

**Adult women in Eluyengweni, Swaziland: their food practices and knowledge of
indigenous green leafy vegetables**

by

VUKILE V DLAMINI

February 2017

University of Pretoria

**Adult women in Eluyengweni, Swaziland: their food practices and knowledge of
indigenous green leafy vegetables**

by

VUKILE V DLAMINI

Dissertation submitted in partial fulfilment of the requirement for the degree
Master's in Consumer Science (General)

In the

Faculty of Natural and Agricultural Sciences
Department of Consumer Science
University of Pretoria

Supervisor: Dr AT Viljoen

February 2017

**Voedselpraktyke en -kennis van inheemse groen blaargroentes van volwasse vroue in
Eluyengweni, Swaziland**

deur

VUKILE V DLAMINI

Verhandeling ingehandig ter gedeeltelike vervulling van die vereiste vir die graad
Meesters in Verbruikerswetenskap (Algemeen)

In die

Fakulteit vir Natuurlike- en Landbouwetenskappe
Departement Verbruikerswetenskap
Universiteit van Pretoria

Studieleier: Dr AT Viljoen

Februarie 2017

Dedication

This work is dedicated to my beloved family especially my husband Mduduzi, my daughters Sabusiswa and Luseluhle and also my son Uminathi who supported me throughout my studies. My parents Harry and Martha Dlamini, my sisters, Lucy, Thuli, Gugu, Zandi, Hlobi, my brothers, Sive and Sphetfo and their families. Thank you very much for your love and support throughout the challenging academic times boNkhosi.

Declaration

I **Vukile Vinah Dlamini** declare that the dissertation, which I hereby submit for the degree Master of Consumer Science (General) degree at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

SIGNATURE:

DATE:

Acknowledgements

My sincere gratitude and appreciation is extended to the following:

- All mighty God who kept me through my studies
- My study leader, Dr Annemarie Viljoen for her tireless time, support and guidance
- Dr Nina Strydom and Mrs Jaqui Sommerville for the statistical analysis of the study
- Mrs Elsie Verheem and Rianie van der Linde for assisting me with finding library sources
- My boss and colleagues for their support and encouragement throughout my studies
- My sister Mrs Mkhonta and family for taking care of my children when I was away for studies
- My husband and children for tolerating my absence and support
- Traditional leaders for the Eluyengweni rural community for granting me permission to carry out the study in the area
- The language editor, Professor Joan Fairhurst for her assistance in language editing my thesis
- Ms Sizakele Dlamini, Make Magagula and Make Phiri and my fieldworkers for assisting me in data collection
- Ms Trudie Erasmus for technical editing and assistance

Adult women in Eluyengweni, Swaziland: their food practices and knowledge of indigenous green leafy vegetables

by

VUKILE V DLAMINI

Supervisor: Dr AT Viljoen

Department: Consumer Science

Faculty: Natural and Agricultural Sciences

Degree: Masters in Consumer Science (General)

Concern regarding the decline in the knowledge and use of indigenous green vegetables exists in many southern African regions including Swaziland. Reasons for this are, amongst others, attributed to a lack of inter-generational knowledge transfer, the influence of westernisation and changing food values and attitudes, as people nowadays regard indigenous green leafy vegetables as a low status food. It is imperative that knowledge of these foods be documented before it is lost to future generation. Indigenous green leafy vegetables have long been considered healthier options than the many recently introduced western-orientated foods, which are closely linked to chronic lifestyle diseases.

The aim of this study was to determine, describe and compare the knowledge of indigenous green leafy vegetables among two generations of rural Swazi women from the Eluyengweni community, and how it manifests in their food practices. Studies on indigenous green leafy vegetables in Swaziland are limited. This study will fill the knowledge gap in this field.

The human ecological perspective was adopted as theoretical perspective and an explorative mixed method approach was followed. Qualitative data was collected through focus group discussions with younger (25-45 years) and older (over 45 years) women. Face-to-face structured interviews provided quantitative data on the knowledge the women had of indigenous green leafy vegetables, including their procurement, preparation, preservation and consumption

patterns. The convenience sample comprised 102 respondents. Observation was done concurrently during both phases of data collection and photographs accompanied comprehensive field notes.

It transpired that the availability of indigenous green leafy vegetables had declined in the community and those that were available were not easily accessible as they were located on the outskirts of the community. In spite of changes in the physical and natural environment, some indigenous green leafy vegetable species are still available in summer. It is clear that the older women, in comparison to their younger counterparts, had more knowledge of indigenous green leafy vegetables in terms of identifying them, where they are found and how they are used. Familiar and available indigenous green leafy vegetables such as *imbuya* (*Amaranthus*), *chuchuza* (*Bidens pilosa*) were preferred, and consumed fairly regularly. Although indigenous green leafy vegetables were still part of the food practices in this community, their consumption among the younger generation had declined. However, due to factors related to modernisation, economic influences and technological advancement the majority of both the younger and older participants seem to have become dependent on, and often include, western-orientated food in their food consumption patterns.

Based on the results, recommendations are made to capture and preserve the knowledge of indigenous green leafy vegetables in this community and to revive interest in these vegetables and promote their consumption.

KEY WORDS: *indigenous green leafy vegetables, knowledge, food practices, Swazi rural women, familiarity, preference, food frequency*

Voedselpraktyke en -kennis van inheemse groen blaargroentes van volwasse vroue in Eluyengweni, Swaziland

deur

Vukile V Dlamini

Studieleier: Dr AT Viljoen

Departement: Verbruikerswetenskap

Fakulteit: Natuur- en Landbouwetenskappe

Graad: Meestersgraad in Verbruikerswetenskap (Algemeen)

Daar is 'n besorgdheid oor die afname in kennis in die gebruik van inheemse groen blaargroentes in baie streke in Suider Afrika, insluitend Swaziland. Redes wat hiervoor aangevoer word, is onder andere, die gebrekkige oordrag van kennis van een geslag na die volgende, die invloed van verwestering asook 'n verandering in waardes en houdings aangesien mense inheemse groen blaargroentes deesdae as 'n lae status voedsel beskou. Daarom is dit noodsaaklik dat kennis oor hierdie voedsel gedokumenteer word voordat dit verlore gaan vir die nageslag. Inheemse groen blaargroentes word gesonder geag in vergelyking met Westers-georiënteerde voedsel, wat op hul beurt nou geassosieer word met kroniese lewenstyl siektes.

Die doel van hierdie studie was om die kennis van inheemse groen blaargroentes van twee geslagte landelike Swazi vroue van die Eluyengweni gemeenskap te bepaal, beskryf en te vergelyk asook hoe dit manifesteer in hul voedselpraktyke. Studies oor inheemse groen blaargroentes in Swaziland is beperk en hierdie studie dra by om die leemte in kennis in hierdie studieveld te vul.

Die menslike ekologiese perspektief is a teoretiese perspektief gebruik en 'n verkennende gemengde metodologie is as navorsingsbenadering gevolg. Kwalitatiewe data is deur middel van fokusgroep gesprekke met beide die jonger (25-45 jaar) en ouer (ouer as 45 jaar) vroue

ingesamel. Met behulp van gestruktureerde individuele onderhoude is kwantitatiewe data oor die kennis van inheemse groen blaargroentes ingesamel wat die verkryging, voorbereiding, preservering en verbruikspatrone van hierdie groentes ingesluit het. 'n Geriefssteekproef van 102 respondente het aan die studie deelgeneem. Waarnemings is gedurende beide fases van die data insameling uitgevoer en fotos en volledige veldnotas is ingesluit.

Dit is duidelik dat die beskikbaarheid van inheemse groen blaargroentes in hierdie gemeenskap afgeneem het, en dit wat beskikbaar was, was nie maklik toeganklik nie, omdat dit aan die buitewyke van die gemeenskap gelêe was. Ten spyte van die verandering in die fisiese en natuurlike omgewing is sommige inheemse groen blaargroentes steeds beskikbaar gedurende die somer. Dit is duidelik dat die ouer vroue, in vergelyking met die jonger vroue oor meer kennis van inheemse groen blaargroentes beskik het met betrekking tot die identifisering, waar hulle groei en hoe om hulle te gebruik. Bekende en beskikbare inheemse groen blaargroentes soos gewone misbredie (*Amaranthus*) en knapsakkerwel (*Bidens pilosa*) was voorkeur groente en is redelik gereeld gebruik. Alhoewel inheemse groen blaargroentes steeds deel vorm van die voedselpraktyke in hierdie gemeenskap, het die gebruik daarvan deur die jonger geslag afgeneem. As gevolg van faktore soos modernisering, die ekonomie en tegnologiese vooruitgang het die meerderheid van beide die jonger en ouer geslag afhanklik geword van westers-georiënteerde voedsel en dit dikwels in hulle eetpatrone ingesluit.

Die resultate van hierdie studie het bygedra dat aanbevelings oor die vaslegging en bewaring van die kennis oor inheemse groen blaargroentes in hierdie gemeenskap gemaak kon word, asook om 'n oplewing in die belangstelling in die gebruik daarvan te bevorder.

SLEUTEL WOORDE: *inheemse groen blaargroentes, kennis, voedselpraktyke, Swazi landelike vroue, voorkeur, bekendheid, voedselrekwensie*

Table of Contents

DEDICATION	I
DECLARATION	II
ACKNOWLEDGEMENTS	III
ABSTRACT	IV
OPSOMMING	VI
LIST OF TABLES	XII
LIST OF FIGURES	XIV
LIST OF ADDENDA	XV
CHAPTER 1 - THE STUDY IN PERSPECTIVE	1
1.1 INTRODUCTION AND BACKGROUND TO THE STUDY	1
1.2 PROBLEM STATEMENT	3
1.3 JUSTIFICATION OF THE STUDY.....	5
1.4 RESEARCH AIM AND OBJECTIVES.....	5
1.5 STUDY AREA	6
1.6 RESEARCH DESIGN AND METHODOLOGY.....	7
1.7 DATA ANALYSIS	7
1.8 DELIMITATION OF THE STUDY	7
1.9 OUTLINE OF THE REPORT	7
1.10 CHAPTER CONCLUSION.....	9
CHAPTER 2 - LITERATURE REVIEW	10
2.1 INTRODUCTION.....	10
2.2 THE HUMAN ECOLOGICAL PERSPECTIVE	10
2.2.1 Theoretical background.....	10
2.2.2 Assumptions of the human ecological perspective	11
2.2.2.1 <i>All parts of the environment are interrelated and influence each other</i>	11
2.2.2.2 <i>Humans interact with multiple environments</i>	11
2.2.2.3 <i>Humans respond to, change, develop, act on and modify their environment</i>	12
2.2.2.4 <i>Interaction between humans and environments are guided by two sets of rules, the physical and biological rules of nature and social rules of humans</i>	12
2.2.2.5 <i>Environments do not determine human behaviour, but pose constraints as well as possibilities and opportunities for people</i>	13
2.3 FACTORS INFLUENCING FOOD CHOICE	13



2.3.1	External environmental factors	14
2.3.1.1	<i>Natural/physical environment</i>	14
2.3.1.2	<i>Economic and political environment</i>	15
2.3.1.3	<i>Socio-cultural environment</i>	15
2.3.2.2	Internal environmental factors	18
2.4	THE FOOD CHOICE PROCESS.....	21
2.5	CHANGES IN FOOD CULTURE	22
2.6	HISTORICAL OVERVIEW OF SWAZI EATING PATTERNS.....	24
2.6.1	Geographical information	24
2.6.2	The Swazi traditional diet from 1930-2000.....	26
2.7	INDIGENOUS KNOWLEDGE ON INDIGENOUS GREEN LEAFY VEGETABLES ...	34
2.8	ROLE OF INDIGENOUS GREEN LEAFY VEGETABLES IN THE SWAZI EATING PATTERN	35
2.8.1	Nutritional value of indigenous green leafy vegetables	35
2.8.2	Preparation of indigenous green leafy vegetables	36
2.8.3	Serving indigenous green leafy vegetables on special occasions and to guests.....	37
2.8.4	Medicinal use of indigenous green leafy vegetables	38
2.8.5	Income generation of indigenous green leafy vegetables	38
2.9	PROCUREMENT AND PRESERVATION OF INDIGENOUS GREEN LEAFY VEGETABLES.....	39
2.9.1	Preservation of indigenous green leafy vegetables.....	40
2.10	CHAPTER CONCLUSION.....	40
CHAPTER 3 - RESEARCH METHODOLOGY		42
3.1	INTRODUCTION.....	42
3.2	RESEARCH DESIGN.....	42
3.3	RESEARCH AIM AND OBJECTIVES.....	43
3.4	CONCEPTUAL FRAMEWORK	44
3.5	CONCEPTUALISATION OF MAIN CONCEPTS	46
3.6	OPERATIONALISATION.....	48
3.7	MEASURING INSTRUMENTS	52
3.7.1	Phase 1: Focus group discussions	52
3.7.2	Phase 2: Face-to-face interviews.....	52
3.7.3	Observations	55
3.8	PILOT TESTING OF FOCUS GROUP DISCUSSIONS AND STRUCTURED INTERVIEWS.....	56
3.9	TRAINING OF FIELDWORKERS.....	56
3.10	STUDY AREA AND POPULATION	56

3.10.1	Gaining access to the community	56
3.11	SAMPLE AND SAMPLING	57
3.11.1	Phase 1: Focus group discussion	57
3.11.2	Phase 2: Face-to-face interview	58
3.12	DATA COLLECTION	58
3.12.1	Phase 1: Focus group discussions	58
3.12.2	Phase 2: Face-to-face interviews.....	59
3.12.3	Observations	59
3.13	DATA ANALYSIS	59
3.13.1	Phase 1: Focus group discussions	59
3.13.2	Phase 2: Face-to-face interview	60
3.14	DATA QUALITY	60
3.14.1	Phase 1: Focus group discussions	60
3.14.2	Phase 2: Face-to-face interview	61
3.15	ETHICS.....	62
3.16	CHAPTER CONCLUSION.....	63
CHAPTER 4 – RESULTS AND DISCUSSION		64
4.1	INTRODUCTION.....	64
4.2	LOCATION OF THE STUDY AREA	64
4.3	DEMOGRAPHIC PROFILE OF THE RESPONDENTS	65
4.4	AVAILABILITY AND ACCESSIBILITY OF INDIGENOUS GREEN LEAFY VEGETABLES.....	67
4.4.1	The Natural and physical environment of Eluyengweni.....	67
4.4.1.1	<i>The natural environment and physical environment of Eluyengweni.....</i>	67
4.4.1.2	<i>The physical environment of Eluyengweni.....</i>	69
4.4.2	Economic environment of Eluyengweni	70
4.4.3	Contribution of the natural and the physical environment to the accessibility of indigenous green leafy vegetables	70
4.4.4	Contribution of the economic environment towards the use and accessibility of indigenous green leafy vegetables	77
4.5	KNOWLEDGE ON INDIGENOUS GREEN LEAFY VEGETABLES	78
4.5.1	Identification and naming of indigenous green leafy vegetables	79
4.5.2	Knowledge about where indigenous green leafy vegetables grow and their seasonal availability.....	80
4.5.3	Knowledge on the use of indigenous green leafy vegetables.....	84
4.5.4	Knowledge transfer on the use of indigenous green leafy vegetables.....	90

4.6	FOOD CONSUMPTION PATTERNS ASSOCIATED WITH INDIGENOUS GREEN LEAFY VEGETABLES	92
4.6.1	Eating patterns	92
4.6.2	Inclusion of indigenous green leafy vegetables at special occasions	98
4.6.3	Familiarity, preference rating and frequency of consumption of indigenous green leafy vegetables	102
4.6.4	Acceptability of indigenous green leafy vegetables.....	113
4.7	CHANGES IN THE CONSUMPTION OF INDIGENOUS GREEN LEAFY VEGETABLES.....	117
4.7.1	Changes and reasons for changes that occurred in the community.....	117
4.7.2	Changes and reasons for changes that occurred in the consumption of indigenous green leafy vegetables	119
4.7.3	Factors contributing to changes in the consumption of indigenous green leafy vegetables.....	122
4.8	CHAPTER CONCLUSION.....	125
	CHAPTER 5 – CONCLUSIONS AND RECOMMENDATIONS	126
5.1	INTRODUCTION.....	126
5.2	CONCLUSIONS OF THE STUDY	127
5.2.1	Conclusions on the availability and accessibility of indigenous green leafy vegetables (objective 1).....	127
5.2.2	Conclusion on the knowledge of indigenous green leafy vegetables (objective 2) ..	128
5.2.3	Conclusion on food consumption patterns associated with indigenous green leafy vegetables (objective 3)	132
5.2.4	Conclusion on changes in the consumption of indigenous green leafy vegetables (objective 4).....	138
5.3	CONTRIBUTION OF THE STUDY	140
5.4	LIMITATION OF THE STUDY	142
5.5	RECOMMENDATIONS	142
5.6	EVALUATION OF THE STUDY.....	143
5.7	SUGGESTIONS FOR FUTURE RESEARCH.....	144
5.8	CONCLUDING REMARKS.....	144
	LIST OF REFERENCES	146

List of Tables

TABLE 2.1:	FOOD TYPES OF THE SWAZI PEOPLE REPORTED IN LITERATURE FROM 1939 UP TO 2004	29
TABLE 2.2:	MEAL PATTERN AND COMPOSITION OF THE SWAZI PEOPLE FROM 1939-2000	32
TABLE 3.1:	OPERATIONALISATION TABLE	49
TABLE 4.1:	DEMOGRAPHIC PROFILE OF STRUCTURED INTERVIEW RESPONDENTS (n=102)	66
TABLE 4.2:	SITES WHERE INDIGENOUS GREEN LEAFY VEGETABLE GROW (n=102)	72
TABLE 4.3:	VEGETABLES GROWN IN HOMESTEAD GARDENS	73
TABLE 4.4:	EASE OF COLLECTION, SITES AND PURCHASING LOCATION OF INDIGENOUS GREEN LEAFY VEGETABLES IN THE COMMUNITY	76
TABLE 4.5:	MONEY AVAILABLE TO SPEND ON FOOD (n=102)	78
TABLE 4.6:	CORRECT IDENTIFICATION OF INDIGENOUS GREEN LEAFY VEGETABLES FROM PHOTOGRAPHS	79
TABLE 4.7:	WHERE INDIGENOUS GREEN LEAFY VEGETABLES GROW	82
TABLE 4.8:	SEASONAL AVAILABILITY OF INDIGENOUS GREEN LEAFY VEGETABLES	83
TABLE 4.9:	REASONS FOR USING INDIGENOUS GREEN LEAFY VEGETABLES WHEN AVAILABLE	88
TABLE 4.10:	USES OF EXCESS INDIGENOUS GREEN LEAFY VEGETABLES AND PRESERVATION METHODS	89

TABLE 4.11: SOURCES OF KNOWLEDGE ON THE COLLECTION, PREPARATION AND CONSUMPTION OF INDIGENOUS GREEN LEAFY VEGETABLES	90
TABLE 4.12: NUMBER OF MEALS CONSUMED ON WEEKEND DAYS	96
TABLE 4.13: MEALS WHEN INDIGENOUS GREEN LEAFY VEGETABLES ARE CONSUMED	97
TABLE 4.15: REASONS FOR SERVING INDIGENOUS GREEN LEAFY VEGETABLES ON A SPECIAL OCCASION.....	99
TABLE 4.16: REASONS FOR SERVING INDIGENOUS GREEN LEAFY VEGETABLES TO GUESTS.....	101
TABLE 4.17: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF INDIGENOUS GREEN LEAFY VEGETABLES (n=102).....	104
TABLE 4.18: FAVOURITE INDIGENOUS GREEN LEAFY VEGETABLES.....	107
TABLE 4.19: REASON(S) FOR LIKING INDIGENOUS GREEN LEAFY VEGETABLES	108
TABLE 4.20: INDIGENOUS GREEN LEAFY VEGETABLES DISLIKED.....	109
TABLE 4.21: REASONS FOR DISLIKING INDIGENOUS GREEN LEAFY VEGETABLES...	110
TABLE 4.22: FAMILIARITY, PREFERENCE AND FREQUENCY OF CONSUMPTION OF CULTIVATED GREEN LEAFY VEGETABLES (n=102).....	111
TABLE 4.23: REASON(S) FOR EATING INDIGENOUS GREEN LEAFY VEGETABLES.....	113
TABLE 4.24: REASONS FOR PROMOTING/ENCOURAGING INDIGENOUS GREEN LEAFY VEGETABLES.....	114
TABLE 4.27: REASON(S) FOR CHANGE IN USE OF INDIGENOUS GREEN LEAFY VEGETABLES SINCE CHILDHOOD.....	121

List of Figures

FIGURE 1.1: MAP OF SWAZILAND SHOWING THE STUDY AREA	6
FIGURE 2.1: THE FOOD CHOICE PROCESS	14
FIGURE 2.2: DEVELOPMENTAL MODEL OF FOOD CULTURE	22
FIGURE 2.3: SWAZILAND ORIENTATION MAP	24
FIGURE 3:1 CONCEPTUAL FRAMEWORK.....	45
FIGURE 4.1: MAP OF SWAZILAND SHOWING THE STUDY AREA	65
FIGURE 4.3: PHYSICAL ENVIRONMENT AND BUSINESS AREA IN THE ELUYENGWENI COMMUNITY	68
FIGURE 4.4: INDIGENOUS GREEN LEAFY VEGETABLES AVAILABLE IN ELUYENGWENI	71
FIGURE 4.5: INDIGENOUS GREEN LEAFY VEGETABLES IN THEIR ORIGINAL SITES.....	74
FIGURE 4.6: EXAMPLES OF THE USE OF INDIGENOUS GREEN LEAFY VEGETABLES IN ELUYENGWENI	85
FIGURE 4.7: DAILY MEAL COMPOSITION	93

List of Addenda

ADDENDUM A: GUIDELINE FOR FOCUS GROUP DISCUSSION.....	164
ADDENDUM B: STRUCTURED INTERVIEW QUESTIONNAIRE	166
ADDENDUM C: OBSERVATION CHECKLIST	178
ADDENDUM D: CONSENT FORM.....	179
ADDENDUM E: PERMISSION LETTER.....	181
ADDENDUM F: ETHICS CLEARANCE	182
ADDENDUM G: PERSONS INVOLVED IN THE STUDY	183
ADDENDUM H: NORMALITY CHECKS FOR FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION.....	184

Chapter 1 - The study in perspective

1.1 INTRODUCTION AND BACKGROUND TO THE STUDY

Globally, societies undergo shifts in their overall food consumption patterns and this, in turn, affect their dietary patterns (Popkin, Adair & Ng, 2012; Crush, Frayne & McLachlan, 2011; Delisle, 2010; Kuhnlein, Erasmus & Spigelski, 2009; Damman, Eide & Kuhnlein, 2008). These changes in dietary patterns are referred to as nutrition transition (Popkin *et al.*, 2012:11; Delisle, 2010). Nutrition transition occurs as a result of a shift in dietary consumption and nutrient intake when the population adopts modern lifestyle (Popkin *et al.*, 2012:11; Vorster, Kruger & Margetts, 2011; Delisle, 2010). These shifts are brought about by the dynamics of socio-economic factors such as migration, urbanisation, modernisation, globalisation, acculturation, delocalisation, commoditisation and consumerisation (Popkin *et al.*, 2012; Kittler *et al.*, 2011:11-12; Delisle, 2010; Viljoen, 2009:40; Popkin, 2006; Viljoen, Botha & Boonzaaier, 2005; Hinze, Karg, Van Zyl, Mahomed, & Steyn, 2005; Cant, Brink & Brijball, 2002; Pelto & Pelto, 2000).

Various authors have reported that a shift in food consumption patterns is taking place in Africa too (Popkin *et al.*, 2012; Crush *et al.*, 2011; Vorster *et al.*, 2011). This is partly due to people leaving the rural areas for a number of reasons in favour of settling in urban areas even though these are already densely populated. Migration is evident in many African countries as people move from their original place of residence to settle in a new location. New cultural contacts are created and eventually the prolonged contact with other cultures results in acculturation (Kittler *et al.*, 2011:11-12; Viljoen, 2009:40). In the acculturation process the migrants' lifestyles and eating patterns change as they are introduced to the foods and new cultures. Moreover, they begin to include and prepare the kind of meals these cultures have together with their own traditional dishes.

Changes in food consumption patterns are prevalent in many sub-Saharan developing countries (South Africa, Botswana, Mozambique, Zimbabwe, Zambia, and Swaziland) (Steyn & Mchiza, 2014; Lane, Hovorka & Lagwegoh, 2012; Popkin *et al.*, 2012). Southern Africa, similar to the rest of the world, is also being cited as experiencing a shift in food consumption patterns (Tathiah, Moodley, Mubauwa, Denny & Taylor, 2013; Popkin *et al.*, 2012; Wenhold, Faber, van Averbeke, Oelofse, van Rensburg, van Heerden & Slabbert, 2007; Modi, Modi & Hendriks, 2006). Traditional foods, though sometimes denigrated, are considered healthier than foods that have been introduced through structural changes in society. This in turn influence food consumption patterns. According to (Kittler *et al.*, 2011:11-12) structural changes involve a

complex system of interrelated processes that function together to result in development as societies shift from traditional to modern ways of life. Traditional food patterns are usually rich in indigenous foods unlike western diets whose food patterns consist mainly of processed foods (Njume, Goduka & George, 2014; McAuley & Knopper, 2011; Delisle, 2010). The loss or decline of traditional food sources has created an increase in reliance on commercially available foods.

This study concerns Swazi society that too is in a process of change. One of the outstanding changes observed is in the lifestyle of its people (FAO, 2004). The Swazi people are becoming more modernised, urbanised and more technologically advanced and are also using more westernised food compared to traditional food as noted in several reports (The World Bank, 2014; Dlamini & Lowrey, 2005; FAO, 2004; Grivetti & Ogle, 2000; Malaza, 1994:95). In fact, Kgaphola and Viljoen (2004) claim that the majority of Swazi people are turning away from traditional foods to rely on a western-orientated food culture.

Another significant global trend also evident in Swaziland although on a smaller scale is an increasing number of women who are employed. There are 31.9% working women in Swaziland (International Labour Organization, 2014). They spend many hours at work away from their homes, thus they have restricted time in the preparation of family meals. The food industry has responded to this need by increasing the availability of processed and convenience foods to meet the demand of the working class (Igumbor, Sanders, Puoane, Tsolekile, Schwarz, Purdy, Swart, Durao & Hawkes, 2012; Habwe & Walingo, 2008). The variety of foods on offer allow people who choose to consume these kinds of food the opportunity to do so and this gradually changes their traditional food habits. This, in turn, replaces traditional nutritious foods with nutritionally inferior, energy dense, convenient, tasty, but expensive foods and beverages (Popkin *et al.*, 2012; Crush *et al.*, 2011; Vorster *et al.*, 2011; Habwe & Walingo, 2008), resulting in food consumption patterns changing.

Access to processed foods for people in developing countries is increasing because of technological developments (Igumbor *et al.*, 2012; Popkin *et al.*, 2012). A progressive shift in food consumption patterns in Swaziland is also noted (The World Bank, 2014; Dlamini & Lowrey, 2005; FAO, 2004; Kgaphola & Viljoen, 2004; Grivetti & Ogle, 2000 & Malaza, 1994:95). A particular food practice shift is that one generation no longer eats the same food as another generation does (Steyn & Mchiza, 2014; Raschke, Oltersdorf, Elmadfa, Wahlqvist, Cheema & Kouris-Blazos, 2007). Moreover, a nutrition transition of this nature can pose a threat to public health as it affects the poor directly and also gives rise to diet-related disorders such as cardiovascular diseases, Diabetes Mellitus type 2, hypertension and obesity (Steyn & Mchiza, 2014; Popkin *et al.*, 2012; Raschke *et al.*, 2007; Popkin, 2006).

As a result of the shift in food consumption practices there has been a dramatic and irrevocable loss of local knowledge regarding the identification of indigenous foods and their uses that form the basis of many cultural food traditions (Mavengahama, McLachlan & De Clercq, 2013; Raschke *et al.*, 2007; Nebel, Pieroni & Heinrich, 2006). Traditional food patterns, in particular the importance of indigenous green leafy vegetables, are an expression of culture, history and lifestyle. Since these vegetables are key elements in traditional food patterns, a change in traditional ways of life has a negative impact on the health of population groups in Swaziland (The World Bank, 2014; Dlamini & Lowrey, 2005; Kgaphola & Viljoen, 2004; Grivetti & Ogle, 2000; Ogle & Grivetti, 1985c).

Various studies in South Africa and other sub-Saharan countries indicated that indigenous green leafy vegetables are nutritious. These vegetables are rich in; iron, calcium, phosphorus, magnesium, zinc, vitamin B, β -carotene, vitamin A and vitamin C. These nutrients are essential to human health (Njume *et al.*, 2014; Powell, Ouarghidi, Johns, Tattou & Eyzaguirre, 2014; Mavengahama *et al.*, 2013; Muhanji, Roothaert, Webo & Stanley, 2011; Schönfeldt & Pretorius, 2011; Lewu & Mavengahama, 2010; Uusiku, Oelofse, Duodu, Bester & Faber, 2010; van der Hoeven, Osei, Greeff, Kruger, Faber & Smuts, 2013; Engle & Faustino, 2007; Pasquini & Young, 2007; Modi *et al.*, 2006). Rural people could use these vegetables to mitigate micro-nutrient deficiencies, address malnutrition and improve dietary diversity (Powell *et al.*, 2014; Maroyi, 2013; Schönfeldt & Pretorius, 2011; Faber, van Jaarsveld, Wenhold & Jansen van Rensburg, 2010; Jansen van Rensburg, van Averbek, Slabbert, Faber, van Jaarsveld, van Heerden, Wenhold & Oelofse, 2007). More so, they could also be a source of income for women who produce more than they need and market the surplus (Muhanji *et al.*, 2011).

1.2 PROBLEM STATEMENT

Limited documentation is available on food consumption patterns in Southern African countries despite evidence of the consequences of the nutrition transition that is currently taking place. Scholars (Orech *et al.*, 2014; Maroyi, 2013; Quaye, Gyasi, Larweh, Johnson & Obeng-Aseidu, 2009; Larson, Story & Nelson, 2009; Steyn & Temple, 2008; Modi *et al.*, 2006; Prasad, 1998) document that, although indigenous green leafy vegetable species are abundantly available, they are poorly used which is partly attributed to the diminishing or lack of knowledge of the younger generation. It is well known that rural women are usually most knowledgeable about indigenous foods (Orech *et al.*, 2014; Berinyuy & Fontem, 2011; Kepe, 2008; Nyomora, 2006; Nebel *et al.*, 2006). The limited knowledge base is a direct result of technological advancement that has made processed food more available. Today the Swazi people do not seem to use indigenous and traditional foods extensively with the exception of a few staple foods (The World

Bank, 2014; Kgaphola & Viljoen, 2004). Therefore, traditions and indigenous knowledge concerning food should not only be preserved but also investigated and documented urgently before it disappears (Powell *et al.*, 2014; Raschke *et al.*, 2007; Modi *et al.*, 2006; Kajembe, Mwenduwa, Mgoo & Ramadhani, 2000; Prasad, 1998). Currently it is particularly important to access and document the knowledge of traditional food practices that elderly women have (Maroyi, 2013; Mavengahama *et al.*, 2013).

Swazi people are gradually moving away from traditional food practices to a western-orientated food pattern (The World Bank, 2014; Kgaphola & Viljoen, 2004; Malaza, 1994:95; Jones, 1963:40-49). Generally there is a decline in use of indigenous food sources and traditional food preparation methods (The World Bank, 2014; Dlamini & Lowrey, 2005). However, rural Swazi women are still key players in indigenous green leafy vegetable production, collection and preparation (Mavimbela, 2004:98; Ogle & Grivetti, 1985a). Moreover, they are also the custodians of very valuable knowledge of these vegetables. In traditional Swazi context, this knowledge was systematically transferred from generation to generation by actively involving children in the procurement of these indigenous green leafy vegetables and the preparation of dishes using them. The present declining knowledge of this food item is partly due to the lack of inter-generational knowledge transfer, westernisation, modernisation and stigmatisation of indigenous green leafy vegetables, as people regard it as low status food (Vorster *et al.*, 2008; Steyn & Temple, 2008; Raschke *et al.*, 2007; Kgaphola & Viljoen, 2004; Agrawal, 1995; Prasad, 1998). If this situation continues this decline will lead not only to the ultimate loss of knowledge of indigenous diets but also extinction of indigenous green leafy vegetable species if the plants are no longer grown and harvested to regenerate growth (Njume *et al.*, 2014; Dweba & Mearns, 2011; Misra, Maikhuri, Kala, Rao, Saxena, 2008; Vorster *et al.*, 2008). Changing food consumption patterns have resulted in a decline in the use of indigenous green leafy vegetables even in rural communities.

Currently the food practices of rural Swazi women are not known including the extent to which indigenous green leafy vegetables are included in their food practices. The indigenous green leafy vegetables that are currently available and accessible in the rural community are also not known, although some researchers have worked in this field in Swaziland and reported on it up to the early 2000 (Dlamini & Mdziniso, 2005; Mavimbela, 2004; Dube & Musi, 2002; Grivetti & Ogle, 2000; Ogle & Grivetti, 1985b; Jones, 1963: 40-49). It definitely seems as if in recent times the use of indigenous green leafy vegetables is rapidly declining. Indigenous green leafy vegetables are high in nutrients and would make a particularly valuable contribution in food and nutrition insecure rural poor communities.

The purpose of this study is therefore to determine and describe the current food practices and the knowledge two generations of rural Swazi women in the Eluyengweni community have regarding indigenous green leafy vegetables. It is imperative that a study of this nature be carried out to disclose the current food practices and knowledge regarding indigenous green leafy vegetables in order to narrow the current gap in the knowledge of this particular food practice. Furthermore, the information gained could be an important basis for recommendations to propose strategies that would both alleviate food insecurity, and increase dietary diversity for rural Swazi people, which would have a positive effect on their general health.

1.3 JUSTIFICATION OF THE STUDY

The study aims to establish the current food practices of rural women in a Swaziland community and to identify the extent to which indigenous green leafy vegetables are included in their food consumption pattern. It will close a knowledge gap that exists in this field of Consumer Science studies. Documentation of such knowledge is urgently needed as it is at risk of disappearing in the foreseeable future. This study focuses on investigating the women's food practices and the extent to which the indigenous green leafy vegetables are used, especially in their daily meals. Furthermore, availability, familiarity, frequency of consumption and preference of indigenous green leafy vegetables will be investigated.

It is envisaged that the findings of this study could help to promote food-based strategies to alleviate food insecurity and increase dietary diversity in rural Swazi households. It will also contribute to consumer education by helping and facilitating consumers to make informed and healthy food choices from available and accessible food resources. Furthermore, it will contribute to information on the current food consumption patterns of rural women in Swaziland, which could help to understand and guide the nutrition transition in this country better, as well as comprehensively.

The following are the aim and objectives of the study.

1.4 RESEARCH AIM AND OBJECTIVES

The aim of the study was to determine, describe and compare the knowledge on indigenous green leafy vegetables of two generations of rural Swazi women from the Eluyengweni community, and how it manifests in their food practices.

In order to achieve the broad goal of the study, the specific objectives were as follows;

- To determine and describe the **availability** and **accessibility** of indigenous green leafy vegetables in the Eluyengweni community
- To determine, describe and compare the **knowledge** of two generations of rural Swazi women on indigenous green leafy vegetables
- To determine, describe and compare the **consumption patterns** of the study group regarding indigenous green leafy vegetables
- To determine and describe the **factors contributing to the changes in the consumption pattern** of indigenous green leafy vegetables of the study group

The theoretical perspective that was used for the study was the human ecological perspective.

1.5 STUDY AREA

The study was conducted in the rural community of Eluyengweni, situated at 26.53S and 31.23E in the Middleveld (*Inkhabave*) ecological region, west of Manzini in Swaziland.

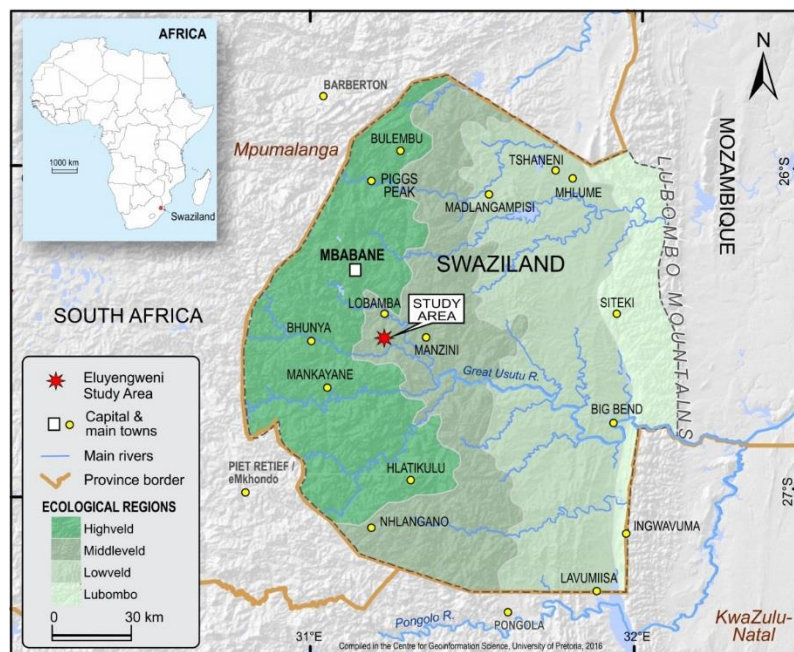


FIGURE .1: MAP OF SWAZILAND SHOWING THE STUDY AREA

1.6 RESEARCH DESIGN AND METHODOLOGY

The study was explorative, descriptive and cross-sectional in design. An explorative study is one that looks for ideas, patterns and new insights into the food practices regarding indigenous green leafy vegetables. Explorative and descriptive research is employed to conduct surveys of people who had practical experience of the problem to be studied (Salkind, 2011:80; De Vos, 2005:106; Babbie & Mouton, 2001:80). It also employed an exploratory sequential mixed methods design which, according to (Creswell, 2013:226), is an approach that starts with a qualitative phase, followed by a quantitative phase. The qualitative data and quantitative data are integrated to produce well validated conclusions.

1.7 DATA ANALYSIS

The qualitative data from focus group discussions was descriptively analysed by transcribing verbatim audio-tape recordings that were translated from Siswati to English. Key themes from the discussions were identified, coded and grouped. These themes were then connected, described and summarised. The quantitative data was analysed using the Statistical Analysis Software package (SAS) Version 9.3.

1.8 DELIMITATION OF THE STUDY

The following delimitations were applicable to this study. It was conducted in one ecological zone, the (Middleveld), in Swaziland. It was carried out in the rural community living in Eluyengweni. Only adult females aged 25 or older were participants in the study. The investigation only focused on indigenous green leafy vegetables, whether they continue to be a part of the current food consumption pattern and how available and accessible they are in the community. The acceptability of indigenous green leafy vegetables as a food item in the current eating pattern was also addressed. The outline of the report will be discussed next.

1.9 OUTLINE OF THE REPORT

The dissertation comprises five chapters; the content for each is outlined:

Chapter 1: The Study in Context

This chapter presents the introduction and background of the study. The research problem and the significance of the study are also stated as well as the aim and objectives of the research. Information on the research methodology is also given in this chapter.

Chapter 2: Literature Review

In this chapter the literature related to the research topic is reviewed. The human ecological perspective and its justification as a theoretical perspective is defended and its suitability for an investigation into the food practices and knowledge of rural women is explained. The food choice process and a historical overview of Swazi eating patterns and use of indigenous green leafy vegetables is described.

Chapter 3: Research Methodology

This chapter presents the research design and gives the aim and objectives of the study. The main concepts of the study and how they relate to the objectives of the study are presented. The conceptual framework shows how the objectives of the study are addressed. The chapter contextualises the main concepts used in the study. The operationalisation of the main concepts in terms of the aims and objectives of the study is described. The study area is delimited and the data collection and data analysis procedures are addressed with reference to sampling and measuring techniques. Methods to ensure data quality is also spelled out.

Chapter 4: Results and Discussion

In this chapter results obtained from the questionnaire, focus group discussions and observations are presented according to the objectives formulated for the study.

Chapter 5: Conclusion and Recommendations

The last chapter presents the conclusion and interpretation of the main findings. The evaluation of the study and recommendations for future research are given and the limitations of the study are also stated.

1.10 CHAPTER CONCLUSION

This introductory chapter described the background, problem statement, justifies and outlines the content of this dissertation. The aims, methodology and delimitations of the research were also spelled out. The next chapter presents the literature review, explains the main concepts and the conceptual framework used in the study.

Chapter 2 - Literature review

2.1 INTRODUCTION

This literature review chapter is presented in three sections. The justification and explanation of the human ecological perspective, used as the theoretical perspective for this study, will be discussed first, then the factors influencing food choice and lastly, the traditional eating patterns of the Swazi people and their use of indigenous green leafy vegetables will be addressed.

2.2 THE HUMAN ECOLOGICAL PERSPECTIVE

In this first section, the human ecological perspective as the theoretical perspective chosen for this study is justified and applicable assumptions are stated.

2.2.1 Theoretical background

Food choice is the selection and consumption of food and beverages based on what, when, where, how and with whom people eat, while considering all other related aspects that contribute to food and eating behavior. The food choice process is thus multifaceted, and takes place within a specific historical time and situation (Sobal & Bisogni, 2009). Almost everything in a person's domain influences food choices at any one point in time. Food choices are affected by various factors, many of which are beyond an individual's control (Fieldhouse, 1995:35). The human ecological perspective focuses on individuals as both biological and social beings in interaction with their environments (Bubolz & Sontag, 1993:421). The perspective is appropriate for this study, because it views individuals within the context of their own environments. The perspective assumes that all factors affecting a situation are interdependent and interrelated. Furthermore, it also allows one to view the relationship between interacting factors, thus addressing the problem holistically (Viljoen, 2009:8; Bubolz & Sontag, 1993:421; Sims & Smiciklas-Wright, 1978).

A discussion of the basic assumptions of the human ecological perspective as related to the study of indigenous green leafy vegetables follows. In this study, it is applied to the knowledge two generations of adult females in a rural community have of indigenous green leafy vegetables, and how they use them as a source of food. According to Sims & Smiciklas-Wright (1978), the ecological systems approach compels one to consider both the human or personal

components of the system as well as the environmental forces that supply the resources required for the human system to function. This will be discussed to show the interrelationship and interdependence of people and their environments. The interacting dynamics of the various environmental forces, and their effect on the food choice processes, reveal the relationships between the other interrelated environments.

2.2.2 Assumptions of the human ecological perspective

The following assumptions of the human ecological perspective are relevant to the study and each will be explained by using applicable examples.

2.2.2.1 All parts of the environment are interrelated and influence each other

The natural physical environment (the soil conditions, climate, atmosphere, water resources, vegetation and animal life) determines the conditions for the food crops that can be successfully grown or cultivated in a specific area. However, the people living there only choose those foods from the food available in the natural environment that are culturally acceptable to them. This implies that another environment, namely the socio-cultural environment, also directs the choice of food eaten.

Example: The Middleveld of Swaziland has abundant indigenous green leafy vegetables as the natural environment favours their growth (Dlamini & Mdziniso, 2005; Ogle & Grivetti, 1985b). The people in the Middleveld collect indigenous green leafy vegetables from the natural environment and consume them as a side dish when they are available. Traditionally, these vegetables have always been part of the Swazi traditional diet, which illustrates the influence of the socio-cultural environment.

2.2.2.2 Humans interact with multiple environments

Human beings interact with different environments when making food choices. For example, the natural and physical environment, the economic and political environments and the socio-cultural environment determine what food is available, accessible and acceptable to humans for consumption. It is the socio-cultural environment that determines which food from the available and accessible food is acceptable for human consumption, even before people make their specific food choice.

Example: Indigenous green leafy vegetables are abundant in the wild in summer and they are a traditional and acceptable food. In situations where there is limited or no money to buy food, it

will be chosen as food because it is available and acceptable. This means that, the economic environment, however, also influences the ultimate choice of these vegetables, as people who can afford to purchase food, could choose other cultivated vegetables.

2.2.2.3 Humans respond to, change, develop, act on and modify their environment

Humans can change or modify their environments and the resources in them to improve their lives and state of well-being. Individuals can thus exert control over their lives and environments. For individuals to survive, they need to adapt to the daily challenges of life. Change is a necessary process for the growth and development (Goodman, Dufour & Pelto, 2000). Humans do not simply adapt to the environment but, they also modify it, to meet their desired needs. Learning is an essential part of the process (Bubolz & Sontag, 1993:433). This they do by controlling their surroundings, the way they live and by making informed decisions.

Example: Industrialisation, which contributed to the mass production of consumer goods brought great changes to the way people earn a living (Pelto & Pelto, 2000:273). Technological advancement in food processing, storage, transportation improved the variety and shelf life of foods considerably and increased the variety of foods available at affordable prices. Due to an increasing number of people working, women in particular, convenience foods are produced as a result of industrialisation. They were developed to meet needs of the working class that no longer had access to locally grown foods due to distance between work and home, and lack of time to prepare meals. This not only affected what people consumed, but also the time and place for consuming food (Bryant, DeWalt, Courtney, & Schwartz, 2003:60-62).

2.2.2.4 Interaction between humans and environments are guided by two sets of rules, the physical and biological rules of nature and social rules of humans

Both sets of rules should be taken into consideration (Bubolz & Sontag, 1993:423). Human-derived rules, such as social norms, relate to the use and allocation of resources, role expectations and the distribution of power (Bubolz & Sontag, 1993:426).

Example: Eating is necessary to meet biological and physiological needs for survival and health. This is a universal activity that involves many different food choice decisions. Humans collect wild foods and also produce crops from the natural environment. Foods will be consumed when the need for eating arises so that life is maintained. The foods that are chosen will be learned through the process of socialisation.

2.2.2.5 Environments do not determine human behaviour, but pose constraints as well as possibilities and opportunities for people

The environment in which human beings live determines the food resources of the people in the area. Some places favour the production of certain crops depending on the nature of the environment. Human beings use different ways to improve the natural environment to enhance food production. They use technology, such as tractors, chemicals for cultivation, to produce crops successfully (Bubolz & Sontag, 1993:426).

Example: In Swaziland, the staple crop of the country is maize. One of the ecological regions, the Lowveld, comprises low-lying savannah plains with thick thorn bushes. This area can be prone to severe drought (All Out Africa, 2014). This region does not favour the growth of maize but some people in the Lowveld region use irrigation as a technological means to grow maize successfully. The majority of farmers do not have the resources to purchase such equipment therefore, they grow cotton as it is drought tolerant. They then sell the cotton and use the money to buy maize from the other ecological regions, thus they survive.

The next section deals with the factors influencing the food choice as part of food practices.

2.3 FACTORS INFLUENCING FOOD CHOICE

Food habits are complex and are influenced by a range of factors (Gillespie & Johnson-Askew, 2009; Sobal & Bisogni, 2009; Viljoen, 2009:291; Fieldhouse, 1995:35). Food habits are dynamic and are maintained because they are effective, practical and meaningful behaviours in a particular culture. Food choice decisions vary from one generation to another over time.

To understand fully why people, eat the way they do, require that all facets of the complex system of food choices and their relationships are understood (Franchi, 2012; Sobal & Bisogni, 2009; Krondl, 1990:14). Food choices are cumulative and develop during a person's life course integrating the more important food experiences (Franchi, 2012). A number of interrelated factors influence the use of food and the choice of food items. These are grouped as external and internal environmental factors.

The external environment comprises three environmental levels namely the natural and physical, the economic together with the political and socio-cultural environments. The first two environmental levels determine the availability and accessibility of food from which humans can choose. The third environmental level (the socio-cultural environment) determines which food

will be acceptable to people from the available and accessible food. The internal environment, together with the socio-cultural environment also contributes to acceptability of food and guides the food choice process further. The environmental levels are presented in Figure 2.1 to show where and how they each interplay in the food choice process. They are then briefly defined and explicated as they pertain to the present study. Some literature sources refer to four different environmental levels: the micro-, meso-, exo- and macro-environments (Figure 2.1), based on their immediacy in relation to either an individual's or a group's decision (Viljoen, 2009:23). This model shows the interrelationship of different factors that affect the food choice process.

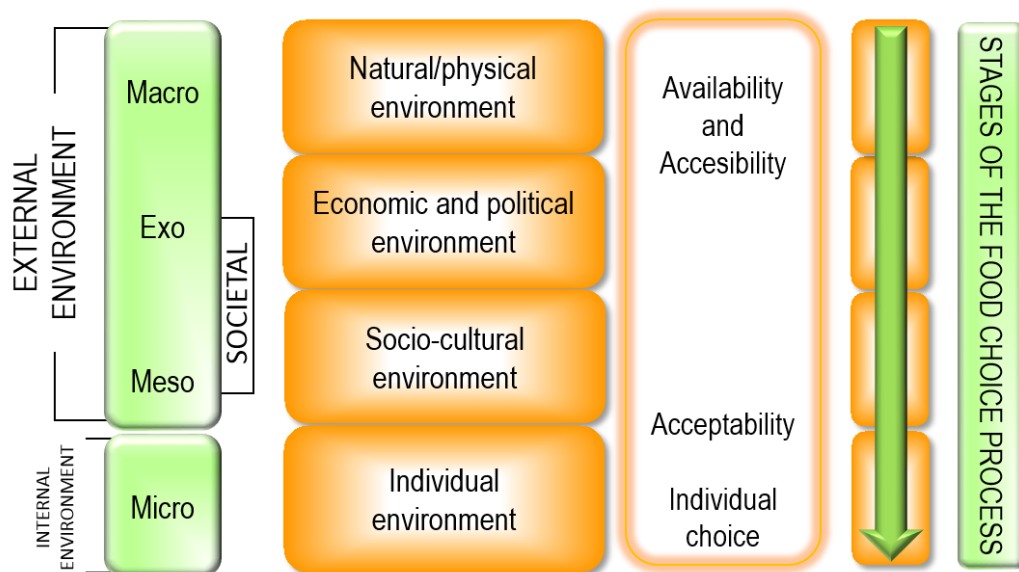


FIGURE 2.1: THE FOOD CHOICE PROCESS (VILJOEN, 2009:23 & 279)

2.3.1 External environmental factors

The external environmental factors influencing food choices comprise the physical, economic and political, and socio-cultural environments. A discussion on each environmental factor and how it relates to the other environments follows.

2.3.1.1 *Natural/physical environment*

The macro-environment represents the natural environment that refers to climate, atmosphere, soil and water resources, minerals, vegetation and animal life as they exist in nature. They influence food availability. In this study, the human built-in environment and infrastructure are the alterations people make to the natural environment, resulting in physical structures like roads, shops, cultivated land, and urban settlements. These were transformed for survival, sustenance and the attainment of a particular lifestyle and goods for survival.

The human environment contains food outlets, schools, workplaces, industrial areas that also affect food choices and health. Both the natural and the human built-environment in which a person lives determine what foods are available for consumption (Sallis & Glanz, 2009). They create both opportunities and constraints with regard to food availability (Anderson, Hetherington & Adamson, 2003:86-89; Bryant *et al.*, 2003:11). A change in food availability contributes to changes in dietary habits (Gilbert & Khokhar, 2008). The natural environment determines what and where (the sites), and at what time of the year, individuals can access indigenous green leafy vegetables and other crops that grow in that specific area (Kepe 2008).

2.3.1.2 Economic and political environment

The economic and political environment includes the way in which production, exchange and consumption of all goods, including food products are managed. The political environment encompasses aspects such as government, policies, welfare programmes, legislation and trade policies (Bryant *et al.*, 2003:13; Fieldhouse, 1995:37). Government trade laws and policies for instance, influence the kinds of crops that farmers will grow and, in turn, determine the price at which the products are offered to consumers (Bryant *et al.*, 2003:14). Moreover, this environment determines the individual's means to obtain food and other resources and the capacity to exploit food resources (Bryant *et al.*, 2003:14). This environment also encompasses the way in which people are organised and stratified within groups and communities, regions and nations (Bryant *et al.*, 2003:14).

The economic environment determines the financial resources available to obtain food (Kittler *et al.*, 2011:14). Money, for example, is a salient resource because the amount available has an effect on the nature of food that can be purchased thus has an overriding influence on what people consume (Blades, 2001:71). People with limited income or other financial means have limited food choice options due food budget restrictions.

Individuals of low socio-economic status have few healthy dietary habits because they rate price and familiarity much higher than health motives as a priority when they make food choices (Konttinen *et al.*, 2013). How culture, as an integral part of the socio-cultural environment guides and influences food choice is explained next.

2.3.1.3 Socio-cultural environment

The socio-cultural environment embraces the two concepts that jointly form the twin concept, social and cultural. The first is derived from society and concerns a person's social life. Society refers to the people who participate in a culture, which gives it concrete expression (Bryant *et*

al., 2003:12; Sobal & Nelson, 2003; Fieldhouse, 1995: 2). The social environment is therefore the larger external environment in which an individual or a group functions, comes into contact with, and interacts with other groups, societies and communities. The socio-cultural environment is defined as the presence of human beings, such as neighbours, together with the abstract or intangible culture that comprises language, laws, norms, cultural values and patterns (Bryant *et al.*, 2003:12; Bubolz & Sontag, 1993:432). It thus consists of social norms, economic institutions like regulatory systems and agricultural-industrial systems that provide the basis for communication, in order to coordinate human activities.

Culture represents the pattern of behaviour that characterises groups of people and distinguishes them from the other groups. It also changes in response to different situations and new information. Culture refers to both, tangible and intangible aspects in people's lives, that is, what people have and do, their ideas, values, beliefs, attitudes together with their behaviour patterns (Ferraro, 2001:22). It also refers to the views that a group of people share; hence, it influences their perception about food and health (Delaney & McCarthy, 2011). Culture has value systems that determine how particular foods and food habits are viewed. This, in turn, determines food acceptance and preference, as food is described according to the degree of like and dislike. These and other capabilities are acquired by an individual as a member of a society (Kittler *et al.*, 2011; Bryant *et al.*, 2003:14). Cultural practices and familiarity have an important impact on food choice and eating practices in a society. Culture is a major determinant of what one eats (Fieldhouse, 1995:1). However, it also changes in response to changing circumstances such as; new information and interaction with other groups or individuals acculturation. Food habits are maintained as they are practical or symbolically meaningful behaviours in a particular culture. Culture can be described as the knowledge, tradition, beliefs, values and behavioural patterns that are developed, learned, shared and transmitted by members of a group (Kittler *et al.*, 2011:11; Bryant *et al.*, 2003:12; Ferraro, 2002). Culture as a whole encompasses the three components of technology, social organisation and ideology (Bryant *et al.*, 2003:12). Each is now discussed briefly.

Technology

Technology refers to the material culture and that part of culture that deals with the development of techniques and strategies to obtain food. It includes the knowledge, techniques and tools that are used for production, distribution, acquisition, storage, preservation and preparation of food. People have created extensive technologies for obtaining and processing food (Bryant *et al.*, 2003:12; Pelto & Pelto, 2000:3; Krondl, 1990: 10). Improved transportation and mass media, for example, contributes to people being influenced to buy certain food products (Radder & Le Roux, 2005; Fieldhouse, 1995). Different techniques are used in food

preparation (Sobal & Bisogni, 2009). Electrification of the rural areas has introduced new preservation technology like the freezing of cooked leafy vegetables (Tshikalange & van Averbek, 2006; Kgaphola & Viljoen, 2004).

Social organisation

Social organisation is the way a social group organises its member into families, social groups and communities (Bryant *et al.*, 2003:13). Local patterns of leadership, the system of social stratification, ethnic identity, relationships between men, women, adults and children, and the informal methods in which foods and other goods are exchanged, are all part of a society's social organisation (Bryant *et al.*, 2003:12). The food an individual chooses is therefore sometimes based on managing certain human relationships. People will choose foods because they want to strengthen and maintain human relationships. Food enhances and brings togetherness, promotes common interests and stimulates the formation of bonds with other people and societies (Furst, Connors, Bisogni, Sobal, & Falk, 1996). Social organisation influences people's diets in a number of ways including the access to food and resources needed to obtain and utilise food. In rural communities, access to arable land and hunting could have a major impact on food intake (Kepe, 2008; Bryant *et al.*, 2003:12).

Ideology

Ideology can be described as the justification of social rules that humans use to organise their daily lives (Bryant *et al.*, 2003:221) in which food is an essential element. Fieldhouse (1995:12) regards ideology as everything that people think and believe in and 'carry around in their heads'. Ideology also relates to the system of religious beliefs. Religions have an important role in forbidding the consumption of certain foods (Kittler *et al.*, 2011:11; Latham, 1997). Almost every religion has religious codes that restrict the eating of some food items, while a few have elaborate dietary laws. The Seventh Day Adventists forbid the consumption of meat, alcohol, spicy food and thus prescribe a vegetarian diet to their followers (Bryant *et al.*, 2003:13). Ideology manifests in the behaviour of a cultural group and the individuals belonging to the group. This implies that the individual's food choice and food related behaviour is influenced by ideology (Bryant *et al.*, 2003:89; Fieldhouse, 1995:30).

The second group of factors influencing food choice are the internal environmental factors, and are discussed next.

2.3.2.2 Internal environmental factors

In the food choice process, the last environmental level of importance is the internal environment. This environment encompasses the unique individual characteristics that influence food choice and food habits. These characteristics are not only biological and physiological characteristics but are also guided by the intangible part of culture namely; beliefs, religion, attitude, values and knowledge. These include ideals, standards and norms that determine what should and should not be consumed. It guides behaviour in making food choices (Sobal & Bisogni, 2009; Rozin, 2006). Individual food preferences form part of this environment and refer to the degree of like or dislike of a particular food. A brief discussion of each of the individual characteristics follows.

Beliefs

A belief is any simple proposition conscious or unconscious decided from what a person says or does. It supports a certain course of action or existing state as desirable and undesirable (Rockeach, 1970:113). A belief about food represents an interpretation of the food values and serves as a cognitive element of attitude towards choosing certain foods (Hauser, Jonas & Riemann, 2011; Parraga, 1990). Food beliefs are often inextricably linked to the larger network of beliefs and attitudes that are based on cultural values (Hauser *et al.*, 2011; Nestle, Wing, Birch, DiSogra, Drewnowski, Middleton, Sigman-Grant, Sobal, Winston, & Economos, 2009; Furst *et al.*, 1996).

Religion

Religion is a set of beliefs that could include prescribed foods or food avoidances. This means that religion as a belief system plays a role when making food choices. Zionists do not eat pork, because it is believed to have demonic properties and is regarded as unclean. For the Zionist this inference is made from the time when Jesus healed the men who were possessed by demons. Jesus cast out the demons that were sent to the pigs and they rushed down over the cliff and all pigs were killed (Longley, 1999:23). The Jews are also a nation that does not consume pork because of the laws stipulated in Leviticus 11 verse 7 states the different foods that Jews should not eat (The Bible, 1995).

Attitudes

Attitude is a long-lasting set of beliefs about a particular object or situation leading to an individual reacting in some preferential manner. Attitudes “are acquired through principles of

learning” (Rockeach, 1970:112). An attitude is a psychological tendency that is expressed by evaluating a specific entity with some degree of favour or disfavour (Hauser *et al.*, 2011; Cherry, 2000; Eagly & Chaiken, 1995). Parraga (1990), similarly suggests that an attitude stems from individual beliefs about an object, and it is often defined as an affective orientation to objects. Furthermore, attitudes are reflected in a complex individual evaluation, and are based on beliefs about the outcome of behaviours and evaluation of the outcomes (Franchi, 2012). Attitudes of people towards certain foods may change due to a particular food’s sensory attributes, nutritional value and price. An individual may hold several beliefs about an object, and with each of these beliefs comes an evaluation. All these beliefs together with their evaluations form an attitude (Dreezens, Martijn, Tenbult, Kok, & de Vries, 2005).

Values

Values are abstract guiding principles in people’s lives that influence what they believe in and do across a variety of situations (Sanderson, 2013; De Boer, Hoogland & Boersema, 2007). They are also referred to as types of beliefs centrally located in one’s total belief system about how one should or should not behave (Rockeach, 1970:124). Values are therefore social products that an individual has internalised. Values affect attitude and action (Sanderson, 2013; Dreezens *et al.*, 2005). The food practices of a cultural group are a reflection of the value system of the group. Values thus determine what foods are desirable and undesirable, which are held in high esteem, and which are not. Traditional foods are connected to culture and they have a strong symbolic value (Guerrero, Guardia, Xicola, Verbeke, Vanhonacker, Zakowska-Biemans, Sajdakowska, Sulmont-Rosse, Issanchou, Contel, & Scalvedi, 2009). Values guide decision-making and human action (Bubolz & Sontag, 1993:432). These are learned through socialisation and slowly internalised by an individual (Parraga, 1990).

Food choice values are changing overtime as life course events and experiences also shape food choice. A value is viewed to be a natural characteristic of an individual such as attitude, but more basic than the attitude causing it (Sobal & Bisogni, 2009). Connors, Bisogni, Sobal, & Devine (2001) are of the opinion that values are considerations that people weigh up against each other in order to make food choices. Values are extremely stable constructs that are not easily changed, even if considerable effort is invested (Dreezens *et al.*, 2005). A person with ‘universalistic’ values is concerned with the welfare of people and the environment such as vegans, who make sustainable food choices such as consuming organic foods (Sanderson, 2013; De Boer *et al.*, 2007).

Knowledge

Knowledge can be described as information, understanding or skills that one acquires through experience. Knowledge is an objective truth and understanding. It is culturally subjective and emerges from complex and ongoing cognitive skills (Long, 1992). Since culture is learned and food habits are part of culture, knowledge regarding food, such as its nutritional value and what is regarded as edible, are learned from the cultural group to which one belongs. Knowledge functions as a tool the individual uses to adapt to and to make changes if necessary and knowledge even serves as a predictor of food consumption (Kittler *et al.*, 2011:18; Parraga, 1990). It is through primary socialisation in the family that children learn and become familiar with the food readily available in their environments and to know what is regarded as edible. The family exerts the strongest influence on eating behaviour through socialisation (Messer, 2007; Bryant *et al.*, 2003:14). The acceptance and utilisation of indigenous green leafy vegetables is currently constrained by a lack of knowledge of them, their correct identification, their methods of preparation, preservation and their importance as source of food in the community (Mnzava, 1997).

Physiological/biological characteristics

Food is needed for survival and health (Fieldhouse, 1995:25). People need energy and nutrients to survive, thus people will respond to the feeling of hunger and satiety (Bryant *et al.*, 2003:2; Blades, 2001; Fieldhouse, 1995:2). Physiological needs are basic determinants of food choice as the body responds to the feeling of hunger and satiety (European Food Information Council Review, 2012). The food an individual chooses determines the nutrients and other substances that enter the body to influence the health of that person (Whitney & Rolfes, 2013:557; Sobal & Nelson, 2003). Children's nutrient requirements differ from those of an adult, in particular, more protein-rich foods for growth as adults are fully grown (Whitney & Rolfes, 2013:518; Kittler *et al.*, 2011:17). The biological factors relate to a food choice decision about what, when and how much is eaten. Biological characteristics of an individual are their age, gender, body image and state of health. Besides these, the sensory attributes such as taste, smell, and sight of food also determine food choice (Kittler *et al.*, 2011:13). A liking for sweetness and disliking bitterness are considered inborn human traits present from birth, although experience can modify this observation (European Food Information Council Review, 2012). The taste and the slippery texture of some indigenous leafy vegetables affect people's choices among these vegetables (Quaye *et al.*, 2009).

External and internal environmental factors and their effect on food choice have been covered in this section and an explanation of the stages of food choice process, as illustrated on the right hand side of the model in Figure 2.1, is now presented.

2.4 THE FOOD CHOICE PROCESS

Availability and **accessibility** of food are determined by the natural and physical built environments. The environment influence human food choices as people can only eat what is available (Viljoen *et al.*, 2005; Bryant *et al.*, 2003:210; Fieldhouse, 1995:27). Fieldhouse (1995:36) points out that food can be available but not necessarily accessible. For example, if food prices are high the individual's ultimate access to the available food is not possible if the individual does not have enough money. Cooking oil could be available in local shops but too expensive for people to buy.

From the available or potentially available food, not everything is selected for consumption, because human food choice is also guided by what is regarded as accessible and acceptable. The socio-cultural and internal environments determine what food is **acceptable**. Human food choices therefore always take place within the boundaries of what is available, accessible and acceptable and reflect an individual's personal motivation to choose from the available, accessible and acceptable food (Viljoen & Gericke, 1998). Accessibility to food is influenced by economic factors, the infrastructure present in the environment and consumer preference (Kittler *et al.*, 2011:12; Latham, 1997:17). Preference can be described as the degree of like or dislike of a specific food that mostly develops through the senses and the frequency of eating that particular food, which comes from familiarity and experience (European Food Information Council Review, 2012).

It is only after the conditions of **acceptability** have been met that the individual's decisions come into play. During this stage that the individual own personal values, beliefs, attitudes and knowledge about the food, as shaped by culture would steer the food choice process (Fieldhouse, 1995:3-6). Food choice is not a static process, it changes continuously overtime. The developmental model of food culture is presented and discussed next to explain the factors that contribute to these changes. It illustrates why and how things are ever-changing in society and how these changes are reflected in food culture. This will be discussed in detail.

2.5 CHANGES IN FOOD CULTURE

The developmental model of food culture given in Figure 2.2 is based on the explanation of the social dynamics and food culture change. This model by Viljoen (2009) is used to explain how structural changes in society are paralleled by food culture change.

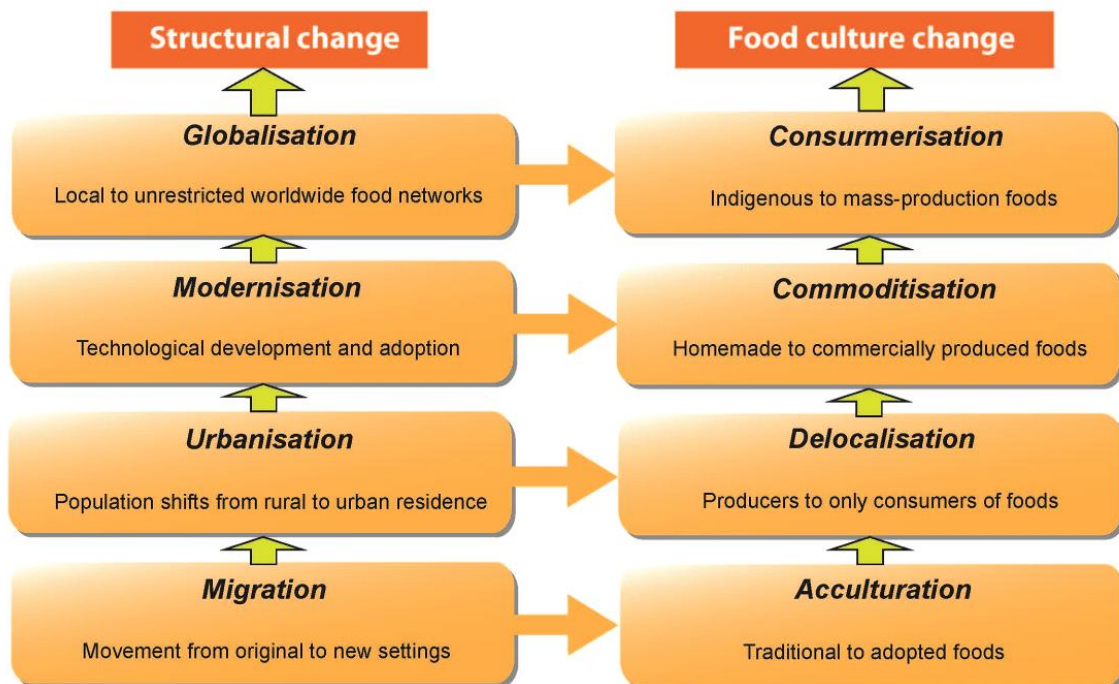


FIGURE 2.2: DEVELOPMENTAL MODEL OF FOOD CULTURE (VILJOEN, 2009:29)

The developmental model of food culture (Figure 2.2) shows that certain structural changes occurring in society lead to food culture change which, in turn, influences changes in the food consumption patterns of people directly. Although the model, portrays a linear process the changes taking place and the factors that influence them are interrelated and overlap.

Migration as a first structural change given in the model is defined as the process whereby people move from their original place or setting to settle in another place. Rural people move to the urban areas in search for employment. People then usually have to change from being self-sufficient producers of food to food purchasers. This is because they have to earn money to purchase food. In addition, because they spend more time at work, they have no time and/or land to grow their own food in the urban area. They then start to rely on commercially produced foods, which are available and convenient to obtain and to prepare. Migration often results in **acculturation** of food habits that emanates from adopting new foods often from other cultures

(Kittler *et al.*, 2011:12; Viljoen, 2009:40; Piscopo, 2004; Sobal & Nelson, 2003) with subsequent changes in beliefs, attitudes, and the social uses of food (Fieldhouse, 1995:12).

These changes are more common in young people who are exposed in school and the work environment where there is little cultural support for traditional means to obtain food. The young generation are more likely to change their eating habits by including modern, processed foods. These are regarded as convenient as snacks and sweets, although they are also associated with being unhealthy (Gilbert & Khokhar, 2008).

Urbanisation is the second structural change caused by the movement of people from rural settings to densely populated locations. The result of this structural change leads to **delocalisation** as food culture changes. This is a process whereby consumers shift from being self-sufficient, to becoming dependent on purchasing food (Kittler *et al.*, 2011:11; Viljoen, 2009:40; Piscopo, 2004; Sobal & Nelson, 2003; Pelto & Pelto, 2000). Although the shift is believed to improve the food choices of people in developed countries, this is not always the situation in developing countries as people need money to purchase food (Pelto & Pelto, 2000). The use of locally produced foods decreases as the focus often shifts to commercially produced foods.

Modernisation is the third structural change that includes the use and adoption of new technology and socio-economic shifts as a result of industrialisation. This change that is brought about by technological advances that also contribute to cultural, social, economic and political shifts, together with changes in the material culture such as food production (Bryant *et al.*, 2003:70; Sobal & Nelson, 2003; Pelto & Pelto, 2000). This leads to changes in food practices in terms of cultural beliefs, values and behaviours of people. Food is no longer home produced but processed and mainly purchased (Kittler *et al.*, 2011:11; Bryant *et al.*, 2003:61). The use of technology is also evident during food preparation and consumption. The majority of people use electricity and electric appliances in preparation of foods nowadays. They also own refrigerators where they store their foods. This process of food culture change is referred to as **commoditisation**. Modernisation results in producers treating food as a commercial product rather than as a basic commodity for human survival.

Globalisation is the third structural change and is defined as the assimilation of local, regional and national food products into a worldwide organisation. These result in food cultural change referred to as **consumerisation**, which is a shift of a society from being producers of local foods, to becoming consumers of commercialised foods (Viljoen, 2009:40). Sobal (2000) emphasises that these changes are complex, and they should be viewed holistically because they are interrelated. As communities are being modernised their society undergoes each of

these three structural changes and each has an effect on their food practices. The next section will deal with a historical overview of Swazi eating patterns.

2.6 HISTORICAL OVERVIEW OF SWAZI EATING PATTERNS

This section reviews past studies on eating patterns conducted in Swaziland and discusses the relevance of their contribution to changing dietary patterns among rural people in the country. The section highlights the historical introduction of modern foods and how this has led to changes in the traditional Swazi diet. Geographic information on Swaziland will be given now.

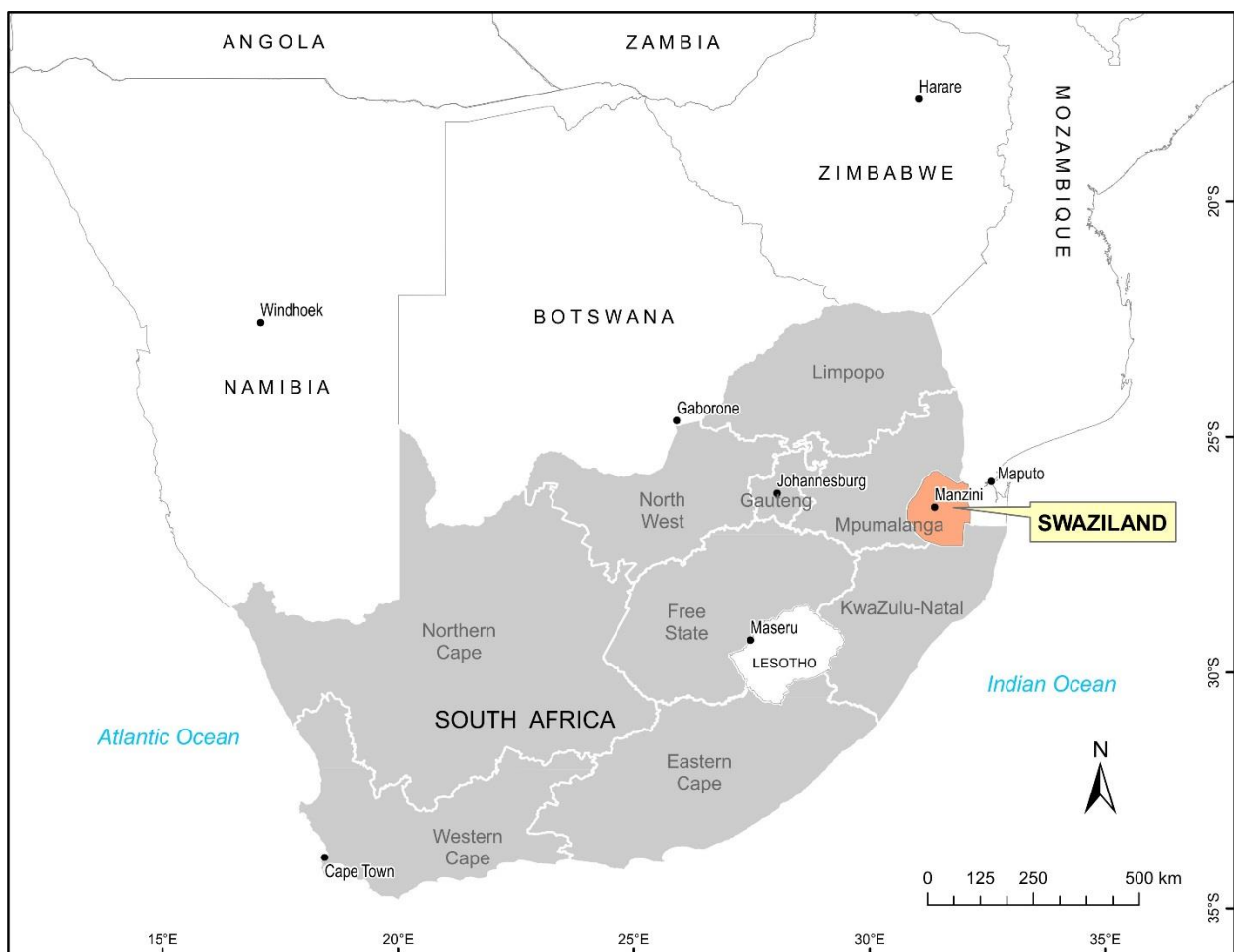


FIGURE 2.3: SWAZILAND ORIENTATION MAP

2.6.1 Geographical information

Swaziland is a landlocked country between Mozambique to its east, with the Republic of South Africa covering the rest of the country's borders. The country is geographically located at 26° 30'S and 31° 30'E and has an area of 17,460km² (All Out Africa, 2014). The country has four

distinct physiographic regions namely, from west to east: Highveld (*Inkhangala*), Middleveld (*Inkhabave*), Lowveld (*Lihlandze*) and Lubombo.

Each of the ecological zones has different geographical features, which has an influence on the type of crops, or vegetation that grows in the area. The vegetation cover for the Highveld consists of typically mountainous short grassland with plantation patches (Sweet & Khumalo, 1994). It consists of steep slopes, valleys and basins. The climate is sub-humid and temperate. The Highveld receives the highest rainfall between 1 000–1 500 mm annually. The soils are mainly ferrasols and acrisols, characterised acid soils, highly clay and deep red colours (Government of Swaziland, 1997).

The Middleveld is the region in central of Swaziland. It is an area of rolling hills of tall grassland and savannah with scattered trees and shrubs. Manzini and Eluyengweni area situated in this area (All Out Africa, 2014). This region has the second highest amount of annual rainfall. It receives between 800 mm–1 000 mm rainfall annually (Government of Swaziland, 1997). The Lowveld comprises low-lying savannah plains with thick thorn bushes. This is a typical habitat for big game and can be prone to severe drought (All Out Africa, 2014). It receives the lowest rainfall, between 500–800 mm annually (Government of Swaziland, 1997). The soils in this region are neutral basic soils and they come with a wide variation of colours. The Lubombo region is a plateau of undulating hills with thick thorn bushes and tall grassland (Government of Swaziland, 1997). The soils are nitisol, one of the best soils in the country, characterised by shiny structural and high clay content (Government of Swaziland, 1997).

The climate of Swaziland varies from tropical to near temperate. The rain falls mostly in the summer months, often in the form of thunderstorms. The country experiences four major seasons; spring from September to October; summer from November to March; autumn between April and May and winter between June and August (Dube, 2010). There are 1 004 072 people in the country (Government of Swaziland, 2010a). The population is predominantly rural as 65% of the population resides in the rural areas.

Swazis traditionally lived on what the environment offered. They got their food through hunting, gathering, cultivation and keeping livestock. Swaziland is endowed with a variety of indigenous green leafy vegetables (also referred to as traditional or edible wild plants) collectively known to Swazis as *tibhidvo*. This is revealed in a number of studies carried out in Swaziland to document the diet of the people.

2.6.2 The Swazi traditional diet from 1930-2000

Beemer (1939) was the first to report on the diet of the Swazi people. During this time, their diet was very traditional. The Swazi people had several food sources, obtained from cultivation, livestock, hunting and gathering. The Swazi people grew cereal crops such as maize (*Umbhila*), sorghum (*Emabele*) and sweet millet (*Imfe*). Vegetables such as pumpkin (*Ematsanga*), gourd (*Emaselwa*), and melon (*Emajoti*) were cultivated on the same field with cereals. Legumes such as cowpeas (*Tinhlumaya*), peanuts (*Emantongomane*), jugo beans (*Tindlubu*), phaseolus mungo (*Mngomeni*), were cultivated in the same fields with root crops such as sweet potatoes (*Bhatata*).

To some extent, they also depended on earnings from wages to supplement their subsistence economy. Swazi men worked in South African mines on the Witwatersrand and in Johannesburg itself and on European farms in South Africa and Swaziland, while their wives were left to care for the rest of the family. The Swazi men working away from home adopted foods that were used by the Europeans and other groups with whom they came in contact while working on the mines.

Traditionally the meal patterns of the Swazi people consisted of only two meals per day (Beemer 1939). The first meal, taken in the morning between 05:00 and 12:00, was mostly thin sour porridge (*Incwancwa*). The second meal, which was the main meal, was eaten from 18:00 onwards. Beemer (1939) stated that, sorghum, millet and maize meal porridge formed the core of the main meal and it was consumed with a relish such as *Ligusha* (*Corchorus spp*), a mixture of greens (*Sijabane*), dried bitter gourd (*Inshubaba*) and other indigenous green leafy vegetables.

Jones (1963) also studied the Swazi diet in the rural and urban areas. From this study, it was reported that the Swazi diet had changed very little from what Beemer (1939) wrote. It is important to note that most people in the rural areas still maintained the traditional diet as they could not afford to buy commercial food. It was reported, however, that the rural people were slowly moving from a subsistence level to a semi-subsistence level. As stated by Beemer (1939), cattle remained a symbol of wealth and were rarely slaughtered. Some cattle were kept as a source of milk, and some of the milk was used to make traditional sour milk (Jones, 1963:58). Although there were few shops in the rural areas during this period, the purchasing of food was rare except for luxury items such as salt and sugar. It was noted that cereal consumption increased with a shift away from home-grown cereals to refined maize and wheat products, such as flour and bread. Migrant labour was common and people searched for work both within and outside the country (such as in mines and forestry) in South Africa in order to

provide food for their families. People started to consume more commercial foods gradually, like sugar, tea, coffee, soft drinks, white bread and flour (Jones, 1963:40).

The Swazi people, to some extent maintained, the two-meal pattern a day in the rural areas, although some households adopted three meals a day according to the European pattern (Jones, 1963:79). In the 1980s, more changes were reported regarding the Swazi diet according to Cappetta (1983) and Ogle & Grivetti (1985a). An increase in the consumption of purchased foods was noted, such as rice, bread, meat, powdered milk and sugar as well as cultivated vegetables (cabbage, tomatoes, and onions) due to rapid urbanisation that contributed to a decline in home-produced food in rural areas and a greater dependence on the money economy for domestic food needs (Cappetta, 1983:183).

Ogle & Grivetti (1985b) similarly reported no change in the consumption of staple foods such as maize, legumes and tubers. They specifically mentioned newly introduced foods such as cooking oil and canned fish, and an increase in the frying of food and the use of spices. A high reliance on wild vegetable foods like green leafy vegetables, chard, Pumpkin leaves, spinach and a variety of wild edible leaves (Ogle & Grivetti, 1985a). Rural Swazis seemed to make more use of cultivated vegetables in comparison to the situation stated in other similar studies.

Later, Huss-Ashmore & Curry (1994) studied the food intake of Swazi women and reported similar meal patterns as those Beemer (1939) and Jones (1963) documented, as they found that the Swazi diet still consisted of two basic dishes, namely stiff maize meal porridge and a relish prepared with either a vegetable relish or stews and meat when available. The continued reliance on wild vegetables was emphasised Huss-Ashmore & Curry (1994).

In the 1990s, Malaza (1994) found higher inclusion of commercial foods compared to what other scholars mentioned. Industrialisation and urbanisation were found to be the main cause of this change. Many household members were employed in urban areas while maintaining their ties with their homesteads in rural areas. This led to more households relying on money to obtain food instead of producing their own. Of note is that the eating pattern changed from two to three meals a day as opposed to the two meals reported by Beemer (1939); Jones (1963) and Malaza (1994). The study by Kgaphola & Viljoen (2004) on the food habits of rural Swazi households, also reported a shift from the traditional Swazi food pattern to a Western-orientated food pattern. Acculturation was also evident as the current eating patterns described as a combination of the traditional Swazi and Western-orientated food customs. A summary of the historical overview of the food sources and eating patterns of the Swazi people is given in Table 2.1.

Table 2.2 shows meal patterns of the Swazi people during the past century.

TABLE 2.1: FOOD TYPES OF THE SWAZI PEOPLE REPORTED IN LITERATURE FROM 1939 UP TO 2004 (KGAPHOLA & VILJOEN, 2004; MALAZA, 1994; HUSS-ASHMORE & CURRY, 1991; OGLE & GRIVETTI, 1985C; OGLE & GRIVETTI, 1985B; OGLE & GRIVETTI, 1985A; CAPPETTA, 1983; JONES, 1963; BEEMER, 1939)

FOOD ITEMS	1930s (Beemer 1939)	1960s (Jones 1963)	1980s (Cappetta, 1983; Ogle & Grivetti, 1985c; Ogle & Grivetti, 1985b; Ogle & Grivetti, 1985a)	1990s (Malaza, 2012; Huss-Ashmore & Curry, 1991)	AFTER 2000 (Kgaphola & Viljoen, 2004)
Cereals	Sorghum	Sorghum	Sorghum	Sorghum	Sorghum
	Maize	Maize	Maize	Maize	Maize
	Millet	Millet	-	-	-
	Wheat flour	Wheat flour	Wheat flour	Wheat flour	Wheat flour
	-	Rice	Rice	Rice	Rice
L egumes	Cowpeas	Cowpeas	Cowpeas	Cowpeas	Cowpeas
	Peanuts	Peanuts	Peanuts	Peanuts	-
	Mung beans	Mung beans	Mung beans	Mung beans	Mung beans
	Jugo beans	Jugo beans	Jugo beans	Jugo beans	Jugo beans
	Sesame seeds	Sesame seeds	Sesame seeds	Sesame seeds	Sesame seeds
	-	-	Sugar beans	Sugar beans	Sugar beans
	-	-	Lentils	Lentils	Lentils
Indigenous green leafy vegetables	Imbuya (<i>Amaranthus</i>)	Imbuya (<i>Amaranthus</i>)	Imbuya (<i>Amaranthus</i>)	Imbuya (<i>Amaranthus</i>)	Imbuya (<i>Amaranthus</i>)
	Chuchuza (blackjack)	Chuchuza (blackjack)	Chuchuza (blackjack)	Chuchuza (blackjack)	Chuchuza (blackjack)
	Ligusha (vegetable jute)	Ligusha (vegetable jute)	Ligusha (vegetable jute)	Ligusha (vegetable jute)	Ligusha (vegetable jute)
	Inshubaba/inkakha (<i>Mormordica</i> species)	Inshubaba/inkakha (<i>Mormordica</i> species)	Inshubaba/inkakha (<i>Mormordica</i> species)	Inshubaba/inkakha (<i>Mormordica</i> species)	Inshubaba/inkakha (<i>Mormordica</i> species)
	Umsobo (<i>Solenum nigrum</i>)	Umsobo (<i>Solenum nigrum</i>)	Umsobo (<i>Solenum nigrum</i>)	Umsobo (<i>Solenum nigrum</i>)	Umsobo (<i>Solenum nigrum</i>)
	Sibhadze (<i>Peucedum</i>)	Sibhadze (<i>Peucedum</i>)	Sibhadze (<i>Peucedum</i>)	Sibhadze (<i>Peucedum</i>)	Sibhadze (<i>Peucedum</i>)
	Silele (<i>Portulaca oleracea</i>)	Silele (<i>Portulaca oleracea</i>)	Silele (<i>Portulaca oleracea</i>)	Silele (<i>Portulaca oleracea</i>)	-
	Umdzayi (<i>Asclepias affins</i>)	Umdzayi (<i>Asclepias affins</i>)	Umdzayi (<i>Asclepias affins</i>)	Umdzayi (<i>Asclepias affins</i>)	Umdzayi (<i>Asclepias affins</i>)
	Umdzebele (<i>Zantedesckia</i>)	Umdzebele (<i>Zantedesckia</i>)	Umdzebele (<i>Zantedesckia</i>)	Umdzebele (<i>Zantedesckia</i>)	-
	Emahala (<i>Aloe saponaria</i>)	Emahala (<i>Aloe saponaria</i>)	Emahala (<i>Aloe saponaria</i>)	Emahala (<i>Aloe saponaria</i>)	-

FOOD ITEMS	1930s (Beemer 1939)	1960s (Jones 1963)	1980s (Cappetta, 1983; Ogle & Grivetti, 1985c; Ogle & Grivetti, 1985b; Ogle & Grivetti, 1985a)	1990s (Malaza, 2012; Huss-Ashmore & Curry, 1991)	AFTER 2000 (Kgaphola & Viljoen, 2004)
Cultivated Vegetables/Crops	Sweet potato	Sweet potato	Sweet potato	Sweet potato	Sweet potato
	Melons	Melons	Melons	Melons	Melons
	Pumpkins	Pumpkins	Pumpkins	Pumpkins	Pumpkins
	Gourds	Gourds	Gourds	Gourds	Gourds
	Cassava	Cassava	Cassava	Cassava	Cassava
	Taro	Taro	Taro	Taro	Taro
	Cabbage	Cabbage	Cabbage	Cabbage	Cabbage
	-	-	Onions	Onions	Onions
	-	-	Tomatoes	Tomatoes	Tomatoes
	-	Spinach	Spinach	Spinach	Spinach
	-	-	Potatoes	Potatoes	Potatoes
	-	-	-	Beetroots	Beetroots
	-	-	Pepper	Pepper	Pepper
-	Chillies	Chillies	Chillies	Chillies	
-	-	-	-	Okra	
Indigenous fruits	Emaganu (marula)	Emaganu (marula)	Emaganu (marula)	Emaganu (marula)	Emaganu (marula)
	Umkhwakhwa	Umkhwakhwa	Umkhwakhwa	Umkhwakhwa	-
	Umfomfo (<i>Cephalanthus</i>)	Umfomfo (<i>Cephalanthus</i>)	Umfomfo (<i>Cephalanthus</i>)	Umfomfo (<i>Cephalanthus</i>)	-
	-	-	Emagwava (guavas)	Emagwava (guavas)	Emagwava (guavas)
	Umkhiwa (figs)	Umkhiwa (figs)	Umkhiwa (figs)	Umkhiwa (figs)	Umkhiwa (figs)
	Umtfundvuluka	Umtfundvuluka	Umtfundvuluka	Umtfundvuluka	-
	Tincozi	Tincozi	Tincozi	Tincozi	-
Tineyi	Tineyi	Tineyi	Tineyi	-	
Fruits (Cultivated and purchased)	Mangoes	Mangoes	Mangoes	Mangoes	Mangoes
	-	Pawpaw	Pawpaw	Pawpaw	Pawpaw
	-	Citrus fruits	Citrus fruits	Citrus fruits	Citrus fruits
	-	Bananas	Bananas	Bananas	Bananas
	-	Peaches	Peaches	Peaches	Peaches
	-	Pineapples	Pineapples	Pineapples	Pineapples

FOOD ITEMS	1930s (Beemer 1939)	1960s (Jones 1963)	1980s (Cappetta, 1983; Ogle & Grivetti, 1985c; Ogle & Grivetti, 1985b; Ogle & Grivetti, 1985a)	1990s (Malaza, 2012; Huss-Ashmore & Curry, 1991)	AFTER 2000 (Kgaphola & Viljoen, 2004)
Meat	Chicken	Chicken	Chicken	Chicken	Chicken
	Beef	Beef	Beef	Beef	Beef
	Goats	Goats	Goats	Goats	Goats
	Mutton	Mutton	Mutton	Mutton	Mutton
	Pork	Pork	Pork	Pork	Pork
	-	Fish	Fish	Fish	Fish
	Game	Game	Game	-	-
Dairy	Milk	Milk	Milk	Milk	Milk
	Emasi (sour milk)	Emasi (sour milk)	Emasi (sour milk)	Emasi (sour milk)	Emasi (sour milk)
Insects	Emanyamane (caterpillars)	Emanyamane (caterpillars)	Emanyamane (caterpillars)	Emanyamane (caterpillars)	Emanyamane (caterpillars)
	Termites	Termites	Termites	Termites	
	Tinhlwa (flying ants)	Tinhlwa (flying ants)	Tinhlwa (flying ants)	Tinhlwa (flying ants)	-
	Skhonyane (locusts)	Skhonyane (locusts)	Skhonyane (locusts)	-	-
Other	Eggs	Eggs	Eggs	Eggs	Eggs
Beverages	Tjwala (traditional beer)	Tjwala (traditional beer)	Tjwala (traditional beer)	Tjwala (traditional beer)	Tjwala (traditional beer)
	-	Cocoa	Cocoa	Cocoa	Cocoa
	Tea	Tea	Tea	Tea	Tea
	-	Coffee	Coffee	Coffee	Coffee
	-	Lidokwe (gruel - thin porridge drink)	Lidokwe (gruel - thin porridge drink)	Lidokwe (gruel - thin porridge drink)	Lidokwe (gruel - thin porridge drink)
	Emahewu (fermented thin sourporridge drink)	Emahewu (fermented thin sourporridge drink)	Emahewu (fermented thin sourporridge drink)	Emahewu (fermented thin sourporridge drink)	Emahewu (fermented thin sourporridge drink)
Seasoning (Traditional Seasoning Food and Modern Seasoning)	-	Coarse salt is crushed	Coarse salt is crushed	Salt	Salt
	-	Curry powder	Curry powder	Curry powder	Curry powder
	-	Red chillies	Red chillies	Red chillies	Red chillies
	-	-	Tintsanga (pumpkin seeds)	Tintsanga (pumpkin seeds)	-
	-	-	Tinganu (marula seeds)	Tinganu (marula seeds)	-
	-	Ludvonca (sesame seeds)	Ludvonca (sesame seeds)	Ludvonca (sesame seeds)	-
	-	-	Stock cubes (chicken/beef) spices	Stock cubes (chicken/beef) spices	Stock cubes (chicken/beef) spices
	-	-	Cooking oil	Cooking oil	Cooking oil
	-	-	-	-	-

TABLE 2.2: MEAL PATTERN AND COMPOSITION OF THE SWAZI PEOPLE FROM 1939-2000

FOOD GROUPS	Beemer (1939)	Jones (1963)	Cappetta (1983) Ogle & Grivetti (1985c), Ogle & Grivetti (1985a), Ogle & Grivetti (1985b)	Huss-Ashmore & Curry (1991), Malaza (1994)	Kgaphola & Viljoen (2000), Kgaphola & Viljoen(2004)
Number of Meals	Two (2) meals per day.	Two (2)meals a day Some households began to serve three mealsn per day	Two (2) meals a day.	Three (3) meals a day	Three (3) meals a day
Meal composition	First meal Porridge and relish Porridge made from sorghum, maize, millet	First meal <i>Emasi</i> and porridge Porridge made from sorghum, maize, millet	First meal Porridge and relish Examples of relishes: <ul style="list-style-type: none"> • Legumes • Wild edible leaves with peanuts • Cabbage • Pumpkin leaves • Spinach • Meat 	First Meal Sour porridge Bread with a filling and tea	First Meal Sour porridge Bread spreads and tea
	Second Meal (Evening) 2 Dishes Stiff maize meal porridge and side dish	Second meal (Mid-day) 2 Dishes Stiff maize meal porridge and a side dish	Second meal (Evening) Porridge and relish	Second meal (Mid-day) Rice Bread Meat Cultivated vegetables: <ul style="list-style-type: none"> • Cabbage • Tomatoes • Onions Purchased foods: <ul style="list-style-type: none"> • Powdered milk • Sugar 	Second meal (Mid-day Meal) Porridge substitute with rice, samp and beans, mealie rice and <i>phuthu</i> (dried crumbly porridge)
	-	Third meal (Evening) <i>emasi</i> and porridge from boiled crushed maize	-	-	Evening meal Resembled breakfast and lunch Other non-traditional varieties added: <ul style="list-style-type: none"> • Rice • Chicken, beef or pork

FOOD GROUPS	Beemer (1939)	Jones (1963)	Cappetta (1983) Ogle & Grivetti (1985c), Ogle & Grivetti (1985a), Ogle & Grivetti (1985b)	Huss-Ashmore & Curry (1991), Malaza (1994)	Kgaphola & Viljoen (2000), Kgaphola & Viljoen(2004)
Snacking	Tinkhobe (boiled dried maize grain)	Tinkhobe (boiled dried maize grain)	Tinkhobe (boiled dried maize grain)	Tinkhobe (boiled dried maize grain)	-
	Lukhotse (ground mealies with nuts)	Lukhotse (crushed mealies with crushed nuts)	Lukhotse (crushed mealies with nuts)	-	-
	Roasted groundnuts	Roasted groundnuts	Roasted groundnuts	Roasted groundnuts	-
	Imfe (sweet millet)	Imfe (sweet millet)	Imfe (sweet millet)	-	-
	-	Sugar cane	Sugar cane	Sugar cane	Sugar cane
	-	Bread	Bread	Bread	Bread
	Emahewu	Emahewu	Emahewu	-	-
	Wild fruits	Wild fruits	Wild fruits	Wild fruits	Wild fruits

From literature review it is clear that indigenous green leafy vegetables are still an integral part of the food consumption patterns of the Swazi people although changes in these have been noted. Indigenous green leafy vegetables is a group of various dark green leaves that are obtained from either the wild or come from plants such as pumpkins and sweet potatoes (Jansen van Rensburg *et al.*, 2007; Maunder & Meaker, 2009). In spite of being abundant, indigenous green leafy vegetables remain underexploited and underutilised (Njume *et al.*, 2014; Shiundu & Oniang'o, 2007; Mnzava, 1997). The change in use of these vegetables is attributed to various factors of which the decline in indigenous knowledge related to indigenous green leafy vegetables is significant and this will be discussed next.

2.7 INDIGENOUS KNOWLEDGE ON INDIGENOUS GREEN LEAFY VEGETABLES

Indigenous knowledge refers to the unique, traditional, local knowledge that exists within a particular geographical area that people and the elders have developed (Dweba & Mearns, 2011; Ngwane, 1999; Grenier, 1998; Mtshali, 1995). Indigenous knowledge is characterised by oral transmission and learning through experience and repetitive practices (Misra *et al.*, 2008; Sillitoe, 2000). Indigenous knowledge includes non-technical insight, wisdom ideas, and perceptions and innovates on capabilities (Agrawal, 1995). Indigenous knowledge often promotes sustainable development, and has an environmental protection component that is important in the survival of culture (Magagula, 2005:33; Mavimbela, 2004:26; Warren, 1996). An example of indigenous knowledge is women's expertise in the identification and use of wild plants. Traditionally, Swazi women obtained indigenous knowledge from their elders, and then expanded this knowledge after marriage if they relocated to another area. They then usually passed this accumulated knowledge on to the next generation (Ogle & Grivetti, 1985b). Similarly, a study done in Poland reported that older people born between 1883-1948 recorded larger numbers of identified plant species than those born in 1960-2000 (Luczaj, 2010).

Indigenous knowledge can be easily lost as rural people are constantly experimenting, adapting and modifying traditional methods and ideas (Langill, 2010). Indigenous knowledge must therefore be clearly documented to prevent its loss (Langill, 2010; Raschke *et al.*, 2007; Flyman & Afolayan, 2006; Modi *et al.*, 2006; Agrawal, 1995; Kajembe, Mwenduwa, Mgoo, & Ramadhani, 2000). Modernisation and westernisation has led to a decline of traditional knowledge about edible species as well as its status. Many local people unfortunately treat their own culture, and knowledge and traditions as inferior to western knowledge. Thus local knowledge has not been transferred to the same extent as before and therefore suffered serious erosion (Agrawal, 1995). The documentation of indigenous knowledge will ensure its

widespread use and formation of its archives (Kajembe *et al.*, 2000). Documentation of indigenous knowledge will also prevent loss of biodiversity (Vorster *et al.*, 2008).

The next section deals with the role and contribution of indigenous green leafy vegetables in the Swazi eating patterns.

2.8 ROLE OF INDIGENOUS GREEN LEAFY VEGETABLES IN THE SWAZI EATING PATTERN

Indigenous foods are defined as those foods that have been proven to be used in the community for a long-time (Guerrero *et al.*, 2009). Indigenous green leafy vegetables may be genuinely native to a particular region or introduced to that area through the natural process of farming (Jansen van Rensburg *et al.*, 2007). Green leafy vegetable species are referred to as indigenous to a region once they are included in the local food culture.

Indigenous green leafy vegetables are nutritious, cheap, take less time to cook and can be used when there is food shortage, especially during dry periods, and to prevent food insecurity and hunger among the rural poor (Mavengahama *et al.*, 2013; Luczaj, 2010; Jansen van Rensburg *et al.*, 2007; Modi *et al.*, 2006; Weinberger & Swai, 2006; Vorster, Love & Browne, 2001; Grivetti & Ogle, 2000). Previous generations consumed indigenous vegetables were widely and fewer nutritional deficiencies occurred than what is evident in present times (Maunder & Meaker, 2009; Grivetti & Ogle, 2000). Elderly people appreciated these species as they perceived them as healthy and tasty, and regarded them as part of their cultural identity (Nebel *et al.*, 2006). Indigenous green leafy vegetables formed part of the inhabitants' consumption pattern and they were mainly prepared as potherbs and served as tasty relish with stiff maize or sorghum porridge. They also contributed to dietary diversity and agro-biodiversity at household level (Mavengahama *et al.*, 2013). The next section will discuss the nutritional value of indigenous green leafy vegetables.

2.8.1 Nutritional value of indigenous green leafy vegetables

Indigenous green leafy vegetables are popular because of their richness in nutrients compared to some cultivated vegetables (Faber *et al.*, 2010). Indigenous green leafy vegetables contain significant amounts of nutrients that are essential for human health (Muhanji *et al.*, 2011; Schönfeldt & Pretorius, 2011; Lewu & Mavengahama, 2010; Uusiku *et al.*, 2010; Habwe & Walingo, 2008; van der Hoeven, Osei, Greef, Kruger, Faber, & Smuts, 2013; Engle & Faustino, 2007; Pasquini & Young, 2007; Modi *et al.*, 2006; Grivetti & Ogle, 2000). These include calcium,

phosphorus, magnesium, zinc, vitamin B, β -carotene, vitamin A and vitamin C. Indigenous green leafy vegetables can be used to overcome malnutrition such as vitamin A deficiency as these plants are higher in vitamin A compared to many other cultivated vegetables (Faber & Wenhold, 2007).

The nutrient content of indigenous vegetables depends on the species and quantities consumed as well as cooking methods used (Uusiku *et al.*, 2010; Gockowski, Mbazo'o, Mbah, & Fouda Maulende, 2003). Cooked wild vegetable jute, for example, has a higher iron and zinc level than uncooked leaves (Schönfeldt & Pretorius, 2011). Cooked vegetables are more digestible and have a higher nutritional value although boiling indigenous green leafy vegetables could reduce vitamin C by 81% (Schönfeldt & Pretorius, 2011; van der Hoeven *et al.*, 2013).

Amaranthus, which is a popular indigenous green leafy vegetable among Africans, is rich in β -carotene, calcium, iron and vitamin A (Schönfeldt & Pretorius, 2011). Amaranthus and black nightshade compared to other indigenous green vegetables were found to have the highest known β -carotene content of up to 7.54 mg per 100g of edible portion (Maunder & Meaker, 2009; Weinberger & Msuya, 2004). The high nutritive value of these vegetables can eliminate vitamin A deficiencies among children, pregnant women and the poor (Habwe & Walingo, 2008). Besides being nutritious, indigenous green leafy vegetables are also used for medicinal purpose and this will be discussed next.

2.8.2 Preparation of indigenous green leafy vegetables

Cooking is the most commonly used method of preparing indigenous green leafy vegetables to enhance digestibility and palatability. Indigenous green leafy vegetables (*umbhidvo*) are washed and boiled for 15-30 minutes and served with the cooking water to conserve the valuable water soluble nutrients (Grivetti & Ogle, 2000). Leaves are usually prepared on their own or in a mixture of two or more species and served as relish or accompaniment to a staple (Flyman & Afolayan, 2006; Dlamini & Mdziniso, 2005; Kgaphola & Viljoen, 2004; Vainio-Mattila, 2000; Ogle & Grivetti, 1985a). The reason for mixing indigenous green leafy vegetables species during preparation is to make it more acceptable by counteracting the bitterness and sliminess. Thus *imbuya* (*Amaranthus*) is cooked with *chuchuza* (*Bidens pilosa*) (van der Hoeven *et al.*, 2013; Flyman & Afolayan, 2006; Ogoye-Ndegwa, 2003). Other vegetables are also mixed with indigenous green leafy vegetables to increase their quantity during periods of drought when food scarcity is experienced (Ogoye-Ndegwa 2003).

In current times, other ingredients such as tomatoes, onions, soup powder, salt, cooking oil are also added during preparation of indigenous green leafy vegetable (Faber *et al.*, 2010; Flyman

& Afolayan, 2006; Kgaphola & Viljoen, 2000; Ogle & Grivetti, 1985a). The addition of oil in the preparation increases the bioavailability of β -carotene, however, this should be done in moderation (Faber *et al.*, 2010). Traditionally, cooking oil was not added during the cooking of these vegetables in Swaziland, only salt, groundnuts, sesame seeds or pumpkin seeds were used (Ogle & Grivetti, 1985a; Jones, 1963:76; Beemer, 1939). The *Ligusha* (*Cochorus* species) which is popular in Swaziland, was traditionally prepared by adding aloe ash mixed in water and allowed to settle for the solids to sink to the bottom of the container. The top liquid was then added to the vegetable for a slimy consistency (Ogle & Grivetti, 1985a; Beemer, 1939). Sodium bicarbonate is currently added when preparing the *Ligusha* (*Cochorus spp*) to achieve sliminess and maintain the green colour (Kgaphola & Viljoen, 2000; Ogle & Grivetti, 1985a). This method is also practised in other African countries (Flyman & Afolayan, 2006; Ogoye-Ndegwa, 2003). The addition of bicarbonate of soda, however, has a detrimental effect on vitamin C content of the cooked dish (Nesamvuni *et al.*, 2001).

Ease of preparation is one of the reasons why women prefer indigenous green leafy vegetables as they do not have enough time to cook after a day's work (Ogoye-Ndegwa, 2003). Prepared vegetables, such as those belonging to the *Cochorus* species, take less time to prepare and so vegetable preparation was done before the porridge was ready to be served (Ogoye-Ndegwa 2003). The next section deals with serving indigenous green leafy vegetables on special occasions and to guests.

2.8.3 Serving indigenous green leafy vegetables on special occasions and to guests

In Swaziland, indigenous green leafy vegetables were traditionally served with maize or sorghum meal porridge as part of the usual eating pattern (Ogle & Grivetti, 1985a; Jones, 1963:81). Therefore, rural Swazi people did not serve indigenous green leafy vegetables to visitors as it was seen as a sign of poverty. Some households would even incur debt to purchase alternative food for visitors to ensure that they would think highly of them (Ogle & Grivetti, 1985a). A study in Kenya similarly reported that it was considered undignified to serve indigenous vegetables to a visitor (Ogoye-Ndegwa 2003). Contrary to that, Weinberger & Swai (2006) reported that the majority of people would serve traditional vegetable crops to visitors, and also serve them on special occasions such as at a wedding and on religious holidays. On the other hand, a study done involving South African family members from urban areas reported that they often requested that traditional dishes were prepared during the festive season (Viljoen *et al.*, 2005). Similarly, a study conducted by Pieniak *et al.* (2009) in Ireland about traditional foods being served on festive occasions revealed that they were perceived as more sophisticated and provided pleasure rather than only being eaten for nutritional and health benefits. The next section will be on the medicinal use of indigenous green leafy vegetables.

2.8.4 Medicinal use of indigenous green leafy vegetables

Indigenous green leaves are also popular because of their medicinal value (Lyatuu, Msuta & Lebotse, 2009; van der Hoeven *et al.*, 2013; Ogoye-Ndegwa, 2003; Grivetti & Ogle, 2000; Dladla, 1999; Ogle & Grivetti, 1985a). Indigenous green leafy vegetables have high phytochemicals, which play a crucial role in management of cardiovascular diseases and several other degenerative diseases (Moyo *et al.*, 2013; Uusiku *et al.*, 2010). In the American Caribbean, it is believed that the frequent consumption of traditional vegetables prevented hypertension and diabetes (Gilbert & Khokhar, 2008). According to a study done on a group of diabetic female inmates in Swaziland, it was reported that the frequent consumption of *inkakha* (*Mormodica involucrate*), *inshubaba* (*Mormodica clementidae*) and *emahala* (*Aloe saponaria*) demonstrated an improvement in their diabetes (Dladla, 1999). Some of the indigenous green leafy vegetables are valued for their bitter taste, which produces a more flavourful product that is believed to have healing properties (Silaula, 1999). People with diseases such as HIV/AIDS, cancer and hypertension are advised to consume indigenous vegetables because of their medicinal value (Lyatuu *et al.*, 2009). The crushed leaves of *Cleom gynandra* is used to make a beverage to cure scurvy. These leaves are also boiled and mixed with sour milk to improve eyesight, provide energy and cure marasmus. This dish is also highly recommended for pregnant women (van der Hoeven *et al.*, 2013).

According to Faber *et al.* (2010), amaranthus, in particular, delays hunger improves the complexion and prevents constipation. The indigenous green leafy vegetables used as medicine are not only eaten, but also prepared as solutions for bathing and massaging (Ogoye-Ndegwa 2003). Elderly people in a South African study revealed that indigenous food plants kept them healthy and they will live longer in comparison to people who eat the modern foods, which they believe contribute to poor health (Nebel *et al.*, 2006; Shava, 1999). Another use of indigenous green leafy vegetables is to generate income and this will be discussed next.

2.8.5 Income generation of indigenous green leafy vegetables

Indigenous green leafy vegetables on the other hand, also contributes to income generation, if this avenue is properly exploited (Muhanji *et al.*, 2011; Faber *et al.*, 2010; Parawira & Muchuweti, 2008; Pasquini & Young, 2007; Weinberger & Swai, 2006; Madakadze *et al.*, 2004; Kajembe *et al.*, 2000). The use of indigenous green leafy vegetables for income generation purposes will now be discussed in detail.

Women are the principal agents involved in the marketing of indigenous green leafy vegetables (Muhanji *et al.*, 2011; Quaye *et al.*, 2009; Kepe, 2008; Gockowski & Ndoumbe, 1999).

Indigenous green leafy vegetables are widely sold for income. Those sold include pumpkin leaves, sweet potato leaves, taro leaves and amaranthus (Cloete & Idsardi, 2013; Shackleton, Paumgarten, Mthembu, Ernst, Pasquini, & Pichop, 2010). Indigenous green leafy vegetables are mainly sold during the rainy season when they are in abundance and are obtained from gardens or from neighbours (Quaye *et al.*, 2009; Gockowski *et al.*, 2003). These vegetables require little financial input and the risk of financial losses are much smaller when compared to cultivating chosen vegetables (Muhanji *et al.*, 2011). The next section will discuss the procurement of indigenous green leafy vegetables.

2.9 PROCUREMENT AND PRESERVATION OF INDIGENOUS GREEN LEAFY VEGETABLES

Procurement of indigenous green leafy vegetables is predominantly the domain of females. Worldwide, women and girls are key players in obtaining indigenous green leafy vegetables through engaging in their production and collection, (Kepe, 2008; Modi *et al.*, 2006; Nyomora, 2006; Prasad, 1998; Ogle & Grivetti, 1985a; Jones, 1963:49; Beemer, 1939). Procurement involves the use of the resources from the environment as they exist naturally and do not modify the available supply. In this context, procurement also involves the utilisation of indigenous green leafy vegetables that grow naturally in different areas which adds variety to food products available (Maunder & Meaker, 2009; Grivetti & Ogle, 2000). Traditionally the collection of indigenous green leafy vegetables took place simultaneously when fetching firewood (Kepe, 2008; Ogoye-Ndegwa, 2003; Ogle & Grivetti, 1985a).

The natural environment where indigenous green leafy vegetables grow, ranges from large areas, such as reserves, plantations, riverbanks and swamps to small patches within homesteads gardens and the veld (Kepe, 2008; Modi *et al.*, 2006; Weinberger & Swai, 2006; Kessy, 1998; Ogle & Grivetti, 1985a; Jones, 1963: 69). Permission was customarily sought for the collection of indigenous green leafy vegetables from the senior member of a household, especially if they grew around the kraal or in fields where other crops were cultivated (Kepe, 2008; Ogle & Grivetti, 1985b; Beemer, 1939).

The young leaves are hand-picked, sometimes with their stems. The preferred time for picking is during the early hours of the day when they are still fresh and tender. They are stemmed individually, or collected by pulling out the whole plant when it is about 15-20 cm tall (Faber *et al.*, 2010). The leafy parts that are consumed are the young succulent stems, flowers and very young fruits (Jansen van Rensburg *et al.*, 2007). Examples of indigenous green leafy vegetables include *Imbuya* (*Amaranthus*), *Chuchuza* (*Blackjack*), *Umsobo* (Black nightshade)

and *inkakha* (Bitter melon) to name a few. They grow in soil with limited fertility and are also drought tolerant (Faber & Wenhold, 2007). Indigenous green leafy vegetables in Swaziland are also given as gifts from family members who live next to sites where the vegetables grow (Ogle & Grivetti, 1985a). During the dry season, women collect vegetables along the lakes, rivers and in bushes where it is relatively green (Ogoye-Ndegwa 2003). The next section will be on the preservation of indigenous green leafy vegetables.

2.9.1 Preservation of indigenous green leafy vegetables

It is not possible to consume fresh indigenous green leafy vegetables throughout the year as they are seasonal and most abundant during summer and scarce the rest of the year. Preservation may serve to enhance popularity and extending its availability throughout the year, thus bridging the seasonality gap (Flyman & Afolayan, 2006). Methods of preservation of indigenous green leafy vegetables include, drying in the sun, canning, vacuum packing, minimal processing, refrigeration, freezing and irradiation (Madakadze *et al.*, 2004). Drying is one of the oldest established methods of preservation and occurs naturally. The fresh leaves are sun-dried or can be blanched or cooked and then sun-dried. During cooking the dried leaves are reconstituted in water. Unfortunately, colour and natural taste is affected (Ogle & Grivetti, 1985a; Jones, 1963). Vitamin C is reduced by 95% (van der Hoeven *et al.*, 2013). Electrification of the rural areas has introduced new preservation technology, including blanching and freezing of leaves (Tshikalange & van Averbek, 2006; Kgaphola & Viljoen, 2004).

In a study on preservation of indigenous green leafy vegetables in Swaziland by Masarirambi, Mavuso, Shongwe, Nkambule, & Mhazo (2010), it was reported that harvesting for preservation of these vegetables should be done in a cooler part of the day and they should be dried on a clean, firm surface like black plastic sheets, metal surface or grass mats (*sitsebe*). They further suggested that drying should be done on an elevated surface and in a closed space to improve hygiene and for efficient drying. Pre-drying time and the use of pre-drying treatments such as blanching, reduces enzyme activity and loss of vitamins (Njume *et al.*, 2014; Faber *et al.*, 2010). Dried food can be used in traditional recipes and can save time, fuel and energy during meal preparation.

2.10 CHAPTER CONCLUSION

The human ecological perspective, the theoretical background and the conceptual framework that guided the study have been explained. The factors influencing the food choice process and changes in food culture, together with a historical overview of Swazi eating patterns, were also

discussed. Indigenous knowledge about indigenous green leafy vegetables, the role of indigenous green leafy vegetables in the Swazi eating patterns, procurement and preservation of indigenous green leafy vegetables were also highlighted. The next chapter describes the research design and the methodology followed in the study.

Chapter 3 - Research methodology

3.1 INTRODUCTION

This chapter deals with the research methodology and discusses the research design of the study. It describes the aim and objectives, conceptual framework, conceptualisation, operationalisation, measuring instruments, sampling, data collection and data analysis, as well as the measures taken to ensure quality data.

3.2 RESEARCH DESIGN

A research design is a structure that is used to obtain solutions to research questions (Kumar, 2011: 94). The study employed an exploratory mixed method approach. Mixed methods research is an approach that employs both quantitative and qualitative research and information at some point in the research process (Creswell, 2013:23). Qualitative data tends to be open-ended without predetermined responses, while quantitative information mostly includes responses to closed questions stated in the questionnaire that is used as the measuring instrument. The mixing of data provides a stronger understanding of the research problem than would be the case if either a qualitative or a quantitative method was used on its own (Creswell, 2013:23). The objectives of the mixed method are to elaborate on quantitative results with supportive qualitative data and to integrate quantitative and qualitative data sets to produce well-validated conclusions (Creswell, 2013:24).

In this study, food practices were determined by both qualitative and quantitative techniques. Qualitatively, focus group discussions and direct observations were used. A quantitative approach was employed in the form of a structured one-on-one interview concurrently with observation to ensure triangulation.

The study was explorative, descriptive and cross-sectional in nature. An explorative study is one that looks for patterns and new insights into a chosen area of research. Explorative and descriptive studies may be employed to conduct surveys of people who have had practical experience of the problem to be studied (Salkind, 2011:213; De Vos, 2005:106; Babbie & Mouton, 2001:80). This kind of study is useful when not much is known about the topic of interest (Page & Meyer, 2003:22). As for this study, limited information is available about the

food practices and the knowledge Swazi rural women have about indigenous green leafy vegetables.

On the other hand, a descriptive study sets out to describe a phenomenon or event that exist, without manipulation or controlling any of the elements involved in the phenomenon or event under study. It represents a picture of the specific details of a situation, social setting or relationship (Neuman, 2006:22; De Vos, 2005:106; Page & Meyer, 2003:22). The descriptive information will reveal the elements that are most relevant to the issue of interest, and this can be integrated with other available knowledge (Page & Meyer, 2003:22). For this study, the researcher was able to expand on past studies relevant to the topic of food practices, knowledge and use of indigenous green leafy vegetables in Swaziland. A cross-sectional study, and the use of samples, compares people from different age groups at a specific time (Salkind, 2011:253). Cross-sectional studies are convenient and affordable because they are done within a specific time frame, and people tend to be located in the same place for sufficient time for the completion of the research (Salkind, 2011:253). In this study, the food practices and knowledge regarding indigenous green leafy vegetables of two generations of Swazi women were explored and compared.

3.3 RESEARCH AIM AND OBJECTIVES

The aim of the study was to determine, describe and compare the knowledge two generations of rural Swazi women from the Eluyengweni community had about indigenous green leafy vegetables (in Figure 3.1) and how it was used in their food practices. This was done not only to explore the extent to which indigenous green leafy vegetables are used and included in their food practices, but also to see how the consumption patterns have changed over time. The following objectives and sub-objectives were formulated for this study.

1. To determine and describe the **availability** and **accessibility** of indigenous green leafy vegetables in the Eluyengweni community
 - 1.1 To describe the **natural** and **physical environment** and how it contributes to the availability and accessibility of indigenous green leafy vegetables
 - 1.2 To determine and describe the **economic and political environments** and how they contribute to the use and accessibility of indigenous green leafy vegetables
2. To determine, describe and compare the knowledge of two generations of rural Swazi women about indigenous green leafy vegetables

- 2.1 To determine, describe and compare the ability of the study group to **identify** and **name** the indigenous green leafy vegetables growing in Eluyengweni
 - 2.2 To determine, describe and compare the study group's **knowledge** on the **availability** of the indigenous green leafy vegetables
 - 2.3 To determine, describe and compare the study group's **knowledge** on the **use** of indigenous green leafy vegetables
 - 2.4 To determine, describe and compare how the **knowledge** of the use of indigenous green leafy vegetables is **transferred**
3. To determine, describe and compare the consumption patterns of the study group regarding indigenous green leafy vegetables
- 3.1 To determine and describe the **eating patterns** of indigenous green leafy vegetables of the study group
 - 3.2 To determine and describe the inclusion of indigenous green leafy vegetables on **special occasions**
 - 3.3 To determine and describe the study group's **familiarity, preference rating and frequency of consumption** of indigenous green leafy vegetables
 - 3.4 To determine and describe the study group's **acceptability** to indigenous green leafy vegetables
4. To determine and describe the **factors contributing to the changes that have taken place in the** study group's **consumption of** indigenous green leafy vegetables
- 4.1 To determine and describe **the changes that occurred** in the study group's consumption of green leafy vegetables
 - 4.2 To determine and describe the **factors contributing to the change** in the study group's consumption of indigenous green leafy vegetables.

3.4 CONCEPTUAL FRAMEWORK

The conceptual framework for this study, given in Figure 3.1, was adapted from the food choice process model of Viljoen (2009:23). The aim of the conceptual framework is to illustrate the major driving forces behind the observed changes in the food systems. The model indicates where and how each of the environmental levels of the human ecological framework operates in the food choice process. The conceptual framework served as a guide for the study.

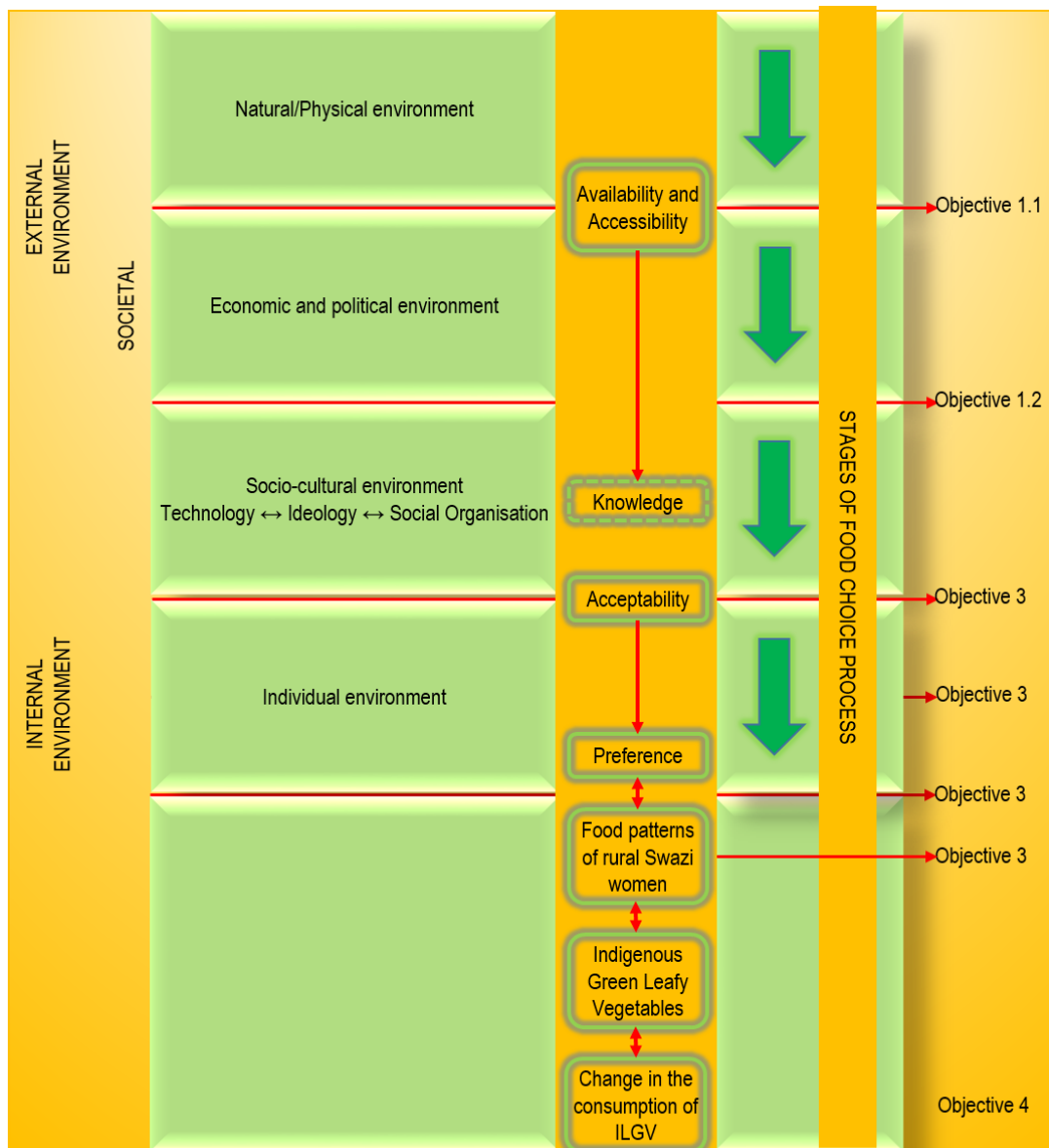


FIGURE 3:1 CONCEPTUAL FRAMEWORK¹ (ADAPTED FROM VILJOEN, 2009:23)

Food choice is influenced by a number of interrelated factors that can be grouped as external and internal environmental factors. The external environmental factors include the natural or physical, economic and political, and socio-cultural environment while the internal environment includes the individual environment.

The natural or physical environment includes the climate, atmosphere, soil and water resources, minerals, vegetation and animal life, and this determines the food available to people in that area. From the available or potentially available food, not everything will be selected for consumption. Consumption is further determined by the economic and political environments that determine affordability. Thus, accessibility of food is from the available food resource.

¹ILGV Indigenous green leafy vegetables

Furthermore, the socio-cultural environment determines which foods are socially and culturally acceptable as explained in Chapter 2 (see 2.3.1.3).

The internal environmental factors encompass individual factors such as the values, knowledge, attitudes and beliefs of an individual that are used in making the ultimate food choice. These personal attributes determine the food that is preferred from what is available and acceptable. It is also only during this stage that the individual's characteristics, as shaped by culture, would steer the food choice process (Fieldhouse, 1995:3-6). Food preferences therefore indicate an individual's personal motivation to choose from the available and acceptable food (Kittler *et al.*, 2011:14; Viljoen & Gericke, 1998). If the individual likes a certain food, indigenous green leafy vegetables in this case, it will be chosen and consumed.

The double pointed arrows in Figure 3.1 between preference and food consumption patterns of rural Swazi women indicate that the Swazi women will only include their preferred indigenous green leafy vegetables as part of their food pattern. The two-way arrow between food consumption patterns symbolises that this study will address indigenous green leafy vegetables as they are interrelated with the people's food practices. Lastly, the factors contributing to change in the use of indigenous green leafy vegetables will be investigated as well. The double pointed arrows mean that the factors are not one-dimensional; rather they interact with each other in a dynamic fashion over time and in different ways for different individuals.

3.5 CONCEPTUALISATION OF MAIN CONCEPTS

The conceptualisation of the key concepts is highlighted.

Availability may be described as food available in the environment (Blijham, De Kan & Niehof, 2007). It also refers to an array of food options that are present in the food system that are acceptable and affordable (Contento, 2011).

Accessibility relates to the ease, or difficulty that people have in obtaining food (Whitney & Rolfes, 2013; Food and Agriculture Organization, 2006). The less effort needed to obtain food, the more likely food will be eaten (Whitney & Rolfes, 2013:280).

Acceptability of a food implies that the food or food product induces a positive response from the individual (Cohuet, Marquer, Shepherd, Captier, Langendorf, Ale, Phelan, Manzo, & Grais, 2012; Sobal & Bisogni, 2009). Apart from individual differences such as the biological and

physiological characteristics of a person, it is also guided by cultural norms, values and beliefs (Rozin, 2006:19; Sobal *et al.*, 2006:2).

Knowledge can be defined as information, an understanding or skill that one gets from experience. It is what people know, the facts, information, skills and understanding gained by an individual through learning or experience about something or being informed about it (Parraga, 1990:662).

Indigenous green leafy vegetables are leaves and stems of plants that rural and urban communities find acceptable and use habitually as vegetables according to custom (Guerrero *et al.*, 2010; Jansen van Rensburg *et al.*, 2007:137). These plants originate, belong to and are locally known in an area, country, and region or district (Medoua & Oldewage-Theron, 2014; Cloete & Idsardi, 2013; Faber *et al.*, 2010).

Food practices are the overall activities and behaviour of an individual during the choice, usage and ultimate consumption of food (Kittler *et al.*, 2011:2; Viljoen, 2009:3; Fieldhouse, 1995:1). It includes the food choices and consumption patterns of a group and all the food-related behaviours of the group (Viljoen *et al.*, 2005).

Food consumption patterns describe the content of a daily food intake and how the types of food are spread throughout the day as well as during a specific season. It is determined by seasonal availability and the accessibility of food (Viljoen *et al.*, 2005).

Eating pattern is a concept that implies there is a repeating pattern over a given period in which people select, prepare and consume food from available and acceptable food options (Whitney & Rolfes, 2013:35). It includes the pattern of the meals themselves and their composition, and how the food is disseminated to individuals or a group of individuals throughout a day or for a specified time (Viljoen & Gericke, 1998:90).

Meal pattern is a term that applies to the number and distribution of meals throughout the course of a day. It also refers to specific constituents of the various meals (Viljoen *et al.*, 2005).

Meal composition refers to food items served or eaten at a specific meal or occasion (Kgaphola & Viljoen, 2004).

Food choice involves the process of deciding which foods are to be eaten based on the food available and accessible at a specific time (Viljoen, 2009:15). It also involves the selection and

consumption of food and beverages considering how, when, where and with whom people eat with and other aspects as related to food and eating behaviour (Kittler *et al.*, 2011:3).

Food preference is the degree of like and dislike a person has for a particular food. Food preference therefore indicates an individual's degree of liking and personal motivation to choose from the available, acceptable food (Franchi, 2012; Viljoen & Gericke, 1998:80).

Familiarity refers to the degree to which an individual knows certain foods (Viljoen & Gericke, 1998).

3.6 OPERATIONALISATION

This section includes the measuring techniques that were used for this study and how the concepts were measured. Table 3.1 gives a summary of the objectives and sub-objectives, concepts, dimensions, indicators and the methods for measuring them.

TABLE 3.1: OPERATIONALISATION TABLE

OBJECTIVES AND SUB-OBJECTIVES	CONCEPT	DIMENSION	INDICATORS	METHOD OF DATA COLLECTION	MEASUREMENT
1. To determine and describe the availability and accessibility of indigenous green leafy vegetables in the Eluyengweni community.					
1.1 To describe the natural and physical environment and how it contributes to the availability and accessibility of indigenous green leafy vegetables.	Natural environment	Availability	Climate, season, rainfall, type of soil	Secondary data Observation Focus group discussion Structured face-to-face interview	Documents and literature Observation check list Focus group topic 1 Question B1,B2,B3, B6,B7, B8, B9,C2,C3,C4
	Physical environment	Accessibility	Infrastructure, roads, buildings, vacant sites , shops, markets	Observation	Observation checklist
1.2 To determine and describe the economic and political environment and how it contributes to the use and accessibility of indigenous green leafy vegetables.	Economic environment	Employment rate	Employment Business, shopping facilities	Focus group discussion Structured face-to-face interview	Focus group discussion topic1 Questions A5 and A7
		Household food budget	Money available for household food purchasing		
2. To determine, describe and compare the knowledge of two generations of rural Swazi women on indigenous green leafy vegetables					
2.1 To determine, describe, and compare the ability of the study group to identify and name the indigenous green leafy vegetables growing in Eluyengweni	Identify	Correct identification of indigenous green leafy vegetables		Focus group discussion Structured face-to-face interview	Focus group topic 1 Question C8
	Name	Correct naming of indigenous green leafy vegetables			
2.2 To determine, describe and compare the study group's knowledge on the availability of the indigenous green leafy vegetables	Availability	Where grown	Sites and locations for collection	Focus group discussion Structured face-to-face interview	Focus group topic 1 Questions C1, Uneven numbers C9 (C9.1 – C9.25), even numbers C9 (C9.2 – C9.26)
		Where offered/sold	Market (community, town, street vendors)		
		When available	Season		

OBJECTIVES AND SUB-OBJECTIVES	CONCEPT	DIMENSION	INDICATORS	METHOD OF DATA COLLECTION	MEASUREMENT
2.3 To determine, describe and compare the study group's knowledge on the use of indigenous green leafy vegetables	Use -Food -Other uses	Preparation, Preservation	Cooking and serving Keeping for future use	Focus group discussion Structured face-to-face interview	Focus group topic 3 Questions B3,B4,D8- D11 D8-D11
2.4 To determine, describe and compare how knowledge on the use of indigenous green leafy vegetables is transferred .	Knowledge transfer Use of indigenous green leafy vegetables	Source of knowledge Knowledge on collection, preparation, and serving	Previous generations, Media, extension workers	Focus group discussion Structured face-to-face interview	Focus group topic 1 Questions C4, C5, C6, C7
3. To determine, describe and compare the food consumption patterns of the study group regarding indigenous green leafy vegetables.					
3.1 To determine and describe the extent to which of indigenous green leafy vegetables are included in the study group.	Eating patterns	Meal patterns (Weekdays) Meal composition (Weekdays)	Number of meals Type of foods eaten	Structured face-to-face interview	24-hour recall, Question D1,D2,D3,D6, D7,D8,D9 F2, F3
3.2 To determine and describe the inclusion of indigenous green leafy vegetables on special occasions	Special occasion	Traditional occasions Modern occasion	Traditional weddings funerals, culture days Christmas, western/ white wedding	Focus group discussion Structured face-to-face interview	Questions D12 – D16
3.3 To determine and describe the familiarity, preference rating and frequency of consumption of indigenous green leafy vegetables by the study group.	Familiarity Preference rating Frequency of consumption	Familiar Degree of liking Number of times eaten	Known Unknown Like Dislike Daily Weekly Monthly	Structured face-to-face interview	Questions Uneven numbers D17 (D17.1 – D17.71) D4,D5 D6,Even numbers D17 (D17.2 – D 17.48), D18-D23
3.4 To determine and describe the acceptability of indigenous green leafy vegetables by the study group	Acceptability	Attitudes Values Beliefs-taboos	Preference rating Frequency of consumption		D24 – D29

OBJECTIVES AND SUB-OBJECTIVES	CONCEPT	DIMENSION	INDICATORS	METHOD OF DATA COLLECTION	MEASUREMENT
4. To explore and describe the changes in the consumption of indigenous green leafy vegetables of the study group					
4.1 To determine and describe the changes that occurred in the consumption of indigenous green leafy vegetables .	Changes in the community Changes in the consumptions of green leafy vegetables	Modernisation Urbanisation Migration Development Modernisation	Determine: -availability -accessibility -acceptability Infrastructure Technological advancement Infrastructure change Westernisation Acculturation	Focus group discussion Structured face-to-face interview	Focus group topic 2 Questions B5,E1,E3,E4,
4.2 To determine and describe the factors contributing to the change in consumption of indigenous green leafy vegetables by the study group.	Change in availability and accessibility accessibility acceptability	Modernisation Global climate change Modernisation Urbanisation Attitude Values Beliefs Knowledge	Population growth Technological advancement Infrastructure Built environment Likes/dislike Taboos Lack of knowledge	Focus group discussion Structured face-to-face interview	Focus group topic 2 Question E2,E5

3.7 MEASURING INSTRUMENTS

An explorative mixed method approach was followed in this study, and data was collected in two phases. The first phase comprised of the focus group discussions to collect qualitative data and this was used to formulate questions for the structured interview questionnaire of the second phase. The second phase involved the use of a structured interview questionnaire to collect quantitative data. Observations were done concurrently in both phases. Each of these data collection techniques will be discussed in detail below.

3.7.1 Phase 1: Focus group discussions

Focus group discussion was a suitable data collection technique for the study because it allowed the researcher to explore attitudes, opinions and perceptions towards a study question as well as local practices, customs and beliefs of the participants through an open discussion between members of a group and the researcher (Kumar, 2011:127; Hubert, 2004:44). Focus group discussions can also be used to reveal issues pertinent to an area of a research where there is little knowledge, and can provide qualitative data to help interpret quantitative data (Page & Meyer, 2003:112).

In this study, the aim of the focus group discussions was to first explore and get acquainted with the study group and the physical and structural environment of the study area. Through the focus group discussion, a broad overview of the knowledge, availability and the utilisation of indigenous green leafy vegetable were sought. The focus group also explored the various dimensions of the concept on food practices and how it contributed to the use of indigenous green leafy vegetables (see Addendum A for the topics/probes that were covered). In this study, after collecting the qualitative information the researcher coded the responses and descriptively analysed the findings then used the information to construct a questionnaire for the quantitative phase of data collection.

3.7.2 Phase 2: Face-to-face interviews

A structured interview is a basic tool used in survey research (Salkind, 2011:199). It involves detailed oral interaction between an interviewer and an interviewee. A structured interview allows flexibility by letting the researcher ask the question in any direction. It also allows for the inclusion of first-hand knowledge of people's feelings and perceptions, which might otherwise be difficult to come by. Salkind (2011:199) pointed out that non-verbal behaviour of the interviewee, the setting and other information that might provide valuable information can be noted during face-to-face interviews. Other advantages of the face-to-face interaction are

immediate feedback from respondents, the ability to explain complicated tasks and to use questions that require visual contact to speed up the interview or improve data quality as well as being suitable for illiterate people (Neuman, 2006:197).

In this study, the participants were also more at ease, as the interviews were held in the familiar, comfortable secure environment of their own homes. Face-to-face interviews contributed to the richness of the data through detailed frank discussions to collect information (Creswell, 2013:34). The interviewer also observed the surroundings and noted items of importance to the study's aims and objectives. The researcher took photographs of indigenous green leafy vegetables that were used for identification. These photographs were taken in their original sites. During the face-to-face interviews each of these photographs were shown to the interviewee to ascertain whether they had knowledge of them and could correctly identify the indigenous green leafy vegetables. This method of collecting data was proven to be suitable for communication with low literacy respondents and saved time (Creswell, 2013:160; Neuman, 2006:197; Salkind, 2011:199).

The interview questionnaire consisted of closed and open-ended questions (see Addendum B). The interview was conducted in Siswati, the home language of the respondents. The questionnaire comprised the following sections:

Section A: Demographic information

Section B: Availability and accessibility of indigenous green leafy vegetables

Section C: Knowledge on indigenous green leafy vegetables

Section D: Food practices regarding indigenous green leafy vegetables

Section E: Changes in the consumption of indigenous green leafy vegetables

Section F: 24-hour dietary recall.

Each section is briefly discussed

Section A: Demographic information.

Demographic information established information that characterises the interviewee (Salkind, 2011:198). For this study, closed-ended questions were used to collect data on the demographic profile of the respondents. The information included the respondent's surname, marital surname, age, educational level, employment, living arrangements, religion and questions pertaining food preparation as these had an influence on the choice of food.

Section B: Availability and accessibility of indigenous green leafy vegetables.

Both closed-ended and open-ended questions were asked in this section. Questions related to where indigenous green leafy vegetables were available in the community, the sites, where they grow and how they were used when available. Respondents were also asked to indicate the reasons why some indigenous green leafy vegetables were not available in the area and how easy it was to collect them. Lastly, questions on homestead gardens and what they cultivated were asked in this section. In the open-ended questions, respondents had the opportunity to give reasons for the answers.

Section C: Knowledge of indigenous green leafy vegetables

This section dealt with each respondent's knowledge of indigenous green leafy vegetables in relation to their source for consumption and the person responsible for purchasing them if purchased. Questions were also asked on how and where they had obtained their knowledge regarding the collection, preparation and consumption of indigenous green leafy vegetables. Photographs of the indigenous vegetables were used to ascertain the respondent's knowledge and ability to identify and name each (see Addendum B). This section was used to measure familiarity and knowledge on indigenous green leafy vegetables in terms of where they grow and the seasonal availability.

Section D: Food practices regarding indigenous green leafy vegetables

In this section, the respondents were asked questions on their eating patterns and if they liked indigenous green leafy vegetables and the reasons for liking them, who prepared the indigenous vegetables, the time of the day when they were usually eaten and the accompaniments served with them. Questions related to how they used surpluses of these vegetables and the methods of preservation were asked. Information on whether indigenous green leafy vegetables were served on special occasions and to guests was also sought in this section.

Familiarity, preference and frequency of consumption of indigenous green leafy vegetables and cultivated vegetables were determined. The vegetables were listed in a table where by the respondents were asked how familiar they were with them by indicating whether they knew the vegetable or not. The preference rating was measured on, a 5-point Likert-type to determine the degree of liking or disliking of each vegetable, (where 1 = dislike very much, 2 = dislike, 3 = neutral, 4=like and 5 = like very much). The frequency of consumption of each vegetable was measured by asking the respondents to indicate the consumption frequency as either per

day, week, and month or only on special occasions. Respondents were, in addition, also asked to list their favourite and most disliked indigenous vegetables and their reasons for liking and disliking these vegetables. Furthermore, they were asked to give the most important reasons why indigenous green leafy vegetables were consumed and about their taboos, if any, with regard to these vegetables.

Section E: Changes in the consumption of indigenous green leafy vegetables

In this section of the questionnaire, respondents were asked to state what changes they had observed in the community since childhood and in their consumption of indigenous green leafy vegetables. They had to state the year in which the changes had occurred, as well as the reasons for the changes in the community.

Section F: 24-hour dietary recall

The purpose of the 24-hour recall was to collect information on the food consumed the previous day and to determine the inclusion of indigenous green leafy vegetables in their meals. The participants were asked to recall, in detail, all the food and beverages they had consumed the previous day.

3.7.3 Observations

Both phases of data collection, holding focus group sessions and structured interviews took place, while constant observation was happening at the same time. Observation is an act of noting a phenomenon in the research site using the five senses of the observer with a recording instrument (Creswell, 2013:166; Creswell, 2011:193). The observations were based on the research objectives and the physical setting, the participant's activities and interactions were noted as they were recorded in a notebook (Creswell, 2013:166). Photographs of the indigenous green leafy vegetable and other relevant objects were taken to illustrate the observations. Observations were done to complement the information from the structured interview and focus group discussions. (See observation checklist Addendum C).

Both the focus group discussion and structured interview questionnaire were pilot tested, and the field workers were trained before the collecting data of the study commenced.

3.8 PILOT TESTING OF FOCUS GROUP DISCUSSIONS AND STRUCTURED INTERVIEWS

Pilot testing involved trying out the questions on a group of people who share similar characteristics with the research participants to see if they made sense (Creswell, 2013:164). For this study, pilot testing was done on a convenient, accessible community with the same geographic proximity. One focus group discussion was held with a group of six women from a neighbouring community. Convenience sampling was used to select the participants. Ten face-to-face interviews were also conducted with rural women in a neighbouring community to pilot test the structured questionnaires. Ladies of the same age groups as those that would participate in the final data collection were selected for pilot testing namely those between (25-45years and 46-60years). The natural environment of the community where the pilot testing was conducted is similar to the study area. After pilot testing the questionnaire, minor changes were made. Some of the questions were rephrased for clarity, and others were simplified to shorten the interview time.

3.9 TRAINING OF FIELDWORKERS

Before the data collection commenced the researcher held a training session with the fieldworkers. They were informed on the goal of the study and the research objectives. They received training in administering the questionnaire and use of the instrument and how they should conduct themselves when collecting data. The interviews were conducted by the researcher assisted by six fieldworkers. These interviews were conducted at the homes of the respondents.

3.10 STUDY AREA AND POPULATION

The study was conducted at Eluyengweni, a rural community situated in the Middleveld agro-ecological zone of Swaziland. According to the Government of Swaziland (2010), there were 626 households, with a population of 2 590 people, of which 1 296 were females. The unit of analysis for the study was rural women of 25 years and older.

3.10.1 Gaining access to the community

Gaining access means getting approval or permission from the individual or authority in charge of the research site to conduct research. De Vos (2005:280) cautions that it is imperative to

seek permission to enter the field that has been chosen, in order to get the study started, so that community members are informed about the research project and what it seeks to accomplish. Kuhnlein *et al.* (2009), emphasise that in gathering information from rural communities, certain procedures must be employed first, to ensure local collaboration. Gaining access also means finding an individual who can provide access to the research site and assist in explaining the purpose of the study to the study population (Creswell, 2013:151). Entry to the community was gained through the Agriculture Extension Worker from the Home Economics section of the Department of Agriculture and Extension in the Swaziland Ministry of Agriculture.

The extension worker was requested to assist with gaining access and introducing the researcher to the chief of the community. She is acquainted with the chief and spokesperson of the community and has good rapport with the women in Eluyengweni community, and often works with them on food-related matters and other rural women development projects. She was therefore the most suitable person to assist the researcher to gain access to the community. The tribal chief of the area granted the researcher permission to conduct the research in the community. Respect of local customs and use of the local language to assist the project was also regarded as essential (Kuhnlein *et al.*, 2009).

3.11 SAMPLE AND SAMPLING

Two generations of women were studied, the first comprised those between the ages of 25–45 and the second one consisted of those who were older than 45 years. Studying two or three generations, uncovers various transmission processes regarding food and food ways information among people (Macbeth & MacClancy, 2004:44). A large sample size is needed when non-probability techniques are used to ensure reliability of the results and to meet the requirements of the statistical test used (Creswell, 2011:174; Babbie & Mouton, 2001:191). Description of the sample and sampling of each phase will be discussed below.

3.11.1 Phase 1: Focus group discussion

In this study, purposive sampling was used to recruit the participants for the focus group discussions. This type of sampling is used when one wants to construct a historical reality or describe a phenomenon where little is known (Kumar, 2011:207). The researcher used her discretion as to who could provide the best information to attain the objectives of the study as suggested in literature (Kumar, 2011:207; Neuman, 2006:268). Laypersons and expert females were included in the study to maximise the differences. In total, three focus group discussions were held, two with nine older women (older than 45 years) and one discussion with seven

younger women (between ages 25 and 45). Women were the most suitable participants because they were traditionally responsible for the collection and preparation of indigenous green leafy vegetables. According to Hubert (2004) and Macbeth & MacClancy (2004:44), the inclusion of two generations in a study of food habits usually brings to light transmission processes on food usage and food habits among the generations. Careful planning was to recruit participants, seeking a suitable venue and permission and developing relevant questions to guide the discussion.

3.11.2 Phase 2: Face-to-face interview

For the second phase, purposive non-probability sampling was used. This involved selecting individuals who were available to be studied (Creswell, 2013:154). The community consisted of 626 households, so to get hold of the respondents, all the households were visited and those that were available were interviewed. This meant that each element had an equal and independent chance of being selected for inclusion in the sample (Kumar, 2011:200). A total of 102 women participated in the one-on-one interviews. To ensure equal distribution of the two generations, it was envisaged to have equal representation of each generation.

3.12 DATA COLLECTION

A discussion of each of the techniques followed in the two data collection phases follows. Data collection was done during the spring and summer of 2011 (August to November) when indigenous green leafy vegetables were in abundance. During the focus group sessions and the individual interviews, the discussions were conducted in the vernacular, SiSwati. This ensured that the participants better understood what was being asked of them.

3.12.1 Phase 1: Focus group discussions

The researcher defined the purpose and expected outcomes of the research project to each group. Using the topic guide, which consisted of open-ended questions, the researcher then facilitated the discussion (see Addendum A). Topics explicated were on specific aspects related to the availability, knowledge, utilisation and current food consumption patterns and changes in indigenous green leafy vegetables.

The extension worker, who acted as a research assistant, took notes during the proceedings. An audiotape recorder was also used to capture each discussion. For clarity, the facilitator would ask participants to elaborate on their responses. The group discussion lasted for

approximately two hours and its outcome served as a foundation for the development of the questionnaire. Member checks were done after two weeks with each focus group to verify the findings and interpretation thus ensuring credibility.

3.12.2 Phase 2: Face-to-face interviews

In the second phase, structured face-to-face interviews were conducted with the key person in the home responsible for food preparation as recommended by Hubert (2004). The best way to gather indigenous knowledge and details about eating practices is to visit people in their homes and to talk to women and elders as they are the most knowledgeable about food-related topics (Langill, 2010). The aim of the structured interview was to gather detailed information about the extent and use of indigenous green leafy vegetables. The researcher and fieldworkers used the paper-based questionnaire as a guide to structure the interview and to record the responses directly onto the questionnaire (see Addendum B).

3.12.3 Observations

The researcher observed what leafy vegetables grew naturally and what was cultivated in the local physical environment. Photographs were taken of the plants in their natural habitats and local names of the plants were recorded. Observations regarding which food items were offered in local shops, and at both formal and informal markets, were noted. An inventory of the food on sale and the price of the items were recorded (see Addendum C for the observation checklist).

3.13 DATA ANALYSIS

The data analysis of the two phases of data collection will be discussed now.

3.13.1 Phase 1: Focus group discussions

Data analysis involves the process of bringing order; structure and meaning to the collected data (De Vos, 2005:333). Data from audiotape focus group discussions were transcribed verbatim, corrected and edited as Miles and Huberman (1994:430) has noted. Care was taken to translate from Siswati into English correctly without losing the original meaning of data. The transcripts were read through and coded, key themes were identified, summarised and described.

3.13.2 Phase 2: Face-to-face interview

Data entry and analysis for closed-ended questions were first coded, captured in a Microsoft Excel spreadsheet and then screened for typing and coding errors and corrected. The data was then entered into the Statistical Analysis Software package (SAS) Version 9.3 by a staff member of the Department of Statistics at the University of Pretoria. The open-ended questions and the results from the 24-hour recall information were descriptively analysed by first grouping similar responses, then describing the outcomes. SAS was also used to calculate percentages and frequencies. The means, median and mode values were also calculated from the responses.

3.14 DATA QUALITY

A number of measures were taken to ensure the quality of the data in each phase of the study. There are different ways in which validity and reliability can be achieved in quantitative and qualitative research. The different measures will be discussed below as both qualitative and quantitative data were collected in this study.

3.14.1 Phase 1: Focus group discussions

Qualitative validity and qualitative reliability ensured the quality of data obtained in this phase. The following measures were taken to combat error in the first phase of data collection in the study. The quality of the first phase was thus ensured by credibility, transferability, dependability and conformability.

Credibility Credibility involves establishing that the answers in qualitative research are believable from the perspective of the participants in the research (Bloomberg & Volpe, 2015:125; Kumar, 2011:185). To ensure credibility the researcher persistently observed the women in the community. Triangulation was also applied in the study through the various data collection techniques used which were focus group discussions, structured interviews together with observations. Different types of media were used to document the findings such as photographs, audiotape recordings, the structured interview questionnaires and observation data sheets. The member checks performed with each focus group verified the results and interpretation. This further enhanced and contributed to the credibility of the findings.

Transferability Transferability refers to assessing whether the findings can be applied to another context or to other participants or not (Bloomberg & Volpe, 2015:126; Kumar, 2011:185;

Babbie & Mouton, 2001:277). To ensure transferability the researcher used purposive sampling. Data was captured until saturation was reached to ensure that detailed descriptions of the data for the specific situation could be given (Babbie & Mouton, 2001:278).

Dependability Dependability is the degree to which a measurement procedure produces similar outcomes when it is repeated (Bloomberg & Volpe, 2015:125; Kumar, 2011:185; Babbie & Mouton, 2001:278). Triangulations of several techniques of data collection were used. In this study, focus groups, structured interviews and observation were used thus dependability was ensured. Furthermore, clearly conceptualising all concepts contributed to the dependability of the study. The researcher developed clear and unambiguous questions (see Addenda A and B). Each topic in the focus group discussion and questions in the structured face-to-face interview measured specific concepts.

Confirmability Confirmability refers to whether the results of the enquiry were true findings and not what the researcher wanted to get from the study. This was ensured by checking or revising the data transcribed from the audiotape recordings, consulting the field notes, questionnaires and observation notes, and engaging in member checks. The literature reviewed also confirmed the findings as the results were related to the existing literature on the use of indigenous green leafy vegetables in Swaziland.

3.14.2 Phase 2: Face-to-face interview

High quality data in quantitative studies gives accurate, consistent measures of the objective truth (Neuman, 2006:315). The qualities of the study for the face-to-face interviews were ensured by taking the following measures to ensure reliability and validity.

Reliability Quantitative reliability means the results received from the participants are consistent and stable over time (Creswell & Clark, 2011:211). Reliability of an instrument also means that it is dependable, consistent, predictable and honest (Kumar, 2011:181; Neuman, 2011:214). This is achieved when instruments provide constant results when repeated measure is made (Creswell, 2013:253; Salkind, 2011:121). This was achieved by pilot testing the questionnaire. The interview questions were also clear. The environment was also comfortable and non-threatening because the interviews for this study were carried out in the respondents' homes. Reliability was also ensured by training fieldworkers. The researcher and fieldworkers discussed the interview questions before the structured interview commenced to clarify their purpose and meaning.

Validity Qualitative validity means that the scores received from the participants are meaningful indicators of the construct being measured. It also refers to truthfulness (Neuman, 2006:214). Validity was further ensured by triangulation, meaning that different methods were used for collecting data, focus group discussions, structured interview, observation and member checks.

Content validity Content validity was ensured. Content validity has taken place if the items measured related to the content and measured what was the intention to measure (Creswell, 2013:10; Kumar, 2011:180). This was ensured by discussing the research questions with the research assistants for clarity. In addition, each question in the topic guide for the focus group discussions, and the structured questions, were connected to an objective of the study.

Construct validity Construct validity determines the degree to which an instrument successfully measures a theoretical construct. It deals with the meaning of an instrument that is what it is measuring and why it operates the way it does (Neuman, 2006:213; De Vos, 2005:162). Construct validity was ensured by a comprehensive review of relevant literature and clear definition of concepts.

Face validity Face validity means each question or item on the research instrument had a logical connection with an objective (Kumar, 2011:180). Each question was connected to an objective of the study, thus face validity was ensured (see Table 3.1). The researcher and the fieldworkers also discussed the questions to make sure each measured what it was intended to measure.

3.15 ETHICS

Ethics approval was granted by the Ethics Committee of the Faculty of Natural Agricultural Sciences at the University of Pretoria. The ethics number is (EC110701-052) (see Addendum E). Permission to conduct the research in the community was sought and granted by the chief responsible for the study area (see Addendum E). Participation in the study was voluntary, both in the focus groups and for the individual interviews. Informed consent was obtained after the study was explained to them, including the proviso that they could withdraw from the study anytime even after giving their consent. Permission to record the focus group discussions was requested at the beginning of the meeting and no participant objected. Respondents and participants were guaranteed confidentiality and anonymity, and they were informed that the study was voluntary and they could withdraw at any point.

3.16 CHAPTER CONCLUSION

This chapter presented the research design and approach used to meet the study aim and objectives. The conceptual framework and the conceptualisation of main concepts were explained. The operationalisation and instruments used in the measurement of the key variables of the study were addressed. Detailed discussion of the data collection process, including gaining access to the subjects, measuring techniques, sample and sampling procedures used in data gathering and analysis were presented. Measures to ensure the quality of the study were also given. The next chapter will present and discuss the results.

Chapter 4 – Results and discussion

4.1 INTRODUCTION

This chapter deals with the presentation and discussion of the results of the study. The results of the first phase and the second phase will be combined to address the objectives and sub-objectives of the study in a holistic manner.

4.2 LOCATION OF THE STUDY AREA

The study was conducted in the rural community of Eluyengweni, situated at 26.53S and 31.23E in the Middleveld (*Inkhabave*) ecological region, west of Manzini in Swaziland. It covers an area of 12.26 square kilometres and the population size is 3913 (Government of Swaziland, 2010). It is governed by *Lobamba lomdzala inkhundla*. Each administrative region has regional councils called *Tinkhundla*. *Inkhundla* is a name of a constituency or rural council in Swaziland. *Tinkhundla* are administrative areas and traditional meeting places where matters of local concern are discussed. In modern Swaziland, the “*Tinkhundla*” have evolved into economic growth points and local government administration centres. Each *Inkhundla* is made up of about ten chiefdoms (*Imiphakatsi*).

The area consists of a dry and open undulating landscape. It is located next to the great Usuthu River. Agricultural production is extensive in this area. Figure 4.1 shows the location of the study area.

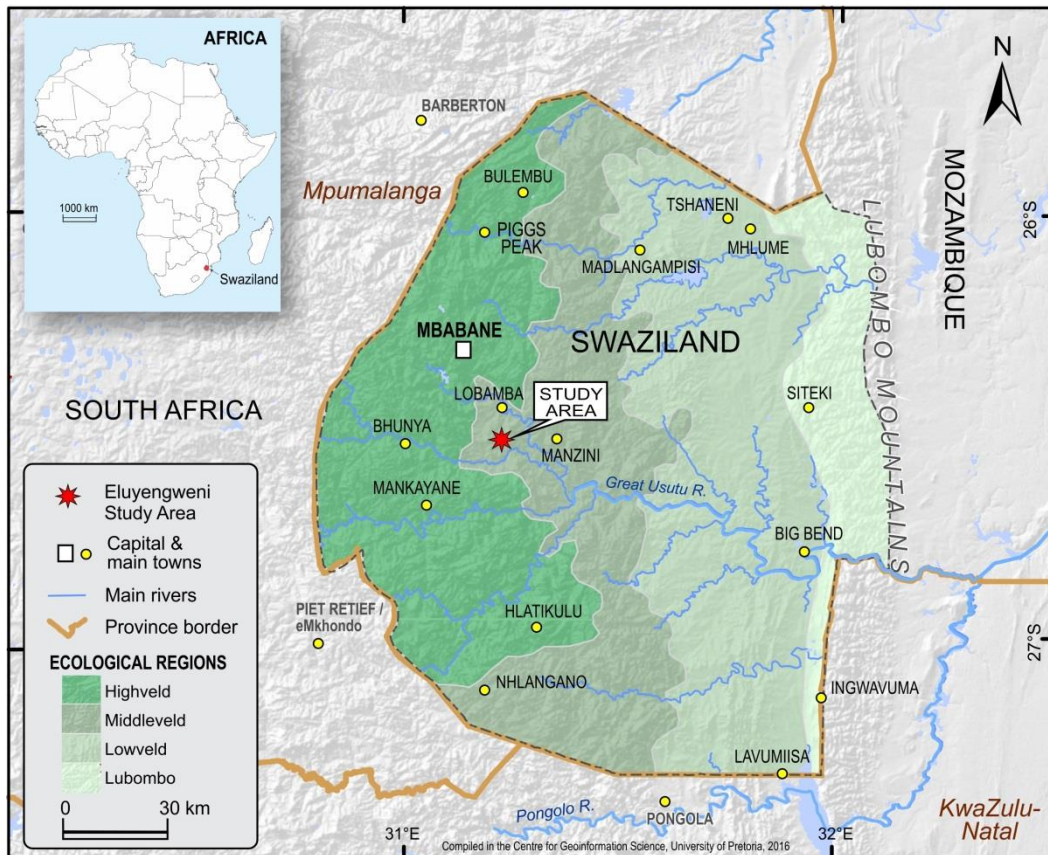


FIGURE 4.1: MAP OF SWAZILAND SHOWING THE STUDY AREA

4.3 DEMOGRAPHIC PROFILE OF THE RESPONDENTS

According to Government of Swaziland (2010), the Eluyengweni community consists of 957 households, with a population of 3 913 people, of which 2 059 are females. It is estimated that there are 1 783 poor individuals in the community. There are 509 females between the ages 25 and 39 and 387 females who are older than 40 years. Data was collected from rural Swazi women at Eluyengweni community who were 25 years or older. Two generations of women were studied for the purpose of this research. Some of these women were born in the area and others moved to the area after their marriage. During the first phase, data was collected by means of focus group discussions. Two groups of women were formed. The first focus group comprised seven females who were between the age of 25 and 45. Both laypersons and experts were included in the study to minimise and maximise the differences. The second and the third focus group discussion had nine women who were between the ages of 45 years and above.

In the second phase of the study, there were 102 female respondents of which 56 were older respondents and 46 were younger respondents. A structured interview questionnaire guided the

interviews (See Addendum B). The demographic profile of the respondents is given in Table 4.1.

TABLE 4.1: DEMOGRAPHIC PROFILE OF STRUCTURED INTERVIEW RESPONDENTS (n=102)

VARIABLE	n=102	%
Age of the respondents	n=102	%
25-45	46	45.09
≥45	56	54.90
Marital status	n=102	%
Married	81	79.41
Not married	21	20.58
Level of education	n=101 (1 missing)	%
Tertiary	9	8.91
High school	17	16.83
Secondary school	30	29.70
Primary school	35	34.65
No formal schooling	10	9.90
Employment	n=100 (2 missing)	%
Fulltime employed	17	17
Casual /seasonal	13	13
Self-employed	27	27
Unemployed	43	43
Christian Denominations	n=102	%
Anglican	36	35.29
Catholic	5	4.90
Jehovah's Witnesses	3	2.94
Methodist	1	0.98
Pentecostal Assembly	25	24.50
7 th Day Adventist	1	0.98
Zionist	31	30.39
Number of people in household	n=102	%
2-6	75	73.52
7-12	27	26.47

The majority of the respondents had a primary school education 34.65% (n=35) and only 8.91% (n=9) had a tertiary education. Most of the respondents were unemployed 43% (n=43). This is in line with the Government of Swaziland (2013a) report that the employment rate in the community is 39.3%.

The results also show that the majority of the women belong to the Anglican Church 35.29% (n=36), followed by those who were Zionist (30.39% n=31). The reason for the majority belonging to the Anglican Church is that there is an Anglican mission in the community. A large proportion of the sample had two to six people living in their households 73.52% (n=75), followed by 26.47% (n=27) who lived in households of between seven and 12 people. These findings concur with the Government of Swaziland (2013a), that the average rural household size in the Manzini region is six persons per household.

4.4 AVAILABILITY AND ACCESSIBILITY OF INDIGENOUS GREEN LEAFY VEGETABLES

The first objective dealt with the availability and accessibility of indigenous green leafy vegetables in the Eluyengweni community. The natural physical and economic environments will be described first as gleaned from literature and observations to contextualise the results. This will be followed by the findings from the focus group discussions and structured interview questionnaires as they apply to each of these environments.

4.4.1 The Natural and physical environment of Eluyengweni

The natural environment refers to the geographical features of an area such as the climate, soil and availability of water (Story *et al.*, 2002). The physical environment on the other hand includes the human-built in environment and the infrastructure. The physical environment refers to the alterations made by humans to the natural environment to make life easier such as roads, shops, access to water and electricity. These two environments will be discussed concurrently to illustrate how they contribute towards the availability and accessibility of indigenous green leafy vegetables.

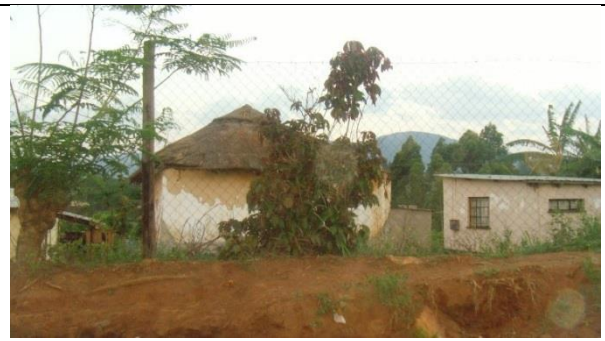
4.4.1.1 *The natural environment and physical environment of Eluyengweni*

The area surrounding the Eluyengweni community consists of a dry and open undulating landscape and the soil are predominantly Oxisol, which is a red soil (Government of Swaziland, 1997; Murdoch 1968). This is the richest soil type in the country ideal for crop production and therefore it contributes to the area being the most agricultural productive in the country.

In the past, every homestead had fields where they grew different crops with maize being the main staple crop. Intercropping was also practised where maize was grown with crops such as, pumpkins, gourds, melons, peanuts, sweet potatoes and jugo beans. With an increase in population, the number of fields decreased per homestead, as they were used as land for the new settlement of the Eluyengweni community. Land has thus become one of the limiting factors, as some homesteads do not have enough for cultivating home gardens (Manyatsi & Makhanya, 2012). The Government of Swaziland promotes crop production by assisting in tractor hiring, which is part of a subsidy programme where people pay less in comparison to hiring a privately owned tractor. The community has access to water for both human consumption, described as portable water, and agricultural purposes. Figure 4.3 below shows photographs which shows the physical environment and business area in the community.



Usuthu Anglican Mission Primary School



Homestead A



Homestead B



University of Swaziland water reservoir at Eluyengweni



Swazi Can Company canal passing through Eluyengweni



Fruit & vegetables business



Other businesses at Eluyengweni



A shopping Complex at Eluyengweni

FIGURE 4.3: PHYSICAL ENVIRONMENT AND BUSINESS AREA IN THE ELUYENGWENI COMMUNITY

According to the Government of Swaziland (2013a), access to improved water sources is still low in the rural areas in Swaziland. The great Usuthu River runs through the community and serves as main water source for the community. Apart from providing water for agricultural production, the Usuthu River also supplies water for household use in the Eluyengweni community. Most of the homesteads have access to piped water from this river. Rural

communities in Swaziland rely on rivers as a source of water (Farolfi *et al.*, 2007). Vegetables are thus cultivated next to the river and livestock drink from it.

The irrigation canal for the neighbouring Malkerns canning factory also passes through the area where the community lies. This irrigation canal benefits some of the community members, as they are able to grow vegetables and other crops adjacent to it. These crop production activities also contribute to the availability of some indigenous green leafy vegetables. A commercial vegetable farm also makes use of the canal water.

In the Eluyengweni community, there is thus potential for developing home gardens, as many homesteads are adjacent to a water source (Manyatsi & Makhanya, 2012). The community is in the Middleveld, and rainfall ranges between 800 to 1000 mm (All Out Africa, 2014). This also favours indigenous vegetation growth. To the northern side of the community, there are pine plantations for the timber mill in Bhunya. These sites contribute to the availability of some indigenous green leafy vegetables.

4.4.1.2 The physical environment of Eluyengweni

The physical environment includes infrastructure such as roads and transportation, supermarkets, restaurant, fruit and vegetable markets and these will be discussed now.

Roads and transportation network The community has a good road infrastructure linking it with the capital city and towns, as well as to Mahlanya vegetable market. Another road passes through the community to the Bhunya timber mill that is owned by SAPPI. In the Eluyengweni community, there are well-constructed roads to the community. This feature contributes to the availability and accessibility of commodities and indigenous green leafy vegetables in the area. The gravel roads in the community are also in good condition to enhance the access to local food resources. Various modes of transport are available as there are buses and taxis services. Community members thus have access to shops and markets.

The community also has a clinic as well as a post office. There are two schools in the community, a primary school and a high school. The University Swaziland is also situated here and students are trained in courses related to Agriculture in its Faculty of Agriculture. It is next to the Agriculture Research Centre. This allows people the potential of having access to technical assistance from the two institutions for the production of vegetables (Manyatsi & Makhanya, 2012). There is an Anglican mission station in the community that owns a big church and a commercial vegetable farm. The community can be described as gradually becoming semi-urban, meaning it is moving towards being urban (Manyatsi & Makhanya, 2012). Other

characteristics of the physical environment relate to housing. People mostly reside in modern brick houses although a few traditional huts are also seen (refer to Figure 4.3).

4.4.2 Economic environment of Eluyengweni

The economic environment relates to the availability, accessibility of food through marketing and retailing, and family income, which, in turn, influences the affordability, and selection of foods; it thus includes the economic means to obtain food.

Business and shopping facilities Eluyengweni has a small shopping complex with two grocery shops, butchery and a restaurant. In the grocery store, only dry and frozen commodities are sold. Fresh vegetables and fruits can only be obtained from the open markets next to the main road. The open market contributes to the availability and accessibility of green leafy vegetables (Figure 4.3).

Employment opportunities Agriculture traditionally formed the backbone of Swaziland's economy and the major source of employment for rural households (Government of Swaziland, 2013b). As reflected in the demographic profile of the study group, the majority of women in this area are not employed. They are involved in different income generating activities such as selling fruits and vegetables at the local market, producing handicrafts, small scale farming such as running a piggery, dairy farming and poultry production. Women who are employed work either in the canning factory at Malkerns as seasonal workers, the Faculty of Agriculture of the University of Swaziland, or as labourers on the Usuthu Mission commercial vegetable farm or as domestic workers. This is consistent with the Government of Swaziland (2013) that reported that rural household's livelihoods are derived from a wide range of activities carried out by households. These are remittances, food production, small businesses, wages and salaries that form part of their means of survival.

4.4.3 Contribution of the natural and the physical environment to the accessibility of indigenous green leafy vegetables

From observations of the natural and physical environments, it was noted that there are a variety of indigenous green leafy vegetables available in the Eluyengweni community. Most of the indigenous green leafy vegetables are available in summer and collected from cultivated fields, the veld and plantations. It was observed and noted that, in summer, homestead gardens had an abundance of indigenous green leafy vegetables either cultivated or growing as weeds. These included *chuchuza* (*Bidens pilosa*), *imbhuya* (*Amaranthus*), *mavelejozi/umsobo* (*Solanum reroflexum*), *ingabe/lihabe* (*Sonchus oleraceus*) and *tintsanga* (Pumpkin leaves).

Indigenous green leafy vegetables that were observed growing in the wild included; *sikhwa*, (*Tulbaghi lunwigiana*), *sibhadze* (*Peucedum*), *ingabe/lihabe* (*Sonchus oleraceus*), *inkakha* (*Momordica involucreta*) and *inshubaba* (*Momordica clementidae*). Figure 4.4 below shows photographs for some of the indigenous green leafy vegetables available in the community



FIGURE 4.4: INDIGENOUS GREEN LEAFY VEGETABLES AVAILABLE IN ELUYENGWENI

It was observed that the following were available in the local markets in summer: *ligusha* (*Corchorus spp*), *chuchuza* (*Bidens pilosa*), *imbhuya* (*Amaranthus*), *mavelejozi/umsobo* (*Solanum reroflexum*) and *ingabe* (*Sonchus oleraceus*). These were portioned and packed in transparent plastic bags as fresh leaves and sold at E5 (*five Emalangen*) per packet. Dried indigenous green leafy vegetables were also sold in powdery form packed and tied in small plastic bags, for example, *inkakha* (*Momordica involucreta*) *inshubaba* (*Momordica clementidae*). A number of cultivated vegetables such as spinach, lettuce, carrots, beetroot and cabbages, and fruit such as banana, apples and pears were also on sale. It was noted that cultivated vegetables and fruits were available throughout the year.

The focus group discussions revealed that a number of indigenous green leafy vegetable were available in the area in summer. This is confirmed by other authors that in Swaziland indigenous green leafy vegetables are abundant in summer (Kgaphola & Viljoen, 2004; Huss-Ashmore & Curry, 1994; Ogle & Grivetti, 1985b; Jones, 1963:45; Beemer, 1939). Some indigenous green leafy vegetables such as *sibhadze* (*Peucedum*) and *emahala* (*Aloe saponaria*) were, however, only available in winter. The majority of the focus group participants were of the opinion that the

indigenous green leafy vegetables from the wild were not easily accessible as they grew a distance from their homesteads. If they wanted to collect indigenous green leafy vegetables, they had to walk this distance. They also mentioned that they obtained other indigenous green leafy vegetables from the plantations and riverbanks such as *inshubaba* (*Momordica clementidae*) and *liklolo* (*Grewia caffra/ Corchorus spp*).

In closed and open-ended questions, the respondents were asked to indicate where one would most often find indigenous green leafy vegetables, and to state the time of the year when they were most abundant. Most of the respondents were familiar with the indigenous green leafy vegetables in question and the sites where they were available. Those vegetables found in the wild were listed; the most mentioned were *inkakha* (*Momordica involucreta*), *sibhadze* (*Peucedum*) and *sikhwa* (*Tulbaghia lunwigiana*). These were said to be usually available in summer, autumn and winter. The women also identified indigenous green leafy vegetables that were found in cultivated fields. The majority identified *chuchuza* (*Bidens pilosa*), *ligusha/liklolo* (*Corchorus spp*), *tintsanga* (Pumpkin leaves) and *emacembe abhatata* (sweet potato leaves). These were said to be mostly available in summer, although a few respondents mentioned their availability in winter. Those identified as available in the homestead gardens in summer were *mavelejozi/umsobo* (*Solanum retroflexum*), *emacembe emjumbula* (cassava leaves), *emacembe abhatata* (sweet potato leaves) and *imbhuya* (*Amaranthus*). The majority indicated that *emacembe emjumbula* (cassava leaves) were available all year round. The number of species available in the local environment makes a significant contribution to the diversity of indigenous green leafy vegetables consumed in the geographical area (Food and Agriculture Organization, 2008; Latham, 1997). In the structured interviews, respondents were asked if indigenous green leafy vegetables were available in the community, and if available, where they were growing.

The majority of the respondents (99.01%, n = 101) agreed that there were indigenous green leafy vegetables in the community, which was confirmed by the findings from the focus group discussions and observations. This is supported by the inventory by Dlamini & Mdziniso (2005) that a number of indigenous green leafy vegetables grow in the Middleveld region of Swaziland. Respondents had to list the sites where indigenous green leafy vegetables grew as well. Table 4.2 presents the responses.

TABLE 4.2: SITES WHERE INDIGENOUS GREEN LEAFY VEGETABLE GROW (n=102)

SITES	n=102	%
Cultivated fields and gardens	92	90.19
Uncultivated fields	53	51.96
Mountains/graveyard/plantations /riverbanks	16	15.68

Respondents could give more than one response

The majority of the respondents 90.19% (92) indicated that indigenous green leafy vegetables grew in cultivated fields or gardens, and more than half 51.96% (n=53) mentioned uncultivated fields. A small number of respondents (15.68%, n=16) mentioned that they grew in mountains, in the graveyard or on the riverbanks. This result is in line with what other studies in Swaziland reported on sites where indigenous green leafy vegetables grow (Ogle & Grivetti, 1985a; Jones, 1963: 63; Beemer, 1939), and also what other South African studies reported (van der Hoeven *et al.*, 2013; Kepe 2008; Jansen van Rensburg *et al.*, 2007).

Nearly half (42.15%, n=43) of the respondents indicated that they had homestead gardens. Those who had homestead gardens were asked to name the vegetables they grow. Table 4.3 shows the responses.

TABLE 4.3: VEGETABLES GROWN IN HOMESTEAD GARDENS

VEGETABLES GROWN IN HOMESTEAD GARDEN	(n=102)		OLDER WOMEN (n=56)		YOUNGER WOMEN (n=46)	
	n	(%)	n	(%)	n	(%)
Carrots (<i>Daucus carota</i>)	14	13.72	8	14.28	6	13.04
Beetroot (<i>Beta vulgaris</i>)	13	12.74	9	8.82	4	8.69
Lettuce (<i>Lactuca sativa</i>)	28	27.45	15	26.78	13	28.26
Spinach (<i>Spinacia oleracia</i>)	32	31.37	16	28.57	16	34.78
Tomatoes (<i>Lycopersicon esculantum</i>)	8	7.84	3	5.35	5	10.86
Green pepper (<i>Capsicum annum</i>)	6	5.88	4	7.14	2	4.34
Green beans (<i>Phaseolus vulgaris</i>)	1	0.98	1	1.78	0	0.0
Onions shallot (<i>Alium sepa</i>)	15	14.70	10	17.85	5	10.86
Cabbage (<i>Brassica oleraceae</i>)	16	15.68	7	12.5	9	19.56
Other	4	3.92	3	5.35	1	2.17

Respondents could give more than one response

In response to the request to list vegetables growing in their homestead gardens, most of the respondents (28.57%, n=16) grew spinach (*Spinacia oleracia*) followed by lettuce (*Lactuca sativa*) (26.78%, n=15). Green beans (*Phaseolus vulgaris*) were found to be the least grown vegetable by the elderly group as only one respondent reported so. The majority of the younger group 34.78%, (n=16) also reported to grow spinach (*Spinacia oleracia*) followed by, (28.26%, n=13) respondents who grew lettuce (*Lactuca sativa*). Cabbages were grown by (14.75%, n=9), none grew green beans. The results do not tally with what Manyatsi & Makhanya (2012) reported because in their study on homestead gardens in Eluyengweni community, they found that cabbages were the most cultivated vegetable. Other cultivated vegetables this study group mentioned were cauliflower, broccoli and shallot being grown in their homestead gardens. Figure 4.5 below shows some of the indigenous green leafy in their original sites in the community.

		
<p>Mavelejozi (black nightshade) <i>Solanum roreflexum</i></p>	<p>Ingabe/Lihabe <i>Sonchus oleraceus</i></p>	<p>Emahala <i>Aloe saponaria</i></p>
		
<p>Tintsanga (Pumpkin leaves) <i>Curcubita spp</i></p>	<p>Emacembe abhatata (Sweet potato leaves) <i>Ipomea spp</i></p>	<p>Inshubaba <i>Momordica clementidae</i></p>
		
<p>Bubati <i>Lapottea pedumentaris</i></p>	<p>Hayihayi <i>Sparmannia ricinocarpa</i></p>	<p>Lunyawo lenkhukhu <i>Hibiscus trionium</i></p>
		
<p>Lisheshelu <i>Aloe cooperin</i></p>	<p>Gwajumbe</p>	<p>Sikhwa <i>Tulbaghi lunwigiana</i></p>

FIGURE 4.5: INDIGENOUS GREEN LEAFY VEGETABLES IN THEIR ORIGINAL SITES

In another question, respondents were asked if they used available indigenous green leafy vegetables as food. The majority (97.05%, n=99) of the respondents indicated that they did. Respondents were also probed both in the focus group discussion and during structured interviews on how accessible indigenous green leafy vegetables were for them. Both groups revealed that indigenous green leafy vegetables were accessible as they were found in fields near their homes. Although it was easy to collect indigenous green leafy vegetables it was time consuming. One of the participants responded by saying:

'I have to walk a long distance if I feel like eating indigenous green leafy vegetables that are obtained in the wild. It was not a problem in the olden days because I was fit; now I can hardly walk a long distance let alone bend.'

They also indicated that it was not safe anymore to walk long distances to search for indigenous green leafy vegetables, as there were criminals in the wild. One of the elderly participants lamented:

'I am scared of being raped.'

With regard to accessibility of indigenous green leafy vegetables, respondents were asked about the ease and time involved in the collection of indigenous green leafy vegetables, whether they purchased indigenous green leafy vegetables and if so, to state the places where they purchased. Table 4.4 below present the responses.

TABLE 4.4: EASE OF COLLECTION, SITES AND PURCHASING LOCATION OF INDIGENOUS GREEN LEAFY VEGETABLES IN THE COMMUNITY

EASE OF COLLECTION	WHOLE GROUP (n=100) (2 MISSING)		OLDER WOMEN (n=55)		YOUNGER WOMEN (n=45)	
	n	%	n	%	n	%
Easy when abundant	75	75	40	70.72	35	77.77
Not easy (difficult)	25	25	15	27.27	10	22.22
Time involved in collection	n=99	%	n=53	%	n=46	%
10-30 minutes	70	70.70	38	71.69	32	69.56
40-60 minutes	10	9.80	6	11.32	4	8.69
>60 minutes	19	18.62	9	16.98	10	21.73
SITES FOR IGLV	WHOLE GROUP (n=102)		OLDER WOMEN (n=56)		YOUNGER WOMEN (n=46)	
	n	%	n	%	n	%
Cultivated fields and garden	81	79.41	46	82.14	35	76.08
Uncultivated fields/wild/mountains	11	10.78	7	12.50	4	8.69
Riverbanks/ Wetlands /Swamps	1	0.98	1	1.78	0	0
Purchase	9	8.82	2	3.57	7	15.21
PURCHASING LOCATION	WHOLE GROUP (n=98)		OLDER WOMEN (n=52)		YOUNGER WOMEN (n=46)	
	n	%	n	%	n	%
Market	65	66.32	35	67.30	30	65.21
Street vendors	22	22.44	10	19.23	13	28.26
Do not buy	11	11.22	7	13.46	3	6.52

4 no responses

According to the findings the majority of both the older respondents (72.72%, n=40) and the younger respondents (77.77%, n=35) were of the opinion that it was easy to collect indigenous green leafy vegetables. Most of the respondents (70.7%, n=70) indicated that they spent between 10 to 30 minutes collecting indigenous green leafy vegetable. Some spent more than 60 minutes (18.62%, n=19).

The findings reveal that respondents obtain indigenous green leafy vegetables for household consumption from cultivated fields, uncultivated fields, the wilds, forests, mountains, private farms, swamps and riverbanks. The majority of the older group of respondents 82.14% (56) obtained indigenous green leafy vegetables for household consumption from cultivated fields, followed by 12.50% (n=7) who said they got them from uncultivated fields, 3.57% (n=2) purchase them. On the other hand, the majority of the younger women (76.08%, n=35) also sourced indigenous green leafy vegetables for consumption from cultivated fields and gardens. Similar findings on sources of indigenous green leafy vegetables were also reported by other studies (Ogle & Grivetti, 1985a; Jones, 1963:49; Beemer, 1939). Southern African studies concur with these findings on sites where indigenous green leafy vegetables grow (Kepe, 2008; Weinberger & Swai, 2006; Modi *et al.*, 2006).

Seven (15.21 %) young women said they purchased indigenous green leafy vegetables. They mentioned that they purchased these vegetables, as they do not have time to collect them. Only two (3.57%) older respondents purchased these vegetables. It was gathered that they bought them from community members and town markets or vendors who would come to the community to sell indigenous leafy home to home. The younger group, on the other hand mentioned that they would buy the vegetables from the local, town markets and from street vendors in town. The majority of the respondents (66.32%, n=65) purchased indigenous green leafy vegetables from local and town markets.

It was revealed in the study though, that some of the women would not buy indigenous green leafy vegetables for food safety and reasons of hygiene as they believed that most of the people who sold the vegetables usually collect them from places such as sewage outlets. In such a case, one might not be sure of their origin and under what conditions they were obtained. From these findings, it seems as if indigenous green leafy vegetables are available, accessible, and still consumed as food in the Eluyengweni community. The next sub-objective deals with the contribution of the economic environment towards the accessibility of indigenous green leafy vegetables.

4.4.4 Contribution of the economic environment towards the use and accessibility of indigenous green leafy vegetables

The focus group discussions and interviews revealed that most of the respondents were not employed and, as a result, they did not have enough disposable income. Most of the participants relied on money from their employed husbands and children, while some relied on grants for the elderly, which they received only every three months. From the structured interviews, it was confirmed that the unemployment rate in the community is high. This substantiates the demographic information in Table 4.1, as 43% of those interviewed were not employed. In the structured interviews respondents were asked, how much money they have available to spend on food per week. Table 4.5 presents results on money available to spend on food.

TABLE 4.5: MONEY AVAILABLE TO SPEND ON FOOD (n=102)

MONEY AVAILABLE TO SPEND(E)	n	%
≤ 100	35	34.31
≤ 200	44	43.13
≤ 300	17	16.66
≤ 400	2	1.96
≤ 500	4	3.92

(E represent Emalangenzi which is Swazi currency (www.cigf.org.uk,2013) which is equivalent to a South African currency, Rand (R)

The majority 34.31% (n=35) of the households spent between E100 to E200 per week on food. In the focus group discussions, the participants mentioned that they do not have enough money to spend on food. They explained that most of the time they would plant maize and legumes in fields the chief allocated them. Others would also grow vegetables in their homestead gardens. These products usually helped to sustain them until the next harvest. The little money they had would only be used to buy food items that they did not produce such as tea, sugar and cooking oil. It was clear that they often experienced food shortages as revealed in the following quotation:

‘When food shortage strikes, we rely on locally available food especially the indigenous green leafy vegetables because we do not afford to buy food from the shops nor markets.’

They also mentioned that when they have money, they spend it on buying maize meal and other ingredients used to prepare relishes as accompaniments to the staples. They mentioned that the money was not enough to spend on food; therefore, they have to rely on other sources such as indigenous green leafy vegetables.

From these results, it can be concluded that it seems as if indigenous green leafy vegetables are still readily available, accessible and consumed as food in the Eluyengweni community. The next section deals with the second objective of the study regarding knowledge on indigenous green leafy vegetables.

4.5 KNOWLEDGE ON INDIGENOUS GREEN LEAFY VEGETABLES

The second objective of the study was to determine, describe and compare the knowledge of the study group on indigenous green leafy vegetables. Knowledge of indigenous green leafy vegetables related firstly to the ability of the respondents to identify the indigenous green leafy vegetables; secondly, to the respondent’s knowledge on the availability of the vegetables; thirdly, to the sub-objective about the use of indigenous green leafy vegetables; and fourthly the sub-objective that dealt with how knowledge on the use was obtained and transferred.

4.5.1 Identification and naming of indigenous green leafy vegetables

In both the focus group discussions and the structured interviews, the study group was asked to identify different indigenous green leafy vegetables. They were shown photographs of different indigenous green leafy vegetables. These were based on the inventory list of indigenous green leafy vegetables Dlamini and Mdziniso (2005) reported as available in the area. The study group was asked to look and identify each vegetable in the photograph.

Older participants in the focus group were able to identify and name most of the indigenous green leafy vegetables in the photographs, whereas the younger participants were not able to identify *sikhwa* (*Tulbaghi lunwigian*), *bubati* (*Laportea pedumentaris*) and *lisheshelu* (*Aloe cooperin*). In Table 4.6, the results of the structured interviews on the ability to identify the listed indigenous green leafy vegetables are given.

TABLE 4.6: CORRECT IDENTIFICATION OF INDIGENOUS GREEN LEAFY VEGETABLES FROM PHOTOGRAPHS

INDIGENOUS GREEN LEAFY VEGETABLES	WHOLE GROUP		OLDER GROUP		YOUNGER GROUP	
	n=102	%	n=56	%	n=46	%
Bubati <i>Laportea pedumentaris</i>	24	23.52	22	39.28	2	4.34
Chuchuza (Blackjack) <i>Bidens pilosa</i>	93	91.17	56	100	37	80.43
Emacembe abhatata (Sweet potato leaves) <i>Ipomea Spp</i>	88	86.27	56	100	32	69.56
Emacembe emjumbula (Cassava leaves) <i>Manihot esculenta</i>	75	73.52	53	94.64	22	47.82
Imbhuya (Pigweed) <i>Amaranthus</i>	92	90.19	56	100	36	78.26
Ingabe/Lihabe (<i>Sonchus oleraceus</i>) <i>Cichorium spp</i>	61	59.80	52	92.85	9	19.56
Inkakha (Bitter gourd) <i>Mormodica involucrate</i>	89	87.25	56	100	33	71.73
Ligusha (Wild vegetable jute) <i>Corchorus spp</i>	102	100	56	100	46	100
Lisheshelu <i>(Aloe cooperin)</i>	34	33.33	33	58.92	1	2.17
Mavelejozi (Black nightshade) <i>Solanum reroflexum</i>	85	83.33	56	100	29	63.04
Sibhadze (<i>Peucedum</i>) <i>Annesorhiza flagellifolia</i>	54	52.94	51	91.07	3	6.52
Sikhwa <i>Tulbaghi lunwigian</i>	51	50.00	46	82.14	5	10.86
Tintsanga (Pumpkin leaves) <i>Curcubita spp</i>	92	90.19	56	100	36	78.26
Umsobo (Black nightshade) <i>Solanum reroflexum</i>	77	75.49	48	85.71	29	63.04

The results obtained from the interview questionnaire concur with the findings from the focus group discussions. The older group compared to the younger group recognised the majority of indigenous green leafy vegetables on the photographs shown to them. All the older women (n=56,100%) were able to identify the following from the photographs; *chuchuza* (*Bidens pilosa*), *inkakha* (*Momordica clementidae*), *ligusha* (*Corchorus spp*), *imbuya*, (*Amaranthus*), *tintsanga* (*Pumpkin leaves*), *emacembe abhatata* (*sweet potato leaves*). More than 80% identified *emacembe emjumbula* (*Cassava leaves*) (96.42%, n=54) and *umsobo/mavelejozi* (*Solanum reroflexum*) (87.50%, n=49), *sikhwa* (*Tulbaghi lunwigiana*), (82.14%, n=46). The following indigenous green leafy vegetables were correctly identified by fewer than 50% of the older women, *bubati* (*Laportea pedumentaris*), (39.28%, n=22) and *lisheshelu* (*Aloe cooperin*) (41.07, n=23).

All the participants in the younger group were able to identify *chuchuza* (*Bidens Pilosa*) and *ligusha* (*Corchorus spp*). The vegetables unknown to the younger group included; *lisheshelu* (*Aloe cooperin*), (2.17%, n=1), *bubati* (*Laportea Pedumentaris*) (4.34%, n=2), *sibhadze* (*Peucedum*) (6.52%, n=3) and *sikhwa* (*Tulbaghi lunwigiana*) (10.86%, n=5). The results on correct identification of indigenous green leafy vegetables is supported by other studies that also indicated that the older generation could identify more of the vegetables compared to the younger generation (van der Hoeven *et al.*, 2013; Luczaj 2010; Ngwane 1999; Muntshali 1995). Maintaining knowledge for identification of indigenous green leafy vegetables is necessary for their continued use (Powell *et al.*, 2014).

4.5.2 Knowledge about where indigenous green leafy vegetables grow and their seasonal availability

The second sub-objective regarding knowledge on indigenous green leafy vegetables related to knowledge of the availability and accessibility of indigenous green leafy vegetables. This was ascertained by asking the participants during the focus group discussions and during the interviews to indicate the sites where specific indigenous green leafy vegetables grew, and the time of the year when they were available. From the focus group discussion with the younger women, the majority of the participants gave cultivated fields as a source of indigenous green leafy vegetables. A few named the uncultivated fields and veld², as sites for these vegetables. In contrast, the older group of participants were able to name various sites including the types of indigenous green leafy vegetables that grow there. For example, indigenous green leafy vegetables, which grow on the riverbanks were listed as; *lisheshelu* (*Aloe cooperin*), *sikhwa* (*Tulbaghi lunwigiana*), *liklolo* (*Grewia caffra/ Corchorus spp*), and from the wild (forest, mountains) *inkakha* (*Momordica involucreta*), *ingabe* (*Sonchus oleraceus*) *bubati* (*Laportea*

²A veld is a grazing land, mountain, forest and hills (Jansen van Rensburg *et al.*, 2007)

pedumentaris), *sibhadze* (*Peucedum*). From cultivated fields and homestead gardens they obtained; *chuchuza* (*Bidens pilosa*), *imbhuya* (*Amaranthus*), *inkakha* (*Momordica involucrata*), *ligusha* (*Corchorus spp*). They also used the leaves of cultivated vegetables such as *tintsanga* (*Pumpkin leaves*) and *emacembe abhatata* (*Sweet potato leaves*) as green leafy vegetables.

The older participants revealed that summer was the season when most of indigenous green leafy vegetables were available, specifically those grown in cultivated fields. The other indigenous green leafy vegetables such as *chuchuza* (*Bidens pilosa*), *inkakha* (*Momordica involucrata*), *ingabe* (*Sonchus oleraceus*), *emacembe abhatata* (*Sweet potato leaves*), *emacembe emjumbula* (*Cassava leaves*), *mavelejozi* (*Black nightshade*), *lisheshelu* (*Aloe cooperin*), *bubati* (*Laportea pedumentaris*) were found all year round. Table 4.7 present the results from the structured interview, questionnaires.

The results on the knowledge of where and when indigenous green leafy vegetables were available confirmed the findings from the focus group. The majority $\geq 70\%$ of the respondents indicated that *inkakha* (*Momordica involucrata*), *sikhwa* (*Tulbaghi lunwigiana*), *bubati* (*Laportea pedumentaris*), *sibhadze* (*Peucedum*) and *lisheshelu* (*Aloe cooperin*) grow in the wild. More older respondents (51.04%, n=24) compared to younger respondents (33.33%, n=6) indicated that *ingabe* (*Sonchus oleraceus*) grew in the wild. On the other hand, those mentioned by the majority in both groups grew in cultivated fields. These are *chuchuza* (*Bidens pilosa*), 78.43% (n=80) *imbuya* (*Amaranthus*), 71.56 (n=73), *ligusha* (*Corchorus spp*) 76.47% (n=78), *tintsanga* (*Pumpkin leaves*) 73.52% (75), *emacembe abhatata* (*Sweet potato leaves*) (70.21%, n=66) and *emacembe emjumbula* (*Cassava leaves*) (64.13%, n=59).

In response to naming the indigenous green leafy vegetables growing in homestead gardens, most of the older women 42.30% (n=22) mentioned cassava leaves (*Emacembe emjumbula*) and 24% (n=12) sweet potato leaves (*Emacembe abhatata*). Younger respondents 29.54%, (n=13) listed sweet potatoes (*Emacembe abhatata*), and 27.50% (n=11) mentioned cassava leaves (*Emacembe emjumbula*). Only older women indicated that *sikhwa* (*Tulbaghi lunwigiana*) grows next to the rivers. Table 4.8 presents results on the seasonal availability of indigenous green leafy vegetables.

TABLE 4.7: WHERE INDIGENOUS GREEN LEAFY VEGETABLES GROW

INDIGENOUS GREEN LEAFY VEGETABLES	WILD						CULTIVATED						HOMESTEAD GARDENS						RIVERSIDE					
	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%
Chuchuza (Blackjack) <i>Bidens pilosa</i>	8	7.92	3	5.45	5	10.86	80	79.20	46	83.63	34	73.91	13	12.87	6	10.90	7	15.21	-	-	-	-	-	-
Inkakha (Bitter gourd) <i>Mormodica involucrate</i>	75	74.25	43	78.18	32	69.56	14	13.86	6	10.90	8	17.39	6	5.94	3	5.45	3	6.52	-	6	3	5.45	3	6.52
Ligusha/liklolo (Wild Vegetable Jute) <i>Corchorus spp</i>	12	12	7	12.72	5	11.11	78	78	42	76.36	36	80	10	10	6	10.90	4	8.88	-	-	-	-	-	-
Sikhwa <i>Tulbaghi lunwigiana</i>	44	74.57	35	77.77	9	64.28	5	8.47	2	4.44	3	21.42	1	1.69	-	-	1	7.14	8	13.55	8	17.77	-	-
Ingabe (Sonchus oleraceus) <i>Cichorium Spp</i>	30	46.15	24	51.06	6	33.33	17	26.15	11	23.40	6	33.33	12	18.46	7	14.89	5	27.77	6	9.23	5	10.63	1	5.53
Emacembe abhatata (Sweet Potato leaves) <i>Ipomea Spp</i>	1	1.06	1	2	-	-	66	70.21	35	70	31	70.45	25	26.59	12	24	13	29.54	2	2.12	2	4	-	-
Emacembe emjumbula (Cassava leaves) <i>Manihot esculenta</i>	-	-	-	-	-	-	59	64.13	30	57.69	29	72.50	33	35.86	22	42.30	11	27.50	-	-	-	-	-	-
Mavelejozi / umsobo (Black nightshade) <i>Solanum reroflexum</i>	5	5.20	5	9.43	-	-	50	52.08	26	49.05	24	55.81	38	39.58	21	39.62	17	39.53	3	3.12	1	1.88	2	4.65
Tintsanga (Pumpkin leaves) <i>Curcubita spp</i>	-	-	-	-	-	-	75	74.25	43	78.18	32	69.56	26	25.74	12	21.81	14	30.43	-	-	-	-	-	-
Sibhadze (Peucedum) <i>Annesorhiza flagellifolia</i>	50	89.28	38	92.68	12	80	5	8.92	2	4.87	3	20	-	-	-	-	-	-	1	2.17	1	2.43	-	-
Bubati <i>Laportea pedumentaris</i>	21	87.50	14	87.50	7	87.50	1	4.16	1	6.25	-	-	0	4.16	-	-	-	-	-	-	-	-	-	-
Lisheshelu <i>Aloe cooperin</i>	34	54.83	26	83.87	8	88.88	1	2.50	-	-	1	11.11	-	-	-	-	-	-	5	12.15	5	16.12	-	-
Imbuya (Pigweed) <i>Amaranthus</i>	3	2.97	2	3.63	2	2.17	73	72.27	42	76.36	31	67.39	20	25	30.43	11	-	14	-	-	-	-	-	-

TABLE 4.8: SEASONAL AVAILABILITY OF INDIGENOUS GREEN LEAFY VEGETABLES

INDIGENOUS GREEN LEAFY VEGETABLES	WHEN AVAILABLE																													
	SPRING						AUTUMN						SUMMER						WINTER						ALL YEAR					
	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%	n=WHOLE GROUP	%	OLDER GROUP	%	YOUNGER GROUP	%
Chuchuza (Blackjack) <i>Bidens pilosa</i>	-	-	-	-	-	-	3	2.970	2	3.63	1	2.17	75	74.25	43	78.18	32	69.56	-	-	-	-	-	-	23	22.77	10	18.18	13	28.26
Inkakha (Bitter gourd) <i>Mormodica involucrate</i>	-	-	-	-	-	-	7	6.93	6	10.90	1	2.17	66	65.34	38	69.09	28	60.86	1	0.99	-	-	1	2.17	27	26.73	11	20	16	34.78
Ligusha/liklolo (Wild Vegetable Jute) <i>Corchorus spp</i>	-	-	-	-	-	-	1	1	1	1.81	-	-	89	89	49	89.09	40	88.88	2	2	1	1.81	-	-	8	8	4	7.27	4	8.8
Sikhwa <i>Tulbaghi lunwigiana</i>	1	1.69	1	2.22	-	-	6	10.16	4	8.88	2	14.28	31	52.54	23	51.11	8	57.14	5	8.47	4	8.88	1	7.14	16	27.11	13	28.88	3	21.42
Ingabe (Sonchus oleraceus) <i>Cichorium Spp</i>	-	-	-	-	-	-	3	4.61	2	4.34	1	5.26	30	46.15	21	45.65	9	47.36	10	15.38	7	15.21	3	15.78	22	33.84	16	34.78	6	31.57
Emacembe abhatata (Sweet Potato leaves) <i>Ipomea Spp</i>	5	5.31	3	6	2	4.54	2	2.12	1	2	1	2.27	52	55.31	26	52	26	59.09	3	3.19	1	2	1	4.54	32	34.04	19	38	13	29.54
Emacembe emjumbula (Cassava leaves) <i>Manihot esculenta</i>	1	1.11	-	1	1	2.5	2	2.22	1	2	1	2.5	38	42.22	18	36	20	50	7	7.72	6	12	1	2.5	42	46.66	25	50	25	42.50
Mavelejozi / umsobo (Black nightshade) <i>Solanum reroflexumm</i>	-	-	-	-	-	-	3	3.12	2	3.77	2	2.32	70	72.91	37	69.81	33	76.74	4	4.16	3	5.66	3	2.32	19	19.79	11	20.75	8	8.60
Tintsanga (Pumpkin leaves) <i>Curcubita spp</i>	-	-	-	-	-	-	1	1	-	-	1	2.22	96	96	53	96.36	43	95.55	-	-	-	-	-	-	3	3	2	3.63	1	2.22
Sibhadze (Peocedum) <i>Annesorhiza flagellifolia</i>	1	1.78	1	2.43	-	-	6	10.71	5	12.19	1	6.66	6	10.71	5	12.19	1	6.66	20	35.71	15	36.58	5	33.33	3	5.35	3	7.31	-	-
Bubati <i>Laportea pedumentaris</i>	-	-	-	-	-	-	2	2.53	2	12.50	-	-	5	6.32	4	25	1	14.28	3	3.79	2	12.50	1	14.28	13	16.45	8	50	5	71.42
Lisheshelu <i>Aloe cooperin</i>	1	2.5	1	3.22	-	-	5	12.5	5	16.12	-	-	14	35	11	35.48	3	33.33	2	5	1	3.22	1	11.11	18	45	13	41.93	5	55.
Imbuya (Pigweed) <i>Amaranthus</i>	-	-	-	-	-	-	5	4.95	2	3.63	3	6.52	86	85.14	47	85.45	39	84.78	2	1.98	2	3.63	-	-	8	7.92	4	7.27	4	8.69

Table 4.8 illustrates the seasonal availability of the indigenous green leafy vegetables. The majority of the respondents mentioned that indigenous green leafy vegetable are mainly available in summer. These are *tintsanga* (*Pumpkin leaves*) (94.11%, n=96), *chuchuza* (*Bidens pilosa*) (73.52%, n=75) *imbhuya* (*Amaranthus*) (84.31%, n=86), *inkakha* (*Momordica involucreta*) (64.70%, n=66), *ligusha* (*Wild vegetable jute*) (87.25, n=89), *mavelejozi/umsobo* (*Solanum reroflex*) (72.91%, n=70), *emacembe abhatata* (*Sweet potato leaves*) (55.3%, n=52) and *sikhwa* (*Tulbaghi lunwigiana*). Those who indicated that indigenous leafy vegetables are available throughout the year mentioned, *bubati* (*Laportea pedumentaris*) 56.52% (n=13) *emacembe emjumbula* (*Cassava leaves*) 46.66% (n=42), *lisheshelu* (*Aloe cooperin*), 46.15% (n=18). A few respondents mentioned that certain indigenous leafy vegetables are available in winter such as *emacembe abhatata* (*Sweet potato leaves*) (9.80%, n=10) and *emacembe emjumbula* (*Cassava leaves*) (6.8%, n=7).

These findings are similar to other studies that indicated that indigenous green leafy vegetables are abundant in summer in Swaziland (Dlamini & Mdziniso, 2005; Ogle & Grivetti, 1985a; Jones, 1963:63). Similar findings in South African studies reported that indigenous green leafy vegetables are abundant in summer (van der Hoeven *et al.*, 2013; Quaye *et al.*, 2009; Kepe, 2008; Weinberger & Swai, 2006).

The third sub-objective addressed knowledge on the use of indigenous green leafy vegetables.

4.5.3 Knowledge on the use of indigenous green leafy vegetables

The use of indigenous green leafy vegetables is important as it gives an indication of how they are included in the daily lives of the people in the community. The inclusion of these vegetables in meals confirms that the study group possesses knowledge on the use of the vegetables. Respondents were asked if they used indigenous green leafy vegetables as food and if so, what the reasons are how are they prepared and served and who is responsible for the preparation of these vegetables, and their preservation. Figure 4.6 below shows the different uses of indigenous green leafy vegetables.



















 <p>Preparation of indigenous green leafy vegetables</p>	 <p>Groundnuts in a food processor</p>	 <p>Crushed groundnut</p>
 <p>Low energy stove used for preparing relishes</p>	 <p>Indakala Crushed groundnuts with tomato and onions (indakala)</p>	 <p>Cooking of spinach</p>
 <p>Baby pumpkin to prepare Pumpkin leaves relish</p>	 <p>Indigenous green-leafy vegetables dishes on display</p>	 <p>Cassava relish</p>
 <p>Spinach relish</p>	 <p>Amaranthus relish</p>	 <p>Ingabe relish <i>Sonchus oleracea</i></p>
 <p>Sweet potato leaf relish <i>Ipomea</i> spp</p>	 <p>Blackjack relish <i>Bidens pilosa</i></p>	 <p>Inkakha relish <i>Mormodica involucrata</i></p>
 <p>Okra relish <i>Corchorus</i> spp</p>	 <p>Pumpkin leaf relish</p>	 <p>Umfuso wetintsanga Dried Pumpkin leaves</p>

FIGURE 4.6: EXAMPLES OF THE USE OF INDIGENOUS GREEN LEAFY VEGETABLES IN ELUYENGWENI

The majority of the respondents 97.05% (n=99) indicated that they used indigenous green leafy vegetables when available. In the focus group discussions, the older group stated that they used these vegetables as food. Those who used it as food stated that they ate the vegetables as a relish together with the staple maize meal porridge. The reason given was that it was an affordable, if not a free form of relish. Some of the younger and older participants stated that the indigenous vegetables helped to get the porridge 'down the throat' because they did not have an alternative relish. Both groups of participants further described the different methods of preparing indigenous green leafy vegetables. The main cooking method that both groups mentioned was boiling. The older women gave recipes on how to prepare indigenous green leafy vegetables. The indigenous green leaves were prepared on their own or as a mixture of leaves.

The first recipe instructed the washing of indigenous green leafy vegetables in cold water, then boiling the leaves until soft. Crushed roasted peanuts or sesame seeds (*Ludvonca*) are added together with salt, stirred into the vegetables, and then served. The second recipe given was to boil baby pumpkin (*Sicobelo*) first, and then add chopped indigenous green leafy vegetables. It is further boiled together until soft. Crushed peanuts (*Emantongomane*) or sesame seeds (*Ludvonca*) and salt are stirred into the mixture as seasoning, simmered for few minutes, and then served. The third recipe method was to prepare a sauce (*Indakala*) first, by boiling chopped onions, tomato and crushed roasted peanuts until it formed a smooth paste. The chopped indigenous green leafy vegetables are then stirred into the sauce, simmered for a few minutes, seasoned and then served. The variety of ways in which indigenous green leafy vegetables are prepared with different ingredients makes them enjoyable and adds interest to a meal (van der Hoeven *et al.*, 2013).

In both the focus group discussions and the interviews, the older women indicated that nowadays they also added cooking oil which was previously not the case. In previous studies in Swaziland, no mention is made of adding cooking oil during the preparation of these vegetables. Only salt, groundnuts, sesame seeds or pumpkin seeds are mentioned (Ogle & Grivetti, 1985a; Jones, 1963:127; Beemer, 1939).

Studies in Swaziland and South Africa report that indigenous green leafy vegetables were usually prepared on their own or as a mixture of two or more species of indigenous green leafy vegetable (Mavengahama *et al.*, 2013; Flyman & Afolayan, 2006; Dlamini & Mdziniso, 2005; Kgaphola & Viljoen, 2004; Ogle & Grivetti, 1985a). The reasons given for mixing different types of indigenous green leafy vegetables were to counteract bitterness, sliminess and to improve flavour. For example, *imbuya* (*Amaranthus*) is cooked with *chuchuza* (*Bidens pilosa*) to improve the flavour (van der Hoeven *et al.*, 2013; Flyman & Afolayan, 2006; Ogoye-Ndegwa, 2003). The

indigenous green leafy vegetables are also mixed with other indigenous green leafy vegetables to increase the quantity during times of drought because individual species are scarce (Ogoye-Ndegwa 2003).

The *ligusha* (*Corchorus spp*) was prepared by mixing aloe ash in water and allowing it to settle. Solids sank to the bottom of the container. The liquid was then added to the boiled water and the vegetables were cooked further. Only a few mentioned that they practised this method. An alternative method of preparing *ligusha* (*Corchorus spp*) was to add sodium bicarbonate to the boiling water to maintain the green colour. The participants mentioned that bicarbonate of soda destroyed some of the nutrients although they were not sure which nutrients were destroyed. In the literature, the addition of bicarbonate of soda in the preparation of indigenous green leafy vegetables is mentioned. However, it reduces the nutrient content due to the adverse effects of bicarbonate of soda on vitamin C (Nesamvuni *et al.*, 2001; Ogle & Grivetti, 1985a; Jones, 1963:127). A number of authors indicate that sodium bicarbonate is often added when preparing *ligusha* (*Corchorus spp*) to make it slimy and maintain the green colour (Kgaphola & Viljoen, 2000; Ogle & Grivetti, 1985a). When cooked, a wooden whisker (*lujujo*) is used to beat the *ligusha* (*Corchorus spp*) for a smooth consistency. It is believed that the older people prepared and consume these foods because they have knowledge, skills and time to prepare such products, unlike the younger generation who have food that is more diverse purchasing and consumption patterns. Moreover, these younger people characteristically have a preference for commercial and convenience foods (Cloete & Idsardi, 2013).

Some participants explained that they used indigenous green leafy vegetables for nutrition and health reasons. They stated that these vegetables have medicinal properties. Indigenous green leafy vegetables helped them to maintain the correct blood sugar level and blood pressure. They also said it boosted their immune system and further “*makes quality blood*”. This aspect was not looked into further as it was not part of the study’s scope. Other participants mentioned that indigenous green leafy vegetables are part of the Swazi culture, and even their grandmothers used them and that is why they also use these vegetables. The younger group also gave health reasons for using these vegetables. They revealed that they believed that these vegetables are more nutritious than cultivated vegetables. Reasons for using indigenous green leafy vegetables as food were determined in the structured interviews. Table 4.9 presents the responses to this question.

TABLE 4.9: REASONS FOR USING INDIGENOUS GREEN LEAFY VEGETABLES WHEN AVAILABLE

REASONS FOR USING INDIGENOUS GREEN LEAFY VEGETABLES	n=102	%	OLDER WOMEN n=56	%	YOUNGER WOMEN n=46	%
Health and nutrition related	87	85.29	47	83.92	40	86.95
Affordable relish	40	39.21	19	33.92	23	50.00
Sensory attributes	9	8.82	5	8.92	4	8.69
Swazi culture	4	3.92	4	7.14	0	0

Respondents could give more than one response

The findings reveal that the health and nutrition-related purposes are the main reasons for using indigenous green leafy vegetables for the majority of both the older respondents (83.92%, n= 47) and the younger respondents (86.95%, n=40). This was followed by those who ate green leafy vegetables because they are an affordable relish. Some of the older respondents 8.92% (n=5) indicated that they used these vegetables because they liked their sensory attributes such as the bitter taste of *inkakha* (*Momordica involucreta*), *inshubaba* (*Momordica clementidae*), while 8.69% (n=4) of the younger respondents liked the pleasant smell of *tintsanga* (Pumpkin leaves). Only 7.14% (n=4) of the older respondents indicated that they ate indigenous green leafy vegetables because they are regarded as part of Swazi culture, while none of the younger respondents gave this reason. The findings for health-related reasons for using indigenous green leafy vegetables by the elderly women is consistent with a study that reported that one of the main reason why older people choose to eat healthy was to prevent further health problems (Chambers, Lobb, Butler, & Trail, 2008). The response on eating indigenous green leafy vegetables because it is part of culture is in line with what Cloete and Idsardi (2013) reported, namely, that culture and traditions are motivators for the consumption of indigenous crops.

The study group was further probed in the focus group discussions to indicate what they do when they have surplus of indigenous green leafy vegetables. The majority of the older women stated that they preserved the surplus, while only a few younger participants said they dried the surplus indigenous green leafy vegetables. Most of the younger women, on the other hand, explained that they hardly have surplus indigenous green leafy vegetables as they only collect enough for their households. The participants were also asked to give the methods of preservation they used. Drying was the method given by the older participants. This method was used to make *umfuso* (dried leafy vegetables). Drying entailed the spreading of the vegetables on a flat surface and leaving them until they dried. Bigger leaves were chopped into smaller pieces before drying. An alternative method is to wash the leaves in salt water or blanch them prior to drying. They would then place them on a flat surface in the shade to prevent the green colour from fading and to preserve the taste. After several days, the leaves are usually completely dry. Thereafter they are crushed and sealed in glass bottles. Others mentioned that

they gave surpluses to neighbours, friends and relatives who reside in the urban areas. Most of the younger participants did not give details on how to dry indigenous green leafy vegetables they only said “they can be dried in the sun” or to prepare *umfuso* (dried green leafy vegetables).

The findings from the focus group discussions confirm the responses from the structured interviews and are presented in Table 4.10.

TABLE 4.10: USES OF EXCESS INDIGENOUS GREEN LEAFY VEGETABLES AND PRESERVATION METHODS

USES	n=96	%	OLDER WOMEN n=55	%	YOUNGER WOMEN n=41	%
Sell	18	18.75	1	1.81	9	21.95
Preserve	57	59.37	36	65.45	21	51.21
Give other people	21	21.87	18	32.72	18	26.82

6 no response

PRESERVATION METHODS	n= 57	%	OLDER WOMEN n=56	%	YOUNGER WOMEN n=46	%
Drying	42	93.33	33	58.92	9	19.56
Freezing	15	26.31	8	14.28	7	15.21

45 no response

The results shows that preservation was the most mentioned method by both the older 65.45% (n=36) and the younger respondents 51.21% (n=21) respectively. This was followed by those who gave surpluses to other people and the few respondents who sold their surpluses (see Table 4.10). Drying as a preservation method was mentioned by the majority of the older respondents (58.92%, n=33) but only by 19.56% (n=9) younger respondents. Freezing was also indicated by a few respondents (26.31%, n=15). The results are consistent with other studies that reported that indigenous green leafy vegetables are mostly preserved in rural communities by means of drying when in abundance (van der Hoeven *et al.*, 2013; Faber *et al.*, 2010; Masarirambi *et al.*, 2010; Weinberger & Swai, 2006; Grivetti & Ogle, 2000; Ogle & Grivetti, 1985a; Jones, 1963:8; Beemer, 1939).

It was imperative that the study also sought to determine how knowledge on indigenous green leafy vegetables is transferred from generation to generation. The next sub-objective addresses the aspect of knowledge transfer.

4.5.4 Knowledge transfer on the use of indigenous green leafy vegetables

One of the explanations given in literature why the use of indigenous green leafy vegetables has diminished is that the younger generation are no longer able to identify green leafy vegetables that can be used as food (Quaye *et al.*, 2009; Weinberger & Swai, 2006). In the focus group discussions, participants were probed on how they became knowledgeable on their use that involved identification, collection and preparation of indigenous green leafy vegetables. Most of the older participants stated that they gained knowledge from their grandmothers and mothers. They explained that, when accompanying their mothers to collect firewood they would often show them the edible species and how to collect them. The younger group gave the same responses except that they said their mothers showed them the edible species when weeding in the nearby fields.

Responses from the structured interviews on the transfer of knowledge regarding the collection, preparation and use of indigenous green leafy vegetables as food are presented in the Table 4.11.

TABLE 4.11: SOURCES OF KNOWLEDGE ON THE COLLECTION, PREPARATION AND CONSUMPTION OF INDIGENOUS GREEN LEAFY VEGETABLES

	n = 102		OLDER GROUP n=56		YOUNGER GROUP n=46	
	n	%	n	%	n	%
Collection						
Mother	76	74.50	44	78.57	32	69.56
Father	15	14.70	9	16.07	6	13.04
Grandmother	36	35.29	21	37.50	15	32.60
Others (grandmothers, neighbours)	13	12.74	6	10.71	8	17.39
Preparation						
Mother	76	74.50	44	78.57	32	69.56
Father	8	7.84	3	5.35	5	10.86
Grandmother	36	35.29	19	33.92	17	36.95
Other	13	12.74	4	7.14	9	19.56
Food source						
Mother	75	73.52	40	71.42	35	76.08
Father	13	12.74	9	16.07	4	8.69
Grandmother	29	28.43	16	28.57	13	28.26
Other	22	21.56	12	21.42	11	23.91

N.B. Respondents could give more than one response as seen in this table.

Knowledge on the collection of indigenous green leafy vegetables

The majority of the older group (78.57%, n=44) and younger group (69.56%, n= 32) gained their knowledge on the collection of indigenous vegetables from their mothers. This was followed by 37.50% (n=21) of the older respondents who obtained knowledge from their grandmothers, and

28.26% (n=11) of the younger respondents who acquired their knowledge from their grandmothers. Other sources of knowledge mentioned were; grandfathers, neighbours and elder sisters. These results confirm the responses obtained from the focus group.

Knowledge on the preparation of indigenous green leafy vegetables

Respondents were asked to indicate the sources of knowledge on the preparation of indigenous green leafy vegetables. From the focus group, discussions both the younger and older participants mentioned that they obtained their knowledge on the preparation of indigenous green leafy vegetables from their mothers and grandmothers. One of the older participants was heard saying;

'Besibuka gogo nakasiphekela umbhidvo' - meaning we would watch our grandmothers when they were cooking green leafy vegetable for us. One of the younger group participants was heard saying:

'uyatiphekela make umbhidvo wakhe asinendzaba nawo' - meaning my mother cooks green leafy vegetable relishes for herself and we are not interested in knowing how to cook it, because we do not like it.

These quotations provide evidence that the younger generation do not seem to take actively part in the preparation of indigenous green leafy vegetables and that knowledge of food preparation is not transferred to the younger generation. Two pots of relishes are often prepared by elderly Swazi women. One for their traditional dishes and the other for a relish using modern foods for the children who do not like eating traditional foods (Dlamini & Lowrey, 2005). This practice leads to knowledge transfer being eroded due to the lack of interest of the younger generation in participation in the collection, preparation and consumption of indigenous vegetables (Powell *et al.*, 2014; Misra *et al.*, 2008).

From the structured interview, it was gathered that the majority of the older group 78.57% (n=44) and the majority of the younger group 69.6% (n=32) obtained their knowledge on the preparation of indigenous green leafy vegetables from their mothers. This was followed by those who stated grandmothers as their source of knowledge. Other sources that were stated were Home Economics teachers and the media.

Knowledge on the use of indigenous green leafy vegetables

The focus group participants were also asked to indicate their source of knowledge regarding the use of indigenous green leafy vegetables as food. They stated that their mothers and grandmothers were their sources of knowledge. However, they also mentioned that nowadays the media, the radio in particular, played a major role in educating and promoting the consumption of the indigenous green leafy vegetables. The media was mentioned mostly by the younger group. Some indicated that they got their knowledge at school.

From the findings of both the focus group discussions and the results of structured interviews, it was clear that the main source of knowledge on the collection, preparation use of indigenous green leafy vegetables came from the older female members. This is substantiated by other scholars who reported that the elderly are custodians of knowledge related to indigenous green leafy vegetables and they are responsible for teaching the younger generation about these food procurement practices (van der Hoeven *et al.*, 2013; Dweba & Mearns, 2011; Weinberger & Swai, 2006; Prasad, 1998; Agrawal, 1995; Ogle & Grivetti, 1985a).

The next section deals with the food consumption patterns of the study group and how indigenous green leafy vegetables are included in these patterns.

4.6 FOOD CONSUMPTION PATTERNS ASSOCIATED WITH INDIGENOUS GREEN LEAFY VEGETABLES

This third objective related to the food consumption patterns regarding indigenous green leafy vegetables and the extent to which they are included in the eating patterns of the study group and if they are included on special occasions. The familiarity, preference rating and frequency of consumption of indigenous green leafy vegetable were also measured, to be able to describe the acceptability of these vegetables to the study group.

4.6.1 Eating patterns

The first sub-objective dealt with the extent to which indigenous green leafy vegetables are included in the eating patterns of the study group. Eating patterns refer to the meal pattern and meal composition of a group or individual. This information was gathered through structured interview questions on the number of meals consumed on weekdays and by a 24-hour recall of what was consumed the previous day. The results revealed that the majority of the respondents (70.58%, n=72) ate three meals on weekdays, whereas 19.60%, (n=20) still enjoyed the

traditional two meals with 4.9% (n=5) who had either only one meal or four meals a day respectively.

Meal composition

The results on the meal composition are presented for each meal and in-between meals. The responses on what is consumed are reported (See Figure 4.7).

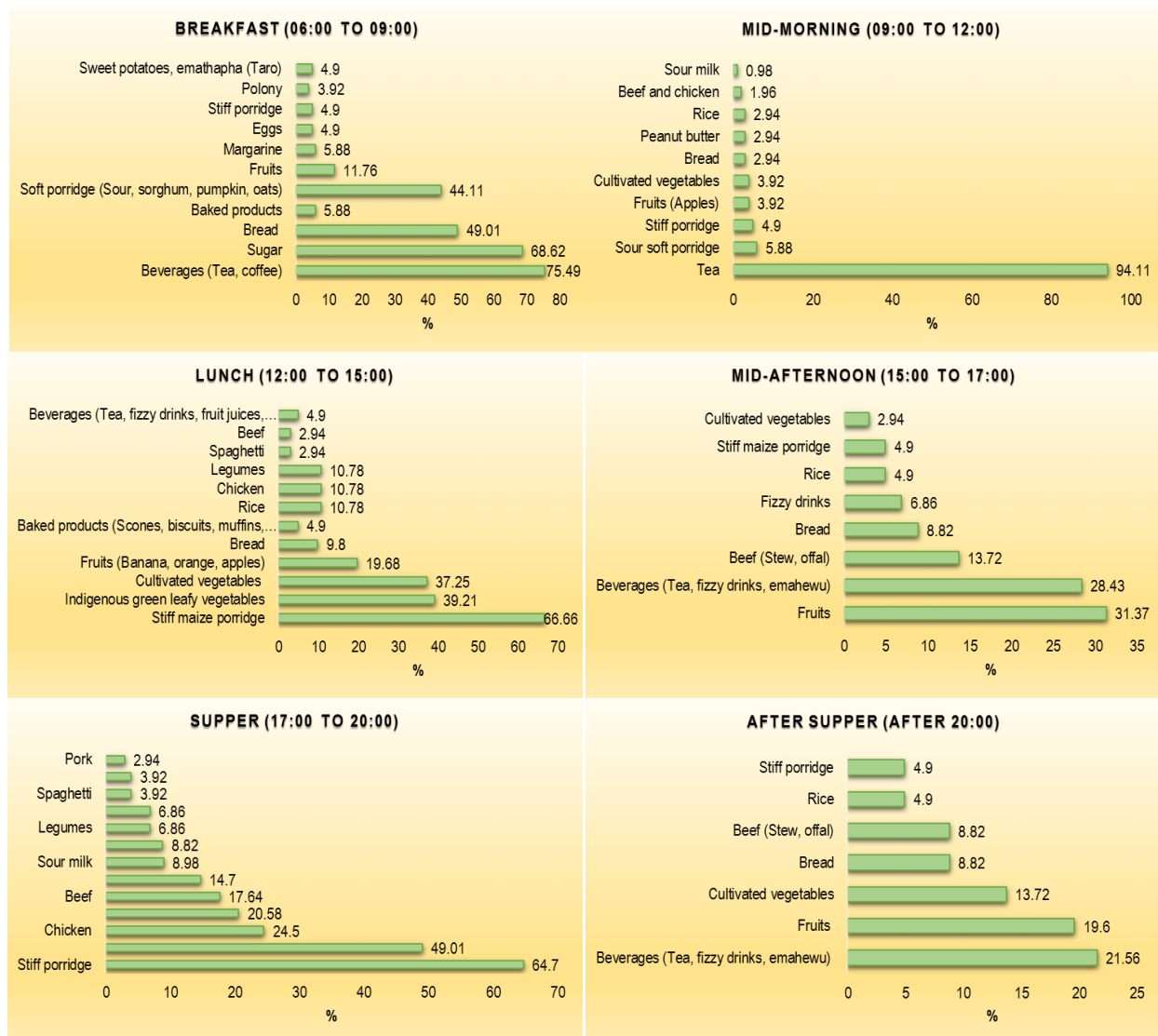


FIGURE 4.7: DAILY MEAL COMPOSITION

Breakfast

The majority of the respondents (77.45%, n=79) drank tea, and 68.62 % (n=70) had sugar at breakfast either in tea or over porridge. Bread was consumed by 49.01 % (n=50) followed by 44.11 % (n=45) who ate soft porridge prepared from either maize meal or a soft maize meal porridge mixed with pumpkin or prepared from sorghum. Other foods that were consumed by

some at breakfast included; fruits, stiff maize meal porridge, sweet potatoes, *taro (Emathapha)*. A few included westernised foods such as breakfast cereals cornflakes (3.92%, n=4), polony (3.92%, n=4) and eggs (4.90%, n=5). Margarine was eaten with bread (5.88%, n=6).

The results on the consumption of bread are consistent with other South African studies that most South Africans eat bread for breakfast (Tshihwanambi, 2007; Viljoen *et al.*, 2005; Viljoen & Gericke, 1998). According to a study by Kgaphola & Viljoen (2004), tea was also the item most included at breakfast. Although some respondents still included traditional foods as part of their breakfast such as soft maize meal porridge, the inclusion of foods such as eggs and polony by some indicates a move towards a more western-orientated breakfast.

Mid-morning

The majority (94.11%, n=96) respondents drank tea in the mid-morning break. A small number ate something as 5.88% (n=6) mentioned soft porridge (maize meal sour thin porridge and sorghum) and 4.90% (n=5) stiff maize meal porridge. Most of the other foods listed were similar to those consumed for breakfast. Other foods eaten at this time were fruit, cultivated vegetables, rice, beef, chicken and sour milk.

Lunch

Two thirds of the respondents (66.66%, n=68) consumed stiff maize porridge for lunch, with 39.21% (n=40) who ate indigenous green leafy vegetables as relish such as *ligusha (Corchorus spp)*, *chuchuza (Bidens pilosa)* and *mavelejozi (Solanum reroflexum)*. Cultivated vegetables such as, spinach, cabbage, carrots, onions, tomatoes and beetroot were also eaten by 37.25% (n=38) of the respondents. Protein-rich foods such as chicken and legumes were eaten by 10.78% (n=11) and beef by 2.94% (n=3). Bread was consumed by 9.80% (n=10). Other foods mentioned were fruit such as bananas, oranges and apples, baked products such as scones and fat cakes. Some consumed foods such as rice, spaghetti and enjoyed fizzy drinks.

Mid-afternoon

Fruit was eaten by (31.37%, n=32), followed by those who drank beverages, mainly tea (26.47%, n=27). Beef was eaten by (13.72%, n=14). Other foods that were enjoyed by some were, bread, stiff maize porridge, rice, and cultivated vegetables.

Supper

As starch, the majority (64.70%, n=66) consumed stiff maize meal porridge followed by (20.58%, n=21) respondents who included rice for supper. Cultivated vegetables were the second most eaten food and eaten for supper as (41.17%, n=42) respondents indicated to do so. Chicken was eaten by 24.50% (n=25) and beef by (17.64%, n=18). Indigenous green leafy vegetables were eaten by (14.70%, n=15) respondents. Other foods consumed were, fruits, sour milk, legumes, canned fish, pork and beverages. The food items included were similar to those included at lunch except that there were a larger number of respondents who ate cultivated vegetables rather than indigenous green leafy vegetables for supper. For lunch the number of respondents who indicated that they ate indigenous green leafy vegetables were nearly the same as those who included cultivated vegetables, as 39.21% (n=40) and 37.25% (n=38) of the respondents respectively indicated so.

The high consumption of staple maize meal stiff porridge means that the respondents still maintain elements of the traditional diet although some changes were noted. The inclusion of the staple food maize porridge confirms that maize meal stiff porridge continues to be an important component of the Swazi meal pattern. It was also noted that chicken was the most eaten type of meat both at lunch and supper. This could be attributed to the fact that it is affordable in Swaziland when compared to the cost of other types of meat. This is consistent with a report that chicken is the most available and affordable meat in the country (Government of Swaziland 2013b). The low consumption of pork (2.94%, n=3) can be for religious reasons as it is believed to be unclean and represents demonic properties (Kgaphola & Viljoen, 2004; Longley, 1999; Jones, 1963:190).

After supper

The results reveal that a small number of respondents (25%, n=24) ate something around this time. The majority drank beverages such as tea, fizzy drinks or *emahewu* (21.56%, n=22), followed by (19.60%, n= 20) who ate fruits. Cultivated vegetables were included by 13.72% (n=14) respondents. Bread was eaten by 8.82% (n=9) of the respondents which was similar to those who ate beef at this time. A small number (4.90%, n=5) also enjoyed rice and stiff maize porridge.

In order to confirm the eating patterns reported for the previous day, respondents were asked if the reported meal composition was a true reflection of what they usually eat. They were asked to explain when it was not a correct representation of what they usually ate, and how it differed. The majority of both the older and the younger respondents (75%, n=42) and (60.86%, n=28)

respectively, indicated that the meals revealed in the 24-hour recall was a true reflection of what they usually eat on weekdays, while (31.37%, n=32) stated that the food was not the same. Those respondents who indicated that their meals differed were further asked to state the reasons why this was so. The majority of the respondents (54.83%, n=17) revealed that they ate more meals and there was a variety on other days, while others (45.16%, n=14) stated that they ate fewer meals on other days compared to the 24-hour recall meals.

Respondents were asked if they ate the same number of meals over weekends as during the week. Table 4.12 presents the responses.

TABLE 4.12: NUMBER OF MEALS CONSUMED ON WEEKEND DAYS

MEALS	n=19	%	OLDER WOMEN (n=12)	%	YOUNGER WOMEN (n=7)	%
One meal	1	5.26	1	8.33	0	0
Two meals	6	31.57	5	16.66	1	14.28
Three meals	11	57.89	5	16.66	6	85.71
More than three meals	1	5.26	1	8.33	0	0

The majority (57.89%, n=11) indicated that they had three meals on weekend days. This was followed by those who had two meals on weekend days (31.57%, n=6). For this study, detailed information on food items consumed on weekend days was not collected as it was not within the scope of the study. From the (24-hour recall) eating pattern, it can be concluded that rural women still consume indigenous green leafy vegetables, although they are few in number. The elderly women enjoyed these vegetables with maize meal stiff porridge especially at lunch and at supper sometimes.

A possible explanation of high consumption of indigenous green leafy vegetables during the day in the 24-hour recall investigation was that the women who are at home during the day regard vegetables as an affordable relish, which they also enjoy. This is supported by literature as traditionally indigenous green leafy vegetables are regarded as women's food (Ogle & Grivetti, 1985a; Jones, 1963:70). These results prove that the Swazi people still maintain elements of their traditional diet. The consumption of legumes and chicken as a protein relish could possibly be attributed to its affordability and availability compared to beef. The low consumption of beef is due to the decrease of the number of beef cattle in the country because of weather conditions and poor rangeland management, as well as the belief that cattle represent wealth (Government of Swaziland, 2013b). The inclusion of processed foods on the other hand, is a sign that the Swazi diet is shifting from being traditional towards becoming more westernised.

The respondents were requested to indicate the meal and the time of the day when indigenous green leafy vegetables were consumed. Table 4.13 presents the results.

TABLE 4.13: MEALS WHEN INDIGENOUS GREEN LEAFY VEGETABLES ARE CONSUMED

	n=102	%	OLDER WOMEN (n=56)	%	YOUNGER WOMEN (n=46)	%
Breakfast	13	12.74	2	14.28	5	10.86
Lunch	30	29.41	18	32.14	12	26.08
Supper	58	56.86	29	51.78	29	63.04
Anytime of the day	1	0.98	1	1.78	0	0

The majority of the respondents 56.86% (n=58) indicated that indigenous green leafy vegetables are served at supper time and this applies to both the young and the older respondents. The results differ from those obtained from the 24-hour recall results where most women reported that they included indigenous green leafy vegetable for lunch the previous day. This implies that these results are only true for the 24-hour recall, but generally, the majority of respondents would include these vegetables at supper time. There were 29.41% (n=30) respondents who indicated they include indigenous green leafy vegetables at lunch time. Only one old woman ate indigenous green leafy vegetables anytime of the day.

As part of the consumption patterns, the respondents were asked to indicate the person responsible for the preparation of indigenous green leafy vegetables. Ninety-five (94.05%) stated the mother as the person responsible for preparing indigenous green leafy vegetables. In another question, the respondents were asked to state the name of the food eaten with indigenous green leafy vegetables. Table 4.14 shows the results.

TABLE 4.14: FOODS EATEN WITH INDIGENOUS GREEN LEAFY VEGETABLES

	n=102	%	OLDER WOMEN n=56	%	YOUNGER WOMEN n=46	%
Porridge (maize meal stiff porridge)	98	96.07	55	98.21	43	93.47
Maize rice	7	6.86	4	7.14	3	6.52
Samp	16	15.68	7	12.50	9	19.56
Rice	31	30.39	14	25	17	36.95

Stiff maize meal porridge with indigenous green leafy vegetables was the most eaten food for the majority of both groups of women that is (98.21%, n=55) of the older group and (93.47%, n=43) of the younger group, followed by rice (30.39%, n=31). Other food that were indicated to be eaten with these vegetables was pasta. The findings of maize meal stiff porridge being the main food eaten with indigenous green leafy vegetables is similar to other studies that these

vegetables are consumed as a relish to accompany the main cereal staple dish especially maize meal (Mavengahama *et al.*, 2013; van der Hoeven *et al.*, 2013; Ogle & Grivetti, 1985a; Jones, 1963:69; Beemer, 1939).

The next section as part of the consumption pattern relates to the second sub-objective and deals with the inclusion of indigenous green leafy vegetables on special occasions.

4.6.2 Inclusion of indigenous green leafy vegetables at special occasions

Respondents were asked in the focus group discussion and structured interview if they served indigenous green leafy vegetables on special occasions. The older participants indicated in the focus group discussion that they served indigenous green leafy vegetables at special occasion events. On the one hand, the younger participants said they would not serve the vegetables on such occasions. Reasons behind serving indigenous green leafy vegetables were ascertained. From the focus group discussions, the older participants gave reasons such as them being healthy and the fact that it tastes good. Other reasons that were given were that people enjoy eating indigenous green leafy vegetables as they are not eaten often. The younger group, on the other hand, said they would not serve indigenous green leafy vegetables as people would not eat them on a special occasion as it would be a sign of poverty. The results of the structured interviews confirm that the majority of the respondents (67.64%, n=69) served indigenous green leafy vegetables at special occasion events. Table 4.15 compares the reasons given by the two groups for serving and not serving indigenous green leafy vegetables, and the special occasions on which the vegetables could be served.

TABLE 4.15: REASONS FOR SERVING INDIGENOUS GREEN LEAFY VEGETABLES ON A SPECIAL OCCASION

REASONS FOR SERVING	n=76 (26 MISSING)	%	OLDER WOMEN (n=56)	%	YOUNGER WOMEN (n=46)	%
Health and nutrition related	42	55.26	19	33.92	15	32.60
Sensory attributes	27	35.52	13	23.21	14	30.43
Familiarity	1	1.31	1	1.78	0	0
Special treat for the elderly	3	3.94	2	3.57	1	2.17
No alternative food available	3	3.94	2	3.57	1	2.17
REASONS FOR NOT SERVING	n=26 (76 MISSING)	%	OLDER WOMEN (n=56)	%	YOUNGER WOMEN (n=46)	%
Symbol of poverty	5	19.23	1	1.78	4	8.69
Sensory attributes	4	15.38	2	3.57	2	4.34
Not appropriate food for special occasion	4	15.38	3	5.35	1	2.17
Other negative responses	13	50	12	21.42	1	2.17
SPECIAL OCCASIONS	n=93 (9 MISSING)	%	OLDER WOMEN (n=56)	%	YOUNGER WOMEN (n=46)	%
Traditional celebration	31	33.33	18	32.14	13	28.26
Modern celebrations	37	39.78	27	48.21	10	21.73
Funerals	12	12.90	9	16.07	3	6.52
Other	13	13.97	10	17.85	3	6.52

The results portray that many (32.14%, n=18) of the older respondents and 28.26% (n=13) of the younger respondents revealed that they served indigenous green leafy vegetables on special occasions for nutrition and health related reasons. Both groups gave responses such as *'it boosts the immune system, adds blood in the body and that it lowers blood pressure'*. The second reason stated by both age groups related to the sensory attributes of indigenous green leafy vegetables. Nearly a quarter (23.21%, n=13) of the older group women and 30.43%, (n=23) of the younger women mentioned it. Both groups stated that indigenous green leafy vegetables tasted and smelled good. Other reasons given for serving these vegetables were that they were special treats for the elderly. Others mention that if no alternative food were available the indigenous green leafy vegetables would be served for a celebratory occasion. They also stated that they would serve these vegetables on a special occasion as people were familiar with these vegetables.

A number of respondents gave negative reasons for not serving indigenous green leafy vegetables at special occasion events. The findings show that 8.69% (n=4) younger respondents indicated that they would not serve indigenous green leafy vegetables because it symbolises poverty. The younger respondents further stated that people were supposed to be served *'decent modern foods'* on special occasions not indigenous green leafy vegetables. Furthermore, they mentioned that people do not like certain sensory attributes of indigenous

green leafy vegetables such as the bitter taste, the smell and the appearance of some of the vegetables such as the sliminess of *ligusha* (*Corchorus spp*) *emacembe abhatata* (*Sweet potato leaves*). Other negative responses given by both groups was the fear that it might cause stomach upsets to the guests. Another reason given was that it was difficult to obtain large quantities of indigenous green leafy vegetables to serve a large number of guests.

Furthermore, the results indicate that the majority of the older respondents (48.21%, n=18) stated that they would serve indigenous green leafy vegetables at modern celebrations such as civil weddings and parties. On the other hand, the majority of younger respondents (28.26%, n=13) said they would serve them at traditional ceremonies such as traditional weddings and on cultural days. Funerals were also mentioned by some of the older participants as an occasion where these vegetables could be served. The older women explained that, in the olden days, it was part of the Swazi custom to serve only indigenous vegetables in bereaved homes. No meat was allowed in the bereaved home as eating meat was regarded as if they were “*eating the dead person*”. Even if meat was in the household before the bereavement, it was all taken out of the home and given to other people. This is why even today, it is believed that indigenous green leafy vegetables are the most suitable food for funerals. Family re-unions or gatherings, church meetings were also listed as other occasions where these vegetables could be served. Some also indicated that when foreigners or tourists visit they are served indigenous green leafy vegetables. They stated that these people like to taste the traditional foods of the country they are visiting.

The findings on indigenous green leafy vegetables being served for health and nutrition purposes are in line with what other studies reported as health being an important reason for certain food choices for older people (Powell *et al.*, 2014; van der Hoeven *et al.*, 2013; Chambers *et al.*, 2008). The results on tourists being interested in traditional food is supported by other studies that, when visiting a country, tourists like to experience the natural environment, local cultures and lifestyles including local customs or traditions (Mavengahama *et al.*, 2013; Malaza, 2012; Kepe, 2008). Both the older and younger groups of women mentioned that they would serve these vegetables only as a side dish or relish to guests or to balance a meal.

In another question, respondents were also asked whether they would serve indigenous green leafy vegetables to guests in their households. Table 4.16 presents the responses.

TABLE 4.16: REASONS FOR SERVING INDIGENOUS GREEN LEAFY VEGETABLES TO GUESTS

REASONS FOR SERVING	n=94 (8 MISSING)	%	OLDER WOMEN	%	YOUNGER WOMEN	%
Health and nutrition related	30	31.91	17	30.35	13	28.26
Sensory attributes	20	21.27	13	23.21	7	15.21
Special treat	21	22.34	13	23.21	8	17.39
Relish	19	20.21	7	12.50	12	26.08
Other positive responses	4	4.25	2	3.57	2	4.34
REASONS FOR NOT SERVING	n=94 (8 MISSING)	%	OLDER WOMEN	%	YOUNGER WOMEN	%
Stomach upset	48	51.06	45	80.35	3	6.5
Negative attitude/it is poor man's food	33	35.10	4	7.14	29	63.04
Other negative responses	13	13.82	2	3.57	11	23.91

Similar reasons as those given for serving indigenous green leafy vegetables at special occasions were obtained from the study group. Most of the older respondents (30.25%, n =17) and younger respondents (28.26%, n=13) would serve indigenous green leafy vegetables to their guests for nutrition and health-related reasons, followed by 23.21% (n=13) older respondents and 15.21% (n=7) younger respondents who would serve them for their sensory properties. Older respondents explained that they serve the traditional vegetable to guests especially their urban guests as they rarely had the opportunity to eat them and they believed they would enjoy being served indigenous green leafy vegetables. Other reasons given by the older group were that they would serve indigenous green leafy vegetables to guests of their own age as they know that most elderly people enjoy indigenous green leafy vegetables more than the younger people.

However, the reasons for not serving indigenous green leafy vegetables to guests were also obtained. These were also similar to responses given for not serving indigenous green leafy vegetables on special occasions. Fear that their guests might suffer from a stomach upset was the reason given by the majority 80.35% (n=45) of the older respondents for not serving indigenous green leafy vegetables to guests. On the other hand the majority of the younger respondents 63.04% (n=29) mentioned '*poor man's food*' meaning these vegetables are perceived as food for the poor, thus not suitable to be served to guests. Some of the younger respondents even said they would rather slaughter a chicken for their guests if they do not have money to buy modern foods. Other negative responses given for not serving indigenous green leafy vegetables related to certain sensory attributes that might not be liked by guests. These were that indigenous green leafy vegetables have a bitter taste, smelled bad and had an unappealing texture such as *ligusha* (*Corchorus spp*) which has a slimy consistency.

Rural Swazi people do not serve indigenous green leafy vegetables to visitors as they were regarded as a sign of poverty (Ogle & Grivetti, 1985a), which is what this study also found. Some of the households could even find themselves in debt after purchase alternative food for their visitors but they did this so that the visitors would think highly of them (Ogle & Grivetti, 1985a). Similarly, it was reported in other studies too that it was undignified to serve indigenous vegetables to a visitor (Dweba & Mearns, 2011; Jansen van Rensburg *et al.*, 2007; Ogoye-Ndegwa, 2003). Contrary to this, Weinberger & Swai (2006) reported that, in Tanzania, many would serve traditional vegetable crops to visitors, although they similarly would not serve them on a special occasion such as wedding or on religious holidays.

To determine and describe which indigenous green leafy vegetables were still known and eaten by the study group, indigenous green leafy vegetables were listed and questions were asked on their familiarity, preference and frequency of consumption as part of the third sub-objective. In addition, the familiarity, preference and frequency of consumption of selected cultivated green leafy vegetables and the leaves of certain cultivated vegetables were also measured, as the study group often consumed them. Strictly speaking, they are not real indigenous green leafy vegetables but are regarded by some as traditional vegetables.

4.6.3 Familiarity, preference rating and frequency of consumption of indigenous green leafy vegetables

Eleven indigenous green leafy vegetables and eleven cultivated leafy vegetables were listed in separate tables in the questionnaire. To determine their familiarity, respondents were asked to indicate whether they knew or had eaten each vegetable before. The preference rating was determined on five point Likert-type scale where 1=dislike very much, 2=dislike, 3=neutral, 4=like it, 5=like very much. The median and the mode values were then calculated. The Smirnov, Lilliefors and Shapiro-Wilk test for normality was performed to compare the distribution of the responses to a normal distribution. This was performed to ascertain whether the distribution of the responses differed from a normal distribution. For the indigenous green leafy vegetables that were liked, a positive skewed distribution was obtained. A positive skewed was shown by the tail of the distribution that trails off to the right, in the direction of higher, more positive score values. A negative skewed distribution on the other hand was shown by the longer tail of distribution that goes to the left of the graph in the direction of lower score values. This showed the indigenous green leafy vegetables that were disliked. These graphs are given in Addendum H.

The indigenous green leafy vegetables and cultivated leafy vegetables with a high preference rating are symbolised by three asterisk (***), a neutral or medium preference rating by two

asterisk (**) and a low preference rating by one asterisk (*). Frequency of consumption was determined and respondents had to indicate how often each of the leafy vegetable was consumed. The options given were, daily, 3-4 times a week, once a week, less than three times a month and on special occasions or never.

Table 4.17 presents the results on the familiarity, preference rating and frequency of consumption of indigenous green leafy vegetables.

TABLE 4.17: FAMILIARITY, PREFERENCE RATING AND FREQUENCY OF CONSUMPTION OF INDIGENOUS GREEN LEAFY VEGETABLES (n=102)

INDIGENOUS GREEN LEAFY VEGETABLES	FAMILIARITY				PREFERENCE RATING			FREQUENCY OF CONSUMPTION									
	UNKNOWN		NEVER EATEN		MEDIAN	MODE	PREFERENCE RATING	DAILY		3-4 TIMES A WEEK		ONCE A WEEK		<3 TIMES A MONTH		SPECIAL OCCASION	
	n	%	n	%				n	%	n	%	n	%	n	%	n	%
Bubati <i>Lapottea pedumentaris</i>	40	39.21	17	16.66	3	7	*	1	0.98	3	2.94	3	2.94	5	4.90	1	0.98
Chuchuza (Blackjack) <i>Bidens pilosa</i>	-	-	-	-	4	47	***	5	4.90	38	37.25	20	19.60	29	28.43	9	8.82
Emahala <i>Aloe saponaria</i>	4	3.92	10	9.80	3	23	**	2	1.96	15	14.70	13	12.74	27	26.47	2	1.96
Imbuya (Pigweed) <i>Amaranthus</i>	-	-	-	-	4	55	***	4	3.92	56	54.90	26	25.49	14	13.72	1	0.98
Ingabe (<i>Sonchus oleraceus</i>) <i>Cichorium spp.</i>	19	18.62	9	8.82	4	29	*	2	1.96	13	12.74	23	22.54	18	17.64	3	2.94
Inkakha (Bittergourd) <i>Momordica involucrate</i>	-	-	1	0.98	4	36	***	16	15.68	29	28.43	31	30.39	17	16.66	7	6.86
Inshubaba (Bittergourd) <i>Momordica clementindae</i>	1	0.98	1	0.98	4	37	***	12	11.76	20	19.60	34	33.33	25	24.50	9	8.82
Ligagajane <i>Cyphia bolusil</i>	51	50	14	13.72	3	9	*	-	-	4	3.92	3	2.94	3	2.94	-	-
Ligusha (Wild vegetable jute) <i>Corchorus spp</i>	1	0.98	3	2.94	4	37	***	10	9.80	34	33.33	33	32.35	12	11.76	6	5.86
Liklolo <i>Grewia caffra</i>	34	33.33	12	11.76	3	24	*	1	0.98	7	6.86	7	6.86	10	9.80	-	-
Luphephetse <i>Anthraxia elata</i>	43	42.15	15	14.70	3	13	*	6	5.88	4	3.92	5	4.90	11	10.78	5	4.90

INDIGENOUS GREEN LEAFY VEGETABLES	FAMILIARITY				PREFERENCE RATING			FREQUENCY OF CONSUMPTION									
	UNKNOWN		NEVER EATEN		MEDIAN	MODE	PREFERENCE RATING	DAILY		3-4 TIMES A WEEK		ONCE A WEEK		<3 TIMES A MONTH		SPECIAL OCCASION	
	n	%	n	%				n	%	n	%	n	%	n	%	n	%
Lisheshelu <i>Aloe boylei</i>	36	35.29	17	16.66	3	16	*	1	0.98	6	5.88	7	6.86	14	13.72	1	0.98
Mavelejozi (Black nightshade) <i>Solanum reroflexumm</i>	5	4.90	4	3.92	4	49	**	6	5.88	32	31.37	27	26.47	22	21.56	4	3.92
Sibhadze <i>Annesorhiza flagelifolia</i>	24	23.52	15	14.70	3	25	*	-	-	5	4.90	17	16.66	11	10.78	1	0.98
Sikhwa <i>Tulbaghi lunwigian</i>	1	0.98	-	-	3	21	**	1	0.98	1	0.98	20	19.60	16	15.68	1	0.98
Silele <i>Potulaca oleracea</i>	34	33.33	11	10.78	3	19	*	1	0.98	8	7.84	17	16.66	12	11.76	6	5.88
Umdzayi (Taro) <i>Asclepias affinis</i>	30	29.41	15	14.70	3	15	*	12	11.76	6	5.88	10	9.80	11	10.78	1	0.98
Umsobo (Black nightshade) <i>Solanum nigrum</i>	16	15.68	12	11.76	3	26	**	4	3.29	11	10.78	19	18.62	18	17.64	12	11.76

Familiarity of indigenous green leafy vegetables

The results show that *chuchuza* (*Bidens pilosa*), *inkakha* (*Momordica involucrata*), *imbuya* (*Amaranthus*) were all familiar to the respondents, followed by 99.01% (n=101) respondents who were also familiar with *inshubaba* (*Momordica involucrata*), *ligusha* (*Corchorus spp*). Indigenous green leafy vegetables that were not familiar to the group included; *ligagajane* (*Cyphia bolusil*) (50%, n=51), *luphephetse* (*Anthraxia elata*) (42.16, n=43), *bubati* (*Lapottea pedumentaris*) (39.2%, n=40), *lisheshelu* (*Aloe boylei*) (35.3%, n=36), whereas *silele* (*Potucala oleracea*) and *liklolo* (*Grewis caffra/Corchorus spp*) were also unfamiliar to a third of the respondents (33.3%, n=34). Other studies concur with the fact that *imbuya* (*Amaranthus*) and *chuchuza* (*Bidens pilosa*) are well known and are frequently consumed indigenous crops (Cloete & Idsardi, 2013; Mavengahama *et al.*, 2013). A low consumption of indigenous crops is associated with unfamiliarity of the crops (Cloete & Idsardi, 2013).

Preference rating of indigenous green leafy vegetables

The indigenous green leafy vegetables that were given a high preference rating were *chuchuza* (*Bidens pilosa*), *imbuya* (*Amaranthus*), *inkakha* (*Momordica involucrata*), *inshubaba* (*Momordica clementidae*), and *ligusha* (*Corchorus spp*). *Sikhwa* (*Tulbaghi lunwigian*), *mavelejozi/umsobo* (*Solanum reroflexum*), *emahala* (*Aloe saponaria*) received a neutral or medium preference rating, while *ingabe* (*Sonchus oleraceus*), *sibhadze* (*Annesorhiza flagelifolia*), *bubati* (*Lapottea pedumentaris*), *lisheshelu* (*Aloe boylei*), *liklolo* (*Grewis caffra/Corchorus spp*), *silele* (*Potulaca oleracea*), *umdzayi* (*Taro asclepisas*) and *ligagajane* (*Cyphia bolusil*) were given a low preference rating.

Frequency of consumption of indigenous green leafy vegetables

The majority 54.90% (n=56) respondents consumed *imbuya* (*Amaranthus*) 3-4 times a week and 25.49% (n=26) did so once a week. *Chuchuza* (*Bidens pilosa*) was consumed frequently by 37.25% (n=38) 3-4 times a week, by 19.60% (n=20) of the respondents did so once a week, 28.43% (n=29) ate it <3 times a month and 8.82% (n=9) did so on special occasion. Thirty-three per cent (n=34) indicated that they ate *ligusha* (*Corchorus spp*) 3-4 times a week and 32.35% (n=12) respondents ate it once a week, 11.76% (n=12) ate it <3 times a month and 5.86% (n=6) ate it on special occasion. *Inkakha* (*Momordica involucrate*) was frequently consumed by 28.43% (n=29) 3-4 times a week and 30.39% (n=31) reported to do so once a week. The results also indicate that 33.33% (n=34) respondents consumed *inshubaba* (*Momordica involucrate*) once a week and 24.50% (n=25) ate it less than three time a month. *Mavelejozi* (*Solanum reroflexum*) was frequently consumed by 31.37% (n=32) 3-4 times a week and 26.47% (n=27)

ate it once a week. Twenty (19.60%) respondents consumed *sikhwa* (*Tulbaghi lunwigian*) once a week. *Umsobo* (*Solanum reroflexum*) on the other hand was consumed by 18.62% (n=19) respondents once a week while 17.64% (n=18) respondents indicated to do so less than three times a month and 11.76% (n=12) ate it on special occasions. *Ingabe* (*Sonchus oleraceus*) is frequently consumed by 22.54 (n=23) respondents once a week. *Emahala* (*Aloe saponaria*) are frequently consumed by 26.47% (n=27) respondents less than three times a month. Table 4.17 also show the results of the indigenous green leafy vegetables which are not frequently consumed such as *bubati* (*Lapottea pedumentaris*), *liklolo* (*Grewia caffra/Corchorus spp*), *luphephetse* (*Anthraxia elata*), *lisheshelu* (*Aloe boylei*), *sibhadze* (*Annesorhiza flagelifolia*), *silele* (*Potulaca oleracea*), and *umdzayi* (*Taro asclepisis nigrum*).

As a cross-check for their preference rating, participants were asked in an open-ended question to indicate their favourite indigenous green leafy vegetables. Table 4.18 gives their responses.

TABLE 4.18: FAVOURITE INDIGENOUS GREEN LEAFY VEGETABLES

INDIGENOUS GREEN LEAFY VEGETABLES	n=102		OLDER WOMEN		YOUNGER WOMEN	
	n	%	n=56	%	n=46	%
Inkakha/linshubaba (Bitter gourd) <i>Mormodica involucrate</i>	31	30.39	22	39.28	9	19.56
Ligusha/liklolo (Wild vegetable jute) <i>Corchorus</i>	34	33.33	19	33.92	15	32.60
Sikhwa <i>Tulbaghi lunwigiana</i>	3	2.94	2	3.57	1	2.17
Ingabe (<i>Sonchus oleraceus</i>) <i>Cichorium Spp</i>	2	1.96	2	3.57	-	-
Emacembe abhatata (Sweet potato leaves) <i>Ipomea Spp</i>	4	3.92	3	5.35	1	2.17
Mavelejozi/umsobo (Black nightshade) <i>Solanum reroflexumm</i>	7	6.86	6	10.71	1	2.17
Tintsanga (Pumpkin leaves) <i>Curcubita spp</i>	53	51.96	24	42.85	29	63.04
Sibhadze (<i>Peocedum</i>) <i>Annesorhiza flagellifolia</i>	4	3.92	4	7.14	-	-
Lisheshelu <i>Aloe cooperin</i>	4	3.92	3	5.35	1	2.17
Imbhuya (Pigweed) <i>Amaranthus</i>	37	36.27	30	53.57	7	15.2
Chuchuza (Blackjack) <i>Bidens pilosa</i>	27	26.47	20	35.71	7	15.2

21 no responses (Respondents could give more than one responses)

The majority (53.57%, n=30) of the older women regarded *imbhuya* (*Amaranthus*) as their favourite indigenous green leafy vegetables followed by *tintsanga* (*Pumpkin leaves*) (42.85%, n=24), *inkakha/linshubaba* (*Momordica involucrate/Momordica clementidae*), *chuchuza* (*Bidens pilosa*) (35.71%, n=30) and *ligusha* (*Corchorus spp*) (33.92%, n=19). The majority (63.04%, n=29) of the younger group stated that their most favourite indigenous green leafy vegetables

were *tintsanga* (*Pumpkin leaves*), followed by *ligusha* (*Corchorus spp*) (32.60%, n=15). These results are similar to the results obtained from the preference ratings of the indigenous green leafy vegetables listed in the questionnaire as these also received a high preference rating (See Table 4.17).

Besides listing their favourite indigenous green leafy vegetables, respondents were asked to give reasons why the indigenous green leafy vegetables were their favourites. Table 4.19 presents the results on the responses of women.

TABLE 4.19: REASON(S) FOR LIKING INDIGENOUS GREEN LEAFY VEGETABLES

	n=102	%	OLDER WOMEN		YOUNGER WOMEN	
			n=56	%	n=46	%
Health and nutrition related	45	44.11	30	53.57	15	32.60
Sensory attributes	66	64.70	32	57.14	34	73.91
Familiarity	6	5.88	6	10.71	-	-
Affordability	5	4.90	3	5.3	2	4.34
Convenience	11	10.78	8	14.28	3	6.52

Respondents could give more than one response

The majority of the older women 57.14% (n=32), gave the sensory attributes of indigenous green leafy vegetables as reason for their favourites, they liked the bitter taste of *inkakha* and *inshubaba* (*Momordica involucrate* and *Momordica clementidae*), while 53.57 % (n=30) respondents gave health and nutrition-related reasons for their choice. They explained that they suffered from high blood pressure, diabetes, arthritis and heart problems and after eating indigenous vegetables, they always felt much better. Other reasons that they gave were convenience and affordability. The majority (73.91%, n=34) of the younger group of women similarly also favoured indigenous green leafy vegetables because of their sensory attributes, followed by 32.60% (n=15) who gave health and nutrition-related reasons. No one in this group mentioned familiarity as a reason. However, during the focus group discussion it was noted that most of the younger respondents did not show much interest in the consumption of indigenous green leafy vegetables. The results on the liking of bitter tasting indigenous green leafy vegetables by the older females are consistent with other studies that indicated that elderly people liked bitter indigenous green leafy vegetables (Nebel *et al.*, 2006; Jones, 1963:69).

Respondents were further asked to indicate indigenous green leafy vegetables that they did not like. Table 4.20 presents the findings.

TABLE 4.20: INDIGENOUS GREEN LEAFY VEGETABLES DISLIKED

INDIGENOUS GREEN LEAFY VEGETABLES DISLIKED	n=102	%	OLDER WOMEN (n=56)		YOUNGER WOMEN (n=46)	
			n	%	n	%
Inkakha/inshubaba/emahala (Bitter gourd) <i>Momordica involucrate</i>	30	29.41	14	25	16	34.78
Ligusha/liklolo (Wild Vegetable jute) <i>Corchorus spp</i>	18	17.64	8	14.28	10	21.73
Sikhwa <i>Tulbaghi lunwigiana</i>	8	7.84	7	12.50	1	2.17
Ingabe (<i>Sonchus oleraceus</i>) <i>Cichorium Spp</i>	5	4.90	2	3.57	3	6.52
Emacembe abhatata (Sweet potato leaves) <i>Ipomea Spp</i>	3	2.94	3	5.35	-	2.17
Emacembe emjumbula (Cassava leaves) <i>Manihot esculenta</i>	6	5.88	3	5.35	3	6.52
Mavelejozi/umsobo (Black nightshade) <i>Solanum reroiflexum</i>	3	2.94	2	3.57	1	2.17
Tintsanga (Pumpkin leaves) <i>Curcubita spp</i>	4	3.92	3	5.35	1	2.17
Sibhadze (<i>Peucedum</i>) <i>Anneso rhizaflage</i> <i>Lilifolia</i>	9	8.82	8	14.28	1	2.17
Bubati <i>Lapottea pedumentaris</i>	1	0.98	-	0	1	2.17
Lisheshelu <i>Aloe cooperin</i>	6	5.88	6	10.71	-	-
Imbuya (Pigweed) <i>Amaranthus caudatus</i>	4	3.92	-	-	4	8.6
Chuchuza (Blackjack) <i>Bidens pilosa</i>	15	14.70	3	5.35	12	26.08

The results indicate that 25%, (n=14) of the older respondents did not like *inkakha* (*Momordica involucrate*) and *inshubaba* (*Momordica clementidae*). This was followed by *sibhadze* (*Peucedum*) and *ligusha* (*Corchorus spp*) as 14.28% (n=8) equally reported so and *sikhwa* (*Tulbaghi lunwigiana*). The majority (34.78%, n= 16) of the younger group did not like *inkakha* (*Momordica involucrate*) and *inshubaba* (*Momordica clementidae*), followed by 26.08% (n=12) respondents who did not like *chuchuza* (*Bidens pilosa*) and 21.73% (n=10) who disliked *ligusha* (*Corchorus spp*). Except for *inkakha* (*Momordica involucrate*) and *inshubaba* (*Momordica clementidae*) which was given a high preference rating, the rest of the indigenous green leafy vegetables that were disliked were similar to the indigenous green leafy vegetables that were given a neutral or a low preference rating (see Table 4.17).

Respondents were further asked to state the reasons for disliking indigenous green leafy vegetables. Table 4.21 presents the responses.

TABLE 4.21: REASONS FOR DISLIKING INDIGENOUS GREEN LEAFY VEGETABLES

REASONS FOR DISLIKING INDIGENOUS GREEN LEAFY VEGETABLES	n=79		OLDER WOMEN		YOUNGER WOMEN	
	n	%	n	%	n	%
Health reasons	6	7.59	2	3.57	4	8.69
Sensory attributes	67	84.81	31	55.35	36	78.26
Had to eat it as a child	6	7.59	2	3.57	4	7.14

The sensory characteristics of indigenous green leafy vegetables were the main reason mentioned for not liking some indigenous green leafy vegetables by the majority of both age groups, (55.35%, n=31) older respondents and (78.26%, n=36) younger group respectively. For example, the sliminess of *ligusha* (*Corchorus spp*), *emacembe abhatata* (*sweet potato leaves*) and *lisheshelu* (*Aloe cooperin*) were not liked. Other sensory attributes that were not liked included the bad smell of certain vegetables such as *sikhwa* (*Tulbaghi lunwigiana*). The younger group did not like the bitter taste of *inkakha* (*Momordica involucrate*), *inshubaba* (*Momordica clementidae*) and *emahala* (*Aloe saponaria*).

Only two (3.57%) older respondents and four (8.69%) of the younger respondents gave health-related reasons for disliking the indigenous green leafy vegetable, like the point that it causes an upset stomach. They believe that this happens after eating *imbuya* (*Amaranthus*). Other reasons that were stated were that they were forced to eat it when they grew up, they did not have an alternative, and now as adults, they could afford to buy alternative relishes such as meat instead of indigenous green leafy vegetables. It is clear that the indigenous green leafy vegetables that are liked or favoured are similar to the ones that are preferred compared to those that are disliked or disfavoured.

Participants were asked during the focus group discussions and the structured interviews whether it is regarded as important to eat indigenous green leafy vegetables. In the discussions with the older group, most of the participants said it was very important to include these vegetables as they ‘*tasted good*’, ‘*make blood in the body*’. They gave the *chuchuza* (*Bidens pilosa*), *inshubaba* (*Momordica clementidae*), *inkakha* (*Momordica involucrate*) as examples of vegetables that reduce high blood pressure and help to lower heart problems. Some of the participants also mentioned that these increase a person’s appetite. The younger group on the other hand, said that they could be eaten because they are healthy without elaborating on the health reasons.

The familiarity, preference rating and frequency of consumption of cultivated green leafy vegetables and the leaves of certain cultivated vegetables were also determined in the same manner as for the indigenous green leafy vegetables. Table 4.22 presents the results on the familiarity, preference rating and frequency of consumption of these vegetables.

TABLE 4.22: FAMILIARITY, PREFERENCE AND FREQUENCY OF CONSUMPTION OF CULTIVATED GREEN LEAFY VEGETABLES (n=102)

INDIGENOUS GREEN LEAFY VEGETABLES	FAMILIARITY		FOOD PREFERENCE RATING					FOOD FREQUENCY									
	UNKNOWN		NEVER EATEN		MEDIAN	MODE	PREFERENCE RATING	DAILY		3-4 TIMES A WEEK		ONCE A WEEK		<3 TIMES A MONTH		SPECIAL OCCASION	
	n	%	n	%				n	%	n	%	n	%	n	%	n	%
Beetroot leaves <i>Beta vulgaris</i>	-	-	23	22.54	4	33	**	-	-	9	8.82	29	28.43	22	21.56	1	0.98
Bitter spinach <i>Bassella alba</i>	-	-	2	1.96	4	45	**	9	8.82	38	37.25	29	28.43	21	20.58	1	0.98
Cabbage <i>Brassica oleraceae</i>	-	-	-	-	4	62	***	3	2.94	50	49.01	24	23.52	20	19.60	30	29.41
Carrots <i>Daucus carota</i>	-	-	53	51.96	4	49	**	1	0.98	4	3.92	6	5.88	4	3.92	5	4.90
Chinnese Cabbage <i>Brassica oleracea</i>	24	23.52	36	36.29	4	15	*	5	4.90	7	6.86	11	10.78	7	6.86	2	1.96
Sweet potato leaves (<i>Emacembe abhatata</i>) <i>Ipomea spp</i>	-	-	36	35.29	4	26	*	-	-	16	15.68	12	11.76	13	12.74	1	0.98
Cassava leaves (<i>Emacembe emjumbula</i>) <i>Manihot esculenta</i>	7	6.86	51	50	3	10	*	-	-	3	2.94	6	5.88	7	6.86	1	0.98
Kale <i>Brassica carinata</i>	-	49.01	25	24.50	3	5	*	-	-	1	0.98	4	3.92	3	2.94	3	2.94
Lettuce <i>Lactuca sativa</i>	-	-	-	-	4	55	***	19	18.62	27	26.47	22	21.56	10	9.80	61	59.80
Smooth leaves spinach <i>Spinacia oleracia</i>	-	-	-	-	4	42	**	4	3.92	30	29.41	38	37.25	26	25.49	3	2.94
Pumpkin leaves (<i>Tintsanga</i>) <i>Curcubita spp</i>	-	-	2	1.96	5	61	***	28	27.45	35	34.31	17	16.66	9	8.82	4	3.92

Familiarity of cultivated green leafy vegetables

All the respondents were familiar with cabbage, smooth spinach, bitter leaf spinach, beetroot leaves, carrots, *emacembe abhatata* (*Sweet potato leaves*) and lettuce. Cabbage, lettuce and smooth spinach, *tintsanga* (*Pumpkin leaves*) and *emacembe abhatata* (*Sweet potato leaves*) were familiar to all the respondents. However 1.96 % (n=2) had never eaten the latter and 35.29% (n=36) had never eaten *emacembe abhatata* (*Sweet potato leaves*). Similar results were reported in a study done in South Africa that indicated that *tintsanga* (*Pumpkin leaves*) were the most popular and frequently consumed leaves of the cultivated vegetables (Cloete & Idsardi, 2013). Kale was the most unfamiliar cultivated leafy vegetable as 49.01%, (n=50) did not know it and 24.50 % (n=25) had never eaten it. This is probably because it is hardly grown in the country nor sold in supermarkets. Cabbage is eaten by many respondents, due to its familiarity as reported in other studies which found that familiarity guides food choices (Seiluri, Lahelma, Rahkonen, & Lallukka, 2011).

Preference rating of cultivated green leafy vegetables

The following cultivated green leafy vegetables received a high preference rating; *tintsanga* (*Pumpkin leaves*) from (60.9%, n=61) respondents, cabbage (61.9%, n=62) respondents and lettuce by (54.9%, n=55) respondents. Those that were given a neutral preference rating were beetroot leaves, smooth spinach, bitter leaf spinach and carrot tops. *Emacembe abhatata* (*Sweet potato leaves*), *emacembe emjumbula* (*Cassava leaves*) kale and Chinese cabbage received a low preference rating.

Frequency of consumption of cultivated green leafy vegetables

Most of the respondents 49.01% (n=50) ate cabbage (*Brassica oleracea*) 3-4 times a week and 23.52% (n=24) did so once a week. *Tintsanga* (*Pumpkin leaves*) was consumed daily by 27.45% (n=28) of the respondents and 34.31% (n=35) consumed it 3-4 times a week. Lettuce (*Lactuca sativa*) was consumed by 18.66% (n=19) respondents daily, with 26.47% (n=27) respondents reported to do so 3-4 times a week, and 21.56% (n=22) once a week. Bitter spinach was frequently consumed by 37.25% (n=38) respondents 3-4 times a week and 28.43% (n=29) indicated to do so once a week. Smooth spinach leaves (*Spinacia oleracea*) were frequently consumed by 29.41% (n=30) 3-4 times a week and 37.25% (n=38) respondents ate it once a week. Beetroot leaves were frequently consumed by 28.43% (n=29) respondents once a week. The vegetables which were infrequently consumed included carrots leaves, Chinese cabbage, sweet potato leaves, cassava leaves and kale (see Table 4.22).

It is noted from these results that the use of indigenous green leafy vegetables has decreased and this has also been confirmed by a number of other studies (Dweba & Mearns, 2011; Luczaj, 2010; Vorster *et al.*, 2008; Prasad, 1998; Ogle & Grivetti, 1985a). The results also reveal that cultivated green leafy vegetable and certain leaves of cultivated vegetables are less frequently consumed. This means that the dietary guidelines recommended by the Food and Agriculture Organization (2007) of eating at least five portions of vegetables and fruits daily would not be met as there is low daily consumption of green leafy vegetables according to the findings of the study.

The next sub-objective deals with the acceptability of indigenous green leafy vegetables.

4.6.4 Acceptability of indigenous green leafy vegetables

How acceptable or not a food item is to an individual, gives a good indication of a person's underlying attitudes, beliefs and values regarding the consumption of that food item (Sobal & Bisogni, 2009).

The acceptability of indigenous green leafy vegetables was also measured by a number of questions. Respondents were asked in a closed and open-ended question to indicate, with reasons, why they liked or disliked indigenous green leafy vegetables and to list their favourite and disliked indigenous green leafy vegetables (see Tables 4.18 and 4.19). The results on the familiarity, preference rating and frequency of eating indigenous green leafy vegetables concur with the results from the reasons given to these questions. The reasons whether they would serve indigenous green leafy vegetables on special occasions and to guests or not, also gave further insights into their attitude towards these vegetables (see Table 4.16).

When questioned on whether it was important to eat indigenous green leafy vegetables, all the respondents agreed. They were further asked to state the reasons behind their responses. These are presented in the Table 4.23.

TABLE 4.23: REASON(S) FOR EATING INDIGENOUS GREEN LEAFY VEGETABLES

	n=102	%	OLDER WOMEN (n=56)	%	YOUNGER WOMEN (n=46)	%
Health and nutritional related	98	96.07	56	100	42	91.30
Affordable relish	31	30.39	27	48.21	4	8.69
Poor man's meat / sign of poverty	3	2.94	1	1.78	2	4.34

Respondents could give more than one response.

The findings of the structured interviews confirm the results from the focus group discussions. All the older respondents believed that it is important to eat indigenous green leafy vegetables for health and nutrition-related reasons. They gave reasons such as that it improves their immune system, lowers high blood pressure, controls their diabetes and makes their body strong. Health and nutrition-related reasons were given by the majority (91.30%, n=42) of the younger group as well.

In the structured interviews, respondents were also asked to indicate whether they would promote the use of indigenous green leafy vegetables. With the exception of one respondent, all agreed that it should be promoted. Participants were also asked to give reasons for their answers. Table 4.24 summarises their reasons.

TABLE 4.24: REASONS FOR PROMOTING/ENCOURAGING INDIGENOUS GREEN LEAFY VEGETABLES

	n=102	%	OLDER WOMEN (n=56)	%	YOUNGER WOMEN (n=46)	%
Health and nutrition	89	87.25	48	85.71	41	89.13
Affordable	10	9.80	7	12.50	3	6.52
Pure	1	0.98	1	1.78	-	-
Other reasons	11	10.78	6	10.71	5	10.86

In the focus groups discussion, several reasons for promoting indigenous green leafy vegetables were given by the elderly group. They said that they would encourage the use of indigenous green leafy vegetable because they are healthy, tasted good and are affordable. Nebel *et al.* (2006) and Latham (1997) similarly reported that older people like indigenous green leafy vegetables because of their bitter taste. The younger group, on the other hand, were of the opinion that, although they are healthy, they do not like indigenous green leafy vegetables because of their taste. They further said also stressed that, for them, it reflects poverty. The researcher shares the opinion of Muhanji *et al.* (2011); Faber *et al.* (2010); Vorster *et al.* (2008); Orech *et al.* (2005) and Ogoye-Ndegwa (2003) that the younger generation has a negative attitude towards indigenous green leafy vegetables.

The main reasons given by the majority of the older group (85.71%, n=48) for the promotion of indigenous green leafy vegetables were health and nutrition reasons. Another reason given by 12.50%, (n= 7) was that they are affordable. The majority of the younger group (89.13%, n=41) also thought they should be promoted for health reasons.

Respondents were also asked to indicate whether they would consume indigenous green leafy vegetables in the future. In the focus group discussion, the older women agreed that they would

never stop eating indigenous vegetables, while the younger group stated that they would not prefer to continue eating indigenous green leafy vegetables. When asked the same question in the structured interviews, the majority of the respondents (94.11%, n= 96) stated that would continue to eat indigenous green leafy vegetables. Only 3.92% (n=4) would not continue to eat indigenous green leafy vegetables in the future. Respondents gave the following reasons for their continuation of eating indigenous green leafy vegetables. In the focus group discussion, the older respondents mentioned that indigenous green leafy vegetables are healthy unlike modern foods. They revealed that they have health problems such as high blood pressure and diabetes. After eating these vegetables their health condition improves. They also stated that it tasted good especially the bitter types. Others said they are affordable, if not free. The younger group, on the other hand, stated that if there is an alternative, they would stop eating indigenous green leafy vegetables because they tasted bad. Table 4.25 shows responses from the structured interviews.

TABLE 4.25: REASONS FOR CONTINUATION OF EATING INDIGENOUS GREEN LEAFY VEGETABLES

	n=102	%	OLDER WOMEN	%	YOUNGER WOMEN	%
Health and nutrition	89	87.25	51	91.07	38	82.60
Affordable	5	4.90	2	3.52	3	6.52
Pure	7	6.86	4	7.14	3	6.52
Other reasons	7	6.86	3	5.35	4	8.69

A number of the older respondents (91.07%, n=51) would continue eating indigenous green leafy vegetables for health reasons. Similarly most of the younger group (82.60%, n=38) would continue eating indigenous green leafy vegetables for health reasons (see Table 4.25).

From all these responses, it seems as if both the older and the younger respondents are willing to promote and consume indigenous green leafy vegetables in the future. As part of the beliefs held regarding the consumption of indigenous green leafy vegetables taboos that prohibit the consumption of indigenous green leafy vegetables were also determined. Beliefs that people have on food contributes to how acceptable the food will be for consumption. The information was collected in the focus group discussions and through structured interviews.

Taboos that prohibit the eating of indigenous green leafy vegetables

From the focus group discussions, it was clear that the older participants gave a number of taboos concerning the consumption of indigenous green leafy vegetables, while none of the younger participants knew of any taboos. The most frequently mentioned taboo was that pertaining to surnames or clan names. People belonging to certain clans are prohibited from

eating particular indigenous green leafy vegetables. People from the Dlamini, Matsenjwa, Ntjangase and Gama clans are prohibited from eating *emahala* (*Aloe saponaria*) because they are “cry over plants”. The people from the Mlotsa clan are prohibited from eating *chuchuza* (*Bidens pilosa*) and *tintsanga* (*Pumpkin leaves*) (Ogle & Grivetti, 1985a; Jones, 1963:194). Similarly people with a Vilakati and MkhaliPhi surname do not eat *luphephetse* (*Anthraxia elata*) which is also an indigenous green leafy vegetable. It is believed that when people from these clans eat what they are prohibited to eat, they will become mentally disturbed. This is also confirmed by (Ogle & Grivetti, 1985a). People from Mazibuko clan are prohibited from eating *umsobo* (*Solanum roreflexum*). This was confirmed by Jones (1963: 194).

Other taboos mentioned related mostly to females in certain situations. These include females who were pregnant, had just given birth, females who were menstruating and those who had just had sexual intercourse. For example, pregnant women are prohibited from eating *silele*, (*Potulaca oleracea*) because of its sliminess, it is believed that it will cause tiredness to the mother and the baby during the birth process. Pregnant women are prohibited from eating *umsobo* (*Solanum roreflexum*) because of its black fruit, thus it is believed that it will make the baby’s eyes to be black in colour.

It was also mentioned that females are not allowed to pick indigenous green leafy vegetables when menstruating, after having sexual intercourse or after eating meat as these will cause the indigenous green leafy vegetables to wilt and eventually dry or die. These findings are similar to other studies in various countries that reported that cultural beliefs associated with agricultural practices mainly relate to the female fertility cycle (menstruation, pregnancy and lactation) (Vorster *et al.*, 2008; Ogoye-Ndegwa, 2003).

Furthermore, any indigenous green leafy vegetable that has to be chewed is prohibited to brides or girls visiting their boyfriend’s home as the belief was that they were not supposed to show their teeth to their future in-laws. Participants also stated that visitors were not supposed to be served with hot indigenous vegetables dishes. Visitors to a homestead are prohibited from picking and or taking any indigenous green leafy vegetables growing next to the homesteads with them as then the rest of the vegetable at that site will wilt. The same question on taboos related to indigenous green leafy vegetables were asked during the structured interviews. The responses are discussed below.

In the structured interviews, when asked if they were aware of any taboos that prohibit the eating of indigenous green leafy vegetables, the majority of the respondents (74.50%, n=76) were not aware of any taboos. Only 25.49% (n=26) were aware of taboos. The only taboos that

were indicated from the interview were similar to the one explained in the focus group and were related to clan names.

It can be concluded that there are a number of taboos which affect the consumption of indigenous green leafy vegetables. These taboos mentioned mainly relate to clan names and the female reproduction cycle. The elderly women proved to be more knowledgeable about the taboos compared to their younger counter parts. Some of the elderly women still believe in these taboos and this affects the consumption of these indigenous green leafy vegetables. From the findings it can be concluded that it seems as if indigenous green leafy vegetables are acceptable in the community as they are willing to continue including them in their meals. However, some younger women were reluctant to continue including them in the future.

The fourth and last objective of the study deals with the factors contributing to the changes in the consumption of indigenous green leafy vegetables and is discussed next.

4.7 CHANGES IN THE CONSUMPTION OF INDIGENOUS GREEN LEAFY VEGETABLES

The last objective of the study was to determine and describe the factors contributing to the changes in the consumption pattern of indigenous green leafy vegetables of the study group. The first sub-objective related to the changes that occurred in the consumption of indigenous green leafy vegetables in the community. The second sub-objective investigated the factors that contributed to the changes in the respondents own consumption of indigenous green leafy vegetables.

4.7.1 Changes and reasons for changes that occurred in the community

In the focus group discussions and structured interviews, questions were asked whether the changes that had occurred in the community had contributed to changes in consumption of indigenous green leafy vegetables. In the discussion with the older group, the participants agreed that changes in the community had prevented them from obtaining indigenous green leafy vegetables. The younger participants in the focus group discussions seemed not sure of any changes that might have taken place that could have contributed to changes that prevented them from obtaining indigenous green leafy vegetables. Actually they did not agree that changes had taken place as they were not aware of them. From the structured interview questions, the majority of the respondents (73.53%, n=75) agreed that there were changes that had taken place in the community that had brought changes in consumption of these

vegetables. The rest of the respondents were not aware of any changes that had taken place in the community.

The study group was asked to give the most important reasons that contributed to the changes in the community. From the focus group discussions the older participants revealed that one of the causes was the building of the University of Swaziland's Faculty of Agriculture which caused a great change as they used to pick indigenous vegetables on the land it now occupies. It was built in 1965 (University of Swaziland, 2014). The people in the few homesteads that were there were relocated in a new settlement, thus they lost their land where they obtained the indigenous vegetables. Secondly, they said that some homesteads were also moved due to construction of the Usuthu Anglican Mission Primary School in the community. Population growth in the area was another reason given as a cause of the increase in the number of homesteads. This resulted in limited available sites where they could collect the indigenous vegetables. They also mentioned that resettlement took place in the community. Homesteads were built on one side of the community and cultivating fields for all homesteads were allocated on another side of the community. This is similar to the findings of other studies which indicated that human settlements caused by population growth result in erosion or lack of land to obtain indigenous green leafy vegetables (Asomani-Boateng, 2002).

During the interviews the respondents were asked to state the reasons for the changes in the community. Table 4.26 present responses from the structured interviews.

TABLE 4.26: REASONS AND TIME WHEN CHANGES IN INDIGENOUS GREEN LEAFY VEGETABLES CONSUMPTION OCCURRED IN THE COMMUNITY

REASONS FOR CHANGES	n=102	%	OLDER WOMEN	%	YOUNGER WOMEN	%
Development/construction of roads /recreational activities	78	76.47	41	40.19	37	36.27
Overcrowding/population increase	19	18.62	13	12.74	6	5.88
Resettlement	5	4.90	5	4.90	0	0
TIME WHEN CHANGES OCCURRED	n=74	%	OLDER WOMEN (n=56)	%	YOUNGER WOMEN (n=46)	%
1960s	2	2.70	2	1.96	0	0.0
1970's	6	8.10	6	5.88	0	0.0
1980s	15	20.27	5	4.90	10	9.80
1990s	26	35.13	16	15.6	10	9.80
2000	25	33.78	12	11.76	13	12.74

28 gave no responses

More than one response was given by each respondent. Table 4.26 shows that most of the older respondents (40.19%, n=41) mentioned that development and construction had caused a change in the consumption of indigenous green leafy vegetables. Examples that were given

included, building the University of Swaziland's Faculty of Agriculture, road construction and development of recreational areas. These viewpoints were followed by the 12.74% (n= 13) who thought the change were caused by overcrowding or population increase. Five of the older respondents stated resettlement as a reason for change in the consumption of indigenous green leafy vegetables. People were moved in 1960 because the SAPPI Company wanted to grow pine trees where they lived, so they left behind rich sites of wild leafy vegetables in the slightly mountainous area and were re-settled in parts of the community with limited land and limited species of indigenous leafy vegetables. The owners sold the fields allocated to the people to grow their crops through the chief of the area to people to build their homes in the community. These reasons all contributed to the change in consumption of the indigenous green leafy vegetables in this period. Most of the younger respondents (36.27%, n=37) reported that the change in consumption of indigenous green leafy vegetables could be attributed to development and construction activities. This is followed by 5.88% (n=6) who stated that the change was brought about by overcrowding or population increase. In the structured interviews, respondents were asked to indicate the decade or approximate date when the changes took place.

Some of the older respondents (15.6%, n=16) believed that the change in consumption occurred in the 1990s, followed by those (11.76%, n=12) who were of the opinion that the change occurred around 2000. There was the younger group (12.74%, n=13) that thought that the change occurred around 2000, followed by those who stated that the change occurred in 1980s (9.80%, n=10) and the 1990s (9.80%, n=10). This is probably because this was the time between 1980s and 2000s when most development started to take place.

4.7.2 Changes and reasons for changes that occurred in the consumption of indigenous green leafy vegetables

Changes that occurred were explored in the focus group discussion and in the structured interviews. After establishing if changes did take place, the nature of the changes and reasons for them were determined. In the older focus group discussion it was gathered that there had been a change in the use of indigenous green leafy vegetables. The younger group, on the other hand, believed that there had been little change since they had come into the community because of marriage. From the structured interviews, the majority of the respondents (90.2%, n=92), believed that there had been changes in their use of indigenous green leafy vegetables since their childhood. The study group was further asked to state the reasons that contributed to the changes. These will be addressed next.

Reasons for the change in the use and consumption of indigenous green leafy vegetables since childhood were first sought from the participants in the focus group and also in the structured interviews. In the focus group discussions with the older women, the participants mainly stated '*imphucuko*', meaning modernisation, had greatly contributed to the change in consumption of these vegetables. They explained that the food retail environment had expanded. They said that when they grew up, there was only one grocery store and a fruit and vegetable market in the community, but nowadays, there is a shopping complex, which consists of a butchery, a restaurant and two mini-supermarkets. One of the participant lamented: '*These provide us with different food options, such as cultivated leafy vegetables from the market, canned fish and other processed foods, thus we forget about the indigenous leafy vegetables which are free to obtain*'.

They stated further that the availability of commercial food has gradually replaced the indigenous green leafy vegetables, which they used to enjoy. They also mentioned that the community is slowly becoming more urbanised, as process of change that they were observing as taking place around them. They said that there is a decline in cultivating food for one's own consumption. Another reason that was mentioned by one of the participants was that '*Nowadays there are vendors by the main road who sell ready to eat meals such as grilled chicken with porridge, salads and grilled green mealies*'. '*These options prevent us from growing our own mealies, so one also loses the opportunity of going to the fields where we can collect the indigenous green leafy vegetables*'.

These quotations confirm that modernisation results in people no longer being self-sufficient anymore. One participant said, '*We used to herd cattle and fetch firewood when we were young, that was when we went to pick indigenous green leafy vegetables in the mountains or riverbanks and bring them home to prepare something which does not happen nowadays*' This statement supports the assumption that changes have occurred as they no longer gather indigenous green leafy vegetables when herding cattle and fetching firewood. The younger group clearly stated that, in their opinion, nothing much had changed in the community that caused a change in consumption of indigenous green leafy vegetables.

Table 4.27 present the results of reasons for change in the use of indigenous green leafy vegetables from the structured interviews. More than one response was given by respondents in this regard.

TABLE 4.27: REASON(S) FOR CHANGE IN USE OF INDIGENOUS GREEN LEAFY VEGETABLES SINCE CHILDHOOD

	n=75	%	OLDER WOMEN (n=56)	%	YOUNGER WOMEN (n=46)	%
Developments/construction of roads/recreational activities	6	5.88	1	0.98	5	4.90
Overcrowding/population increase/migration	9	8.82	5	4.90	4	3.92
Technological advancement; Modern methods of farming	49	48.03	27	48.21	22	47.8
Resettlement	7	6.86	6	5.88	1	0.98
Change of climate	4	3.92	1	0.98	3	2.94

Most of the older respondents (48.21%, n=27) gave technological advancement as a reason for the change in the use of indigenous green leafy vegetables. This included; use of modern methods of farming, such as the use of tractor for tilling the soil other than the ox-driven mouldboard disc plough which was used in the olden days. This contributed to change in the availability of indigenous green leafy vegetables. Because the modern tractors dig the soil deeper compared to the mouldboard plough, this practice caused a loss of natural indigenous vegetables seeds that were never replaced in the fields where tractors were used. This opinion is supported by other studies that the natural on-going growth of indigenous green leafy vegetables declined due to changes in farming practices (Mavengahama *et al.*, 2013; Dube & Musi, 2002).

Other reasons stated for this change were similar to the ones discussed in the focus group responses, especially resettlement and overcrowding. In the younger group (13.72%, n=14), changes in technology since their childhood were given as the main reason for change in the use of indigenous green leafy vegetables. Modernisation and modern methods of farming were also specified by (7.84 %, (n=8), followed by 7.84% (n=8) who stated modernisation as a cause of change in the consumption of the indigenous green leafy vegetables. The results confirm the findings from the focus group discussions.

The results confirmed that modernisation and urbanisation are evidently taking place in the community and this has a significant impact on the availability and accessibility of indigenous green leafy vegetables. This has led to people not to rely solely on what the environment offers, but to depend mainly on the variety of purchased food available and accessible for them. It was observed that people in the community mainly rely on cultivated vegetables which they obtain from the local market and a few from homestead gardens. This concurs with other studies that found that socio-cultural change among the Swazi people comes about through migration, urbanisation and modernisation and contributes to changes in their traditional eating patterns (Kgaphola & Viljoen, 2004; Malaza, 1994:95), and this also takes place in South Africa

(Mavengahama *et al.*, 2013). This is attributed to the reliance on mass produced foods (Kittler *et al.*, 2011:11-12; Viljoen, 2009:49; Sobal, 2000). In this study the older group was able to explain the changes that have occurred in the community in more detail, compared to the younger generation. This is probably because they have been in the community for a longer time.

4.7.3 Factors contributing to changes in the consumption of indigenous green leafy vegetables

The second sub-objective of the fourth objective relates to identifying the factors that contribute to the change in the consumption of indigenous green leafy vegetables. The factors will be discussed under the sub-headings of availability, accessibility and acceptability.

Availability of indigenous green leafy vegetables

From the results of this study, it is clear that indigenous green leafy vegetables are no longer abundant in the community anymore. The lack of availability of some species has been reported to have been brought about for number of reasons. The first reason for the unavailability of the indigenous green leafy vegetables in the physical environment related to lack of vacant land. This was attributed to population growth and resettlement in the community, which led to the building of new homesteads in what used to be called 'the wild'. This is supported by a study that reported that the Middleveld of Swaziland is the region that has been botanically disturbed the most, due to pressure on the land as a result of increased population density, intensive agricultural development and rapid industrialisation, leaving little of the original vegetation (Dlamini, 2007).

Moreover, the construction of infrastructure such as roads, shops. In this way the physical environment has been altered and the natural habitat of the wild green leafy vegetables was destroyed. The only vacant land is now some distance from the homesteads. People have thus to walk a considerable distance now to collect indigenous green leafy vegetables. Other reasons given for the change in the natural environment is the use of agricultural chemicals, which has contributed to the unavailability of indigenous green leafy vegetables in the community. For example, herbicides and pesticides were used to improve the yield of the cultivated crops but this practice altered the natural potential of the soil. It permanently destroyed indigenous green leafy vegetables as they were treated as weeds that prevented future growth. Huss-Ashmore & Curry (1991) supported this by reporting that chemicals used to optimise commercial crop yields substantially, lowered the availability of edible wild plants.

The indigenous green leafy vegetables are uprooted during harvesting, instead of just picking the leaves. This results in the unavailability of the species as they are not replanted. This happening is in line with what Mavengahama *et al.*, (2013) document that these vegetables are becoming extinct because they are wrongly harvested and not replaced. Global climate change is mentioned as another cause of the unavailability of these green leaf plant species. The respondents mention that when there is drought and it becomes too hot and dry for a long time without rain, indigenous green leafy vegetables would not grow nor thrive. This is similar to the findings in studies that wild edible plants were diminishing due to drought which, in turn, can be attributed to global climate change in Swaziland (AMCEN, 2011; Government of Swaziland, 2010b). From this discussion it is clear that the availability of indigenous green leafy vegetables has declined. The physical environment offers an opportunity for people to choose food from what is available in their environment. If the physical environment has been altered as explained here, the availability of foods naturally growing in the area is affected. According to Gilbert & Khokhar (2008) change in food availability results in changes in dietary habits. This affects the accessibility of indigenous green leafy vegetables and will be discussed next.

Accessibility of indigenous green leafy vegetables

It has already been explained that indigenous green leafy vegetables are now located far away from the homesteads in the Eluyengweni, thus it is not easy to pick them. The older group, in particular, explained that because of their age and other ailments they suffer from, they were not able to walk long distances anymore to collect these vegetables. They specifically mentioned they cannot send their children to the wild because they would not be able to identify the edible species. It was also not safe to walk the long distance to the remote areas where indigenous green leafy vegetables grow because there were thugs, and they are scared of being raped. They could currently only access limited types of indigenous green leafy vegetables that were found in fields close to their homes and in their homestead gardens for those who had. The physical and natural environment thus determines what, where, how much and at what time of the year indigenous vegetables can be accessed (Kepe, 2008).

Economic reasons such as the increasing employment of women in the community led to change in the accessibility of indigenous green leafy vegetables. This is due to women not having time to pick and prepare these vegetables as they now spend more time at work. On the other hand, these women earn an income and can afford to purchase some commercial, processed foods which are more convenient to use. This is similar to the findings by Pieniak *et al.* (2009) who stated that convenience is a barrier to traditional food consumption. Some indigenous green leafy vegetables would be available in the local and town markets but unemployed women cannot afford to buy them. Food can be available but not necessarily

accessible, due to high food prices and this will also affect an individual's access to food. There is thus proof that modernisation is taking place in the area, and the natural environment has been modified. New ways of obtaining food are evident, similar to what is reported in other studies that indicated that there are numerous ways nowadays that can be used to obtain food (Tathiah *et al.*, 2013; Popkin *et al.*, 2012; Sobal, 2000).

As a result of modernisation, there is technological advancement in the area which has also contributed to inaccessibility of indigenous green leafy vegetables. Due to the supply of electricity to many homes in the community, people use electricity as a source of cooking and to pump water. People no longer walk to fetch either firewood or water anymore, and the collection of indigenous green leafy vegetables which was done in the process, is no longer practised. Another reason given was on the change in the accessibility of indigenous green leafy vegetables are that these vegetables are located on private farms, and most of the time permission to access them is not granted. This is supported by studies in South Africa that report that nowadays permission to access potential sites for indigenous leafy vegetables has to be sought before collecting from them (Kepe, 2008). It can be concluded that indigenous green leafy vegetables are not easily accessible in the community and this in turn, affects their acceptability. The next section will be on the discussion of factors contributing to change in the acceptability of indigenous green leafy vegetables.

Acceptability of indigenous green leafy vegetables

Acceptability of food is determined by personal attributes such as familiarity, attitudes, beliefs, values and sensory preferences. According to Sobal & Bisogni (2009), the choice of food will reflect an individual's personal motivation to select food from available and acceptable foods. Acceptability of indigenous green leafy vegetables is influenced by several factors the study group mentioned. Familiarity was one of the reasons revealed to have contributed to change in the acceptability of these vegetables. The indigenous green leafy vegetables are no longer prepared as often as they were in the olden days. Hence, they are not familiar to the younger generation. Instead, more cultivated leafy vegetables are prepared and these have become more acceptable than indigenous green leafy vegetables.

Even the older women who were familiar with indigenous green leafy vegetables are now using cultivated vegetables more often. This is supported by studies in South Africa that unfamiliarity of traditional foods leads to their low consumption (Cloete & Idsardi, 2013; Pieniak *et al.*, 2009). From the findings of this study it has become clear that some of the women have never eaten certain indigenous green leafy vegetables such as *bubati* (*Lapottea pedumentaris*) (see Table 4.21). Moreover, the younger group did not like a larger number of indigenous green leafy

vegetables compared to cultivated vegetables. The younger group do not like the inkakha and *inshubaba* (*Momordica species*) too (see Table 4.23). This is a sign that they are not acceptable.

From the 24-hour recall survey, it is clear that the indigenous green leafy vegetables are mainly prepared for lunch. This can possibly be attributed to the fact that they do not appeal to most family members who are away during the day. The attitudes of the younger group contribute to the change in acceptability of indigenous vegetables. The group expressed a negative attitude towards indigenous green leafy vegetables. They clearly refer to indigenous vegetables as a '*poor man food*' and stipulate that they would not serve them to guests, and would only eat them themselves when no other alternative relish is available. Unlike the older group, the younger group did not like most of the indigenous green leafy vegetables, instead they preferred cultivated vegetables (see Table 4.23). The younger group stated that indigenous green leafy vegetables such as *imbuya* (*Amaranthus*) had a bad smell and caused a stomach disorder when eaten.

Furthermore, knowledge about indigenous green leafy vegetables is no longer systematically transferred to younger people, which contributes to a lack of acceptability. In comparison with the older group, the younger group was able to identify only a few indigenous green leafy vegetables. They were also not interested in learning how to prepare indigenous green leafy vegetables. Instead their mothers would prepare indigenous green leafy vegetables for themselves and modern foods on the side for their children. The majority also did not want to preserve indigenous green leafy vegetables, which is yet another indication that indigenous green leafy vegetables are not accepted. From these observations, it can be concluded that indigenous green leafy vegetables are neither chosen nor included as often as before, and do not often form part of the food practices of the younger generation anymore.

4.8 CHAPTER CONCLUSION

The results and a discussion on themes were presented in this chapter. Information on the availability and accessibility of indigenous green leafy vegetables in the Eluyengweni community was given together with an account of the knowledge of the study group on about indigenous green leafy vegetables. The consumption patterns of indigenous green leafy vegetables were also reported as well as the factors contributing to the evident change in the consumption of indigenous green leafy vegetables. The next chapter will present a conclusion of the study and discusses what it accomplished.

Chapter 5 – Conclusions and Recommendations

5.1 INTRODUCTION

This chapter deals with the conclusions of the study that focused on food practices and knowledge of two generations of women in Eluyengweni rural community regarding indigenous green leafy vegetables. The conclusions will be based on the study objectives. The significance, evaluation and limitations of the study as well as recommendations for future research will also be presented.

Literature explicitly states that changes in eating patterns are observed globally (Igumbor *et al.*, 2012; Crush *et al.*, 2011; Popkin *et al.*, 2012; Delisle, 2010; Damman *et al.*, 2008). The changes in eating patterns are due to modernisation and technological advancement including globalisation with increased reliance on commercially processed food and food from unrestricted worldwide food networks, instead of locally produced food. Many also have adopted modern lifestyles as a result of economic and social structural changes such as migration, urbanisation and modernisation. As a result of people busy lifestyles, the food industry responded and made processed and convenience foods more available, affordable and acceptable for the consumers. The traditional diet high in fibre and low in fat has thus been replaced in the process (Igumbor *et al.*, 2012; Crush *et al.*, 2011; Popkin *et al.*, 2012; Delisle, 2010; Damman *et al.*, 2008). Nutrition transition results as people increasingly adopt these highly processed foods. The change in available foods results in a shift from the traditional to a western-orientated eating pattern. The unfortunate consequences of the change in diet results to non-communicable diseases, over nutrition and overweight or obesity.

The Swazis are also experiencing changes in food consumption patterns. In the limited studies available, there is evidence that the lifestyle of the Swazi people is gradually shifting from being traditional to becoming more westernised (The World Bank, 2014; Dlamini & Lowrey, 2005; Malaza, 1994:95; Ogle & Grivetti, 1985a; Jones, 1963:40). Traditionally, the Swazi people were hunters and gathers, and later on they also cultivated crops to obtain food. The change is due to social structural changes such as migration, urbanisation, modernisation and globalisation. Since the early 1960s, people are increasingly relying more on purchased foods at the expense of their traditional diet (Kgaphola & Viljoen, 2004; Malaza, 1994:95; Cappetta, 1983:183; Ogle & Grivetti, 1985a; Jones, 1963:40). These changes continue up to the current times (The World Bank, 2014). The result is that traditional local knowledge of the use of indigenous green leafy vegetables is being lost, yet it is the basis of many food traditions. This affects food choice, as

people tend to discard indigenous green leafy vegetables in favour of processed and commercial available foods. The decline in local knowledge is also partially due to the lack of transfer of knowledge from the older to the younger generation, together with the influence of westernisation and stigmatisation of the use of indigenous green leafy vegetables (Misra *et al.*, 2008; Steyn & Temple, 2008; Kgaphola & Viljoen, 2004; Agrawal, 1995).

Today knowledge and the use of indigenous green leafy vegetables in Swaziland is not known. This study aimed to determine and describe the food practices and knowledge of indigenous green leafy vegetables as it manifests in two generations of rural Swazi women in the Eluyengweni community. In this chapter the conclusions reached in this study are discussed and presented first.

5.2 CONCLUSIONS OF THE STUDY

The conclusions presented are based on the objectives formulated for the research.

5.2.1 Conclusions on the availability and accessibility of indigenous green leafy vegetables (objective 1)

This objective includes a description of the natural and physical environment as well as the economic environment and how it contributes to the availability and accessibility of indigenous green leafy vegetables. From the findings it is clear that in the past indigenous green leafy vegetables were abundant and available in the community. This is not the situation in current times. It was indicated however, that a number of changes in the physical and natural environment of the community occurred that negatively influenced the availability of these vegetables. The changes have taken place include the development of different infrastructures such as roads, shops, schools and the construction of the University of Swaziland's Faculty of Agriculture. In the past there were only a few scattered homesteads in comparison to the current situation. Nowadays there are homesteads all over the community to such an extent that there is no longer space for building new homes. These socio-economic and structural developments have led to limited unoccupied wild spaces, as these were the locations where indigenous green leafy vegetables were found. Currently these vegetables are found far away from the homesteads, thus they have become inaccessible. Moreover, the presence of shops offers a wide variety of food products for sale where people can purchase and obtain food instead of cultivating or collecting indigenous green leafy vegetables.

Although the physical and natural environment has been altered, indigenous green leafy vegetables continue to be mostly available in summer. The majority of both the younger and the older women reveal that they still have access to indigenous green leafy vegetables which grow in cultivated fields and homestead gardens. The majority of respondents (63.72%, n=65) stated that some indigenous green leafy vegetables such as *ligusha* (*Corchorus spp*), *inkakha* (*Momordica involucreta*), *inshubaba* (*Momordica clementidae*), *mavelejozi* (*Solanum reroflexum*), *imbhuya* (*Amaranthus*) and *chuchuzza* (*Bidens pilosa*) are also available for purchasing in the community or markets.

It can be concluded that the physical and natural environment of the community has been altered due to technological advancement and infrastructural changes. As a result of development, a decline in the availability and accessibility of indigenous green leafy vegetables in the community has occurred. However, a few indigenous green leafy vegetables are still available for use.

Economic environment

From the structured interviews, it became clear that a large number (43%) of the respondents were unemployed and they did not have enough disposable income (see Table 4.1). These participants rely on money from their employed husbands and children, while some rely on grants for the elderly which they only receive every three months. The majority (77.61%) of the respondents spend between E100 and E200 per week on food in their households. They mentioned that they could not always afford to purchase foods from shops or even vegetables on sale in the community market and shops.

It can be concluded that, although money is limited, the majority rely on purchased or commercially available foods. It was also revealed that it was more convenient to purchase green leafy vegetables than to collect indigenous green leafy vegetables. It thus seems as if people have become more convenience orientated as a result of modernisation and technological advancement due to the easy access to supermarkets and food stores.

5.2.2 Conclusion on the knowledge of indigenous green leafy vegetables (objective 2)

The second objective dealt with knowledge of indigenous green leafy vegetables. The sub-objectives explored the respondents' ability to identify and name indigenous green leafy vegetables; their knowledge on where indigenous green leafy vegetables grow and their seasonal availability. The uses of indigenous green leafy vegetables and how knowledge was transferred about the use of indigenous green leafy vegetables was also investigated.

Knowledge on identification and availability of indigenous green leafy vegetables

All the respondents were able to correctly identify *ligusha* (*Corchorus spp*), *inkakha* (*Momordica involucrate*) and *chuchuza* (*Bidens pilosa*). The older respondents were able to correctly identify all the indigenous green leafy vegetables except for *lisheshelu* (*Aloe cooperin*) which 39.28% of the respondents could not correctly identify (see Table 4.6). The younger group on the other hand were able to only correctly identify the following: *chuchuza* (*Bidens pilosa*), *umsobo/mavelejozi* (*Solanum reroflexum*), *inkakha* (*Momordica involucrate*) and *imbuya* (*Amaranthus*). From the results it became clear that the group of older women knew and could correctly identify more indigenous green leafy vegetables than the younger group.

The older ladies also displayed more knowledge about the sites where indigenous green leafy vegetables grew and the seasonal availability of indigenous green leafy vegetables than their younger counterparts. Various sites for these vegetables were given by the older respondents and these included cultivated and uncultivated fields, veld, forests, riverbanks and swamps while the younger group only mentioned cultivated and uncultivated fields (see Table 4.7). The majority of both the older and the younger respondents mentioned summer as the season when most of the indigenous green leafy vegetables were abundant such as, *chuchuza* (*Bidens pilosa*), *inkakha* (*Momordica involucrate*), *ingabe* (*Sonchus oleraceus*), *emacembe abhatata* (*Sweet potato leaves*), *emacembe emjumbula* (*Cassava leaves*), *mavelejozi* (*Black nightshade*), *lisheshelu* (*Aloe cooperin*), *bubati* (*Laportea pedumentaris*). Some respondents also pointed out that some indigenous green leafy vegetables are available all year round such as; *sibhadze* (*Peucedum*), *sikhwa* (*Tulbaghi lunwigiana*) *emacembe emjumbula* (*Cassava leaves*), (46.66%, n=42), *lisheshelu* (*Aloe cooperin*), (46.15%, n=18) (see Table 4.8).

Knowledge on the use of indigenous green leafy vegetables

This sub-objective dealt with determining the study groups' knowledge on the use of indigenous green leafy vegetables as food, how they were prepared and served and who was responsible for the preparation and preservation. The majority of the respondents (97.05%, n=99) indicated that they used indigenous green leafy vegetables when available. The majority of both the older respondents (83.92%, n=47) and the younger respondents (86.95%, n=40) indicated that they ate these vegetables because of their health-related properties and nutrient content. They ate it as relish to accompany the staple maize meal porridge. Some of both the younger and older participants consumed the indigenous green leafy vegetables just to get porridge "down the throat" in cases where they did not have an alternative relish (Ogle & Grivetti, 1985c).

Preparation: most of the respondents (95%) said that women (meaning themselves) were responsible for preparing indigenous green leafy vegetables. From both the focus group discussions and structured interviews, it was gathered that boiling was the main cooking method used to prepare indigenous green leafy vegetables. Both the younger and older respondents boiled the indigenous green leafy vegetables with salt and then it was eaten as relish or snack (*lilashe*). The younger group mentioned that they added modern processed ingredients like cooking oil and peanut butter during the preparation. The older groups however, used sesame seeds (*ludvonca*) and pounded groundnuts to add as a seasoning when preparing a nutritious and delicious relish.

They further explained that nowadays peanut butter, cooking oil and other vegetables such as tomatoes, onions were added to season these vegetables. Indigenous green leafy vegetables could be prepared on their own or as mixtures of various species of leaves to counteract bad attributes such as bitterness and sliminess and to increase the quantity when scarce. An example of mixing leaves is when *inshubaba* (*Mormodica clementindae*) is prepared, usually *chuchuza* (*Bidens pilosa*) and *imbhuya* (*Amaranthus*) are also added to reduce the bitterness of *inshubaba* (*Mormodica clementindae*). The younger group and some older participants stated that *ligusha* (*Corchorus spp*) was prepared by boiling and adding bicarbonate of soda to develop the sliminess and to preserve the green colour. Both groups indicated that they were aware that adding bicarbonate of soda destroyed some of the nutrients. Most of the older group mentioned that aloe ash was traditionally used to prepare *ligusha* (*Corchorus spp*) and some were still following this practice as it did not affect the nutritive value of the *ligusha* (*Corchorus spp*), “it is healthier than using bicarbonate of soda” according to them.

In conclusion, the older women were able to explain traditional food preparation and flavouring methods, in contrast to the younger women, who were only knowledgeable about more modern preparation methods.

Serving: indigenous green leafy vegetables were mainly served as a relish or side vegetable and eaten mainly with the staple maize meal porridge as the majority (96.07%, n=98) of both groups of respondents did so. Besides maize meal porridge, other foods also eaten with indigenous green leafy vegetables by some respondents were rice, maize rice or samp. Supper was indicated by the majority of both the younger group (63.04%, n=29) and the older group (51.78%, n=29) respectively as the meal where indigenous green leafy vegetables were served followed by lunch. However, this was not reflected in the 24-hour recall, as the results indicated that cultivated leafy vegetables were served during supper and indigenous green leafy vegetables for lunch. Consumption of the staple maize meal porridge by the majority of the study group portrays that the Swazi people still maintain some elements of the traditional diet.

People nowadays are inclined to eat indigenous green leafy vegetables when they are available. It seems as if indigenous green leafy vegetables are used more as a relish for lunch because 39% of the respondents included them as a relish in comparison to 15% respondents who ate them for supper. It could be concluded that more females consume them during lunch. This is in line with what the literature reported that indigenous green leafy vegetable is a female food (Kepe 2008; Nyomora, 2006; Modi *et al.*, 2006; Ogoye-Ndegwa 2003; Prasad, 1998).

Preservation: surplus indigenous green leafy vegetables were preserved by the majority of both the older (65.45%, n=36) and younger respondents (51.21%, n=21). From the focus group discussion, it was gathered that most of the younger participants did not preserve indigenous green leafy vegetables as they would only collect enough for a meal. They did not seem to be knowledgeable concerning the preservation methods of these vegetables. Drying as a method of preservation was indicated to be practised by the majority of the older women (58.92%, n=33) compared to (19.56%, n=9) of the younger group. The older group could explain how to dry indigenous green leafy vegetables. They would spread the leaves on sacks and dry the leaves outdoors in the shade or indoors. Thereafter they would store the dried leaves either crushed or not crushed in sealed bottles. Some of the older respondents also mentioned that they would cook and freeze *ligusha* (*Corchorus spp*) as a way of preserving it. This shows that they had more knowledge in comparison to their younger counterparts who could not explain how to preserve indigenous green leafy vegetables.

The older women had more detailed knowledge about the preservation of vegetables in comparison to the younger group of women. In conclusion, the older group of women were more knowledgeable in terms of use, preparation, preservation and consumption of indigenous green leafy vegetables compared to the younger group.

Knowledge transfer on the use of indigenous green leafy vegetables

This sub-objective determined how knowledge was transferred regarding the collection, preparation and consumption of indigenous green leafy vegetables. The majority of the older respondents (78.57%, n=44) and younger respondents (69.56%, n=32) indicated that they obtained their knowledge on the collection and preparation of indigenous green leafy vegetables from their mothers. Mothers again were indicated by the majority of the older group (71.42%, n=40), and younger group (76.08%, n=35) as their source of knowledge on consumption of these vegetables. In the focus group discussion, the older group mentioned that they also got their knowledge from observing their grandmothers when they prepared indigenous green leafy vegetables. The younger group stated that they were not even interested in watching their

mothers when preparing these vegetables. Thus they lacked the know-how of procuring and preparing these vegetables.

It could be concluded that the older women were more knowledgeable on identifying and using indigenous green leafy vegetables compared to their younger counterparts. The younger women did not show much interest in gaining knowledge on indigenous green leafy vegetables. It seems as if knowledge is no longer systematically transferred from the older generation to the younger generation, and that the younger generation do not regard it as important to know about indigenous green leafy vegetables. Several studies support the fact that knowledge on indigenous green leafy vegetables are no longer transferred from the older generation to the younger generation, thus there is a risk that it will eventually be lost in future (Misra *et al.*, 2008; Modi *et al.*, 2006; Ogoye-Ndegwa, 2003). Since younger people do not participate in the collection and preparation of the indigenous green leafy vegetables the knowledge is not transferred (Orech *et al.*, 2014).

5.2.3 Conclusion on food consumption patterns associated with indigenous green leafy vegetables (objective 3)

The third objective on the food consumption patterns include sub-objectives that relate to the food consumption patterns regarding indigenous green leafy vegetables, and the extent to which they were included in the eating patterns of the study group. The second sub-objective dealt with whether indigenous green leafy vegetables were included on special occasion and if they were served to guests. The familiarity, preference rating and frequency of consumption of indigenous green leafy vegetable were also measured to describe the acceptability of these vegetables to the study group.

Eating Patterns: the findings from the weekday eating pattern confirmed that changes continue to take place. The majority (71%) of the study group had adopted three meals a day while only twenty percent followed the traditional two meals a day pattern.

At breakfast, the majority (70%) have tea as a beverage, followed by (55%) who ate bread. Traditional soft maize meal porridge or sorghum soft porridge was still included by 40% of the respondents. This confirms that people still include traditional foods although, modern foods were also consumed for breakfast by some. Examples were breakfast cereals, polony, margarine and eggs. The majority (96%) enjoyed tea mid-morning.

Stiff maize porridge was reported to be eaten by the majority at lunch and supper time. This means that maize still forms the staple food for the Swazi women in this community. Indigenous

green leafy vegetables were the relish most mentioned and enjoyed with maize porridge for lunch, as 40% of the respondents reported so. At supper, the majority (49%) included cultivated vegetables with maize meal porridge followed by (15%) who consumed indigenous green leafy vegetables. The results confirm that the traditional dishes are still included in meals as reported in previous studies (Kgaphola & Viljoen, 2004; Malaza, 1994; Huss-Ashmore & Curry, 1994; Jones, 1963; Beemer, 1939).

From the study, the inclusion of indigenous green leafy vegetables at lunch is also noted. This is probably because it is an affordable relish for the rural women who were unemployed. It can be concluded that indigenous green leafy vegetables are mostly included at lunch compared to supper.

Although the inclusion of traditional foods including indigenous green leafy vegetables is noted in the study group's food patterns, it seems to be declining and if used, it is used together with the western-orientated foods. The majority of the respondents (82%) reported that their meal patterns during weekends were similar to meal patterns during the week. An exception was the 17% respondents who reported that their weekend meals differed from weekdays meals. It was reported that on Sundays in particular, this minority would serve a variety of vegetables and meat. Chicken was the most mentioned meat and was also part of their weekend day meals.

It can be concluded that, to some extent, the study group maintained a traditional Swazi diet as traditional foods still form part of their meals. Although indigenous green leafy vegetables are included in the lunch and supper meals, other commercially available alternatives such as cultivated vegetables, chicken, rice and beef are also eaten at these meals. The inclusion of indigenous green leafy vegetables in the eating pattern of the study group seemed to decline. Indigenous green leafy vegetables were enjoyed for lunch by a few elderly women only, as reported in the 24-hour recall, although the majority of the respondents stated that they would include these vegetables at supper time.

Inclusion of indigenous green leafy vegetables on special occasions and to guests

Under this sub-objective the inclusion of indigenous green leafy vegetables on special occasions and served to guests was explored. In the structured interviews, the majority of the study group (67%) indicated that they would serve indigenous green leafy vegetables on special occasions. The main reason given by both groups related to health and nutrition followed by the sensory attributes of good taste and good smell. The younger women in the focus group discussion however, said they would not serve these vegetables and explained that '*decent food*' was supposed to be served on special occasions and that indigenous green leafy

vegetables were not regarded as ‘*decent food*’. When asked at which special occasions indigenous green leafy vegetables could be served, the majority of older respondents mainly indicated modern celebrations while the majority of the younger group mentioned traditional celebrations. This implies that the younger group regard indigenous green leafy vegetables as not suitable for modern celebrations.

The older females mentioned that they would serve indigenous green leafy vegetables to their guests from urban areas to introduce them to the different traditional foods, as these guests were used to modern foods only, and rarely had the opportunity to eat such foods. However, the older women who indicated not to serve indigenous green leafy vegetables to their guests gave reasons that they fear that the guests might develop stomach discomfort after eating the vegetables. The younger women on the other hand mentioned that they would serve indigenous green leafy vegetables to their guests only if they asked for it. They believed that guests should be served modern foods similar to those served on special occasions. It could be concluded that the older women were more willing to serve indigenous green leafy vegetables on special occasion and to guests compared to their younger counterparts who seemingly have a negative attitude towards serving these vegetables. This is similar to the findings by Ogle & Grivetti (1985a) who indicated that young individuals believed that it was an embarrassment to serve indigenous green leafy vegetables to guests.

Familiarity, preference rating and frequency of consumption of indigenous green leafy vegetables and cultivated leafy vegetables

The sub-objective dealt with the familiarity, preference rating and frequency of consumption of indigenous green leafy vegetables, cultivated green leafy vegetables and certain leaves of cultivated vegetables to determine whether the green leafy vegetables were known and were eaten by the study group. Respondents were also asked questions on the continuation of using or eating indigenous green leafy vegetables in future.

Almost all the respondents (99%) were familiar with *chuchuza* (*Bidens pilosa*), *inkakha* (*Momordica involucretae*), *inshubaba* (*Momordica clementidae*), *imbuya* (*Amaranthus*) and *ligusha* (*Corchorus spp*). These indigenous green leafy vegetables also received a high preference rating and were frequently consumed (3-4 times a week) by more than 30% of the respondents. During the focus group discussions, it was observed that a number of the older participants displayed a higher interest in the consumption of these vegetables compared to the younger participants. *Emahala* (*Aloe saponaria*), *mavelejozi/umsobo* (*Solanum reroflexum*) and *sikhwa* (*Tulbaghi lunwigan*) were familiar to only a few respondents and received a neutral preference rating. These were said to be eaten once a week and less than three times a month

when available. More than 50 percent of the respondents were not familiar with the following vegetables: *ligagajane* (*Cyphia bolusil*), *luphephetse* (*Anthraxia elata*), *bubati* (*Lapottea pedumentaris*), *lisheshelu* (*Aloe cooperin*), *silele* (*Potulaca oleracea*) and *liklolo* (*Grewia caffra*/*Corchorus spp*). These were given a low preference rating. They were also eaten fewer than three times a month or only on a special occasion.

Tintsanga (Pumpkin leaves) were the most liked indigenous green leafy vegetable by the majority (51.96%) of both the older and the younger women. The main reason given for liking this vegetable was its sensory attributes (good taste and good smell). Other indigenous green leafy vegetables that were liked by the older women included *imbhuya* (*Amaranthus*), *inkakha* (*Momordica involucretae*), *inshubaba* (*Momordica clemintidae*), *ligusha* (*Corchorus spp*) and *chuchuza* (*Bidens pilosa*). The momordica species were liked for their bitter taste and the belief that they had medicinal effects. The older women explained that at their age they suffered from diseases such as diabetes, arthritis, cardio-vascular diseases and hypertension so after eating these vegetables they felt stronger and healthier. Apart from *tintsanga* (Pumpkin leaves), the younger group also mentioned; *ligusha* (*Corchorus spp.*), *imbuya* (*Amaranthus*) and *chuchuza* (*Bidens pilosa*) as their favourite indigenous green leafy vegetables because of their good taste. The younger group stated clearly that they were not familiar with most of the indigenous green leafy vegetables and they did not like many of them. The majority of the younger group (78%) disliked *inkakha* (*Momordica involucretae*), *inshubaba* (*Momordica clemintidae*), because of their bitter taste. They disliked *ligusha* (*Corchorus spp*) because of its slimy texture. The majority of the older respondents, however did not like *inkakha* (*Momordica involucretae*), *inshubaba* (*Momordica clemintidae*) because of their bitter taste. *Ligusha* (*Corchorus spp*) and *sikhwa* (*Tulbaghi lunwigan*) were not liked for their sliminess; *sibhadze* (*Peucedum*) and *lisheshelu* (*Aloe boylei*) were disliked because of their bad smell.

In conclusion, the more familiar indigenous green leafy vegetables were preferred, and also included more often in the eating patterns. This is supported by other studies that stated that consumption of traditional and indigenous crops depended on their familiarity and sensory attributes (Cloete & Idsardi, 2013; Pieniak *et al.*, 2009). The undesirable sensory attributes like the bitterness or sliminess of some indigenous green leafy vegetables also contributed to these vegetables being disliked and therefore these were not consumed. In both groups some indigenous green leafy vegetables were disliked because of their sensory attributes like *inkakha* (*Momordica involucretae*) that is disliked for its bitter taste.

As a cross-check, the researcher also determined the familiarity, preference rating and frequency of consumption of cultivated green leafy vegetables and certain leaves of cultivated vegetables and this will be discussed next.

Familiarity, preference rating and frequency of consumption of cultivated green leafy vegetables

With the exception of Chinese cabbage (*Brassica oleracea*), *umjumbula* (*Cassava leaves*), *emacembe abhatata* (*Sweet potato leaves*) and kale (*Brassica karinata*), all the other cultivated leafy vegetables and certain leaves of cultivated vegetables were familiar to the respondents. Most respondents frequently included cabbage (*Brassica oleracea*) 3-4 times a week or consumed it at least once a week. Bitter leaf spinach (*Vernonia amygdalina*) and smooth spinach (*Spinacia oleracia*) were frequently consumed by more than 30% of the respondents mentioned they ate it 3-4 times a week and >20% respondents did so once a week. Lettuce (*Lactuca sativa*) was consumed by 26.56% respondents 3-4 times a week and by 21.56% respondents ate it once week. These cultivated green leafy vegetables, except for spinach (*Spinacia oleracia*) received a high preference rating, with bitter leaf spinach (*Vernonia amygdalina*) receiving a medium preference rating. More than 20% respondents had never eaten beetroot leaves (*Beta vulgaris*), carrot tops (*Daucus carota*), Chinese cabbage (*Brassica oleracea*), *emacembe emjumbula*, (*Cassava leaves*) and kale (*Brassica carinata*). Beetroot leaves (*Beta vulgaris*) and carrot tops (*Daucus carota*), received a medium preference rating. The rest of the vegetables eaten less often were given a low preference rating, and only a few respondents even included them.

It can be concluded that the cultivated green leafy vegetables and certain leaves of cultivated vegetables that are familiar received a high preference rating and hence were consumed frequently. From the findings, it is concluded that cultivated green leafy vegetables are more preferred and, as reported in the 24-hour recall they were evidently eaten at lunch and supper. A number of studies similarly reported that cultivated vegetables seemed to have replaced indigenous green leafy vegetables (Dweba & Mearns, 2011; Luczaj, 2010; Vorster *et al.*, 2008).

Acceptability of indigenous green leafy vegetables

The acceptability of indigenous green leafy vegetables was the last sub-objective regarding the consumption patterns of indigenous green leafy vegetables. This was determined by asking the respondents questions to describe their attitudes to and values and beliefs about these vegetables. The majority (87.25%) of the respondents indicated that indigenous green leafy vegetables should be promoted. The majority of both the older and the younger respondents (85.71%) and (89.13%) respectively agreed that that the consumption of indigenous green leafy vegetables should be encouraged mainly for health and nutrition-related reasons. The older group explained that, in the olden days, there were fewer non-communicable diseases such as diabetes because indigenous green leafy vegetables were the main relish in their traditional

diet. Therefore, indigenous green leafy vegetables have to be re-introduced to decrease the prevalence of such diseases to ensure that people are healthier. The older group emphasised the importance of the promotion of indigenous green leafy vegetables to the younger generation to preserve the Swazi eating culture. The younger group stressed that as much as they were aware of the nutritional benefits of indigenous green leafy vegetables, they would only continue to eat these vegetables when there was no alternative relish available. It can be concluded that indigenous green leafy vegetables are acceptable as a food item especially by the older group as they indicated that the vegetables should be promoted. It can be concluded that both groups of women would promote the use of the indigenous green leafy vegetables because of their nutritional benefit. However, the younger group of women do not have a positive attitude towards many of the indigenous green leafy vegetables because of their sensory attributes.

Taboos that prohibited the eating of indigenous green leafy vegetables were also determined as part of the women's beliefs regarding the consumption of these vegetables. Most of the beliefs were explained by the older group during the focus group discussions. The taboos that were mentioned related to clan names. People with clan names such as, Dlamini, Matsenjwa, Ntjangase, and Gama were not allowed to eat *emahala* (*Aloe saponaria*). This is because they are believed to be 'cry over' plants. The other taboos mainly related to female reproduction. Females who are menstruating, or recently had sexual intercourse, are pregnant or have just given birth were prohibited from collecting indigenous green leafy vegetables as it is believed that the vegetables they plucked would wilt and die. It could be concluded that a number of indigenous green leafy vegetables were not eaten due to certain beliefs held by rural Swazi people. This could explain why pregnant women ate vegetables far less frequently. It is a pity as these vegetables could provide them with a source of valuable nutrients and make this less vulnerable to being healthier which would benefit the child they are carrying.

Overall it can be concluded that the acceptability of indigenous green leafy vegetables is related to familiarity of being exposed to it or having eaten it before. Both the older and younger respondents indicated that they would continue to eat and promote the use of indigenous green leafy vegetables. However, in the focus group discussion with the younger women, they were not keen to continue eating indigenous green leafy vegetables. This is supported by literature that younger people believe that eating indigenous green leafy vegetables symbolises a low economic status (Misra *et al.*, 2008; Ogle & Grivetti, 1985a).

5.2.4 Conclusion on changes in the consumption of indigenous green leafy vegetables (objective 4)

The fourth objective dealt with two sub-objective relating to changes in the consumption of indigenous green leafy vegetables and factors contributing to the changes in the consumption of these vegetables.

Reasons for change that occurred in consumption of indigenous green leafy vegetables

From the findings, it is clear that most of the changes that occurred were brought about mainly by social structural changes associated with migration, urbanisation, modernisation and globalisation. These have contributed to the changes in the physical and natural environments and the economic, political and socio-cultural environments. Their impact has affected the availability, accessibility and acceptability of indigenous green leafy vegetables in the community in the study area.

Change in the availability of indigenous green leafy vegetables

The majority of the respondents (90%) agreed that there have been changes regarding the availability of indigenous green leafy vegetables in the community. From the focus group discussion with the older females, it was gathered that the main change was brought about by a current lack of vacant land due to population growth. Dlamini (2007) notes reduction of the original sites where these vegetables used to grow. The majority (48%) of both the older and the younger respondents recognise that modernisation, development (*imphucuko*) and technological advancement are reasons for the change in the availability of indigenous green leafy vegetables. This has further led to food culture change. Modernisation had brought about changes in the physical and natural environment due to the building of roads, shops, schools and the University's Faculty of Agriculture in the area. These developments have impinged on the original sites of the natural growth of indigenous green leafy vegetables. As a result, these vegetables are now only available on the outskirts of the community which is a distance from the homesteads.

Global climate change is also mentioned as contributing to the lack of availability of indigenous green leafy vegetables. The study group stated that drought also caused the disappearance of these vegetables. AMCEN (2011) reports that prolonged periods of drought led to the unavailability of indigenous green leafy vegetables as some of them did not survive and eventually disappeared. Increased use of agricultural chemicals such as herbicides and pesticides were also mentioned as reducing the availability of indigenous green leafy

vegetables. Their use aimed to increase the yield of exotic crops while altering the natural potential of the soil. This information concurs with the findings by Huss-Ashmore & Curry (1991) that the use of agricultural chemicals contributes to a decrease of indigenous species as they are meant to increase the yield of exotic crops.

Change in accessibility of indigenous green leafy vegetables

Accessibility of indigenous green leafy vegetables changed due to modernisation, economic influences and technological advancement. These factors have contributed to the unavailability of indigenous green leafy vegetable and, in turn, altered the accessibility of these vegetables. These vegetables are no longer abundant in the community as in the past, however, it was reported that some indigenous green leafy vegetables are still found on the outskirts of the community. The current sites are not easily accessible as the women in the community have to walk a long distance that is not safe. The older females also complained of their degenerative diseases such as knee and back problems that prevent them from walking to these distant sites even if they feel like collecting the vegetables. As a result, they can now only access the indigenous green leafy vegetables that grow in nearby fields and in homestead gardens.

Technological advancement, like the electrification of homes has also brought about change in accessing indigenous green leafy vegetables. The people nowadays use electricity as a source of energy for cooking, instead of firewood. Women used to walk to fetch firewood and picked these vegetables at the same time; this used to be the norm in days gone by (Jones, 1963:49; Ogle & Grivetti, 1985a). Economic reasons, such as the increase in female employment outside the home and the community, have also led to change in the accessibility of indigenous green leafy vegetables. Employed rural women no longer have time to procure and prepare these vegetables. Since they spend so much time at work away from home, they rely on processed foods that are convenient and accessible. Even though the majority of women in the community are unemployed (see Table 4.1) they too tend to rely on purchased foods. Private ownership of land in the area has also led to limited access to sites where indigenous green leafy vegetable grow. People now have to ask permission from the owner to pick indigenous green leafy vegetables and most of the time this not granted (Kepe, 2008). Therefore, these vegetables are still available but they are not as accessible as was the case a few decades ago.

Change in acceptability of indigenous green leafy vegetables

Acceptability of indigenous green leafy vegetables is determined by familiarity and internal, individual factors such as attitudes, believes, values and sensory preferences. The lack of familiarity is one of the reasons the study group gave for not consuming these vegetables.

Indigenous green leafy vegetables were not prepared at home as often as they were in the olden days. Hence the younger generation are not familiar with some of them. Cultivated green leafy vegetables are prepared instead. Even the older women who are familiar with indigenous green leafy vegetables often prepare cultivated leafy vegetables. Familiarity with the different kinds of indigenous vegetables therefore seems to be an important influencing factor. Since they are not well-known, their acceptability is reduced. People prefer to eat food they know (Cloete & Idsardi, 2013; European Food Information Council Review, 2012; Bryant *et al.*, 2003:310). This fact, together with the degree of liking or disliking specific foods due to their varying sensory attributes, determines the acceptability level of the food item.

For the majority of both the younger and the older group of women, the reasons behind their preference and acceptability of indigenous green leafy vegetables relates to certain sensory attributes. The younger group did not like a number of these vegetables as they experienced some of the sensory attributes like a bad smell, sliminess and bitter taste of some of these vegetables negatively. Thus they did not consume these vegetables to the same extent as their older counterparts.

It can be concluded that social structural changes, particularly urbanisation, modernisation, technological development and acculturation, have occurred in the Eluyengweni community. These have affected the availability, accessibility and acceptability of indigenous green leafy vegetables negatively. It transpires that indigenous green leafy vegetables are no longer abundant and are often inaccessible. This contributes to a decline in their consumption. Although some species are still included in the eating patterns of some residents, it is mainly the older women who enjoy them. This has also led to the loss of knowledge among the younger generation as they do not include these vegetables in their eating patterns, except on special occasions. The loss of knowledge transfer to the next generation is evident.

5.3 CONTRIBUTION OF THE STUDY

The aim of the study was to gain insight into the current food practices and knowledge of two generations of women regarding indigenous green leafy vegetables. The findings reveal that indigenous green leafy vegetables are still available in the Eluyengweni community, although not in abundance anymore. Most of the indigenous green leafy vegetables are not easily accessible, as they are found on the outskirts of the community.

Concerning knowledge about indigenous green leafy vegetables, the study confirms the findings from some documented literature that the older women are the custodians of the knowledge of

these vegetables compared to their younger counterparts (Orech *et al.*, 2014; van der Hoeven *et al.*, 2013; Dweba & Mearns, 2011; Weinberger & Swai, 2006; Prasad, 1998; Agrawal, 1995; Ogle & Grivetti, 1985a). The study also confirms that the older women are more knowledgeable about identifying the indigenous green leafy vegetables and know where to collect them and how to prepare and preserve them. The younger generation of women do not have this knowledge or skills of preparation. The younger women could only identify a few indigenous green leafy vegetables, compared to the older women. They also gave cultivated fields and uncultivated fields as the only sites they knew of for these vegetables. However, both groups of women mentioned summer as the season of abundance for indigenous green leafy vegetables.

The findings of the study reveal that the older group of women displayed more knowledge of the preparation and preservation of indigenous green leafy vegetables compared to the younger women. When asked about the method of preparing the indigenous green leafy vegetables, the younger group indicated that they only boil the vegetables and included modern ingredients for flavour. The older women mentioned several traditional methods for preparing the vegetables. The majority of the women enjoyed these vegetables as a relish eaten with maize meal porridge. The younger women only mention drying as a preservative method, whereas the older women gave an elaborate method of drying the vegetables.

The findings from the focus group discussion with the younger women revealed that the younger ladies were not motivated to participate in the procurement and preparation of indigenous green leafy vegetables. This explains why they have limited knowledge of indigenous green leafy vegetables. This situation contributes to the lack of inter-generational transfer of knowledge of indigenous green leafy vegetables.

It is also reported that indigenous green leafy vegetables are mainly consumed for lunch. The older women are often alone at home to cook and enjoy this food item. It seems as if the older Swazi women are inclined to eat indigenous green leafy vegetables when they are available for this meal. This supports the reports from literature that indigenous green leafy vegetables are women's food (Orech *et al.*, 2014; Kepe, 2008; Nyomora, 2006; Modi *et al.*, 2006; Ogoye-Ndegwa, 2003). Maize meal porridge was found to be the main food eaten with these vegetables. This means, to some extent, that the women are maintaining certain aspects of the traditional diet. In the study it was found that both the older and younger women are willing to continue including indigenous green leafy vegetables in future eating patterns. However, in the focus group discussion with the younger women, they seemed clear that their interest in the consumption of these vegetables is limited. It was also evident that western-orientated foods are also part of their meals that generally comprised cultivated leafy vegetables, rice, bread and tea. The majority followed a three-meal pattern instead of the traditional two-meal pattern. This

confirms what is reported in the literature that the Swazi meal pattern is gradually shifting from being traditional to being more western-orientated (The World Bank, 2014; Dlamini & Lowrey, 2005; Food and Agriculture Organization, 2004; Grivetti & Ogle, 2000; Malaza, 1994:24).

The change in consumption of indigenous green leafy vegetables in the Eluyengweni community has been accelerated by a number of social structural changes that have occurred in the community. This has altered the availability, accessibility as well as the acceptability of the indigenous green leafy vegetables. Literature documents that socio-cultural changes arise through migration, urbanisation and modernisation of people which contributes significantly to traditional eating patterns being affected (Mavengahama *et al.*, 2013; Kgaphola & Viljoen, 2004; Malaza, 1994:24). Ultimately this has led to the decline in the use of indigenous green leafy vegetables in the women's eating patterns.

5.4 LIMITATION OF THE STUDY

When conducting a study, limitations often occur. This study is not an exception. Although great care was taken in the development of the questionnaire and with the pilot test, it was challenging to keep some respondents attention as they got tired towards the end of the interview. It was also very difficult for the researcher to build a good rapport with some of the younger women in the group who did not seem to be interested in the topic of indigenous green leafy vegetables in their focus group session. This hampered the discussion and limited information on certain topics.

5.5 RECOMMENDATIONS

Based on the findings of the study, recommendations are made to capture and preserve the knowledge of indigenous green leafy vegetables, as well as to revive awareness and promote the use of indigenous green leafy vegetables. The suggested ways to do this are to attempt to implement the ideas suggested.

- Document and compile a glossary with pictures of available indigenous green leafy vegetables in the country to be used as reference for the current and future generation to identify edible species of indigenous green leafy vegetables.
- Capture and document knowledge of older females as they possess valuable information about indigenous green leafy vegetables.
- Promote the use of indigenous green leafy vegetables through exhibitions that focus on various indigenous green leafy vegetables.

- Cooking demonstrations of familiar indigenous leafy vegetables by using modern recipes in Swazi constituencies (*etinkhundleni*).
- Develop recipe booklets and leaflets for consumers and include recipes of indigenous green leafy vegetables *to enhance* a renewed interest in the inclusion of indigenous green leafy vegetables, specifically those enjoyed in family meals.
- Encourage consumer facilitation and nutrition education to increase awareness of indigenous green leafy vegetables.
- Inform homemakers, generally the womenfolk, about the health benefits of including indigenous green leafy vegetables in the family's food consumption patterns. In this way the younger generation are sure to become aware and familiar with them and continue to include these vegetables in their food patterns.
- As a point of departure indigenous green leafy vegetables that are eaten and preferred should be promoted.
- Tertiary education institutions and schools should be encouraged to develop modern recipes using indigenous green leafy vegetables so that everyone, including the younger generation, will be motivated to include these vegetables in their meals.
- Topics on indigenous foods and indigenous green leafy vegetables in particular, should be included in the school Consumer Science curriculum and syllabus in lower and higher grades. Recipes could be prepared during practical lessons as a way of transmitting and preserving knowledge about the preparation of these foods.

5.6 EVALUATION OF THE STUDY

An evaluation of the study is important to make a truthful and objective assessment of the study conducted. This should explain that the data collected was accurate, comprehensive and meaningful. Important too is to show that the study can be replicated elsewhere and yield the same results if the setting is similar. The quality of the data was ensured by taking certain measures to ensure the reliability and validity for both the quantitative and qualitative data in this mixed method study (see Chapter 3, section 3.14). A major strength of this study was that through a variety of data collection methods triangulation of data could be effected. Focus group discussions, observation and structured interviews supported and enhanced each of the data collecting methods. Together these provided a holistic picture of the situation pertaining to indigenous green leafy vegetables in the Eluyengweni community. Clearly, the women in the community have sound knowledge of these plants and they are an important and valuable food item.

5.7 SUGGESTIONS FOR FUTURE RESEARCH

Based on the findings of the study, the following suggestions are made for future research:

- Replicate the study in the other ecological zones of Swaziland, the Highveld, Lubombo and Lowveld regions. This will be useful for establishing a country-wide, in-depth understanding of the level of *the knowledge and use of indigenous green leafy vegetables*.
- Conduct a study to investigate the food practices of all indigenous Swazi foods including both men and women to obtain a true reflection of the extent to which indigenous Swazi foods are consumed in Swazi households.
- Develop and establish a database to capture and document knowledge about indigenous foods from the older generation in Swaziland in an organised manner.
- Determine and document the nutrient composition of the currently available indigenous green leafy vegetables. This information could be used to raise an awareness of their health benefits and hence simultaneously revive and renew interest and appreciation for these vegetables.

5.8 CONCLUDING REMARKS

The study provides current information about the level of knowledge and eating practices of two generations of women in the rural community of Eluyengweni. It confirms that indigenous green leafy vegetables are no longer abundant and accessible. In addition, the research found that the younger generation of women lack knowledge regarding the correct identification of indigenous green leafy vegetables, the locations where they grow as well as their preparation and preservation. The findings also reveal that in spite of the decline in the availability of indigenous green leafy vegetables, the older group of women still have extensive knowledge and use these vegetables fairly often in their food patterns.

This study also confirms the adoption of western-orientated eating patterns in the current eating practices of the rural Swazi women in this particular community that is similar to many other societies in the country. More modern foods, such as processed foods are frequently included in their food patterns. This characteristic contributes to the decline in consumption of indigenous green leafy vegetables.

The limited availability and accessibility of indigenous green leafy vegetables results in the younger generation not getting the opportunity to consume these vegetables as frequently as their parents and grandparents did. Continuous exposure and frequent consumption to foods

such as of vegetables result in people becoming familiar with them. This practice helps them to gradually develop a preference or liking for these indigenous varieties over time. When people do not exposure or limited access to these particular vegetables it is understandable that they tend to not like them. In contrast to this, processed foods that are readily available often contain high quantities of fat, sugar and salt that enhance their palatability. People then develop a preference for them due to frequent exposure. They become familiar with their taste and soon develop preference for these palatable commercially available foods.

The study thus confirms that the food practices of Swazi women in Eluyengweni continue to evolve. However, their knowledge on indigenous green leafy vegetables is sadly declining. A concerted effort has to be made to preserve this knowledge for future generations.

List of References

Agrawal, A., 1995. Indigenous and scientific knowledge: some critical comments. *Development and Change*, 26(3): 413–439.

All out Africa. 2014. Swaziland. [Online] Available from: <http://alloutafrica.co.sz> [Accessed 2014-01-01].

Amcen. 2011. *Addressing climate change challenges in Africa: a practical guide towards sustainable development*. [Online] Available from: [https://www.reeep.org/sites/default/files/Guide Book - Addressing Climate Change Challenges in Africa.pdf](https://www.reeep.org/sites/default/files/Guide%20Book%20-%20Addressing%20Climate%20Change%20Challenges%20in%20Africa.pdf) [Accessed: 2015-05-15].

Anderson, A., Hetherington, M., Adamson, A. 2003. *The development of and evaluation of a novel school based intervention to increase fruit and vegetable intake in children (Five a day the bash street way)*. Report No. 09003. London: Food Standards Authority.

Asomani-Boateng, R. 2002. Urban cultivation in Accra: An examination of the nature, practices, problems, potentials and urban planning implications. *Habitat International*, 26(4):591–607.

Babbie, C., Mouton, J. 2001. *The Practice of Social Research*. Cape Town: Oxford University Press.

Beemer, H. 1939. Notes on the diet of the Swazis in the protectorate. *Bantu Studies*, 13:199–236.

Berinyuy, J.E. & Fontem, D.A. 2011. Evaluating post-harvest opportunities and constraints to utilization and marketing of African leafy vegetables in Cameroon. *African Journal of Food, Agriculture, Nutrition and Development*, 11(2):4647–4664.

Blades, M. 2001. Factors affecting what we eat. *Nutrition and Food Science*, 31(2):71–74.

Blijham, N., De Kan, L. & Niehof, A. 2007. Determinants and adequacy of food consumption of children in La Trinidad, the Philippines. *International Journal of Consumer Studies*, 31(3):195–203.

Bloomberg, L.D. & Volpe, M. 2015. *Completing your qualitative dissertation: a road map from beginning to end*, Thousand Oaks: Sage Publications.

De Boer, J., Hoogland, C.T. & Boersma, J.J. 2007. Towards more sustainable food choices: Value priorities and motivational orientations. *Food Quality and Preference*, 18(7):985–996.

Bryant, C.A., Dewalt, K.M., Courtney, A. & Schwartz, J. 2003. *The cultural feast: an introduction to food and society*, Belmont: Thomson Wadsworth.

Bubolz, M.M. & Sontag, M.S. 2003. Human ecology theory. In: Boss, S.K., Doherty, P.G., LaRossa, W.J., Shumm, R., & Steinmetz, W.R., (eds.) *Sourcebook of family theories and methods: a contextual approach*. New York: Plenum Press.

Cant, M.C., Brink, A., & Brijball, S. 2002. *Customer behaviour: a South African perspective*. Cape Town: Juta Academic.

Capetta, M. 1983. Population, food, and nutrition: Swaziland, 1940-1982. In: Vletter, D. (ed.) *The Swazi rural homestead*. Kwaluseni: University of Swaziland.

Chambers, S., Lobb, A., Butler, L. & Bruce, T. 2008. The influence of age and gender on food choice: a focus group exploration. *International Journal of Consumer Studies*, 32:356–365.

Cherry, K. 2000. *How attitudes form, change and shape our behavior*. [Online] Available from: <http://psychology.about.com/od/socialpsychology/a/attitudes.htm> [Accessed: 2014-05-27].

Cloete, P.C. & Idsardi, E.F. 2013. Consumption of indigenous and traditional food crops: perceptions and realities from South Africa. *Agroecology and Sustainable Food Systems*, 37(8):902–914.

Cohuet, S., Marquer, C., Shepherd, S., Captier, V., Langedorf, F.A., Phelan, K., Manzo, M.L. & Grais, R.F. 2012. Intra-household use and acceptability of ready-to-use-supplementary-foods distributed in Niger between July and December 2010. *Appetite*, 59(3):698–705.

Connors, M., Bisogni, L.A., Sobal, J. & Devine, C.M. 2001. Managing values in personal food systems. *Appetite*, 36(3):189–200.

Contento, I.R., 2011. Overview of determinants of food choice and dietary change: implications for nutrition education. In: Contento, I.R. (ed.) *Nutrition education: linking research, theory and practice*. Sudbury: Jones & Bartlett Learning.

Creswell, J.W. 2013. *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Thousand Oaks: SAGE.

Creswell, J.W. 2011. Controversies in mixed methods research. In: Denzin, N. K., Lincoln, Y. S (eds.), *Sage Handbook of Qualitative Research 4*. Thousand Oaks: SAGE.

Creswell, J.W. & Clark, V, 2011. *Designing and Conducting Mixed-methods Research*. Thousand Oaks: SAGE.

Crush, J., Frayne, B. & McLachlan, M., 2011. *Rapid Urbanization and the Nutrition Transition in Southern Africa*. Cape Town: African Food Security Urban Network (AFSUN).

Damman, S., Eide, W.B. & Kuhnlein, H.V. 2008. Indigenous peoples' nutrition transition in a right to food perspective. *Food Policy*, 33(2):135–155.

Delaney, M. & McCarthy, M. 2011. Food choice and health across the life course: a qualitative study examining food choice in older Irish adults. *Journal of Food Products Marketing*, 17(2-3):114–140.

Delisle, H. 2010. Findings on dietary patterns in different groups of African origin undergoing nutrition transition. *Applied physiology, nutrition, and metabolism*, 35(2):224–228.

De Vos, A.S. 2005. Qualitative data analysis and interpretation. In: De Vos, C.S., Strydom, A.S., Fouché, H. & Delpont, C.B. (eds.) *Research at grass roots for the social sciences and human services professions*. Pretoria: Van Schaik.

Dladla, L. 1999. *Determinants of the effect of 3 indigenous vegetables (emahala, inkhakha, inshubaba) on Non-insulin dependent diabetic mellitus*. Unpublished BSc project. Swaziland: University of Swaziland.

Dlamini, N. & Lowrey, P. 2005. *New ways of saving the old ways helping countries to rescue traditional foods and crops*. Mbabane: Government of Swaziland.

Dlamini, N., & Mdziniso, P. 2005. *An inventory of indigenous crops and wild edible species and their preparation methods: a case study of Manzini region*. Ministry of Agriculture and Cooperatives. Home Economics section. Mbabane: Government of Swaziland.

Dlamini, R.M. 2007. *Investigation of sustainable indigenous agricultural practices: a systems approach*. Unpublished MSc. project. Stellenbosch: University of Stellenbosch.

Dreezens, E., Martijn, C., Tenbult, P., Kok, G. & de Vries, N.K., 2005. Food and the relation between values and attitude characteristics. *Appetite*, 45(1): 40–46.

Dube, M.A. & Musi, P.J. 2002. *Analysis of indigenous knowledge in Swaziland: Implications for sustainable agricultural development*. ATPS working paper series No. 34. Nairobi: African Technology Policy Studies Network.

Dube, M.A. 2010. Farmer's preparedness to respond to climate change using water and land use practices: lesson from Swaziland. In: Mloza-Banda, M., Matarira, H.R., & Dube, C., (eds.) *Strengthening the capability of community and local institution in Southern Africa to respond to climate change through land use*. [Online] Available from: http://start.org/download/gec10/Mloza-Banda_Final.pdf [Accessed: 2014-10-05].

Dweba, T.P. & Mearn, M.A. 2011. Conserving indigenous knowledge as the key to the current and future use of traditional vegetables. *International Journal of Information Management*, 31(6):564–571.

Eagly, A.H. & Chaiken, S. 1995. Attitude strength, attitude structure, and resistance to change. *Ohio State University Series on Attitudes and Persuasion*, 4:413–432.

Engle, L M. & Faustino, F. 2007. Conserving the indigenous vegetable germplasm of Southeast Asia. *ACTA Horticulture*, 752:55–60.

European Food Information Council Review. 2012. *Fruit and vegetable consumption in Europe – do Europeans get enough?* [Online] Available from: <http://www.eufic.org/article/en/expid/Fruit-vegetable-consumption-Europe> [Accessed: 2012-06-08].

Faber, M., Oelofse, A., Van Jaarsveld, P.J., Wenhold, F. & Jansen van Rensburg, W.S. 2010. African leafy vegetables consumed by households in the Limpopo and KwaZulu-Natal provinces in South Africa. *South African Journal of Clinical Nutrition*, 23(1):30–38.

Faber, M. & Wenhold, F. 2007. Nutrition in contemporary South Africa. *Water SA*, 33(3): 393–400.

Farolfi, S., Mabugu, R.E. & Ntshingila, S.N. 2007. Domestic water use and values in Swaziland: a contingent valuation analysis. *Agrekon*, 46(1):157–170.

Ferraro, G.P. 2001. *Cultural anthropology: an applied perspective* London: Wadsworth.

Ferraro, G.P. 2002. *The cultural dimensions of international business* Upper Saddle River: Prentice Hall.

Fieldhouse, P. 1995. *Food and nutrition: custom and culture*. 2nd ed. London: Chapman and Hall.

Flyman, M.V. & Afolayan, A.J. 2006. The suitability of wild vegetables for alleviating human dietary deficiencies. *South African Journal of Botany*, 72(4):492–497.

Food and Agriculture Organization. 2008. An introduction basic concepts of food security. *Food security information for action: practical guides*. Rome: Food and Agriculture Organisation. [Online] Available from: <http://www.fao.org/docrep/013/al936e/al936e00.pdf> [Accessed: 2015-05-22].

Food and Agriculture Organization. 2004. *Building on gender, agrobiodiversity and local knowledge as part of agrobiodiversity: a training manual*. Rome: Food and Agriculture Organization.

Food and Agriculture Organization. 2007. *Crop and food supply assessment mission to Swaziland*. Rome: Food and Agriculture Organization.

Food and Agriculture Organization. 2006. *New ways of saving the old ways, helping countries to rescue traditional foods and crops*. Rome: Food and Agriculture Organization. [Online] Available from: <http://www.fao.org/Newsroom/en/field/2004/51002/index.html> [Accessed: 2009-01-21].

Franchi, M. 2012. Food choice: beyond the chemical content. *International Journal of Food Sciences and Nutrition*, 63(S1):17–28.

Furst, T., Connors, M., Bisogni, C.A., Sobal, J. & Winter, L. 1996. Food choice: A conceptual model of the process. *Appetite*, 26, pp.247–265.

Gilbert, P.A. & Khokhar, S. 2008. Changing dietary habits of ethnic groups in Europe and implications for health. *Nutrition Reviews*, 66(4):203–215.

Gillespie, A.M.H. & Johnson-Askew, W.L. 2009. Changing family food and eating practices: The family food decision-making system. *Annals of Behavioral Medicine*, 38(Supplement).

Gockowski, J. & Ncoumbe, M. 1999. *An analysis of horticultural production and marketing systems in the forest margins eco regional benchmark of Southern Cameroon*. Ibadan: International Institute of Tropical Agriculture.

Gockowski, J., Mbazo, J., Mbha, G. & Moulende, T.F. 2003. African traditional leafy vegetables and the urban and peri-urban poor. *Food Policy*, 28(3):221–235.

Goodman, A.H., Dufour, D.L. & Pelto, G.H. 2000. *Nutritonal anthropology: biocultural perspectives on food and nutrition* London: Mayfield Publications.

Government of Swaziland. 2010a. *2007 Population and housing census volume 1-6*. Mbabane: Government of Swaziland.

Government of Swaziland. 2010b. *2007 Climate data analysis: Swaziland second communication*. Mbabane: Government of Swaziland

Government of Swaziland. 2013a. *Swaziland annual vulnerability assessment and analysis report*. Mbabane: Government of Swaziland.

Government of Swaziland. 2013b. *Swaziland business yearbook*. [Online] Available from: <http://www.swazibusiness.com/sbyb2007/agric.htm> [Accessed: 2014-09-20].

Government of Swaziland. 1997. *The Swaziland environment action plan (SEAP)*. Mbabane: Publisher. [Online] Available from: <http://www.environment.gov.sz/files/seap.pdf> [Accessed: 2015-04-03].

Grenier, L. 1998. *Working with indigenous knowledge: a guide for researchers*. Ottawa: International Development Research Centre.

Grivette, L.E. & Ogle, B.M. 2000. Value of traditional foods in meeting macro- and micronutrient needs: the wild plant connection. *Nutrition Research Reviews*, 13(1):31–46.

Guerrero, L., Guardia, M.D., Xicola, J., Verbeke, W., Vanhonacker, F., Zakowska-Biemans, S., Sajdakowska, M., Sulmont-Rosse, C., Issanchou, S., Contel, M. & Scalvedi, M.L. 2009. Consumer-driven definition of traditional food products and innovation in traditional foods. A qualitative cross-cultural study. *Appetite*, 52(2):345–354.

Guerrero, L., Claret, A., Verbeke, W., Enderll, G., Zakowska-Biemans, Vanhonacker, F., Issanchou, S., Sajdakowska, M., Granli, S., Scalvedi, L., Contel, M. & Hersleth, M. 2010. Perception of traditional food products in six European regions using free word association. *Food Quality and Preference*, 21(2):225–233.

Habwe, F.O. & Walingo, K.M. 2008. Food processing and preparation technologies for sustainable utilization of Africa indigenous vegetables for nutrition security and wealth creation in Kenya. In: Robertson, J.R. & Lupien, G.L. (eds.) *Using food science and technology to improve nutrition and promote national development*. Ontario: International Union of Food Science & Technology.

Hauser, M., Jonas, K. & Riemann, R. 2011. Measuring salient food attitudes and food-related values. An elaborated, conflicting and interdependent system. *Appetite*, 57(2):329–338.

Hinze, A., Karg, C., Van Zyl, M., Mahomed, N. & Steyn, N.P. 2004. The acceptability of different types of soymilks available in Cape Town in consumers from high and low socio-economic areas. *International Journal of Consumer Studies*, 28(1):40–48.

Hubert, A. 2004. Qualitative research in the anthropology of food: A Comprehensive qualitative/quantitative approach. In: Macbeth, H.M. & MacClancy, J (eds) *Researching food habits: methods and problems*. New York: Berghahn books.

Huss-Ashmore, R. & Curry, J.J. 1991. Diet, nutrition, and agricultural development in Swaziland. 2. Patterns of food consumption. *Ecology of Food and Nutrition*, 26(3):167–185.

Huss-Ashmore, R. & Curry, J.J. 1994. Diet, nutrition, and agricultural development in Swaziland. 3. Household economics and demography. *Ecology of Food and Nutrition*, 33(1-2):107–121.

Igumbor, E., Sanders, D., Puoane, T., Tsolekile, L., Schwarz, C., Purdy, C., Swart, R., Durao, S. & Hawkes, C. 2012. “Big food,” the consumer food environment, health, and the policy response in South Africa. *PLoS Medicine*, 9(7).

International Labour Organisation. 2014. *Decent work: country programme for Swaziland (2010-2014)*. Geneva: ILO. [Online] Available from: <http://www.ilo.org/public/english/bureau/program/dwcp/download/swaziland.pdf> [Accessed: 2015-05-15].

Jansen Van Rensburg, W.J., Van Averbek, W., Slabbert, R., Faber, M., Van Jaarsveld, P., Van Heerden, I., Wenhold, F. & Oelofse, A. 2007. African leafy vegetables in South Africa. *Water SA*, 33(3):317–326.

Jones, S.M. 1963. *A study of Swazi nutrition. Report of the Swaziland nutrition survey, 1961-1962 for the Swaziland administration*. Durban: Institute for Social Research, University of Natal.

Kajembe, G.C., Mwenduwa, M.I., Mgoo, J.S. & Ramadhani, H. 2000. *Potentials of non-wood forest products in household food security in Tanzania: the role of gender based local knowledge*. Report No. GCP/RAF/338/NOR. Tanzania: Gender, Biodiversity and Local Knowledge systems (LinKS) to Strengthen Agricultural and Rural Development.

Kepe, T. 2008. Social Dynamics of the value of wild edible leaves (Imifino) in a South African rural area. *Ecology of Food and Nutrition*, 47(6):531–558.

Kessy, J.F. 1998. Conservation and Utilization of Natural Resources in the East Usambara forest reserves: conventional views and local perspectives. *Tropical Resource Management Papers*, 18(Wageningen):168.

Kgaphola, M.S. & Viljoen, A.T. 2004. Food habits of rural Swazi household: 1939-1999. Part 2: Social structural and ideological influences on Swazi food habits. *Journal of family Ecology and Consumer Science*, 32:16–25.

Kgaphola, M.S. & Viljoen, A.T. 2000. Food Habits of Rural Swazi Households: 1939-1999, Part 1: Technological influences on Swazi food habits. *Journal of Family Ecology and Consumer Science*, 28:68–74.

Kittler, P.G., Sucher, K. & Nelms, M. 2011. *Food and Culture*. Belmont: Cengage Learning.

Kontinen, H., Sarlio-Lahteenkorva, S., Silventoinen, K., Mannisto, S. & Haukkala, A. 2013. Socio-economic disparities in the consumption of vegetables, fruit and energy-dense foods: the role of motive priorities. *Public Health Nutrition*, 16(5):873–82.

- Kronld, M. 1990. Origins of food preferences: conceptual models. Anderson, G.H., Krasnegor, N.A., Miller, G.D. and Simopoulos, A.P (eds) *Diet and behavior: multidisciplinary approaches*. London: Springer-Verlag.
- Kuhnlein, H.V., Erasmus, B. & Spigelski, D. 2009. *Indigenous Peoples' Food Systems: The Many Dimensions of Culture, Diversity and Environment for Nutrition and Health*. Rome: FAO.
- Kumar, R. 2011. *Research Methodology: A Step by Step Guide for Beginners*. London: Sage Publications.
- Lane, K., Hovorka, A. & Legwegoh, A., 2012. Urban food dynamics in Botswana: insights from Gaborone's Central Business District. *African Geographical Review*, (October):1–15.
- Langill, S. 2010. *Indigenous knowledge: resource kit for sustainable development researchers in dryland Africa*. Ottawa: International Development Research Centre.
- Larson, N.I., Story, M.T. & Nelson, M.C. 2009. Neighborhood environments. disparities in access to healthy foods in the U.S. *American Journal of Preventive Medicine*, 36(1).
- Latham, M.C. 1997. *Human nutrition in the developing world*. Rome: Food & Agriculture Organization.
- Lewu, F.B. & Mavengahama, S. 2010. Wild vegetables in Northern Kwazulu-Natal, South Africa: Current status of production and research needs. *Scientific Research and Essays*, 5(20):3044–3048.
- Long, N. 1992. Introduction. In: Long, A. & Long, N. (eds.) *Battlefield of knowledge: the interlocking and practices in social research and development*. London: Routledge.
- Longley, A. 1999. *O'level guide the acts of apostles*, Harare: Longman.
- Luczaj, L. 2010. Changes in the utilization of wild green vegetables in Poland since the 19th century: a comparison of four ethnobotanical surveys. *Journal of ethnopharmacology*, 128(2):395–404.
- Lyatuu, E., Msuta, G. & Lebotse, L. 2009. *Marketing of indigenous leafy vegetables and how small-scale farmers income can be improved in SADC region (Tanzania, Zambia, Botswana)*:

marketing information. Final Marketing Report of Joint SADC-Implementation and Coordination of Agricultural Research and Training (ICART) and European Union Project.

Macbeth, H. M. & Macclancy, J. 2004. *Researching food habits: methods and problems*, New York: Berghahn books.

Madakadze, R., Masarirambi, M. & Nyakudya, E., 2004. Processing of horticultural crops in the tropics. In: Dris, S. M. & Jain, R (eds.) *Production practices and quality assessment of food crops*. New York: Springer.

Magagula, S.N. 2005. *The role of Indigenous knowledge in sustainable crop production in Luyengo*. Unpublished MSc thesis. Kwaluseni: University of Swaziland.

Malaza, M.T. 2012. *The development, standardisation and acceptability of the traditional Tsonga-Shangaan dishes, Xigugu and Xiendla hi vomu for use in ethnic restaurants*. MSc Unpublished thesis. Pretoria: University of Pretoria.

Malaza, T. 1994. *Food security in Swaziland: factors influencing dietary patterns*. Unpublished PhD thesis. Pennsylvania: Pennsylvania State University.

Maletnlema, T.N. 2002. A Tanzanian perspective on the nutrition transition and its implications for health. *Public health nutrition*, 5(1a):163–168.

Manyatsi, A.M. & Makhanya, M. 2012. *Home gardens for household livelihood strategies at Luyengo*. Available from: <http://www.waternetonline.ihe.nl/symposium/10/full%20papers/.../Manyatsi%20A%20M.do>. [Accessed 2014-01-01].

Maroyi, A. 2013. Use of weeds as traditional vegetables in Shurugwi district, Zimbabwe. *Journal of ethnobiology and Ethnomedicine*, 9(1):60. [Online] Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3751906&tool=pmcentrez&rendertype=abstract>. [Accessed: 2015-05-06].

Masarirambi, M.V., Mavuso, V., Shongwe, V.D., Nkambule, T. & Mhazo, N. 2010. Indigenous post-harvest handling and processing of traditional vegetables in Swaziland: a review. *African Journal of Agricultural Research*, 5(24):3333–3341.

Maunder, E.M.W. & Meaker, J.L. 2009. The current and potential contribution of home grown vegetables to diets in South Africa. *Water SA*, 33(3):1401–406.

Mavengahama, S., Mclachlan, M. & De Clercq, W. 2013. The role of wild vegetable species in household food security in maize based subsistence cropping systems. *Food Security*, 5(2):227–233.

Mavimbela, H.C. 2004. *Biodiversity management: indigenous knowledge on traditional food plants among rural women*. Unpublished MSc thesis. Kwaluseni: University of Swaziland.

Mcauley, C. & Knopper, L.D. 2011. Impacts of traditional food consumption advisories: compliance, changes in diet and loss of confidence in traditional foods. *Environmental Health*, 10(1):55.

Medoua, G.N. & Oldewage-Theron, W.H. 2014. Effect of drying and cooking on nutritional value and antioxidant capacity of morogo (*Amaranthus hybridus*) a traditional leafy vegetable grown in South Africa. *Journal of food science and technology*, 51(4):736–742.

Messer, E. 2007. Cultural factors in food habits: reflections in memory of Christine S. Wilson. *Ecology of Food and Nutrition*, 46(3-4):185–204.

Miles, M.B. & Huberman, M.A. 1994. *Qualitative data analysis: an expanded sourcebook*. 2nd ed. Beverly Hills: SAGE.

Misra, S., Maikhuri, R.K., Kala, C.P., Rao, K.S., & Saxena, K.G. 2008. Wild leafy vegetables: a study of their sustenance dietetic support to the inhabitants of Nanda Devi Biosphere, India. *Journal of Ethnobiology and Ethnomedicine*, 4(1):15–23.

Mnzava, N.A. 1997. Vegetable crop diversification and the place of traditional species in the tropics. In: Guarino, L. (ed.) *Traditional African vegetables*. Rome: International Plant Genetic Resources Institute.

Modi, M., Modi, A. & Hendriks, S. 2006. Potential role for wild vegetables in household food security: a preliminary case study in Kwazulu-Natal, South Africa. *African Journal of Food, Agriculture, Nutrition and Development*, 6(1).

Moyo, M., Amoo, S.O., Ncube, B., Ndhlala, M., Finnie, J.F. & Van Staden, J. 2013. Phytochemical and antioxidant properties of unconventional leafy vegetables consumed in Southern Africa. *South African Journal of Botany*, 84:65–71.

- Mtshali, C.S. 1995. *An investigation of environmental knowledge among two rural black communities in Natal*. Unpublished PhD thesis. Grahamstown: Rhodes University.
- Muhanji, G., Roothaert, R., Webo, C. & Stanley, M. 2011. African indigenous vegetable enterprises and market access for small-scale farmers in East Africa. *International Journal of Agricultural Sustainability*, 9(November):194–202.
- Murdoch, G.M. 1968. *Soils and land capability in Swaziland*, Mbabane: Ministry of Agriculture, Government of Swaziland.
- Nebel, S., Pieroni, A. & Heinrich, M. 2006. Ta chorta : Wild edible greens used in the Graecanic area Ta cho in Calabria, Southern Italy. *Appetite*, 47:333–342.
- Nesamvuni, C., Steyn, N.P. & Potgieter, M.J. 2001. Nutritional value of wild, leafy plants consumed by the Vhavenda. *South African Journal of Science*, 97(1-2):51–54.
- Nestle, M., Wing, R., Birt, L., Disogra, L., Drewnowski, A., Middleton, S., Sigman-Grant, M., Sobal, W.J. Winston, M. & Economos, C. 2009. Behavioral and social influences on food choice. *Nutrition Reviews*, 56(5):50–64.
- Neuman, W.L. 2011. *Social research methods: qualitative and quantitative approaches*. 7th Ed. University of Wisconsin, Whitewater.
- Neuman, W.L. 2006. *Social research methods: qualitative and quantitative approaches*. Boston: Pearson Education.
- Ngwane, M. 1999. *Socio-cultural factors that have contributed to the decrease of plant species in the Estearn Cape: a case study of Etyeni Village, Tsolo, Transkei*. Unpublished MSc thesis. Grahamstown: Rhodes University.
- Njume, C., Goduka, N.I., & George, G. 2014. Indigenous leafy vegetables (imifino, morogo, muhuro) in South Africa: A rich and unexplored source of nutrients and antioxidants. *African Journal of Biotechnology*, 13(19):1933–1942.
- Nyomora, A. 2006. Indigenous vegetable crops of Tanzania: research and development needs. In: Chadha, M. I., Kuo, G. & Gowda, C. L. L (eds). *International conference on indigenous vegetables and legumes: prospectus for fighting poverty, hunger and malnutrition*. Hyderabad: ISHS Acta Horticulturae.

Ogle, B.M. & Grivetti, L.E. 1985a. Legacy of the chameleon: edible wild plants in the Kingdom of Swaziland, Southern Africa. A cultural, ecological, nutritional study. Part II - demographics, species availability and dietary use, analysis by ecological zone. *Ecology of Food and Nutrition*, 17(1):1–30.

Ogle, B.M. & Grivetti, L.E. 1985b. Legacy of the chameleon: edible wild plants in the Kingdom of Swaziland, Southern Africa. A cultural, ecological, nutritional study. Part III - cultural and ecological analysis. *Ecology of Food and Nutrition*, 17(1):31–40.

Ogle, B.M. & Grivetti, L.E. 1985c. Legacy of the chameleon: edible wild plants in the Kingdom of Swaziland, Southern Africa. A cultural, ecological, nutritional study. Part IV-nutritional analysis and conclusions. *Ecology of Food and Nutrition*, 17(1):41–64.

Ogoye-Ndegwa, C. 2003. Traditional gathering of wild vegetables among the Luo of Western Kenya-a nutritional anthropology project. *Ecology of Food and Nutrition*, 42(1):69–89.

Orech, F.O., Akenga, T., Ochora, J., Friis, H. & Aagaard-Hansen, J. 2005. Potential toxicity of some traditional leafy vegetables consumed in Nyang'oma division, Western Kenya. *African Journal of Food, Agriculture, Nutrition and Development*, 5(1):1–13.

Page, C. & Meyer, D. 2003. *Applied research design for business and management*. Roseville: McGraw-Hill.

Parawira, W. & Muchuweti, M. 2008. An overview of the trend and status of food science and technology research in Zimbabwe over a period of 30 years. *Scientific Research and Essay*, 3(12):599–612.

Parraga, I.M. 1990. Determinants of food consumption. *Journal of the American Dietetic Association*, 90(5):661–663.

Pasquini, M.W. & Young, E. 2007. Networking to promote the sustainable production and marketing of indigenous vegetables through urban and peri-urban agriculture in sub-saharan Africa (IndigenoVeg). In: Chadha, M. I., Kuo, G., Gowda, C. L. L (eds.). Hyderabad: *Acta Horticulturae*.

Pelto, G.H. & Pelto, P.J. 2000. *Diet and delocalisation: Dietary changes since 1750*. London: Nutritional Anthropology.

Pienniak, Z., Verbeke, W., Vanhonacker, F., Guerrero, L. & Hersleth, M. 2009. Association between traditional food consumption and motives for food choice in six European countries. *Appetite*, 53(1):101–108.

Piscopo, S. 2004. *Socio-ecological factors influencing food choices and behaviours of Maltese primary schoolchildren*. Unpublished PhD thesis. Birmingham: University of Birmingham.

Popkin, B.M. 2006. Global nutrition dynamics: The world is shifting rapidly toward a diet linked with non-communicable diseases. *American Journal of Clinical Nutrition*, 84(2):289–298.

Popkin, B.M. 2004. The nutrition transition: an overview of world patterns of change. *Nutrition reviews*, 62(7 Part 2):S140–S143.

Popkin, B.M., Adair, L.S. & Ng, S.W. 2012. Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1):3–21.

Powell, B., Quarghidi, A., Johns, T., Tatto, M. & Eyzaguirre, P. 2014. Wild leafy vegetable use and knowledge across multiple sites in Morocco: a case study for transmission of local knowledge. *Journal of Ethnobiology and Ethnomedicine*, 10:34.

Prasad, G. 1998. Scientific knowledge, wild plants and survival. *Agenda*, 14(38):81–84.

Quaye, W., Gyasi, O., Larweh, P., Johnson, P., Obeng-Aseidu, P. 2009. The extent of marketability and consumer preferences for traditional leafy vegetables - a case study at selected markets in Ghana. *International Journal of Consumer Studies*, 33(3):244–249.

Radder, L. & Le Roux, R. 2005. Factors affecting food choice in relation to venison: a South African example. *Meat Science*, 71(3):583–589.

Raschke, V., Oltersdorf, U., Elmadfa, I., Wahlqvist, M.L., Cheema, B.S. & Kouris-Blazos, A. 2007. Content of a novel online collection of traditional East African food habits (1930s-1960s): data collected by the Max-Planck-Nutrition research unit, Bumbuli, Tanzania. *Asia Pacific Journal of Clinical Nutrition*, 16(1):140–151.

Rockeach, M. 1970. *Beliefs, attitude and values: theory of organisation and change*. St Fransisco: Jossey-Bass.

Rozin, P. 2006. The integration of biological, social, cultural and psychological influences on food choice. In: Shepherd, M & Raats, R (eds.). *The psychology of food choice*. Oxfordshire: CABI.

Salkind, N.J. 2011. *Exploring research*. 8th ed. Canada: University of Kansas Pearson education Inc.

Sallis, J.F. & Glanz, K. 2009. Physical activity and food environments: solutions to the obesity epidemic. *The milbank quarterly*, 87(1):123–54.

Sanderson, B. 2013. Food for thought: how values affect our food choice. [Online] Available from: <http://valuesandframes.org/food-for-thought/> [Accessed: 2014-02-28].

Schönfeldt, H.C. & Pretorius, B. 2011. The nutrient content of five traditional South African dark green leafy vegetables—a preliminary study. *Journal of Food Composition and Analysis*, 24(8):1141–1146.

Seiluri, T., Lahelma, E., Rahkonen, O. & Lallukka, T. 2011. Changes in socio-economic differences in food habits over time. *Public Health Nutrition*, 14(11):1919–1926.

Shackleton, C., Paumgarten, F., Mthembu, T., Ernst, L., Pasquini, M. & Pichop, G. 2010. Production of and trade in African indigenous vegetables in the urban and peri-urban areas of Durban, South Africa. *Development Southern Africa*, 27(3):291–308.

Shava, S. 1999. The use of indigenous plants as food by the rural community in the Eastern Cape: Tuku “A” village, Peddie. *South African Journal of Environmental Education*, 19:85–97.

Shiundu, K. & Oniang’o, R.K. 2007. Marketing African leafy vegetables: challenges and opportunities in the Kenyan context. *African Journal of Food, Agriculture, Nutrition and Development*, 7(4):2–17.

Silaula, S.M. 1999. Nutritional value of indigenous foods and food plants. In: Makhubu, L. P., Mshana, R. N., Amusan, O. O., Adeniji, K., Msonthi, J. D (eds) *Proceedings of the symposium on African medicinal and indigenous food plants and the role of traditional medicine in healthcare*. Kwaluseni: UNISWA.

Sillitoe, P. 2000. Cultivating indigenous knowledge on Bangladeshi soil: an essay in definition. In: P. Sillitoe, (ed.) *Indigenous knowledge development in Bangladesh: Present and future*. Dhaka: The University Press Limited.

Sims, L.S. & Smiciklas-Wright, H. 1978. An ecological systems perspective: Its application to nutrition policy, program design and evaluation. *Ecology of Food and Nutrition*, 7(3):173–179.

Sobal, J., Bisogni, C.A., Devine, C.M. & Jastran, M. 2006. A conceptual model of the food choice process over the life course. In: Shepherd, M & Raats, R. (eds.) *The Psychology of food choice*. Oxford: CABI.

Sobal, J. 2000. *Social change and foodways. Cultural aspects of food*. Itacha New York: Division of Nutritional Sciences. Cornell University. [Online] Available from: <http://food.oregonstates.edu> [Accessed: 2011-01-12].

Sobal, J. & Bisogni, C.A. 2009. Constructing food choice decisions. *Annals of Behavioral Medicine*, 38(1):37–46.

Sobal, J. & Nelson, M.K. 2003. Commensal eating patterns: a community study. *Appetite*, 41(2):181–190.

Steyn, N.P., Olivier, J., Winter, P., Burger, S. & Nesamvuni, C. 2001. A survey of wild, green, leafy vegetables and their potential in combating micronutrient deficiencies in rural populations: research in action. *South African Journal of Science*, 97(7 & 8):276–278.

Steyn, N. & Temple, N. 2008. *Community nutrition textbook for South Africa: a right-based approach*. Tyberg: Medical Research Council.

Steyn, N.P. & Mchiza, Z.J. 2014. Obesity and the nutrition transition in Sub-Saharan Africa. *Annals of the New York Academy of Sciences*, 1311(1):88–101.

Story, M., Neumark-Sztainer, D. & French, S. 2002. Individual and environmental influences on adolescent eating behaviors. *Journal of the American Dietetic Association*, 102(3 Supplement):S40–S51.

Sweet, R.J. & Khumalo, S. 1994. *Range resources and grazing potentials in Swaziland*. FAO Report. Mbabane: Ministry of Agriculture and Co-operatives.

Tathiah, N., Moodley, I., Mubauwa, V., Denny, L. & Taylor, M. 2013. South Africa's nutritional transition: overweight, obesity, underweight and stunting in female primary school learners in rural KwaZulu-Natal, South Africa. *South African Medical Journal*, 103(10):718–723.

The Bible, 1995. *The Holy Bible: new international version*. Cape Town: Bible Society of South Africa.

The World Bank. 2014. Nutrition at a glance, Swaziland. Japan. The World Bank [Online] Available from: <http://siteresources.worldbank.org/NUTRITION/Resources/281846-1271963823772/Swaziland4811screen.pdf> [Accessed: 2015-03-15].

Trichopoulou, A., Vasilopoulou, E., Georga, K., Soukara, S. & Dillis, V. 2006. Traditional foods: why and how to sustain them. *Trends in Food Science and Technology*, 17(9):498–504.

Tshihwanambi, T.P. 2007. *Consumption patterns of vitamin A-rich foods of 10-13-year-old children living in the rural area in Venda*. Unpublished MSc thesis. Pretoria: University of Pretoria.

Tshikalange, T. & Van Averbek, W. 2006. The cultivation of *Brassica rapa* L. subsp. *chinensis* in Vhembe, Limpopo Province, South Africa. In: Oelofse, A (ed.) *Proceedings of the international symposium on the nutritional value and water use of indigenous crops for improved livelihoods*. Pretoria: Water SA.

University of Swaziland. 2014. *University of Swaziland 2014/2015 Calender*. Kwaluseni: UNISWA.

Uuisiku, N.N., Oelofse, A., Duodu, K., Bester, M. & Faber, M. 2010. Nutritional value of leafy vegetables of sub-Saharan Africa and their potential contribution to human health: a review. *Journal of Food Composition and Analysis*, 23(6):499–509.

Vainio-Mattila, K., 2000. Wild vegetables used by the Sambia in the Usambara Mountains, NE Tanzania. *Annales Botanici Fennici*, 37(1):57–67.

Van der Hoeven, M., Osei, J., Greef, M., Kruger, A., Faber, M. & SmutsM, C. 2013. Indigenous and traditional plants: South African parents' knowledge, perceptions and uses and their children's sensory acceptance. *Journal of Ethnobiology and Ethnomedicine*, 9(1):78. [Online] Available from: <http://ethnobiomed.biomedcentral.com/articles/10.1186/1746-4269-9-78> [Accessed: 2016-08-08].

Viljoen, A.T., Botha, P. & Boonzaaier, C.C. 2005. Factors contributing to changes in food practices of a black South African community. *Journal of Family Ecology and Consumer Sciences*, 33(1):46–62.

Viljoen, A.T. & Gericke, G.J. 1998. Methodology for the collection and application of information on food habits and food preferences in menu planning of heterogeneous groups. *Journal of Family Ecology and Consumer Sciences*, 26(2):89–102.

Viljoen, A.T. 2009. *The meaning of the food practices of the people of Mmotla, near Pretoria, South Africa. A socio-cultural and socio-psychological approach*. Unpublished PhD thesis. Pretoria: University of Pretoria.

Vorster, H.H., Love, P. & Browne, C. 2001. Development of food-based dietary guidelines for South Africa: the process. *Southern Journal of Clinical Nutrition*, 14(3):S1–S3.

Vorster, H.J., Stevens, J.B. & Steyn, G. 2008. Production systems of traditional leafy vegetables: Challenges for research and extension. *South African Journal of Agricultural Extension*, 37(1):85–96.

Vorster, H.H., Kruger, A. & Margetts, B.M. 2011. The nutrition transition in Africa: can it be steered into a more positive direction? *Nutrients*, 3(4):429–441.

Warren, D. M. 1996. Indigenous knowledge systems for sustainable agriculture in Africa. In: James, V.U (ed) *Sustainable development in third world countries: applied and theoretical perspectives*. London: Greenwood Publishing Group.

Weinberger, K., & Msuya, J.M. 2004. *Indigenous vegetables in Tanzania: significance and prospects*. Shanhua: AVRDC-WorldVegetableCenter.

Weinberger, K. & Swai, I. 2006. Consumption of traditional vegetables in Central and Northeastern Tanzania. *Ecology of Food and Nutrition*, 45(2):87–103.

Wenhold, F.A., Faber, M., Van Averbeke, W., Oelofse, A., Van Jaarsveld, P.J., Jansen van Rensburg, W.S., Van Heerden, I. & Slabbert, R. 2007. Linking smallholder agriculture and water to household food security and nutrition. *Water SA*, 33(3):327–336.

Whitney, E. & Rolfes, S.R. 2013. *Understanding nutrition*. 13th ed. Belmont: Thomson/Wadsworth Publishing.

Addendum A: Guideline for focus group discussion

TOPIC 1: KNOWLEDGE ON INDIGENOUS GREEN LEAFY VEGETABLES

1. What can you tell me about Indigenous Green Leafy Vegetables?

- Do you know Indigenous Green Leafy Vegetables?
- List Indigenous Green Leafy Vegetables that you know?
- List Indigenous Green Leafy Vegetables available in the community?
- Where do you find them?
- Which time of the year are they available?
- How do you obtain them?
- How did you get to know about Indigenous Green Leafy Vegetables?

TOPIC 2: EATING PRACTICES

1. Do you eat Indigenous Green Leafy Vegetables?

- If yes, why do you eat Indigenous Green Leafy Vegetables?
- How frequently do you include them in your diet?
- If they are not there, what do you eat instead?
- If not why don't you eat Indigenous Green Leafy Vegetables?
- Have you eaten Indigenous Green Leafy Vegetables when you were a child?
- Do you still eat Indigenous Green Leafy Vegetables?
- If no, why not?

2. Which Indigenous Green Leafy Vegetables do you normally eat?

- Why do you normally eat those Indigenous Green Leafy Vegetables?
- List indigenous green leafy vegetables that you do not eat?
- What is the reason for not eating?

3. What is your deepest concern about eating Indigenous Green Leafy Vegetables?

TOPIC 3: PROCUREMENT, PREPERATION AND PRESERVATION

1. Who usually obtains and prepares the vegetables?

- Who obtains Indigenous Green Leafy Vegetables?
- Name the ones you usually obtain?
- Who prepares them?
- How are they prepared and served?

2. If they are plenty, what do you normally do with them?

- How are they preserved?
- How do you know about the above skill of Indigenous Green Leafy Vegetables?
- Is it important to eat Indigenous Green Leafy Vegetables?
- Are Indigenous Green Leafy Vegetables popular these days? State the reasons?

TOPIC 4: WHEN DID THINGS CHANGE IN THE USE AND CONSUMPTION OF INDIGENOUS GREEN LEAFY VEGATABLES?

- 1. Can you mention reasons that can prevent one from not eating Indigenous Green Leafy Vegetables?**
- 2. Is there anything further that you think is of importance concerning Indigenous Green Leafy**

Addendum B: Structured interview questionnaire

Respondent Number:

For official use only

V1

SECTION A: DEMOGRAPHIC INFORMATION

Please answer all the questions.

A1 What is your birth surname?

A1

A2 What is your marital surname?

A2

A3 What is your age? (at last birthday)

A3

A4 What is your highest level of education?

A4

A5 What is your employment?

A5

A6 To which church group do you belong?

A6

A7 On average, how much money is available in your household to spend on food in a week?

A7



A8 How many people live in your household?

A8

A9 Who in your household decides what food is to be prepared?

A9

A10 What source of energy do you use most of the time for cooking food?

A10

SECTION B: AVAILABILITY AND ACCESSIBILITY OF INDIGENOUS GREEN LEAFY VEGETABLES (IGLV)

Please answer the following questions.

B1 Do you have IGLV in the Luyengo community?

Yes	1
No	2

B1

B2 If yes, where do they grow?

B2.1
B2.2
B2.3
B2.4

B3 Do you use IGLV when they are available?

Yes	1
No	2

B3

B4 What is the reason(s) for your answer?

B4.1
B4.2
B4.3
B4.4

B5 Some IGLV are not readily available in the Luyengo community, what do you think are the reason(s) why they are not available?

B5.1
B5.2
B5.3
B5.4



B6 How easy is it for you to collect / obtain IGLV?

B6.1	<input type="checkbox"/>
B6.2	<input type="checkbox"/>
B6.3	<input type="checkbox"/>

B7 How much time and effort is involved in obtaining the IGLV?

B7.1	<input type="checkbox"/>
B7.2	<input type="checkbox"/>
B7.3	<input type="checkbox"/>

B8 Do you have a backyard garden?

Yes	<input type="checkbox"/>	1
No	<input type="checkbox"/>	2

B8	<input type="checkbox"/>
----	--------------------------

B9 If yes, what do you grow in your backyard garden?

B9.1	<input type="checkbox"/>
B9.2	<input type="checkbox"/>
B9.3	<input type="checkbox"/>
B9.4	<input type="checkbox"/>
B9.5	<input type="checkbox"/>
B9.6	<input type="checkbox"/>
B9.7	<input type="checkbox"/>

SECTION C: KNOWLEDGE ON IGLV

Please answer the following questions.

C1 How are IGLV obtained for household consumption? (They can give more than one answer.)

C1.1	<input type="checkbox"/>
C1.2	<input type="checkbox"/>
C1.3	<input type="checkbox"/>
C1.4	<input type="checkbox"/>

C2 If you buy them, where do you buy them?

C2.1	<input type="checkbox"/>
C2.2	<input type="checkbox"/>
C2.3	<input type="checkbox"/>
C2.4	<input type="checkbox"/>

C3 Who is responsible for **buying** IGLV?

C3.1	<input type="checkbox"/>
C3.2	<input type="checkbox"/>
C3.3	<input type="checkbox"/>
C3.4	<input type="checkbox"/>



C4 If you collect IGLV, who usually **picks** them?

C4.1	<input type="checkbox"/>
C4.2	<input type="checkbox"/>
C4.3	<input type="checkbox"/>
C4.4	<input type="checkbox"/>

C5 Where did you get the knowledge on the **collection** of IGLV?

C5.1	<input type="checkbox"/>
C5.2	<input type="checkbox"/>
C5.3	<input type="checkbox"/>

C6 Where did you get the knowledge on the **preparation** of IGLV?

C6.1	<input type="checkbox"/>
C6.2	<input type="checkbox"/>
C6.3	<input type="checkbox"/>

C7 Where did you get the knowledge on the **consumption** of IGLV?

C7.1	<input type="checkbox"/>
C7.2	<input type="checkbox"/>
C7.3	<input type="checkbox"/>

C8 Please give me information on the following IGLV. I will show you pictures of each and will then ask you certain questions on each of them. Do you know the following IGLV?

Chuchuza (blackjack)	Yes	1	No	2
Inkakha	Yes	1	No	2
Ligusha	Yes	1	No	2
Sikhwa	Yes	1	No	2
Ingabe	Yes	1	No	2
Emacembe abhatata (sweet potato leaves)	Yes	1	No	2
Emacembe emjumbula (cassava leaves)	Yes	1	No	2
Mavelejozi	Yes	1	No	2
Tintsanga (Pumpkin leaves)	Yes	1	No	2
Sibhadze	Yes	1	No	2
Bubati	Yes	1	No	2
Lisheshelu	Yes	1	No	2
Imbhuya (Amarunthus)	Yes	1	No	2

C8.1	<input type="checkbox"/>
C8.2	<input type="checkbox"/>
C8.3	<input type="checkbox"/>
C8.4	<input type="checkbox"/>
C8.5	<input type="checkbox"/>
C8.6	<input type="checkbox"/>
C8.7	<input type="checkbox"/>
C8.8	<input type="checkbox"/>
C8.9	<input type="checkbox"/>
C8.10	<input type="checkbox"/>
C8.11	<input type="checkbox"/>
C8.12	<input type="checkbox"/>
C8.13	<input type="checkbox"/>



C9 Please tell me where would one **most often** find IGLV and during what time of the year are they **most abundant**

INDIGENOUS GREEN LEAFY VEGETABLES	Familiar		Where found					When available				
	Unknown	Never eaten	In the wild	Planting fields	Home gardens/yards	Riverside	Community members	Spring	Autumn	Summer	Winter	All year
Imbuya <i>Amaranthus</i>	8	9	1	2	3	4	5	1	2	3	4	5
Chuchuza (blackjack) <i>Bidens bipinnata</i>	8	9	1	2	3	4	5	1	2	3	4	5
Inkanka <i>Momordica involucrate</i>	8	9	1	2	3	4	5	1	2	3	4	5
Ishubaba <i>Momordica clementinae</i>	8	9	1	2	3	4	5	1	2	3	4	5
Sikhwa <i>Tulbaghia lunwigiana</i>	8	9	1	2	3	4	5	1	2	3	4	5
Lisheshelu <i>Aloe boylei</i>	8	9	1	2	3	4	5	1	2	3	4	5
Mavelejozi <i>Solanum reroflexumm</i>	8	9	1	2	3	4	5	1	2	3	4	5
Umsobo <i>Solanum nigrum</i>	8	9	1	2	3	4	5	1	2	3	4	5
Emahala <i>Aloe saponaria</i>	8	9	1	2	3	4	5	1	2	3	4	5
Ingabe <i>Cichorium species</i>	8	9	1	2	3	4	5	1	2	3	4	5
Silele <i>Portulaca oleracea</i>	8	9	1	2	3	4	5	1	2	3	4	5
Ligusha <i>Corchorus spp</i>	8	9	1	2	3	4	5	1	2	3	4	5
Liklolo <i>Grewia caffra</i>	8	9	1	2	3	4	5	1	2	3	4	5
Luphphetse <i>Anthraxia elata</i>	8	9	1	2	3	4	5	1	2	3	4	5
Umdzayi <i>Asclepias affinis</i>	8	9	1	2	3	4	5	1	2	3	4	5
Ligagajane <i>Cyphia bolusii</i>	8	9	1	2	3	4	5	1	2	3	4	5
Emacembe abhatata (sweet potato leaves)	8	9	1	2	3	4	5	1	2	3	4	5
Umbhidvo wetintsanga (Pumpkin leaves) <i>Curcubita spp</i>	8	9	1	2	3	4	5	1	2	3	4	5
Emacembe emjumbula (cassava leaves)	8	9	1	2	3	4	5	1	2	3	4	5
Sibhadze <i>Annesorhiza flagellifolia</i>	8	9	1	2	3	4	5	1	2	3	4	5
Bubati <i>Laportea pedumentaris</i>	8	9	1	2	3	4	5	1	2	3	4	5
Other (specify)	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5

C9.1	<input type="checkbox"/>	C9.2	<input type="checkbox"/>
C9.3	<input type="checkbox"/>	C9.4	<input type="checkbox"/>
C9.5	<input type="checkbox"/>	C9.6	<input type="checkbox"/>
C9.7	<input type="checkbox"/>	C9.8	<input type="checkbox"/>
C9.9	<input type="checkbox"/>	C9.10	<input type="checkbox"/>
C9.11	<input type="checkbox"/>	C9.12	<input type="checkbox"/>
C9.13	<input type="checkbox"/>	C9.14	<input type="checkbox"/>
C9.15	<input type="checkbox"/>	C9.16	<input type="checkbox"/>
C9.17	<input type="checkbox"/>	C9.18	<input type="checkbox"/>
C9.19	<input type="checkbox"/>	C9.20	<input type="checkbox"/>
C9.21	<input type="checkbox"/>	C9.22	<input type="checkbox"/>
C9.23	<input type="checkbox"/>	C9.24	<input type="checkbox"/>
C9.25	<input type="checkbox"/>	C9.26	<input type="checkbox"/>
C9.27	<input type="checkbox"/>	C9.28	<input type="checkbox"/>
C9.29	<input type="checkbox"/>	C9.30	<input type="checkbox"/>
C9.31	<input type="checkbox"/>	C9.32	<input type="checkbox"/>
C9.33	<input type="checkbox"/>	C9.34	<input type="checkbox"/>
C9.35	<input type="checkbox"/>	C9.36	<input type="checkbox"/>
C9.37	<input type="checkbox"/>	C9.39	<input type="checkbox"/>
C9.40	<input type="checkbox"/>	C9.41	<input type="checkbox"/>
C9.42	<input type="checkbox"/>	C9.43	<input type="checkbox"/>
C9.44	<input type="checkbox"/>	C9.45	<input type="checkbox"/>
C9.46	<input type="checkbox"/>	C9.47	<input type="checkbox"/>
C9.48	<input type="checkbox"/>	C9.49	<input type="checkbox"/>
C9.50	<input type="checkbox"/>	C9.51	<input type="checkbox"/>
C9.52	<input type="checkbox"/>	C9.53	<input type="checkbox"/>



CULTIVATED VEGETABLES	Familiar		Where found					When available				
	Unknown	Never eaten	In the wild	Planting fields	Home gardens/yards	Riverside	Community members	Spring	Autumn	Summer	Winter	All year
Beetroot leaves	8	9	1	2	3	4	5	1	2	3	4	5
Cabbage	8	9	1	2	3	4	5	1	2	3	4	5
Spinach smooth	8	9	1	2	3	4	5	1	2	3	4	5
Bitter spinach	8	9	1	2	3	4	5	1	2	3	4	5
Kale	8	9	1	2	3	4	5	1	2	3	4	5
Chinese cabbage	8	9	1	2	3	4	5	1	2	3	4	5
Lettuce	8	9	1	2	3	4	5	1	2	3	4	5
Carrot tops	8	9	1	2	3	4	5	1	2	3	4	5
Other (specify)	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5

C9.54		C9.55	
C9.56		C9.57	
C9.58		C9.59	
C9.60		C9.61	
C9.62		C9.63	
C9.64		C9.65	
C9.66		C9.67	
C9.68		C9.69	
C9.70		C9.71	
C9.72		C9.73	
C9.74		C9.75	
C9.76		C9.77	

SECTION D: FOOD PRACTICES REGARDING IGLV

Please answer the following questions regarding your eating pattern and use of IGLV

D1 How many meals do you usually eat on week days?

D1

D2 Do you eat the same number of meals during weekend days?

Yes	1
No	2

D2

D3 If no, how many meals do you eat?

D3

D4 Do you like IGLV?

Yes	1
No	2

D4

D5 Give a reason(s) for your answer.

D5.1
D5.2
D5.3
D5.4



D6 How often do you eat IGLV?

D6

D7 When do you usually eat IGLV?

D7

D8 Who prepares the IGLV dishes in your household?

D8.1
D8.2

D9 Name the food that is usually eaten with IGLV dishes

D9.1
D9.2
D9.3
D9.4

D10 If IGLV are in abundance, what do you do with the surplus?

Sell	1
Preserve	2
Other (specify)	3

D10.1
D10.2

D10.3

D11 If you preserve the surplus, explain the preservation method(s) you use.

D11.1
D11.2
D11.3
D11.4

D12 Do you serve IGLV at special occasions?

Yes	1
No	2

D12

D13 Give the reason(s) for your answer

D13.1
D13.2
D13.3
D13.4

D14 If yes, name the **special occasions** where you would serve IGLV?

D14.1
D14.2
D14.3
D14.4



D15 Would you serve IGLV to guests?

Yes	1
No	2

D15

D16 Give the reason(s) for your answer?

D16.1
D16.2
D16.3
D16.4

D17 Please indicate if you know and/or have eaten the IGLV listed below. If you have eaten them indicate by **ticking** how much you like/dislike them and who often you eat them, when they are available.

NON-QUANTITATIVE FOOD FREQUENCY QUESTIONNAIRE

	Familiar		Food Preference					Food Frequency				
	Unknown	Never eaten	Dislike it very much	Dislike it	Neutral	Like it	Like it very much	Daily	3 - 4 X per week	1 X per week	< 3 X per week	Special occasions
INDIGENOUS GREEN LEAFY VEGETABLES (IGLV)												
Imbuya <i>Amaranthus</i>	8	9	1	2	3	4	5	1	2	3	4	5
Chuchuza (blackjack) <i>Bidens bipinnata</i>	8	9	1	2	3	4	5	1	2	3	4	5
Inkanka <i>Momordica involucrate</i>	8	9	1	2	3	4	5	1	2	3	4	5
Ishubaba <i>Momordica clementinae</i>	8	9	1	2	3	4	5	1	2	3	4	5
Sikhwa <i>Tulbaghia lunwigiana</i>	8	9	1	2	3	4	5	1	2	3	4	5
Lisheshelu <i>Aloe boylei</i>	8	9	1	2	3	4	5	1	2	3	4	5
Mavelejozi <i>Solanum roreflexum</i>	8	9	1	2	3	4	5	1	2	3	4	5
Umsobo <i>Solanum nigrum</i>	8	9	1	2	3	4	5	1	2	3	4	5
Emahala <i>Aloe saponaria</i>	8	9	1	2	3	4	5	1	2	3	4	5
Ingabe <i>Cichorium species</i>	8	9	1	2	3	4	5	1	2	3	4	5
Silele <i>Portulaca oleracea</i>	8	9	1	2	3	4	5	1	2	3	4	5
Ligusha <i>Corchorus spp</i>	8	9	1	2	3	4	5	1	2	3	4	5
Liklolo <i>Grewia caffra</i>	8	9	1	2	3	4	5	1	2	3	4	5
Luphephetse <i>Anthriscus elata</i>	8	9	1	2	3	4	5	1	2	3	4	5
Umdzayi <i>Asclepias affinis</i>	8	9	1	2	3	4	5	1	2	3	4	5
Ligagajane <i>Cyphia bolusii</i>	8	9	1	2	3	4	5	1	2	3	4	5
Emacembe abhatata (sweet potato leaves)	8	9	1	2	3	4	5	1	2	3	4	5

D17.1 D17.2
D17.3 D17.4
D17.5 D17.6
D17.7 D17.8
D17.9 D17.10
D17.11 D17.12
D17.13 D17.14
D17.15 D17.16
D17.17 D17.18
D17.19 D17.20
D17.21 D17.22
D17.23 D17.24
D17.25 D17.26
D17.27 D17.28
D17.29 D17.30
D17.31 D17.32
D17.33 D17.34



	Familiar		Food Preference					Food Frequency				
	Unknown	Never eaten	Dislike it very much	Dislike it	Neutral	Like it	Like it very much	Daily	3 - 4 X per week	1 X per week	< 3 X per week	Special occasions
Umbhidvo wetintsanga (Pumpkin leaves) <i>Curcubita spp</i>	8	9	1	2	3	4	5	1	2	3	4	5
Emacembe emjumbula cassava leaves)	8	9	1	2	3	4	5	1	2	3	4	5
Sibhadze Annesorhiza flagellifolia	8	9	1	2	3	4	5	1	2	3	4	5
Bubati Laportea pedumentaris	8	9	1	2	3	4	5	1	2	3	4	5
Other (specify)	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
CULTIVATED VEGETABLES												
Beetroot leaves	8	9	1	2	3	4	5	1	2	3	4	5
Cabbage	8	9	1	2	3	4	5	1	2	3	4	5
Spinach smooth	8	9	1	2	3	4	5	1	2	3	4	5
Bitter spinach	8	9	1	2	3	4	5	1	2	3	4	5
Kale	8	9	1	2	3	4	5	1	2	3	4	5
Chinese cabbage	8	9	1	2	3	4	5	1	2	3	4	5
Lettuce	8	9	1	2	3	4	5	1	2	3	4	5
Carrot tops	8	9	1	2	3	4	5	1	2	3	4	5
Other (specify)	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5
	8	9	1	2	3	4	5	1	2	3	4	5

- D17.35 D17.36
- D17.37 D17.39
- D17.40 D17.41
- D17.42 D17.43
- D17.44 D17.45
- D17.46 D17.47
- D17.48 D17.49
- D17.50 D17.51
- D17.52 D17.53
- D17.54 D17.55
- D17.56 D17.57
- D17.58 D17.59
- D17.60 D17.61
- D17.62 D17.63
- D17.64 D17.65
- D17.66 D17.67
- D17.68 D17.69
- D17.70 D17.71
- D17.72 D17.73
- D17.74 D17.75
- D17.76 D17.77

D18 List your favourite IGLV.

- D18.1
- D18.2
- D18.3
- D18.4

D19 Give the reason(s) why you like them

- D19.1
- D19.2
- D19.3
- D19.4



D20 List the IGLV that you don't like.

D20.1	<input type="checkbox"/>
D20.2	<input type="checkbox"/>
D20.3	<input type="checkbox"/>
D20.4	<input type="checkbox"/>

D21 Give the reason(s) why you don't like them

D21.1	<input type="checkbox"/>
D21.2	<input type="checkbox"/>
D21.3	<input type="checkbox"/>
D21.4	<input type="checkbox"/>

D22 Do you think it is important to eat IGLV?

Yes	<input type="checkbox"/>	1
No	<input type="checkbox"/>	2

D22

D23 Give the reason(s) for your answer

D23.1	<input type="checkbox"/>
D23.2	<input type="checkbox"/>
D23.3	<input type="checkbox"/>
D23.4	<input type="checkbox"/>

D24 Are you aware of any taboos that prohibit the eating of IGLV?

Yes	<input type="checkbox"/>	1
No	<input type="checkbox"/>	2

D24

D25 If yes, please explain the taboos that you know apply to eating IGLV?

D25.1	<input type="checkbox"/>
D25.2	<input type="checkbox"/>
D25.3	<input type="checkbox"/>
D25.4	<input type="checkbox"/>

D26 Do you think the use/consumption of IGLV should be promoted or encouraged?

Yes	<input type="checkbox"/>	1
No	<input type="checkbox"/>	2

D26

D27 Give the reason(s) why you think it should be promoted/ encouraged or not.

D27.1	<input type="checkbox"/>
D27.2	<input type="checkbox"/>
D27.3	<input type="checkbox"/>
D27.4	<input type="checkbox"/>

D28 In future would you continue to eat IGLV?

Yes	<input type="checkbox"/>	1
No	<input type="checkbox"/>	2

D28



D29 Give the reason(s) why

D29.1	<input type="checkbox"/>
D29.2	<input type="checkbox"/>
D29.3	<input type="checkbox"/>
D29.4	<input type="checkbox"/>

SECTION E: CHANGES IN THE CONSUMPTION OF IGLV

Please answer the following questions on the changes of IGLV consumption and the reasons that you think contributed to these changes.

E1 **What** has changed in the Luyengo community?

E1.1	<input type="checkbox"/>
E1.2	<input type="checkbox"/>
E1.3	<input type="checkbox"/>
E1.4	<input type="checkbox"/>

E2 **Why** do you think these change have occurred in the community?

E2.1	<input type="checkbox"/>
E2.2	<input type="checkbox"/>
E2.3	<input type="checkbox"/>
E2.4	<input type="checkbox"/>

E3 **When** did these changes start to happen in the community?

E3.1	<input type="checkbox"/>
E3.2	<input type="checkbox"/>
E3.3	<input type="checkbox"/>
E3.4	<input type="checkbox"/>

E4 Has there been a change in **your** use/consumption of IGLV since you were a child?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

E4	<input type="checkbox"/>
----	--------------------------

E5 Give the most important reason(s) that contributed to this change in **your own** use/consumption of IGLV.

E5.1	<input type="checkbox"/>
E5.2	<input type="checkbox"/>
E5.3	<input type="checkbox"/>
E5.4	<input type="checkbox"/>



SECTION F: 24 HOUR RECALL SHEET

Time of consumption	Food/Drink consumed	Preparation	Quantity consumed
6-9 Breakfast			
9-12 In-between			
12-3 Lunch			
3-5 in-between			
5-8 Supper			

- F1.1
- F1.2
- F1.3
- F1.4
- F1.5
- F1.6
- F1.7
- F1.8
- F1.9
- F1.10
- F1.11
- F1.12
- F1.13
- F1.14
- F1.15
- F1.16
- F1.17
- F1.18
- F1.19
- F1.20
- F1.21
- F1.22
- F1.23

Addendum C: Observation checklist

- **Availability of Indigenous Green Leafy Vegetables in the community**
 - Which Indigenous Green Leafy Vegetables naturally grow in the veld/field?
 - Which Indigenous Green Leafy Vegetables grow in the fields/home garden?
 - List Indigenous Green Leafy Vegetables that are found in the local shops/local markets/street vendors?
 - At what cost and quantity do they sell the Indigenous Green Leafy Vegetables?
 - Ask vendors or people selling Indigenous Green Leafy Vegetables as to where and how they obtain them?

- **Daily activities of the women will be observed**

- **Infrastructure in the community such as; roads, transport, electricity**

- **Shops and what is sold**

Addendum D: Consent form

Dear Participants

Questionnaire on Indigenous green leafy vegetables

Thank you for your willingness to participate in this study by answering this questionnaire.

I am a student at the University of Pretoria enrolling on Masters in Consumer Science. I humbly ask you to participate in the study by answering this questionnaire. The study is on adult women in Eluyengweni, Swaziland: their food practices and knowledge of indigenous green leafy vegetables

The information gathered will enable me to:

- Determine and describe the available indigenous green leafy vegetables in the community
- Determine and compare the indigenous knowledge of two generations of Swazi women on indigenous green leafy vegetables
- Describe and compare your practices regarding the use of indigenous green leafy vegetables
- Determine how your consumption pattern of indigenous green leafy vegetables have changed

Please note that this leaflet serves to help you decide whether you are interested to participate in the study. I want to assure you that all the information that you will provide will be treated with **confidentiality** as you will not be identified in the questionnaire. I will only use a number to mark the questionnaire for office use.

The research protocol was submitted to the ethics committee of the faculty of Natural and Agricultural Science of the University of Pretoria. The results of the study will be written in a report as part of my fulfilment for my degree and it will also be published in a scientific journal.

Your participation is entirely voluntary and you may withdraw / stop participating at any stage if you so wish during data collection.

I FULLY UNDERSTAND WHAT THE STUDY IS ABOUT AND AM WILLING TO PARTICIPATE IN THIS STUDY.

.....

Signature of participant.....Date.....

The questionnaire will take approximately **15minutes** to complete. Thank you for your support.

RESEARCHER

Addendum E: Permission letter

Eluyengweni Royal Kraal
P O Box 170
Luyengo
Tel: 25274421

25th May 2011

To whom it may concern

I, the undersigned hereby certify that Miss Vukile Dlamini has been given the mandate by the local authority (Umphakatsi) of Eluyengweni Community to research on the indigenous green leafy vegetables.

She will go from one home to the next enquiring about the above mentioned task.

Kindly assist her where need be in carrying out the project.



Chief Lembelele
(Chief of Eluyengweni Royal Kraal)



Addendum 7: Ethics clearance



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

ETHICS COMMITTEE
Faculty of Natural and Agricultural Sciences


02 August 2011
Dr AT Viljoen
Department of Consumer Sciences
University of Pretoria
Pretoria
0002

Dear Dr Viljoen

Re: EC110701-052 Transition of food practices and Indigenous knowledge on indigenous green leafy vegetables of three generations of rural Swazi women in the Luyengo community

The project conforms to the requirements of the Ethics Committee.

Kind regards


Prof NH Casey
Chairman: Ethics Committee

Addendum G: Persons involved in the study



Make Magagula, the HE extension worker

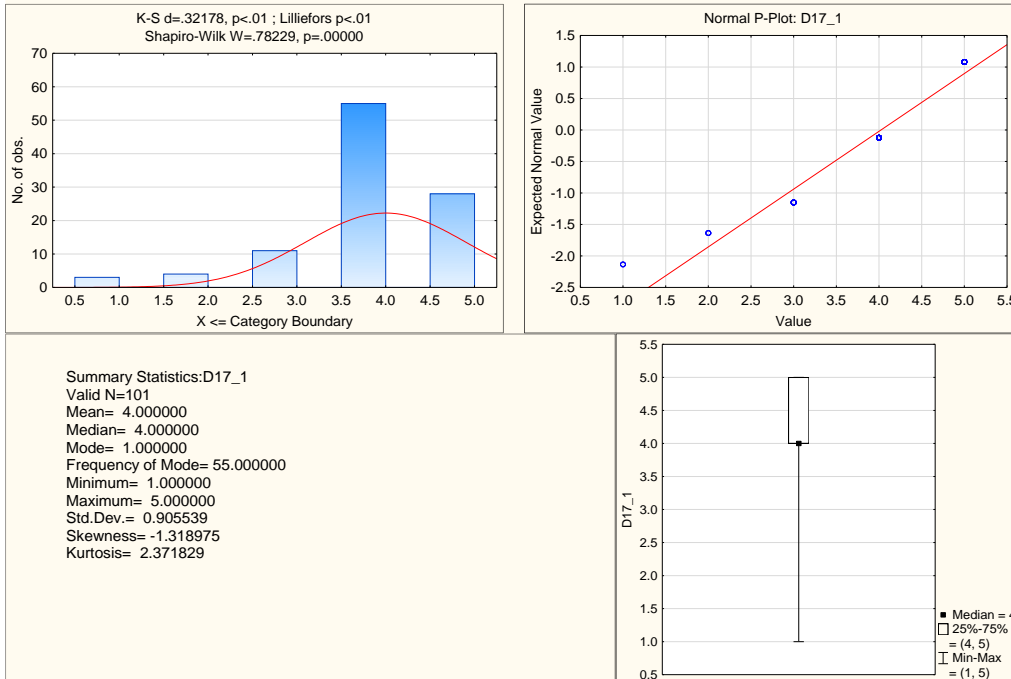


The Researcher

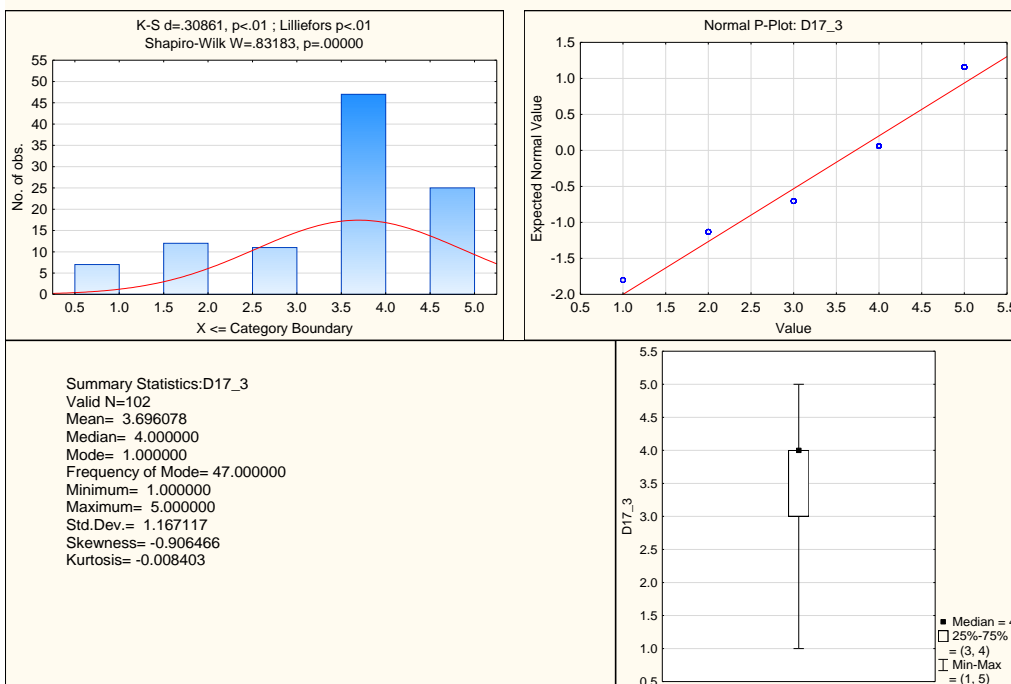


Addendum 4: Normality checks for familiarity, preference rating and frequency of consumption

Summary: D17_1

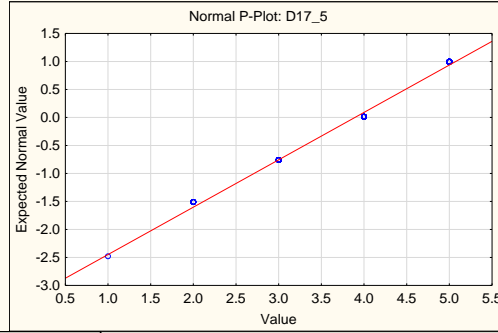
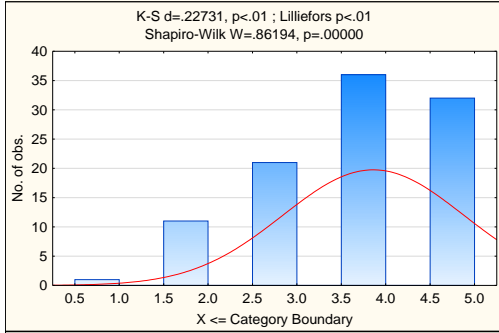


Summary: D17_3

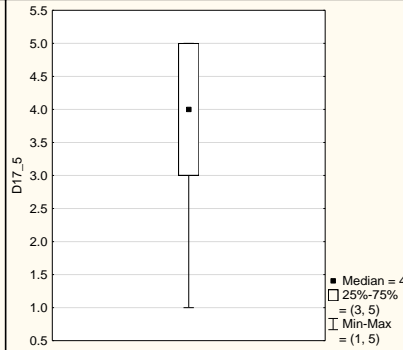




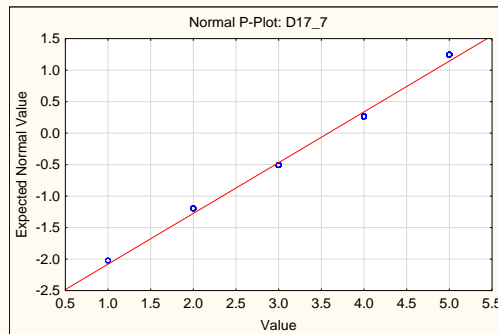
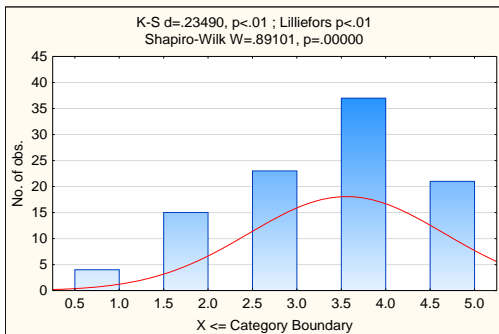
Summary: D17_5



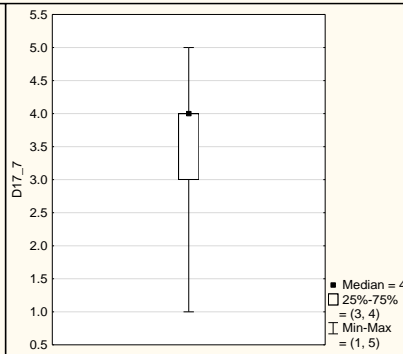
Summary Statistics:D17_5
Valid N=101
Mean= 3.861386
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 36.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.020095
Skewness= -0.581063
Kurtosis= -0.498967



Summary: D17_7

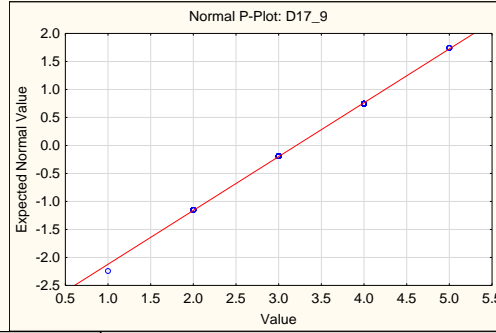
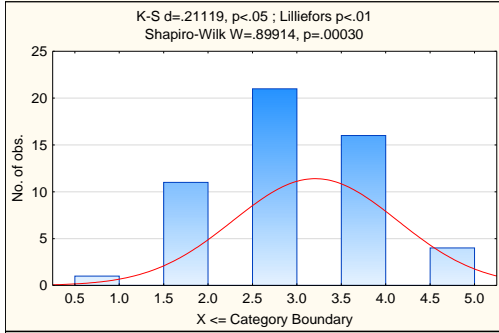


Summary Statistics:D17_7
Valid N=100
Mean= 3.560000
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 37.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.103896
Skewness= -0.476872
Kurtosis= -0.530445

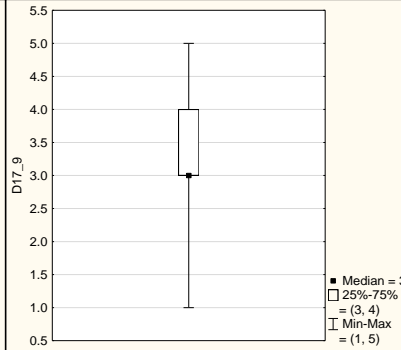




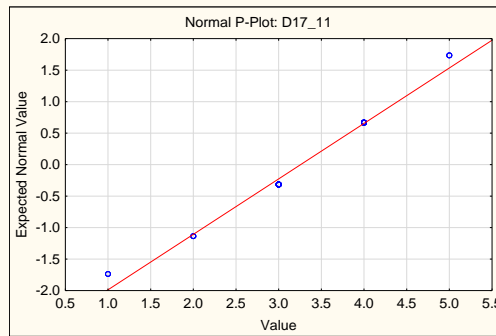
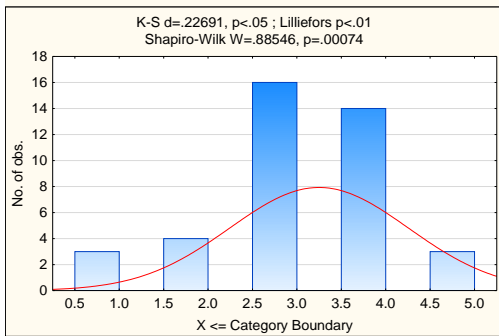
Summary: D17_9



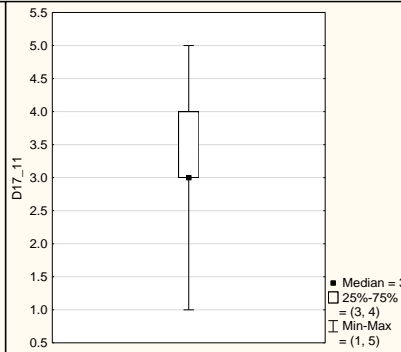
Summary Statistics:D17_9
Valid N=53
Mean= 3.207547
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 21.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.927331
Skewness= 0.017130
Kurtosis=-0.414934



Summary: D17_11

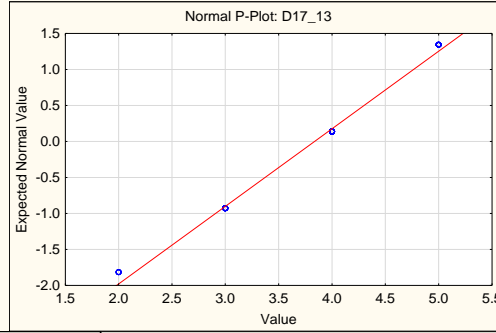
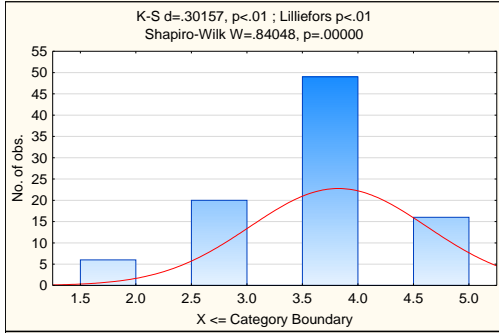


Summary Statistics:D17_11
Valid N=40
Mean= 3.250000
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 16.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.006390
Skewness=-0.536214
Kurtosis= 0.232395

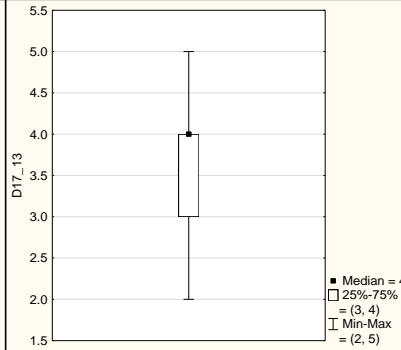




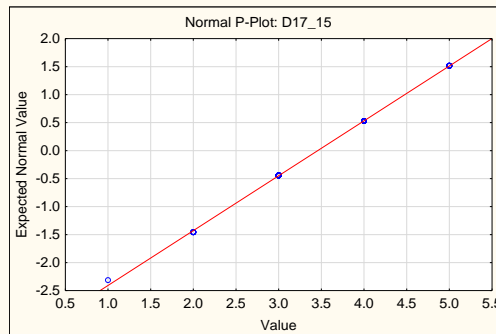
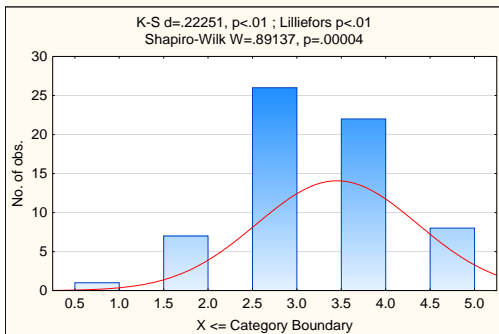
Summary: D17_13



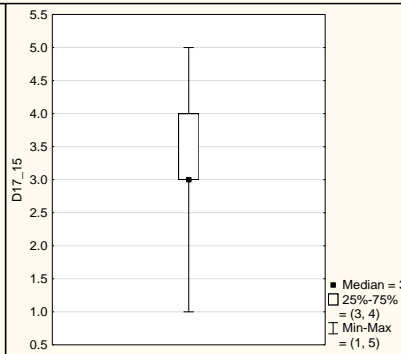
Summary Statistics:D17_13
Valid N=91
Mean= 3.824176
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 49.000000
Minimum= 2.000000
Maximum= 5.000000
Std.Dev.= 0.797125
Skewness= -0.478676
Kurtosis= 0.024340



Summary: D17_15

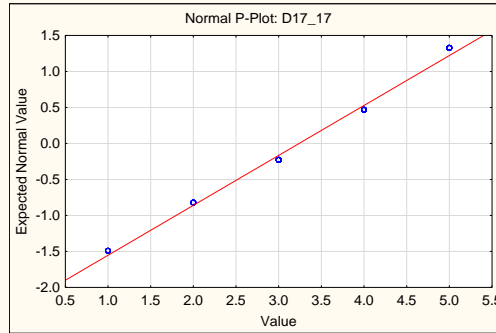
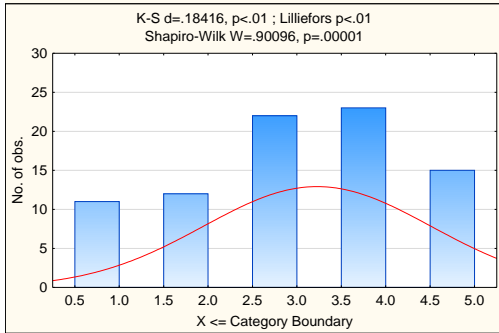


Summary Statistics:D17_15
Valid N=64
Mean= 3.453125
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 26.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.907284
Skewness= -0.119583
Kurtosis= -0.151829

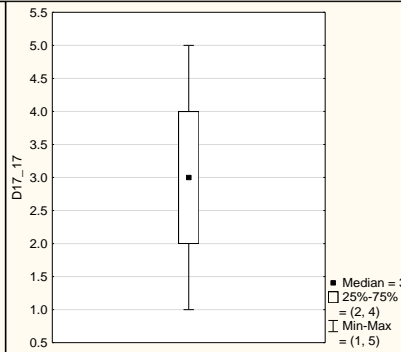




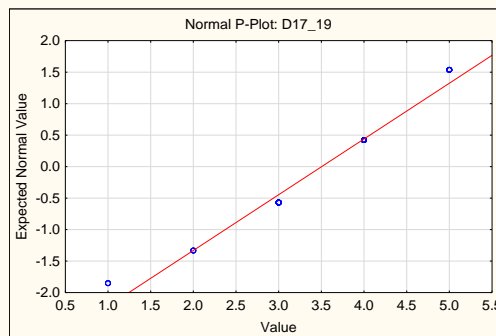
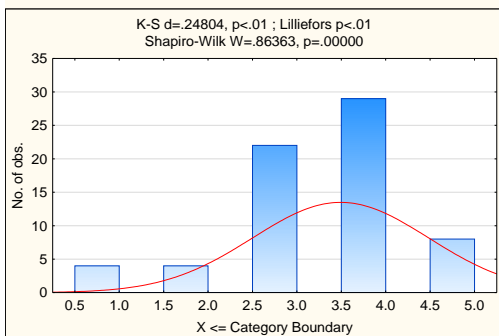
Summary: D17_17



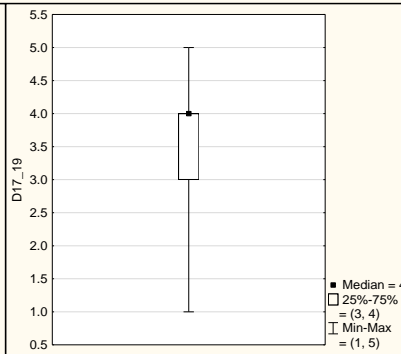
Summary Statistics:D17_17
Valid N=83
Mean= 3.228916
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 23.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.281437
Skewness=-0.299703
Kurtosis=-0.900616



Summary: D17_19

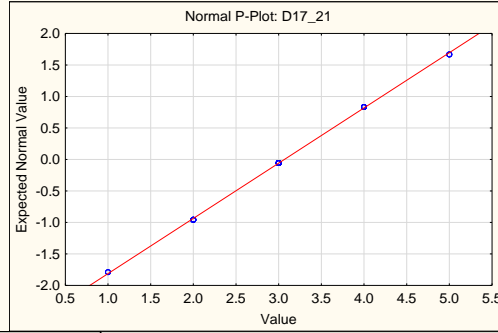
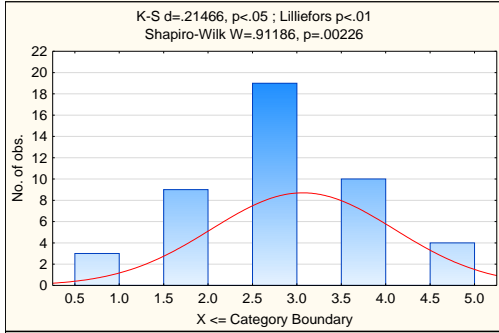


Summary Statistics:D17_19
Valid N=67
Mean= 3.492537
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 29.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.990456
Skewness=-0.750239
Kurtosis= 0.630880

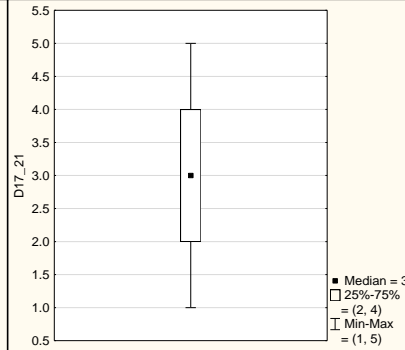




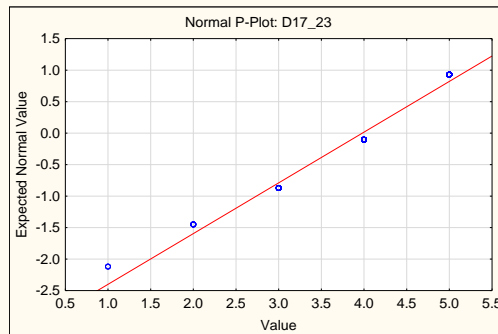
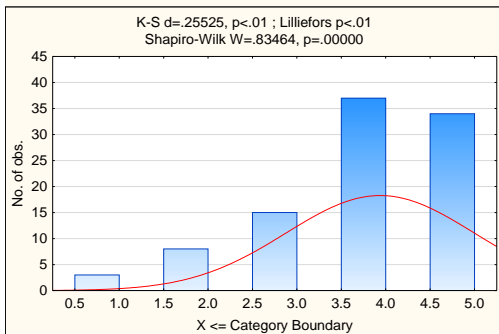
Summary: D17_21



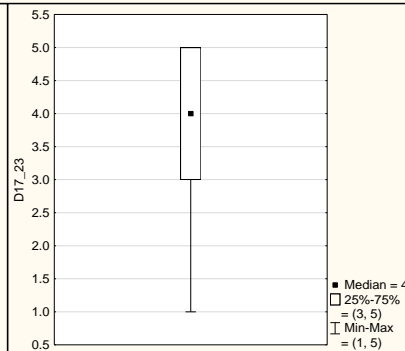
Summary Statistics:D17_21
Valid N=45
Mean= 3.066667
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 19.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.031327
Skewness= -0.008095
Kurtosis= -0.226039



Summary: D17_23

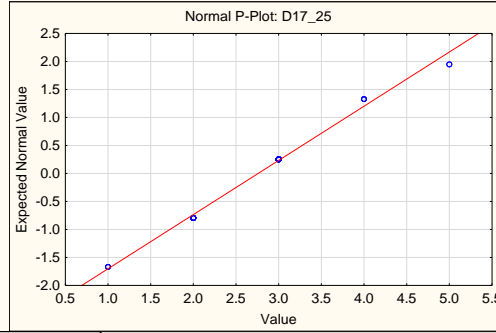
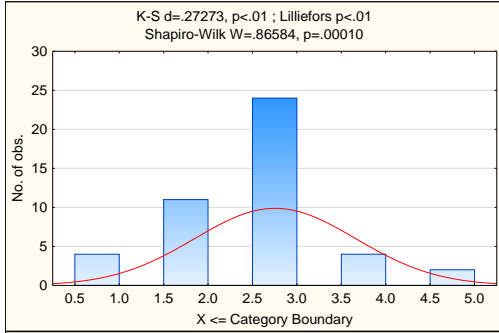


Summary Statistics:D17_23
Valid N=97
Mean= 3.938144
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 37.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.058836
Skewness= -0.949764
Kurtosis= 0.355911

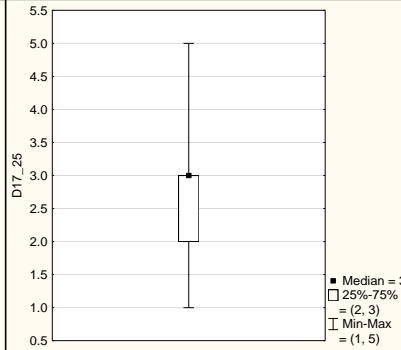




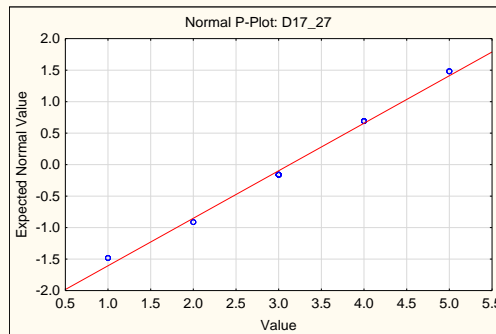
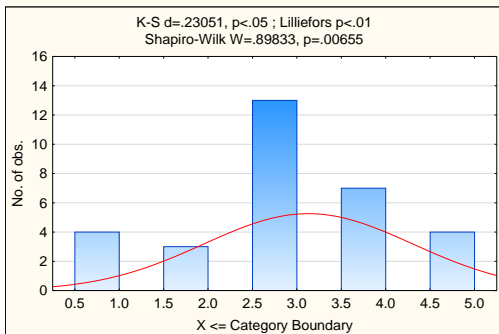
Summary: D17_25



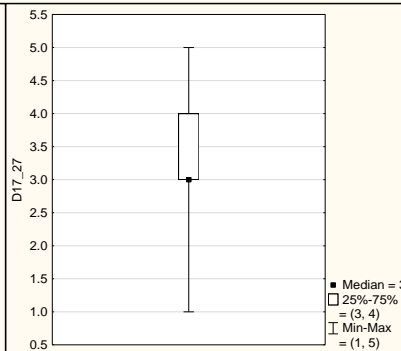
Summary Statistics:D17_25
Valid N=45
Mean= 2.755556
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 24.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.908434
Skewness= 0.135958
Kurtosis= 0.685939



Summary: D17_27

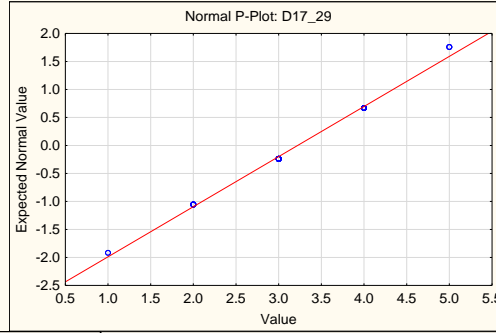
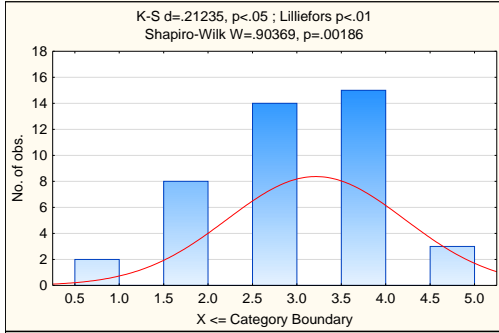


Summary Statistics:D17_27
Valid N=31
Mean= 3.129032
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 13.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.175923
Skewness= -0.265694
Kurtosis= -0.341300

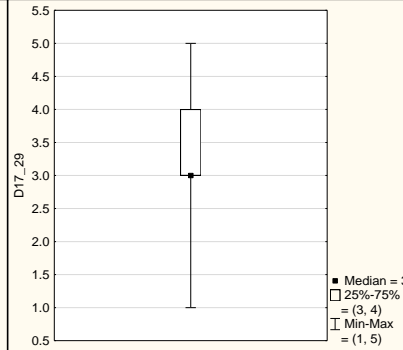




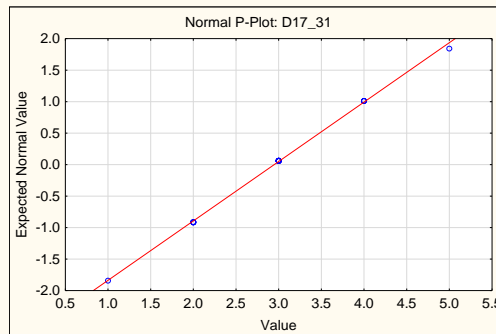
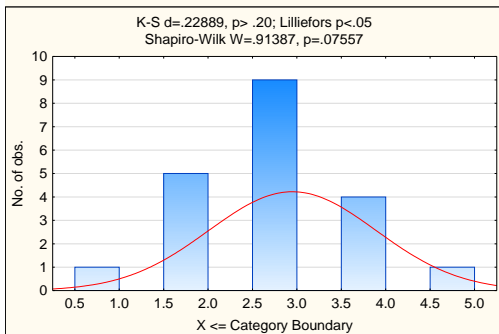
Summary: D17_29



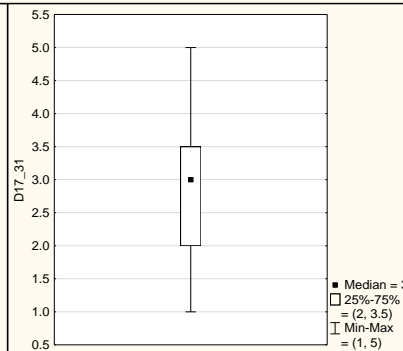
Summary Statistics:D17_29
Valid N=42
Mean= 3.214286
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 15.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.000871
Skewness= -0.301824
Kurtosis= -0.370351



Summary: D17_31

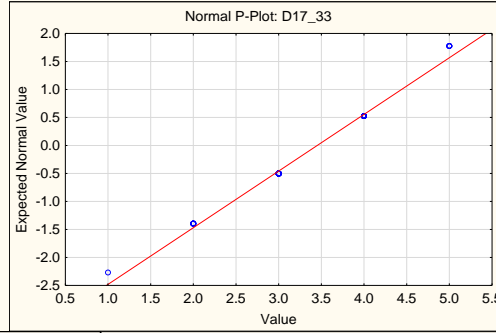
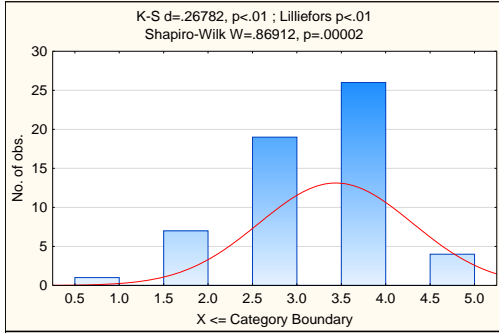


Summary Statistics:D17_31
Valid N=20
Mean= 2.950000
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 9.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.944513
Skewness= 0.107228
Kurtosis= 0.187310

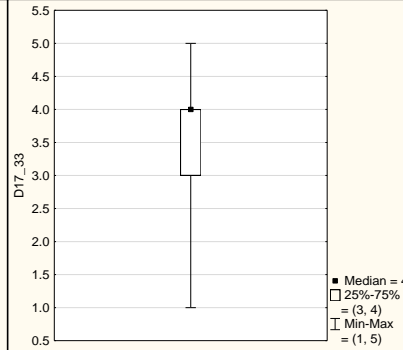




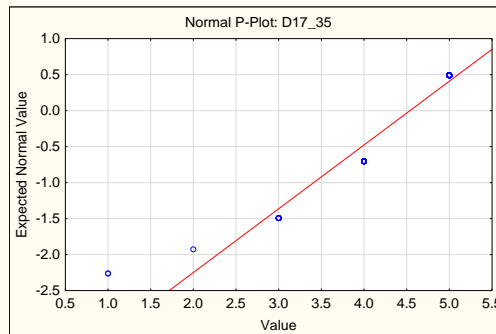
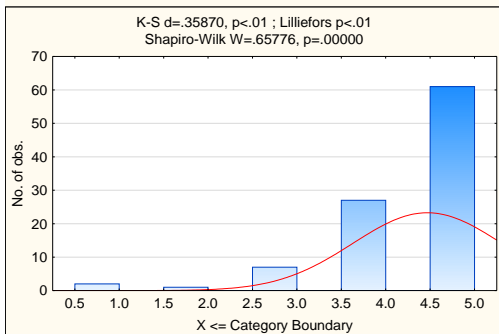
Summary: D17_33



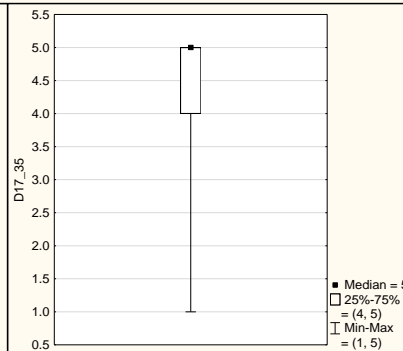
Summary Statistics:D17_33
Valid N=57
Mean= 3.438596
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 26.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.866387
Skewness= -0.487140
Kurtosis= 0.092279



Summary: D17_35

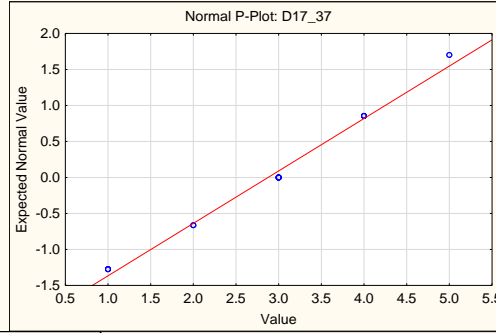
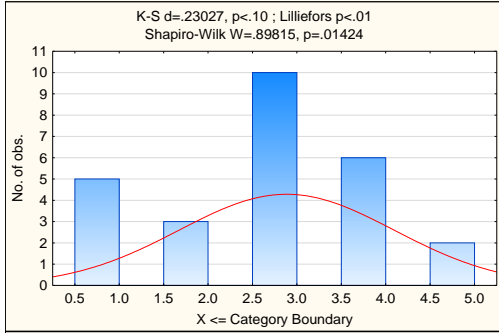


Summary Statistics:D17_35
Valid N=98
Mean= 4.469388
Median= 5.000000
Mode= 1.000000
Frequency of Mode= 61.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.839785
Skewness= -2.033999
Kurtosis= 4.969407

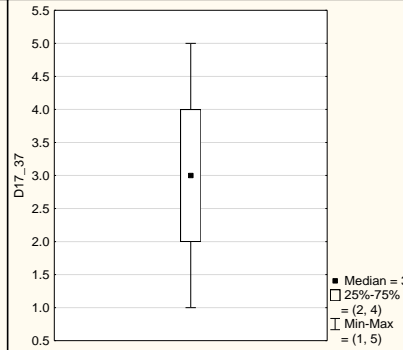




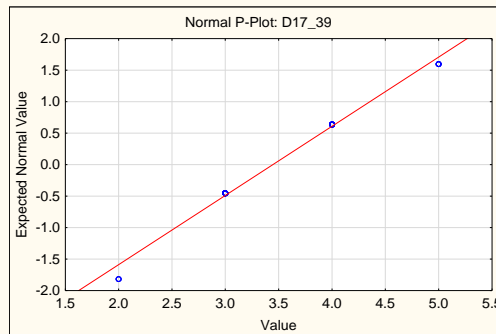
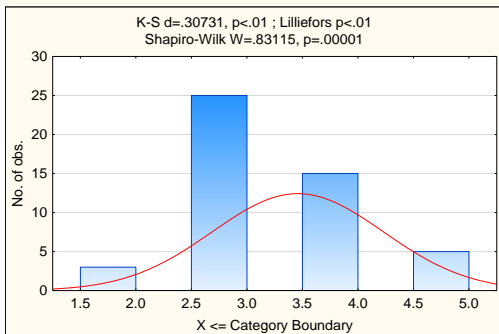
Summary: D17_37



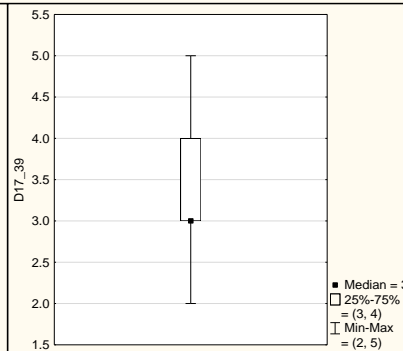
Summary Statistics:D17_37
Valid N=26
Mean= 2.884615
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 10.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.210848
Skewness=-0.201917
Kurtosis=-0.693072



Summary: D17_39

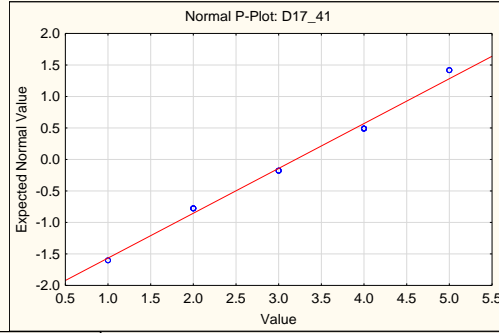
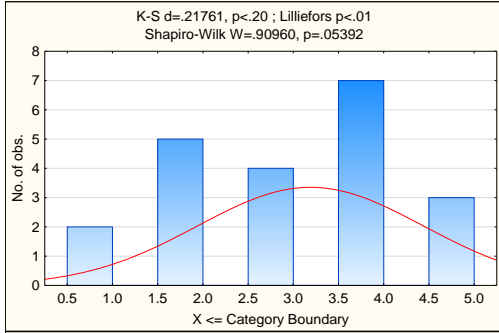


Summary Statistics:D17_39
Valid N=48
Mean= 3.458333
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 25.000000
Minimum= 2.000000
Maximum= 5.000000
Std.Dev.= 0.770696
Skewness= 0.436158
Kurtosis=-0.172182

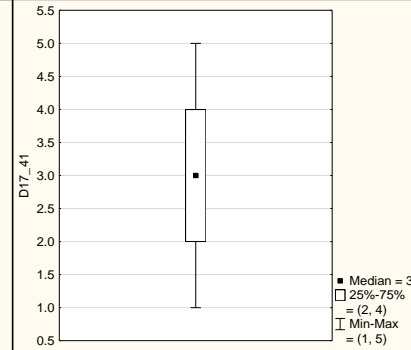




Summary: D17_41

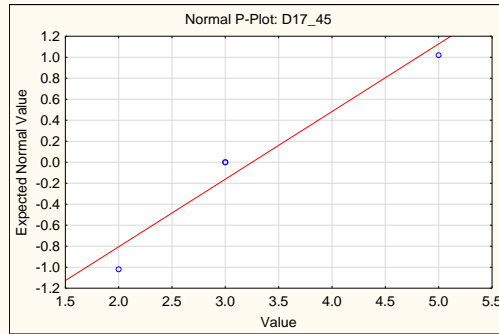
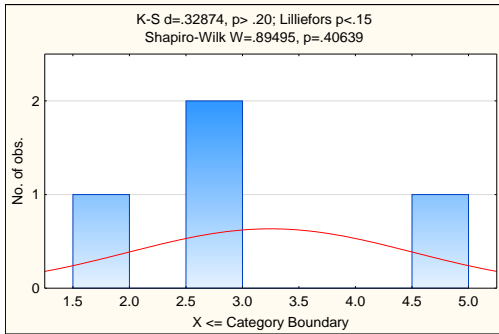


Summary Statistics:D17_41
Valid N=21
Mean= 3.190476
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 7.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.249762
Skewness= -0.226359
Kurtosis= -0.981940

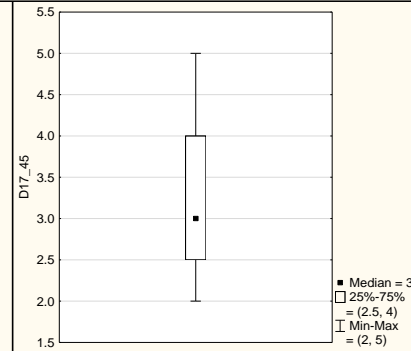


D17_43 :There are fewer than 2 valid cases for this variable; cannot produce frequency table or histogram.

Summary: D17_45

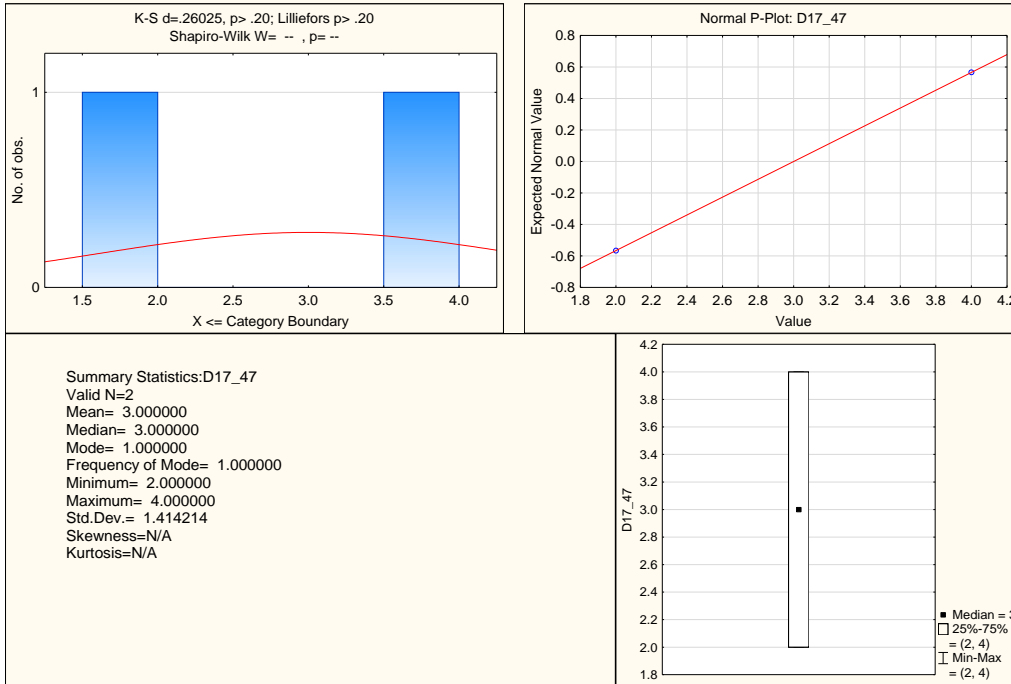


Summary Statistics:D17_45
Valid N=4
Mean= 3.250000
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 2.000000
Minimum= 2.000000
Maximum= 5.000000
Std.Dev.= 1.258306
Skewness= 1.129338
Kurtosis= 2.227147





Summary: D17_47

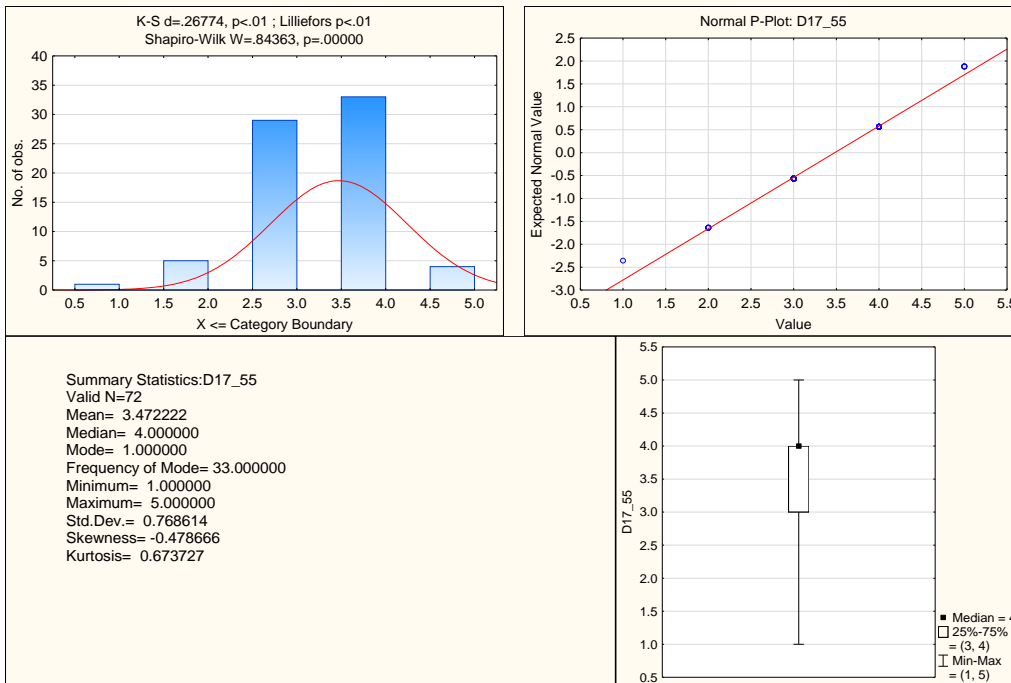


D17_49 :There are fewer than 2 valid cases for this variable; cannot produce frequency table or histogram.

D17_51 :There are fewer than 2 valid cases for this variable; cannot produce frequency table or histogram.

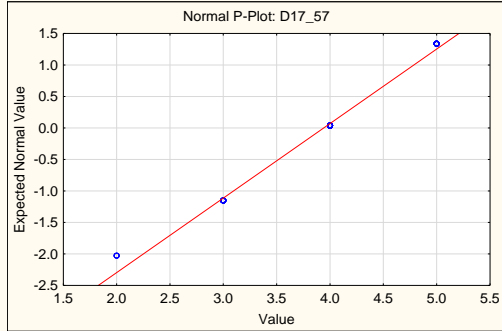
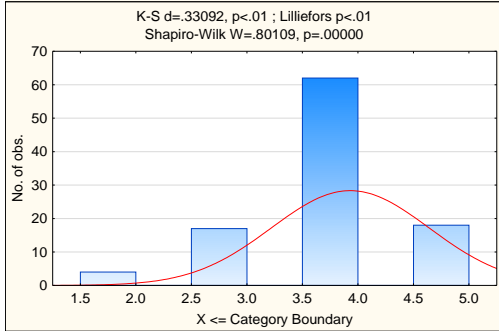
D17_53 :There are fewer than 2 valid cases for this variable; cannot produce frequency table or histogram.

Summary: D17_55

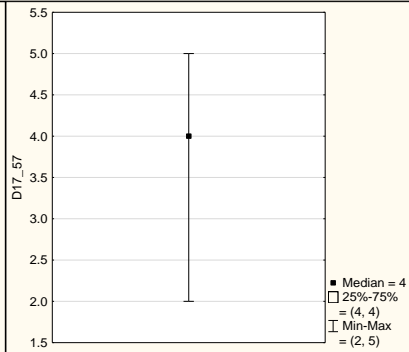




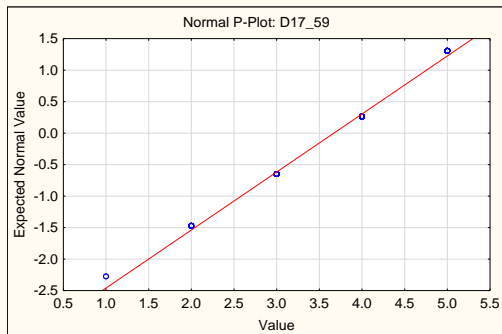
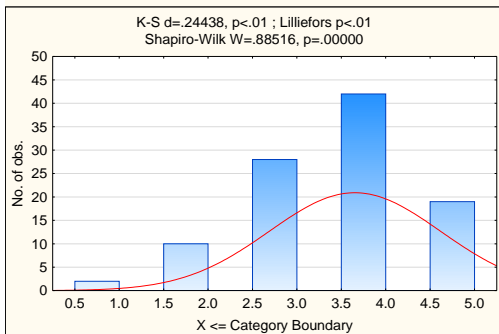
Summary: D17_57



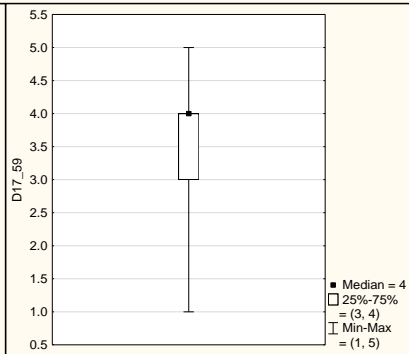
Summary Statistics:D17_57
Valid N=101
Mean= 3.930693
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 62.000000
Minimum= 2.000000
Maximum= 5.000000
Std.Dev.= 0.710738
Skewness= -0.581478
Kurtosis= 0.730730



Summary: D17_59

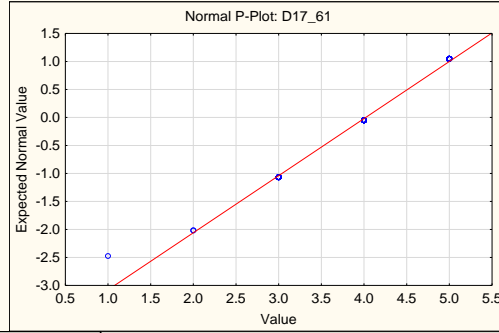
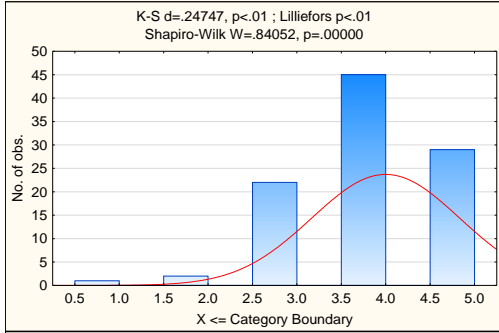


Summary Statistics:D17_59
Valid N=101
Mean= 3.653465
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 42.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.963697
Skewness= -0.481578
Kurtosis= -0.112031

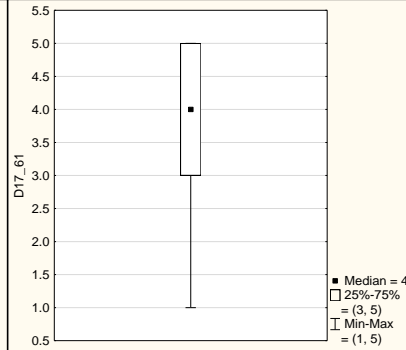




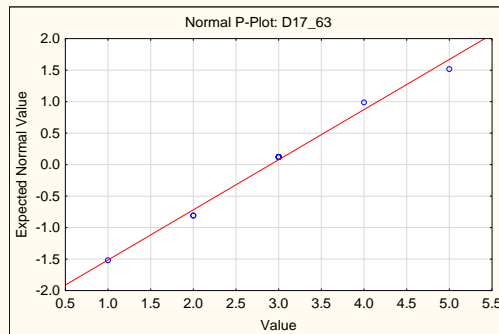
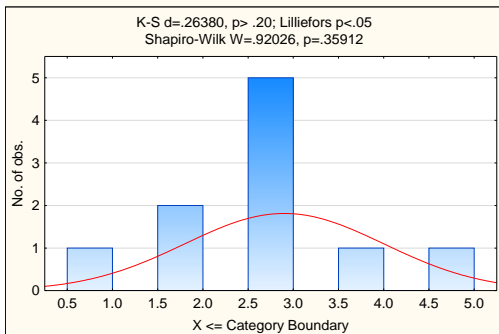
Summary: D17_61



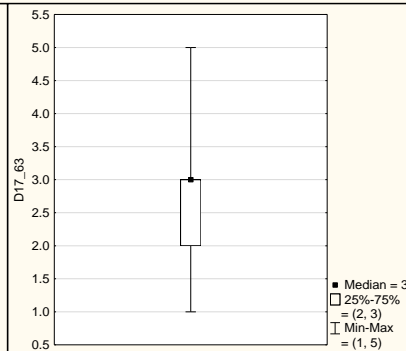
Summary Statistics:D17_61
Valid N=99
Mean= 4.000000
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 45.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 0.832993
Skewness= -0.648658
Kurtosis= 0.601182



Summary: D17_63

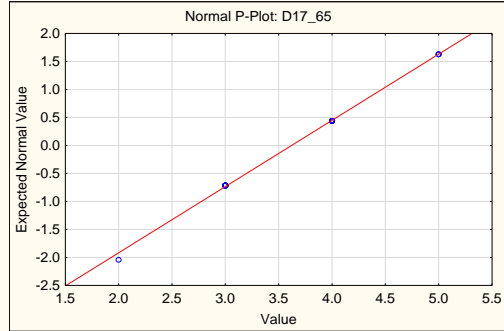
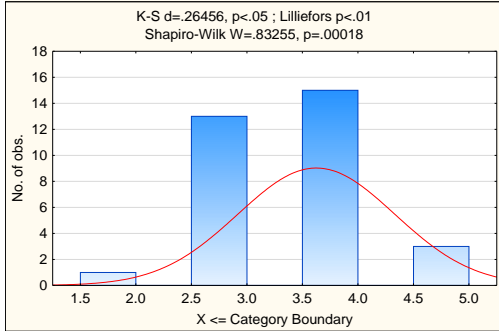


Summary Statistics:D17_63
Valid N=10
Mean= 2.900000
Median= 3.000000
Mode= 1.000000
Frequency of Mode= 5.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.100505
Skewness= 0.237589
Kurtosis= 0.906850

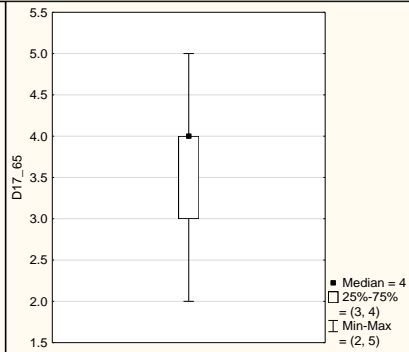




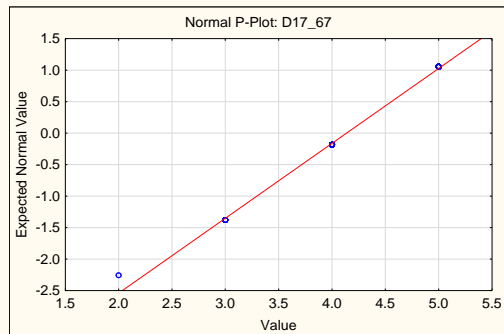
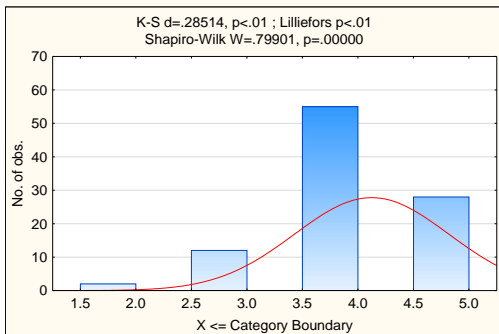
Summary: D17_65



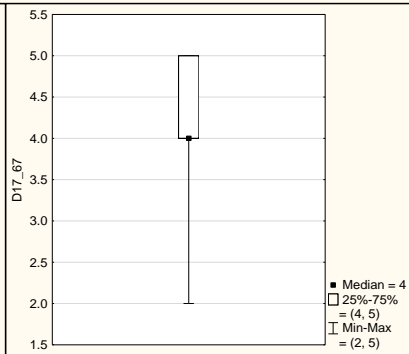
Summary Statistics:D17_65
Valid N=32
Mean= 3.625000
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 15.000000
Minimum= 2.000000
Maximum= 5.000000
Std.Dev.= 0.707107
Skewness= 0.109488
Kurtosis=-0.185095



Summary: D17_67

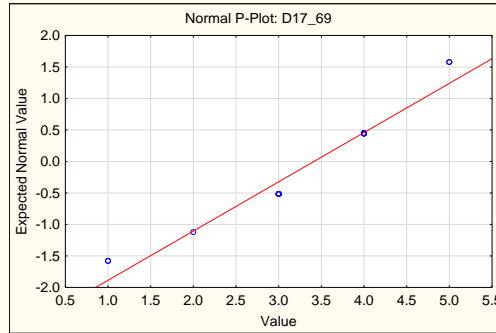
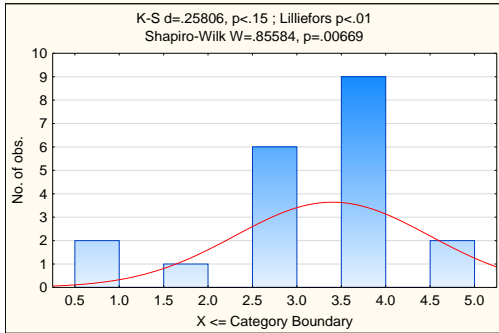


Summary Statistics:D17_67
Valid N=97
Mean= 4.123711
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 55.000000
Minimum= 2.000000
Maximum= 5.000000
Std.Dev.= 0.696086
Skewness=-0.550189
Kurtosis= 0.509476

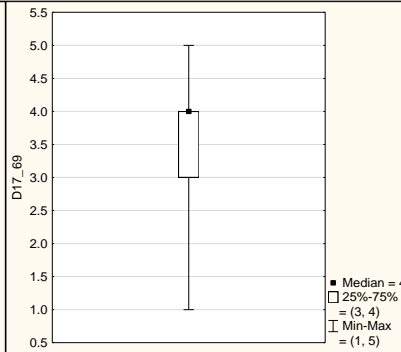




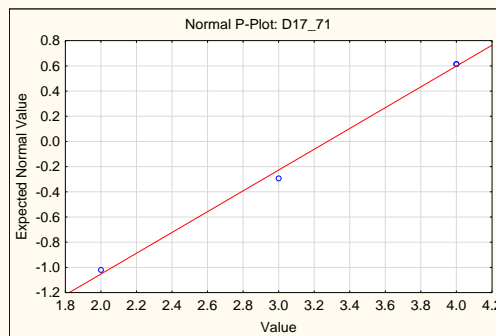
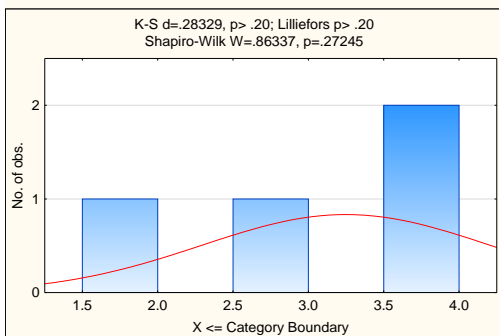
Summary: D17_69



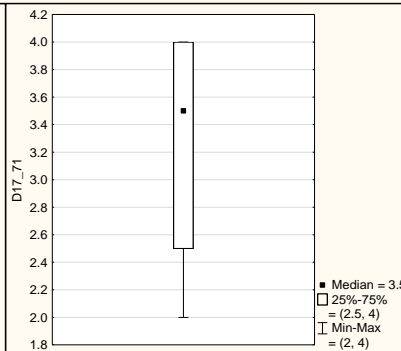
Summary Statistics:D17_69
Valid N=20
Mean= 3.400000
Median= 4.000000
Mode= 1.000000
Frequency of Mode= 9.000000
Minimum= 1.000000
Maximum= 5.000000
Std.Dev.= 1.095445
Skewness= -0.918209
Kurtosis= 0.706054



Summary: D17_71



Summary Statistics:D17_71
Valid N=4
Mean= 3.250000
Median= 3.500000
Mode= 1.000000
Frequency of Mode= 2.000000
Minimum= 2.000000
Maximum= 4.000000
Std.Dev.= 0.957427
Skewness= -0.854563
Kurtosis= -1.289256



D17_73 :There are fewer than 2 valid cases for this variable; cannot produce frequency table or histogram.

D17_75 :There are fewer than 2 valid cases for this variable; cannot produce frequency table or histogram.

D17_77 :There are fewer than 2 valid cases for this variable; cannot produce frequency table or histogram.