges and Opportunities for South Africa*. Geneva: UNEP.

van Opheusden, A.H.M. &. van der Burgt , G.J.H.M. (2012*). Decomposition rate of organic fertilizers: effect on yield, nitrogen* availability and nitrogen stock in the soil. Louis Bolk Institute. Retrieved from http://www.louisbolk.org/downloads/2666.pdf

Vittersø, G. and Tangeland, T. (2015). The role of consumers in transitions towards sustainable food consumption. The case of organic food in Norway. *Journal of Cleaner Production*, 92, 91-99

Willer, H. and Lernoud, J. (2014). *The World of Organic Agriculture. Statistics and Emerging Trends 2014. International Federation of Organic Agriculture Movements and Research Institute of Organic Agriculture*. Retrieved from www.fibl.org/fileadmin/documents/shop/1636-organic-world-2014.pdf.

Winsteps. (2018). Table 10.1 *Item statistics in misfit order*. Retrieved from https://www.winsteps.com/winman/table10_1.htm

Wright, B.D. (1997). A history of social science measurement. *Educational Measurement: Issues and Practice*, 16(4), 33–45.

Zhai, F., Wang, H., Du, S., He, Y., Wang, Z., Ge, K. and Popkin, B. M. (2009) Prospective study on nutrition transition in China. *Nutrients Revolution*, 67

APPENDICES

APPENDIX 1: The Survey Administered

Organic food systems and sustainable consumption behaviour in Johannesburg, South Africa

The purpose of this study investigate the intentions and choices organic food consumers make when buying and eating organic food.

Section 1: Consumer information

1. Age group

☐ 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56+

2. Gender

☐ Male ☐ Female

3. Highest level of education achieved

☐ Post Graduate Degree ☐ Degree ☐ Diploma/Certificate ☐ Matric ☐ Primary

4. Which residential area do you live in?

_____

Section 2: The market and your consumption of organic food

5. Do you buy organic food at this market?

☐ Yes ☐ No

6. How long have you been buying from this market?

☐ 0-6 months ☐ 7-12 months ☐ 1-2 years ☐ 3-4 years ☐ 5+ years

7. How often do you come to this market to buy organic food

☐ Never ☐ Daily ☐ Weekly ☐ Fortnightly ☐ Monthly ☐ Other*

*If other please specify

_____

8. Do you buy organic food from conventional supermarkets (e.g. Woolworths, Pick n Pay etc.)?

☐ Yes ☐ No

If yes, please give your reasons.

_____

9. How far do you travel to do your organic food shopping at this market?

☐ 0-5 km ☐ 6-12 km ☐ 13-18 km ☐ 19- 24 km ☐ Over 25km

10. What mode of transport do you use to get to this market?

☐ Public transport ☐ Bicycle ☐ Walking ☐ Private Car ☐ Other*

*If other please specify: _____

11. Why do you choose this mode of transport?

_____

12. How frequently do you eat organic food?

☐ Never ☐ Daily ☐ Weekly ☐ Fortnightly ☐ Monthly ☐ Other*

*If other please specify

_____

13. Indicate (✓) which of the following are most likely to be reasons influencing how often you eat organic food.

I only need a few organic food products

Organic food is inaccessible

Organic food is healthy

Organic food is good for the air/soil/water (environment)

I buy what I can afford

14. Indicate (✓) the major organic foods that you buy and eat (consume).

☐ Fresh produce (fruit and veg) ☐ Dairy products ☐ Meat ☐ Cooked food ☐ Processed/canned/dried food

15. Please provide reasons for your choice of preferred organic food/s ticked in question 14.

_____

_____

_____

Please place a tick in the applicable box to specify your position on the following statements.

	Strongly agree	Agree	Not Sure	Disagree	Strongly disagree
16. I like consuming organic food.					
17. I completely cut out (exclude) meat in my diet/meals.					
18. Meat is an important part of my diet/meals.					
19. I only eat plant-based organic foods.					
20. I eat plant-based foods because they are healthy.					
21. I only consume plant-based organic foods because they have less impact on the environment than animal-based food.					
22. I consider the distance that food has traveled to reach me.					
23. I choose to eat locally produced organic foods because I trust the local organic food producers.					
24. I like eating locally produced food because the price is affordable.					
25. I like preserving local farming traditions.					
26. I buy and consume locally produced food because money remains in the local economy.					
27. I like eating food with low transportation carbon footprints.					
28. I like eating seasonal organic food.					
29. I buy seasonal organic food because is cheaper.					
30. I like eating non-seasonal organic food.					
31. I eat organic food so that I can avoid consuming pesticides.					
32. I buy and eat organic food to support local farmers.					
33. I eat organic food because it is fresher than conventionally grown food					
34. I like eating locally produced food but variety of local food is limited.					
35. I buy and eat what I want irrespective of whether is local or imported organic food.					
36. It does not matter where the food is from as long it is organically grown.					
37. I support imported organic food because I have more variety to choose from.					
38. I eat organic food because I believe that I play a part in reducing carbon emissions.					
39. I believe that organic farming is good for the environment.					
40. The organic food I buy and eat is packaged in an environmentally friendly way.					

APPENDIX 2: Fit Statistics Before Item Removal

Item Misfit before removal of item 3 and 23. These two items did not fit the Infit/Outfit MNSQ nor the PTMEASURE. i.e Model Fit lacking.

item STATISTICS: MISFIT ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PTMEASUR-AL CORR.	PTMEASUR-AL EXP.	EXACT MATCH OBS%	EXACT MATCH EXP%	DISPLACE	item
3	33	59	34.26	1.51	1.34	1.4	1.62	2.2	A-.14	.21	28.8	45.7	.04	03 Avoid Pesticides
23	123	61	47.24	.94	1.55	3.4	1.54	3.4	B .42	.28	8.2	26.9	.00	23 Cut Meat
24	120	60	47.15	.95	1.31	2.0	1.31	2.0	C .57	.28	6.7	26.9	.00	24 Meat Important
14	182	60	54.73	1.14	1.14	.8	1.27	1.4	D .07	.22	33.3	38.4	-.03	14 Preserving traditions
20	123	61	47.24	.94	1.15	1.1	1.18	1.3	E .14	.28	24.6	26.9	.00	20 Only Plant
2	52	60	38.38	1.22	1.14	.7	1.08	.4	F .06	.25	33.3	39.0	.03	02 Fresher
13	112	61	46.06	.95	1.07	.6	1.08	.6	G .04	.28	29.5	28.5	.00	13 Local Price
9	93	61	43.94	.98	1.05	.4	1.07	.5	H .04	.28	27.9	32.5	.01	09 Seasonal Cheaper
4	187	59	55.99	1.23	1.01	.1	1.03	.2	I .26	.21	32.2	39.2	-.03	04 Support Local Farmers
5	115	60	46.62	.95	1.03	.2	1.03	.3	J .51	.28	18.3	27.0	.00	05 Aslong organic
12	75	61	41.72	1.05	1.00	.1	1.02	.2	K .12	.27	36.1	38.6	.02	12 Trust Local
21	45	60	36.97	1.31	.96	-.1	.95	-.1	L-.10	.23	43.3	38.3	.03	21 Plant Healthy
22	157	60	51.25	1.01	.96	-.2	.95	-.2	l .38	.26	36.7	33.4	-.02	22 Plant environment
15	60	61	39.55	1.15	.93	-.3	.92	-.3	k-.07	.26	39.3	39.2	.02	15 Money Economy
17	58	60	39.38	1.17	.90	-.4	.93	-.3	j .17	.26	40.0	39.1	.02	17 Local Variety
10	120	58	47.54	.97	.91	-.6	.90	-.7	i .41	.28	29.3	27.0	.00	10 Non Seasonal
18	115	59	46.79	.96	.91	-.6	.91	-.6	h .48	.28	22.0	26.8	.00	18 Local or imported
11	144	58	50.40	1.00	.88	-.8	.90	-.6	g .22	.27	36.2	31.0	-.01	11 Consider distance
19	109	61	45.73	.95	.78	-1.6	.78	-1.6	f .42	.29	34.4	29.7	.00	19 More variety
7	210	61	59.57	1.46	.74	-1.1	.70	-1.3	e .37	.17	50.8	45.9	-.04	07 Good Environment
1	223	61	63.74	1.85	.73	-1.0	.70	-1.1	d .29	.14	65.6	70.4	-.05	01 Like Consuming
8	204	60	58.93	1.42	.62	-1.8	.63	-1.7	c .26	.18	53.3	43.3	-.04	08 Seasonal Food
16	190	61	55.49	1.18	.60	-2.3	.61	-2.2	b .35	.21	44.3	39.4	-.03	16 CO2 footprint
6	189	59	56.41	1.26	.53	-2.7	.55	-2.4	a .38	.20	50.8	39.5	-.03	06 Reducing CO2
MEAN	126.6	60.1	48.13	1.15	.97	-.1	.99	.0			34.4	36.3	.00	
P.SD	55.1	1.0	7.56	.23	.24	1.3	.26	1.4			13.2	9.4	.02	

TABLE 3.1 'Attitudes towards consumption of orga ZOU869WS.TXT Aug 29 2017 23:48
INPUT: 61 person 24 item REPORTED: 61 person 24 item 5 CATS MINISTEP 3.92.1

SUMMARY OF 61 MEASURED person

	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	49.8	23.6	47.00	1.75	1.00	-.1	.99	-.1
P.SD	6.3	.8	2.20	.04	.40	1.4	.44	1.3
S.SD	6.3	.8	2.22	.04	.40	1.4	.44	1.3
MAX.	71.0	24.0	51.58	1.92	2.12	3.2	2.78	4.2
MIN.	36.0	20.0	39.21	1.72	.39	-2.9	.41	-2.4

REAL RMSE	1.88	TRUE SD	1.15	SEPARATION	.61	person RELIABILITY .27
MODEL RMSE	1.75	TRUE SD	1.34	SEPARATION	.76	person RELIABILITY .37
S.E. OF person MEAN = .28						

person RAW SCORE-TO-MEASURE CORRELATION = -.96
CRONBACH ALPHA (KR-20) person RAW SCORE "TEST" RELIABILITY = .39 SEM = 4.93

SUMMARY OF 24 MEASURED item

	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	126.6	60.1	48.13	1.15	.97	-.1	.99	.0
P.SD	55.1	1.0	7.56	.23	.24	1.3	.26	1.4
S.SD	56.3	1.0	7.72	.23	.24	1.4	.27	1.4
MAX.	223.0	61.0	63.74	1.85	1.55	3.4	1.62	3.4
MIN.	33.0	58.0	34.26	.94	.53	-2.7	.55	-2.4

REAL RMSE	1.21	TRUE SD	7.46	SEPARATION	6.17	item RELIABILITY .97
MODEL RMSE	1.17	TRUE SD	7.47	SEPARATION	6.38	item RELIABILITY .98
S.E. OF item MEAN = 1.58						

item RAW SCORE-TO-MEASURE CORRELATION = 1.00
Global statistics: please see Table 44.
UMEAN=48.1288 USCALE=-8.3419

APPENDIX 3: Summary Statistics Of Person And Item Measures

SUMMARY OF 61 MEASURED person

	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	47.3	21.7	49.98	1.87	1.01	-.1	.97	-.1
P.SD	6.0	.7	2.38	.05	.41	1.4	.39	1.2
S.SD	6.0	.7	2.40	.05	.41	1.4	.39	1.2
MAX.	66.0	22.0	57.86	2.06	2.18	3.2	2.20	2.9
MIN.	33.0	19.0	43.72	1.84	.39	-2.7	.42	-2.3

REAL RMSE	2.02	TRUE SD	1.25	SEPARATION	.62	person RELIABILITY .28
MODEL RMSE	1.87	TRUE SD	1.47	SEPARATION	.78	person RELIABILITY .38
S.E. OF person MEAN = .31						

person RAW SCORE-TO-MEASURE CORRELATION = .96
CRONBACH ALPHA (KR-20) person RAW SCORE "TEST" RELIABILITY = .40 SEM = 4.62

SUMMARY OF 22 MEASURED item

	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	131.0	60.1	48.13	1.17	.97	-.1	.97	-.1
P.SD	53.8	.9	7.69	.22	.22	1.3	.23	1.3
S.SD	55.1	1.0	7.87	.23	.23	1.3	.24	1.3
MAX.	223.0	61.0	60.55	1.88	1.48	3.0	1.48	3.0
MIN.	45.0	58.0	32.40	.97	.54	-2.6	.56	-2.4

REAL RMSE	1.22	TRUE SD	7.59	SEPARATION	6.22	item RELIABILITY .97
MODEL RMSE	1.19	TRUE SD	7.60	SEPARATION	6.38	item RELIABILITY .98
S.E. OF item MEAN = 1.68						

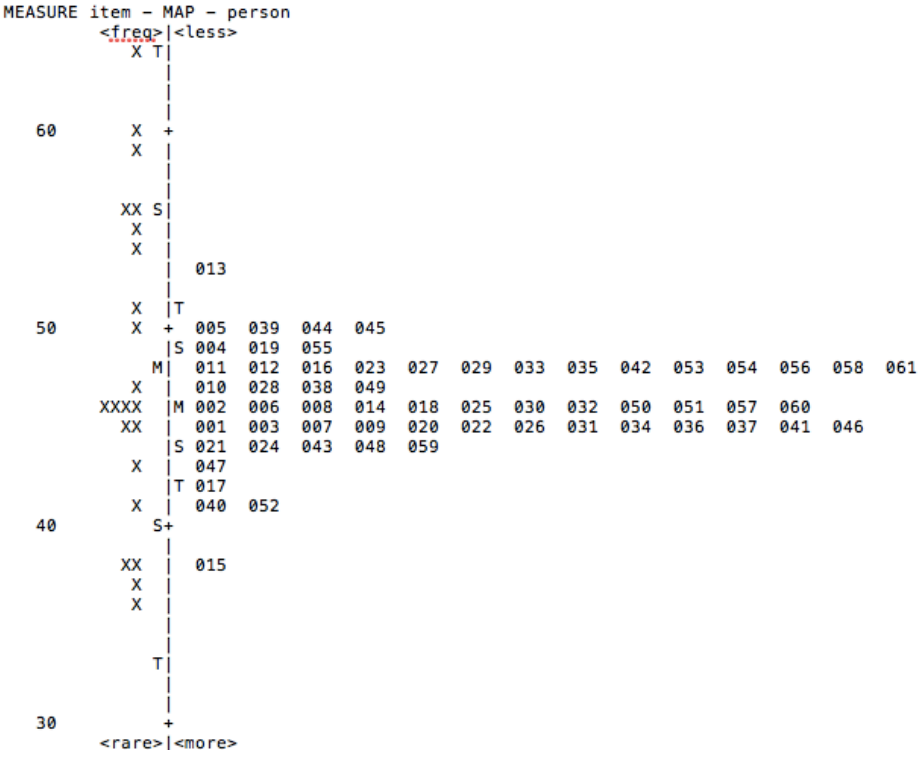
item RAW SCORE-TO-MEASURE CORRELATION = -1.00
Global statistics: please see Table 44.
UMEAN=48.1288 USCALE=8.3419

APPENDIX 4: Rankings Of Highest And Lowest Person Measures

person STATISTICS: MEASURE ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PTMEASUR-AL CORR.	PTMEASUR-AL EXP.	EXACT MATCH OBS%	EXACT MATCH EXP%	person
15	66	22	57.86	2.06	1.15	.6	.92	-.1	.67	.59	59.1	47.9	015
52	61	22	55.46	1.95	1.11	.5	1.03	.2	.60	.62	45.5	45.0	052
40	60	22	55.01	1.93	1.81	2.3	2.20	2.8	.48	.63	31.8	44.5	040
17	58	22	54.12	1.90	1.24	.9	1.20	.7	.73	.64	36.4	41.7	017
47	55	22	52.84	1.87	1.53	1.7	1.30	1.0	.74	.66	18.2	38.1	047
24	51	21	52.34	1.91	1.05	.3	.97	.0	.55	.67	38.1	38.1	024
43	51	21	52.14	1.92	1.31	1.1	1.15	.5	.83	.68	19.0	39.3	043
21	53	22	52.01	1.86	.82	-.6	.89	-.3	.44	.67	22.7	38.8	021
59	53	22	52.01	1.86	.64	-1.3	.73	-.9	.56	.67	50.0	38.8	059
48	47	19	51.84	2.03	.67	-1.1	.62	-1.2	.79	.68	47.4	39.9	048
31	50	21	51.66	1.91	1.25	.9	1.07	.3	.75	.68	42.9	39.3	031
7	52	22	51.59	1.85	1.09	.4	.99	.1	.82	.67	31.8	38.8	007
9	52	22	51.59	1.85	.76	-.8	.70	-1.0	.66	.67	40.9	38.8	009
37	52	22	51.59	1.85	.72	-1.0	.69	-1.0	.88	.67	36.4	38.8	037
41	52	22	51.59	1.85	1.81	2.4	1.67	1.9	.61	.67	27.3	38.8	041
36	48	21	51.26	1.88	.92	-.2	.89	-.2	.75	.67	28.6	37.5	036
3	51	22	51.18	1.85	1.12	.5	1.03	.2	.78	.67	22.7	37.6	003
20	51	22	51.18	1.85	1.37	1.3	1.28	.9	.45	.67	45.5	37.6	020
22	51	22	51.18	1.85	.98	.0	.82	-.5	.65	.67	50.0	37.6	022
46	51	22	51.18	1.85	1.08	.4	1.00	.1	.72	.67	27.3	37.6	046
26	48	21	51.04	1.90	.54	-1.8	.54	-1.6	.86	.68	52.4	37.6	026
1	50	22	50.77	1.84	.81	-.6	.81	-.6	.79	.68	36.4	37.6	001
34	50	22	50.77	1.84	.64	-1.4	.60	-1.4	.82	.68	40.9	37.6	034
6	49	22	50.37	1.84	.47	-2.3	.49	-2.0	.75	.68	45.5	36.4	006
8	49	22	50.37	1.84	.92	-.2	.87	-.3	.84	.68	22.7	36.4	008
25	49	22	50.37	1.84	.70	-1.1	.67	-1.1	.81	.68	40.9	36.4	025
30	49	22	50.37	1.84	1.86	2.5	1.53	1.6	.40	.68	50.0	36.4	030
32	49	22	50.37	1.84	1.02	.2	1.06	.3	.68	.68	22.7	36.4	032
50	49	22	50.37	1.84	.39	-2.7	.45	-2.2	.77	.68	72.7	36.4	050
60	49	22	50.37	1.84	.49	-2.1	.60	-1.4	.66	.68	63.6	36.4	060
57	44	20	50.11	1.90	.58	-1.6	.57	-1.5	.87	.66	35.0	36.1	057
2	48	22	49.96	1.84	.59	-1.6	.66	-1.2	.73	.68	45.5	36.3	002
14	48	22	49.96	1.84	.88	-.3	.85	-.4	.88	.68	27.3	36.3	014
18	48	22	49.96	1.84	.95	-.1	.92	-.2	.87	.68	9.1	36.3	018
51	48	22	49.96	1.84	1.06	.3	1.05	.3	.47	.68	45.5	36.3	051
38	47	22	49.55	1.84	.80	-.7	.73	-.9	.78	.68	31.8	36.3	038
49	47	22	49.55	1.84	1.18	.7	1.08	.4	.81	.68	13.6	36.3	049
28	41	20	49.39	1.93	.98	.0	1.09	.4	.45	.69	30.0	36.7	028
10	46	22	49.15	1.84	1.55	1.8	1.34	1.1	.65	.69	36.4	36.3	010
33	45	22	48.74	1.84	.80	-.7	.79	-.6	.84	.69	22.7	35.7	033
42	45	22	48.74	1.84	1.51	1.7	1.39	1.3	.72	.69	22.7	35.7	042
53	40	20	48.44	1.96	2.08	2.8	2.19	2.9	.51	.71	.0	36.5	053
16	44	22	48.33	1.84	.63	-1.4	.59	-1.5	.74	.69	36.4	35.6	016
23	44	22	48.33	1.84	.46	-2.3	.43	-2.3	.81	.69	63.6	35.6	023
61	44	22	48.33	1.84	1.23	.9	1.25	.9	.31	.69	18.2	35.6	061
56	42	21	48.26	1.90	.46	-2.2	.42	-2.3	.76	.70	66.7	35.9	056
11	43	22	47.93	1.84	1.03	.2	1.11	.5	.55	.69	27.3	35.9	011
12	43	22	47.93	1.84	.97	.0	1.02	.2	.58	.69	50.0	35.9	012
27	43	22	47.93	1.84	1.24	.9	1.36	1.2	.48	.69	31.8	35.9	027
29	43	22	47.93	1.84	.70	-1.1	.68	-1.1	.85	.69	27.3	35.9	029
35	43	22	47.93	1.84	.57	-1.7	.64	-1.3	.64	.69	45.5	35.9	035
58	43	22	47.93	1.84	1.11	.5	1.01	.1	.68	.69	31.8	35.9	058
54	35	19	47.77	1.99	.80	-.6	.71	-.9	.68	.69	42.1	35.9	054
4	42	22	47.52	1.85	.62	-1.4	.64	-1.2	.79	.69	40.9	36.3	004
19	42	22	47.52	1.85	.73	-.9	.79	-.6	.58	.69	45.5	36.3	019
55	39	21	47.50	1.89	.68	-1.1	.65	-1.2	.70	.69	47.6	36.1	055
5	40	22	46.70	1.85	2.18	3.2	1.95	2.6	.51	.69	27.3	37.0	005
44	40	22	46.70	1.85	1.35	1.2	1.25	.9	.44	.69	36.4	37.0	044
45	39	22	46.28	1.86	.66	-1.2	.72	-.9	.59	.69	50.0	38.0	045
39	38	21	46.06	1.88	1.49	1.6	1.31	1.0	.74	.68	28.6	37.5	039
13	33	22	43.72	1.91	1.18	.7	1.28	.9	.65	.69	31.8	41.1	013
MEAN	47.3	21.7	49.98	1.87	1.01	-.1	.97	-.1			36.7	37.5	
P.SD	6.0	.7	2.38	.05	.41	1.4	.39	1.2			13.9	2.3	

APPENDIX 5: Item-Person Map



APPENDIX 6: ITEM MEASURE ORDER

item STATISTICS: MEASURE ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PTMEASUR-AL CORR.	PTMEASUR-AL EXP.	EXACT MATCH OBS%	EXACT MATCH EXP%	item
1	223	61	63.85	1.88	.74	-1.0	.71	-1.1	.33	.15	68.9	69.3	01 Like Consuming
6	210	61	59.52	1.50	.75	-1.1	.69	-1.4	.42	.19	52.5	47.0	06 Good Environment
7	204	60	58.85	1.46	.64	-1.7	.64	-1.7	.29	.20	55.0	43.6	07 Seasonal Food
5	189	59	56.18	1.29	.54	-2.6	.56	-2.4	.43	.23	50.8	40.7	05 Reducing CO2
3	187	59	55.75	1.27	1.02	.2	1.02	.2	.34	.23	32.2	40.3	03 Support Local Farmers
15	190	61	55.22	1.21	.61	-2.3	.61	-2.2	.41	.23	45.9	40.6	15 CO2 footprint
13	182	60	54.40	1.18	1.19	1.0	1.29	1.5	.13	.24	33.3	39.9	13 Preserving traditions
21	157	60	50.73	1.04	1.03	.3	1.03	.2	.36	.28	36.7	34.8	21 Plant environment
10	144	58	49.79	1.03	.96	-.2	.98	-.1	.19	.28	36.2	33.6	10 Consider distance
9	120	58	46.79	.99	.93	-.4	.93	-.4	.45	.30	29.3	28.6	09 Non Seasonal
19	123	61	46.45	.97	1.27	1.8	1.30	2.0	.07	.30	24.6	28.7	19 Only Plant
22	120	60	46.38	.98	1.48	3.0	1.48	3.0	.46	.30	6.7	28.7	22 Meat Important
17	115	59	45.98	.99	.91	-.6	.91	-.6	.55	.30	22.0	29.1	17 Local or imported
4	115	60	45.79	.98	1.04	.3	1.04	.3	.57	.30	21.7	29.1	04 Aslong organic
12	112	61	45.20	.97	1.17	1.2	1.20	1.3	-.01	.30	32.8	29.3	12 Local Price
18	109	61	44.86	.98	.80	-1.4	.79	-1.5	.47	.30	37.7	30.6	18 More variety
8	93	61	42.97	1.01	1.10	.7	1.11	.7	.07	.29	29.5	32.5	08 Seasonal Cheaper
11	75	61	40.64	1.08	1.06	.4	1.08	.5	.10	.28	36.1	38.8	11 Trust Local
14	60	61	38.38	1.17	.99	.0	.99	.0	-.13	.26	37.7	40.2	14 Money Economy
16	58	60	38.21	1.19	.94	-.3	.98	.0	.16	.26	40.0	40.2	16 Local Variety
2	52	60	37.18	1.25	1.16	.8	1.09	.5	.10	.25	35.0	40.1	02 Fresher
20	45	60	35.70	1.33	.96	-.1	.95	-.2	-.03	.24	41.7	39.4	20 Plant Healthy
MEAN	131.0	60.1	48.13	1.17	.97	-.1	.97	-.1			36.6	37.5	
P.SD	53.8	.9	7.69	.22	.22	1.3	.23	1.3			12.8	8.9	

APPENDIX 7: Coded Words For Likert Scale Questions

1. Fresher = I eat organic food because it is fresher than conventional food

2. Avoid Pesticides = I eat organic food so that I can avoid eating pesticides (Reverse because eating organic is more of a health initiative rather than a direct environmental concern)

3. Support Local Farmers = I buy and eat organic food to support local farmers

4. As long organic = It doesn't matter to me where the food comes from as long as it is organically grown (Reverse because eating organic from supermarkets doesn't fit into the localized nature of organic food systems which are more sustainable)

5. Reducing CO2 = I eat organic food because I believe I play a part in reducing carbon emissions

6. Good Environment = I believe that organic food is good for the environment

7. Environmental Packaging = The organic food I buy is packaged in an environmentally friendly way

8. Seasonal Food = I like eating organic seasonal food

9. Seasonal Cheaper = I buy seasonal organic food because it is cheaper

10. Non-Seasonal = I like eating non-seasonal food

11. Consider distance = I consider the distance that food has travelled to reach me

12. Trust Local = I choose to eat locally produced food because I trust local organic (Reverse because eating organic based on trust is not a sustainable consumptive behaviour- not based on direct environmental concern)

13. Local Price = I like eating organic food because it is more affordable (Reverse because eating local organic is based on affordability it is not a sustainable consumptive behaviour i.e. not based on direct environmental concern)

14. Preserving traditions = I like preserving local farming traditions

15. Money Economy = I buy and consume locally produced food because the money stays in the local economy (Reverse because eating local organic is based on financial it is not a sustainable consumptive behaviour i.e. not based on direct environmental concern)

16. CO2 footprint = I like eating food with low Carbon emissions

17. Local Variety = I like eating locally produced but a variety of local food is limited (Reverse because eating local organic is influenced by variety it is not a sustainable consumptive behaviour i.e. not based on direct environmental concern)

18. Local or imported = I buy and eat what I want irrespective of whether it is local or imported (Reverse because eating local organic is influenced by variety it is not a sustainable consumptive behaviour i.e. not based on direct environmental concern)

19. More variety = I support imported organic food because I have more variety to choose from (Reverse because eating local organic is influenced by variety it is not a sustainable consumptive behaviour i.e. not based on direct environmental concern)

20. Only Plant = I only eat plant-based foods

21. Plant Healthy = I eat plant-based food because it is healthy (Reverse because eating local organic is influenced by variety it is not a sustainable consumptive behaviour i.e. not based on direct environmental concern)

22. Plant environment = I only eat plant-based foods because it has less of an impact on the environment

23. Cut Meat = I completely cut out meat

24. Meat Important = Meat is an important part of my diet

END LABELS

The reversed items are scored in reverse as a way to say that those questions are meant to score the response higher if they Strongly Disagree than Strongly Agreeing. This is based on our model of sustainable consumption and what is scored highest (4) is most sustainable over what is scored lowest is least sustainable.