

**INVESTIGATING THE ROLE OF INDIGENOUS VEGETABLES ON FOOD  
SECURITY AND AGROBIODIVERSITY IN NORTHERN KWAZULU-NATAL,  
SOUTH AFRICA**

by

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**“You cannot protect the environment unless you empower people, you inform them, and you help them understand that these resources are their own, that they must protect them.**

**— Wangari Maathai**

## DECLARATION

I hereby declare that this thesis submitted for the degree of Doctor of Philosophy at the University of the Free State, is my own original work and has not been submitted to any institution for assessment purposes. I have also acknowledged all sources used and have cited these in the reference section.

.....  
Qinisani Nhlakanipho Qwabe

.....  
Date

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***“Give instruction to a wise man and he will be still wiser, teach a righteous man and he will increase his learning” Proverbs 9:9***

This study is dedicated to all those who work to improve the socio-economic conditions of rural livelihoods and all those interested in changing the food systems narrative.

## ABSTRACT

Over the past years there have been concerns over the increasing number of food insecure households resulting from the socio-economic imbalances that exist in society. Literature informs us that it is mostly the small-scale farming communities in rural counties that often face the burden of deprivation – with hunger being the primary challenge. This is not only unique to South Africa but is also observed in other parts of the developing world. The current projections on the world population which are estimated to grow by over 2 billion people by 2050, indicate that the bulk of this growth will take place in Africa (1.9 billion people). These predictions highlight the already existing threat to food security which may not be easy for the developing world to overcome if immediate action is not taken. Thus, the study is underpinned on two theories, the Malthusian and Boserup's theories of population growth. Both theorists held their views on the impact of uncontrolled populations on food security. Sir Thomas Robert Malthus believed that food production cannot keep up with the growth of the human population and would ultimately result in famine and calamity. This means that since the human population grows at a faster rate than the means of subsistence, and as the growth of agricultural products remains low, it is surpassed by the rising population; thereby creating poverty. Contrastingly, Ester Boserup argued that population growth is a cause for change in agriculture and reference is made to new innovations that would help increase food supply, such as modern technologies. The researcher makes an attempt to show the coexistence of both the Malthusian and Boserup theories. The underpinning of these two theories in the study played a critical role as food insecurity formed part of the problem statement. In the researcher's view, such research is critical in a country like South Africa that has battled household food insecurity for decades. The second aspect of the problem statement points to the overlooked role of indigenous vegetables on agrobiodiversity which coexists with food security. In modern times, priority in the agroecosystems has been given to conventional farming methods which in their nature are closely associated with the use of transgenic crop varieties, which in this study are referred to as exotic crops since they are not of African origin. It is important to note that the overall significance of maintaining the production of indigenous vegetation as was observed in the

communities that formed part of this study, helps with the conservation of the ecosystem and stability of species diversity.

This research attempts to eliminate the stigma that is associated with the utilisation of indigenous vegetables and develops a framework that influencers and policymakers in the politics of food could adopt in order to integrate these undervalued foods to the food systems. To achieve this, a mixed methods approach was adopted wherein the triangulation of qualitative and quantitative findings was made. Quantitative data was gathered through the use of a survey wherein a questionnaire was administered to 195 participants. Qualitative data on the other hand, adopted a phenomenology research design and was collected through interviews from six focus group discussions which comprised a total of five participants in each group. Using the Microsoft Excel software package (version 2016), a Pearson Correlation Coefficient analytic approach was used to test the nature, strength and direction of key variables being measured. This was complemented by a Chi Square Test of Independence that was useful in determining cause and effect outcomes, while a correlation coefficient was used to calculate the frequency and direction of interaction between variables.

**Keywords:** Agrobiodiversity, Food security, Indigenous vegetables, Rural communities, Small-scale farming

**Note:** An article was published from the findings of this study in the South African Journal of Agriculture Extension – please see **reference** below:

Qwabe, Q.N., Zwane, E.M., Swanepoel, J.W. 2021. Recognising indigenous vegetables as potential contributors to livelihoods development: A case of two district municipalities in northern KwaZulu-Natal. S. Afr. J. Agric. Ext. Vol. 49 No. 2, 2021: 83-96. Available at: <http://dx.doi.org/10.17159/2413-3221/2021/v49n2a11213>

## OPSOMMING

Oor die afgelope jare was daar kommer oor die toenemende aantal voedselonseker huishoudings as gevolg van die sosio-ekonomiese wanbalanse wat in die samelewing bestaan. Literatuur lig ons in dat dit meestal die kleinskaalse boerderygemeenskappe in landelike provinsies is wat dikwels die las van ontbering in die gesig staar – met honger as die primêre uitdaging. Dit is nie uniek aan Suid-Afrika nie, maar word ook in ander dele van die ontwikkelende wêreld waargeneem. Die huidige projeksies oor wêreldbevolking skat dat daar teen die jaar 2050 twee miljard meer mense sal wees, met die grootste deel van hierdie groei wat in Afrika plaasvind (1,9 miljard mense). Hierdie voorspellings beklemtoon die reeds bestaande bedreiging vir voedselsekureit wat dalk nie maklik vir die ontwikkelende wêreld sal wees om mee tred te hou as daar nie onmiddellik opgetree word nie. Hierdie studie word dus deur twee teorieë ondersteun, naamlik die Malthusian en Boserup se teorieë oor bevolkingsgroei. Beide teoretici huldig standpunte oor die impak van onbeheerde bevolkingsgroei op voedselsekerheid. Malthus het geglo dat voedselproduksie nie kan byhou met die groei van die menslike bevolking nie en uiteindelik tot hongersnood en rampspoed sal lei. Dit beteken dat aangesien menslike bevolking teen 'n vinniger tempo groei as lewensmiddele, en aangesien die groei van landbouprodukte laag bly, voedselproduksie sal deur die stygende bevolking oortref word, wat armoede meebring. Hierteenoor het Boserup aangevoer dat bevolkingsgroei 'n oorsaak is vir verandering in die landboubedryf en daar word verwys na nuwe innovasies wat sal help om voedselvoorsiening te verhoog, soos moderne boerderytegnologie. Die navorser probeer om die naasbestaan van hierdie twee teorieë aan te toon. Die onderbou van die twee teorieë in die studie het 'n kritieke rol gespeel aangesien voedselonsekerheid deel van die probleemstelling gevorm het. Na die navorser se mening is sulke navorsing van kritieke belang in 'n land soos Suid-Afrika wat al dekades lank met huishoudelike voedselonsekerheid gestry het. Die navorsing poog om die stigma wat geassosieer word met die gebruik van inheemse groente uit te skakel en ontwikkel 'n raamwerk wat beïnvloeders en beleidmakers in die politiek van voedsel kan aanneem om hierdie ondergewaardeerde voedsel in die voedselstelsels te integreer. Om dit te bereik, is 'n gemengde metode-benadering gevolg waarin die triangulasie van kwalitatiewe en kwantitatiewe bevindinge gemaak is. Kwantitatiewe data is ingesamel deur die gebruik van 'n opname waarin 'n vraelys aan 195



deelnemers geadmineer is. Kwalitatiewe data is verkry deur die gebruik van 'n fenomenologiese navorsingsontwerp en is ingesamel deur onderhoude met ses fokusgroepe wat altesaam vyf deelnemers per groep bestaan het. Met behulp van Microsoft Excel is 'n Pearson-korrelasiekoëffisiënt analitiese benadering gebruik om die aard, sterkte en rigting van sleutelveranderlikes wat gemeet word, te toets. Dit is aangevul deur 'n Chi-kwadraad Toets van Onafhanklikheid wat nuttig was in die bepaling van oorsaak-en-gevolg uitkomst, terwyl 'n korrelasiekoëffisiënt gebruik is om die frekwensie en rigtings van interaksies tussen veranderlikes te bereken.

**Sleutelwoorde:** agrobiodiversiteit, voedselonsekerheid, inheemse groente, landelike gemeenskappe, kleinskaalse boerdery

## TABLE OF CONTENTS

<b>DECLARATION</b> .....	iii
<b>ACKNOWLEDGEMENTS</b> .....	iv
<b>ABSTRACT</b> .....	vi
<b>OPSOMMING</b> .....	viii
<b>LIST OF FIGURES</b> .....	xvii
<b>LIST OF TABLES</b> .....	xix
<b>LIST OF ANNEXURES</b> .....	xix
<b>LIST OF ACRONYMS AND ABBREVIATIONS</b> .....	xx

### CHAPTER 1

#### INTRODUCTION AND ORIENTATION OF RESEARCH

1.1 RESEARCHER'S POSITIONALITY .....	1
1.2 BACKGROUND AND PROBLEM STATEMENT .....	2
1.3 PURPOSE AND SIGNIFICANCE OF THE STUDY .....	4
1.3.1 Research Questions .....	5
1.3.2 Objectives .....	5
1.4 RESEARCH DESIGN.....	6
1.4.1 Survey .....	6
1.4.2 Phenomenology .....	7
1.5 STUDY POPULATION .....	7
1.6 SAMPLING TECHNIQUE AND SAMPLE SIZE .....	7
1.7 STRENGTHS AND LIMITATIONS OF THE STUDY .....	8
1.7.1 Strengths .....	8
1.7.2 Limitations.....	9
1.8 PLAN OF RESEARCH ACTIVITIES.....	9

### CHAPTER 2

#### CONCEPTUAL AND LOGICAL FRAMEWORK

2.1 INTRODUCTION .....	10
2.2 CONCEPTUAL FRAMEWORK.....	11
2.3 CONTEXTUALISING THE MAIN CONCEPTS.....	12
2.3.1 Agrobiodiversity .....	12
2.3.2 Food Security .....	14

2.3.3	Indigenous Vegetables.....	14
2.3.4	Non-timber Forest Products (NTFPs).....	14
2.3.5	Rural Agriculture.....	15
2.3.6	Socioeconomic Status (SES) .....	15
2.3.7	Sustainable Agriculture .....	16
2.3.8	Wild Edible Vegetables (WEVs) .....	16
2.4	ANCHOR THEORIES .....	17
2.4.1	The Malthusian Theory.....	17
2.4.2	The Boserupian Theory .....	18
2.4.3	Researcher’s Position: Coexistence of Malthus and Boserup’s.....	18
2.6	SUMMARY .....	21

### **CHAPTER 3**

#### **UNDERSTANDING THE HISTORY OF SOUTH AFRICA’S FOOD DYNAMICS**

3.1	INTRODUCTION.....	22
3.2	FOUNDATIONS OF AFRICAN FOOD SYSTEMS, A PRELUDE TO THE .....	23
3.3	THE GREEN REVOLUTION: LESSONS FROM INDIA .....	24
3.4	THE IMPACT OF THE GREEN REVOLUTION ON SA’S INDIGENOUS.....	25
3.4.1	Subsistence vs Conventional Agriculture .....	26
3.4.2	Indigenous Food Crops (IFCs) vs Exotic Food Crops (EFCs).....	28
3.5	CONTEXTUALISING PERCEPTIONS IN RELATION TO IFCs .....	29
3.6	SUMMARY .....	30

### **CHAPTER 4**

#### **AN EXPLORATION OF THE STATE OF FOOD SECURITY IN SOUTH AFRICA**

4.1	INTRODUCTION.....	31
4.2	UNDERSTANDING FOOD SECURITY.....	32
4.3	SOUTH AFRICA’S STATE OF FOOD SECURITY.....	32
4.4	HOUSEHOLD STATISTICS.....	33
4.5	THE FOOD CHALLENGE .....	33
4.5.1	Food Availability: The First Fundamental Challenge .....	34
4.5.2	Food Accessibility: The Second Fundamental Challenge .....	34
4.6	TRANSITORY-ACUTE FOOD INSECURITY .....	35
4.7	CHRONIC FOOD INSECURITY IN SOUTH AFRICA .....	37

4.8	FOOD AVAILABILITY AND ACCESSIBILITY IN RURAL COMMUNITIES ...	38
4.8.1	Understanding Different Levels of Assessing Food Security .....	39
4.9	SOUTH AFRICA'S FOOD SECURITY STRATEGY .....	40
4.9.1	Policy of Food Security .....	40
4.9.2	Recoup Measures to Enhance Resilient Food Systems .....	41
4.10	FOOD SECURITY CHALLENGES AND RISK MANAGEMENT .....	42
4.11	LINK BETWEEN RURAL AGRICULTURE AND FOOD SECURITY .....	43
4.12	SUMMARY .....	43

## **CHAPTER 5**

### **AGROBIODIVERSITY: A CONTRIBUTOR TO ECOLOGICAL WELLBEING**

5.1	INTRODUCTION.....	45
5.2	CONCEPTUALISING AGRICULTURAL BIODIVERSITY .....	46
5.3	INDIGENOUS PLANTS ON AGROECOSYSTEMS .....	49
5.3.1	Non-timber Forest Products (NTFPs).....	50
5.3.2	Management of non-timber Forest Products .....	50
5.3.3	Wild Edible Vegetables (WEVs) .....	51
5.4	MANAGEMENT OF THE AGRICULTURAL ENVIRONMENT.....	52
5.4.1	Agrobiodiversity, its Significance and Impact on the Ecosystem.....	52
5.4.2	Conventional Vegetation – A Threat to Ecological Diversity.....	53
5.4.3	Significance of Indigenous Agriculture on Livelihood Development .....	54
5.5	SUMMARY .....	54

## **CHAPTER 6**

### **FRAMEWORK OF ANALYSIS AND RESEARCH METHODOLOGY**

6.1	INTRODUCTION.....	55
6.2	OVERVIEW OF THE STUDY AREA .....	57
6.2.1	Profiling Umkhanyakude District (UKDM/DC27).....	58
6.2.2	Profiling the King Cetshwayo District Municipality (KCDM/DC28) .....	60
6.2.3	Profiling Ilembe District Municipality (IDM/DC29).....	61
6.3	RESEARCH METHODOLOGY .....	62
6.3.1	Research Paradigm.....	63
6.3.1.1	Positivism.....	64
6.3.1.2	Interpretivism .....	65

6.3.1.3	Pragmatism.....	65
6.3.2	Justification for the Pragmatism Philosophy.....	66
6.4	REASONING APPROACH.....	66
6.4.1	Deductive Reasoning.....	67
6.4.2	Inductive Reasoning.....	67
6.4.3	Abductive Reasoning.....	68
6.4.4	Justification for the Chosen Reasoning Approach.....	68
6.4.4.1	Research Traditions.....	68
6.4.4.2	Quantitative Research Methods.....	68
6.4.4.3	Qualitative Research Methods.....	69
6.4.4.4	Mixed Methods Design.....	69
6.5	RESEARCH STRATEGY.....	72
6.5.1	Quantitative Dimension Strategies.....	72
6.5.1.1	Strengths of Survey Research.....	73
6.5.1.2	Weaknesses of Survey Research.....	73
6.5.2	Qualitative Dimension Strategies.....	74
6.5.2.1	The Case Study.....	74
6.5.2.2	Ethnographic Research.....	74
6.5.2.3	Phenomenology (Interpretive Phenomenological Approach).....	74
6.5.2.4	Grounded Theory.....	75
6.5.2.5	Narrative Enquiry.....	75
6.5.3	Justification for Chosen Research Strategy.....	75
6.5.3.1	Transcendental Phenomenology.....	76
6.5.3.2	Hermeneutic Phenomenology.....	77
6.5.4	Reflexivity and Bracketing as Accomplices to Phenomenology.....	80
6.6	SAMPLING METHOD AND DATA COLLECTION TECHNIQUES.....	81
6.6.1	Data Collection Instrument Construction.....	83
6.6.1.1	Questionnaire Design.....	83
6.6.1.2	Structure of Questions.....	85
6.7	JUSTIFICATION OF SELECTED DATA COLLECTION METHODS.....	85
6.7.1	Approach to a Mixed Methods Approach.....	85
6.8	DATA ANALYSIS.....	87
6.8.1	Qualitative Dimension.....	87
6.8.2	Quantitative Dimension.....	88
6.9	ETHICAL CONSIDERATIONS.....	89

6.10	SUMMARY .....	89
------	---------------	----

## CHAPTER 7

### PRESENTATION AND DISCUSSION OF RESULTS

7.1	INTRODUCTION .....	91
7.2	PROFILING THE RESEARCH PARTICIPANTS .....	92
7.2.1	Number of Family Household Members .....	92
7.2.2	Gender Distribution of Study Participants' Head of Family Units .....	93
7.2.3	Marital Status of Participants .....	93
7.2.4	Age of Household Head .....	94
7.2.5	Educational Level .....	95
7.2.6	Religion .....	96
7.2.7	Employment Status .....	96
7.2.8	Household Monthly Income .....	97
7.3	SURVEY RESULTS (DESCRIPTIVE STATISTICS) .....	98
7.3.1	Indigenous Vegetables Grown in the Community .....	98
7.3.2	Wild Vegetables Collected from Forests .....	99
7.3.3	Preferences Between Exotic and Indigenous Foods .....	99
7.3.4	Substitutional Uses of Indigenous Foods .....	100
7.3.5	Availability of Indigenous Foods .....	101
7.3.6	Known Nutritional Value of Indigenous Foods .....	102
7.3.7	Difficulties Related to Cultivation .....	103
7.3.8	Indigenous Foods that May Be Eaten Raw .....	104
7.3.9	Role Played by Indigenous Foods in Communities .....	104
7.3.10	Preservation of Indigenous Vegetables .....	105
7.3.11	Permission for Use of Indigenous Vegetables .....	106
7.3.12	Indigenous Vegetables Associated with Health Risks .....	107
7.3.13	Information Provided by Community Workers and Extension .....	108
7.3.14	Effect of Climatic Conditions on Production of Indigenous Veg .....	108
7.3.15	Known Traditional Methods Used to Overcome Production Chal .....	110
7.3.16	Environmental Impact of Indigenous Vegetables .....	111
7.3.17	Role of Indigenous Vegetables on Agrobiodiversity .....	112
7.3.18	Cultural Value of Indigenous Vegetables .....	113
7.3.19	Use of Indigenous Vegetables for Income Generation .....	114

7.3.20	Known Perceptions of the Younger Generation .....	115
7.3.21	Resilience of Indigenous Vegetables .....	116
7.3.22	Resilience of Non-indigenous (Exotic) Vegetables.....	117
7.3.23	Contribution to Sustained Livelihoods .....	118
7.3.24	Knowledge of Agricultural Technology .....	119
7.3.25	Commercialisation of Indigenous Vegetables.....	120
7.3.26	Effects from the Extinction of Indigenous Vegetables .....	121
7.4	INFERENCE STATISTICAL ANALYSIS (CHI-SQUARE TEST OF .....	122
7.4.1	Pearson Correlation Coefficients.....	122
7.4.2	Indigenous Vegetables Availability and Community Utilisation .....	123
7.4.3	Use of Indigenous Vegetables for Convenience Purposes .....	123
7.4.4	Accessibility and Role of Indigenous Vegetables in Livelihoods.....	124
7.4.5	Traditional Regulations and Permission for Utilisation .....	125
7.4.6	Known Nutritional Benefits of Indigenous Vegetables and .....	126
7.4.7	Education and Awareness Provided by Agricultural Extensionists .....	126
7.4.8	Effect of Climate on the Production of Indigenous Vegetables.....	127
7.4.9	Ability of Indigenous Vegetables to withstand Extreme Weather .....	128
7.4.10	Integrating Technology with Traditional Production Systems .....	129
7.4.11	Use of Indigenous Vegetables for Income Generation .....	130
7.4.12	Impact of Extinction of Indigenous Vegetables on Food Security.....	132
7.5	A SYSTEMATIC APPROACH TOWARDS A FOCUS GROUP.....	133
7.5.1	Synthesis of Literature.....	133
7.5.2	Integrating the Focus Group Discussion into the Logical Model.....	136
7.5.2.1	Methodological Design.....	136
7.5.2.2	Data Collection .....	136
7.5.2.3	Analysis .....	138
7.5.2.4	Findings and Interpretation .....	138
7.5.3	Profiling the Focus Study Participants.....	138
7.6	PRESENTATION OF QUALITATIVE FINDINGS .....	139
7.6.1	Coding Strategy.....	139
7.6.2	Axial Coding Stage.....	141
7.6.3	Nexus between Emerging Themes and Participant's Experiences .....	142
7.6.4	Existing Indigenous Vegetables related to Agrobiodiversity .....	143
7.6.5	Critical Indicators that Influence Household Food Security .....	143
7.6.6	Barriers Hindering Access to and use of Indigenous Vegetables .....	144

7.7	SUMMARY .....	145
-----	---------------	-----

## CHAPTER 8

### INTEGRATION OF QUALITATIVE AND QUANTITATIVE FINDINGS, THEORETICAL CONTRIBUTION, CONCLUSION AND IMPLICATIONS

8.1	INTRODUCTION.....	146
8.2	TRIANGULATION .....	147
8.2.1	Production and Utilisation of Indigenous Vegetables .....	148
8.2.2	Household Food Security .....	148
8.2.3	Lack of Support for Farmers.....	150
8.2.4	Poor Extension Services .....	152
8.2.5	Youth Participation in the Production of Indigenous Vegetables .....	153
8.2.6	Commercialisation of Indigenous Vegetables .....	154
8.3	CONTRIBUTION TOWARDS THEORY BUILDING: POPULARISING .....	155
8.3.1	Phase 1: Raising Awareness.....	156
8.3.2	Phase 2: Programme Initiation .....	157
8.3.3	Phase 3: Programme Implementation .....	159
8.4	CONCLUSION AND IMPLICATIONS.....	160
	<b>REFERENCES.....</b>	<b>162</b>
	<b>APPENDIX A: ETHICS CLEARANCE LETTER.....</b>	<b>190</b>
	<b>APPENDIX B: PARTICIPANT’S CONSENT LETTER .....</b>	<b>191</b>
	<b>APPENDIX C: QUESTIONNAIRE .....</b>	<b>192</b>
	<b>APPENDIX D: INTERVIEW SCHEDULE (FOCUS GROUP INTERVIEWS) .....</b>	<b>201</b>



## LIST OF FIGURES

Figure 2.1: Conceptual framework .....	11
Figure 2.2: Skeletal Framework: Mapping the methodology .....	20
Figure 4.1: Three levels from which food security is measured in SA .....	39
Figure 4.2: Summative illustration of the reviewed concepts on food security	44
Figure 5.1: Benefits of agrobiodiversity .....	48
Figure 6.1: KwaZulu-Natal Map showing the three selected districts.....	58
Figure 6.2: Geographical map of Umkhanyakude District Municipality .....	58
Figure 6.3: Map of the King Cetshwayo District Municipality .....	60
Figure 6.4: Geographical map of Ilembe District Municipality .....	61
Figure 6.5 Theoretical Design .....	63
Figure 6.6: Typology of Mixed Methods Research .....	71
Figure 6.7: Seven-step process of phenomenology .....	79
Figure 6.8: Understanding phenomena through bracketing .....	81
Figure 6.9: Questionnaire design model .....	83
Figure 7.1: Structure of Households .....	92
Figure 7.2: Gender of head of family unit .....	93
Figure 7.3: Marital Status of participants .....	93
Figure 7.4 Age of household leader .....	94
Figure 7.5: Educational level .....	95
Figure 7.6: Religious Background .....	96
Figure 7.7: Employment Status .....	96
Figure 7.8: Household Income .....	97
Figure 7.9: Indigenous foods grown in community .....	98
Figure 7.10: Wild vegetables collected from forests .....	99
Figure 7.11: Preference between vegetables categories .....	99
Figure 7.12: Use of Indigenous foods as substitutes of conventional foods ....	100
Figure 7.13: Availability .....	101
Figure 7.14: Accessibility .....	102
Figure 7.15: Known Nutritional Value .....	102
Figure 7.16: Indigenous Vegetables that are difficult to grow .....	103
Figure 7.17: Indigenous Vegetables that can be eaten raw .....	104

Figure 7.18: Role of indigenous vegetables in communities .....	105
Figure 7.19: Indigenous vegetables' requirement for preservation .....	105
Figure 7.20: Permission for utilization .....	106
Figure 7.21: Perceived health risks .....	107
Figure 7.22: Education provided .....	108
Figure 7.23: Effectiveness of education .....	108
Figure 7.24 Effect of Climatic Conditions .....	108
Figure 7.25: Growth and yield in respect of climatic factors .....	109
Figure 7.26: Availability of traditional methods for overcoming threats .....	110
Figure 7.27: Perceptions on environmental impact .....	111
Figure7.28: Relationship between indigenous vegetables and agrobiodiversity	112
Figure 7.29: Cultural significance of indigenous vegetables .....	113
Figure 7.30: Monetary value .....	114
Figure 7.31: Observed youth perceptions of indigenous vegetables .....	115
Figure 7.32: Resilience of indigenous vegetables against environmental .....	116
Figure 7.33: Resilience of exotic vegetables against environmental threats ....	117
Figure 7.34: Livelihood contribution .....	118
Figure 7.35: Integration of modern technology to traditional production .....	119
Figure 7.36: Potential for commercialization .....	120
Figure 7.37: Extinction of indigenous vegetables .....	121
Figure 7.38: Community grown indigenous vegetables vs Utilization .....	123
Figure 7.39: Utilization of indigenous vegetables vs exotic vegetables .....	124
Figure 7.40: Accessibility and role of indigenous vegetables .....	124
Figure 7.41: Traditional regulations vs permission for utilization .....	125
Figure 7.42: Known nutritional benefits of indigenous vegetables .....	126
Figure 7.43: Education and knowledge transfer (awareness) .....	127
Figure 7.44: Effect of climate indigenous vegetables production .....	128
Figure 7.45: Ability of indigenous vegetables to withstand climatic conditions	129
Figure 7.46: Integration of technology with traditional production systems	130
Figure 7.47: Use of indigenous vegetables for income generation .....	131
Figure 7.48: Potential for the commercialization of indigenous vegetables .....	131
Figure 7.49: Impact of extinction on food security .....	132
Figure 7.50: Logical model for conducting a group discussion .....	134

Figure 8.1: A three-phase framework to promote and popularise indigenous vegetables through commercialisation .....	155
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### **LIST OF TABLES**

Table 3.1: Four main groups of the perceived benefits of indigenous crops ...	25
Table 3.2: Genetically modified crops mostly utilised in South Africa .....	28
Table 4.1: Different phases of TAFI in South Africa by IFSS .....	36
Table 4.2: Key drivers of TAFI in South Africa .....	37
Table 4.3: Twin track approach .....	42
Table 6.1: Summary profile of the three district municipalities .....	57
Table 6.2: Local municipality governance .....	59
Table 6.3: Individual district profiles .....	82
Table 7.1: Axial coding stage .....	142

### **LIST OF ANNEXURES**

Appendix A: Ethics clearance letter .....	191
Appendix B: Participant's consent letter .....	192
Appendix C: Questionnaire .....	193
Appendix D: Interview schedule (Focus group interviews) .....	202

## LIST OF ACRONYMS AND ABBREVIATIONS

AIKS	: Indigenous agricultural knowledge systems
COGTA	: Department of Cooperative Governance and Traditional Affairs
DAFF	: Department of Agriculture, Forestry and Fisheries
DC27	: uMkhanyakude District Municipality
DC28	: King Cetshwayo District Municipality
DC29	: Ilembe District Municipality
EFCs	: Exotic Food Crops
FAO	: Food and Agriculture Organization
HSRC	: Human Science Research Council
IA	: Indigenous Agriculture
IFCs	: Indigenous Food Crops
IFSPC	: Integrated Food Security Phase Classification
IFSS	: Integrated Food Security Strategy
IPA	: interpretive phenomenological analysis
NRKZN	: Northern KwaZulu-Natal
NTFPs	: Non-timber Forest Products
PSPPD	: Programme to Support Pro-Poor Policy Development
SES	: Socio-economic status
SIS	: Smallholder irrigation schemes
SSA	: Statistics South Africa
TAFI	: Transitory-acute food security
WEVs	: Wild edible vegetables

## CHAPTER 1

### INTRODUCTION AND ORIENTATION OF RESEARCH

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#### 1.1 RESEARCHER'S POSITIONALITY

The introduction and full disclosure of a researcher in the context of background and socio-economic positioning is an integral part of reasoning and evaluation. Pittaway (2013) justifies this by asserting that the values of the researcher can influence observations and their biases (researcher) may influence the decisions taken during the research process. In the same light, the researcher acknowledges his positioning as a young, Black African male who stems from the King Cetshwayo District in the north of KwaZulu-Natal, South Africa. In the context of this study which seeks to promote indigenous vegetables, the researcher has a close relationship with the indigenous vegetables that are being investigated as they form part of the delicacies that were mostly consumed in his community during his upbringing. In addition to this, the researcher has invested his time promoting these indigenous vegetables, both scholarly and in his own personal capacity. However, while the researcher acknowledges his stance of pragmatic positioning, it is worth noting that during data collection he upheld the position of a *layperson*, one who did not have any prior knowledge about indigenous vegetables. This was done as a means of eliminating previous knowledge to minimising bias. In this chapter, the researcher provides an introduction to the research. This includes the background of the study and justification of its significance based on the problem statement. The objectives and research questions through which the researcher's philosophic sagacity is underpinned are also introduced.

## 1.2 BACKGROUND AND PROBLEM STATEMENT

Access to adequate food as set out in section 27 of the South African Constitution<sup>1</sup> (1996) is every citizen's right. Although South Africa is known to be food secure at a national level as declared by the Food and Agricultural Organisation (FAO, 1996), hunger, malnutrition, diseases, and rural poverty are some of the prominent challenges that the country is faced with (Pauw, 2005). This notion of food insufficiency has been previously studied and affirmed (Mavengahama, McLachlan and De Clerq, 2013) and these studies evidently indicate that it is relative to hunger, poverty, and micronutrient deficiencies. This study sought to contribute towards food security through modelling a framework that promotes the production and use of indigenous vegetables. Often, it is the rural poor who are usually the victims of food insecurity as a result of poverty.

The concept 'poverty' can be understood from two different perspectives: the first may refer to the insufficiency of monetary resources and inadequacy of all types of chronic resources that are needed to satisfy basic human needs such as nutrition. The second perspective is that of powerlessness, which refers to people who are governed by forces that are out of their control, such as monarchs in positions of authority (Ijaiya, Ijaiya, Bello, and Ajayi, 2011). This agrees with Chambers (2013) who studied the context of the rural poor and arrived at the conclusion that those who are often under the autonomy of their tribal leaders, experience some kind of poverty. According to Chambers (2013), the rural poor are usually caught in the 'deprivation trap' through which five clusters of disadvantage merge to entrap people in confined and hostile situations.

Among Chambers' five clusters of disadvantages is poverty, which is commonly understood as the lack of assets. Relatively, the four other clusters are wider dimensions of poverty, and they include powerlessness, physical weakness, vulnerability and isolation. Although it now comes as a relevant theme for a multitude of contexts, the deprivation trap was initially designed to represent the rural situation. In the South African context, looking at the different levels of socio-economic profiles that exist (poor, middle-class, rich), there is a certain class of people which sources a

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<sup>1</sup> RSA (Republic of South Africa). 1996. Constitution of the Republic of South Africa, 1996. Pretoria: Government Printer.

livelihood through indigenous farming due to a lack of financial resources among other things. Recently there has been a political debate with the emphasis being on the improvement of agricultural activities and an improved economic growth through the commercialisation of agricultural commodities (Ramaphosa, 2019a). However, care should be taken that through this political rhetoric – one of the most important factors that is being overlooked is agrarian reform. Consequently, the narrative around the liberation for all in the context of food security and hunger alleviation remains questionable since there are no comprehensive frameworks that exist which focus on agricultural development in rural communities (Hendriks, 2015). There is, therefore, a need for an integrated programme that aims to reorganise the institutional framework of agriculture in order to facilitate social and economic progress in accordance with the philosophy, values and creed of the rural communities.

This study is thus centred around agrarian transformation, which can reduce the challenge of food insecurity, which would not be curbed if not properly addressed. This underpinning has led to a two-pronged problem statement being on:

**(i) Food insecurity in the South African context:** A declaration has been previously made in a period spanning over two decades that South Africa is food insecure at household level (FAO, 1996; SSA, 2017). This agrees with the assertion by Swanepoel (2017) who states that because of inconsistencies on the state of food security that is experienced at household level, there are no clear regulated sets of measures for monitoring food security due to:

- Corruption and political instability.
- Dissimilar research methodological techniques.
- Exclusive and inefficient agricultural and food systems.
- Fragmented policies on food security from different government departments.
- Lack of livelihood resilience strategies to vulnerability (threats, shocks and trends).
- Unproductive and unsustainable agricultural frameworks.

**(ii) The overlooked role of indigenous vegetables on agrobiodiversity:** This is the second problem area. The value and appreciation of indigenous vegetables has been lost due to westernisation. The majority of South African households have shifted from the production of African indigenous foods to conventional crops

(exotic vegetables) which are resource demanding and are believed to be associated with environmental degradation (Senyolo, Wale and Ortmann, 2018). It is the researcher's belief that while the practise of growing exotic vegetables is crucial, it is equally important not to overlook challenges that are associated with their production, especially when considering the rural context. Some examples of these challenges include the use of costly agrochemicals during the production stages. Based on this, there is a need to promote the production and utilisation of indigenous vegetables as they have been proven to be convenient in rural farming systems. In addition to this, there is limited literature that exists on the coexistence of indigenous vegetables, agrobiodiversity, and food security. Therefore, there is a need to explore the relationship between these variables as agriculture remains a livelihood strategy for many and provides a primary source of food.

### **1.3 PURPOSE AND SIGNIFICANCE OF THE STUDY**

The aim of the study was to explore the association between three phenomena, namely indigenous vegetables, agrobiodiversity, and food security as a means of determining the impact of indigenous vegetables on agrobiodiversity and food security. Following this systematic investigation, a framework that integrates indigenous vegetables into the food systems was developed. The framework illustrates the key areas of development that could be adopted in order to allow the integration of indigenous vegetables to the conventional food chain. This is especially important as indigenous vegetables are known for their naturalistic growth habits which include the minimal use of chemical resources that may be harmful to soil microorganisms, leading to nutritional deficiencies and unintended soil degradation (Aktar, Sengupta and Chowdhury, 2009). To achieve this, the researcher studied the benefits and limitations associated with indigenous vegetable production and contrasted them with conventional cash crops, herein referred to as 'alien and/or exotic' species. Maslow (1943) outlined different human needs in their hierarchical nature with the very basic needs (food, water, shelter, safety, and security) being the emergent assortment of human development essentials. Taking into consideration that the attainment of food security relies on effective and productive agricultural practices, there was a need to determine the possible role of indigenous vegetables on food security. The findings of this study could be invaluable to policy makers, government departments –



particularly, the Department of Agriculture, Land Reform and Rural Development (DALRRD), non-governmental organisations (NGOs) and other entities that seek to redress food security and maintain ecological diversity.

### **1.3.1 Research Questions**

The following research questions pertaining to the problem statement gave context to the objectives of this study:

- Which are the commonly utilised indigenous vegetables in the selected communities?
- How do indigenous vegetables contribute to food security?
- How is the access and utilisation of indigenous vegetables hindered when managing agrobiodiversity?
- To what extent does the utilisation of indigenous vegetables on agrobiodiversity management contribute to rural livelihoods?
- What strategy can be devised towards the promotion of indigenous vegetables as important role-players in agrobiodiversity management and food security?

### **1.3.2 Objectives**

The following objectives served as a navigation tool for answering the primary set research questions and ultimately the main purpose of the study:

- To provide insight on commonly utilised indigenous vegetables in the selected communities
- To determine how indigenous vegetables contribute to food security.
- To examine the barriers hindering access and utilisation of indigenous vegetables when managing agrobiodiversity.
- To measure the perceptions on the utilisation of indigenous vegetables and agrobiodiversity management to rural livelihoods.
- To devise a strategy that seeks to promote indigenous vegetables as important role-players for agrobiodiversity management and food security.

## **1.4 RESEARCH DESIGN**

The term research is generally understood as a systematic investigation that is geared towards the establishment of facts and/or a search for knowledge, whereas the design is known to be an arrangement scheme or a plan. In a singular definition, Burns and Grové (2007) define the term 'research design' as a pattern that is used for the administration and the regulation of a research project with a goal of yielding accurate findings through which valid and reliable conclusions can be made. This study sought to examine how indigenous vegetables contribute to agrobiodiversity management and the attainment of food security. To achieve this, a mixed methods approach (also known as a triangulation approach) was employed. This type of research design is an approach to enquiry that integrates both qualitative and quantitative paradigms. A mixed methods approach in a study of this nature is important as it helps to strengthen the validity and reliability of the design by applying multiple research instruments and analyses.

### **1.4.1 Survey**

The study employed a survey technique for the collection of numerical data. Glasow (2005) defines a survey as a systematic method of data collection and analysis of information obtained from a sample of units. It was for this reason that a questionnaire was used as a primary research instrument to gather quantifiable data as suggested by Mathers, Fox and Hunn (2009). Two types of statistics were used in this study: namely, descriptive statistics and inferential statistics. Descriptive statistics were used to summarise the characteristics of the sample that was investigated without drawing any conclusions on the theory of probability and to provide a basic summary about the sample of the investigation (Seltman, 2012). Inferential statistics were used to infer the properties of the chosen population.

Using the Microsoft Excel 2016 software package for statistical analysis, a Pearson Correlation Coefficient analytic approach was used for mathematical analysis and to test the nature, strength and direction of key variables being measured. Additionally, a Chi Square Test of Independence analysis was useful in determining cause and effect outcomes, while a correlation coefficient was used to calculate the frequency and direction of interaction between variables (Schober, Boer and Schwarte, 2018).

### **1.4.2 Phenomenology**

The qualitative component of the study adopted the phenomenology research design. Phenomenology is commonly described as a philosophical study that is concerned with real life situations and the holistic experiences of people in their complexity (Padilla-Diaz, 2015). To obtain this information, focus group discussions were held and open-ended interviews were conducted. The motivation for the use of focus group discussions was to learn the perceptions of people in relation to the agronomic influence of indigenous vegetables on agrobiodiversity and food security. This phenomenological method thus helped in the understanding, contextualisation and interpretation of the participants' perceptions (Rubin and Rubin, 1995). After data was obtained, it was analysed using webQDA, a qualitative data analysis computer software package which helps with organising, analysing and generating insights for open-ended responses. According to Costa, Breda and Pinho (2015), the support of webQDA software in coding and analysing data from groups helps in organising teamwork, integrating various interpretations, and to minimise bias.

### **1.5 STUDY POPULATION**

A population refers to the total number of elements from which a sample is drawn, and a sample contains the selected items that are used to present the entire population (Gray, 2004). Three district municipalities formed part of the study. These include Ilembe, King Cetshwayo, and uMkhanyakude District Municipalities. The population from which the sample was drawn was rural farmers who were actively involved in agricultural activities. The justification behind the selection of rural farmers is because they are considered to be knowledge holders of indigenous agriculture since they mostly participate in the production and utilisation of indigenous crops (DAFF, 2011).

### **1.6 SAMPLING TECHNIQUE AND SAMPLE SIZE**

Participants were purposefully selected. The researcher notes that purposive selection is a type of non-probability sampling that is most effective when qualitatively studying cultural phenomena which have knowledgeable experts (Welman, Kruger and Mitchell, 2005). However, Tongco (2007) reassures that this type of sampling technique can also be used in quantitative paradigms. Given the period in which this

research was conducted when there was a global outbreak of the coronavirus (COVID-19) pandemic which was accompanied by strict lockdown<sup>2</sup> regulations and limited numbers of social gatherings, the researcher saw it fit to adopt a non-probability sampling technique that would be convenient under these prevailing circumstances. In light of this, most organisations (including government) worked remotely which made it more difficult to access databases of households within the selected district municipalities. Thus, it was convenient to get referrals directly from participants. Primarily, the study was aimed at including four district municipalities with a total of 384 participants. However, due to lockdown restrictions, permission was granted from the University of the Free State to only work with three district municipalities which resulted in a total of 225 participants taking part in the study. Quantitative data was sought from 195 participants, and qualitative data was gathered through six focus group interviews from the three district municipalities (Ilembe, King Cetshwayo, and Umkhanyakude District Municipalities).

## **1.7 STRENGTHS AND LIMITATIONS OF THE STUDY**

The inclusion of this section is critical because it details the notable advantages (strengths) and disadvantages (limitations) of the study. This is important because upcoming scholars and researchers who refer to this work, may improve and build-up from the listed shortfalls.

### **1.7.1 Strengths**

- Through use of the mixed methods approach, the study's validity is strengthened Zohrabi (2013).
- Quantitative data was refined and complemented by qualitative findings.
- Quantitative findings yielded precise, consistent, and reliable results as they were measured statistically (Edmondson and McManus, 2007).
- The use of the qualitative method helped in providing detailed information to explain complex issues (Busetto, Wick and Gumbinger, 2020).

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<sup>2</sup> The term 'lockdown' in this context refers to stringent restrictions on travel, social interaction, and public spaces that the South African government imposed on its citizens in response to the COVID-19 pandemic.

### 1.7.2 Limitations

- The data collection process was both time and financially consuming.
- Qualitative findings were challenging to analyse due to large amounts of data.
- Some study participants expected to be compensated for their time.
- The study was taken during a global pandemic which led to the reduction of the sample size.

## 1.8 PLAN OF RESEARCH ACTIVITIES

**Activity 1 [June 2019 – February 2020]:** Refine the project proposal, first chapter of the thesis. This chapter gives an overview of the overall project. It includes the abstract, problem statement, study aims and objectives, a brief description of the proposed research methods as well as the rationale for the study.

**Activity 2 [October 2019]:** Design the research tools, a survey questionnaire (for quantitative data) and an interview schedule (for qualitative data). These tools helped the researcher to meet all the empirical objectives as they were the first step towards the data collection process.

**Activity 3 [January – March 2019]:** Ethics application to the University of the Free State Committee (Human) for ethical consideration.

**Activity 4 [November 2019 – June 2021]:** Review of literature. This exercise assisted in building knowledge prior to the data collection and discussion. It also helped in achieving the theoretical objective of the study which sought to gain understanding about indigenous vegetables and their role on agrobiodiversity and food security.

**Activity 6 [November 2020 – March 2021]:** Data collection process.

**Activity 7 [April 2021 – June 2021]:** Data analysis.

**Activity 8 [July 2021 – September 2021]:** Discussion chapter.

**Activity 9 [October 2021]:** Submission of thesis for language editing/proof reading/printing and binding.

**Activity 10 [November 2021]:** Submission of thesis for examination.

## CHAPTER 2

### CONCEPTUAL AND LOGICAL FRAMEWORK

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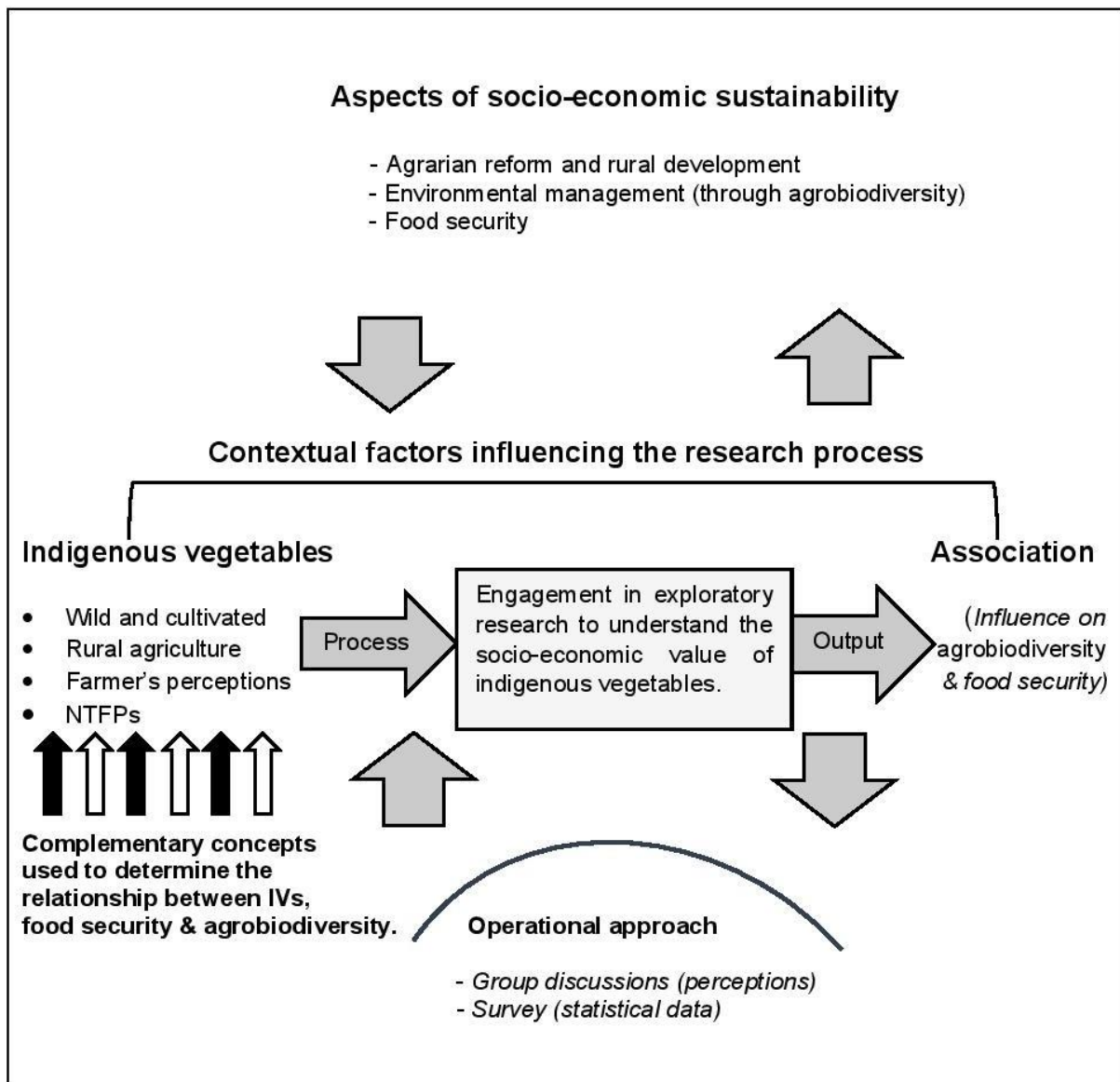
#### 2.1 INTRODUCTION

The term conceptual framework is defined as the system of concepts, assumptions, expectations, beliefs, and theories that support and inform one's research and the relationships among them (Miles and Huberman, 1994; Robson, 2002). Using concepts from existing studies and theories in relation to the main topic, the researcher developed a conceptual framework, a visual presentation of the key concepts that anchor the study. The main concepts are indigenous vegetables, agrobiodiversity, and food security. Other concepts that arise from the study are rural agriculture, sustainable agriculture, non-timber forest products (NTFPs), wild edible vegetables (WEVs) and socio-economic status (SES). The second part of the chapter presents a logical framework which maps the theoretical and methodological flow of the study. It consists of concepts, methods, and theories that are used. To develop this theoretical framework, the researcher immersed himself in pertinent research literature to determine the theories and models that are relevant to the research problem. The significance of the theoretical framework is that it strengthens the study through theoretical assumptions that can be critically evaluated by the reader. The Alabama State University<sup>3</sup> points out that the articulation of theoretical assumptions of a research study forces one to address questions of why and how and permits the researcher to move from merely describing the observed phenomena but also generalising about its various aspects.

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<sup>3</sup> Alabama State University. The Conceptual Framework. College of Education; Drafting an Argument.

## 2.2 CONCEPTUAL FRAMEWORK



**Figure 2.1: Conceptual framework (Source: Researcher, 2021)**

Figure 2.1 illustrates the conceptual framework which outlines the broader aspects of socio-economic sustainability that the study sought to contribute towards. These include food security, agrobiodiversity and ultimately, agrarian reform and rural development through the inclusion of Indigenous vegetables in the food and environmental management systems. To obtain the relevant data that addresses the main objectives of the study and allow for correlational and theoretical analyses, group discussions were conducted to get the participants' perceptions on Indigenous vegetables. This is especially important since there is a lack of documented literature on Indigenous vegetables in the food discourse. Studying perceptions of people who

are also knowledge holders will help in the preservation of such rich information for the benefit of future generations. Similarly, guided by the relevant concepts as illustrated in Figure 2.1 (some are not included), a survey questionnaire was designed and administered to the participants (Appendix C).

## **2.3 CONTEXTUALISING THE MAIN CONCEPTS**

### **2.3.1 Agrobiodiversity**

Agricultural biodiversity (agrobiodiversity) as recorded by Odour, Boedecker, Kennedy and Termote (2019), refers to useful plant species that can be utilised as food, animal feed, medicine, and mulch or construction material. This definition signifies that different plant species which play a role in the food value chain, whether cultivated or non-cultivated, form part of ecological biodiversity. The Food and Agriculture Organization (FAO)<sup>4</sup> further associates the loss of genetic biodiversity to loss of capacity to maintain and enhance livestock productivity. The inclusion of animals fits the concept of agrobiodiversity as species from the animal kingdom play a significant role in agricultural systems through their monetary and non-monetary value. It is common knowledge that in order for flowering plants to germinate, there first has to be a process of pollination that takes place which is mostly through animal vectors. Such a coexistence indicates a symbiotic association between the plant and animal kingdoms.

Of the same accord, Baul, Rahman, Moniruzzaman and Nandi (2015) allude to agrobiodiversity as a variability of living organisms and stress its importance on sustainable agricultural production. It must be noted, however, that the term 'sustainable' in the context of agriculture is often used loosely without any consideration of the weight it carries. According to Pretty (1995), there is no absolute definition for sustainability. However, when speaking of 'sustainable agriculture', sustainability is often associated with regenerative practices that are of value to the environment and livelihoods. This is supported by the eighth edition of the Oxford

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<sup>4</sup> An undated publication by the Food and Agricultural Organization that embraces agrobiodiversity through the conservation of animals can be retrieved on the link: <http://www.fao.org/3/v1650t/v1650t0y.htm>.



Advanced Learner's Dictionary<sup>5</sup> which defines sustainability as the use of natural products and energy in a manner that does not harm the environment. Deducing from the descriptions of agrobiodiversity and sustainability, the term 'agrobiodiversity' in the context of this study, refers to different plants and animals that are of social, environmental, and economic value. Agrobiodiversity, a subdivision of biodiversity, is an important subset of agriculture that is embraced for the diversity that it brings to the agricultural domain and the broader ecosystem. Joshi, Gorkhali, Pradhan, Ghimire, Gotame, Prenil, Mainali, Karkee and Paneru (2020) highlight some of the most important components that are brought about by agrobiodiversity. These include domesticated, semi-domesticated, wild relatives and wild edible crop species. It is important that indigenous species be given attention similar to their exotic counterparts. It is the researcher's opinion that such an undertaking would help in building a balanced ecosystem while also ensuring sustainability.

The loss of agrobiodiversity can be attributed to different vulnerabilities that have eroded and continue to erode different indigenous crops. According to Joshi *et al.* (2020), the replacement of indigenous vegetation by modern vegetation is one of the main reasons why there is a surge in the loss of agrobiodiversity. Similarly, Shelef, Weisberg and Provenza (2017) argue that indigenous vegetation has been neglected as a result of conventional crops that have been widely accepted and which have immensely contributed to the loss of agrobiodiversity. These conventional varieties are known to be associated with environmental health hazards which include a decline in the overall biodiversity (Carpenter, 2011). Joshi *et al.* (2020) continue to argue that the limited use of local landraces for breeding purposes, the wide distribution of modern varieties, changes in the land use patterns resulting in habitat loss, natural and manmade diseases, mono-genotyping and the migration of farmers and land abandonment which lead to over-exploitation, are some of the factors that have contributed significantly to agrobiodiversity deterioration. It is for this reason that an investment in the promotion, the production and preservation of indigenous species ought to be made in order to protect these species while adding a co-created value of balancing out the agroecosystem. Previous research informs us that the indiscriminate

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<sup>5</sup> American Psychological Association. 2018. Socioeconomic status. Accessed Online: <http://www.apa.org/topics/socioeconomic-status/>.

use of agricultural chemicals such as pesticides and herbicides has been a major cause of the loss of indigenous plants (Gill and Garg, 2014). However, there is still a lack of empirical evidence on this matter.

### **2.3.2 Food Security**

The concept 'food security' has been used over the years and it continues to evolve considerably with time. Because of this, it is a difficult concept to measure as it looks beyond the mere availability of food but rather deals primarily with the entire process of food production, its distribution, and consumption. The Food and Agricultural Organisation (FAO) has made an important contribution in this concept of food security; for example, it defines food security in an internationally comprehended manner as a situation that exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996). This translates to sufficient availability of food at a global, national, communal, or at a household level. This definition by the FAO points out four pillars of food security: namely, availability, access, utilisation, and stability. These are expounded on in the fourth chapter.

### **2.3.3 Indigenous Vegetables**

Although there is no single definition for indigenous vegetables, in the context of this study they refer to edible plants that either occur naturally from the wild or are home-grown and are produced through practices that are considered to be traditional. This description concurs with the Department of Agriculture, Forestry and Fisheries (DAFF) definition that indigenous vegetables are crops that are native or unique to a specific area and are grown using the traditional methods of the people (DAFF, 2011).

### **2.3.4 Non-timber Forest Products (NTFPs)**

Shackleton and Shackleton (2004) define non-timber forest products as extensive biological products from the wild. These include both wild plants and animals, and other goods of biological origin other than timber from natural, modified or managed forest landscapes (Pandey, Tripathi and Kumar, 2016). NTFPs play a significant role in the environment as they form an important part of the ecosystem. Their presence

brings an ecological balance that is necessary for environmental health and the coexistence of different living organisms.

### **2.3.5 Rural Agriculture**

Most rural households have their unique ways of agricultural production. These practices are known to be either indigenous and/or traditional to the farming communities. As such, the terms indigenous agriculture, rural agriculture, and traditional agriculture are used synonymously in this study. Zwane (2012) defines 'rural agriculture' as an action-driven process in which rural farmers learn through their own experiences and initiatives how to acclimatise their indigenous knowledge to the modern world. Several authors (Mavengahama, McLachlan and De Clerq, 2013; Shackleton and Shackleton, 2004; Zwane, 2012) spotlight agriculture to be a major livelihood strategy for communal citizens. Based on this reason, the researcher feels a strong need that the constructs of rural agriculture be explored in this study as a means of better understanding the farming systems in rural areas.

### **2.3.6 Socioeconomic Status (SES)**

The socioeconomic status (SES) is a combination of the social and economic position of a person, household, or community in relation to others. This concept is often measured as a unification of education and income within a given context (Qwabe, 2019). The American Psychological Association<sup>6</sup> defines SES as the social standing or class of an individual or group. Based upon the above-mentioned definition it is the researcher's observation that communities which formed part of this study are previously disadvantaged and are of a low SES. They are characterised by gravelly roads, poor infrastructure (although there has been governmental intervention over the years), and a poor transport system. It is thus important that the SES of the identified communities be explored to determine the correlation between their livelihood status and the overarching objective of this study which is aimed at determining the significance of indigenous vegetables in the context of food security and agrobiodiversity in communal areas.

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<sup>6</sup> American Psychological Association. 2018. Socioeconomic status. Accessed Online: <http://www.apa.org/topics/socioeconomic-status/>

### **2.3.7 Sustainable Agriculture**

Sustainable agriculture is generally understood as an agricultural practice that values environmentally friendly methods of production that do not compromise the health of the environment nor lead to the degradation of land. The researcher acknowledges the assertion by Lichtfouse, Navarrete, Debaeke, Souchere, Alberola and Menassieu (2008), who declare that sustainable agriculture is a comprehensive integration of biological, ecological, chemical, physical, economic, and social sciences to improve novel agricultural practices that are safe and do not degrade the environment. The concept can also be defined as a food production approach that meets people's dietary needs without compromising the ability of future generations to meet their own needs.

### **2.3.8 Wild Edible Vegetables (WEVs)**

The researcher defines wild indigenous vegetables (WEVs) as plants that occur naturally in the wild and are neither cultivated nor domesticated but can be utilised for human consumption. This definition is affirmed by Jansen van Rensburg, Venter, Netshiluvhi, van den Heever, Vorster and Ronde (2004), who state that WEVs grow naturally in the wild and play a crucial role in the make-up of the ecosystem as a source of food for herbivorous and omnivorous species. WEVs are also known to be of benefit to mankind through their multiple uses which include medicinal value, fibres, fuel wood, beverages, oil, and food. Of the same accord, Bhatia, Sharma, Manhas and Kumar (2018) report that WEVs have an important role to play in the alleviation of poverty, food availability, agricultural diversity, income generation, and reduction of malnutrition.

Based on personal experiences, the researcher believes that WEVs have a positive impact on the overall well-being of the natural environment and its living organisms, more especially species from the animal kingdom including human beings. The rationale behind this assertion is because a wide range of WEVs are used for food, medicinal, and cultural purposes (Aryal, Poudel, Chaudhary, Chettri, Chaudhary, Ning and Kotru, 2018). However, due to the misuse of these vegetation over the years and without any measures of preserving them, WEVs are gradually becoming extinct. A different logic, however, is brought by Seburanga (2013) who argues that the decline of WEVs could be attributed to the domination of landscapes by alien species which

is one of the legacies of colonisation that resulted in cultural disintegration and erosion of indigenous knowledge. The researcher is of the same accord with Seburanga on the claim about the decline of WEVs. It is, therefore, vital that effective ways of preserving WEVs be investigated and documented.

## **2.4 ANCHOR THEORIES**

While the use of theories is not common in the field of natural sciences, the researcher embraced the logic used in the social sciences of anchoring the study in theory in order to make informed decisions around the design. Two anchor theories were thus adopted. These are the Malthusian theory (proposing theory) and the Boserup theory (opposing theory). The two theories are concerned with the correlation of population growth and food supply. While the study places focus on two phenomena, agrobiodiversity management and food security; the co-existence of the two theories helps in presenting the link between indigenous vegetables, agrobiodiversity management, and food security which are later presented in the discussion chapters.

### **2.4.1 The Malthusian Theory**

Malthus lived during the early times of the Neolithic Revolution between the 1700s through to the early 1800s. During this pre-industrial revolution era, most countries across the world were marked by a low-producing agricultural sector (Olsson and Svensson, 2010). Malthus's theory hinges on the premise that population growth is inversely proportional to food production and ultimately food supply. He argues that “[...] *when not moderated, population increases in a geometrical ratio, while subsistence (food supply) increases only in an arithmetical ratio*” (Dunn, 1998). It can be argued that Malthus's concern centred on the politics of food and its significance to livelihood well-being. This is supported by his assertion of the disparity between the rate of population growth and slower increase in food supply which would ultimately result in war, famine, and diseases if not properly addressed.

While Malthus's theory seems to be popular among scholars of the current epoch, the fact that his views were shaped by the events of the late 1700s and early 1800s should not be overlooked. During these times, the state of agriculture was not as advanced as it is in the current times. The use of technology and application of scientific methods

were still in their infancy. According to Shermer (2016), the scenario of the Principle of Population by Sir Thomas Robert Malthus, was an effective mechanism for reducing a surplus population as it influenced policy makers to take radical measures to control the populations' family size which included forced sterilisations. However, in line with the overarching aim of this study, the Malthusian theory will be contrasted with the primary findings and further employed to answer the main research questions that are centred on the relationship between indigenous vegetables, food security and agrobiodiversity.

#### **2.4.2 The Boserupian Theory**

Although Sir Robert Malthus became popular for his essay on population growth in the pre-industrial era, Ester Boserup introduced an opposing theory approximately two centuries later. Boserup (1965) believed in a futuristic philosophy which embraced technological advancement in proportion to population growth. Contrary to Malthus (1798) who believed that the human population would multiply until such a time that there is no longer space for food supply, Boserup (1965) believed that population growth determines the rate of food production. It can thus be argued that Boserup's theory posits that population growth leads to the adjustment of agricultural practices. This means that when people experience food scarcity, wars and famine are not the end result as per Malthus's assertion; rather they invent new ways to produce food.

#### **2.4.3 Researcher's Position: Coexistence of Malthus and Boserup's Theories**

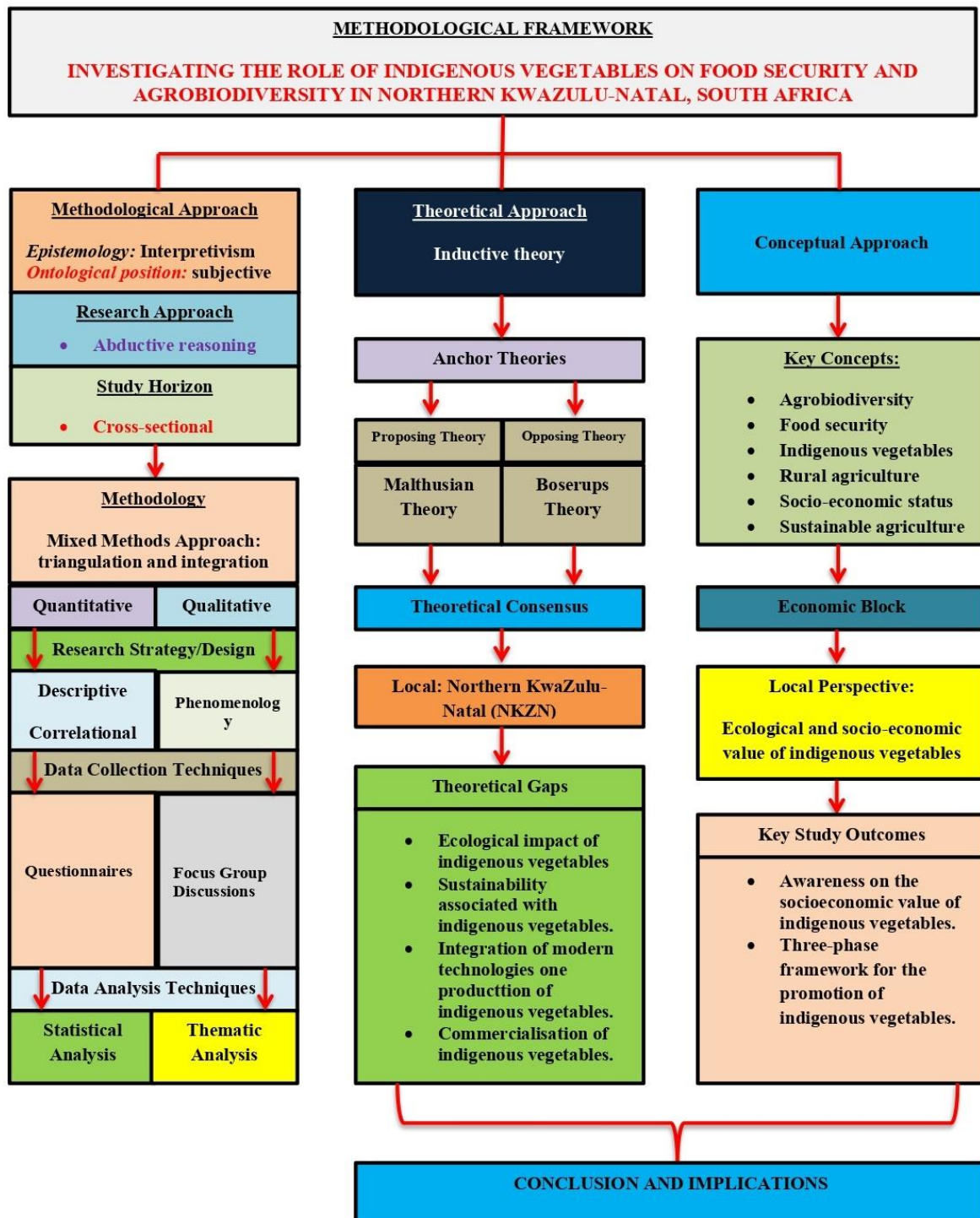
Thomas Robert Malthus and Ester Boserup both believed in the law of nature. They each had their own theory about food supply in relation to population growth. The Malthusian theory suggests that population growth cannot grow beyond food supply (Malthus, 1798), while Boserup's theory on the other hand, suggests that population growth motivates the intensity of agricultural production. According to Boserup (1965), food supply grows simultaneously with population growth, and which often results in the former (food supply) not being able to keep up with the increase in population. Understanding that the two theorists existed in different eras, it is possible that their worldviews were shaped by their experiences and the occurrences of their individual epochs. Malthus lived through the 18-19<sup>th</sup> century whereas Boserup lived through the 20<sup>th</sup> century. These timeframes are an indication that the existence of the two theorists

was divided by the Industrial Revolution (IR). It also paints a clear image as to why the counter-Malthusian theory by Boserup is on a continuous framework which strongly favours technological advancement.

Both Malthus and Boserup acknowledged the fact that the population increases. However, the contrast lies at the heart of food supply. Malthus strongly believed that the population increases faster than food supply. In his view, the population increases geometrically (1, 2, 4, 8, 16, 32...) whereas food reserves increase arithmetically (1, 2, 3, 4, 5...). On the other hand, Boserup believed that population growth presents an opportunity for innovation as it stimulates the development of technology.

While these two theories are usually used in contrast, the researcher proposes that the two theories co-exist. Intensification is driven by population growth as per Boserup's prediction, until it reaches a diminishing point where the environment reaches its limits. Such a ceiling, combined with population growth, eventually points to the Malthusian calamity. It is, therefore, important to link the two theories not only with food production and supply, but also the management of the agricultural biosphere which ultimately gives birth to food security. To achieve this, the following logical framework is presented in Figure 2.2 which maps the methodological flow which the study followed.

## 2.5 SKELETAL FRAMEWORK: MAPPING THE METHODOLOGY



**Figure 2.2: Methodological Framework (Source: Researcher, 2021)**

The framework presented in Figure 2.2 gives an overview of the link between the methodological, theoretical, and conceptual approaches. The researcher has adopted a pragmatic approach that is built of abduction and induction. This philosophically based problem-solving framework has been proven by numerous researchers as one



of the main reasoning processes that points towards the attainment of belief and elimination of doubt (Rahman, Haron, Nordin and Ghani, 2014). The framework also outlines three theoretical gaps which this study intends to contribute towards filling. This includes (i) the sustainability that is associated with the production of indigenous vegetables, (ii) indigenous knowledge as a tool to augment Afrocentric science, and (iii) the commercialisation of indigenous vegetables.

It should be noted that the researcher's positioning in this study is informed by his close association with indigenous vegetables. As such, it favours the promotion of these indigenous vegetables and is informed by both *posteriori* knowledge and empirical evidence. It is for this reason that the researcher believes that there is a link between sustainability and indigenous vegetables. However, numerous factors such as stigmatisation have contributed towards the inferiority of these indigenous vegetables in the market environment (Qwabe, 2019). Therefore, through this undertaking, all the efforts of this study have been channelled towards the promotion of the continued use and production of indigenous vegetables, their marketability and commercialisation, and their socio-economic value, with the aim of informing food security policy. The methodological approach is explained and justified in Chapter 6, and combines the descriptive, correlational, and phenomenological study designs which are used complementarily in the analysis and interpretation of the findings.

## **2.6 SUMMARY**

This chapter sought to present the key concepts that anchor the study. Alongside this, was the presentation of the Malthusian and Boserup theories which are centred on the effect of population growth in the food systems. Underpinning these theories to the study helped in better understanding food security as one of the focus phenomena of the study, and to deconstruct the research questions concerned with it and ultimately develop constructive arguments. In addition to this, a complete skeletal structure of the methodological flow for the study is illustrated. The next chapter provides a background on South Africa's food dynamics.

## CHAPTER 3

### UNDERSTANDING THE HISTORY OF SOUTH AFRICA'S FOOD DYNAMICS

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#### 3.1 INTRODUCTION

Since the beginning of the green revolution in the early 1960s in developing countries, agriculture has primarily focused on conventional cereal and horticultural crops which have become globally dominant and have replaced many locally produced indigenous food crops (IFCs) which were previously produced in many communities; for example, in the aboriginal communities (Singh and Singh, 2017). According to Bvenura and Afolayan (2015), this popularisation of conventional food crops left the development and cultivation of indigenous and traditional food crops to be severely undervalued. In this section, the researcher discusses the history of African foods, the state of food systems prior to the green revolution, how the development and popularisation of conventional crops affected the food systems in the indigenous communities, and what that meant for IFCs. Secondary literature forms the basis of this discussion and looks at the broader African context since the history of South African food systems cannot be separated from occurrences that have affected the food systems of other African States. Context is provided to indicate that the use of the term 'African' in this study does not necessarily denote the continent as we know it, but rather native communities in which the indigenous people reside and exist in accordance with their unique customs, values, beliefs, and traditions.

### 3.2 FOUNDATIONS OF AFRICAN FOOD SYSTEMS, A PRELUDE TO THE GREEN REVOLUTION

The history of African food systems is one of the areas that is not well documented in African literature. Much of the existing and easily accessible literature can be dated from the 1960s after the conception of the green revolution. Hazell (2009) defines the green revolution as the introduction of a package that consisted of modern agricultural inputs such as improved seed cultivars that were believed to be drought and disease resistant, chemical fertilizers, and pesticides that were aimed at enhancing crop production as a means of curbing escalating levels of hunger and poverty.

While the green revolution has had a tremendous influence on the food systems of South Africa and Africa at large, its primary objective to end hunger has not proven to be a complete success. Corroborating this is Darkoh (1989), who specified that 'Africa has been in grips of food shortages since the 1960s', which coincides with the period in which the green revolution was still a new concept on the African continent. Over the years, the introduction of this green revolution has both replaced and led to the undervaluing of IFCs (Bvenura and Afolayan, 2015). These crops (IFCs) are those that were considered to be traditional, and which were grown using local production methods with respect to the areas in which they were either cultivated or grew naturally, and which formed part of the indigenous people's cuisines in the historical times (Akinola, Mabhaudhi, De Bruin and Rusch, 2020). Among some of the popular indigenous varieties were groundnuts, kaffir corn (sorghum), finger millet, bullrush millet, which Punt (1979) highlights as some of the important crops that were behind Africa's resilient food systems prior to and during the arrival of the settlers and their westernised methods of production.

It is worth noting, however, that while the IFCs and indigenous vegetables played a significant role in the food systems of African communities – there was a need to realise both Sir Thomas Robert Malthus<sup>7</sup> and Ester Boserup's<sup>8</sup> theories about the correlation between population growth and food supply. As the global population increased, preventative measures in relation to population growth as suggested by

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<sup>7</sup> Malthus' theory postulates that population increase happens exponentially while food supply growth happens arithmetically.

<sup>8</sup> Boserup's theory posits that population change drives the intensity of agricultural production.

Malthus did not succeed. Population control measures (e.g. family planning) was not effective in some parts of the world, including Africa and an alternative was found. This alternative is in line with Esther Boserup's views that population increase gives birth to agricultural innovation. Boserup's outlook proved to be true as innovative measures in the food production domain have been the primary key towards producing adequate food for all people across the globe. This means that the application of Boserup's philosophy has yielded a parallel increase between agricultural production and the growing population globally. The downfall of this ideology is that it benefited the West and was imposed in developing countries like South Africa while intentionally attaching a stigma to IFCs (Akinola, Mabhaudhi, De Bruin and Rusch, 2020).

### **3.3 THE GREEN REVOLUTION: LESSONS FROM INDIA**

Although the green revolution is often synonymised with technological innovations, it is crucial to understand why it came about in the first place. According to Frankema (2014), the green revolution was not just about a mere technological breakthrough that would realise experiments of high-yielding seed varieties. The real revolution, however, was about the rapid diffusion of useful scientific knowledge across large parts of the Southern hemisphere. One can argue that this urge to share information could have been aimed at re-adjusting by improving the state of agriculture and meeting the increasing food demand parallel to the increasing population as per Boserup's proclamation. However, some researchers contrast the commencement of the green revolution with issues of social equity and capitalist accumulation (Patel, 2013). An example of this can be drawn from India as one of the first countries that saw the birth of the green revolution.

Stone (2019) argues that India's Green Revolution was about Malthusianism since India proved the dangers of population growth that outpaced food production. Contrastingly, Stone continues to state that India's Green revolution was also about Boserup's conviction that technological innovation was India's only hope that could save millions of lives. The two contrasting viewpoints that Stone (2019) raises indicate the coexistence of Malthus and Boserup's convictions on population growth and food supply. However, in as much as this study is concerned with the theory of the green revolution from a food supply perspective, critical points drawn from India such as the conviction of pure technological triumph as a drive to capitalism and social inequality

should not be overlooked. In the same light, the introduction of the green revolution may have been genuinely aimed at improving the declining food systems dating from as early as the mid-1900s. Such concerns do not fall within the limits of this study but propel the researcher towards investigating the repercussions of the green revolution on IFCs.

### 3.4 THE IMPACT OF THE GREEN REVOLUTION ON SA'S INDIGENOUS CROPS

The green revolution introduced high-yielding crop varieties in South Africa during the 1960s with the primary aim of increasing agricultural production and alleviating food hunger and poverty. While the intention was necessary when looked at from this perspective (this is not to corroborate the misconception that South Africans suffered from hunger), the exotic varieties which were believed to be high yielding led to the deterioration of indigenous crops. According to Akinola *et al.* (2020), South Africa found itself in a situation whereby researchers and agricultural extension officers labelled indigenous leafy vegetables as weeds. Teachings of this nature led to the unfortunate stigmatisation of indigenous foods by many, more especially the younger generation (Ineke, Jansen van Rensburg, Zijl and Sonja, 2007). Today, in many parts of the country IFCs are associated with poverty and are known to be poor man's food. This is especially true for crops like traditional leafy vegetables.

**Table 3.1: Four main groups of the perceived benefits of indigenous food crops**

Benefit	Example
<b>1. Nutritional benefits</b>	Nutrient density can be higher than in other foods.
<b>2. Environmental benefits</b>	Indigenous crops can be drought tolerant in the face of climate change.
<b>3. Socio-cultural benefits</b>	The interaction between local knowledge and nutritional value of indigenous foods.
<b>4. Economic benefits</b>	Livelihoods and income generated due to the sales of IFCs.

**Source: Adopted from Akinola *et al.* (2020)**

Table 3.1 shows the many benefits that are brought about by IFCs. However, despite these benefits, IFCs remain underutilised and undervalued. This under- appreciation of indigenous crops justifies why they have been neglected while their exotic counterparts have been widely studied and even form part of the South African national dietary guidelines (Vorster, Badham and Venter, 2013). The tabulated benefits on IFCs are an indication that these crops can play a significant role in the development of the current food systems in the context of health, resilience and environmental well-being, cultural appreciation, and income generation. It is, therefore, important to investigate why crops with so much potential still border on the marginal line of the socio-economic value chain in the current epoch.

### **3.4.1 Subsistence vs Conventional Agriculture**

To separate the production of IFCs from subsistence agriculture would be a fallacy because the two are coexistent and should not be separated from one another. Indigenous crops have been the backbone of indigenous agriculture (which is predominantly subsistence) for over centuries. However, in some parts of the world, subsistence farming remains neglected which has led to its significant decline, especially in the rural areas (de Janvry and Sadoulet, 2011; Siphesihle and Lelethu, 2020). This is true in the African context too. A study which concentrated on the future of subsistence farming in rural communities found that one of the notable downfalls with subsistence farming is that academics and policymakers hold a negative view about this form of agriculture because it is characterised by low usage of modern inputs (technology) and low productivity (Onakuse, 2012). Because of this, subsistence agriculture has been associated with backwardness and inefficiency, and is believed to hold back economic growth.

The researcher notes that Onakuse's observation is the same as the findings by Qwabe (2019) who investigated the socio-economic importance of indigenous vegetables. Despite their socio-economic value, indigenous vegetables are looked down upon, associated with poverty (Akinola *et al.*, 2020), and used as an income generating tool by academics who study them for the sake of improving their scholarship and not necessarily because they seek to inform policy and/or improve people's livelihoods (Qwabe, 2019). In the latter chapters, the researcher shows the

interlinkage between IFCs and subsistence agriculture, and justifies their importance in the social, environmental, and economic domains.

Such a discussion is important in a world where there is an ever-growing increase in the population and a staggering of access to food sources. Specific reference is made to Africa, a continent that is known to be the poorest in the world (Addae-Korankye, 2014). This truth applies even in South Africa, a country that is known to be food secure at a national level but still suffers from food poverty at a household level (FAO, 1996; SSA, 2017) despite the conventional interventions that dominate the country's dualistic agricultural economy at both subsistence and commercial scales. The researcher argues that the challenge regarding access to food at a period where the country has been influenced by the West to utilise genetically modified organisms (GMOs), is underpinned by numerous factors which include the constantly declining economy. Genetically engineered crops are costly and access by small-scale farmers is often challenging (Azadi, Samiee, Mahmoudi, Jouzi, Khachak, Maeyer and Witlox, 2015). There are many benefits that are believed to be associated with GMOs, but they may never be a reality for poor communities (Altieri, 2000).

GMOs could also threaten biodiversity by wiping out indigenous species that have thrived for over decades and this could have implications for food security. The second factor that the researcher observes is the maintenance that is required when using GM/high yielding crops. The challenge lies not in the purchasing of GMOs only, but also the cost-ineffective management practices that follow thereafter (Azadi *et al.*, 2015). Furthermore, Fanadzo, Chiduza, Mnkeni, van der Stoep and Stevens (2010) allude to the poor crop management practices that have failed to deliver on the improvement in production and rural livelihoods. Among these practices are poor smallholder irrigation schemes (SIS), fertilizers, pesticides, herbicides, and extension services. Table 3.2 presents some of the most utilised GMOs that form part of the people's diet in South Africa.

**Table 3.2: Genetically modified crops mostly utilised in South Africa**

<b>Most consumed vegetable crops in South African households</b>			
Potatoes	Tomatoes	Cabbages	Onions
Eggplants	Cauliflower	Green beans	Hubbard squashes
Peas	Sweet corn	Marrows	Turnips
Butternut	Beetroot	Butter squashes	Carrots
Cucumbers	Gem squashes	Lettuce	Broccoli
Swiss chard	Bell peppers	Melons	Others

**Source: Adapted from (Hoffman and Harrison, n.d.)**

Most of the GMOs that are listed in Table 3.2 are crops that require high maintenance as well as reliable irrigation systems. Although these crops are believed to be high yielding crops, they also require inputs such as pesticides and herbicides which an ordinary small-scale rural farmer whose socio-economic status is characterised by illiteracy and unemployment, can barely afford (Khapayi and Celliers, 2016). The researcher's intention is not to assume that GM crops are not beneficial in South Africa's food systems, but to point out their shortfalls which are near impossible to fully adopt considering the country's staggering economy and production challenges. However, there is a need to recognise and fully appreciate IFCs that form part of people's identity, which are easy to access, and require fewer management practices in comparison to their exotic food crop counterparts (Akinola *et al.*, 2020).

### **3.4.2 Indigenous Food Crops (IFCs) vs Exotic Food Crops (EFCs)**

Both the IFCs and exotic food crops (EFCs) play an important role in the food systems of South Africa. However, one of the most growing concerns in the politics of food is the discrimination against indigenous foods at a time when part of the everyday narrative in the African discourse is rooted in decolonisation, transformation, and the embrace of indigenous knowledge systems (Lugo-Morin, 2020). The reason for this as previously indicated, dates back from the 1960s when efforts from the West were taken to promote exotic horticultural and cash crops which resulted in the neglect of indigenous crop varieties (Bvenura and Afolayan, 2015). To help accelerate the mass production of EFCs, scientists and agricultural extension officers promoted these 'so-called' high yielding varieties through their teachings (Akinola *et al.*, 2020). These



teachings undervalued IFCs and placed them far below EFCs as they were referred to as 'weeds.' Today it is a challenge to undo these historical implantations and suggest corrective measures that may lead to the adoption of IFCs in the modern food systems.

### **3.5 CONTEXTUALISING PERCEPTIONS IN RELATION TO IFCs**

Since the study is anchored on the perceptions of the participants, it is important that the concept 'perception' be contextualised. In this study, the word perception is a key component of both conceptual and theoretical frameworks that are presented in the second chapter. The term 'perception' is associated with words such as cognisance, awareness, sense, conception, idea, notion thought, etcetera. However, in this study, the researcher adopts McDonald's (2011) definition, which simply defines the term 'perception' as a uniquely individualised experience from which a person can draw what is known to oneself. Such experiences are often shaped by social experiences which manifest based on how one views the world through a filter of sociocultural elements. The importance of perceptions in this study lies on the premise that the indigenous crops that are being investigated coexist with the people. They are found in the environments in which people live and are mostly utilised as a source of livelihood. Each person has his/her own views about these crops based on their individual experiences. These experiences are often shaped by each individuals' social experiences which are anchored on their societal beliefs, values, teachings, and customs (Bandura, 1999). Previous studies (such as Partos, Cropper and Rawlings, 2016), have shown that in as much as societies may have their unique ways of doing things and hold shared beliefs, at an individual level each person holds views that differ from others regardless of their shared experiences. Therefore, it is important to highlight that the perceptions of the study participants in relation to their individual experiences with indigenous vegetables are highly valuable to this study.

### **3.6 SUMMARY**

This chapter provides a background about the green revolution, a phenomenon described as the introduction of a package consisting of modern agricultural inputs and technologies that were primarily aimed at enhancing crop production to curb the escalating levels of hunger and poverty. Drawing from previous studies, the researcher contrasts the effects of this green revolution on local food systems and how it led to the decline of indigenous food crops (IFCs), particularly in South Africa. Reference is made to India from which the introduction of the high-yielding crop varieties brought about by the green revolution were vastly populated. Previous literature indicates that in as much as the green revolution era may be synonymous with technological advancement, it was a form of gaining monetary power. Simply put, it is a capitalist system. However, this does not form the core of this discussion as it leans more towards the political spectrum which does not serve any interest of this study, nor does politics contribute to any of its objectives. The researcher continues to explore the benefits that are associated with indigenous crops, some of which have been presented in Table 4.1. Despite these benefits, due to the stigma that has been systematically planted among the indigenous people through the teachings of scientists and extensionists, IFCs stand neglected and underappreciated. On the other hand, non-indigenous crop varieties (presented in Table 4.2) are still the predominantly utilised varieties in many households despite the inconvenience associated with their production. The chapter concludes by contextualising the concept 'perception' as a grounding component for the conceptual and theoretical frameworks of the study. In doing this, the researcher highlights the importance of perceptions in a study of this nature as they are a source of people's lived experiences which differ from person to person. This uniqueness of perceptions thus benefits the study in that a diverse discussion resulted from the analysis.

## CHAPTER 4

### AN EXPLORATION OF THE STATE OF FOOD SECURITY IN SOUTH AFRICA

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#### 4.1 INTRODUCTION

In the previous chapters, reference has been made to the Food and Agriculture Organisation (FAO, 1996) and Statistics South Africa (SSA, 2017) who have repeatedly stated that South Africa faces a challenge of household food insecurity. But to what extent is food insecurity experienced, and who are the most affected? This chapter explores the groups vulnerable to food insecurity, the causalities of food hunger in households, and the socio-economic positioning that is a result of poverty. As per the definition of the FAO (1996), food security is not only determined by the availability and accessibility of food. It is also concerned with the safety and nutritional component that is contained by the foods that people consume. The understanding of the state of household food insecurity lays a foundation for the second objective of this study which seeks to determine the critical indicators that determine household food insecurity in communal areas. To address this objective, this section focuses on food security challenges, the food security policy and strategy, as well as the risk management measures. The researcher used these gauges to search for literature concerned with household food security, most of which has been studied and documented by scholars in the social sciences (Dunga, 2020; Malan, 2020). In addition to this, the researcher differentiates between chronic and transitory-acute food insecurity. The link between agriculture and food security are also explored as a coping mechanism towards the extenuation of food poverty in rural communities.

## **4.2 UNDERSTANDING FOOD SECURITY**

Food security has sprouted as a global crisis as a result of the increasing population and climate related challenges. The concept 'food security' has been used and continues to evolve considerably over time. As a result, it is a difficult concept to measure as it looks beyond the mere availability of food but rather deals primarily with the entire process of food production, its distribution, and consumption. FAO has defined food security in an internationally comprehended manner as a situation that exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996). In a narrow sense, food security refers to sufficient availability of food, be it globally, nationally, within a community, or at a household level. This widely accepted definition by the FAO points out four dimensions of food security; namely, availability, access, stability, and utilisation which form part of the main discussion in this chapter.

## **4.3 SOUTH AFRICA'S STATE OF FOOD SECURITY**

Although South Africa is known to be food secure at a national level, hunger, malnutrition, diseases, and rural poverty are some of the prominent challenges that the country still grapples with (Pauw, 2005). This notion of food insufficiency has been studied and affirmed in numerous studies (such as Mavengahama *et al.*, 2013), which evidently indicate that it is relative to hunger, poverty, and micronutrient deficiencies. According to Havas and Salman (2011), food is an energy source and limited access to food has a direct impact on health. In South Africa, it is mostly the rural poor who are usually the victims of food insecurity and poverty because these are closely linked to household socio-economic status which is indicated by food expenditure, income, and employment status (Chakona and Shackleton, 2019).

According to Ijaiya, Ijaiya, Bello and Ajayi (2011), poverty can be understood from two different perspectives, the first one is the insufficiency of monetary resources and inadequacy of all types of chronic resources that are needed to satisfy basic human needs such as nutrition. The second perspective is that of powerlessness, which refers to people who are governed by forces that are out of their control such as monarchs in positions of authority. Similarly, Chambers (1983) mentions that the rural poor are

usually caught in what he outlines as the 'deprivation trap' through which five clusters of disadvantage merge to entrap people in confined situations of animosity. Among these five clusters of disadvantages is poverty, which can be narrowly described as the lack of assets. Relatively, the four other clusters are wider dimensions of poverty and in agreement with Ijaiya *et al.* (2011), they include powerlessness, physical weakness, vulnerability and isolation. Although the deprivation trap now comes as a relevant theme for a multitude of contexts, it was initially designed to represent the rural context.

#### **4.4 HOUSEHOLD STATISTICS**

Food security is a poverty problem that has threatened, and continues to threaten, the world population (FAO, 2006). At national level, South Africa is able to produce, export, and import what it needs to meet its food requirements (DOA, 2002). However, a report by the World Bank (2021) indicates that approximately 30.8 million (55.5%) of the South African population are living in poverty at the national upper poverty line (-R992) while 13.8 million people (25%) experience extreme poverty. This figure, compared to the 2009 findings, is much lower as then 16.7 million people lived in absolute poverty (SSA, 2017). These findings suggest that between the years of 2009 and 2015 (the period which the latest general household survey results by SSA present), about 2.9 million people survived food poverty. This improvement in food security could be attributed to government interventions and enforced policies in the goal to attain food security. However, there is still a need to further explore the existing gaps between the macro policy environment at national level as well as the effects on, and experiences of, rural farmers at micro level. Hence the study recognises the perceptions of rural farmers with regard to their lived experiences and the way they are affected by government policies which have not fully recognised indigenous vegetation as a critical element of livelihoods development that needs to be mainstreamed in the existing food systems.

#### **4.5 THE FOOD CHALLENGE**

South Africa is a diverse country that comprises eleven official languages and different ethnic groups who all have their unique indigenous cuisines. However, just like many other countries around the world, the country relies on western cuisines and

conventional agriculture (Mashele and Auerbach, 2016). While this system of farming is universally accepted, it has not entirely proven to be a winning solution. For example, South Africa is well known for its participation in the import-export market; however, for over two decades it has been declared as food insecure at a household level (FAO, 1996; SSA, 2017). This denotes that there is sufficient food for everyone in the country; however due to compounding challenges like the triple challenge (inequality, poverty, and unemployment), as stipulated by Van der Westhuizen and Swart (2015), food accessibility remains a challenge for vulnerable groups which are of a low socio-economic status. Such challenges indicate that the industrialised and/or globally accepted conventional methods of the food value chain have shortfalls and are not entirely the solution in the politics of food despite their multifaceted advantages.

#### **4.5.1 Food Availability: The First Fundamental Challenge**

Despite the political and economic advancements that have taken place in South Africa since transitioning into democracy, millions of people still experience different levels of poverty (SSA, 2017). A national survey review on food security between 1999-2008 reported that food availability is different across all South African provinces (Labadarios, Mchiza, Steyn, Gericke, Maunder, Davids and Parkera, 2011). Other than the Western Cape, all provinces were found to exhibit low food variety and specific reference was made to poorer and rural households in comparison to their higher-income and urban household counterparts (Labadarios *et al.*, 2011). This imbalance in food availability contradicts FAOs assertion that food availability proves true when there is always adequate food supply of basic food stuffs to sustain a stabilised expansion of food consumption and to counterbalance variations in production and prices (FAO, 1996).

#### **4.5.2 Food Accessibility: The Second Fundamental Challenge**

The food security status in individual households is a sensitive livelihood stressor which changes over time. In South Africa food accessibility remains one of the greatest challenges that is experienced by the previously disadvantaged and the rural poor (De Cock, Vink, van Rooyen, Staelens, Schonfeldt and D'haese, 2013). Despite this apparent challenge, there is often a policy constriction with regard to focusing on the

rural poor due to the assumption that low-income households are concentrated in poor municipalities (Labadarios *et al.*, 2011). This policy tension is a contributing factor that hinders people's access to adequate entitlements that are needed to acquire appropriate foods for a nutritious diet. These entitlements as defined by the FAO (2006) are commodity bundles over which a person can institute command provided the legal, political, economic as well as social arrangements of the community in which they live. This is inclusive of traditional rights such as access to common resources.

#### **4.6 TRANSITORY-ACUTE FOOD INSECURITY**

Food insecurity is understood as the lack of nutritious foods that are consumed in sufficient quantities to maintain good health (Ke and Ford-Jones, 2015). There are different types of food insecurity that exist; these include chronic food insecurity and transitory-acute food insecurity (TAFI). The World Food Programme (2005) defines TAFI as a situation whereby people and households are temporarily not able to meet their food intake needs without sacrificing livelihood assets. Although TAFI is not persistent, it is considered to be a severe form of food insecurity which according to the World Food Programme (2005), constitutes the following:


- Food intake in insufficient quantities;
- Unable to maintain quality health and nutrition; and
- Access to food in a manner that is socially unacceptable, depletes productive assets, and leads to destitution.

A study conducted in Bangladesh found that rural and urban households adopted different coping strategies to deal with TAFI. These include borrowing money, borrowing food, sale or mortgage of assets, consumption of fewer items or changed food habits, and utilisation of alternative foods other than staple foods (Das, Rasul, Hossain, Khan, Alam, Ahmed and Clemens, 2020). During the year 2020, 9.34 million people were recorded in South Africa as facing high levels of food insecurity (about 16% of the population), with KwaZulu-Natal (KZN) being the only province reported to be in the third phase<sup>9</sup> (demonstrated in Table 4.1).

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<sup>9</sup> Report by the Integrated Food Security Phase Classification, Issued February 2021. Retrieved: [https://reliefweb.int/sites/reliefweb.int/files/resources/IPC\\_South\\_Africa\\_AcuteFoodInsec\\_2020Nov2021Mar\\_Report.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/IPC_South_Africa_AcuteFoodInsec_2020Nov2021Mar_Report.pdf)

**Table 4.1: Different phases of TAFI in South Africa by the Integrated Food Security Strategy (IFSS)**

<b>TAFI SITUATION IN SOUTH AFRICA FROM SEPTEMBER TO DECEMBER 2020</b>		
 <p><b>9.3M</b></p> <p><b>16% of the population analysed</b></p> <p>People facing high levels of acute food insecurity (IPC Phase 3 or above)</p> <p><b>IN NEED OF URGENT ACTION</b></p>	<b>Phase 5</b>	<b>0 people in catastrophe</b>
	<b>Phase 4</b>	<b>1, 160, 000 people in emergency</b>
	<b>Phase 3</b>	<b>8, 175, 000 people in crisis</b>
	<b>Phase 2</b>	<b>14, 845, 000 people in stress</b>
	<b>Phase 1</b>	<b>34, 950, 000 people in food security</b>

**Source: DOA (2002)**

According to the Integrated Food Security Phase Classification (IFSPC, 2021), KZN – the province in which this study is focused, was, at the time that this study was conducted, in crisis and required immediate action. This is an indication that the state of food security in the province deteriorates at a faster rate in comparison to the other eight provinces which are in phase 2 and only in need of action for a livelihood protection. It is worth noting that since this study was conducted at a time where the world saw an outbreak of the killer disease known as the Coronavirus (COVID-19) which had multiple variants for which no cure was found within the first two years, governments had to enforce health protocols which were precautionary measures to control the spread of the disease and protect the mass dying of people. This is despite the fact that millions of people continued to succumb to the pandemic globally, and thousands of lives were claimed at a national level. One of the common precautionary measures that were taken world-wide were strict lockdown restrictions which limited movement and required people to stay-at-home and operate virtually. These lockdown strategies, however, were not optimal in the context of economics as they crippled the global economy which left the poor more vulnerable than before (Mahashinghe, Erandi and Perera, 2021).



**Table 4.2: Key drivers of TAFI in South Africa**

<b>KEY DRIVERS OF TAFI</b>	
<b>COVID-19</b>	The outbreak of COVID-19 both globally and in South Africa led to lockdown restrictions which restricted movement and led to people not being able to go to work. Consequently, there were salary cuts and loss of employment which negatively affected the purchasing power of households.
<b>Economic decline and unemployment</b>	Due to the slowdown in the national economy as a result of mass job losses and reduced income, most households failed to afford enough food to eat as many households acquired most of their food items through purchase.
<b>Food prices</b>	Food prices had a major impact on food access in South Africa. This is because many households and individuals obtain most of their food through purchase. In 2020 alone, a significant price increase of about 30% was observed for certain products in the food basket.
<b>Drought</b>	The ongoing drought in certain areas of the country continues to negatively impact livestock production.

**Source: IFSPC (2021)**

Table 4.2 indicates the major drivers of TAFI that existed during the time that this research was conducted. While COVID-19 may have been a recent causality of food insecurity, its short-and long-term effects cannot be overlooked. Hence it was added by the Integrated Food Security Phase Classification in addition to the already existing drivers of TAFI.

#### **4.7 CHRONIC FOOD INSECURITY IN SOUTH AFRICA**

Individuals who are considered to be chronically food insecure are often exposed to long-term inadequate diets that are often a result of the inability to acquire food due to varying socio-economic challenges (Tarasuk, 2001). Such challenges include a weak economic growth resulting from weak macro-economic policies, skewed patterns of income and wealth distribution, exacerbated levels of unemployment, rapid population growth, land tenure insecurity which may lead to inability to produce, and financial

mismanagement (Sinding, 2009) Unlike TAFI, the major disadvantage of chronic food insecurity has prolonged effects that are often life threatening. An example of this includes malnutrition among young children, stunted growth, and hunger. It is for this reason that the inclusion of indigenous crops in food discourse should not be overlooked as their non-indigenous counterparts tend to be financially challenging and not easily accessible for many non-working rural citizens (Akinola *et al.*, 2020), more especially those who are often classified as the poorest of the poor.

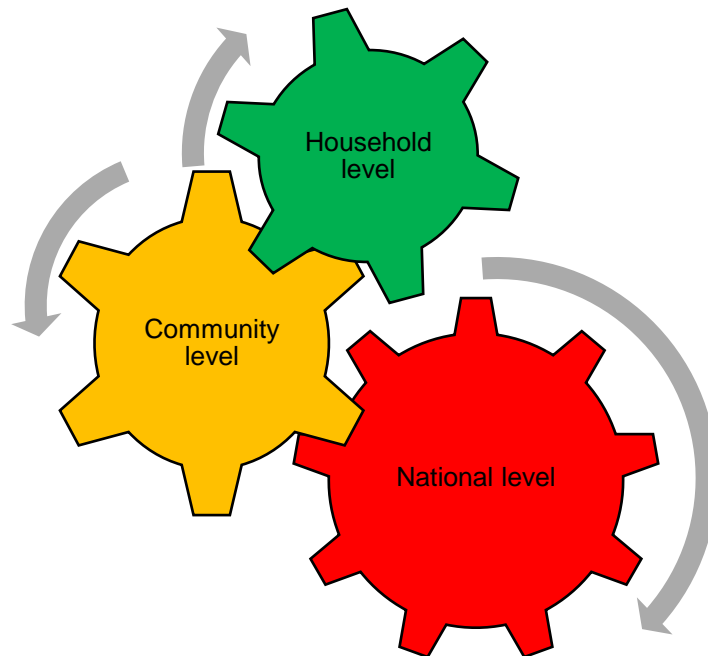
#### **4.8 FOOD AVAILABILITY AND ACCESSIBILITY IN RURAL COMMUNITIES**

Gaining access to healthy and affordable food is one of the global challenges that have existed for many years. In the context of food security, the availability and accessibility of food determine whether the possibility of utilisation and nourishment can be achieved. According to the Department of Agriculture, Forestry and Fisheries (DAFF, 2011), food security can be accessed at three levels (Figure 5.1). In South Africa, about 55% of the population households face a certain degree of food insecurity (World Bank, 2020). This has been an ongoing challenge for over two decades (FAO, 1996) and this led to government recognising several key food security challenges as outlined in the Integrated Food Security Strategy (IFSS) by the Department of Agriculture (DOA, 2002). Despite this, however, gaps still exist in meeting household food security in individual households.

In an investigation by De Cock, *et al.* (2013), who studied the food security situation of rural households in the Limpopo Province, it was reported that the rate of household food production does not necessarily contribute to a higher food security status. This means that households which do not have a strong source of income are unable to compensate by producing food for subsistence purposes. This is in contrast with many documented studies that have reiterated the significance of household food production. One example of such studies is that of Fanzo, Davis, McLaren and Choufani (2018), who assert that the prioritisation of rural people's livelihoods is paramount towards achieving sustainable development as they play an essential role in global food systems through subsistence agriculture.

#### 4.8.1 Understanding Different Levels of Assessing Food Security

Figure 4.1 illustrates different levels from which food security is measured in South Africa.



**Figure 4.1: Three levels from which food security is measured in South Africa (Source: DAFF, 2011)**

Each level has its distinct approach of measurement. At a national level, food security is concerned about the nation's ability to manufacture, import, retain and sustain food that is needed to support its population with minimum per capita nutritional standards (DAFF, 2011). At community level, it is concerned with communal residents' ability to obtain safe, culturally accepted, and nutritionally adequate diets through a sustainable system that maximises community self-reliance (Engler-Stringer, 2014). The last level is the household level at which food security is measured according to the availability of food in one's home and which can be accessed. While all three levels may be interrelated, the researcher was mainly concerned with the availability and accessibility of food at household and communal levels.

## 4.9 SOUTH AFRICA'S FOOD SECURITY STRATEGY

Access to safe and nutritious food is a fundamental human right, a right that is enshrined in Section 27 of the South African Constitution.<sup>10</sup> The inclusion of the right to food in the national Constitution serves as an obligation of the State to provide legislation and other supporting measures which ensure that the basic food needs of the people are met. It is also a human rights commitment by the State under the human rights law (Mechlem, 2004). Taking into consideration the importance of the food crisis, food security was identified as a priority policy objective through the Reconstruction and Development Programme (RDP) that was gazetted in 1994.<sup>11</sup> In the subsequent years, government took an initiative to reprioritise public spending to focus on improving the food insecurity conditions of historically disadvantaged people. This was done through the approval of the Integrated Food Security Strategy by Cabinet in 2002 with the aim of integrating previously isolated policies that sought to tackle the challenge of food insecurity in South Africa (Drimie and Ruysenaar, 2010).

### 4.9.1 Policy of Food Security

Food security as identified in the RDP is a priority policy objective which has led to the prioritisation of public spending to better improve the lives of the previously disadvantaged. This policy has increased government spending in all spheres since it is inclusive of land reform grants for smallholder farmers and production loan schemes for small-scale and emerging farmers (DOA, 2002). In the current epoch, food insecurity as a global crisis justifies the first Sustainable Development Goals (SDGs)<sup>12</sup> which are channelled towards the eradication of extreme poverty and hunger. According to Labadarios *et al.* (2011), the recognition of the right to food in the South African Constitution is one of the factors that has contributed to the decrease of extreme poverty and hunger in the country as a result of enforced government policies which were set towards the redress of food security.

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<sup>10</sup> RSA (Republic of South Africa). 1996. Constitution of the Republic of South Africa, 1996. Pretoria: Government Printer.

<sup>11</sup> The RDP is a South African socio-economic policy framework that integrates growth, development, construction, and redistribution into a unified programme.

<sup>12</sup> SDG no.1 and no.2 are No Poverty and Zero Hunger, respectively. The Sustainable development Goals can be accessed in the United Nations Website through the following link: <https://sdgs.un.org/goals>.

#### **4.9.2 Recoup Measures to Enhance Resilient Food Systems**

Post-apartheid, South Africa is still blanketed by the plague of poverty, more especially in previously disadvantaged areas where a greater portion of the population remains in destitution due to lack of subsistence. The United Nations (UN, 1995) defines the term 'destitution' (often referred to as absolute poverty), as a condition that is characterised by severe deprivation of basic human needs which among others includes food, safe drinking water and sanitation facilities. To survive this deprivation, the FAO developed a 'twin-track approach' (Table 4.3) which is aimed at fighting hunger (FAO, 2006). The first track combines sustainable agriculture and rural development programmes for the enhancement of direct access to food for the needy. The goal of rural development and productivity enhancement as outlined in Table 4.3, is to address recouping measures for the establishment of resilient food systems. This food system resilience includes the overall structure of the food economy as well as its components which include agricultural production, food processing diversification, technology, markets, and consumption.

The second track evaluates options of support to vulnerable groups. This vulnerability analysis as delineated by FAO, seeks to comprehend food security dynamics (FAO, 2006). From this twin-track conceptual framework, Stamoulis and Zezza (2003) point out six principles FAO. These include (i) the focus on food security, (ii) fostering broad-based sustainable agricultural and rural growth, (iii) addressing the entire rural space, (iv) addressing the root causes of food insecurity (through which there is promotion of productivity growth, access to resources, land tenure, returns to labour and education), (v) addressing cross-cutting issues, and (vi) encouraging the participation of all stakeholders in the dialogue, leading up to the elaboration of national strategies.

**Table 4.3: Twin track approach**

<b>Twin Track Approach</b>	<b>Availability</b>	<b>Access and Utilisation</b>	<b>Stability</b>
<b>Rural Development/ Productivity Enhancement</b>	<ul style="list-style-type: none"> <li>- Enhancing food supply for the most vulnerable</li> <li>- Improving rural food production by small-scale farmers</li> <li>- Rural infrastructure investment</li> <li>- Investing in rural markets</li> <li>- Revitalisation of livestock sector</li> <li>- Rehabilitation of resources and conservation</li> <li>- Enhancing income and other food entitlements</li> </ul>	<ul style="list-style-type: none"> <li>- Re-establishing rural institutions</li> <li>- Enhancing access to assets</li> <li>- Ensuring access to land</li> <li>- Reviving rural financial systems</li> <li>- Strengthening the labour market</li> <li>- Mechanisms to ensure safe food</li> <li>- Social rehabilitation programmes</li> </ul>	<ul style="list-style-type: none"> <li>- Diversification of agriculture and employment</li> <li>- Monitoring food security and vulnerability</li> <li>- Dealing with structural causes of food insecurity</li> <li>- Reintegration of refugees and displaced people</li> <li>- Developing risk analysis and management</li> <li>- Access to credit system and savings mechanisms</li> </ul>
<b>Direct and Immediate Access to Food</b>	<ul style="list-style-type: none"> <li>- Food aid</li> <li>- Seed/input relief</li> <li>- Livestock capital restocking</li> <li>- Enabling market revival</li> </ul>	<ul style="list-style-type: none"> <li>- Transfers: food/cash based</li> <li>- Redistribution of assets</li> <li>- Rehabilitation of social programmes</li> <li>- Nutrition intervention programmes</li> </ul>	<ul style="list-style-type: none"> <li>- Re-establishing social safety nets</li> <li>-Monitoring of immediate vulnerability and intervention impact</li> <li>- Efforts towards peacebuilding</li> </ul>

**Source: FAO (2006)**

#### **4.10 FOOD SECURITY CHALLENGES AND RISK MANAGEMENT MEASURES**

According to FAO (2009), risk refers to a situation where there is uncertainty about future outcomes of an on-going process. Current projections indicate that the world population will increase by 2.3 billion people by 2050 (FAO, 2009). The same projection suggests that this population increase would result in severe food insecurity as per the Malthusian Theory of Population. One of the indicators is deduced from studies which confirm that most female-headed households already face the challenge of food insecurity (Ndobo, 2013). According to the DOA (2002), five key areas for food

security challenges in South Africa include (i) inadequate safety nets, (ii) weak support networks and disaster management systems, (iii) inadequate and unstable household food consumption, (iv) lack of purchasing power, and (v) poor nutritional status. These challenges are mostly faced by rural households which are of a low socio-economic status. In most instances, these households depend on social security grants and agriculture for a livelihood which according to the socio-normative standards, makes them poor and vulnerable to poverty. This presents an opportunity for different role-players in the politics of food to explore ways of reducing the risk of food insecurity, especially among the disadvantaged.

#### **4.11 LINK BETWEEN RURAL AGRICULTURE AND FOOD SECURITY**

According to Mavengahama *et al.* (2013), hunger, malnutrition, diseases, and rural poverty are some of the challenges that are faced in South Africa. On the basis of this and on the premise that access to food is a human rights issue, food security is one of the solutions to overcome rural poverty and hunger. This includes access to nutritious foods as per the FAO's definition of food security which combines food accessibility and nutrition (FAO, 2006). Altman, Hart and Jacobs (2009) point out numerous studies that have reported South African households which suffer from malnutrition and micronutrient deficiencies. This challenge calls for an intensified and dedicated collaboration between agencies that advocate proper nutrition and the agricultural sector, particularly smallholder agriculture because this addresses the availability and access dimensions for rural households known to be at nutritional risk for malnutrition (Wenhold, Faber, van Averbek, Oelofse, van Jaarsveld, Jansen van Rensburg, van Heerden and Slabbert, 2007).

#### **4.12 SUMMARY**

This chapter focused on understanding the current state of food security in South Africa. To obtain this information, reference was made to reliable sources that are documented by the South African governmental departments, open access journals, international organisations such as the FAO, and peer-reviewed academic articles. Figure 4.2 below illustrates some of the subtopics that were explored as a means of better understanding the state of food security in South Africa.



**Figure 4.2: Summative illustration of the reviewed concepts on food security (Source: Researcher, 2021)**

It is worth noting, however, that while a holistic understanding of food security is important in this study, the researcher's interest was in communal and household food security. It is for this reason that in the subsequent chapters, the researcher's analysis and discussion mainly focuses on communities under investigation and individual households.



## CHAPTER 5

### AGROBIODIVERSITY: A CONTRIBUTOR TO ECOLOGICAL WELLBEING

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#### 5.1 INTRODUCTION

The purpose of this chapter is to explicate agrobiodiversity and its contribution to ecological wellbeing while concurrently highlighting the significance of its maintenance in a balanced and sustainable manner. The researcher presents agrobiodiversity as a critical component of agriculture that enhances a multi-perspective approach both to its science and benefits due to its diverse nature. Contextual application of the concept of agrobiodiversity is clearly explicated and located within the different plant and animal species (flora and fauna) that are of social, ecological, and economic value, which contribute to people's livelihoods without causing harm to the environment. Additionally, this chapter portrays agrobiodiversity's critical relevance regarding sustainability and ecological conservation to nature preservation and environmental well-being. A cogent argument is made for a balanced approach towards the treatment of indigenous vegetation in relation to their exotic counterparts. This type of endeavour would contribute to the establishment of an equitable and impartial ecosystem while also assuring livelihood and environmental sustainability. The connotative feature of sustainability as a fundamental element of agrobiodiversity is postulated in its focus on variability of living organisms which play a pivotal role in the prevention of natural resource depletion to maintain ecological equilibrium. The document corpus addresses elements of agrobiodiversity - its distinctions and treatments thereof. Two biotic vegetation ecology clusters are discussed. These include the non-timber forest products (NTFPs) and wild edible vegetables (WEVs). The epilogue of the chapter is characterised by pragmatic ideas for management of agrobiodiversity as a praxis.

## 5.2 CONCEPTUALISING AGRICULTURAL BIODIVERSITY

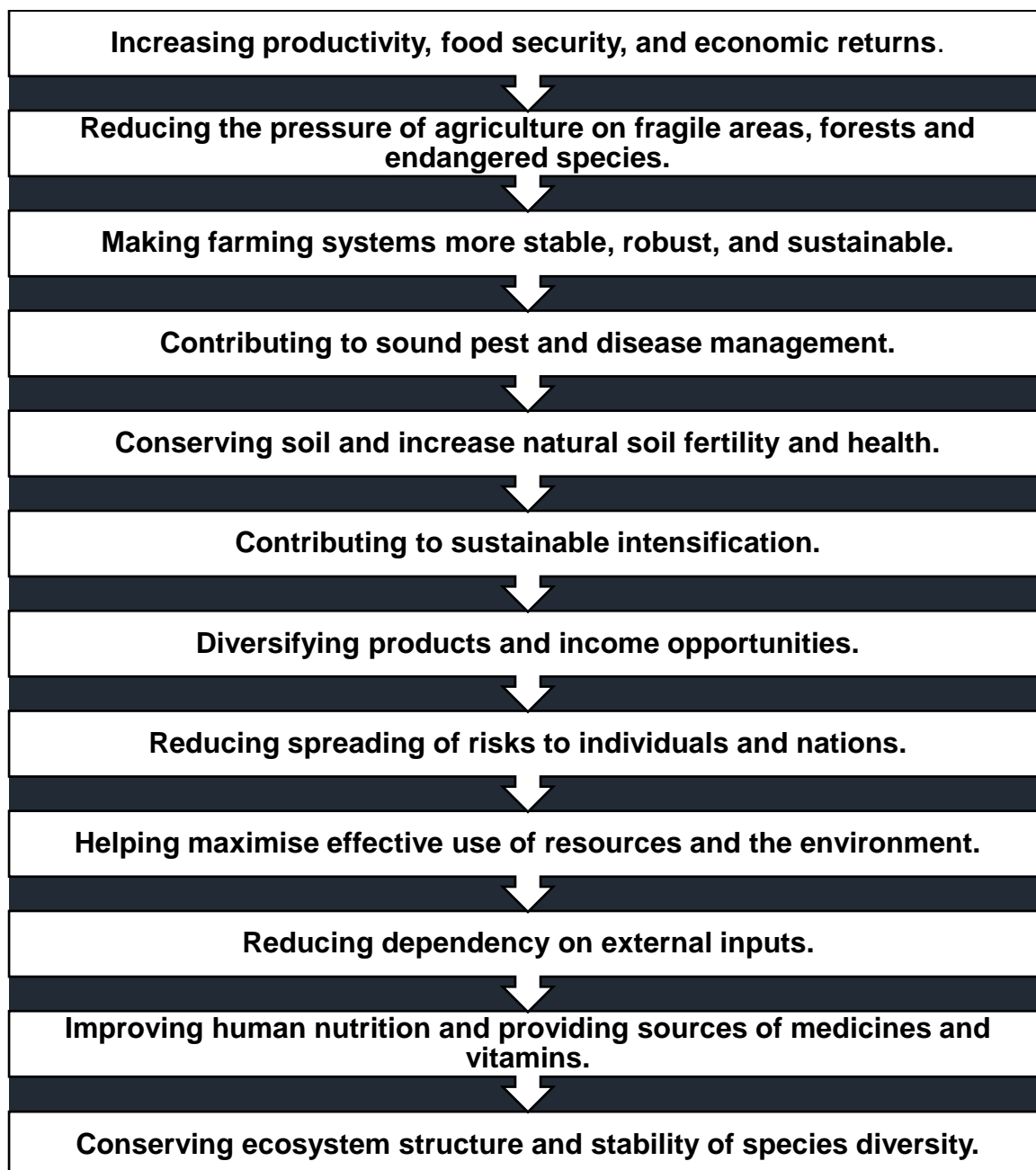
Agrobiodiversity as recorded by Odour, Boedecker, Kennedy and Termote (2019), refers to plant species that can be utilised as either food, animal feed, medicine, and mulch or construction material. This assertion implies that different vegetation which plays a role in the food value chain whether cultivated or non-cultivated wild species, form part of agricultural and ecological biodiversity. Of the greatest importance, the concept 'agrobiodiversity' is concerned with edible animal species that could be utilised as a source of food, fuel, manure and/or income. The inclusion of different fauna (animal species) correctly fits the description as species from the animal kingdom play a significant role in both agricultural and ecological systems through their contribution to soil formation, litter decomposition, nutrient recycling, biotic regulation, and the improvement of plant growth (Briones, 2018). These processes are crucial in ecosystem functioning which create an enabling environment for vegetation, particularly indigenous vegetation.

According to Mata *et al.* (2021), indigenous vegetation promotes insect biodiversity as insects rely on them for food and habitat which in turn allows for the natural process of pollination. This, therefore, indicates a symbiotic association between the plant and animal kingdoms. It further places emphasis on the importance of agricultural biodiversity on ecological sustainability. Baul, Rahman, Moniruzzaman and Nandi (2015) state that agrobiodiversity is concerned with the variability of living organisms which play an important role in sustainable agriculture. However, care must be taken that conceptually, the term 'sustainable' in the context of agriculture is often used loosely without any consideration of the weight it carries (Ng and Zhang, 2019).

Moore, Mascarenhas, Bain and Strauss (2017) point out that there is a lack of consistent definitions for the term 'sustainability' which makes it difficult to define within the context of agriculture. However, the growing use of the term 'sustainable agriculture' is generally associated with regenerative practices that are valuable to the environment such as precision and/or organic farming (Hendriks, 2011). The eighth edition of the Oxford Advanced Learner's Dictionary defines sustainability as the use of natural products and energy in a manner that does not harm the environment. Deducing from the above descriptions of agrobiodiversity and sustainability, the term

agrobiodiversity in the context of this study, refers to different plant and animal species (flora and fauna) that are of social, ecological, and economic value, which contribute to people's livelihoods without causing any harm to the environment.

Agrobiodiversity is an important subset of agriculture that needs to be embraced for the diversity that it brings to the agricultural field and the broader ecosystem. Joshi *et al.* (2020) highlight some of the most important components that are brought about by agricultural biodiversity. This includes domesticated, semi-domesticated, wild relatives and wild edible crop species which are important role-players in livelihoods development and ecological sustainability. Figure 5.1 below illustrates the benefits of agrobiodiversity. Among other things, these benefits include increased productivity which has a direct correlation to food security and income returns. It also highlights sustainability and ecological conservation which are of utmost importance to nature preservation and environmental well-being. On the basis that indigenous vegetation is a component of agrobiodiversity, it is imperative that the recognition and appreciation of indigenous vegetation is placed at a similar level to their exotic counterparts. Such an undertaking would help in ensuring an attainment of a balanced ecosystem while also ensuring livelihood and environmental sustainability.



**Figure 5.1: Benefits of agrobiodiversity, modelled from Thrupp (2000)**

The loss of agrobiodiversity can be attributed to different factors which threaten the native biology of the environment. According to Joshi *et al.* (2020), the replacement of indigenous vegetation by invasive species is one of the main reasons why there is a surge in the loss of agrobiodiversity. Numerous studies indicate that the use and management of indigenous vegetation is in a constant decline as a result of the prosperity of non-indigenous crops (Dorga, Sood, Dobhal and Sharma, 2010; Seburanga, 2013; Lawal, Lennard and Hewitson, 2019). These non-indigenous species are associated with environmental health hazards which include a decline in

the overall biodiversity (Simberloff, 2005). It can thus be argued that both indigenous flora and fauna have become endangered through the introduction of non-indigenous species. In their report, Joshi *et al.* (2020) indicate that the limited use of local landraces for breeding purposes, the wide distribution of modern varieties, changes in the land use patterns resulting in habitat loss, natural and manmade diseases, monogenotyping and the migration of farmers and land abandonment (which lead to over-exploitation), are some of the factors which are the greatest contributors to agrobiodiversity deterioration. It is for this reason that an investment in the promotion, production and management of indigenous species be made as a means of protecting indigenous species while adding a co-created value of balancing out the agroecosystem. Previous research has indicated that the indiscriminate use of agricultural chemicals such as pesticides and herbicides has been a major cause of the loss of indigenous species (Dorga *et al.*, 2010). However, there is still the challenge of a lack of empirical evidence on this matter. While this research sought to find ways of promoting the production and utilisation of indigenous vegetables, it also explored the perceived effects of the use of western practices within the African production systems and how these practices enhance and/or inhibit the development of agriculture within the African context.

### **5.3 EFFECT OF INDIGENOUS PLANTS ON AGROECOSYSTEMS**

There are growing calls for sustainable ecological systems in the scientific body of knowledge as a move towards an adaptation strategy that is aimed at dealing with adverse effects of environmental degradation (Scoones, 2016). In this subsection, ecological sustainability and its components are discussed with a sound theoretical backing within the scope of natural sciences. An ecosystem comprises a biological community of living organisms and their physical environments. This community connects human beings and their environment which entails meeting human needs without compromising the health of ecosystems (Morelli, 2011). The living parts of the ecosystem include both the biotic and abiotic factors which all play a crucial role in ecological sustainability. Two biotic elements of vegetation ecology are discussed, and these include the non-timber forest products (NTFPs) and WEVs.

### **5.3.1 Non-timber Forest Products (NTFPs)**

NTFPs as recorded by Shackleton and Shackleton (2004), are extensive biological products from the wild. These include both wild plants and animals, and other goods of biological origin other than timber from natural, modified or managed forested landscapes (Pandey, Tripathi and Kumar, 2016). NTFPs thus play a significant role in the environment as they form an important part of the ecosystem. Their presence brings an ecological balance that is necessary for environmental health and the coexistence of all living organisms, including human beings. According to Mahonya, Shackleton, and Schreckenber (2019), NTFPs contribute in various ways to the well-being of rural and urban populations through their monetary contribution that is generated from casual and/or fulltime trade at village and urban markets. Some of the most common NTFPs include firewood, bamboo, thatch grass, and timber for construction. Wild edible vegetation also forms part of NTFPs which are mostly utilised for consumption and medicinal purposes.

### **5.3.2 Management of non-timber Forest Products**

Shackleton and Shackleton (2004) argue that more than eighty-five per cent (85%) of rural households in South Africa utilise NTFPs. However, the management of these products is negatively skewed. As a result of this, there is a major decline in the production and protection of NTFPs. This assertion is corroborated by Shackleton and Shackleton (2004) who mention that this decline is primarily because NTFPs are not utilised as an option of interest and appreciation for their value, but rather because of unfavourable circumstances. In Nepal, there are forest policies and legislation that are driven towards the commercialisation of NTFPs as a source of income generation (Gauli and Hauser, 2011). These policies recognise NTFPs as a source of income for rural communities. They also recognise community owned land to be suitable for production of NTFP resources rather than forestry alone. In South Africa however, there is regression on policy formulation of NTFPs. According to Tewari (2012), the lapse on policy formulation is a result of continual under-reporting of the benefits that are brought about by these products and lack of marketability. Consequently, their importance in the national accounting and role in supporting livelihoods has been undermined at the policy formation stage. On this basis, there is a need for the

recognition of the contributions and value that are brought about by the NTFPs to the livelihoods of people and their contribution to food security. Such a realisation would help in the shaping of policies and regulations regarding the management of NTFPs at a national level.

### **5.3.3 Wild Edible Vegetables (WEVs)**

Wild edible vegetation are plants that occur naturally from the wild and are neither cultivated nor domesticated but can be used for human consumption. The consumption of these plants is an ancient phenomenon which predates agriculture and enables communities to cope with food scarcity (Ojejel, Mucunguzi, Katuura, Kakudidi, Namaganda and Kalema, 2019). This is also known as ecosystem-based adaptation. Wild edible vegetation grows naturally in the wild and plays a crucial role in the make-up of the ecosystem as a source of food for herbivorous and omnivorous species. Msuya, Kideghesho and Mosha (2010) avow that WEVs are beneficial to mankind through their multiple uses which include the increase of nutritional quality for rural diets, micronutrients, fibres, fuel wood, beverages, oil, and food. Of the same accord, Bhatia, Sharma, Manhas and Kumar (2018) indicate that WEVs play an important role in the alleviation of poverty, food unavailability and malnutrition as well as increasing agricultural diversity and income generation.

It is for this reason that the researcher maintains his positionality that WEVs have a positive ecological impact on all its living organisms. The rationale behind this assertion is because a wide range of WEVs are used for food, medicinal (although this is often perceived), and cultural purposes (Aryal *et al.*, 2018). However, due to the continuous use of these vegetable species over the years and with little/no measures of preservation, WEVs are gradually becoming extinct (Corlett, 2016; Thapa, Dhakal and Chaudhary, 2014). A different logic, however, is brought by Seburanga (2013), who argues that the decline of WEVs is attributable to the domination of landscapes by non-indigenous species which was one of the effects of European colonisation that resulted in cultural disintegration and erosion of indigenous knowledge.

## **5.4 MANAGEMENT OF THE AGRICULTURAL ENVIRONMENT**

A pragmatic approach that is driven towards the management of the agricultural environment is paramount. In line with the overarching objective of this study, the researcher emphasises a need for the use of indigenous vegetation for the restoration and proper management of agricultural land. This is especially important since previous research has proven indigenous plants to be of great value to environmental well-being (Wanjohi, Sudoi, Njenga and Kipkore, 2020; Ulian, Sacande, Hudson and Mattana, 2016). Therefore, it is important to properly manage indigenous plants and local agriculture for the benefit of mankind and the environment. According to Shelef, Weisberg and Provenza (2017), local agriculture comprises two facets, the first of which is concerned with native plant species (herein referred to as indigenous plants). These species have not been studied broadly and their marketability is limited. Weldegerima (2009) indicates that the documentation of indigenous plants is a vehicle for the preservation of cultural heritage, preservation of biological diversity, and income generation through their multipurpose uses. The second facet of native agriculture that Shelef *et al.* (2017) recorded is food production. The role of native agriculture in the food systems is in line with FAO's drive towards sustainable food systems for the future.

### **5.4.1 Agrobiodiversity, its Significance and Impact on the Ecosystem**

Agrobiodiversity is a universal term that is used in reference to all organisms that are related to food and agronomic production which are crucial in meeting the needs of human well-being and development (Shen, Xu, Li, Clemens, Zhang, Jin, Wu, Wei, Lin and Xue, 2017). In 1999, the FAO defined agrobiodiversity as "the variety and variability of animals, plants, and microorganisms on earth that are important to food and agriculture which result from the interaction between the environment, genetic resources and the management systems and practices that are used by people (FAO, 1999). It forms part of the greater biodiversity scheme which boosts the ecosystem productivity in which all species have an important role to play in the global biodiversity system (Chen and Tang, 2013). Thus, agrobiodiversity is vital in the food and nutrition systems, and it plays an important role in ecological sustainability, (Shen *et al.*, 2017).



Baldinelli (2014) further affirms that agrobiodiversity considers both genetic and agroecosystem diversity and values cultural biodiversity.

#### **5.4.2 Conventional Vegetation – A Threat to Ecological Diversity**

Over the past years there have been changes in agricultural practices across the globe, partly because of the ever-changing climatic conditions (Harvey, Saborio-Rodriguez, Martinez-Rodriguez, Viguera, Chain-Guadarrama, Vignola and Alpizar, 2018). This has affected the entire production chain from the farming techniques that are used for production to the type of crops that are produced. Historically, people relied on indigenous vegetation to sustain themselves (Muyambo, Bahta and Jordaan, 2017). These generally do not require much use of farming inputs such as fertilizer, irrigation water, pesticides and herbicides, to mention a few. However, a drastic change has been witnessed globally through the overreliance on conventional crop varieties that are associated with high nutrition and rapid development.

According to Ijaiya, *et al.* (2011), the world saw an introduction of high-value crops in the market environment which came with numerous benefits (such as disease and pest resistance, high nutrition, adaptation, yield potential, quicker maturity, and affordability) that attracted and pulled people away from traditional to westernised farming techniques. Consequently, indigenous production became under threat (Singh and Singh, 2017). Today, the production of non-indigenous, conventional vegetation has become a typology among communities that are actively involved in farming, and this can be seen as a natural outgrowth of Norman Borlaug's Green Revolution (Durham and Mizik, 2021). Such an approach poses a risk for agricultural, cultural as well as ecological diversity. According to Shen *et al.* (2017), while developmental programmes such as the Sloping Land Conversion Programme (SLCP) that are meant to improve agriculture and people's livelihoods may be a success in reducing soil and water loss through increased natural and artificial vegetative cover, they still threaten the prevalence and survival of indigenous crop species as their continuity is being brought to an end.

### **5.4.3 Significance of Indigenous Agriculture on Livelihood Development**

Indigenous agriculture (IA) is central to the traditional livelihoods and culture of the people, particularly those residing in the former homelands. This assertion is corroborated by Yin (2001), Gao (2003) and Qi (2006), who indicate that agriculture forms a basis of the people's livelihood, their tradition and culture. The reason for this association between IA and the people is that the foods that are produced locally within a specific region usually symbolise the cultural heritage of the people (Akinola, Mabhaudhi, De Bruin and Rusch, 2020). It is through these foods that their sense of being and/or identity is remembered, especially in a world where modernisation has become a global mantra. According to Jansen van Rensburg, Venter, Netshiluvhi, van der Heever, Vorster and De Ronde (2004), IA plays a crucial role within the farming systems and households through consumption. With reference to rural households that are usually found on the outskirts of towns and bigger cities, different kinds of poverty are often experienced, such as food insecurity and financial deficit being the most common. It is in such instances that IA plays a role in the people's livelihood as it fills certain gaps.

## **5.5 SUMMARY**

This chapter provided a discussion on agrobiodiversity and its contribution to ecological sustainability. The exploration of this phenomenon lies on the premise that ecological well-being is dependent on a harmonious relationship between people and their environment. In addition to the explication of the contextual application of agrobiodiversity, different flora and fauna are brought into the discussion as the key role-players in the agricultural biodiversity discourse without which environmental sustainability would be possible. Furthermore, an expansion is made on two vegetation ecology clusters which include NTFPs and WEVs which are subsequently followed by the pragmatic ideas of the management of the agricultural environment. This includes the significance of IA which is central to people's livelihoods as it forms part of their cultural heritage.

## CHAPTER 6

### FRAMEWORK OF ANALYSIS AND RESEARCH METHODOLOGY

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*“Research methodology considers and explains the logic behind research methods and techniques. It further explains the nature and process of research to enable readers to conduct their own research and to find specific answers to their specific research problems” (Welman, Kruger, and Mitchell, 2005).*

#### 6.1 INTRODUCTION

For any research to be considered valid and reliable, it is crucial that the philosophical, metaphysical<sup>13</sup>, and methodological steps taken in the study be well presented and justified. The methodology chapter, therefore, provides reasoning behind the operationalisation and research design of the study. Leedy and Ormrod (2014) describe the term research methodology as an approach or method that is assumed by the researcher during a research project. This chapter elaborates on a mixed method approach which was used for both the collection and analysis of data. A mixed method approach is important for incorporating the collection and analysis of data that is gathered using quantitative and qualitative paradigms in a single study (Perone and Tucker, 2003). While the two research methods are employed, the positivist approach outweighs the interpretivist approach on the basis that the study sought to find quantifiable data from which inferential statistics and correlations could be drawn. However, this was complemented by textual interpretations that were obtained from focus group discussions. Borrowing from Pittaway (2013), the use of the quantitative paradigm was aimed at capturing quantifiable data, as well as the variables being evaluated with respect to the nexus between the study participants and indigenous vegetables. The quantitative paradigm was fixed on a survey design which brought forth data on the farmers' demographics, identification of Indigenous vegetables, barriers that hinder the access and use of Indigenous vegetables, and the correlation between indigenous vegetables and agrobiodiversity management.

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<sup>13</sup> Philosophical steps that are generally sought to explain elements of reality which are not easily discovered or experienced in everyday life. Such steps include the relationship between mind and matter, substance and attribute, and between potentiality and actuality.

The qualitative component of the study was focus group discussions which were held with the study participants to better understand their perceptions on indigenous vegetables and their significance in the context of rural livelihoods. According to Nyumba, Wilson, Derrick and Mukherjee (2018), focus group discussions are frequently used as a qualitative tactic that is aimed at getting to a deeper understanding about social issues. Therefore, it was for this reason that focus group discussions formed part of the study as they helped to better understand the role and impact of indigenous vegetables both in the context of people's livelihoods, food security, and the broader ecosystem through agrobiodiversity. The rationale behind the inclusion of focus group discussions was because the study embraces a transcendental phenomenology. Figure 6.7 below presents a seven-step process of doing phenomenology which recognises and justifies the importance of studying the perceptions of people (Qutoshi, 2018).

## 6.2 OVERVIEW OF THE STUDY AREA

The selected areas that participated in the study were three district municipalities in the northern region of KwaZulu-Natal (NRKZN). These include uMkhanyakude District Municipality (DC27)<sup>14</sup>, King Cetshwayo District municipality (DC28)<sup>15</sup>, and Ilembe District Municipality (DC29)<sup>16</sup>. These areas are characterised by household members that are actively involved in agricultural activities. It is the researcher's view that the appetite for agriculture in NRKZN is because it is predominantly rural and comprises many unemployed and illiterate people.

**Table 6.1: Summary profile of the three district municipalities**

	<b>DC27</b>	<b>DC28</b>	<b>DC29</b>
<b>Population (2019)</b>	689 090	982 726	678 048
<b>Households</b>	151 245	225 798	191 369
<b>Unemployment rate</b>	31.0%	34.7%	30.9%
<b>Main economic sector</b>	Agriculture and Tourism	Mining and Agriculture	Agriculture
<b>Service delivery (rural communities)</b>	Poor	Poor	Poor
<b>Sanitation management</b>	Poor	Good	Poor
<b>Crime</b>	High	High	High

**Source: 2020 profile and analysis of district development models (2021)**

Table 6.1 provides a summary of the existing socio-economic conditions within DC27, DC28 and DC29. All three district municipalities have a population of more than half a million people, while DC28 has nearly a million residents. The individual district profile and analysis developmental models reveal that all districts struggle to deliver satisfactory services to its residents, more especially those residing in rural communities. There are also high levels of crime. These can be justified by the high levels of unemployment which are recorded at above 30% in each district municipality. Based on the tabulated data, it is evident that the northern KZN region has a negatively inclined socio-economic status (SES).

<sup>14</sup> District code for Umkhanyakude District Municipality (UKDM)

<sup>15</sup> District code for King Cetshwayo District Municipality (KCDM)

<sup>16</sup> District code for Ilembe District Municipality (IDM)



**Figure 6.1: KZN Map showing the three District Municipalities. Retrieved Online: ([https://en.wikipedia.org/wiki/List\\_of\\_municipalities\\_in\\_KwaZulu-Natal](https://en.wikipedia.org/wiki/List_of_municipalities_in_KwaZulu-Natal))**

**6.2.1 Profiling Umkhanyakude District (UKDM/DC27)**

Umkhanyakude district municipality (DC27) is the second largest municipality in the KZN province with an area size of 12 818km<sup>2</sup> as depicted in Figure 6.2 below.



**Figure 6.2: Geographical map of Umkhanyakude District Municipality (Sourced: Umkhanyakude District Municipality).**

It is geographically located in the northern region of KZN (32.014489; -27.622242) and is counted among the poorest communities in South Africa which suffer from socio-economic deprivation (Patrick, 2020). According to Mthembu and Hlophe (2020), DC27 is peri-urban and is predominantly rural with a dependancy ratio of 81.2%. Mthembu and Hlophe (2020) further corroborate the high levels of unemployment indicated on Table 6.1 through the assertion that the poverty rate in this municipality ranges from 72.1% to 88.6%, which has resulted in 95% of rural dwellers being reliant on subsistence agriculture and government support grants.

**Table 6.2: Local municipality governance**

<b>Local municipality</b>	<b>No. of households</b>	<b>No. of wards</b>	<b>No. of traditional leaders</b>
<b>Umhlabuyalingana</b>	39 614	18	4
<b>Jozini</b>	44 584	20	7
<b>Mtubatuba</b>	25 255	20	1
<b>Big 5 Hlabisa</b>	41 792	13	6

**Source: Umkhanyakude District Municipality IDP 2020/2021**

Table 6.2 shows that DC27 consists of four local municipalities; namely: uMhlabuyalingana, Jozini, Big 5 Hlabisa and Mtubatuba. Due to its rural nature, most communities within this district municipality fall under the autonomy of their traditional authorities with a total of 18 traditional leaders (COGTA, 2020). UKDM mostly comprises people who are illiterate, unemployed, and live below the poverty line. This is one of the reasons why the municipality is counted among the country's 10 district municipalities with the highest multi-poverty index (MPI)<sup>17</sup>.

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<sup>17</sup> International measure of acute multidimensional poverty that captures the acute deprivations in health, education, and living standards that a person faces simultaneously.

## 6.2.2 Profiling the King Cetshwayo District Municipality (KCDM/DC28)



**Figure 6.3: Map of the King Cetshwayo District Municipality (Source: King Cetshwayo Municipality)**

The King Cetshwayo District Municipality (KCDM) has the third highest population in the province with the highest gross domestic product (GDP) after eThekweni Metro. It has a total area size of 8213 km<sup>2</sup> and is geographically located in the northern region of KZN (28.6192°S, 31.5370°E). Figure 6.3 shows that the district consists of six local municipalities namely the City of uMhlathuze, KwaMbonambi, Mthonjaneni, Nkandla, Umfolozi, and Umlalazi. The district is also one of the growing economies in KZN with its Richards Bay Industrial Development Zone (RBIDZ) attracting a myriad of international investors, as well as its two major economies; namely the mining and agricultural sectors. COGTA (2020) reported that the agricultural sector in KCDM resembles that of the country which is dualistic in nature, consisting of both subsistence and commercial farms. The commercial farms are predominantly sugarcane and forestry which have been the primary focus of emerging farmers. The subsistence agriculture on the other front is predominant on the Traditional Council Lands.



### 6.2.3 Profiling Ilembe District Municipality (IDM/DC29)



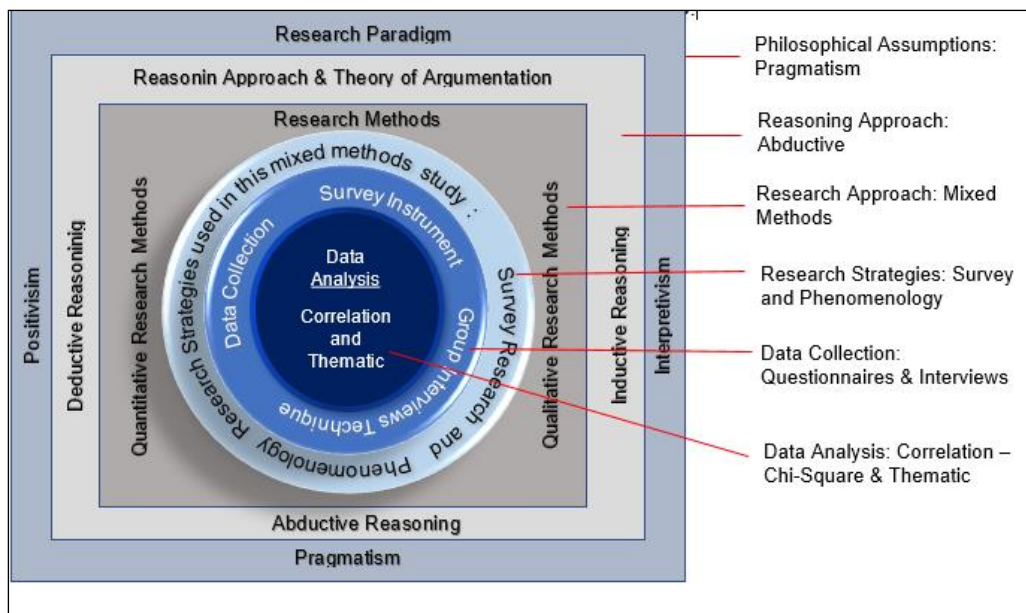
**Figure 6.4: Geographical map of Ilembe District Municipality (Source: Ilembe Municipality)**

Ilembe is the smallest district municipality of the KwaZulu-Natal Province with a total area size of 3269km<sup>2</sup>. It consists of four local municipalities as displayed in Figure 6.4. These include Mandeni, KwaDukuza, Maphumulo and Ndwedwe local municipalities. Apart from KwaDukuza sub-district, the other three municipalities are rural with some areas classified as being deeply rural (Drysdale, Moshabela and Bob, 2019). Most of the land in IDM is under the authority of tribal leaders and is characterised by both commercial and subsistence farming. This is because agriculture in this area is the main economic sector through which people source resilience.

### **6.3 RESEARCH METHODOLOGY**

According to Saunders and Rojon (2014), research methodology entails a systematic, theoretical analysis of the procedures used in a particular field of study, as well as a theoretical investigation of methods and concepts linked to knowledge sharing. Additionally, it incorporates concepts such as a paradigm, theoretical model, and research procedures such as quantitative, qualitative, and mixed approaches of research. Creswell (2018) refers to 'research methodology' as including blueprints and research procedures that define the phases between general assumptions and specific data collection, analysis, and interpretation techniques. Other scholars have defined the research methodology in terms of the specific procedures or strategies used to identify, select, process, and analyse data on a subject in support of Creswell's (2018) assertions.

Numerous research sources provide extensive literature on the importance and structure of research techniques in academic research. Polit and Beck (2012) define the term 'research technique' as the procedures, techniques, and strategies used to investigate and evaluate the collected data. The research method encompasses the population: sample identification and selection; data collection and processing; and validity and reliability testing. Research methodology is crucial since it provides a comprehensive plan that is used for resolving the research problem that encompasses all of the activities desired by the researchers (Daniel, Kumar and Omar, 2018). This chapter was theoretically inspired by the work of Saunders, Lewis, and Thornhill (2015), as depicted in Figure 6.5.



**Figure 6.5: Theoretical design (Source: Modelled from Saunders *et al.*, 2015).**

### 6.3.1 Research Paradigm

Sometimes and primarily in research, the conceptual paradigm is employed to indicate philosophical assumptions. Research paradigm refers to a "world perspective" or a physical world orientation of a researcher (Mackenzie and Knipe, 2006; Kivunja and Kuyin, 2017). These experts further explain that a perspective of the world is a method of thinking, reasoning, or set of shared opinions that shapes the goal or understanding of study results. Lather's (1986), prior work which stated that the research paradigm naturally conveys the opinion of the researcher on the environment in which he/she lives and wants to live, strengthens the meaning of the word research paradigm. The researcher considers that the explanation of the analytical model by Lather (1986) is succinct, but it also conveys the significance of the notion.

According to Kivunja and Kuyin (2017), an abstract idea and value is the paradigm of how researchers view the world and how they understand and act in that environment. This is the point of view through which a scientist perceives the cosmos. It is the intellectual prism through which the investigator examines the analytical components of his research endeavor in order to determine the research methodologies and how the findings are to be interpreted. Field leaders have recognised a paradigm as a core collection of beliefs or a worldview which guides

research (Collins and Stockton, 2018; Saunders, Lewis and Thornhill, 2019). Such paradigms are also described by Denzin and Lincoln (2011), as 'individual creations' that deal with first notions, which demonstrate where the researcher comes from so as to create meaning in the data. Paradigms are therefore important since they incorporate beliefs and define what is to be investigated, how it is to be examined and the results of the study should be interpreted by researchers in a certain subject. The model identifies the methodological orientation of a researcher, with important consequences for all choices done during the study process including the collection of techniques and methodologies. Researchers provide a broad range of paradigms; however, all paradigms may be categorized in three primary taxonomies, in accordance with Candy's (1989) view. The paradigms will be briefly discussed below.

#### **6.3.1.1 Positivism**

This philosophical premise, which is concerned with objective reality, was initially established between 1830 and 1842 by Auguste Comte (Brenner, 2018). According to Howel (2012), positivism is based on a worldview that asserts that information can be formed or developed solely via the use of quantifiable, observable scientific techniques, procedures, and observation. It refutes the axiom that the metaphysical or abstract may be analysed, observed, quantified, or characterised. The positivist school of thought holds that the feelings and opinions of sample participants should not be recognised (Howel, 2012). Positivism is intimately connected with empiricism, the belief that the researcher must accept only important knowledge gained through empirical evidence and reasoning (McNamee, 2005).

The positivist paradigm places a premium on the researcher's objectivity and requires researchers to be isolated from, or have limited contact with, the thing being investigated. In a positivist research experiment, human behaviour is regarded similarly to that of objects; human behaviour is determined by external stimuli that elicit unique reactions, and there are immutable laws that predict future events that can be seen and understood (Brenner, 2018).

### **6.3.1.2 Interpretivism**

This philosophy is concerned with subjective and contradictory views of reality. Its structure is quite complicated, since it incorporates aspects from several schools of thought that have been incorporated into the overarching philosophy of Interpretivism (Chowdhury, 2014). Max Webber, a German sociologist who lived from 1864 to 1920, is credited as being the primary proponent of this theory. His Social Interpretivism theory was founded on the German term *verstehen*, which translates as 'to comprehend' (Crossman, 2019). Thus, philosophy is concerned with comprehending reality from the perspective of the social actor's mental state.

According to Hay (2011), interpretivism as a philosophy encompasses various descriptive perspectives on construction and hermeneutics. Hermeneutics is utilised to comprehend issues arising from human activity from which human beings develop their own awareness and sense of reality through their lived experiences (McLeod, 2019). This means that the lens through which individuals observe and interact with the environment is strongly impacted by their ability to form meanings, which serve as the basis for their perceived sensations. Interpretation is described as a multi-perspective view of the social environment and reality (Creswell, 2014). In Saunders *et al.* (2015), interpretivism is a central epistemological philosophy founded on research philosophy that characterises knowledge creation. Qualitative research studies fall under the category of interpretive epistemology.

### **6.3.1.3 Pragmatism**

Pragmatism was derived from the ideas of researcher John Dewey as a notion and a lens through which to evaluate scientific discourse (Maddux and Donnett, 2015). Pragmatism, as a philosophy and research paradigm, is concerned with genuine facts and views as critical for issue solutions (Zukauskas, Vveinhardt and Andriukaitiene, 2018). This school of thinking is most appropriate for this analysis since it abandons metaphysical constructs (Interpretivism and positivism) in favour of 'what works' in order to provide solutions to the research (Johnson and Onwuegbuzie, 2004).

As a research approach, pragmatism avoids debating contentious philosophical questions such as truth and existence. Rather than that, it acknowledges the

possibility of a single or several truths that may be objectively explored (Plano and Creswell, 2008). According to pragmatist scholars, there is an empirical reality that exists apart from human experience. However, this reality is ingrained in the environment and can be perceived only through human experience (Goles and Hirschheim, 2000; Tashakkori and Teddlie, 2008). The pragmatic theory's central assumption is that knowledge and truth are collaboratively created perceptions and behaviours (Yefimov, 2004). Pragmatists generally think that all knowledge in the universe is produced socially, although certain iterations of such social creations more closely mirror individual interactions than others (Morgan, 2014a). Pragmatism was found to be suitable as a philosophy underpinning this study. This was justified by the fact that the paradigm used was positivism, which believes in objective reality devoid of social interaction (Denzin and Lincoln, 2011) together with interpretivism, which is critical for propounding perspectives of research participants (Leedy and Ormrod, 2014).

### **6.3.2 Justification for the Pragmatism Philosophy**

Pragmatism as a research paradigm refuses to grapple with problematic philosophical concepts such as truth and reality. Rather, it recognises that one or numerous facts might be available for scientific research (Plano and Creswell, 2008). Pragmatists have stated their unique point of view that there is an objective reality apart from human experience. However, this reality is environmentally grounded and can only be addressed through human experience (Goles and Hirschheim, 2000; Morgan, 2014a; Teddlie and Tashakkori, 2008). One of the main pragmatic concepts is that knowledge and reality rely on social beliefs and practices. Pragmatics usually agree that all knowledge in this world is socially constructed, but various versions of these social constructions are more similar than others to individual experiences. Thus, these views were practical in answering the research questions that inform this study.

## **6.4 REASONING APPROACH**

In the context of the theoretical foundation of this investigation the term 'approach to research' refers to the use of logical reasoning or argumentation to support the creation of research findings (Saunders, Lewis and Thornhill, 2015). The metaphysical

ontology of research studies, more precisely the deductive, inductive, and abductive logical frameworks of reasoning, is the outcome of three distinct methods (Trochim, 2006). The following section provides a brief explication of each approach in line with its underpinning philosophical assumptions, and finally provides justification for the chosen one.

#### **6.4.1 Deductive Reasoning**

The deductive technique, often known as a top-down approach, is concerned with deriving conclusions from theoretical assumptions (Gabriel, 2013). Its investigative methodology is essentially founded on observable generalisations resulting from a particular event or occurrence. It is also based on universal generalisations, which are sometimes referred to as propositions, and begins with a straightforward statement or prediction expressing a particular assumption (Malhotra, Nunan and Birks, 2017). It is worth noting the longstanding dominance of hypothetico-deductive (H-D) approaches in business and organisational research, with their reliance on validation, as mentioned in Locke (2007). Additionally, it is critical to remember that the deductive function is better suited for evaluating theory than for progress (Mantere and Ketokivi, 2013). The approach is situated within the positivist epistemological school of thinking.

#### **6.4.2 Inductive Reasoning**

Inductive reasoning is predicated on the idea that viewpoints might differ, and so all research stems from observers' perceived beliefs about their empirical reality (Malhotra, 2017). This approach is sometimes referred to as 'bottom-up' and is associated with the interpretivist and constructivist paradigms of research (Saunders, *et al.*, 2015). Unlike its primary rival, inductive assumptions are taken directly from the offered premises throughout the inductive reasoning process (Dowden and Munro, 2019). To substantiate Lincoln and Guba's (1984) postulates, the technique provides high degrees of credibility substantiation. The two researchers are experts on consistency requirements for robust determination within the interpretivist paradigm.

### **6.4.3 Abductive Reasoning**

A pragmatic method based on abductive epistemology as a basis for reasoning enables the connection between theory construction and theory testing (Behfar and Okhuysen, 2018). According to Psillos (2011), the distinction between this technique and deductive reasoning is that abductive reasoning is a mode of reasoning that is selected as a result of causal effects whereas deductive reasoning is based on observations of consequences from causes. The abductive approach incorporates inductive reasoning concepts (Rapanta, 2018).

### **6.4.4 Justification for the Chosen Reasoning Approach**

#### **6.4.4.1 Research Traditions**

What has become commonly known as research traditions is made up of three prominent techniques of social sciences research, which Saunders' Research Onion clearly captured, and which are consistent with generally acknowledged scientific principles: Quantitative methods, qualitative methods and mixed designs (Saunders *et al.*, 2015). Research techniques are strongly related to the possible advantages and limits of their results as postulated in a particular study underlying philosophical assumptions (Neuman, 2014; Kothari and Garg, 2016). McMillan and Schumacher (2001) present characteristics and variance between generally two traditions (quantitative and qualitative) and research techniques as a guidance to researchers to know how each method may be utilised in a mixed method study to provide evidence. The section below explicates how these methods differ and how they may be used in a mixed methods approach.

#### **6.4.4.2 Quantitative Research Methods**

According to Saunders *et al.* (2015), quantitative research, also known as positivist or deductive methodology, investigates associations between quantitatively measured and analysed variables using a variety of graphical and statistical tools. The researcher is viewed as distinct from the subjects of the study, and the validity of the data is guaranteed by integrating controls on a regular basis. Cohen, Manion and Morrison (2017), well-known specialists in research techniques, defined quantitative approaches as a form of acceptable empirical abstractions that give



objective consideration through the use of computational and mathematical structures. Quantitative analysis may thus be defined from a positivist epistemological viewpoint as a systematic and coherent process of research that employs statistical and numerical data to make conclusions and generalise about a particular phenomenon being examined (Welman *et al.*, 2005). Quantitative analysis is defined by its emphasis on empirical data, statistical evidence, and generalisability.

#### **6.4.4.3 Qualitative Research Methods**

Qualitative research, commonly referred to as phenomenological research, is a method of enquiry originating in philosophy and psychology in which the researcher recounts the lived experiences of persons regarding phenomena as reported by participants. This account culminates in the essence of numerous persons' encounters with the phenomena under study. This approach is philosophically sound and generally entails conducting interviews (Moustakas, 1995; Giorgi and Giorgi, 2003). The qualitative research approach is concerned with compiling participants' information related to their views, whereas quantitative research is concerned with figures and statistics. The qualitative method is predicated on the belief that there is no one reality, that experiences vary across persons and throughout time, and that what is perceived has significance only within a specific context (Burns and Grové, 2003). Because this study's ontological perspective has embraced the interpretivist epistemology, the researcher employed qualitative research methodologies in conducting the enquiry. According to Cooper and Schindler (2014), qualitative research is a set of interpretive techniques that aims to translate, decode, describe, and otherwise come to terms with the meaning of certain phenomena, rather than their frequency, a fundamental approach to exploration that includes individual in-depth interviews, group interviews, participant observation, videotaping, and projective techniques.

#### **6.4.4.4 Mixed Methods Design**

This study follows a mixed methods approach which systematically exploits both quantitative and qualitative paradigms. Doyle, Brady and Byrne (2009) argue that the emergence of a mixed methods approach was in response to the observed

limitations that were a corollary of the sole use of either quantitative or qualitative methods. Mixed methods research is a methodological technique that involves the collection of both qualitative and quantitative data, the incorporation of textual and numerical data, and the use of diverse designs that may incorporate philosophical traditions and theoretical frameworks. The basic premise of this mode of enquiry is that combining qualitative and quantitative techniques results in a more comprehensive knowledge of a research topic while also enhancing the legitimacy and believability of conclusions through triangulation (Creswell, 2014).

In this study, the quantitative approach to statistical analysis made use of inferential methods (Quinlan, Berbés-Blázquez, Haider and Peterson, 2015). Scientific data analysis and quantitative techniques can be used to get extremely objective conclusions. Both de Vaus (2001) and Muijs (2004) concur that quantitative techniques should be used to evaluate hypotheses about unique individual beliefs and attitudes (de Vaus, 2001; Muijs, 2004). Qualitative methods do not attempt to anticipate or explain human behaviour; rather, they seek to comprehend and characterise it (Cresswell, 2014). Qualitative methods, according to Flick (2015), contextualise human experiences, perspectives, and perceptions. According to Muijs (2004), the finest research method for comprehending an individual's ideas, attitudes, values, and perceptions is qualitative research. Qualitative research aims to grasp the social and cultural contexts that shape human behaviour patterns (de Vaus, 2001).

When a single method is insufficient to answer research issues, a mixed methods approach is sometimes advised (Saunders *et al.*, 2015). The mixed methods technique used in this study combines the advantages of qualitative and quantitative methodologies to provide a more in-depth examination of the research (Zou, Sunindijo and Dainty, 2014). This is reinforced by Neuman (2014), who asserts that the mixed methods approach is an all-inclusive technique for studying a research topic, something that neither qualitative nor quantitative research alone can achieve (Neuman, 2014). This study included a combination of qualitative and quantitative research methodologies. This was accomplished through the use of a survey (questionnaire) to gather quantitative data and guided interviews to acquire qualitative data. Scholars such as Schoonenboom and Johnson (2017); and

Johnson and Onwuegbuzie (2004) provided a framework for understanding mixed methods, as presented in a typology of Costa and Tumagole (2020) below.

Theoretical notation	Logical Approach	Design Typology	
		Core	Supplemental
QUAL + quan	Inductive simultaneous	Qualitative	Quantitative
QUAL → quan	Inductive sequential	Qualitative	Quantitative
QUAN + qual	Deductive simultaneous	Quantitative	Qualitative
QUAN → qual	Deductive sequential	Quantitative	Qualitative

Figure 6.6: Typology of mixed methods research (Source: Costa and Tumagole, 2020)

Costa and Tumagole (2020) present five distinct types of mixed techniques under this system based on the work of Plano and Creswell (2008), and Caracelli and Greene (1997). These may take the following forms:

- **QUAL + quan** signifies the qualitative dimension's core part and the supplementary quantitative dimension. Additionally, it refers to a logical method to research that parallels an inductive technique. This means that both quantitative and qualitative aspects exist concurrently.
- **QUAL - quan**, as a primary component, represents the qualitative dimension, with the quantitative dimension as an add-on. It also refers to a logical method that is predicated on an inductive sequential investigation. This indicates that the qualitative component comes first, followed by the quantitative.
- **QUAN + qual** identifies the quantitative dimension as the core part of the investigation and the extra qualitative approach as qualitative. This indicates that both quantitative and qualitative components occur together.
- **QUAN - qual** identifies the quantitative dimension as the core part of the investigation and the extra qualitative approach as qualitative. This indicates that the quantitative component comes first, followed by the qualitative component.

## **6.5 RESEARCH STRATEGY**

As a mixed method research, the strategy or design for this study employed a survey strategy from the quantitative dimension and phenomenology from the qualitative dimension. Kumar and Omar (2018) define a research design as a strategy or a well-defined investigative plan that is utilised to address crucial issues during the enquiry. This step involves the selection of research methodologies, strategies and procedures, as well as data collecting, analysis, and interpretation approaches. In the qualitative tradition, this research aims to ascertain participants' perspectives on indigenous vegetables while also attempting to ascertain how to instill their value in order to encourage individual pride, well-being, and economic activity. According to Kothari and Garg (2016), such studies that attempt to tackle a specific problem are classified as applied or action research.

### **6.5.1 Quantitative Dimension Strategies**

For the quantitative dimension, this study used survey research. Survey research is defined as "the collection of data through the responses of a random sample of people" (Check and Schutt, 2012). This type of study offers a variety of strategies for recruiting participants, collecting data, and utilising various types of equipment. Quantitative research techniques (e.g. numerically rated questionnaires) or qualitative research techniques (e.g. open-ended questions) can be used in research surveys (i.e. mixed methods). Surveys are frequently used in social and psychological research to describe and analyse human behaviour (Singleton and Straits, 2009). Individuals and groups of scholars have provided information over decades of survey research. It can range from asking respondents a few specific questions on the side of the road, to eliciting information about their habits and preferences, to conducting a more complete research study employing a variety of precise and trustworthy tools. Consumer behaviour surveys conducted by commercial or political organisations, as well as public opinion polls, are frequent examples of less rigorous research (Ponto, 2015).

Historically, survey research has involved a large gathering of population-based data. This type of survey research was primarily designed to quickly collect data on the characteristics of a large sample of persons of interest. Examples include large census surveys that collect data on demographic and personal characteristics, as well as

customer feedback surveys. These surveys were generally conducted through mail and sought to characterise people's demographic characteristics or to elicit opinions on whether certain services or commodities are supported by a community or group (Burnett, 2016). In recent years, survey research has adopted a more rigorous approach to research, with scientifically validated strategies indicating which (representative sample), what and how to distribute (survey method), and when to initiate and monitor non-responder data collection (reduction of non-response error) to ensure high-quality research processes and results (Waclawski, 2012). At the moment, the term "survey" can refer to a broad variety of research aims, sampling and recruitment strategies, data collection instruments, and survey administration methodologies.

#### **6.5.1.1 Strengths of Survey Research**

Surveys may amass data from very large population samples. Additionally, they are excellent for gathering demographic information on the sample makeup (McIntyre, 1999). Surveys encompass a wide variety of factors, require minimal expenditure, and are typically easy to generalise (Bell, 1996). Additionally, surveys can elicit data about sentiments that would be hard to ascertain using observer approaches (McIntyre, 1999). It is critical to note, however, that surveys provide estimates of the actual population, not precise measurements (Salant and Dillman, 1994).

#### **6.5.1.2 Weaknesses of Survey Research**

If knowing the historical context of occurrences is necessary, surveys are typically inappropriate, according to Pinsonneault and Kraemer (1993). Bell (1996) notes that there might be biases, either because of the absence of response from intended participants or because of the type and accuracy of the reception of replies. Other sources of inaccuracy include deliberate misreporting by participants to confuse the results of the survey or to hide misbehaviour. Finally, individuals may have difficulties judging their own behaviour, or have a poor reminder of their behavioural conditions.

## **6.5.2 Qualitative Dimension Strategies**

Costa (2020) asserts that qualitative research is more complex due to different research strategies with different methods of enquiry and analysis, which are all dependent on subjectivity. Some prominent strategies for qualitative research include phenomenology, action research, ethnography, case study, narrative research, and grounded theory (Saunders *et al.* 2016). Besides these commonly known and practiced strategies in academic research, there are others such as autoethnography (Ellis, Adams and Bochner, 2010; Campbell, 2016), ethnomethodology (Davidson, 2012; Ingram, 2018), appreciative enquiry (Boyd and Bright, 2007; Hung, 2017), participatory action research (Baum, MacDougall and Smith, 2006), and netnography (Bergold and Thomas, 2012; Kozinets, 2015; Costello, McDermott and Wallace, 2017). The following sections provide brief explications of popular qualitative research strategies.

### **6.5.2.1 The Case Study**

In research-oriented disciplines, such as assessment, case studies can serve a number of purposes, including facilitating a thorough examination of a case (typically a programme, event, activity, process, or one or more persons), promoting design of enquiry, and stimulating new theory. Researchers keep track of their case data by employing a wide array of data gathering methods over an extended period of time (Yin, 2014).

### **6.5.2.2 Ethnographic Research**

Ethnography was first adopted by sociologists to understand tiny groups (Denzin and Lincoln, 2011). It was then adopted by anthropologists as a way to study the different perspectives, social interactions, and behavioural tendencies of such people. It requires engagement and assessment throughout time, along with data analysis (Berry, Reeves, Kuper and Hodges, 2008).

### **6.5.2.3 Phenomenology (Interpretive Phenomenological Approach)**

This interpretive phenomenological analysis (IPA) has been the prevailing method for qualitative research in numerous academic disciplines. It undertakes a study of the life

experiences of a small group of people while also investigating their interconnections and differences (Finlay, 2011). In a study that argued for an experiential approach to psychology, Jonathan Smith offered IPA as an integrated hermeneutic phenomenology (Smith, Flower and Larkin, 2009). To attain the primary objectives of IPA, we must do detailed and extensive investigations on life event comprehension, and we must obtain a comprehensive knowledge of the experience in order to comprehend the situation.

#### **6.5.2.4 Grounded Theory**

Sociology professor, Bruce Grocott, describes the Grounded Theory as an approach to study design based on sociology, in which researchers develop a broad, abstract theory about a process, action, or interaction based on the perceptions of participants (In Charmaz, 2006). This information-gathering approach incorporates many data collecting stages and involves the integration of types of information (Corbin and Strauss, 2015).

#### **6.5.2.5 Narrative Enquiry**

This analysis is fundamentally based in the humanities area. The methodology is more of a scientific story in which scholars study the lives of people around actual events or phenomena that are partly or fully involved in their lives (Riessman, 2008). Meta-reclassification of manifest details into a narrative chronology is the main aspect of this research methodology, which often concludes as a cumulative narrative exposition of interlinks between the life of the researcher and the participant.

### **6.5.3 Justification for Chosen Research Strategy**

Phenomenology, which is a methodology chosen for qualitative strategy in this study, may be characterised as an effort to describe the essence of a phenomenon by immersing researchers in the event itself (Teherani, Martimianakis, Stenfors-Hayes, Wadhwa and Varpio, 2015). The aim of phenomenology is to give an accurate description of what it means to be experiencing this moment—not only what one is feeling, but how one is feeling about it as well. Phenomenology is distinguished according to the method in which it approaches the ‘what and how’ of human experience. Thus, each phenomenological method is associated with a certain school

of philosophy. When it comes to choosing a phenomenological research approach, the scholars must consider their personal philosophy. As there is a wide variety of ways that a scientist might follow, it is not unexpected that scientists are exposed to a variety of phenomenological traditions. The researcher makes a specific and intentional effort to focus on the transcendental approach to phenomenology in this research. To give just one example, the *Encyclopedia of Phenomenology* (published in 1997), devotes seven separate entries to seven distinct phenomenological approaches (In Teherani *et al.*, 2015).

Another modern innovation also connects the hermeneutic and transcendental divides, although there are close similarities. Phenomenology is usually defined as a study of what is seen and experienced, as well as the ways humans interpret and comprehend what they see (Manen, 1997). According to this simpler definition, phenomenology is the study of how people interact with the world in their daily lives. By understanding a subjectively lived experiences from a fresh perspective, new interpretations and interpretations that inform or guide your understanding of the experience might be discovered. Phenomenology is transcendental (descriptive) and hermeneutic (interpretive) (Lavery, 2003).

### **6.5.3.1 Transcendental Phenomenology**

Phenomenology derives from centuries-old philosophical traditions. Nonetheless, most historians credit Edmund Husserl with coining the term in the early twentieth century (In Kafle, 2011). Understanding Husserl's academic background can help illuminate his transcendental approach to phenomenology. Husserl's early work concentrated on mathematics as a subject of study, but he soon expanded his scope to include other phenomena (In Jones, 1975). Husserl's philosophy aimed to treat objective and subjective experiences equally, with his body of work culminating in his interest in 'pure phenomenology' or the search for a universal foundation for philosophy and science (Lavery, 2003). Husserl opposed positivism's exclusive emphasis on objective observations of external reality, arguing instead that scientific enquiry should focus on things as felt by an individual's consciousness. Thus, Husserl claimed that no philosophical or scientific theory, no deductive logic methods, and no other empirical science or psychological hypotheses should guide phenomenology's investigation. Rather than that, the emphasis should be on what is immediately



communicated to an individual's intuition (In Moran, 2000). Staiti (2012) remarked that this approach toward phenomenology is comparable to that of a natural scientist who has lately uncovered a hitherto unknown dimension of reality. This shift in emphasis necessitates the researcher returning to the self in order to ascertain the nature and significance of objects (Moustakas, 1995). As Husserl put it, all scientific knowledge is founded on internal evidence (Husserl, 1970). Inner evidence—that is, what emerges in consciousness—is the proper place to study phenomena. For Husserl, this means that subjective and objective knowledge are inextricably linked. To comprehend the reality of phenomena, one must first comprehend the phenomenon as experienced by a person. This experience represents an undiscovered dimension of being (Staiti, 2012). Husserl based phenomenology in an epistemological attitude; for him, the fundamental issue of a phenomenological enquiry was, 'What does it mean for a person to know or be conscious of a phenomenon?' His theory of phenomenology allows for the study of every experienced phenomenon, extending analysis beyond sensory perception (i.e. what I see, hear, and touch) to experiences of thinking, memory, imagination, and emotion (Reiners, 2012).

### **6.5.3.2 Hermeneutic Phenomenology**

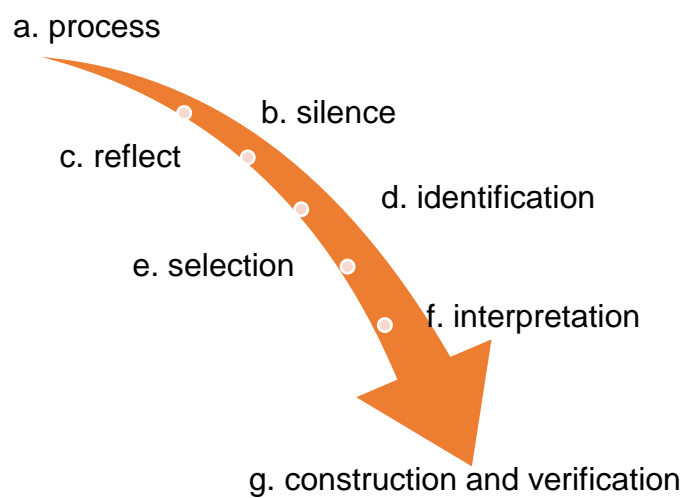
Hermeneutic phenomenology, alternatively referred to as interpretative phenomenology, derives from Martin Heidegger's work. Heidegger began his career in theology before entering university as a philosophy student. While Heidegger's philosophical research began in accordance with Husserl's work, he eventually questioned numerous critical parts of Husserl's transcendental phenomenology. The focus of phenomenological investigation was a fundamental rupture from his predecessor. While Husserl was concerned with the nature of knowing (an epistemological concern), Heidegger was concerned with the nature of being and time (an ontological concern) (Reiners, 2012). Hermeneutic phenomenology, by focusing on human experience and how it is lived, departs from Husserl's emphasis on acts of attending, seeing, recalling, and thinking about the world. and on human beings as knowers of phenomena (Lavery, 2003). By contrast, Heidegger is concerned with human beings as world agents and so emphasises the link between an individual and his or her lifeworld. Heidegger used the word 'lifeworld' to allude to the concept that individuals' realities are inextricably impacted by the world in which they live (Lopez

and Willis, 2004). Individuals are considered to always have an awareness of themselves in the environment, even if they are not continuously, explicitly, and/or consciously aware of it (Staiti, 2012). According to Heidegger, an individual's conscious perception of a phenomena is inextricably linked to both the universe and the individual's own past. Rather than that, consciousness is a product of historically experienced events, including an individual's personal past and the society in which he or she was reared (Lopez and Willis, 2004). A person cannot escape his or her lifeworld. Humans cannot observe phenomena without reference to their prior knowledge. Thus, hermeneutic phenomenology attempts to 'understand the deeper layers of human experience that are buried under surface awareness and the effect of the individual's lifeworld, or the world as he or she pre-reflectively experiences it (Bynum and Varpio, 2018).

Hermeneutic phenomenology examines individuals' narratives in order to comprehend their daily lives and their life worlds. However, the hermeneutic tradition goes beyond descriptive comprehension. Hermeneutic phenomenology is predicated on interpretation—on the process of understanding experiences and phenomena through the lens of the individual's lifeworld. Here, one can observe how Heidegger's theological training influenced his approach to phenomenology. Hermeneutics is a term that relates to the interpretation of writings, to ideas that emerged as a result of the necessity to translate literature from other languages and when access to the original text (e.g. the Bible) was difficult (Enos, 2010). If every human experience is informed by the individual's lifeworld and must be understood in light of that context, hermeneutic phenomenology must go beyond the description of the phenomena to its interpretation. The researcher must be aware of and account for the effect of the individual's background on the individual's experience of being.

This is not to imply that an individual's subjective experience is predetermined; subjective experience is intricately tied to social, cultural, and political circumstances. Situated freedom is a notion that states that while individuals are free to make decisions, their freedom is not absolute; it is constrained by the particular circumstances of their everyday life (Lopez and Willis, 2004). Hermeneutic phenomenology is the study of the meanings associated with an individual's existence in the universe, as perceived via his or her lifeworld, and how these meanings and interpretations affect the individual's choices (Lavery, 2003). This emphasis requires

the hermeneutic phenomenologist to interpret the narratives provided by research participants in relation to their individual contexts in order to shed light on the fundamental structures of participants' understanding of being and how that understanding shaped the individual's decisions (Bynum and Varpio, 2018). The type of phenomenology used in this study is called hermeneutic phenomenology as it portrays participant's lived experiences in relation to agrobiodiversity, indigenous vegetables and food security. Figure 6.7 below depicts this study's approach.



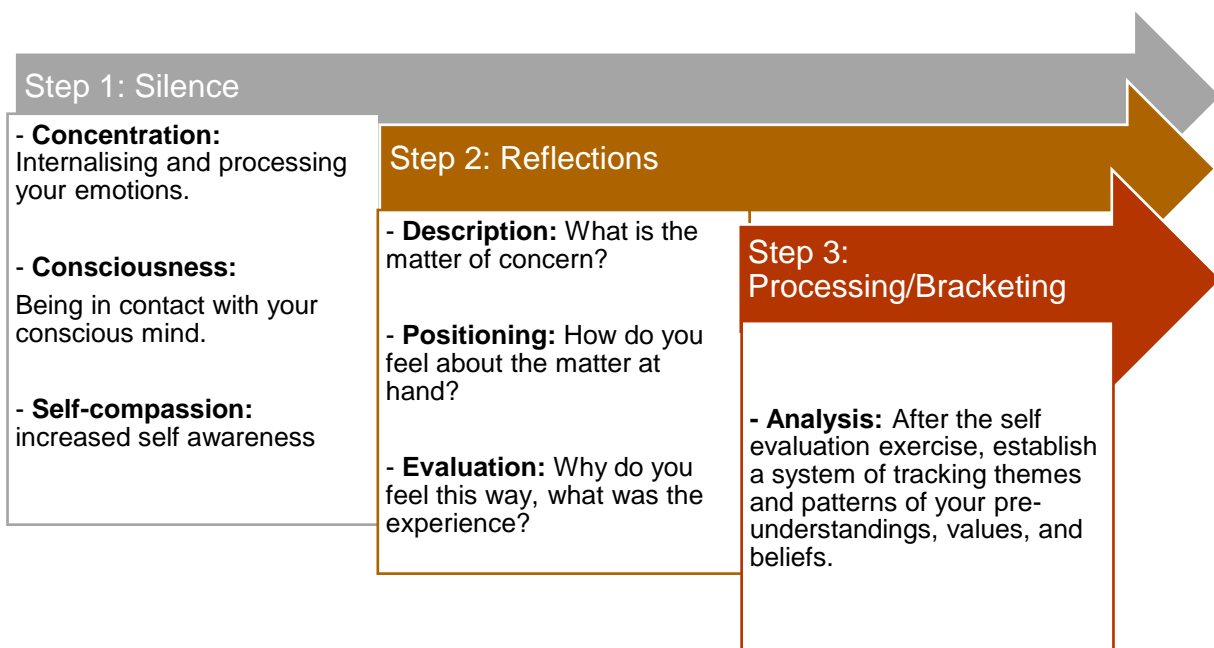
**Figure 6.7: Seven-step process of phenomenology Source: Modelled from Qutoshi (2018)**

The use of phenomenology is beneficial for a study of this nature as it gives recognition to the perceptions of the people who provide information based on lived experiences. Gearing (2004) defines phenomenology as "...the study of a phenomenon perceived by human beings at a deeper level of understanding in a specific situation with a detailed description and interpretation of lived experiences through bracketing." Bracketing as both a philosophical and meta-theoretical construct can be conceptualised as raising awareness and making explicit our pre-understandings, values, beliefs about a phenomenon rather than getting rid of them, which would be impractical and untrue (Dörfler and Stierand, 2020). However, in doing this and within the context of this study, the researcher applied a systematic approach in the bracketing exercise.

#### **6.5.4 Reflexivity and Bracketing as Accomplices to Phenomenology**

Since phenomenology is concerned with the understanding of people's lived experiences, it is imperative to approach this unquantifiable aspect of the study in a systematic manner. This entails following a step-by-step process which can help minimise bias and increase the reliability and credibility of the study. To achieve this, a 7-step phenomenological technique to understanding theoretical phenomena is followed (Figure 6.7 above). This technique incorporates the fundamental steps of reasoning which include (i) silence, (ii) reflection, and (iii) processing. It is worth noting, however, that these fundamental steps are reorganised from Qutoshi's (2018) initial pattern which begins with the 'process' and ends with 'reflection'. The researcher believes that prior to taking any steps in a research project, it is crucial to first start by evaluating oneself as a means of eliminating bias and preconceptions which may result in single-sided conclusive statements (reflexivity). After suspending any forms of judgement and biases about a phenomenon, focus can then be placed on the analysis of experience (bracketing).

Figure 6.8 below illustrates the way a phenomenon in research can be better understood. The first step towards understanding a phenomenon is to take measures towards minimising all forms of bias by embracing silence which is an intrinsic exercise that is concerned with self-evaluation. In order to minimise bias, it is important to have a conversation with oneself that includes three intrinsic steps which include the internalisation and processing of one's emotions (concentration). Concentrating helps the individual to be in contact with the conscious mind (consciousness). Being conscious of one's own beliefs, strengths, weaknesses, and overall intrinsic attributes helps in being aware of oneself (self-awareness).



**Figure 6.8: Understanding phenomena through bracketing (Source: Author, 2021)**

After the individual is in contact with the subconscious mind, s/he can have a reflective moment whereby s/he tries to determine what the matter of concern is (description). Once the description has been established, individuals can then position themselves based on how they feel with regard to the matter being investigated (positioning). The reflection step ends with the evaluation process where the researchers use personal experiences to justify their position (evaluation). The final step towards understanding a phenomenon includes the development of themes, which when correctly used, can work to the researcher's benefit. This is then followed by the recording and simplification of themes (analysis). The end results of the analysis help with the interpretation of what the themes could mean and thus provide conclusive statements about the phenomena at hand.

## **6.6 SAMPLING METHOD AND DATA COLLECTION TECHNIQUES**

A non-probability sampling technique was used to identify individuals who utilised Indigenous vegetables. This approach was purposeful as farmers were selected purely due to their knowledge and experiences. This suggests that there could be a relationship between the farmer(s) and Indigenous vegetables and could thus help in fulfilling the objectives of the study. Saunders, Lewis and Thornhill (2012)

avow that when conducting research, it is important to select individuals because of their knowledge and experience as it is their opinions which play a crucial role in addressing the objectives of the project. Since the study was conducted during a pandemic (COVID-19), it was not easy for the researcher to access the communities. On this basis, the researcher had to work closely with agricultural extension officers from DC27, DC28, and DC29. The study participants were purposefully selected by the extension officers to fill out the survey questionnaire for quantifiable data. According to individual district profile analyses,<sup>18,19,20</sup> the following population was recorded:

**Table 6.3: Individual District Profiles**

<b>Municipal Name</b>	<b>District code</b>	<b>No. of People</b>
<b>Umkhanyakude District</b>	DC27	625846
<b>King Cetshwayo District</b>	DC28	982726
<b>Ilembe District</b>	DC29	678048

The total population from all district municipalities was 2286620. The total population helped to determine the sample size needed to get results that reflect the target population as needed. The sample was thus calculated using an online survey software, Survey System.

**Table 6.4: Sample Description**

<b>Confidence level = 95%</b>
<b>Confidence interval = 5</b>
<b>Total population = 2286620</b>
<b>Sample size needed = 384</b>

<sup>18</sup> COGTA, 2020. Profile and analysis district development model. Umkhanyakude District Municipality. Report no. 01/52.

<sup>19</sup> COGTA, 2020. Profile and analysis district development model. King Cetshwayo District Municipality. Report no. 01/52.

<sup>20</sup> COGTA, 2020. Profile and analysis district development model. Ilembe District Municipality. Report no. 04/52.

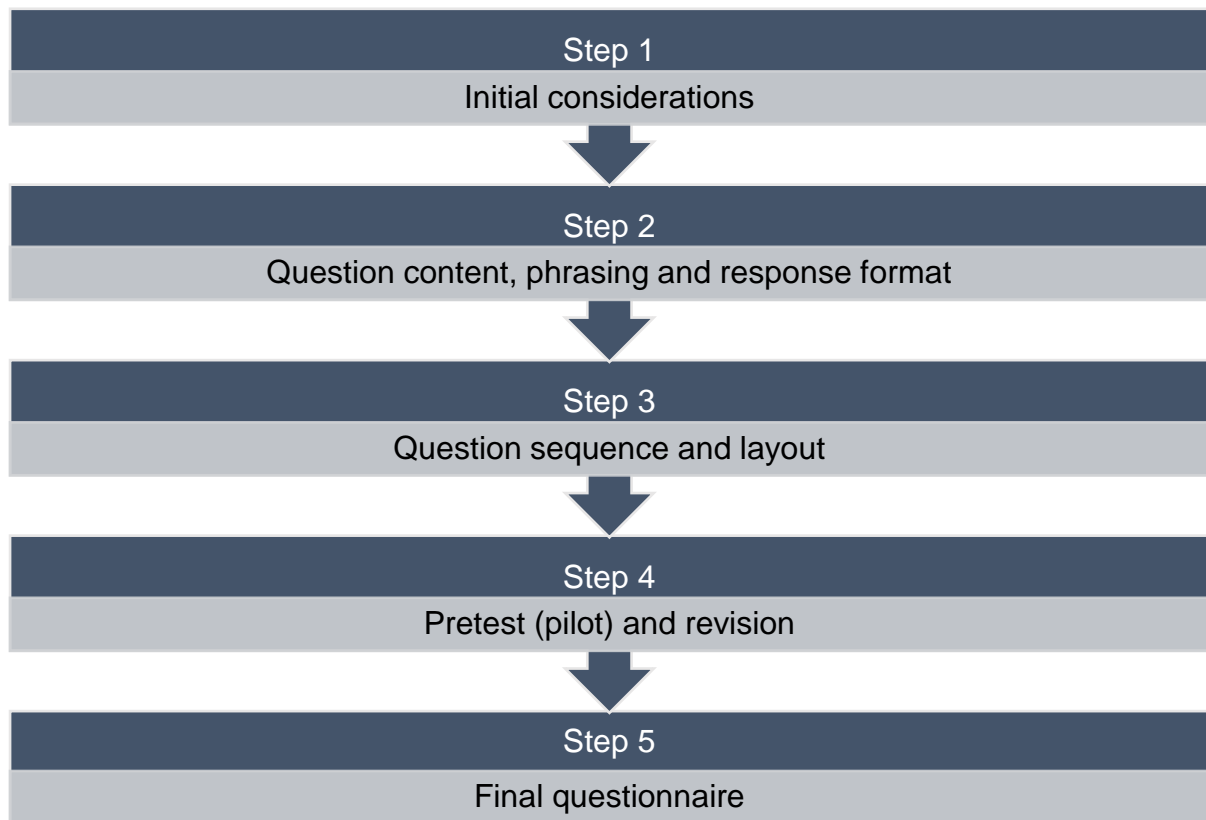
Table 6.4 indicates that a minimum sample of 384 participants was required based on the population from the three municipalities. However due to the COVID-19 restrictions, it was challenging to reach many participants. As a result, 225 participants participated in the study, of which 195 filled out survey questionnaires (quantitative) and 30 formed part of the six focus group interviews (qualitative).

### 6.6.1 Data Collection Instrument Construction

The purpose of designing a questionnaire was to gather data that would answer to the main research question. In doing this, numerous key areas were included in the formulation of this instrument. These key areas include agrobiodiversity management, food security, and indigenous vegetables.

#### 6.6.1.1 Questionnaire Design

The questionnaire followed a five-stage planning process as indicated by Roopa and Rani (2012). This five-stage process is grounded on obtaining data that is both useful and relevant using a systematically thought questionnaire design.



**Figure 6.9: Questionnaire design model (Source: Modelled from Roopa and Rani, 2017)**

Although the pilot study could not be conducted because of the COVID-19 pandemic which led to a series of lockdowns, and limited movement and social gatherings, all the other steps indicated in Figure 6.9 above were followed and were found to be relevant for the study. To the knowledge of the researcher, limited studies of this nature that focus on indigenous vegetables have been conducted in South Africa. However, most existing studies on indigenous vegetables revolve around the socio-economic benefits of these species and do not necessarily seek to devise a strategy that promotes their production and utilisation as a method of achieving agrobiodiversity and food security. In line with the research questions, the questionnaire was divided into five sections which include:

- The demographic information (social statistics) of the study participants, precisely the head of the household. Since the study is conducted in rural communities, it is important to acquire demographic information as a means to determine the underlying growth rate of the rural economy and overall living standards.
- The identification and profile of existing indigenous vegetables. Such information is important in this study as it makes it feasible to know whether indigenous vegetables have the potential to contribute towards agrobiodiversity management.
- Determining the role of indigenous vegetables in food security. As one of the focus aspects of the study, it was crucial to explore in length the contributions made by indigenous vegetables to people's livelihoods.
- Barriers hindering access to and use of indigenous vegetables. This section is more concentrated on law and governance of indigenous vegetables at a regional level.
- Making policy recommendations on the production and use of indigenous vegetables to agrobiodiversity management and food security. This section is informed by the data obtained from all sections of the study. However, questions around policy recommendation and the role of government in promoting Indigenous vegetables and indigenous vegetable products in the politics of food were included.



### **6.6.1.2 Structure of Questions**

Since the study adopted a mixed methods approach, data were collected using different instruments. Quantitative data was collected using a survey that only comprised closed-ended questions with a set of answers from which participants were expected to choose (Appendix C). The questions were mostly contingency questions/ cascade formatted questions, what Roopa and Rani (2012:) describe as a question that is answered only if the participant gives a particular response to a previous question. These questions help in preventing participants from responding to questions that do not necessarily apply to them. The use of closed-ended questions was done deliberately as they are convenient for the participants since they are easy to fill out in comparison to open-ended questions. The use of closed-ended questions also helped in saving time for the participants as the majority of them have household and farming activities to deal with on a daily basis. The list of responses was a combination of dichotomous answers, such as “yes” or “no”, and multiple category closed-ended questions. Qualitative data was collected through focus group discussions. Questions were almost similar to individual interview questions (Appendix D). However, during the discussion process, the researcher was able to probe and ask follow-up questions. Findings from group discussions helped to corroborate quantitative results.

## **6.7 JUSTIFICATION OF SELECTED DATA COLLECTION METHODS**

### **6.7.1 Approach to a Mixed Methods Approach**

The rising levels of poverty in South African households and the deterioration of the ecosystem have become a topical issue within the social, economic, and political domains. To respond to this, the study explored the role of indigenous vegetables on agrobiodiversity, their socio-economic importance and contribution to food security, as well as their impact on agrobiodiversity. Three district municipalities with the municipal codes DC27, DC28, and DC29 formed part of the investigation. The areas of focus were mainly rural areas since rural communities mostly produce and utilise indigenous vegetables. The study focused on the extent to which indigenous vegetables could be used to inform policy as a means of reducing the dire levels of food poverty and to preserve the ecosystem.

The researcher believed that to obtain results that were relevant to the study, an interaction with farmers was necessary. Thus, the selected method of interaction involved focus group discussions to better understand the people's perceptions concerning the status of indigenous vegetables and their prospects of being leveraged as an agrobiodiversity and food security strategy. The use of group discussions helped in eliminating the sole use of preset answers that often result in limited outcomes due to difficulties in understanding the holistic context of the phenomenon, and data that is not robust enough to understand complex issues. In a similar manner, the use of focus group discussions alone would not be sufficient for a study of this nature. For objectivity<sup>21</sup> and accuracy purposes, consistent, concise, and reliable data is required. It is for this reason that the use of survey questionnaires was also embraced.

Data was obtained using a mixed methods approach where 195 questionnaires were distributed using a purposive sampling method. The rationale for the use of a purposive sampling method was because in order to obtain rich information related to the phenomena of interest (indigenous vegetables), the identification of active agricultural practitioners had to be done. Consequently, the researcher selected the study participants based on specific characteristics that would be beneficial in answering the research questions. These include the cultivation and utilisation of indigenous vegetables, and the overall participant's geography. The selection of purposive sampling was also due to the reason that the study was conducted during an extremely difficult period when there were severe national lockdown restrictions as a result of the COVID-19 outbreak. This meant that people's movements were restricted and so were their levels of interaction. For the benefit of the readers who are unaware, more information about the COVID-19 pandemic can be accessed on different platforms online and on the World Health Organisation website (2021) (<https://www.who.int/>). In addition to the survey, six focus group discussions were held across all three district municipalities and with each group comprising five participants to gather qualitative data.

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<sup>21</sup>Principle drawn from positivism that researchers should remain distanced from what they study so that findings depend on the nature of what was studied rather than their personality, beliefs, and values.

## **6.8 DATA ANALYSIS**

Data analysis is an important part of research that is concerned with making sense of information through processes that simplify new data. This step precedes the interpretation and discussion. The data analysis process further helps with the identification of significant patterns and themes which involves finding general statements about relationships among categories of data (Filita, 2013). This study employed a mixed methods approach which consists of both qualitative and quantitative paradigms that allow both thematic and correlation processes as outlined by (Filita, 2013).

### **6.8.1 Qualitative Dimension**

The aim of analysing qualitative data is to make a valid inference from the vast amount of collected data which is more complicated compared to quantitative data due to a few well-established and accepted rules and guidelines. Some general approaches have been developed, including the three steps: data reduction through the iterative process of coding and categorisation, data display, and conclusions. Qualitative data is analysed by coding units of words, sentences, paragraphs and themes, displayed in graphs, frequently mentioned phrases, diagrams and matrices. Conclusions drawn from the qualitative data must be plausible, reliable and valid (Sekaran and Bougie, 2016).

In this study, the thematic analysis, through the WebQDA, software was used to transform raw data. WebQDA is recommended as one of the user-friendly cloud-based solutions that enable qualitative data to be generated in coherent and organised code while offering quick and reliable data management and analytical clarity at the same time (Machado and Vieira, 2020; Pope, Brandao, Rosario and Costa, 2020). The core of the analytic processes involves interpretation of experiences of participants through data transcriptions and further coding those transcriptions to obtain thick rich descriptions.

Human interpretation of others' experiences implies that the researcher immediately assumes a vital position as a critical research instrument (Bahrami, Barati, Ghoroghchian, Montazer-Alfaraj and Ranjbar, 2016). As a research instrument, the researcher is entrusted with making subjective judgments about data collection, data

analysis, coding, theming, and contextualisation of data as he or she progresses toward answering the research question and characterising a particular occurrence. After all, data analysis is regarded as the most challenging part of qualitative research and is also critical for proving achievement of the research's objectives (Thorne, Stephens and Truant, 2016; Nowell, Noris, White and Moules, 2017).

### **6.8.2 Quantitative Dimension**

Two types of statistics were used in this study namely, descriptive and inferential statistics. Descriptive statistics summarise the sample being investigated without drawing any conclusions on the theory of probability. Although inferential statistics are the main goal of the quantitative analysis component of this study, descriptive statistics are nevertheless useful for providing a basic summary about the sample of the investigation (Seltman, 2012).

Using the Excel 2016 software package for statistical analysis, a Pearson Correlation Coefficient analytic approach was used for mathematical analysis, testing the nature, strength and direction of key variables being measured. Furthermore, a Chi Square Test of Independence analysis was useful for calculating cause and effect outcomes, while a correlation coefficient was used to calculate the frequency and directions of interaction between variables (Schober, Boer and Schwarte, 2018). Literature indicates an ongoing debate regarding reliability and validity with Microsoft tools in statistics; while some scholars advocate against these, there is growing scientific evidence of the reliability of using the Excel packages in research methods (Elliott, Hynan, Reisch and Smith, 2006; Oluwarotimi, Featherstone and Bergtold, 2010; Divisi, Di Leonardo, Zaccagna and Crisci, 2017). This thesis did not use a regression approach because the researcher was not studying causal effects. As a result, the above-mentioned Pearson correlation coefficient analysis prescripts and Chi Square tests were considered appropriate for determining the intensity and trajectory of these variables, as well as providing the degree of these variables for precision and consistency in the presentation of conclusions. Using the Excel package, this method of analysis was used to assess the frequency and course of monotonic relationships and is commonly used when variables are being observed (Schober *et al.*, 2018). The correlation analyses' main aim was to see that there was a linear association between the factors.

## 6.9 ETHICAL CONSIDERATIONS

This study involves human participants, thus ethical clearance is mandatory for the security of those who will participate. Ethical clearance was granted from the University of the Free State (Appendix A). The reason for obtaining ethical clearance is to ensure that the rights of the participants are not violated, their privacy is ensured, they are respected as individuals, and not subjected to unnecessary research (Wayne and Stuart, 2001). In line with the Human Science Research Council, four basic rights of research participants were ensured (HSRC, 1997):

- 1. Right to informed consent:** this right protects participants against taking part in an activity that they do not understand. The researcher ensured that participants fully comprehended what the study entails and what the contributions made by the participants would be used for.
- 2. Right to anonymity:** this right protects the identity of participants. It demands that the researcher explain the procedures that will be used to keep the identity of participants confidential.
- 3. Right to confidentiality:** this right protects the privacy of the information provided by participants. It demands from researchers that they explain who would have access to the information supplied by participants, and how access to that information by others will be controlled.
- 4. Right to discontinue participation:** this right ensures that participants feel completely free to withdraw their participation. It demands from researchers that they explain to the participants that they have a right to end their participation at any given time during the process without needing to provide a reason to do so.

## 6.10 SUMMARY

This chapter provided insight and justification for the different methods that were applied in the study. These methods were aimed at answering the research questions and to meet the set objectives. The researcher started this section by giving an overview of the study area and profiled individual municipalities (KCDM, UKDM, IDM). This information is important as it forms part of the situational analysis which helps to determine the suitable research methods. This was followed by discussing the reasoning approach which is grounded on pragmatism. Pragmatism is a unique

approach that evaluates theories or beliefs in terms of the success of their practical application. It can also be understood as a philosophy that includes positivism and interpretivism. Following a pragmatic approach was more suitable for this study since it follows a mixed methods design which is inclusive of qualitative and quantitative research methods. (interpretivism) and quantitative (positivism) research methods. All the chosen methods were informed by literature and justified using secondary data, mostly publications that are concerned with different designs and methods. The design for this study employed a survey strategy from the quantitative dimension and phenomenology from the qualitative dimension. The chapter concludes by outlining the ethical considerations that were followed during the data collection process and how the participants rights were protected. The next chapter presents the main findings and discussion of the study.

## CHAPTER 7

### PRESENTATION AND DISCUSSION OF RESULTS

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#### 7.1 INTRODUCTION

This Chapter presents the analysis and interpretation of findings conducted in this study, reflecting on procedures and activities to formulate conclusions. It is, therefore, important to note that this study sought to answer the following research questions:

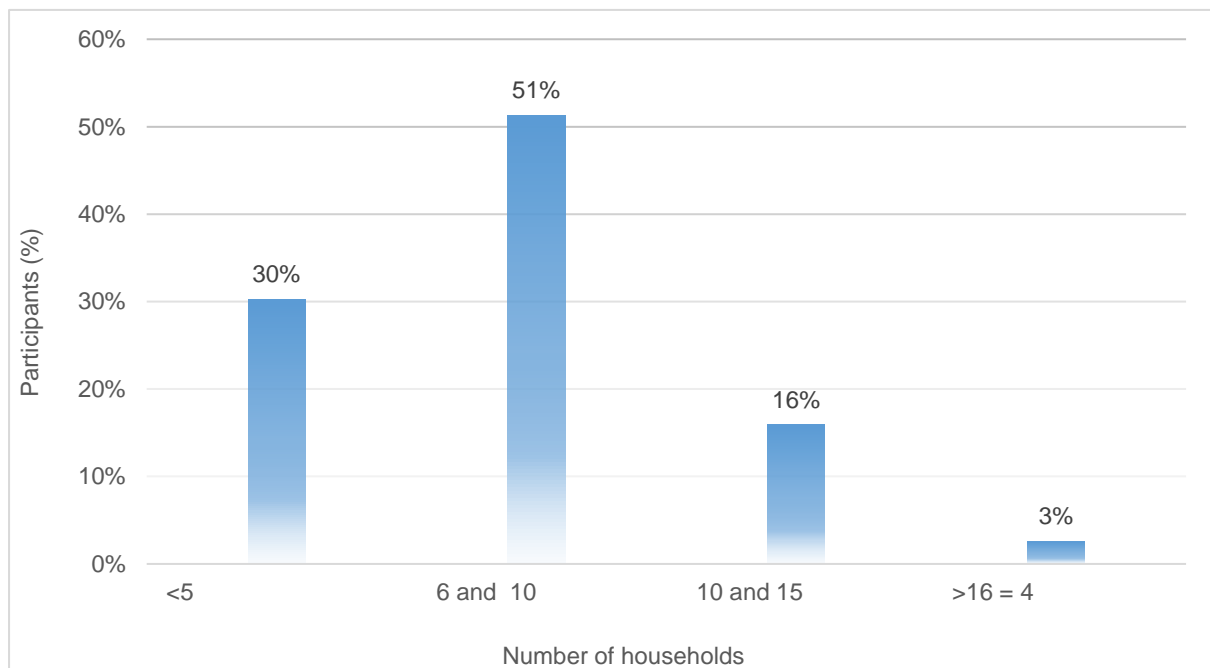
- Which are the commonly utilised indigenous vegetables in the selected communities?
- How do indigenous vegetables contribute to food security?
- How are the access and utilisation of indigenous vegetables hindered when managing agrobiodiversity?
- To what extent does the utilisation of indigenous vegetables on agrobiodiversity management contribute to rural livelihoods?
- What strategy can be devised for the promotion of indigenous vegetables as important role-players to agrobiodiversity management and food security?

The participants' characteristics are presented, followed by a detailed account of analytic procedures, the actual presentation of data and subsequent data interpretation.

## 7.2 PROFILING THE RESEARCH PARTICIPANTS

The following presentation is represented in terms of the questionnaire structure and questions in relation to participants' demographic profiles. This information is presented in a manner that does not compromise the participant's personal dignity and confidentiality agreements made between researcher and participants in terms of the ethics requirements.

### 7.2.1 Number of Family Household Members

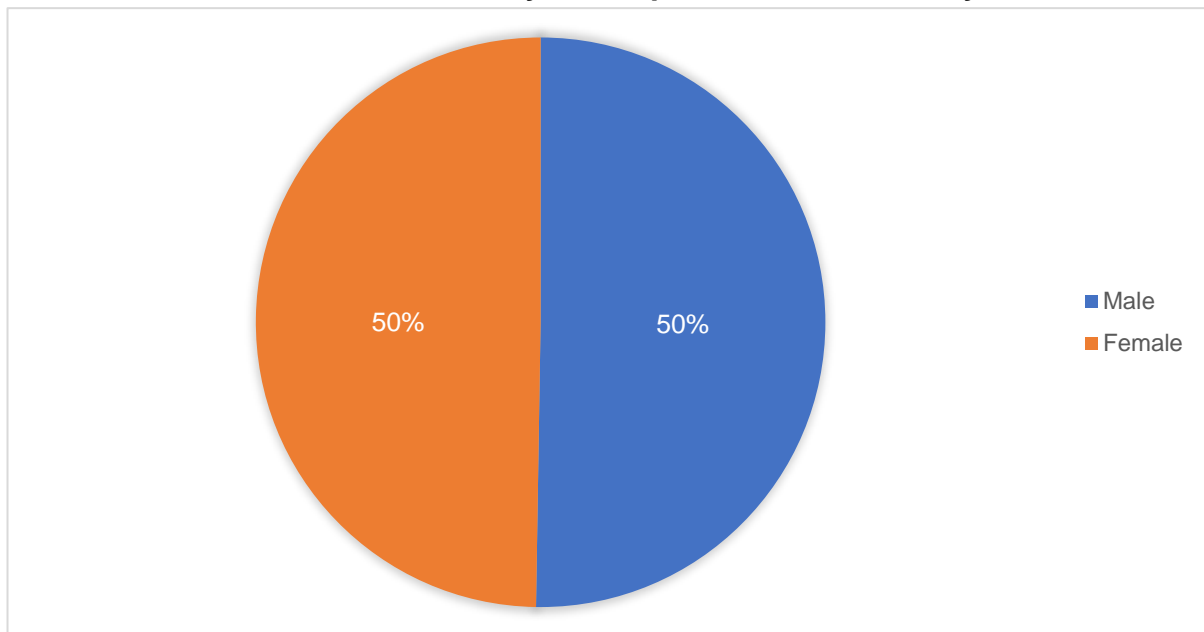


**Figure 7.1: Number of household members**

In terms of Figure 7.1, most of families have between 6 and 10 members. This category is followed by those with less than 5 family members per household. In the context of this study, this information is critical as it informs us that large families' livelihoods are dependent on agrobiodiversity in rural communities.



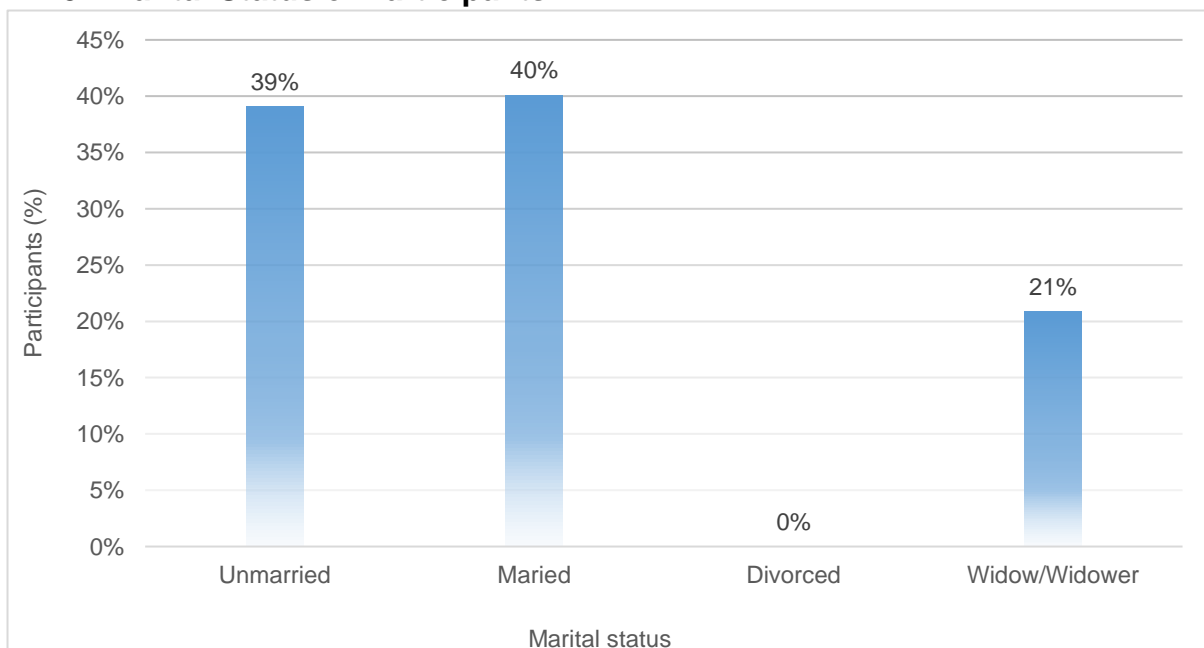
### 7.2.2 Gender Distribution of Study Participants' Head of Family Units



**Figure 7.2: Gender (head of family unit)**

The gender distribution of family heads was spread equally at 50% across males and females. These results give an indication that indigenous vegetable utilisation is not determined by the gender of the household head.

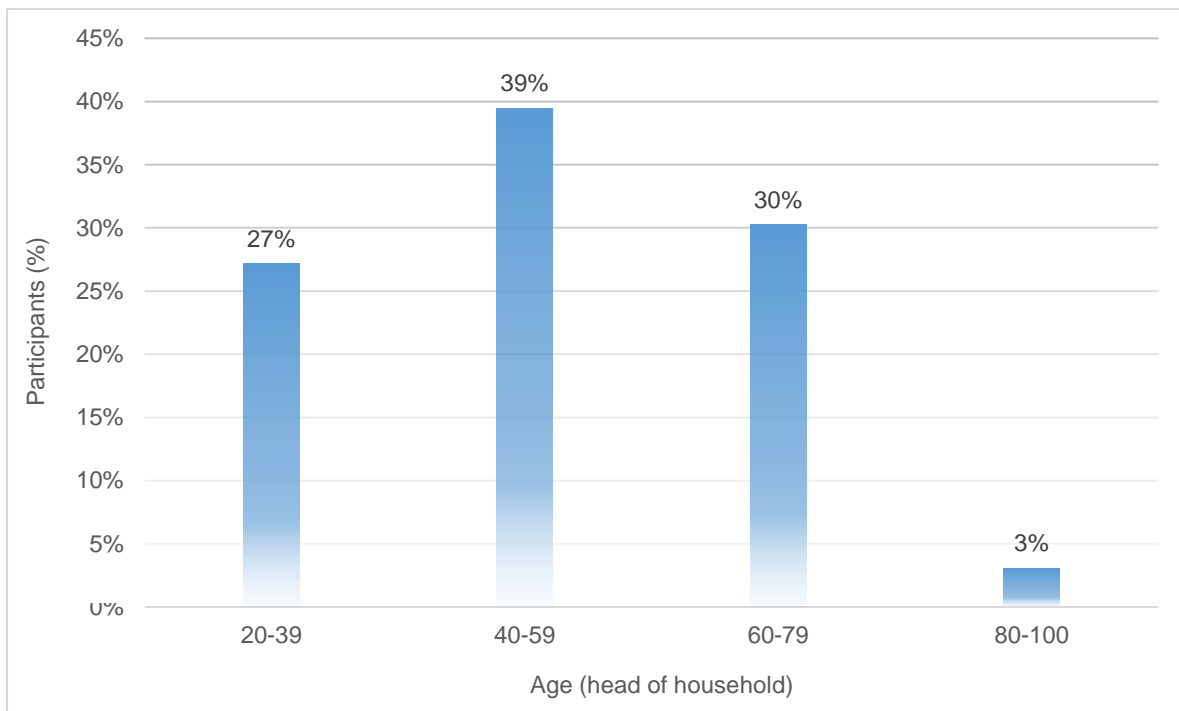
### 7.2.3 Marital Status of Participants



**Figure 7.3: Marital status of participants**

Figure 7.3 indicates that 40% of the participants were married while close to that number, 39% were unmarried, while 21% were widowed and none of the participants were divorced. Because of the cultural beliefs and customs of the participants, it is unlikely for unmarried people to establish a nuclear family with a normalised social unit. This means that of the 39% unmarried respondents (mostly women), the households were female-led. These findings also indicate that approximately 60% of the households comprised single parents. When contrasted with the educational level and employment status, it is evident that most of these household heads are illiterate and lack a stable source of income as a result of high unemployment.

#### 7.2.4 Age of Household Head

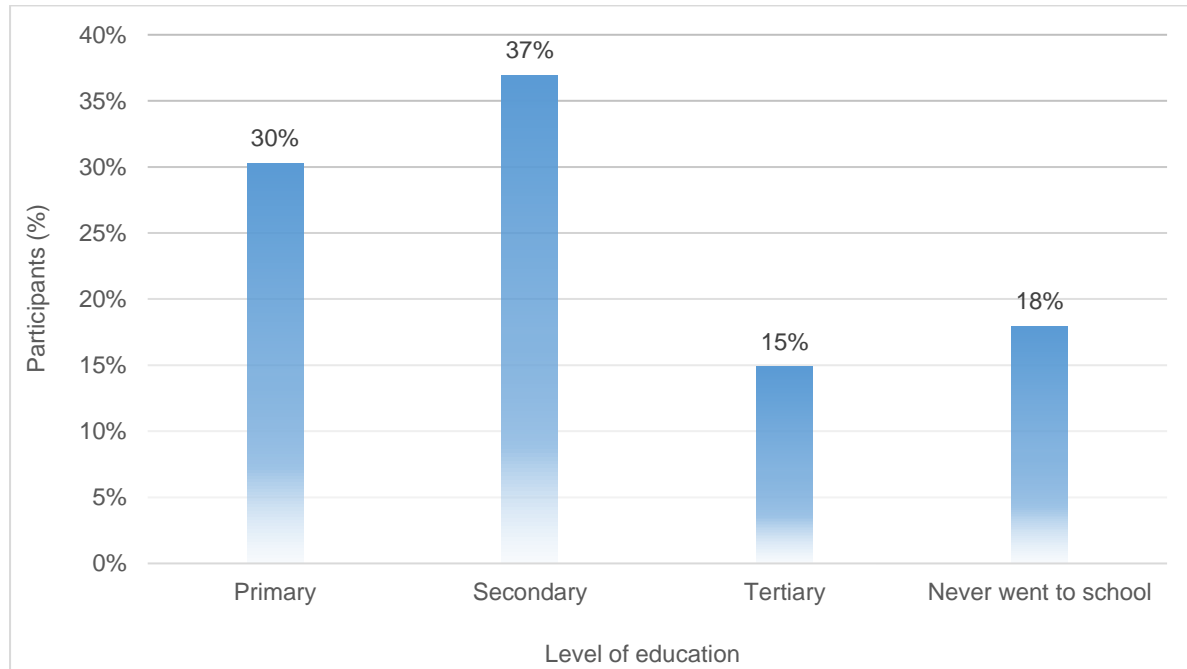


**Figure 7.4: Age of household leader**

Most of the participants in this study belonged to the middle-age group category (40-59) (39%), while 30% were in the 60-79 age group. The age group of those between 20-39 constituted 27% of the sampled participants and those above the age of 80 constituted only 3%. This finding suggests that most of the sampled farmers are middle-aged or elderly. This indicates a supportive view that is often generalised about the majority of small-scale agricultural practitioners in rural areas being old, and that there is often a lack of young farmers who are being prepared to take over when their parents retire. In agreement with Terblanche (2006), there is a need for a coordinated

effort by all role-players in agriculture to take the initiative towards bringing a new generation of farmers into rural communities who will learn from the elderly generation and carry this knowledge over into the upcoming generations as a means of protecting both the indigenous knowledge systems and traditional foods.

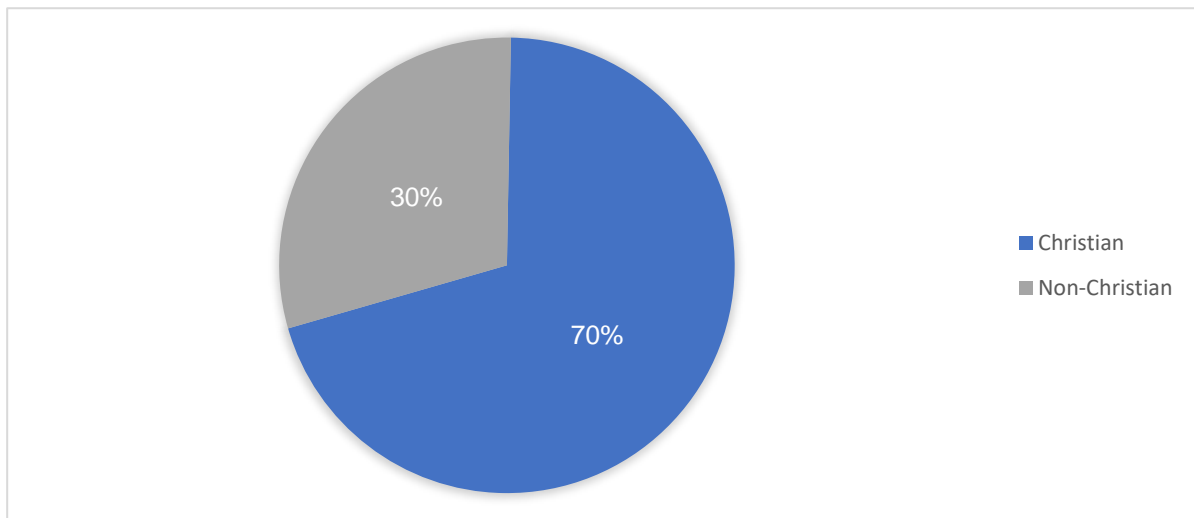
### 7.2.5 Educational Level



**Figure 7.5: Educational level**

Figure 7.5 shows that 37% of participants had some form of secondary school education, followed by 30% of those who only had access to primary school education. Notably, eighteen percent (18%) of participants never went to school and only 15% had tertiary education. It is worth noting that most of the participants who had secondary education did not study through to the twelfth grade. Combined together, this means that about 85% of the sampled participants did not receive higher education which places them to a position of disadvantage as most professions require a skills training certificate and/or a school leaving certificate which is obtained after completing grade 12. The findings presented in figure 7.5 coincide with the findings presented in figure 7.7 which reveal the employment status of the participants.

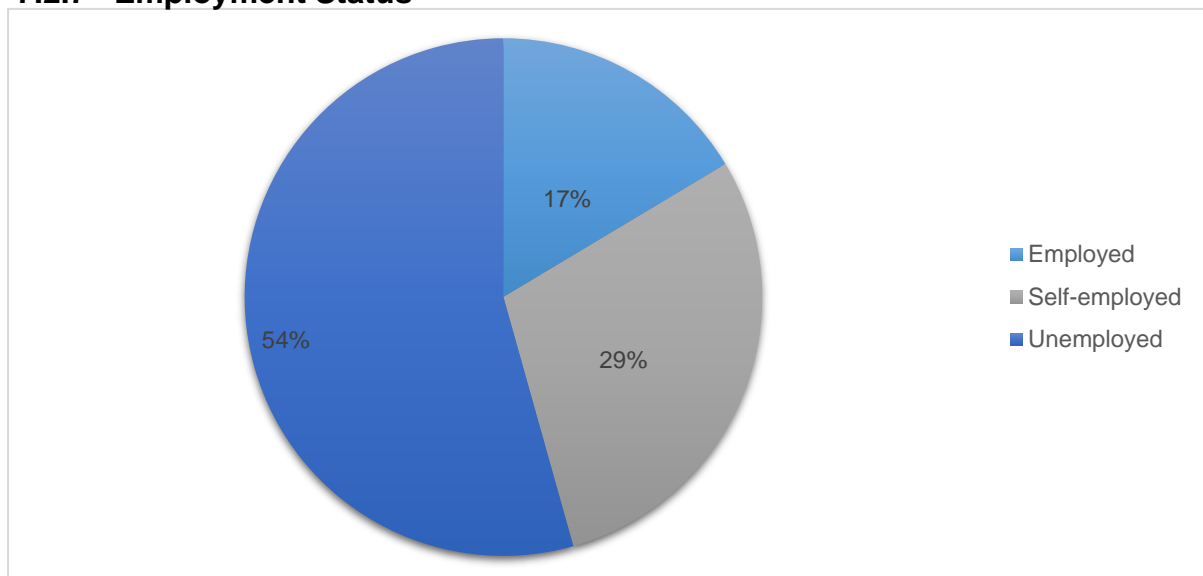
## 7.2.6 Religion



**Figure 7.6: Religious background**

Most of the participants were Christians (70%) while traditionalists (those who were non-Christians) constituted only 30% of the surveyed sample. The role of religion plays a critical role in the utilisation of indigenous vegetation as these are sometimes used for traditional purposes which is sometimes in contrast with some Christian denominations, especially when used as traditional herbal medicine. Different attitudes on Christianity and the use of indigenous vegetation as traditional medicine have been presented in the works of many researchers (Sugishita, 2009; Gabasiane, 2013; Winkler, Mayer, Ombay, Mathias, Schmutzard and Jilek-Aall, 2009).

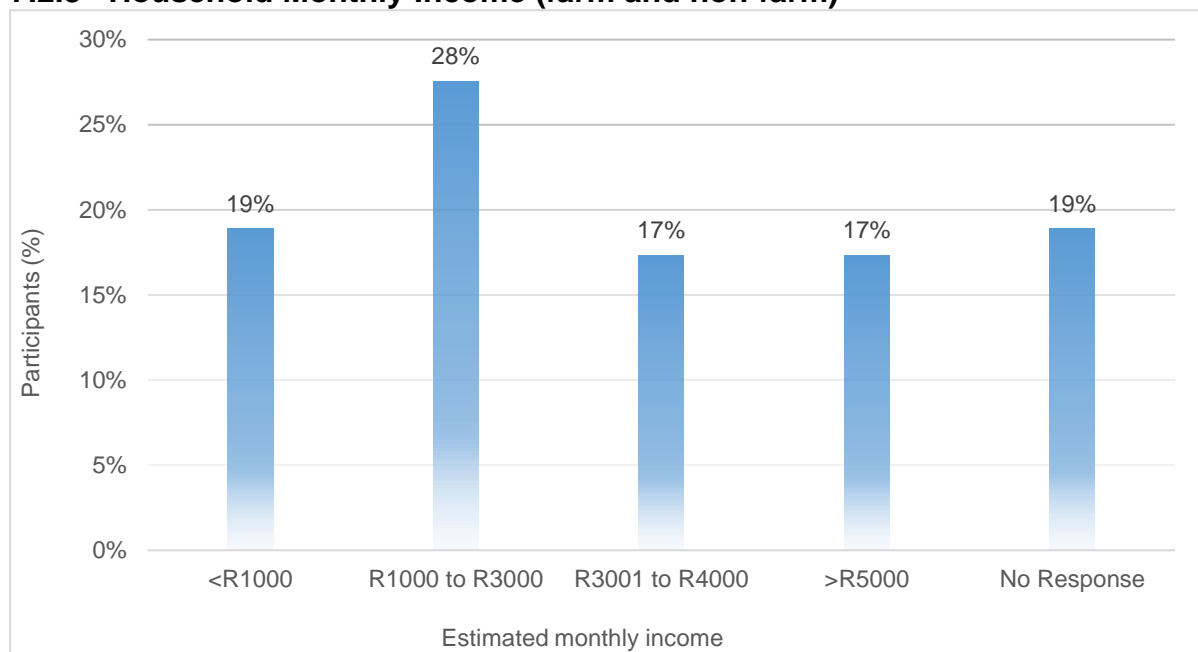
## 7.2.7 Employment Status



**Figure 7.7: Employment status**

Regarding employment status of participants, 54% were unemployed and 29% self-employed. Only 17% of the participants were in formal employment. These findings coincide with the results presented in figure 7.5 which indicate that most of the participants were unskilled (those that never went to school and/or only received either primary or secondary education) were highly unemployed. As indicated before, the study was undertaken during the early stages of the COVID-19 pandemic, there is no doubt that COVID-19 might have influenced the status of unemployment. Be that as it may, however, the presented findings are not significantly different from similar studies that have been conducted previously (Lewu and Mavengahama, 2010).

### 7.2.8 Household Monthly Income (farm and non-farm)



**Figure 7.8: Household income**

Although the question on the household monthly income was optional, only 19% opted not to respond to it. The majority (28%) of participants indicated that they earned between R1000 and R3000, 19% were earning below R1000 while 17% had income ranging between R3000 to R4000. Another 17% indicated a monthly income that is above R5000. Deducing from the presented findings, it is evident that for households with an average of 6-10 members, it could be challenging to meet all the household needs due to the limited income that the majority of households receive monthly.

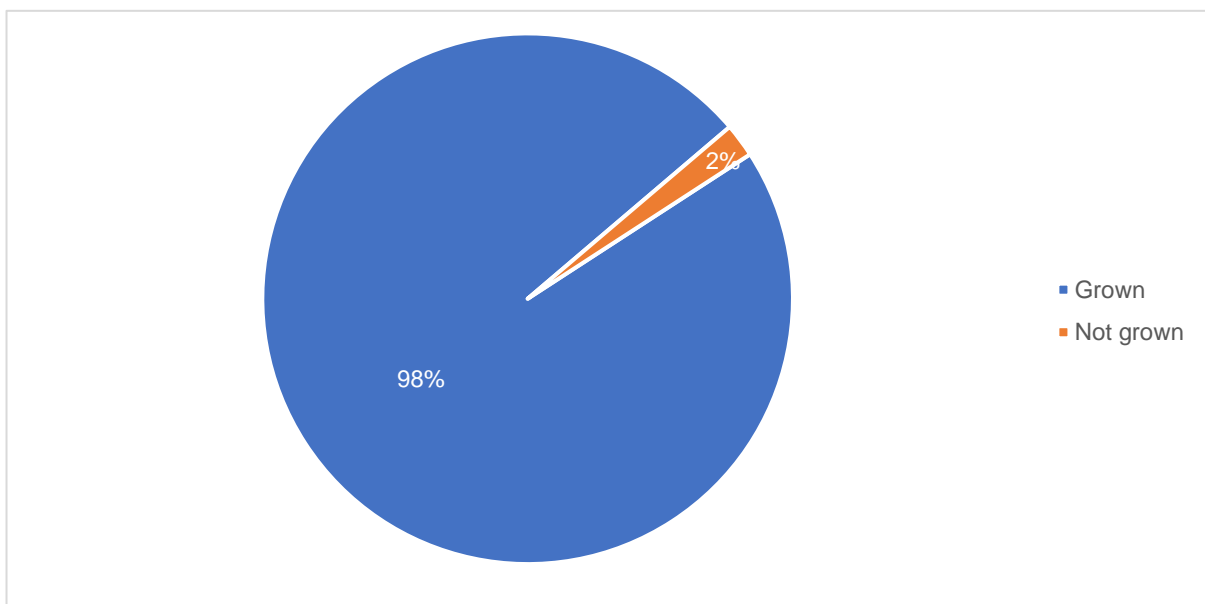
### 7.3 SURVEY RESULTS (DESCRIPTIVE STATISTICS)

These results represent descriptive statistics and are presented in terms of questions associated with each of the study objectives.

**Objective 1: To provide insight on commonly utilised indigenous vegetables in the selected communities**

#### 7.3.1 Indigenous Vegetables Grown in the Community

Participants were asked to indicate the indigenous vegetables grown in the community and their responses are depicted in Figure 7.9.

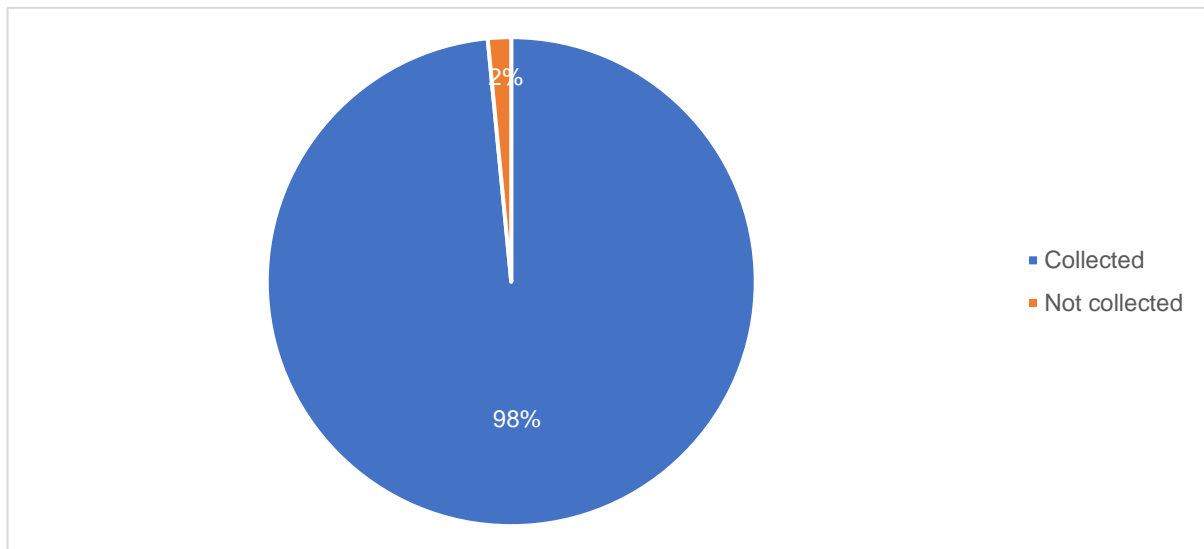


**Figure 7.9: Indigenous foods grown in community**

It was important to establish whether indigenous vegetables were grown in the identified communities as this formed part of the objectives of the study, without which the main question would not have been answered if the identification of indigenous vegetables was not made. Most participants indicated that there were indigenous vegetables grown in the community (98%), while only 2% responded negatively. This information confirms that rural households in DC27, DC28 and DC29 municipalities grow indigenous vegetables in their communities.

### 7.3.2 Wild Vegetables Collected from Forests

Participants were asked to indicate whether they collected indigenous vegetables from the forests and their responses are presented in Figure 7.10.

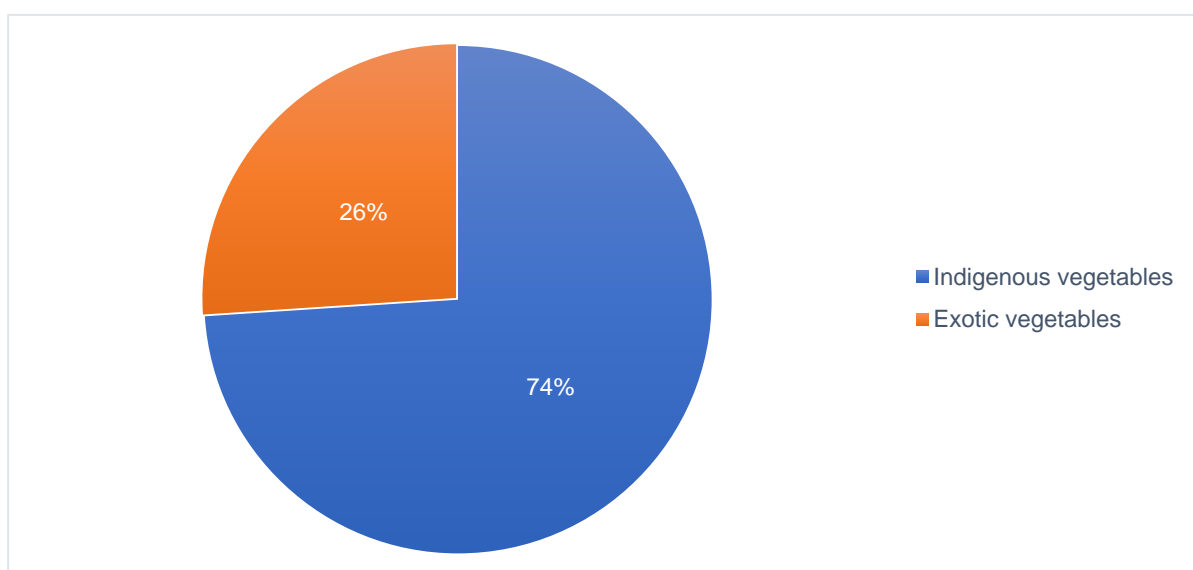


**Figure 7.10: Wild vegetables collected from forests**

It is interesting to note that 98% of participants indicated that wild vegetables were available from forests, which they harvest for household use. It was interesting to note that the finding here is equivalent to the responses of 7.3.1.

### 7.3.3 Preferences Between Exotic and Indigenous Foods

Participants were asked to indicate their preference between exotic and indigenous foods and their response is indicated in Figure 7.11.



**Figure 7.11: Preferences between vegetable categories**

Participants indicated that they prefer indigenous vegetables more than exotic vegetables, and this includes wild vegetables. As explained in the second chapter, indigenous vegetables refer to edible plants that either occur naturally from the wild or are home-grown and are produced through practices that are considered to be traditional. On the other hand, exotic vegetables refer to those planted with seeds purchased from the local retailers such as cabbage, potatoes, carrots, spinach etcetera (Nesamvuni, Steyn and Potgieter, 2001). This depicts that participants grow indigenous vegetables only for sustainability purposes rather than preference. The preference of indigenous vegetables over exotic vegetables was also found in the work of Jansen van Rensburg *et al.* (2007), which corroborates current findings.

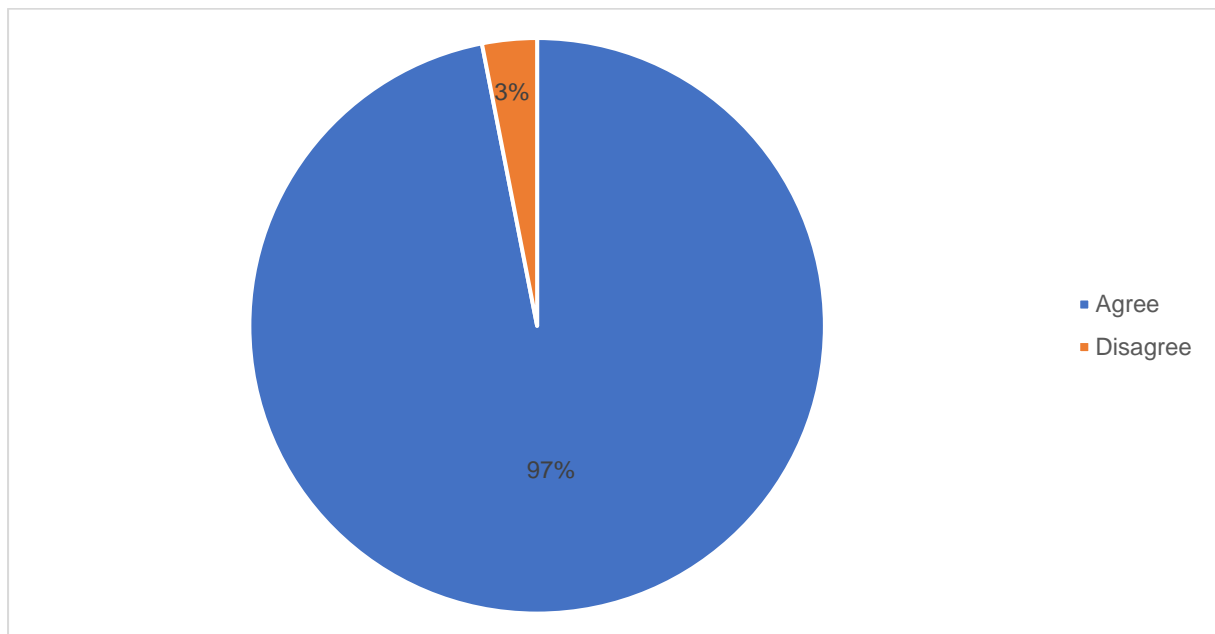
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**Objective 2: To determine how indigenous vegetables contribute to food security.**

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### 7.3.4 Substitutional Uses of Indigenous Foods

Participants were asked to indicate their substitutional uses of indigenous foods and their response is indicated in Figure 7.12.



**Figure 7.12: Use of Indigenous foods as substitutes for conventional foods in times of food scarcity**

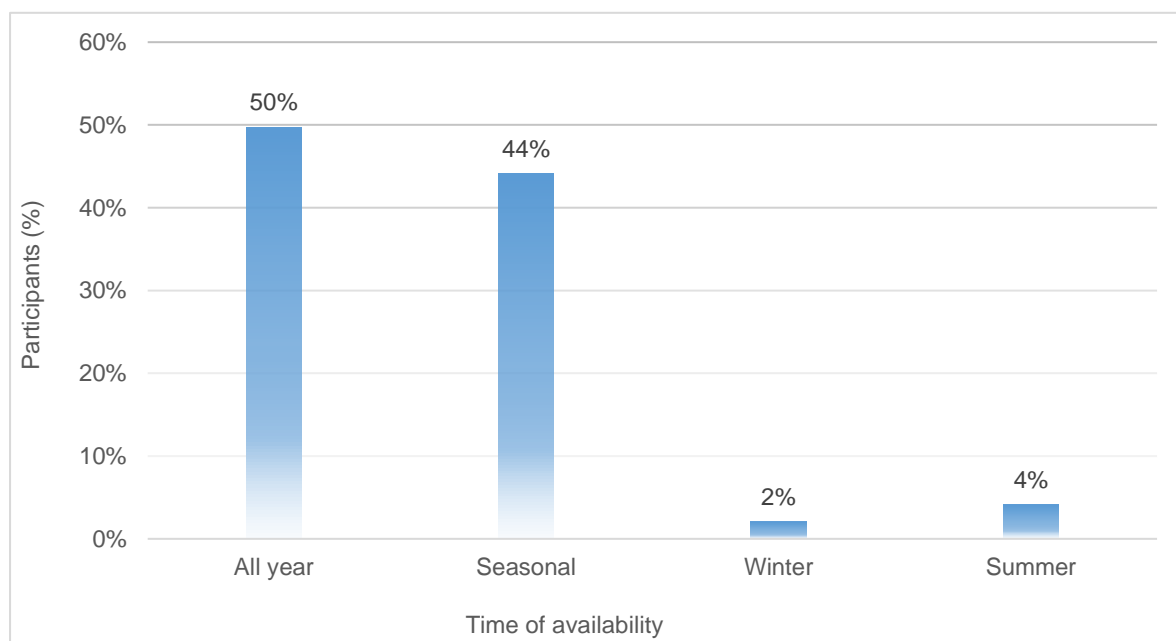
This section sought to understand if the rural communities used indigenous vegetables as substitutes in times of food scarcity. Indigenous vegetables have been found to



provide food security for rural communities living in marginal regions and practicing minimal input agriculture (Shiundu and Oniang'o, 2007). Figure 7.12 indicates that 97% of rural communities use indigenous foods as substitutes for their preferred conventional foods. Only 3% of the surveyed sample did not agree with the substitutional use of indigenous vegetables.

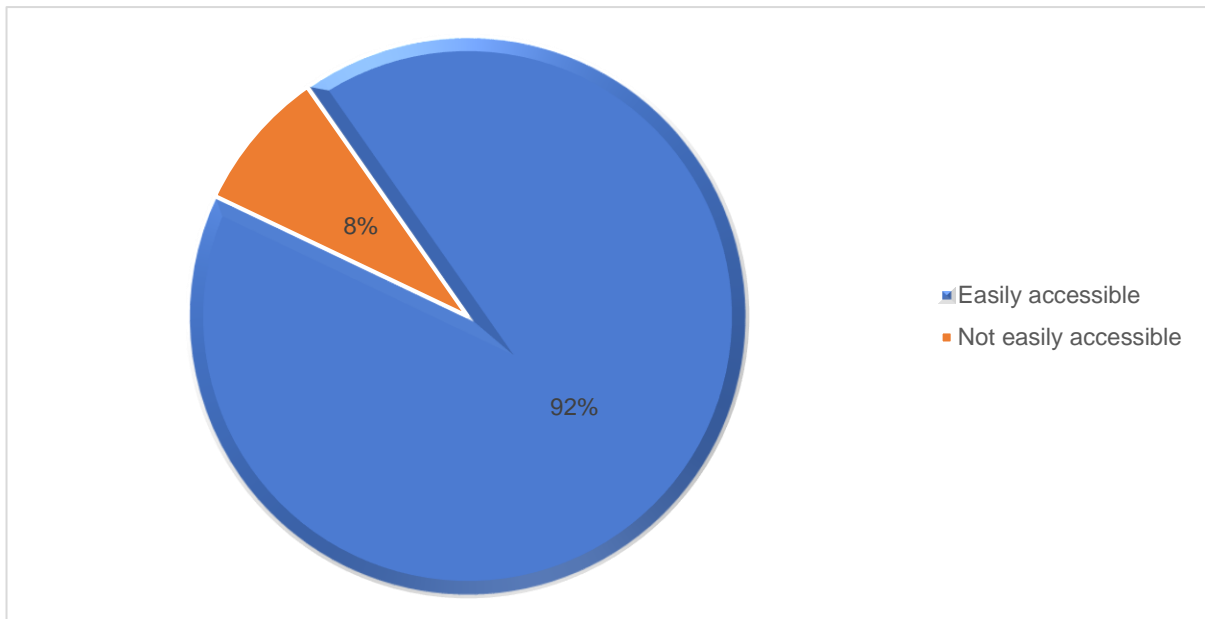
### 7.3.5 Availability of Indigenous Foods

Participants were asked to indicate the availability and accessibility of indigenous foods and their responses are indicated in Figures 7.13 and 7.14, respectively.



**Figure 7.13: Availability**

Figure 7.13 relates to the availability of indigenous vegetables throughout the year. Half (50%) of the participants indicated that there was sufficient availability of indigenous vegetables all year round, while 44% indicated that availability was seasonal. In support of the latter, 4% indicated availability in summer while 2% indicated availability in winter. The majority (94%) indicated that the food is available, and this has been proclaimed by different studies which have indicated that indigenous vegetables are easily available for consumption throughout the year, reducing the burden of food insecurity during times of food scarcity (Feyssa, Njoka, Asfaw and Nyangito, 2012).

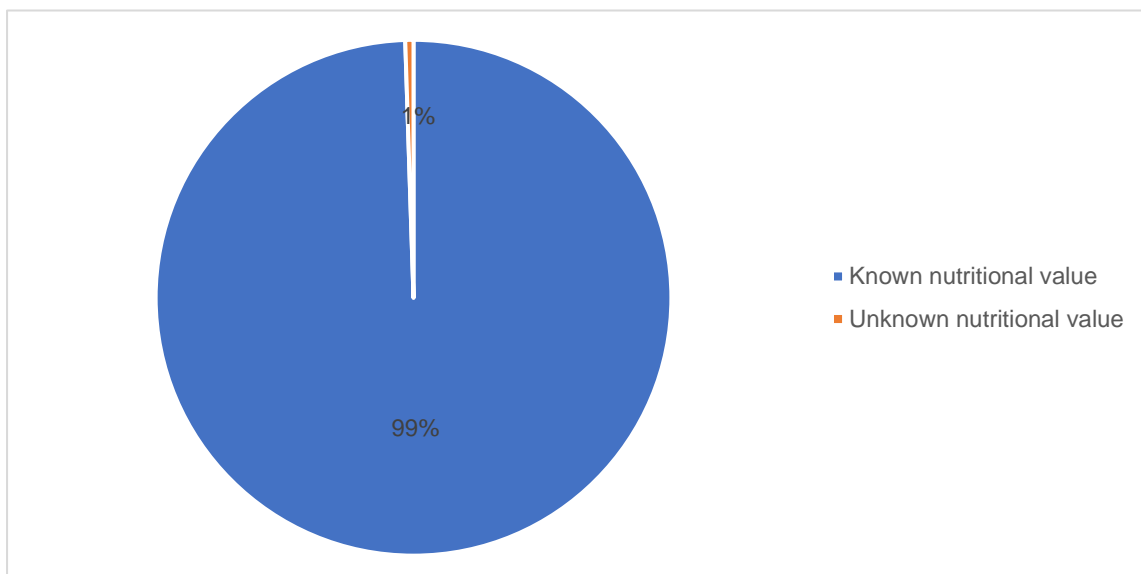


**Figure 7.14: Accessibility**

Indigenous plants grow spontaneously in natural environments and have provided food and medicine to humans for centuries in nearly all cultures (Mbhenyane, 2017). These views may be seen in Figure 7.14, where 92% of participants indicated that it was easy to access indigenous vegetables, while only 8% did not agree.

### 7.3.6 Perceived Nutritional Value of Indigenous Foods

Participants were asked to state whether they knew of any nutritional benefits of indigenous foods and their responses are indicated in Figure 7.15.

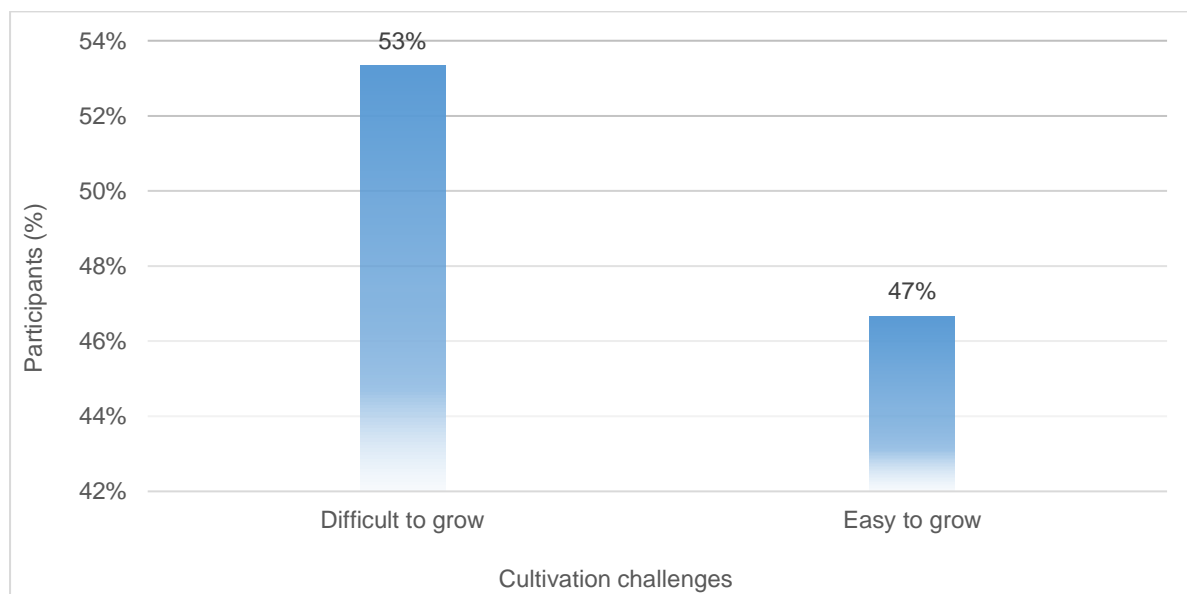


**Figure 7.15: Known nutritional value**

It appears that participants are well conversant with nutritional value derived from indigenous foods at 99%, while only 1% indicated lack of knowledge in this context. Indigenous foods are becoming more recognised as potential sources of vitamins and bioactive substances (Smith and Eyzaguirre, 2007; Maseko, Mabhaudhi, Tesfay, Araya, Fezzehazion and Du Plooy, 2017). They are high in calcium, iron, and vitamins A and C, as well as fibre and protein. They are an important source of nutrition in rural regions, contributing significantly to protein, mineral, and vitamin consumption, as well as fibre intake; they also offer variety to the diet (Mavengahama, 2013).

### 7.3.7 Difficulties Related to Cultivation

Participants were asked to indicate the difficulties related to cultivation of indigenous foods and their responses are indicated in Figure 7.16.

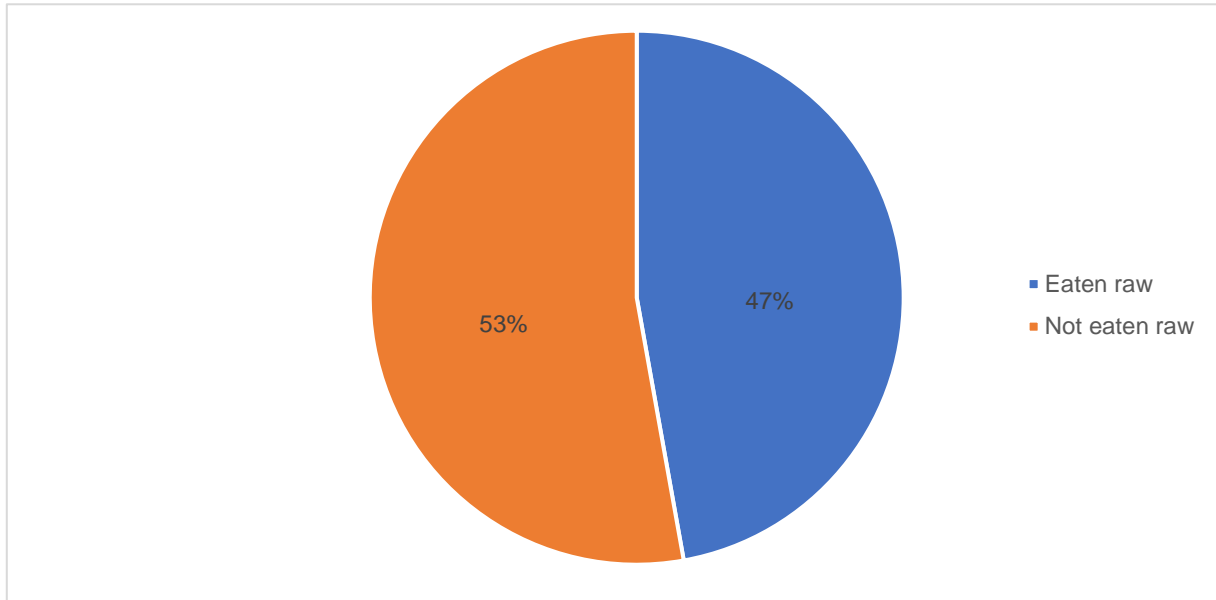


**Figure 7.16: Indigenous vegetables are difficult to grow**

Most of the participants, according to Figure 7.16, indicated that indigenous vegetables were difficult to grow (53%) while the remaining 47% disagreed with the statement. Challenges related to production of indigenous vegetables were also experienced by other communities in developing countries such as China and India (Ahloowalia and Chadha, 2007). Similar problems were also indicated in the works of Maseko *et al.* (2017).

### 7.3.8 Indigenous Foods that May Be Eaten Raw

Participants were asked to indicate whether there were any indigenous foods that could be eaten raw, and their responses are reflected in Figure 7.17.

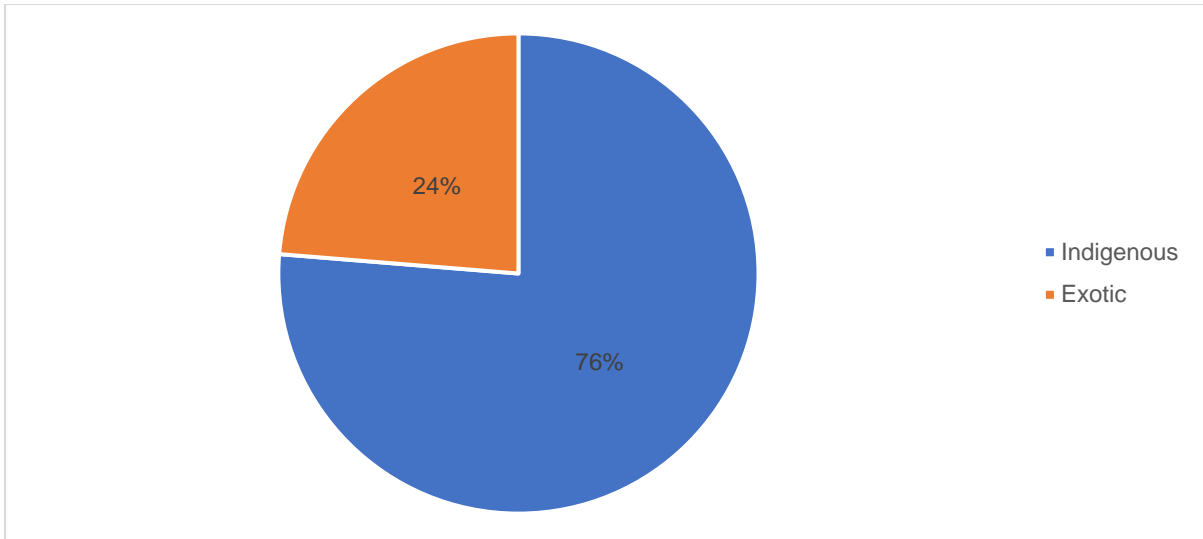


**Figure 7.17: Indigenous vegetables can be eaten raw**

While most participants indicated that they were not aware of indigenous vegetables that can be eaten raw (57%), there were individuals who claimed that some indigenous vegetables did not need cooking (47%). A study conducted by Rankoana, (2021) found that indigenous vegetables were suitable for food security due to the fact that they did not need energy for preparing.

### 7.3.9 Role Played by Indigenous Foods in Communities

A lot of research has been conducted on the role of indigenous vegetables and foods on food security in South Africa and beyond, and many studies reached a consensus that indigenous vegetables play an important role in rural communities regarding food security (Nesamvuni *et al.*, 2001; Ahloowalia and Chadha, 2007; Maseko *et al.*, 2017; Masekoameng and Molotja, 2019).

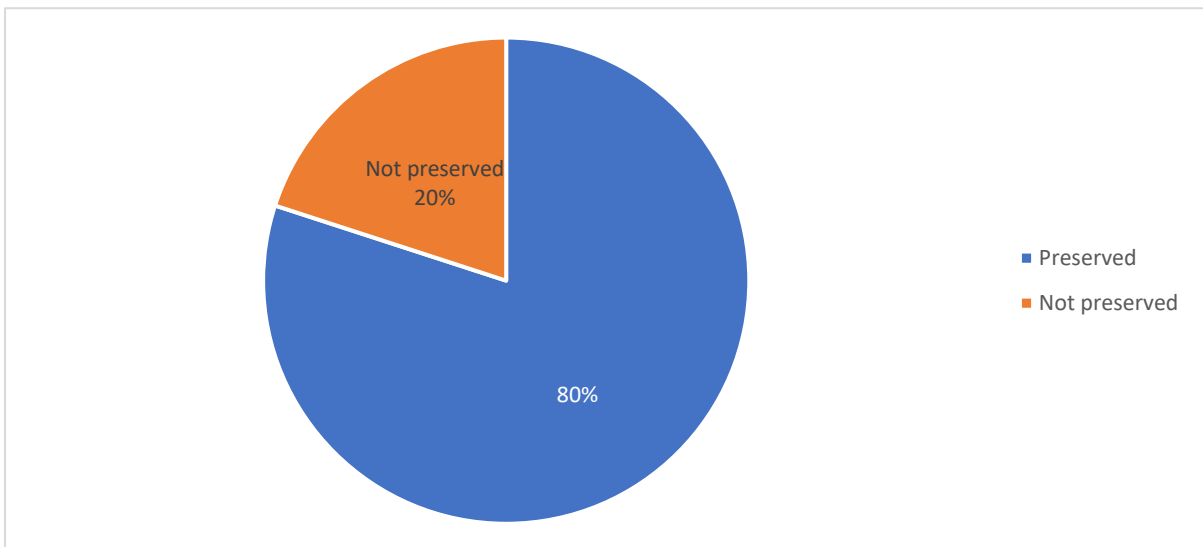


**Figure 7.18: Role of indigenous vs exotic vegetables in communities**

Figure 7.18 indicates that indigenous vegetables play a more vital role in rural communities, with 76% of the participants responding in the affirmative, while only 24% viewed exotic vegetables as having an important role in the livelihoods of community members.

### 7.3.10 Preservation of Indigenous Vegetables

It is the knowledge of the writer that communities do preserve vegetables; especially the ones that are considered to be seasonal, so that when they are not available, they can still be accessed. Participants were thus asked to indicate whether they do preserve indigenous vegetables and their responses are indicated in Figure 7.19.



**Figure 7.19: Indigenous vegetables preservation**

Another interesting aspect that this research examined was whether indigenous vegetables had requirements for preservation. Figure 7.19 shows that 20% of participants indicated that indigenous vegetables did not require any form of preservation. However, a substantial number of participants (80%) claimed that indigenous vegetables can be preserved. In South Africa different vegetables are dried using different methods such as sun-drying, drying under the shade or using a specific powder bought from the shops.

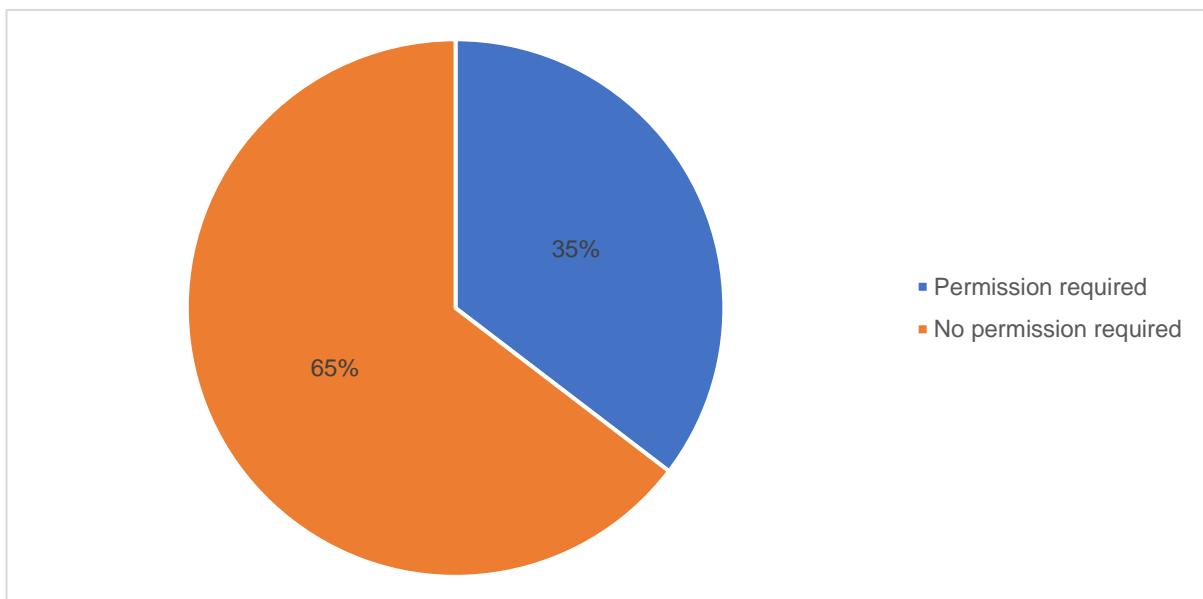
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**Objective 3:** To examine the barriers hindering access to, and utilisation of indigenous vegetables when managing agrobiodiversity.

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### 7.3.11 Permission for Use of Indigenous Vegetables

Participants were asked to indicate whether they need permission to use indigenous vegetables and their responses are indicated in Figure 7.20.

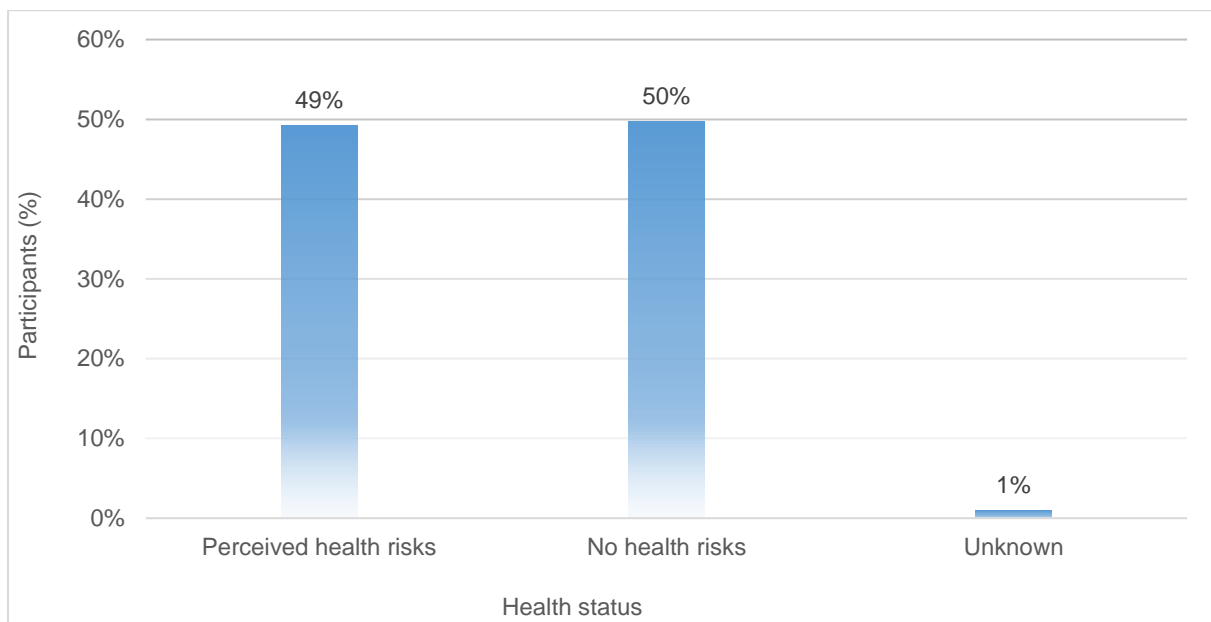


**Figure 7.20: Permission for utilisation**

According to Figure 7.20, 65% of participants indicated that there was no need to seek permission for using indigenous vegetables, whilst just over a third (35%) of participants indicated that permission was a requirement. The only permission which one has to acquire is when one enters a protected area such as a reserve area or a park, like a national park especially, when searching indigenous plants for medicinal purposes.

### 7.3.12 Indigenous Vegetables Associated with Health Risks

The subject of health risks related to indigenous vegetables has been widely researched, with outcomes indicating health benefits (Smith and Eyzaguirre, 2007;; Mbhenyane, Mushaphi, Mabapa, Makuse, Amey, Nemathaga, Lebese, 2013;Masekoameng and Molotja, 2019). It is for this reason that the participants were asked to indicate whether indigenous vegetables are associated with health risks, and their responses are indicated in Figure 7.21.



**Figure 7.21: Perceived health risks**

In this study, 49% of participants indicated that there are some indigenous vegetables that have potential health risks, while 50% indicated that there were no indigenous vegetables with health risks. Only 1% claimed not to know whether any indigenous vegetables had health risks or not. The responses neither confirm or deny whether there are any health risks that are associated with the consumption and/or utilisation of indigenous vegetables. Therefore, no conclusions can be made to validate whether the perceived health risks are true or not.

### 7.3.13 Information Provided by Community Workers and Extension Officers Regarding Indigenous Vegetables

Participants were asked to indicate whether they received any form of information from community workers and extension services, and if that information was effective.

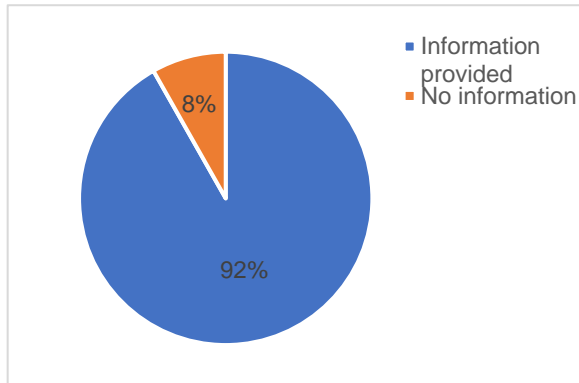


Figure 7.22: Education provided

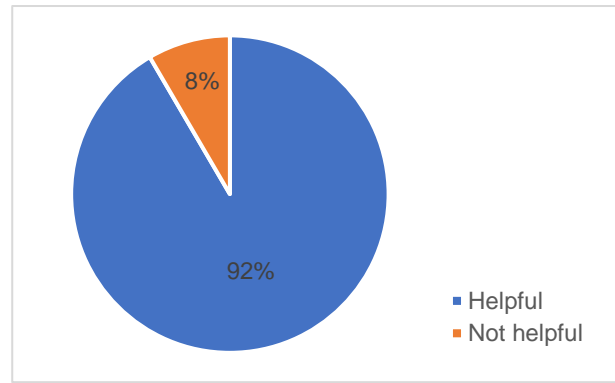


Figure 7.23: Effectiveness of education

This binary question sought to understand and measure the impact of the effectiveness of education that is provided to communities in relation to the production and utilisation of indigenous vegetables. Similarities were noted in responses captured in Figure 7.22 and Figure 7.23 respectively, with answers in the affirmative at 92% while those in the negative at 8%.

### 7.3.14 Effect of Climatic Conditions on Production of Indigenous Vegetables

Participants were asked to indicate whether the varying climatic conditions affected their indigenous production, and the findings are presented in Figure 7.24 and Figure 7.25, respectively.

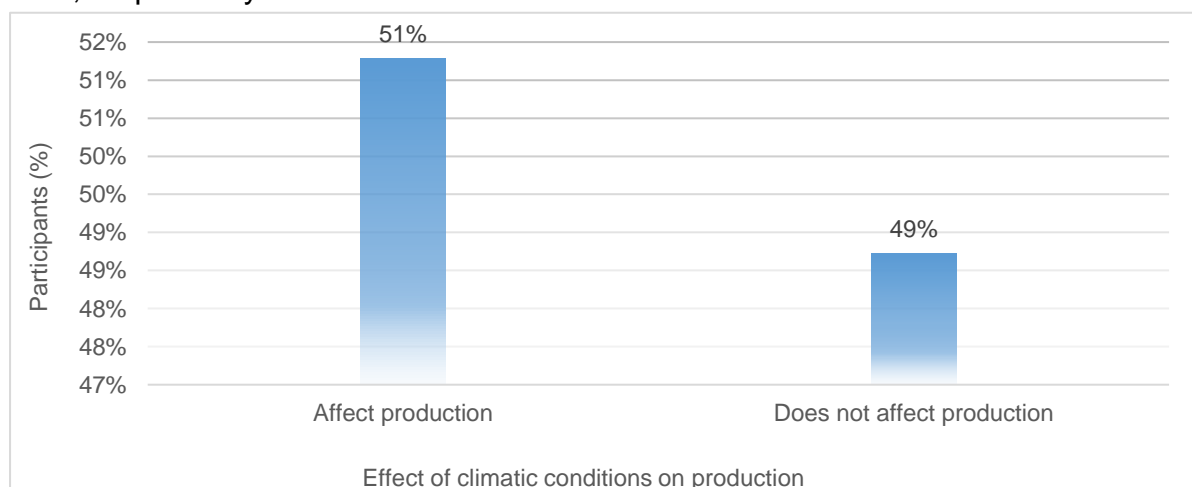
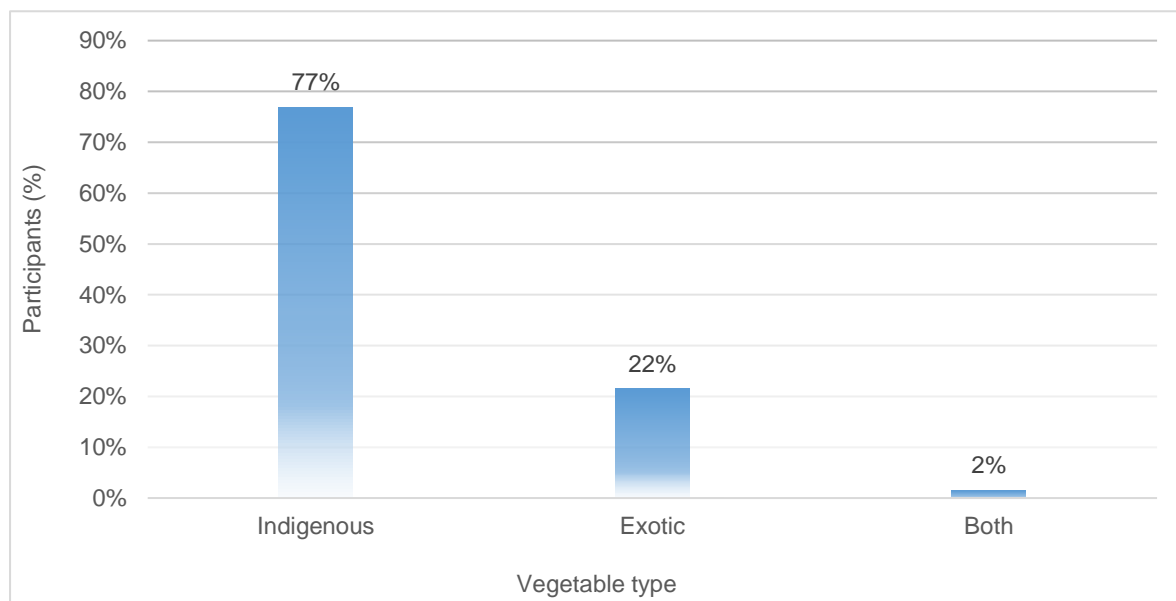


Figure 7.24 Effect of Climatic Conditions



Researchers of indigenous foods have shown considerable interest in the impacts of climate change on the production of these vegetables, and most reach consensus on outcomes (Saxena, Fuentes, Herbas and Humphries, 2016). Most of these researchers agree that indigenous vegetables do not get affected by climactic conditions. According to Chepkoech, Mungai, Stöber, Bett, and Lotze-Campen (2018), climate change is one of the main contributors of shortages in food security in Sub-Saharan Africa. In terms of Figure 7.24, there is almost a tie between the participants agreeing that climatic conditions do affect production of indigenous vegetables, at 51% and those who disagree at 49%.

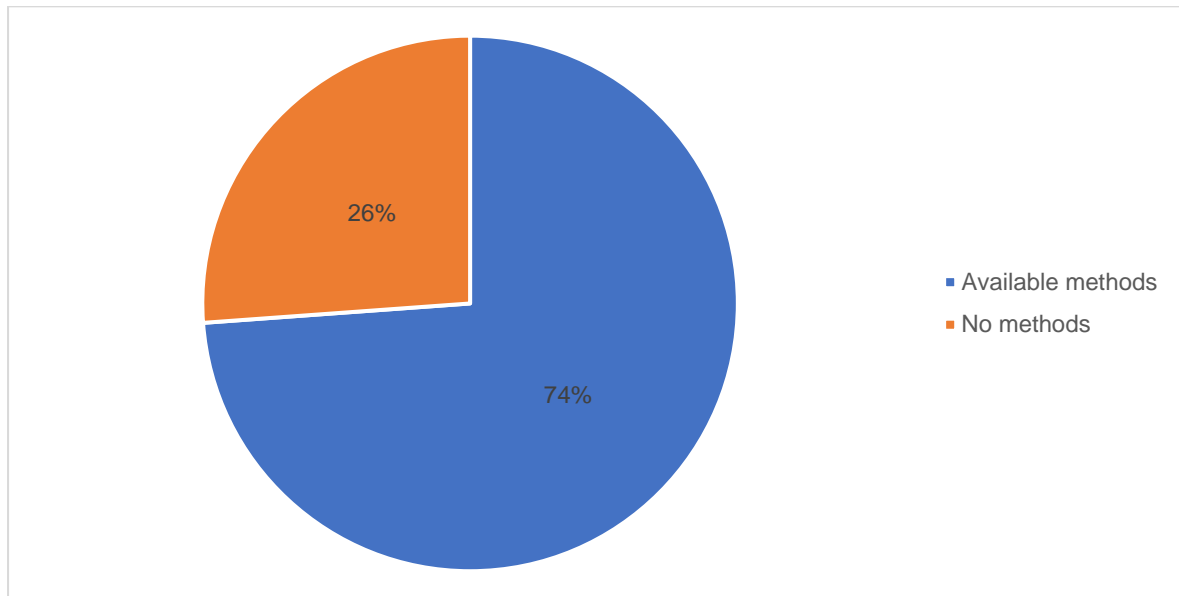


**Figure 7.25: Growth and yield in respect of climatic factors**

There are many reasons for conflicting views regarding the resilience of indigenous vegetables under varying climatic conditions as presented in Figure 7.25 and as posited by Stöber, Chepkoech, Neubert, Kurgat, Bett and Lotze Campen (2017). Some studies attribute the decline of indigenous vegetables production to severe and continually changing climatic conditions (Muthomi and Musyimi, 2009). In comparison to exotic vegetables, participants indicated that indigenous vegetables performed much better under the varying climatic conditions (77%) in relation to exotic vegetables (22%).

### 7.3.15 Known Traditional Methods Used to Overcome Production Challenges

Participants were asked to indicate whether there were any traditional methods that were used to combat any threats during the production of indigenous vegetables and their responses are presented in Figure 7.26.



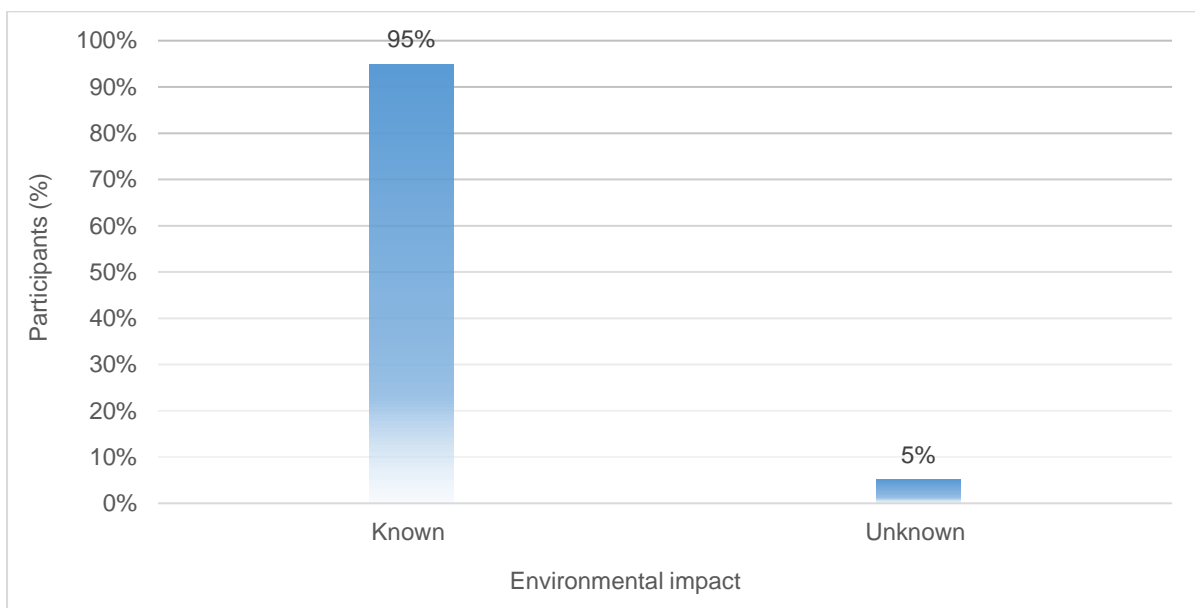
**Figure 7.26: Availability of traditional methods for overcoming threats**

In view of challenges in food production, this question sought to understand if rural communities had means of combating any threats during the production of indigenous vegetables. According to Figure 7.26, 74% of participants indicated that there were means of production using traditional methods that could be practised to overcome production threats. Only 22% responded in the negative. These statistics support the findings of Rampa, Lammers, Linnemann, Schoustra and de Winter (2020), who concluded that traditional systems for production of indigenous foods were pivotal in food security assurance.

**Objective 4:** To measure the perceptions on the utilisation of indigenous vegetables and agrobiodiversity management to rural livelihoods.

### 7.3.16 Environmental Impact of Indigenous Vegetables

Participants were asked to indicate whether indigenous vegetables had a positive impact on the well-being of the environment and the responses are presented in Figure 7.27.

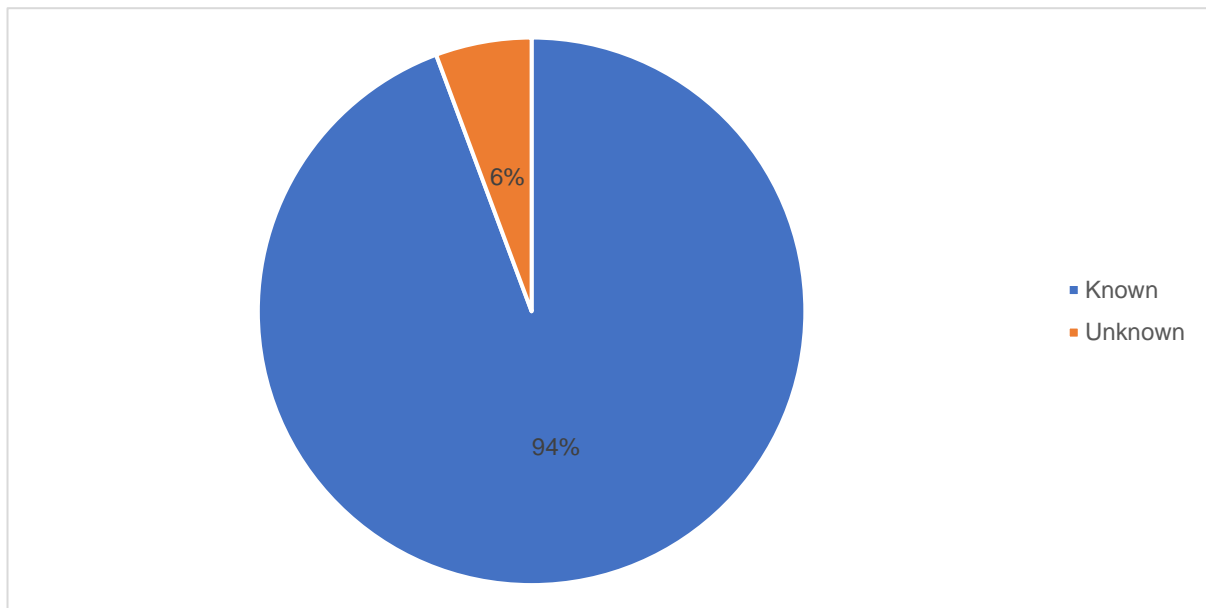


**Figure 7.27: Perceptions on environmental impact**

Farming activities are dependent on favourable environmental conditions and are often at risk of erratic environmental conditions. According to Capuno, Gonzaga, Dimabuyu and Rom (2015), indigenous vegetables play a crucial role in food security, income generation, and the food culture of the rural poor. Their adaptability and resilience to stresses provide farmers with the needed coping strategies to confront climate change. Similarly, indigenous vegetables play a crucial role in the health of the environment (Ahloowalia and Chadha, 2007). As a means of establishing whether indigenous vegetables have an impact on the well-being of the environment, most participants (95%) indicated that indigenous vegetables do have an environmental impact while 5% held opposing views.

### 7.3.17 Role of Indigenous Vegetables on Agrobiodiversity

Participants were asked to indicate whether indigenous vegetables played any role towards agrobiodiversity and the responses are presented in Figure 7.28.

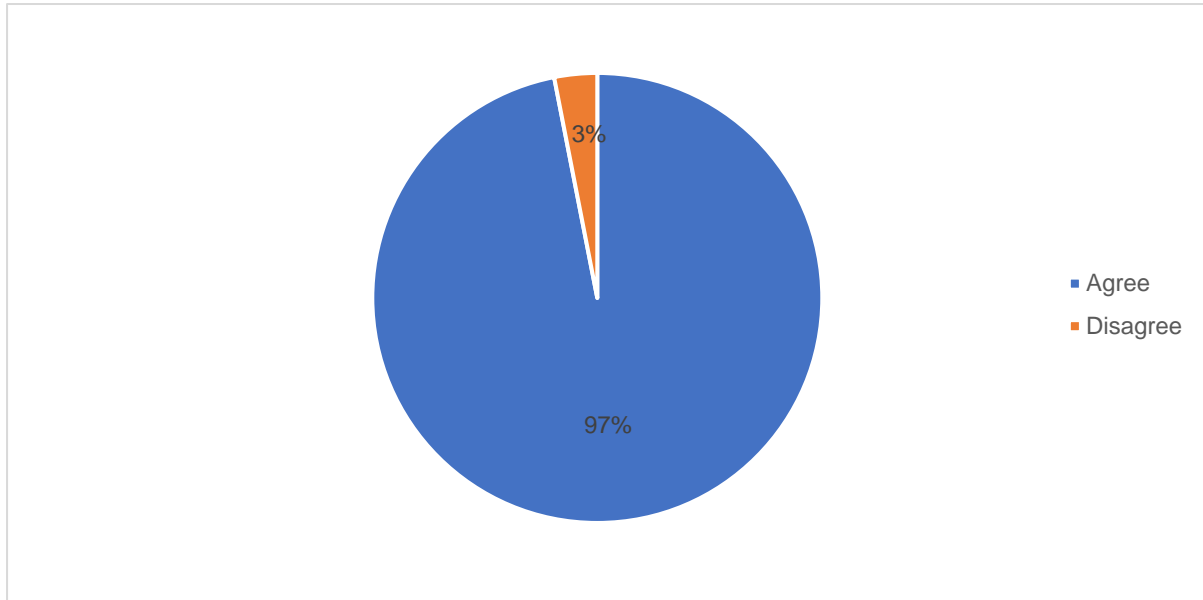


**Figure 7.28: Relationship between indigenous vegetables and agrobiodiversity**

With regard to understanding the role of indigenous vegetables on agricultural agrobiodiversity, 94% of the participants indicated that there was an existing relationship between these two variables. These findings are similar to the conclusions made by Mavengahama (2013) who indicates that agrobiodiversity helps in buffering against the accumulation and multiplication of pests and diseases and provides important cover for the soil. This finding also came out strongly as one of the emerging themes in the qualitative part of the study. It is worth noting that 6% of the participants did not see any relationship between indigenous vegetables and agrobiodiversity.

### 7.3.18 Cultural Value of Indigenous Vegetables

Participants were asked to indicate whether indigenous vegetables had any cultural value, and the responses are presented in Figure 7.29.

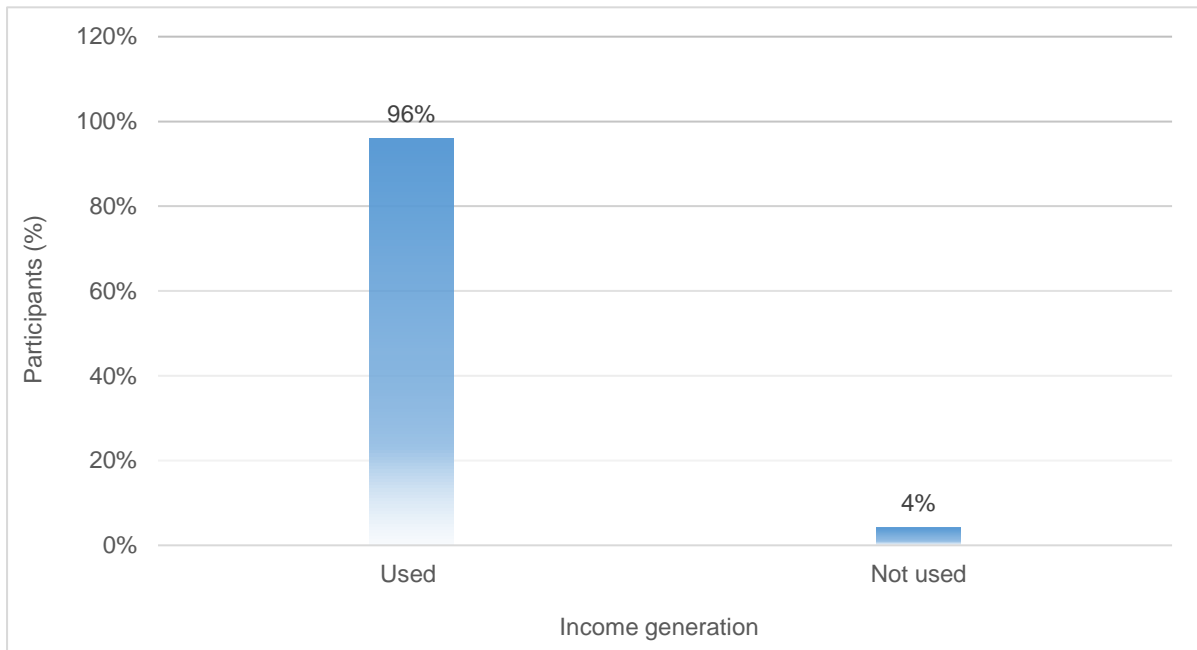


**Figure 7.29: Cultural significance of indigenous vegetables**

The findings of this research corroborate what previous research has reported in relation to indigenous vegetables and their cultural significance. Engler-Stringer (2010) refers to indigenous vegetables as plant species that are fundamental to many cultural identities of diverse ethnic groups, and they serve as a symbol of heritage, trademark, and culture (Akinola, Mabhaudhi, De Bruin and Rusch, 2020). Across the three district municipalities that were under investigation, 97% of the participants indicated that indigenous vegetables were culturally significant as they formed part of their heritage and indigenous knowledge. Contrastingly, 3% felt that there was no cultural significance brought by indigenous vegetables.

### 7.3.19 Use of Indigenous Vegetables for Income Generation

Participants were asked to indicate whether indigenous vegetables could be used to generate income in the households, and their responses are indicated in Figure 7.30.

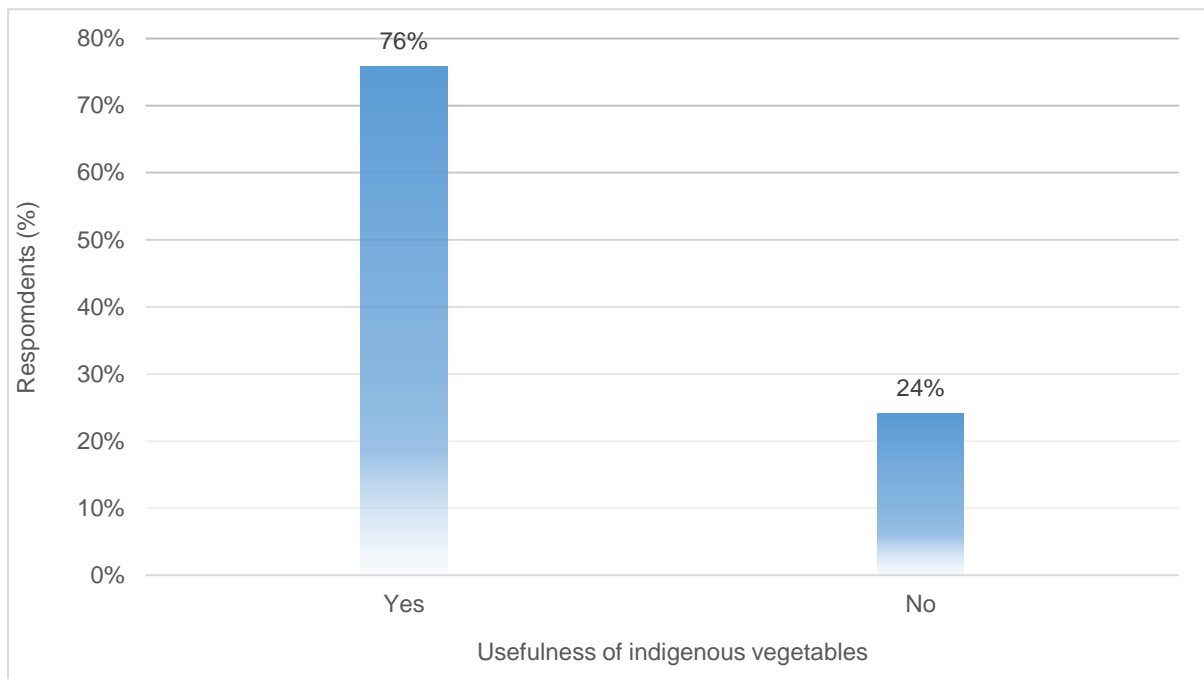


**Figure 7.30: Monetary value**

Unemployment is one of the biggest socio-economic challenges that is mostly common in South Africa's rural communities. According to Wilkinson *et al.* (2017) unemployment in South Africa disproportionately affects the black majority, particularly black youths and females who reside in rural areas. This confirms the findings of this study which indicate that more than 50% of the participants were unemployed as illustrated in Figure 7.7. In response to this challenge, 96% of the participants indicated that the sale of indigenous vegetables played an important role in generating income for households. However, the remaining 4% did not hold a similar perception as they indicated that indigenous vegetables did not provide an important source of household income.

### 7.3.20 Known Perceptions of the Younger Generation

Participants were asked to indicate their perceptions with regard to the younger generation and their responses are indicated in Figure 7.31.

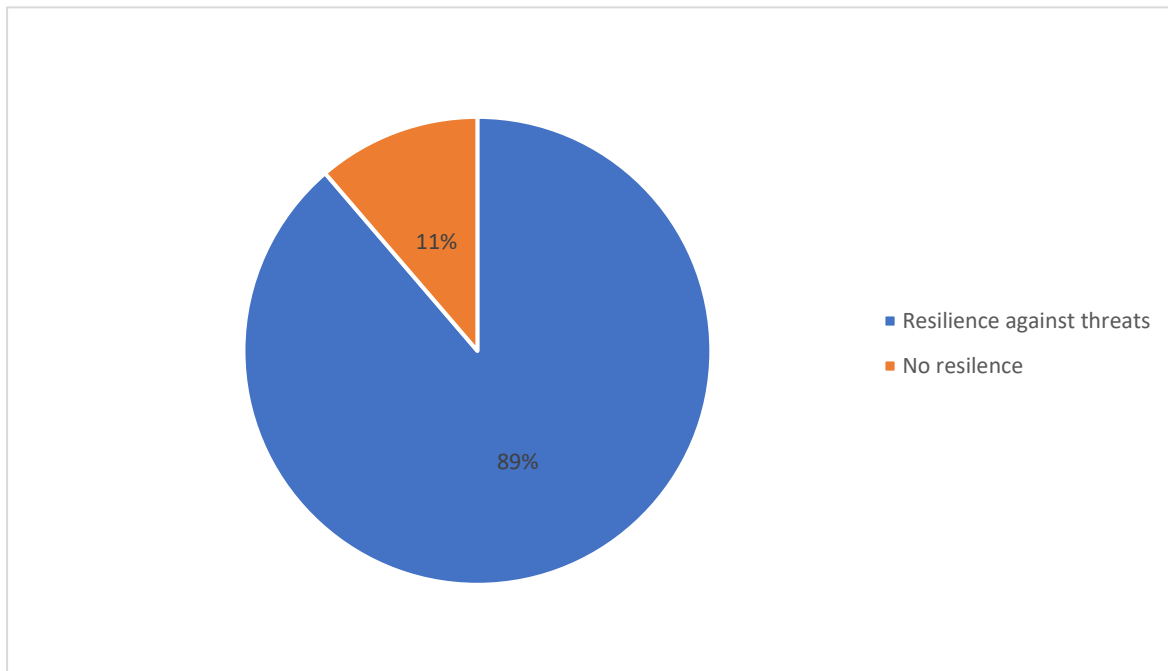


**Figure 7.31: Observed youth perceptions of indigenous vegetables**

A significant number of the participants (74%) indicated that the younger generation did find indigenous vegetables useful, while there is an indication that some of the younger generations do not see the value of these plants (24%). The latter findings are not uncommon. Kansiime, Ochieng, Kessy, Karanja and Romney (2018), and Dlamini and Viljoen (2020) report negative perceptions that are held by the younger generation in relation to the usefulness and preference of indigenous vegetables.

### 7.3.21 Resilience of Indigenous Vegetables

Participants were asked to indicate whether indigenous vegetables could withstand environmental threats during production, and the responses are presented in Figure 7.32.



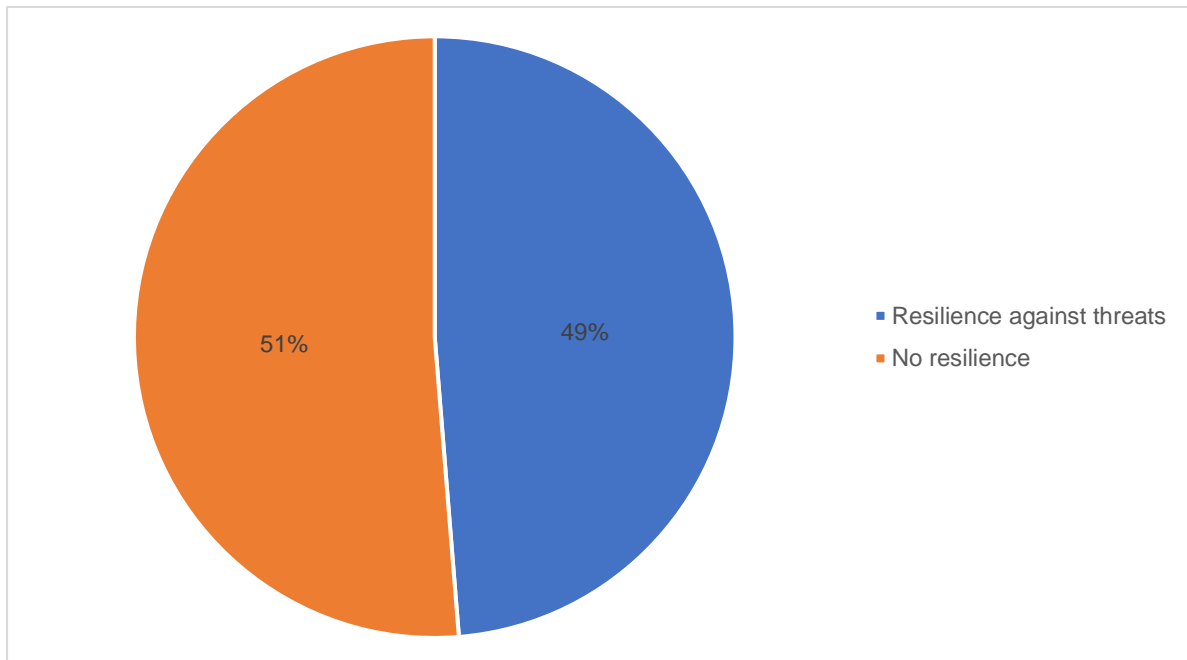
**Figure 7.32: Resilience of indigenous vegetables against environmental threats**

Over the past few years, the world has seen a pattern of weather changes as a result of climate change. These varying weather patterns have directly influenced agriculture and the effects have been negative with respect to production (Thornton, Dinesh, Cramer, Loboguerrero and Campbell, 2018). The study findings indicate that indigenous vegetables were able to withstand extreme weather conditions which could pose environmental threats. Examples of such threats include drought, loss of wetlands (due to extreme heat), and heavy rains resulting in floods. While 89% of the participants stated that indigenous vegetables thrived under harsh environmental conditions, 11% disagreed.



### 7.3.22 Resilience of Non-indigenous (Exotic) Vegetables

Participants were further asked to indicate whether exotic vegetables could withstand environmental threats during production and the responses are presented in Figure 7.33.

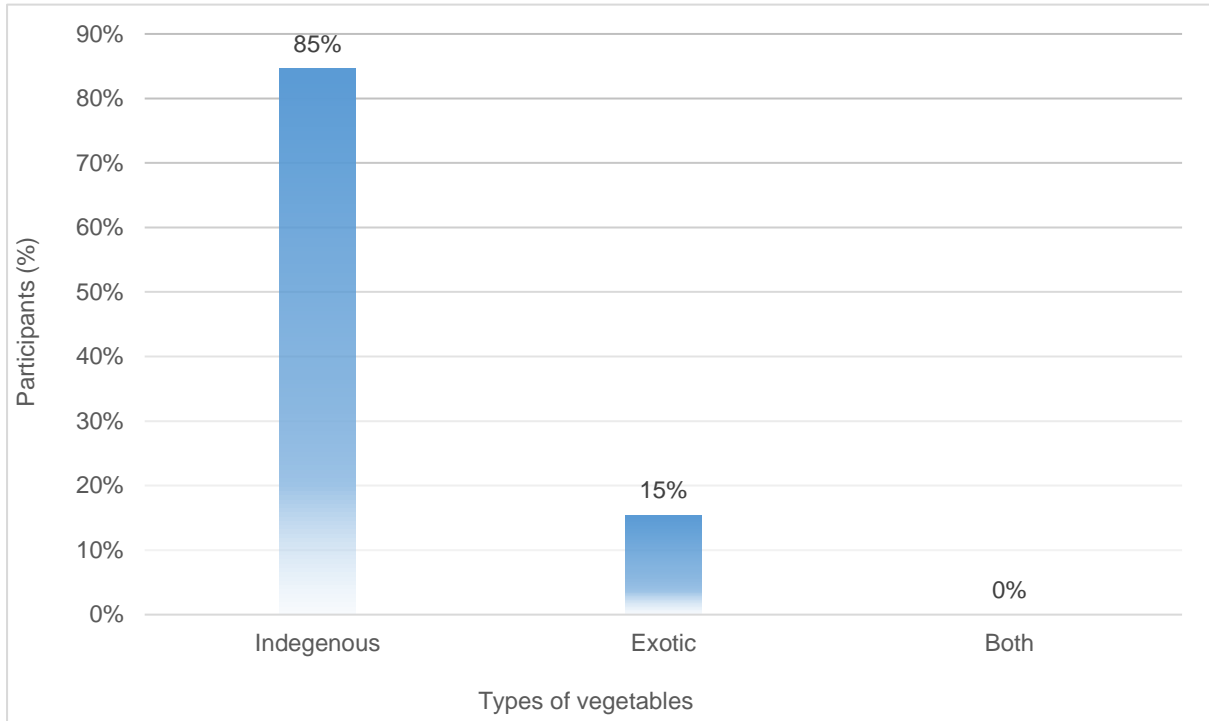


**Figure 7.33: Resilience of exotic vegetables against environmental threats**

Some scholars who have demonstrated an interest in indigenous agricultural knowledge systems (IAKS) have indicated that non-indigenous (exotic) vegetables find it difficult to withstand the biotic and abiotic environmental stresses when compared to indigenous vegetables (Maseko *et al.*, 2017). In northern KZN, participants held contrasting views with regard to the resilience of exotic vegetables. While 51% indicated that exotic vegetables were able to withstand environmental threats, 49% disagreed.

### 7.3.23 Contribution to Sustained Livelihoods

Participants were asked to indicate whether indigenous vegetables played any significant role in their livelihoods, and their responses are indicated in Figure 7.34.



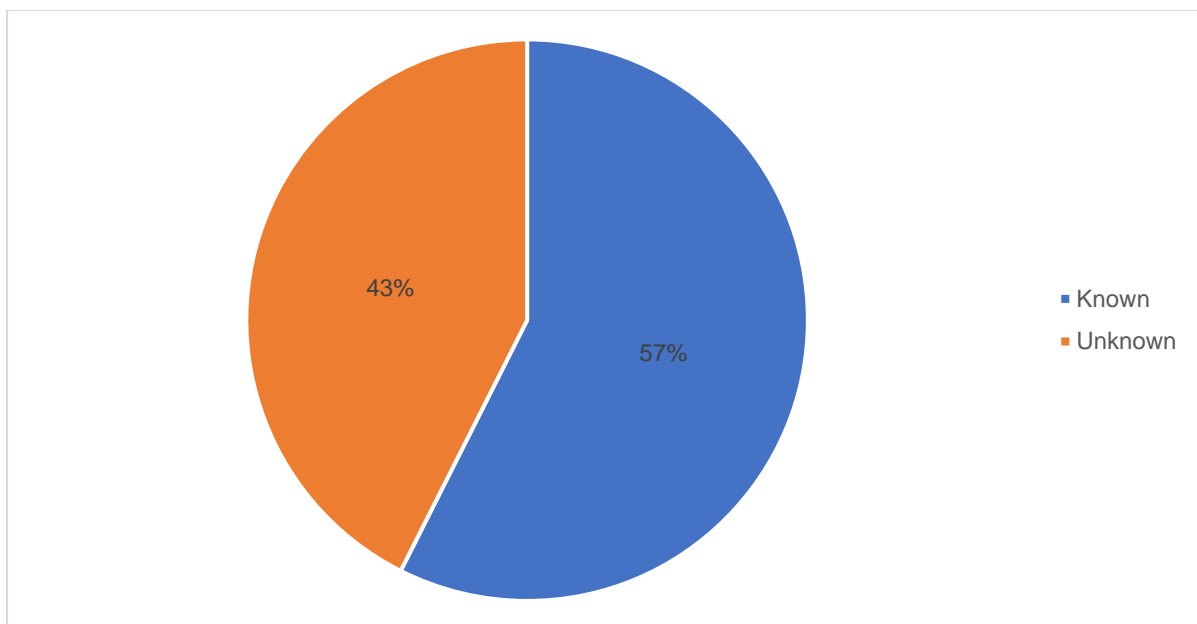
**Figure 7.34: Livelihood contribution**

The perceptions drawn from the participants gave an indication that indigenous vegetables played a significant role in their livelihoods. To answer this question, there were three variables of interest which include (i) income generation, (ii) food availability and accessibility for household utilisation, and (iii) medicinal value. With respect to this, 85% of the participants indicated that indigenous vegetables made a substantial livelihood contribution. However, 15% indicated that exotic vegetables contributed more for them.

**Objective 5:** To devise a strategy that seeks to promote indigenous vegetables as important role-players to agrobiodiversity management and food security.

### 7.3.24 Knowledge of Agricultural Technology

In light of the technological drive that is used to maximise production in the farming systems, participants were asked to indicate whether they had any knowledge of agricultural technology, and their responses are indicated in Figure 7.35.

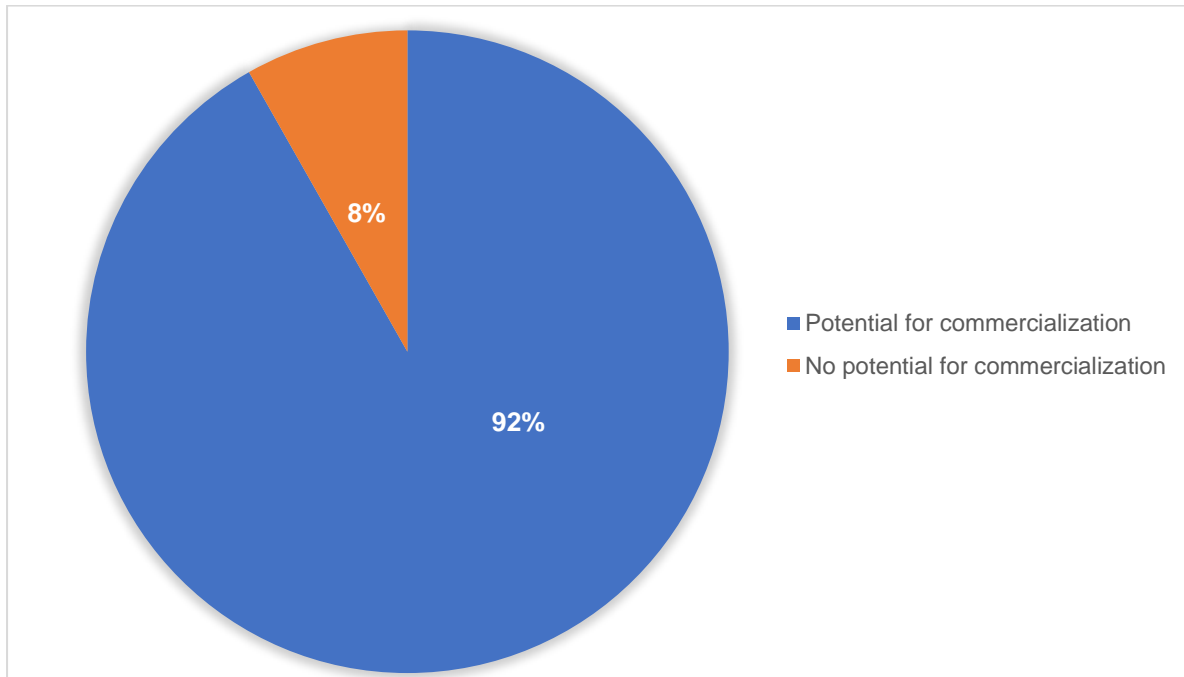


**Figure 7.35: Integration of modern technologies with traditional production systems**

Farming technology (such as tractors, combine harvesters, irrigation systems etc.) is one of the driving forces for increasing productivity and promoting agriculture across the globe. However, due to limited access to information, some rural farmers have little to no knowledge regarding technologies that are used in the agricultural industry today and which could be integrated with traditional production systems. It was no surprise to learn that that only 57% of the participants had knowledge of farming technologies that can be integrated with traditional farming systems, while the remaining 47% had no knowledge of such technologies.

### 7.3.25 Commercialisation of Indigenous Vegetables

The inclusion of indigenous vegetables in the formal market is one of the challenges which this study sought to contribute towards. It was for this reason that perceptions regarding the potential commercialisation of indigenous vegetables were asked from the participants, and the findings are captured in Figure 7.36.

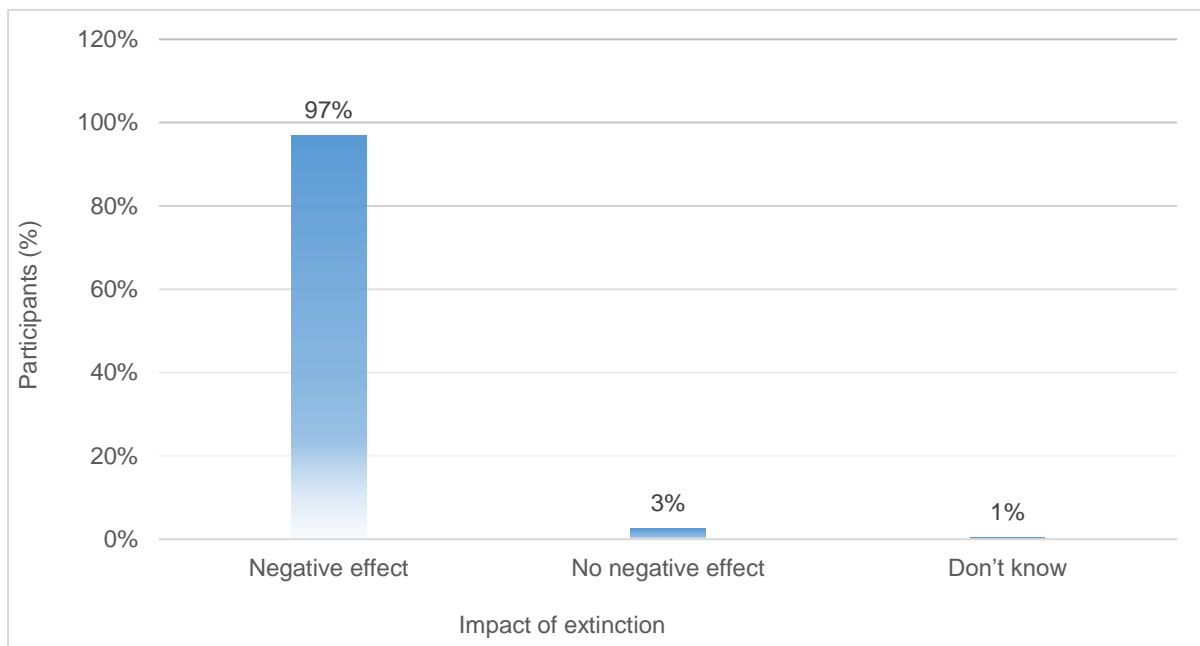


**Figure 7.36: Potential for commercialisation**

Indigenous crops are some of the most highly neglected foods which are not commercialised in comparison to their exotic crop counterparts. Through their high nutritional value and resilient attributes, indigenous vegetables offer potential trade opportunities for rural farmers (Mahlangu *et al.*, 2020). This study's findings indicate that most of the farmers who participated in this research indicated that indigenous vegetables do have a potential to be commercialised (92%). However, 8% did not hold similar views as they indicated that these vegetables cannot be commercialised.

### 7.3.26 Effects from the Extinction of Indigenous Vegetables

The literature review stresses that there is a challenge with regard to the increasing number of indigenous vegetation that are constantly declining (Dorga Sood, Dobhal and Sharma, 2010; Seburanga, 2013). To understand what this means for the participants, they were asked how the extinction of indigenous vegetables would affect them.



**Figure 7.37: Extinction of indigenous vegetables**

Most of the participants indicated that if indigenous vegetables were to be extinct in northern KZN, they would be negatively affected (97%). Two percent (2%), however, indicated that they did not think that there would be any negative effect. An additional 1% indicated that they did not know whether any negative impact could result from the extinction of indigenous vegetables.

## **7.4 INFERENTIAL STATISTICAL ANALYSIS (CHI-SQUARE TEST OF INDEPENDENCE)**

### **7.4.1 Pearson Correlation Coefficients**

Correlation is a word that is frequently misused in spoken communication. Correlation is a phrase used among scientific peers to allude to an association, connection, or any other type of interaction, link, or correspondence (Altman, 1991). This wide colloquial understanding occasionally results in scientists misusing the statistical term 'correlation' in research studies.

Correlation may be defined as a reciprocal relationship between two or more objects; a statistic that indicates how closely two variables co-vary; it can range from -1 (perfect negative correlation) to 0 (no correlation) to +1 (perfect positive correlation). Correlation is a statistical technique for determining the possibility of a two-way linear connection between two continuous variables (Mukaka, 2012).

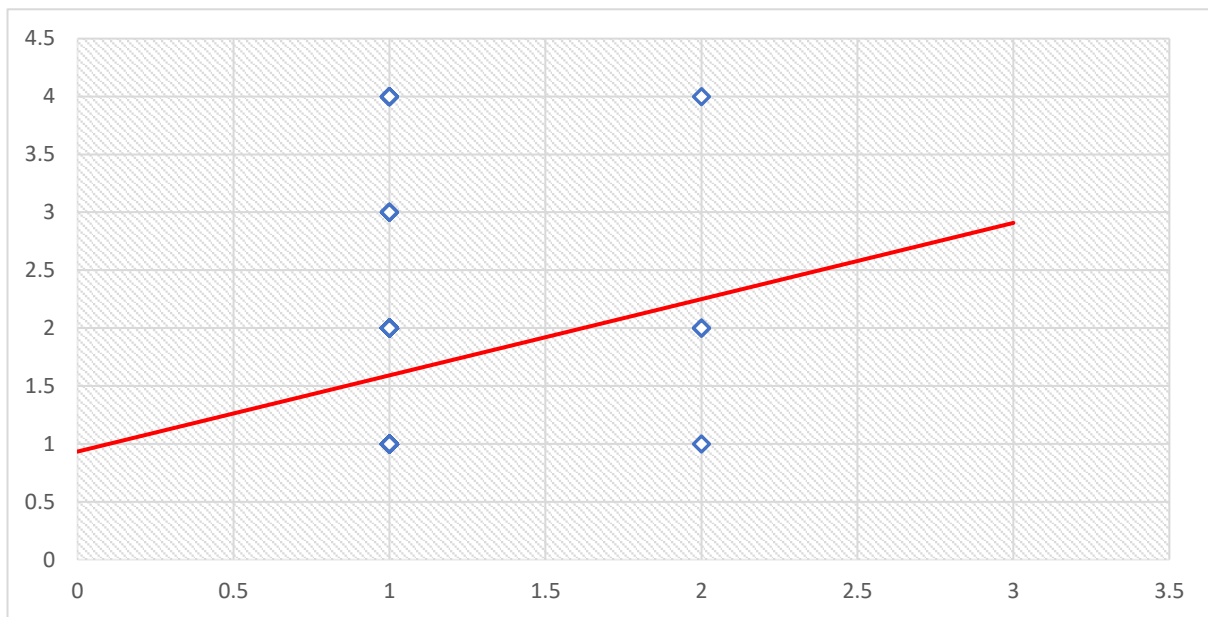
A correlation is quantified using a statistic called the correlation coefficient, which quantifies the strength of the hypothesised linear relationship between the two variables. It is a dimensionless quantity with a value between -1 and +1. A correlation value of 0 implies that there is no linear link between two continuous variables, whereas a correlation coefficient of -1 or +1 shows that there is a perfect linear relationship. The relationship's strength might range between -1 and +1.

Correlation coefficients approach unity as correlation strength increases. If the coefficient is positive, the variables are inextricably linked (i.e., as the value of one variable goes up, the value of the other also tends to do so). If the coefficient, on the other hand, is negative, the variables are inversely linked (i.e., as the value of one variable goes up, the value of the other tends to go down) (Swinscow, 1997).

The test of independence and associations in terms of relationships were administered on different variables that informed the analysis in this study. The following section provides a detailed account of results with interpretations thereof.

### 7.4.2 Indigenous Vegetables Availability and Community Utilisation

A Chi-Square test of independence revealed that there was no relationship between the indigenous vegetables' availability and perceived community utilisation, at a P value of 0.18052. This was further supported by the Pearson Correlation test statistic at 0.128659, which indicates that there was a positive direction of variables but without statistical significance. Figure 7.38 indicates the nature and direction of these variables.

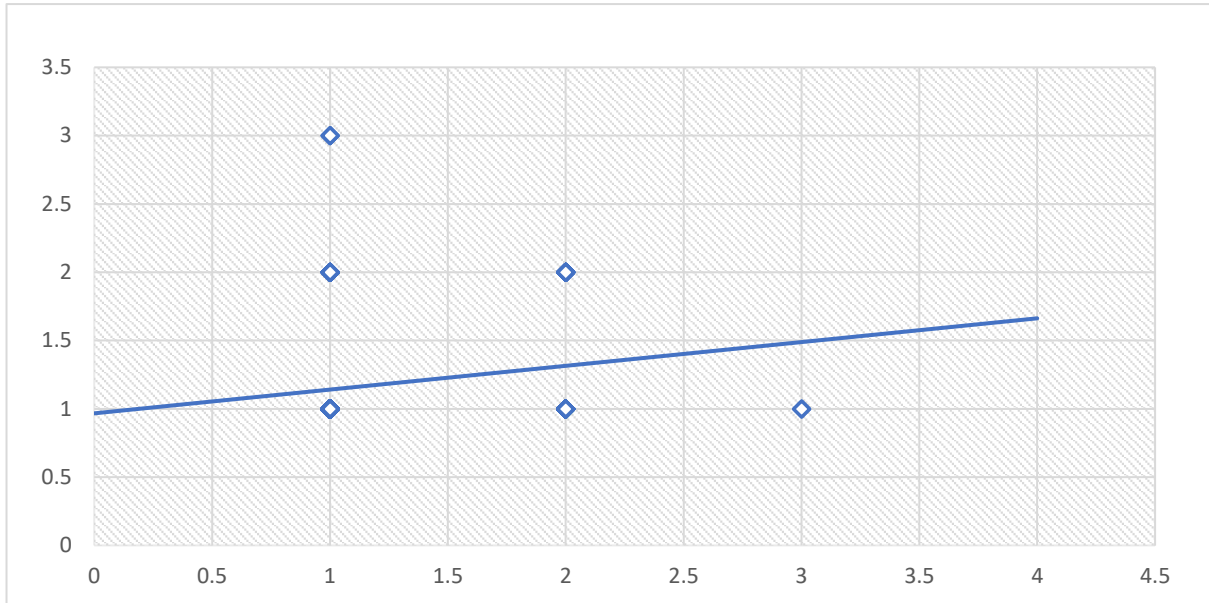


**Figure 7.38: Community grown indigenous vegetables vs utilisation**

There could be a number of reasons associated with this outcome, as reported in various studies (Maseko *et al.*, 2017; Masekoameng and Molotja, 2019). A study by Mungofa, Malongane and Tabit (2018) found that there was a decline of utilisation of indigenous vegetables in the Limpopo Province due to perception related issues. The decline in utilisation has been associated with unfamiliarity about indigenous foods and their declining availability by the Programme to Support Pro-Poor Policy Development (PSPPD, 2010).

### 7.4.3 Use of Indigenous Vegetables for Convenience Purposes

According to Maseko *et al.* (2017), the underutilisation of indigenous vegetables is attributable to the preference for exotic vegetables, even under dire economic situations. Figure 7.39 depicts the findings from this study.

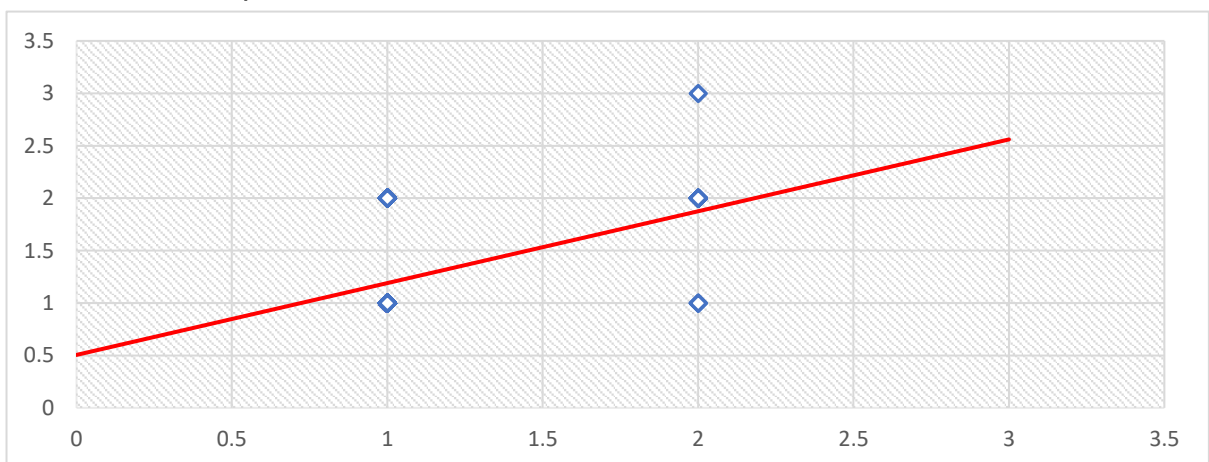


**Figure 7.39: Utilisation of indigenous vegetables vs exotic vegetables**

Examining the use of indigenous vegetables for convenience purposes within the sampled population, it was interesting to note that, although the Chi-Square test revealed a statistically significant outcome at a P value of 0.00074, the level of use was found to be weak at a Pearson Coefficient of 0,191227.

#### 7.4.4 Accessibility and Role of Indigenous Vegetables in Livelihoods

Masekoameng and Molotja (2019) postulated about the pivotal role that indigenous vegetables play in the lives of rural community members in South Africa, rejecting any claim that there was no vital role played by these vegetables at a P value of 7, 95643E-09 from a Chi-Square test statistic.



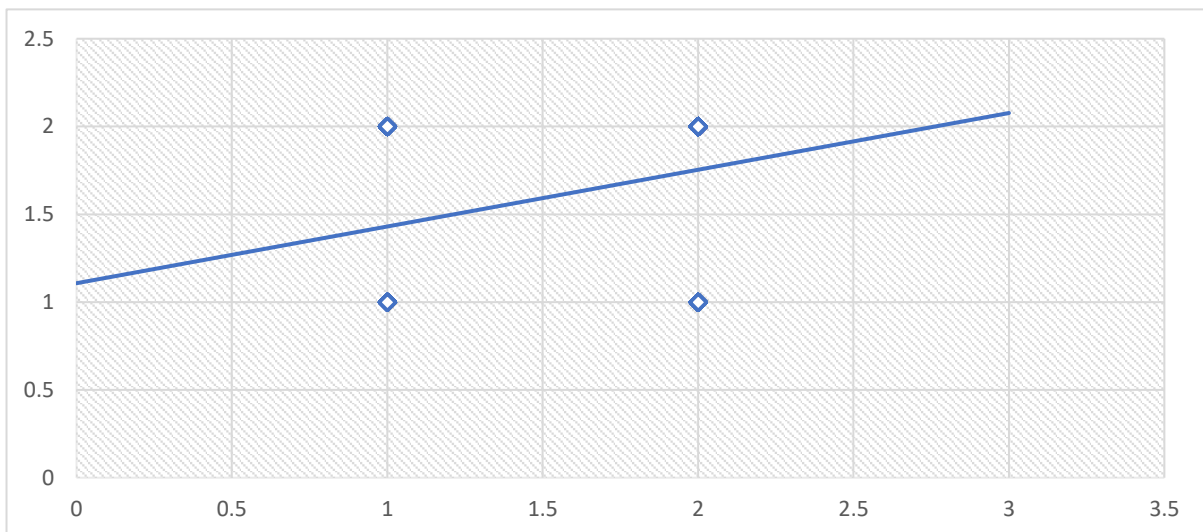
**Figure 7.40: Accessibility and role of indigenous vegetables**



It is interesting to note that there is a positive but unstable relationship between the indigenous vegetables and the role they play in the community, at a Pearson Correlation Coefficient score of 0.42466. Just like many authors on the subject of indigenous vegetables, these views were also supported by Rankoana (2021).

#### 7.4.5 Traditional Regulations and Permission for Utilisation

The researcher wanted to test a null hypothesis claiming that there are no traditional regulations for harvesting indigenous vegetables, and as such people do not need permission before utilising them. A Chi-Square test for independence resulted in a statistically significant P value at 8, 67686E-06, culminating in the rejection of the hypothesis. A correlation between the need for securing permission for utilisation of indigenous vegetables and standing regulations regarding the use appeared to be weak at 0.31851, supporting the rejection of the hypothesis stated above. Although the correlation is weak and not statistically significant, it is interesting to note that the direction of the variables is on the positive side.

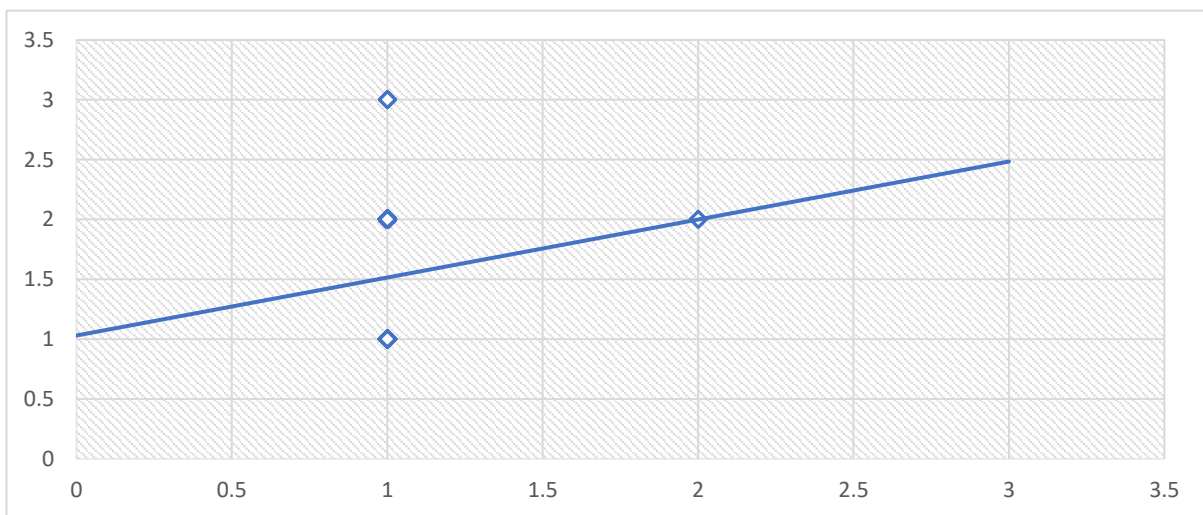


**Figure 7.41: Traditional regulations vs permission for utilisation**

Many studies that have remarked on the role of traditional practices in relation to indigenous vegetables indicated permission was required related to preservation of the environment (Maseko *et al.*, 2017; Masekoameng and Molotja, 2019; Govindasamy, Gao, Simon, Van Wyk, Weller, Ramu and Mbewu, 2020).

#### 7.4.6 Known Nutritional Benefits of Indigenous Vegetables and Perceived Health Risks

The subject of nutritional value and associated benefits has been widely researched by scholars both in South Africa, Botswana, Zambia, Kenya, Nigeria and Europe (Rankoana, 2017; Maseko *et al.*, 2017; Mungofa *et al.*, 2018; Govindasamy *et al.*, 2020). However, regardless of the research and reported perceived nutritional value of indigenous vegetables, this current study revealed that these are known, and thus failed to reject a hypothesis that claimed that there are no known nutritional benefits from indigenous vegetables and that others are perceived to have health risks when consumed.



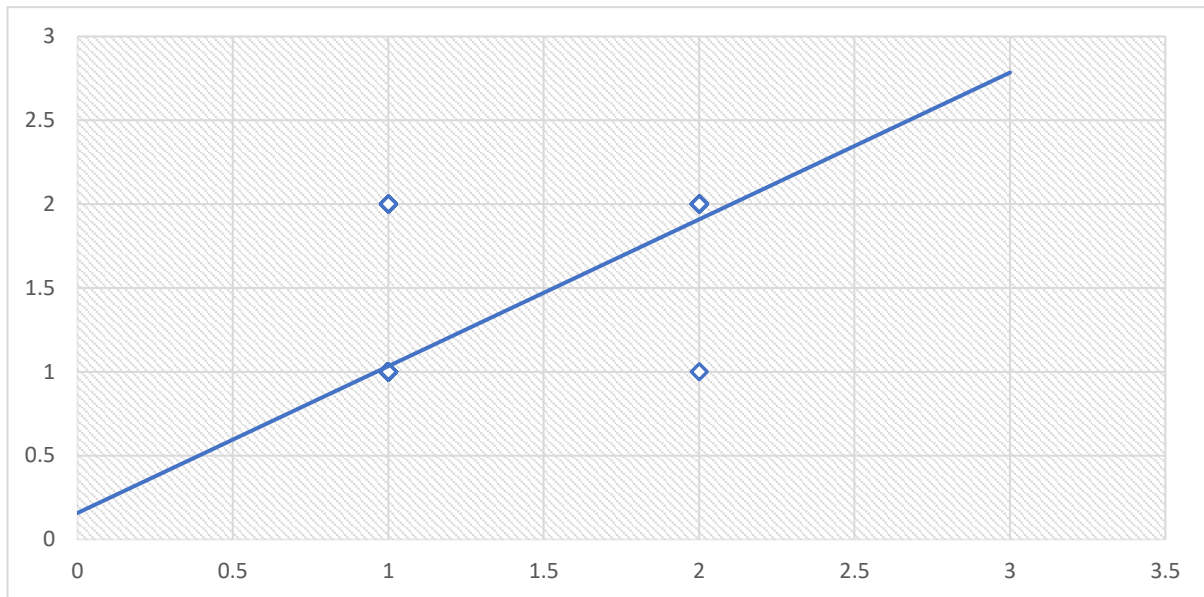
**Figure 7.42: Known nutritional benefits of indigenous vegetables**

The Chi-Square statistic culminated in a P value of 0,773773195, which was statistically insignificant, with a corresponding coefficient of 0.06658. This coefficient indicates that there is no relationship between known nutritional importance and any health risks when consumed.

#### 7.4.7 Education and Awareness Provided by Agricultural Extensionists and Community Workers

The intervention of healthcare workers and agricultural extension officers has been acclaimed to add value to the production of indigenous foods, as revealed in this study. This is evidenced by the Chi-Square statistic measuring a claim suggesting that

information and awareness provided by agricultural extension services and community workers does not enhance production and utilisation of indigenous vegetables, which was rejected with a P value of 3, 32114E-24.



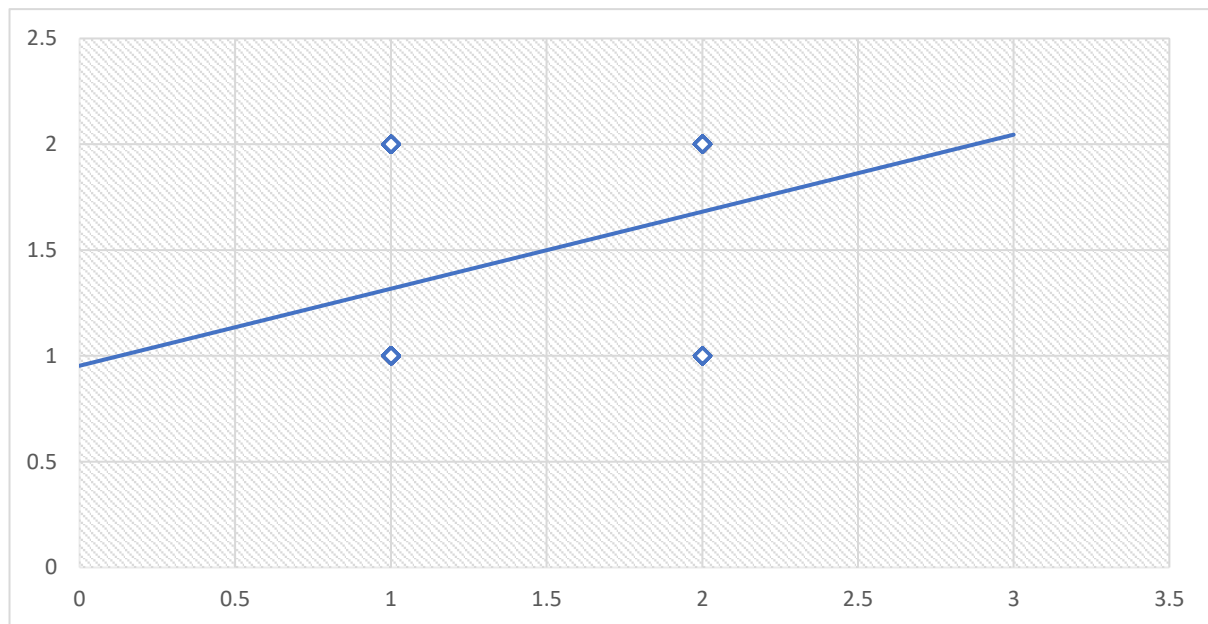
**Figure 7.43: Education and knowledge transfer (awareness)**

Abioye, Zaid and Egberongbe (2011) posit that the most important practices for farmers who want to practice traditional agriculture are those practices that involve soil management techniques, including pest and disease control measures, soil preparation methods, and plant starting and transplantation techniques. These techniques can be extended to practices of indigenous vegetable production, as propounded by Mugwisi, Ocholla and Mostert (2014). It was further interesting to note that the Pearson Correlation of 0.73634 indicates a perfect positive relationship between the time invested by agricultural extension officers together with community workers and the production rate of indigenous vegetables. Figure 7.43 indicates a positive linear relationship depicting the positive work of agricultural extension officers.

#### **7.4.8 Effect of Climate on the Production of Indigenous Vegetables**

There is increasing acceptance that the global climate is changing rapidly and impacting the marginalised communities (Steffen, Grinevald, Crutzen, and McNeill, 2011; IPCC, 2014). While the timing, size, and direction of such changes will likely vary by location, experts expect that they will have a significant influence on agricultural productivity, ecosystem health and function, and human health (Reid *et*

al., 2005). Additionally, these issues are becoming increasingly interconnected: human health outcomes are inextricably tied to the health of ecosystems and agricultural areas.

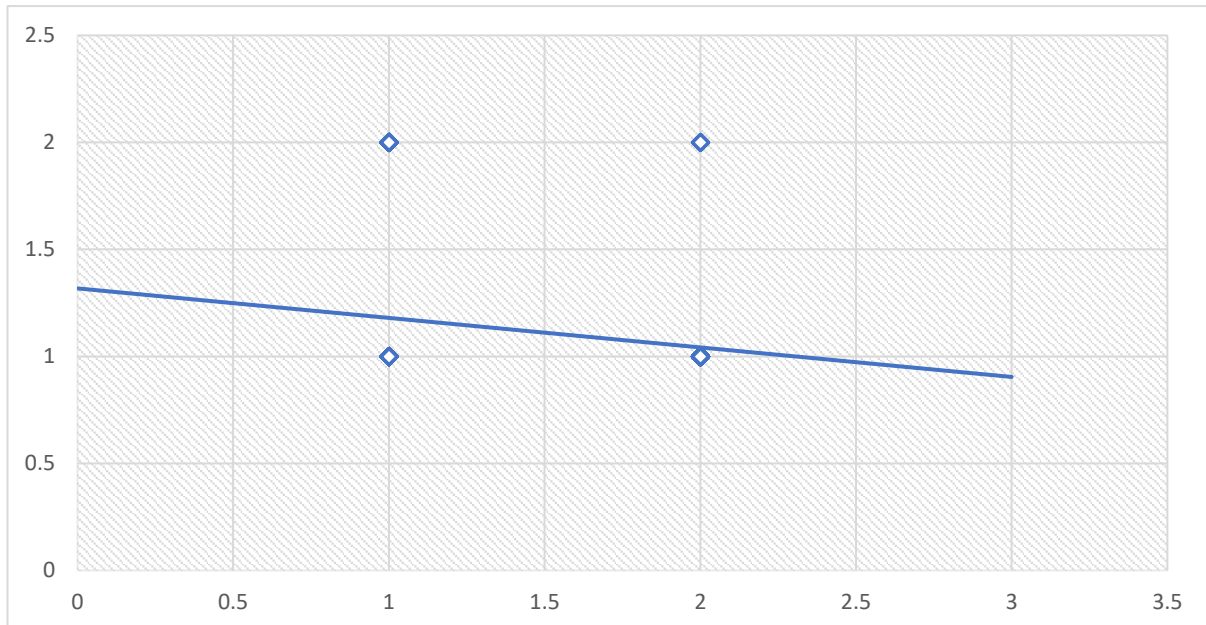


**Figure 7.44: Effect of climate on indigenous vegetable production**

In this study, a claim suggesting that all indigenous vegetables are not difficult to grow and that varying climatic conditions do not affect the production of both cultivated and wild indigenous vegetables, was rejected, at a P value of 3,90572E-07. A further test was conducted to look at the nature, strength, and direction of the relationship between indigenous vegetables which are difficult to grow and the effects of varying climatic conditions on production of both cultivated and wild indigenous vegetables. The Pearson Correlation Coefficient indicated that there was a very weak but positive relationship between these variables at 0.363321.

#### **7.4.9 Ability of Indigenous Vegetables to withstand Extreme Weather Conditions**

The purpose of this section was to find out the durability of indigenous vegetables in extreme weather conditions which have been experienced in South Africa in recent years, and which resulted in major infrastructural destruction across all provinces (Bopape, Waitolo, Plant and Phaduli, 2021).



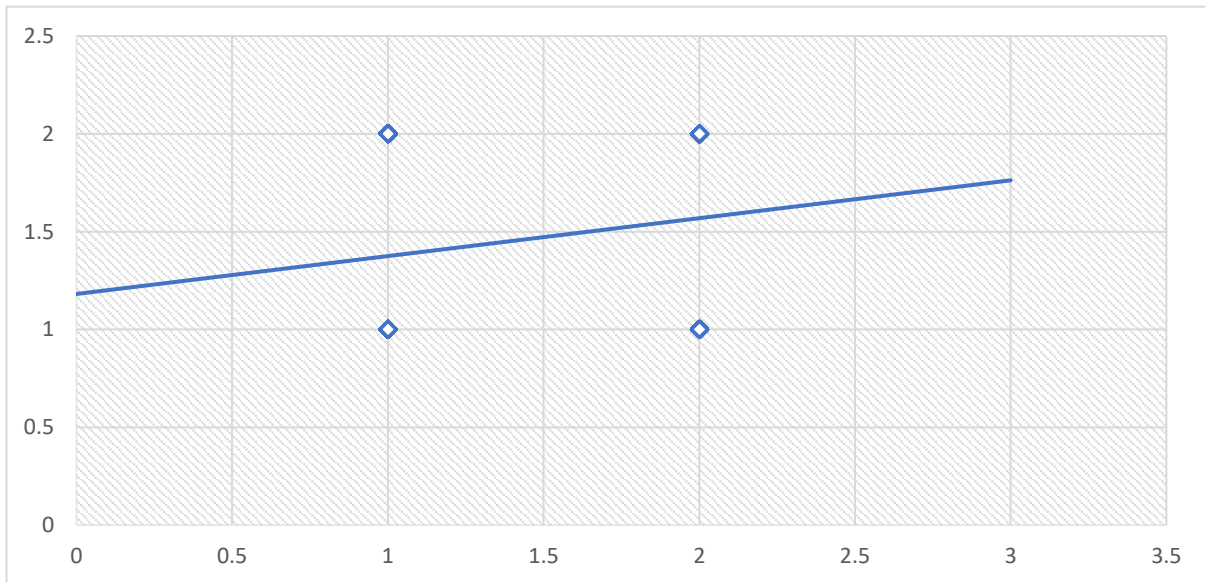
**Figure 7.45: Ability of indigenous vegetables to withstand climatic conditions**

The study indicates that indigenous vegetables, regardless of their reported ability to withstand harsh weather conditions in the past (Maseko *et al.*, 2017), do not fare well under these conditions as the severity of current conditions is reshaping agrobiodiversity from how it was experienced before. As such, a Chi-Square test of independence revealed that, concerning the heavy rains and severe drought that have hit South Africa lately, indigenous vegetables are not able withstand varying climatic conditions, at a P value of 0.002348. Furthermore, a Pearson Correlation Coefficient on whether the effect of varying climatic conditions on the production of both cultivated and wild indigenous vegetables can predict the ability to withstand such threats, found a weak negative correlation between variables at -0,21786.

#### **7.4.10 Integrating Technology with Local (Traditional) Production Systems**

This section investigated the possibility of combining farming technology with traditional systems to aid production of indigenous vegetables. The null hypothesis was that there are no technologies that could be integrated with traditional productions systems, which was rejected with a P value of 0,016249199. Community members within the sampled population have found ways to combine traditional systems with technology to adapt to changing environmental and climatic conditions (Stöber *et al.*, 2017). Literature indicates that tropical regions, particularly large parts of Sub-Saharan Africa, are faced with adverse existential stressors that have led scholars to referring

to this region as a climate change hotspot (Müller, Waha, Bondeau and Heinke, 2014). The devastation of effects of climate change has left the region faced with three major burdensome challenges; namely (1) high vulnerability to the consequences of climate change, (2) high poverty rates, and (3) large population densities.

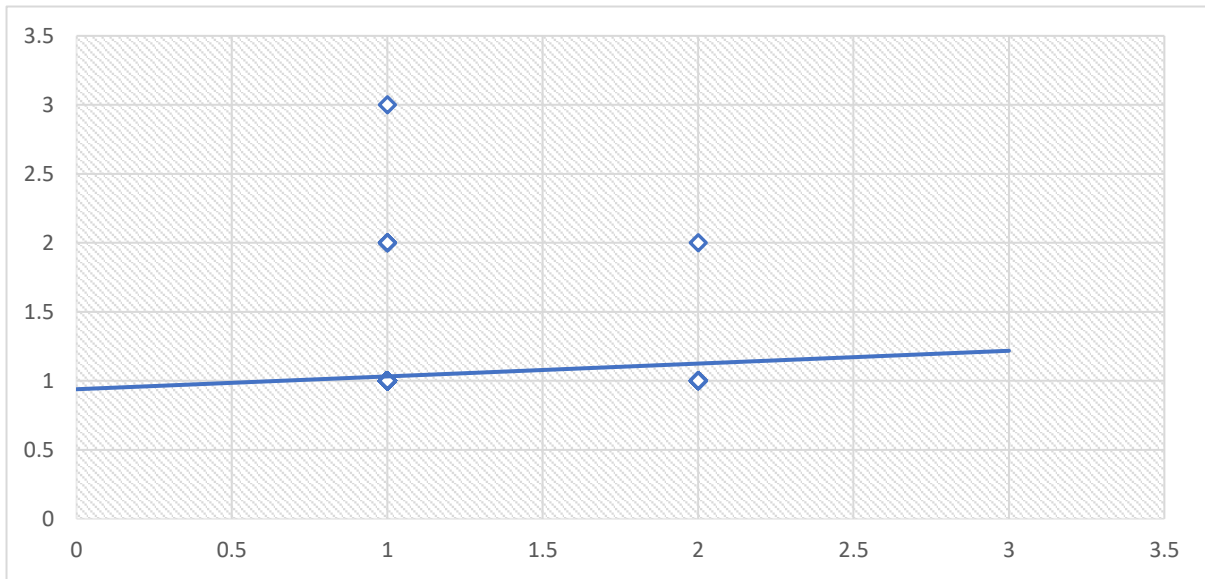


**Figure 7.46: Integration of technology with traditional production systems**

A Pearson Correlation coefficient further indicated a score of 0,172102 regarding the nature, strength, and direction of the relationship between traditional methods used to overcome threats during production and technology integration. This statistic means there is close to no relationship between these variables. This could mean that as much as some of the community members know that there is a way of integrating technology with traditional systems, in practice that rarely happens.

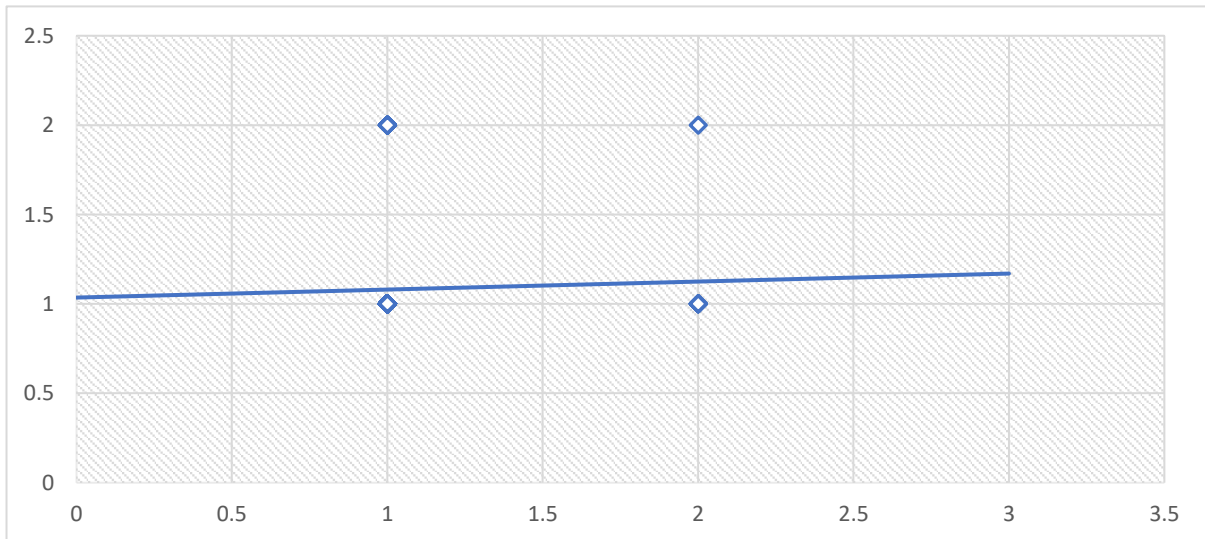
#### **7.4.11 Use of Indigenous Vegetables for Income Generation**

The World Bank released a report in 2021 where governments in Africa were encouraged to enhance commercialisation of indigenous vegetables (World Bank Group, 2021). In this study, due to possible lack of encouragement from government, a null hypothesis claiming that since people do not use indigenous vegetables for income generation, there would be no negative effect if they were to be extinct, could not be rejected, at a P value of 0,193004888. This correlation was interesting to find since the descriptive findings indicate that indigenous vegetables were used as sources of income.



**Figure 7.47: Use of indigenous vegetables for income generation**

A Pearson Correlation Coefficient of 0,087008 further indicates that currently, there is no relationship between the uses of these indigenous vegetables for income generation and possible extinction.



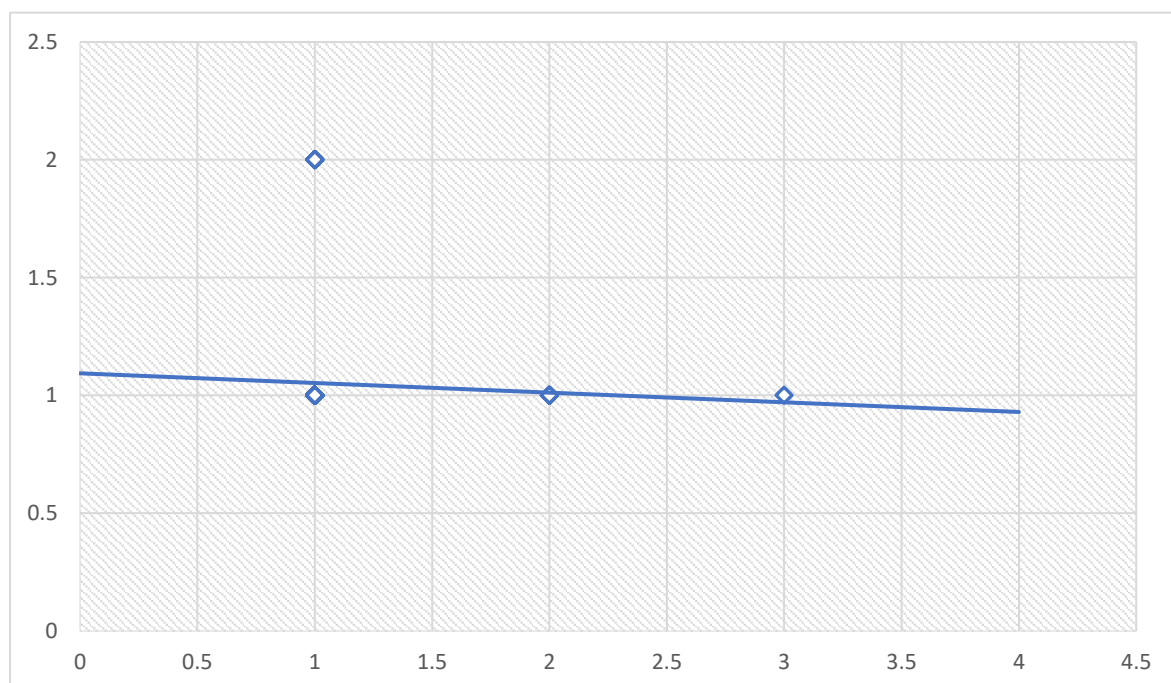
**Figure 7.48: Potential for the commercialisation of indigenous vegetables**

Interestingly, the surveyed sample believed that there was no potential for the commercialisation of indigenous vegetables, at a P value of 0,651267955. This was further substantiated by those who indicated that any sporadic sales of these

indigenous vegetables, if any, was not an indication of a potential for market value. This was evidenced through a Correlation Coefficient of 0,032368.

#### 7.4.12 Impact of Extinction of Indigenous Vegetables on Food Security

Participants indicated that, contrary to popular literature postulating that indigenous foods provide food security, it was not the case with them and as such, the extinction of indigenous foods would not have a negative effect. A Chi-Square statistic resulting in a P value of 0,986626221 supported a null hypothesis suggesting that extinction of indigenous vegetables would not have an effect on food security.



**Figure 7.49: Impact of extinction on food security**

A relationship test on the Pearson Coefficient was conducted to further establish if the extinction of indigenous vegetables would impact their potential to contribute to food security. A Correlation coefficient of -0,0394 supported the Chi-Square test outcome mentioned above, indicating no relationship between extinction of indigenous vegetables and food security.

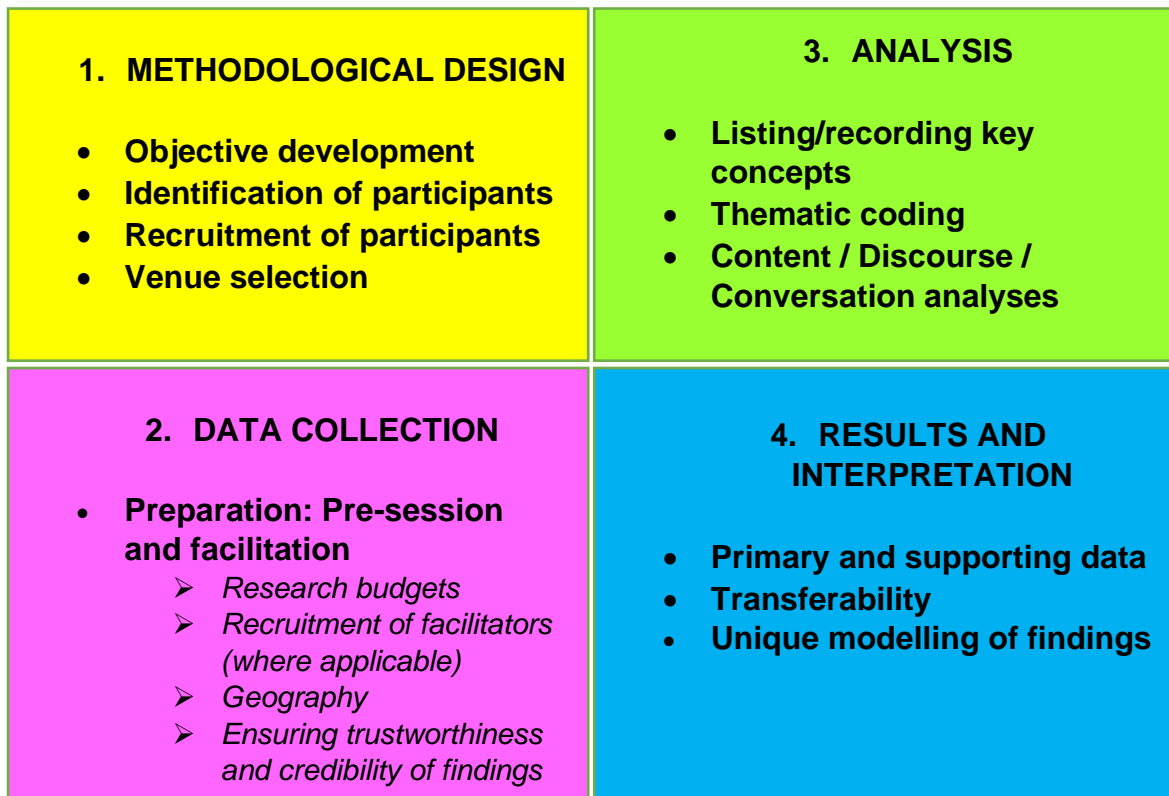


## 7.5 A SYSTEMATIC APPROACH TOWARDS A FOCUS GROUP DISCUSSION

### 7.5.1 Synthesis of Literature

The dynamics of focus group discussions are quite vast and carry great potential for studies that explore social elements. This study followed the framework presented by Nyumba, Wilson, Derrick and Mukherjee (2018), who reported that group discussions begin with a methodological design which entails (i) defining the objectives of the study, (ii) identifying and recruiting participants, and (iii) identifying a suitable location in which to hold the discussions. The design is then followed by the data collection which involves pre-session preparation and facilitation during meetings. It is worth noting, however, that the data collection process is often challenging when considering the (i) maximisation of research budgets, the recruitment of facilitators, (iii) conducting interviews in geographically dispersed areas, and (iv) ensuring the trustworthiness and credibility of the data (Flynn, Albrecht and Scott, 2018). The third step of conducting group discussions is then followed by the analysis which includes the (i) listing, (ii) coding, (iii) content analysis, (iv) discourse analysis, and (v) conversation analysis (Nyumba *et al.*, 2018).

Elo, Kääriäinen, Kanste, Pölkki, Utriainen and Kyngäs (2014) explain content analysis as one of the qualitative research methods that is used to analyse and interpret data. In order for a content analysis to be successful, data must be reduced to concepts that describe the research phenomenon by creating categories, a model, conceptual system, or conceptual map. Discourse analysis on the other hand, is the study of social life which is understood through analysis of language in its broader sense (this includes face-to-face talk, non-verbal interaction, images, symbols and documents) (Shaw and Bailey, 2009). Conversation analysis is commonly used in social research. It is a distinctive methodological feature that investigates the sequential organisation of speech as a way of accessing the understanding of participants and collective means of organising natural forms of social interaction (Hutchby, 2019). Conversation analysis mostly uses video and audio recording technology to gather data as naturally occurring interactions unfold in real time. The last step that follows the analysis in group discussions is the presentation of results and interpretation thereof, which are often used for the benefit of scholars, policy makers and practitioners, and members of the general community.



**Figure 7.50: Logical model for conducting a group discussion**

Using a systematic approach to review literature on conducting group discussions, the researcher developed a logical model that can be applied when conducting a study that employs group discussions as a data collection technique. This model also acted as a guide for systematically conducting group discussions and presenting findings in a credible manner. Four main steps are included in the model which include:

**Step 1: The Methodological Design**

- (i) Objective definition, which includes the identification of participants according to the objectives of the study. The question to be answered is whether the *identified participants relate to the set objectives*.
- (ii) Identification of participants; at this stage, the researcher determines how the participants will be included in the study, who will be included and who will be excluded (inclusion and exclusion criteria?). This can be determined by the study objective(s) and procedures.<sup>22</sup> Previous studies may be effective tools of reference during this stage.

<sup>22</sup> Hornberger, Brianna Rangu and Sneha, (2020) give a detailed report on the design of the inclusion and exclusion criteria when conducting research. The report can be accessed: <https://repository.upenn.edu/crp/1>.

- (iii) Recruitment of participants; once the participants have been identified and the inclusion and exclusion criteria are determined, the principal investigator (researcher) must determine how participants of interest can be reached. The question to be asked is whether *permission is required prior to interacting with potential participants, and which institutions and/or persons are needed to make this process possible*. An example of this can be found in the work of Appiah (2020), who reports that when conducting research in rural communities, the first point of entry should be the governing structures (tribal authorities) from whom permission to access the participants would be sought.
- (iv) Venue selection; the last step of the methodological design is to determine the venue in which the discussions would take place. *Where will the discussions be held? What should the setting be like?* This is important when conducting group discussions as numerous factors could lead to the failure of discussion. For example, if the chosen location is not easy for participants to reach and there is no mode of transport, participants may choose not to participate. Krueger<sup>23</sup> presents a detailed report on the characteristics of group interviews.

## **Step 2: Data Collection**

- (i) Preparation: Pre-session and facilitation: prior to the collection of data with the identified groups, it is important to prepare for all group sessions. This entails familiarising the facilitators with the script that would be used, understanding the group dynamics, and ensuring that all recording material is in a usable condition. During the preparation stage, facilitators along with the assistants must be well trained to improve their skills. This is important since the facilitator is central to the discussion by creating a relaxed and comfortable environment for unfamiliar participants, observing non-verbal interactions, and taking notes (Nyumba *et al.*, 2018).

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<sup>23</sup> Krueger, R. 2020. Designing and Conducting Focus Group Interviews. The full report can be accessed at: <https://www.eiu.edu/ihec/Krueger-FocusGroupInterviews.pdf>

## **7.5.2 Integrating the Focus Group Discussion into the Logical Model**

### **7.5.2.1 Methodological Design**

**Objective development:** In the context of this study, the study participants were identified in accordance with the objectives of the study which include (i) the identification of indigenous vegetables in the communities, (ii) determining critical indicators that influence food security in the identified communities, (iii) determining whether there are barriers that hinder the production and/or access of indigenous vegetables, and (iv) finding a link between the use of indigenous vegetables and agrobiodiversity management and livelihoods.

**Identification of participants:** On the basis that the research is focused on rural communities where indigenous vegetables are grown and/or utilised, the researcher identified three district municipalities where these vegetables were grown. To achieve this, previous research was used to determine such areas (Lewu and Mavengahama, 2010; Ntuli, Zobolo, Slabbert and Madakadze, 2012).

**Recruitment of participants:** Following the identification process was the recruitment of participants through the assistance of a municipal council member and an agricultural extension officer from one of the municipal wards and the Department of Agriculture and Rural Development in IDM and KCDM, respectively. Assistance to recruit participants in UKDM was also sought from an agricultural extension officer from Umfolozi Sugar Mill.

**Selection of geographical location:** All three individuals also assisted with organising the location(s) in which the group discussions were conducted.

### **7.5.2.2 Data Collection**

**Pre-session and facilitation:** In preparation for the group discussions, open-ended questions that formed the basis of the discussion were designed. The recording equipment was also organised at this stage. The primary investigator facilitated the discussions, no external facilitators were employed. Numerous challenges were experienced during the data collection process.

**Research budgets:** All activities of the data collection process were personally covered by the researcher (such as transportation costs). This caused a delay in the study since the researcher was unemployed at the time and the geography of the study areas was widely dispersed. Considering that the participants were mostly the elderly generation, the researcher had to provide snacks for the study participants as requested by one of the three individuals who organised the participants.

The justification for this was that the elderly generation usually has some form of illness such as high blood pressure and sugar diabetes; thus, they need to ensure that they are not deprived of food as this could compromise their health. In research, there is an ethical debate around the use of incentives for study participants as this could be confused with bribery for participants to give biased responses, and a breach of ethics. However, Molyneux, Mulupi, Mbaabu and Marsch (2012) provide clarity and report that the provision of lunch or snacks to participants is usually concerned with medical care.

**Conducting interviews in geographically dispersed areas:** The three district municipalities were distant from the researcher's residence; therefore, the researcher had to drive to these municipalities and the transportation costs were expensive. A total of R4200.00 was spent on transportation alone.

**Ensuring the trustworthiness and credibility of data:** To ensure that the data was trustworthy, the researcher had a prolonged engagement with the study participants during all the group discussions. Recording material was also used which assisted in transcribing each participant's responses word-for-word as a step preceding the analysis. The transcripts were initially done in isiZulu, the language in which data was collected and later translated to English. However, the researcher had to revisit the recorded data repeatedly to ensure that it was correctly captured. This is in line with the findings of Elo *et al.* (2014:5) who report that "[...] a good qualitative researcher cannot avoid the time-consuming work of returning again and again to the data, to check whether the interpretation is true to the data and the features identified are corroborated by other interviews." The transcripts were then presented to the study leaders along with the recordings.

### **7.5.2.3 Analysis**

Data was analysed through the use of web Qualitative Data Analysis (webQDA), a web-based qualitative analysis software. According to Costa, Breda and Pinho (2015), the support of webQDA software in coding and analysing data from groups helps in organising teamwork, integrating various interpretations, and to minimise bias. Following the transcribing process, data was exported to webQDA wherein initial codes were generated. Patterns were then identified across all the coded data for the development of themes which were named and developed. This rigorous process of analysing data follows what Nowell, Norris, White and Moules (2017) describe as a rigorous and methodical procedure that yields meaningful and useful results. The themes form the main points of the qualitative aspect of the study.

### **7.5.2.4 Findings and Interpretation**

The analysis was then followed by a systematic presentation of results as suggested by Anderson (2010). This includes:

- Presenting data in a manner that is sufficient for allowing the reader to determine the link between the interpretation and the supporting data.
- Discussing the transferability of research findings to other settings.

### **7.5.3 Profiling the Focus Study Participants**

In this study, six group discussions were conducted with the farmers across all three districts (IDM, KCDM, and UKDM). In each district, two group discussions were held and each group comprised five participants; thus, the total number of participants was thirty (n=30). Most of the participants were elderly women (n=24) and one elderly man (n=1). Only one group included young people who were all females (n=5). The majority of the elderly generation who participated in the study were mostly pensioners (mostly illiterate) who were above the age of 60. These are the people that are mostly the producers and consumers of indigenous vegetables. The younger generation who also took part in the study were pupils between 18 to 26 years old, some of whom were still at high school, while some were staying at home due to either unemployment after graduating from an institution of higher learning, or because they never completed secondary school.

## 7.6 PRESENTATION OF QUALITATIVE FINDINGS

### 7.6.1 Coding Strategy

For language-based or visual data, a code is a short phrase or word that sums up, focuses on, characterises, and/or emotes a section of the data. Information can be collected from any of the following sources: journal entries, participant observation field notes, memos, books, documents, journals, literature, images, photographs, recordings, videos, websites, e-mails, and so on. From a single word to a full sentence to an entire page of text to a stream of moving images, the portion of data to be coded during First Cycle coding procedures varies greatly.

Code sections, lengthier texts, and reconfiguration of the codes used thus far can all be coded in the Second Cycle. Similarly, a title represents and encapsulates the core subject matter and content of a book, film, or poem; whereas a code captures the primary subject matter and content of a datum. Furthermore, the data transformation stage which involves theme generation, is further demonstrated in Table 7.1 below.

The following coding strategy as outlined by Onwuegbuzie, Frels and Hwang (2016) was utilised:

- i. **Emotion Coding:** This technique reflects the participants' feelings and reactions. By analysing an author's feelings or mood about his or her study findings, emotion codes might be used. For instance, “unexpected” or “new” can mean that the information found in the article is surprising.
- ii. **In-Vivo Coding:** This technique captures participants' direct statements. Capturing participant's direct statements enhances the ability of the researcher to opine about how findings are interpreted, and conclusions made.
- iii. **Value Coding:** This method presents the beliefs, values and moral dynamics of the participants.
- iv. **Descriptive Coding:** Situations are described by this method. Descriptive coding is then applied to the relevant descriptive nouns when the reviewer completes his or her Descriptive Codes assignment. Another way to describe visual data is with Descriptive Codes. The next step after generating descriptive codes is to do a content analysis using, for example,

computer-assisted qualitative data analysis software (such as WordStat, webQDA, QDA Miner, NVivo, MaxQDA, ATLAS-ti) to determine the frequency of use of terms. Trying to find "essential terms" may help a reviewer in examining Descriptive Codes.

The webQDA software was used to analyse data using the COSTA Model technique (Costa, 2020), and thematic analysis was applied to the results. While it makes it possible to obtain meaningful qualitative data that can be organised and structured into a cohesive code, as well as easy and rapid data administration and analysis, it is recommended for its user-friendliness (Machado and Vieira, 2020; Pope, Brandao, Rosario and Costa, 2020).

The COSTA Qualitative Data Analysis (QDA) approach was used to resolve large volumes of raw data into bits that can be easily synthesised. A systematic meta-cognitive approach is crucial to this strategy and seeks to systematically assimilate, code, and index all data documents in order to derive meaning and answer the research question (Saldana, 2015).

In qualitative research, the analytical process is the most challenging and intricate phase. When discussing and advocating for qualitative research rigour, researchers such as Maguire and Delahunt (2017) and Nowell, Noris, White and Moules (2017) have received a significant amount of attention. Bias and subjectivity can be a serious concern when it is a researcher who is the main instrument (Bahrami, Soleimani, Yaghoobzadeh and Ranjbar, 2016). Lack of objectivity and subjectivity in interpretivist research is noted because within the paradigm, researchers are obligated to choose techniques to gather, analyse, code, transform, and contextualise the data (Starks and Trinidad, 2007).

Costa QDA (Costa and Tumagole, 2020) employed a theme coding method to analyse data documents and departmental documents to extract informative and underlying messages from the data and departmental documents. The COSTA QDA helps to exhibit rigour in data analysis while offering a flexible approach to data analysis.

According to scholars and theorists such as Sandelowski (2001), Onwuegbuzie and Daniel (2003) and Maxwell (2010), who support quantifying occurrences of patterns in a qualitative data analytic process of coding, the COSTA QDA method yields the



chance to estimate effect magnitude, to exhibit account accuracy, and to establish the accuracy of the data (Tashakkori and Teddlie, 2008; Srivastava and Thomson, 2009) as indicated in Table 7.1 below.

As a result, this methodology enables researchers and analysts to leverage systematic tactics while at the same time encouraging creativity through the application of coding procedures and theme generation coming from "cleaned" data as a result of the reduction process (Dey, 1993; Clarke and Braun, 2013). The process also enables creativity to flourish.

### **7.6.2 Axial Coding Stage**

Table 7.1 illustrates how the inductive (posteriori) codes have been colour linked in relation to anchor (apriori) codes. Additionally, it provides a description of the code frequencies while providing a forum for the axial coding process (Saldana, 2015). At this stage, a thorough examination of the inductive codes resulted in a process of relational analysis that resulted in the codification of the sub-themes.

According to Nowell *et al.* (2017), this is the start of the quest for meaning in qualitative data that has been altered. This stage is sometimes referred to as axial coding because it involves relational analysis through the observation of patterns, similarities between concepts, and the formation of themes (Theron, 2015; Corbin and Strauss, 2008). Saldana (2015) defines axial coding as the deliberate and intentional reorganisation and reconstruction of data that has become dispersed during the initial inductive coding phase. The role of sorting, categorising, and theme development is at the heart of axial coding. As previously stated, the inductively generated codes from data documents were linked to established anchor codes as part of the coding approach (Charmaz, 2006). Nine (9) anchor codes were created, each one connected to the topic and study issue and containing inductive codes extracted from data documents, as Costa (2020) suggests.

**Table 7.1: Axial coding stage**

Name	Frequency
Indigenous Vegetables	174
Exotic Vegetables	33
Agrobiodiversity	56
Food Security	88
Health Benefits	43
Socio Economic Status	344
Natural Resources	155
Challenges	410
Knowledge Transfer	128
<b>Total</b>	<b>1431</b>

Close examination of these categories led to the generation of themes of connection between emerging themes and participant's experiences while linking them to study objectives, which were:

1. To provide insight on commonly utilised indigenous vegetables in communities.
2. To determine how indigenous vegetables contribute to food security.
3. To examine the barriers hindering access to and utilisation of indigenous vegetables when managing agrobiodiversity.
4. To measure the perceptions on the utilisation of indigenous vegetables and agrobiodiversity management to rural livelihoods.
5. To devise a strategy that seeks to promote indigenous vegetables as important role-players in agrobiodiversity management and food security.

### **7.6.3 Nexus between Emerging Themes and Participant's Experiences**

Dennis (2014) emphasises the critical nature of adequate coverage of participant input and its significance in ensuring the study's credibility. Korth (2002) expressed a similar sentiment regarding the dearth of study on the significance of participant-researcher interactions, which serve as co-creators of qualitative research findings. Additionally, Dennis (2014) made major arguments that researchers frequently take the viewpoint of participant remarks for granted. While the researcher protected the participants' anonymity, the following remarks from participants provide insight to their experiences and perspectives on indigenous vegetables.

#### **7.6.4 Existing Indigenous Vegetables related to Agrobiodiversity Management among the Selected Communities**

Participants indicated knowledge of existing indigenous vegetables related to agrobiodiversity management. The quantitative results as indicated in Figure 7.9, indicated that there were indigenous vegetables grown in the community, while only 2% disagreed with the 89% who agreed. This information indicates that rural household members engage in activities of growing indigenous vegetables in their communities, which is a central feature of agrobiodiversity. As explained in the conceptual framework of this study, agrobiodiversity, a subset of biodiversity, is a critical aspect of agriculture that is appreciated for the diversity it brings to both the agricultural domain and the broader ecosystem. Joshi *et al.* (2020) discuss several of the most significant components of agrobiodiversity. Domesticated, semi-domesticated, wild cousins, and wild edible crop species are included.

Some of the direct statements from participants:

“You can plant the vegetative part of sweet potato as a cover crop and not with the intention of harvesting.”

“It’s the same as when I plant a crop this season – I cannot repeat the same crop in the same plot the following season. This is called crop rotation.”

“I would often rotate so that I would get good yields.”

“Sometimes I would not harvest some of my produce. I would keep it in the garden until it decays. This helps the soil because it enriches it.”

#### **7.6.5 Critical Indicators that Influence Household Food Security in Selected Communities**

In ascertaining whether rural populations resorted to indigenous vegetables in times of food scarcity, the study found that indigenous vegetables contribute to food security in rural populations who live in marginal areas and practice low-input agriculture, supporting findings that were documented over a decade ago by Shiundu and Oniang’o, (2007). This study found out that 97% of rural communities use indigenous

foods as substitutes for their preferred conventional foods. Only 3% of the surveyed sample did not agree with the substitutional use of indigenous vegetables. Conventional vegetables include *Brassica oleracea var. capitata* and Swiss chard (Odhav *et al.*, 2007).

Some of the direct statements from participants:

“We would suffer because we mostly depend on planting”  
“Things would be bad, God! We would be poor”  
“Things would not be right because it means that we would always have to spend money to buy food.”  
“In the absence of indigenous foods produced by the elderly generation, food diversity would be a challenge. Would not be able to do this if we do not plant.”  
“Indigenous food is good for your health (all participants agreed).”  
“Each family grows enough for their own household.”  
“We had our own vegetables too.”

Studies indicate that household food security continues to be a serious issue in South Africa and many other developing countries, notably those in Africa. Numerous food security intervention programmes have been implemented in KwaZulu-Natal province to ensure food security. Nonetheless, food security remains a concern for the province's families, and so far, indigenous vegetable production seems to be a viable and practical option (Ngema, Sibanda and Musewa, 2018).

#### **7.6.6 Barriers Hindering Access to and use of Indigenous Vegetables when managing Agrobiodiversity**

The majority of participants from the quantitative dimension of this study (53%) believed that indigenous vegetables were difficult to raise which presented itself as one of major barriers, while the remainder (47%) disagreed. Other populations in emerging countries such as China and India have also encountered difficulties with indigenous vegetable cultivation (Ahloowalia and Chadha, 2007). Similar issues were raised in the work of Maseko *et al.* (2017). These views have been well triangulated

with outcomes of the qualitative dimension, wherein a litany of challenges was indicated by participants. Some of these challenges included lack of support from government, poor participation by the youth, climatic conditions, and lack of resources.

Some of the direct statements from participants:

“There is a bit of a problem with regards to the harvest.”

“Sometimes they cost us because they would call and ask us to harvest for them and when we have done so, they would not show up.”

“You would count the dozens as they load in the car. When you are done, they would then say that they do not have the money, they would bring it back.”

“If we were to get a market to sell that produce, we would make a lot of money.”

“We do have advisors, but they do not help us with accessing the market.”

“They do not assist us with those things because if I were to say that it would mean it's something that happens regularly.”

“You would know that there is an extension officer, but you just never see them.”

“We hardly see them.”

“To plough a hectare, rake, and open ridges, costs over R3000.00.”

“If they could get us a tractor, they would have done a commendable job.”

“The issue of water is a problem if we grow exotic crops.”

“If we could have a way or learn to have our own market in retail stores, then they could take our indigenous foods.”

“Because there are many people that like the foods that we grow.”

“If they could find a way to take our produce to places where they can be sold.”

## 7.7 SUMMARY

The purpose for this chapter was to present the primary data that were obtained from participants. This includes both qualitative and quantitative data. The presentation of findings is divided into four sections (i) demographic data (ii) descriptive analysis, (iii) inferential statistical analysis, and (iv) qualitative findings. A detailed discussion on the systematic application of qualitative methods also forms part of this chapter. In addition to the presentation of results, the presented results are discussed and supported with relevant literature for corroboration and argument purposes. The next chapter is the concluding chapter which sums up the qualitative and quantitative findings through triangulation. A three-phase conceptual framework that seeks to contribute towards theory building with respect to indigenous vegetables is also presented.

## CHAPTER 8

### INTEGRATION OF QUALITATIVE AND QUANTITATIVE FINDINGS, THEORETICAL CONTRIBUTION, CONCLUSION AND IMPLICATIONS

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#### 8.1 INTRODUCTION

The study commenced with a descriptive survey, statistical research that helped in identifying individual households' situations in relation to demographics. This part of the study was systematically planned, designed, and formatted in order to gather data that could be quantified. The survey thus helped in providing statistically conclusive findings after the grouping of responses as presented in the previous chapter. The use of the survey also assisted with gathering useful data for inferential and correlational statistics which sought to determine the relationship between indigenous vegetables, their consumers, and the environment. The qualitative aspect of the study was followed by group discussions within the same district municipalities from which quantitative data was collected. The aim of this undertaking was to validate the statistical findings sought through the descriptive survey. The qualitative findings were also presented in the previous chapter. What distinguishes this chapter from the previous one is that it brings meaning to both qualitative and quantitative findings through triangulation. Williams (2007) describes triangulation as the integration of statistical data and theoretical findings. The confirmatory nature of triangulation helped in strengthening the confidence of the study as it facilitated the validation of data through cross verification from more than one source, and further allowed the researcher to obtain detailed and contextual findings from varied dimensions (Perone and Tucker, 2003).

## 8.2 TRIANGULATION

Carter, Bryant-Lukosius, DiXenso, Blythe, and Neville (2014) define the term triangulation as the application of multiple methods and/or sources of data in research in order to develop a comprehensive understanding of phenomena. Similarly, Bekhet and Zauszniewski (2012) indicate that triangulation involves using more than a single method to better understand a phenomenon. An interesting assertion by both Carter *et al.* (2014) and Bekhet and Zauszniewski (2012), is that the integration of qualitative and quantitative findings is a well-established technique that helps to increase the validity and enhances the understanding of studied phenomena. Regardless of the time-consuming nature of triangulation, the use of mixed methods research (MMR) approaches provides depth of information which would not be possible by singularly utilising these approaches in isolation (Almalki, 2016). Drawing from these theoretical findings, the researcher applied the triangulation design as a means of increasing the validity and reliability of the study.

The validation of data was ensured through the use of concurrent validity in which an assessment was conducted using multiple research instruments (surveys and group interviews) to measure similar constructs and/or objectives. The findings in the previous chapter indicate that the different measures that were taken in gathering data of the same construct converged and correlate with one another. This is known as construct validity (Taherdoost, 2016). For the interest of the reader, other forms of validity are detailed in the same work of Taherdoost.<sup>24</sup> The trustworthiness of data was also heightened by using research instruments that were valid, reliable, unambiguous and specifically aimed at answering the objectives of the study. To achieve this, the researcher considered the issue of external validity, the possible application of findings to similar settings (Welman, Kruger and Mitchell, 2005). The design of the research instruments was informed by previous literature from similar studies. This was done to ascertain that the findings could be generalised beyond the studied participants to a wider population.

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<sup>24</sup> The author details various forms of validity tests and groups them into their categories. These include Criterion validity (Predictive validity, Concurrent validity, Predictive validity), Face validity, Content validity, and Construct validity (Discriminant validity and Convergent validity).

### **8.2.1 Production and Utilisation of Indigenous Vegetables**

Indigenous vegetable production plays an integral part in people's livelihoods. Previous literature also indicates the important role that is played by these crops on social and economic levels (Ntuli *et al*, 2012; Mavengahama *et al.*, 2013; Njume *et al.*, 2013,). The findings of this study indicate that the rural communities from which primary data was collected across all the three districts, indigenous vegetables formed part of people's livelihood strategy. When asked about the impact of a decline in agricultural activities in the respective communities, one participant stated: "*things would not be right because it means that we would always have to spend money to buy food.*" The use of '*always*' in this response suggests that the utilisation of indigenous vegetables is a common practice which provides convenience for the farming communities as it saves money which can be used for other purposes such as paying for children's education, hiring tractor(s), transport, and other food and non-food products. This concurs with the qualitative findings where all the participants indicated that indigenous vegetables were easily accessible and often available across all seasons of the year.

These findings are not unique to the district municipalities under investigation. Feysa, Njoka, Asfaw and Nyangito (2012) reported similar findings and concluded that in comparison with their exotic counterparts, the beauty of indigenous vegetables is that they are often available for consumption throughout the year which reduces the burden of food insecurity at a household and community level. Another interesting discovery that was made in relation to the production of indigenous vegetables was that:

- Some of them can be eaten in their raw state.
- They can be used for medicinal purposes.
- They have the ability to thrive under harsh environmental conditions;
- They play an important role on agricultural biodiversity (and food security); and
- They have a monetary value and have a potential for commercialisation.

### **8.2.2 Household Food Security**

At a household level, high unemployment and dependence on state grants contributes to food insecurity. Unemployment is one of South Africa's triple challenges as



mentioned in the previous chapters. It is common knowledge that in order to have access to food and non-food products, money is needed. This financial resource is highly crucial in families where the average household has a significantly high number of members who do not have any form of income. Findings indicate that households constitute at least 6-10 family members with an average income source that ranges from R1001.00 to R3000.00. It is noteworthy to indicate that the elderly generation mostly provided support in the households using the money received from government social grants. This support grant is in line with Section 27(1)(c) of the Constitution of the Republic of South Africa<sup>25</sup> which stipulates all people have a right to access social security which includes those who are less privileged and are unable to support themselves. According to Ralston, Schatz, Menken, Gomez-Olive and Tollman (2016), social protection grants play a critical role in survival and livelihoods of elderly individuals in South Africa.

During the discussion with the participants, it was found that among many other household needs, pension money is mostly used to purchase food products, and hire farming machinery (tractors). It was also found that indigenous vegetables provide food diversity (FD) which forms an important aspect of food security. This is articulated in the FAO's definition of food security which highlights food products that meet the dietary needs of the people. This diversity is crucial as it not only helps with the availability and accessibility of food but also the nutritional component which is necessary for a healthy lifestyle. Mavengahama (2013) stipulates that indigenous vegetables play a central role in household food security for poor rural groups as they help to substitute some food crops and provide relish. One of the most common responses around the significance of indigenous vegetables on food availability was that they were crucial sources of food. One participant stated: "*without these crops, the entire community would die of hunger. These are our foods and we cannot survive without them since we cannot buy everything – we're unemployed.*" From this assertion, it is evident that indigenous vegetables are crucial in bridging the food poverty gap in these rural communities under investigation.

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<sup>25</sup> RSA (Republic of South Africa). 1996. Constitution of the Republic of South Africa, 1996. Pretoria: Government Printer.

### 8.2.3 Lack of Support for Farmers

The lack of support of small-scale farmers is not an uncommon challenge that is faced in the communities that were investigated. Most farmers complained that there was no form of support that was received from government or any other institutions. However, there were a few who pointed to some occasional form of support from the local Departments of Agriculture, which included the donation of seeds for planting and fertiliser. This was also an uncommon practice which happened only once in a couple of years. Drawing from the qualitative findings, some participants made the following assertions:

*“They do not assist us with those things because if I were to say that it would mean it’s something that happens regularly.” \_ P1*

*“We are waiting for the next elections so that we can get to see them when they campaign. They always visit during the elections – they never make the mistake of not showing up.” \_ P2*

*“We hear rumours that they are going to aid support to the community, but we have never received any support.” \_ P3*

*“We once heard that there are tractors that are meant to help farmers in the community, but we have never even seen them.” \_P4*

From the above perceptions, there are three areas of interest with regard to the challenges that are faced by rural communities when it comes to getting support. It is important, however, to first declare that although the question on support was not limited to government institutions, participants kept referring to government support which is an indication that they do not know of any other support avenues except for government. This is one area in which community development workers (CDWs) or public officers (POs) can share knowledge when interacting with rural communities so that farmers may be aware of different streams from which support can be sought. The three areas of interest are as follows:

- While government does provide farming support to communities, it happens infrequently. This challenge is not only in relation to farming inputs and finances, but it also includes access to extension services. Participants (50%)

who indicated that they had had access to extension services strongly spoke against meeting with these professionals at regular intervals. This limitation has a negative impact on the development of farming communities as extension personnel are supposed to be mediators between farmers, government, and non-government institutions. Other forms of support such as making farming machinery available is highly important. The two responses in relation to lack of support were noted from participants and indicate a need for reliable support in order to improve the socio-economic status of the communities: “*we need guidance because we even fail to plough sweet potatoes.*” This claim was made by one of the participants who formed part of the group discussions which only comprised five youngsters.

This is an indication that there is a knowledge gap that is needed in communities which require the intervention of extension personnel as government representatives. An elderly woman also indicated that: “*to plough a hectare, rake, and open ridges, costs over R3000.00.*” This means that since there is a challenge to access farming machinery, farmers have to save money from their pension which was R1890.00 per month at the time that this study was conducted. Government can thus assist farmers by making means to ensure that there is always easy access to farming machinery which would not require excessive spending from these farmers as they are already vulnerable to many depriving socio-economic contexts.

- The second participant touches on the issue of lack of service delivery and states that the only time that communities get to see people in government is during the electoral campaigns when they need votes from them. It is only then that free gifts such as politically branded t-shirts that are complemented by ‘*empty*’ promises would be made. This approach is contemptuous and scornful, and is an indication that people are not valued but instead, are only worthy when it comes to gains that benefit those with political muscle.
- A noteworthy comment made by some participants was that sometimes help does arrive in the communities but only a few get to benefit. An example was

made by some of the participants in KCDM that there would be programmes such as learnerships which are aimed at developing communities but would end up benefiting those close to the councillor(s). Similarly, information about agricultural development programmes hardly ever reaches the people that they are supposed to reach. This then speaks to issues of accountability which ought to be followed-up on, especially at a ground level where leaders are not often in the spotlight and can do as they please to benefit themselves and those that are closely related to them by association.

#### **8.2.4 Poor Extension Services**

Agricultural extension is meant to be an effective tool that drives farming in rural communities as a means of promoting socio-economic development (Zwane, 2012); however, this does not happen. About half of the participants indicated that they have had some form of support from extension services, and from these participants a positive relationship was found as 92% of them indicated that at the time that assistance was provided by extension personnel, the lessons that were gained proved to be effective. During the group discussions, it was disappointing to learn that extension personnel were not in touch with the farmers. Some of the responses that were recorded in relation to extension services include the following:

*“No, we do not have any knowledge about extension officers.” \_P5*

*“Lack of advisory services affects us badly.” \_P6*

*“Ayi! We don’t have such. If you did not learn from your grandmother, forget!” \_P7*

*“In a month? Oh no, we hardly ever see her.” \_P8*

*“They stay in the office.” \_P9*

*“We do not have any of those in this area.” \_P10*

*“It hurts us a lot because this person is educated so they must teach us about farming and tell us if we are doing the right thing.” \_P11*

These assertions from the participants are an indication that there is a weak extension service programme in rural communities. This is concerning as this was ubiquitously discovered across all the communities and district municipalities from which data was collected. This is an area of exploration that needs to be addressed by those

undertaking research which seeks to develop rural farming and institutions that are concerned with food security in rural communities. These include both government and non-government institutions. Extension officers should be actively involved in communities and always working closely with farmers and should spend less time in their office as this lowers the effectiveness of the profession. This also speaks to issues of accountability in which every extension officer should be held liable if there is no positive change that is observed in communities in which they have served over a predetermined period.

### **8.2.5 Youth Participation in the Production of Indigenous Vegetables**

There is a growing concern that there is a decline of African youth participation in agricultural activities (Mukwedeya, 2018) and the production and utilisation of indigenous vegetables in particular (Akinola *et al.*, 2020). It is important for the younger generation to start seeing the value of producing and utilising indigenous vegetables as they have a role to play in meeting the dietary needs of the people and play a part in agrobiodiversity. Quantitative results reveal that 76% of the participants felt that the youth realised the value and usefulness of indigenous vegetables while only 24% did not. This was in contrast to the qualitative findings as the elderly generation across all district municipalities expressed great concern about the relationship between the younger generation and agriculture – more especially indigenous vegetables. Contrary to the quantitative results drawn from the survey, the following were recorded from the group discussions:

*“Sometimes they even laugh when you talk to them about such foods.” \_P12*

*“That is what they eat, not indigenous foods.” \_P13*

*“They forget about where they come from.” \_P14*

*“They don’t even compromise. They just don’t like Zulu foods; they want modern things.” \_P15*

*“They want fried foods, eggs, cheese, and the likes.” \_P16*

The expressions raised by the elderly generation suggest that the younger generation is not inclined towards their traditional food varieties, which P15 refers to as *Zulu foods*. Instead, the younger generation prefers western foods that does not necessarily

identify with their origin. P14 even raises a point that the abandonment of indigenous foods by the younger generation is an indication that they have forgotten about their origin, where they come from and the association of indigenous foods and their heritage, which 97% of the participants in the quantitative aspect of the study indicated that indigenous vegetables formed part of. The abandonment of these indigenous vegetables can have dire effects in the future as this may lead to their extinction if not reproduced. It would also pose a threat to the indigenous culture and heritage as they form a great deal of the indigenous communities' customary values.

### **8.2.6 Commercialisation of Indigenous Vegetables**

When compared to their exotic counterparts, indigenous vegetables are nowhere near able to compete against these vegetable crops in the market. The reason for this is that exotic vegetables are well promoted across the globe and are easily accessible in almost every market as either seed and/or food products. When it comes to the commercialisation of indigenous vegetation, very little room is available in the mainstream markets. As a result, the findings indicate that the producers of indigenous crops resort to selling informally in their respective communities, on the roadside, or as street vendors in local towns and cities. Participants stated:

*“If we could have a way or learn to have our own market in retail stores, then they could take our indigenous foods.” P\_17*

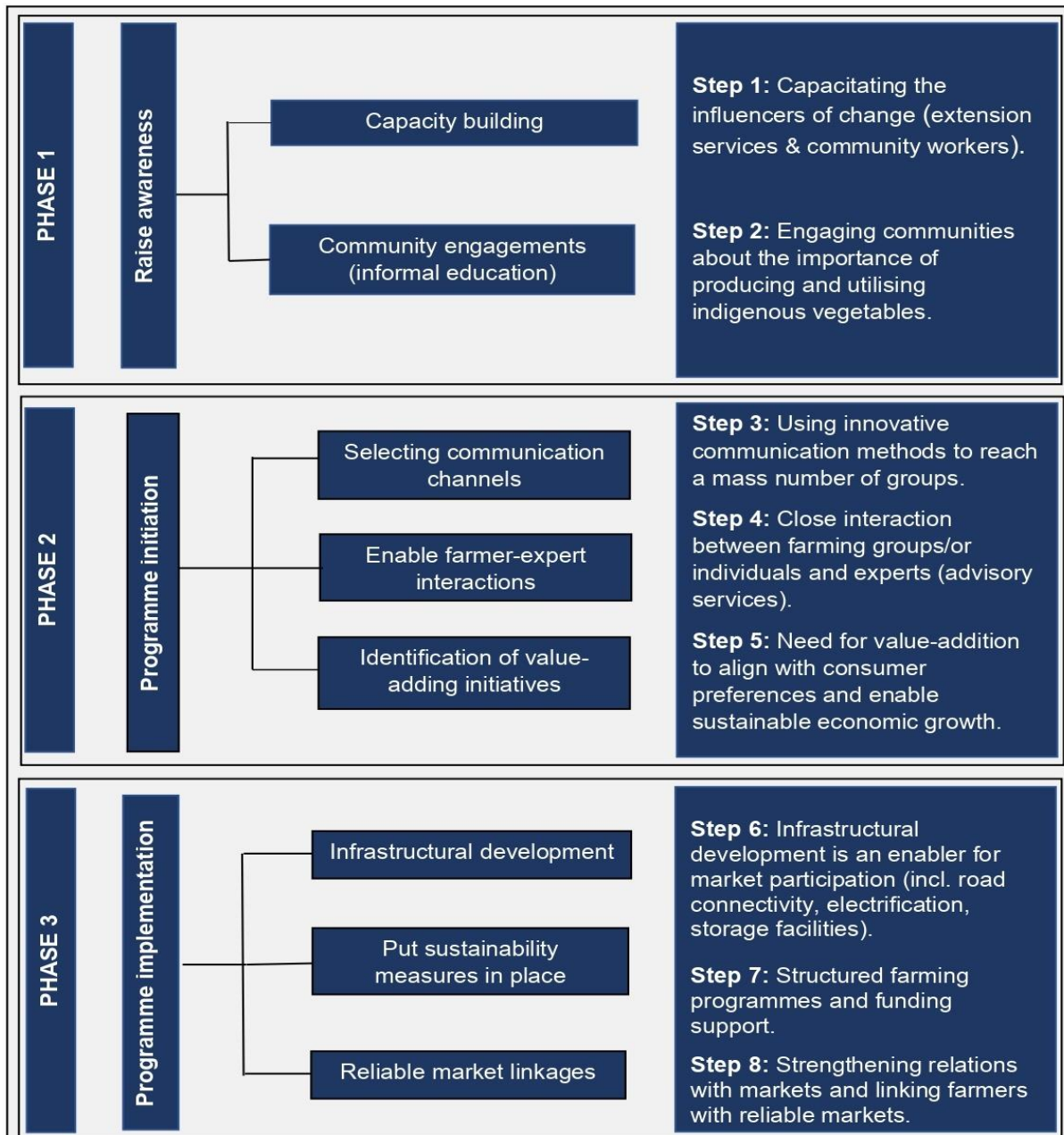
*“Supermarkets do not sell things like taro, they sell potatoes.” \_P18*

*“We have never enquired whether Boxer could be able to take our produce.” \_P19*

*“We do not have enough information and anyone that helps us.” \_P20*

The responses made by the participants suggest that there is a lack of information with regard to gaining access to the markets. Compounding this, however, is the notion that supermarkets only sell conventional foods which are common to everyone on a global scale. To popularise indigenous vegetables like conventional crops, certain measures such as advocacy, processing, packaging, and other forms of value-adding, can be used as possible solutions. This includes further research on the nutritional component of these foods which is critical at such a time when health consciousness has become a global mantra.

### 8.3 CONTRIBUTION TOWARDS THEORY BUILDING: POPULARISING INDIGENOUS VEGETABLES THROUGH COMMERCIALIZATION



**Figure 8.1: A three-phase framework to promote and popularise indigenous vegetables through commercialisation (Source: Author, 2021)**

Figure 8.1 is an illustration of a framework that can be used to promote the market potential (commercialisation) of indigenous vegetables. This framework is informed by the literature and findings that are presented in the previous chapters. It is divided into three phases which include raising awareness through engaging people in communities, having implementation programmes, and market participation. Each phase has different steps that can be followed to ensure that its goals are achieved.

### **8.3.1 Phase 1: Raising Awareness**

Raising awareness is one of the most effective methods of driving change and creating a paradigm shift about particular phenomena. According to O'Connor, McGowan and Jolivet (2019), one of the most effective mechanisms for improving health and affecting social change is through raising awareness. This seen in the work of Akinola *et al.* (2020) as presented in chapter 4, where an indication is made that during the introductory years of the green revolution, South Africa found itself in a situation whereby researchers and agricultural extension officers strongly promoted transgenic vegetables which were mostly exotic. This then created a shift that promoted exotic crops over their indigenous counterparts. To reverse the process, a similar approach that is underpinned on raising awareness can be followed to re-introduce indigenous vegetables to masses of people. This framework can help towards contributing to bridging the existing socio-economic challenges that are faced by small farmers in rural communities which among other things include food insecurity, unemployment and inequality. In addition to this, the mass production of indigenous crops could have a ripple effect as it could also contribute to agricultural biodiversity among farming communities which is an important aspect of agroecology. Three steps are observed under the first phase:

#### **Step 1: Capacity building**

The importance of capacity building can be seen in the work of Raidimi and Katibi (2019) who investigated the role of agricultural extension and training in achieving sustainable food security. Similar insights are highlighted by Zwane (2012) on the significant role of extension services for the development of rural communities. The commonalities between the findings of the two sets of scholars lies in the capacitation of agricultural advisors/extension officers as human capital. In the context of this study, capacitating extension services can help in ensuring that advisors are well informed about indigenous vegetables and their significant role in livelihoods development and the broader agro-ecology.



## **Step 2: Community engagement through informal education**

Informal education is one of the oldest and most common practices in the context of community development. Hague and Logan (2009) argue that engaging communities through informal learning is important to development. This is because in most cases, change initiatives are inclusive of adult learners who are often practical, relevance and goal oriented, and most importantly, tend to bring life experiences and knowledge to their learning experiences. Preceding chapters have indicated that rural communities in particular, are mainly the primary producers and consumers of indigenous vegetables. However, there is a value-addition limitation that is often amiss which development specialists (e.g. extension services and community workers) can introduce to communities through informalised educational measures. It is important for the said development specialists to always remember that when engaging communities, learning is always a two-way process.

### **8.3.2 Phase 2: Programme Initiation**

The second phase in the process of promoting the value-chain of indigenous vegetable production is the initiation stage which is inclusive of three steps. These include the selection of communication channels, enabling farmer-expert interactions, and identifying value adding initiatives.

### **Step 3: Selecting communication channels**

Van Niekerk, Stroebel, van Rooyen, Whitfield and Swanepoel (2009:70) state that good communication skills and the ability to speak the indigenous languages of the people are two of the important factors that are necessary when seeking to build a new future towards “equitable access and participation.” This is especially important when attempting to create a paradigm shift about particular phenomena. O'Connor *et al.* (2019) emphasise that in order to drive change and influence social behaviour, it is important to make use of effective communication channels. The methods used to reach people plays a critical role when seeking to deliver a message to an intended audience. More especially, this is so when raising awareness about a particular

phenomenon. Several communication channels can thus be used as indicated by the Social and Behaviour Change Communication (SBCC)<sup>26</sup> :

- Mass Media - television, radio (including community radio) and newspapers.
- Mid-Media (also known as “traditional” or “folk” media) - participatory theatres, public talks, announcements and community-based surveillance.
- Print Media - posters, flyers and leaflets.
- Digital and Social Media - mobile phones, applications and social media.
- Interpersonal Communications - door-to-door visits, phone lines and discussion groups.

The employability of relevant communication channels would thus help to reach large numbers of people and create awareness about indigenous vegetables.

#### **Step 4: Enabling farmer-expert interactions**

It is also important to ensure that farmer-expert interactions are enabled. This does not necessarily denote face-to-face interactions, but other methods of interacting directly with farmers (such as the use of ICT) can be used. Mtenga (2021) and Agunga and Manda (2014) highlight that for effective interaction to take place, it is important to understand the audience (farmers). This means that it is important to consider the characteristics of the farmers and this could be achieved through conducting a situational analysis. Enabling farmer-expert interactions and using the right communication channels as indicated in step 3, would help with ensuring that farmers receive important information from experts.

#### **Step 5: Identification of value-adding initiatives**

Bille, Shikongo-Nambabi and Cheikhyoussef (2013) assert that training farmers about the importance of adding value to indigenous foods into processed food products and to train farmers about value addition is highly important for both job creation, food security, and income generation. This is especially important for rural communities where unemployment and social segregation as alluded to in the previous chapter, are experienced. Supporting this is Okello, Shikuku, Sindi and Low (2015) who state that

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<sup>26</sup> Social and Behaviour Change Communication. See: <https://sbccimplementationkits.org/service-communication/wp-content/uploads/sites/13/2017/01/ServiceCom-I-Kit-Learn-Section.pdf> for full publication.

value-adding has the potential to improve the income revenues of rural households through sales into the urban niche markets, resulting in enhanced community development. One of the most overlooked areas in the context of indigenous foods is the value addition of products. It is the researcher's view that the reason for this neglect is because these foods, particularly indigenous vegetables, are often consumed by indigenous communities in their natural forms without any processing (apart from cooking) which tends to be less appealing to potential consumers. This points to the importance of value-adding identification in order to align with consumer preferences (informed by research/situational analysis), and enable sustainable economic growth.

### **8.3.3 Phase 3: Programme Implementation**

Programme implementation is concerned with how an intervention is put into practice and is vital to establishing outcome evaluations (Durlak, 2008). Three steps form part of the third phase which include infrastructural development, putting sustainability measures in place, and establishing reliable markets.

#### **Step 6: Infrastructural development**

Infrastructural development is an enabler for the success for most agricultural projects considering the nature of the farming business. During this stage, five basic physical systems which are outlined by Patel<sup>27</sup> can be considered:

- Input based infrastructure (seeds, equipment and machinery).
- Resource based infrastructure (water for irrigation, power/energy).
- Physical infrastructure (proper roadworks and road connectivity, transport, storage, connectivity and preservation).
- Institutional infrastructure (agricultural extension services, education technology, information and communication services, financial services, marketing and research).

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<sup>27</sup> The work of Patel, A (2010) on Infrastructure For Agriculture & Rural Development In India, which outlines a need for a comprehensive programme & adequate investment in improving the quality of life can be accessed on: <https://www.findevgateway.org/sites/default/files/publications/files/mfg-en-paper-infrastructure-for-agriculture-rural-development-in-india-need-for-a-comprehensive-program-adequate-investment-sep-2010.pdf>

### **Step 7: Put sustainability measures in place**

In the context of the presented framework, sustainability refers to the ability to maintain the success of the indigenous vegetable value-chain by improving their competitive edge and ability to compete with their exotic counterparts, and durability. To achieve this, an infusion of capital support during the initial stages is paramount. This is supported by Shan, Hwang and Zhu (2017) who claim that sustainable financing plays a critical role in fostering the development of sustainability when undertaking a project. Capital support would then be followed by measures where farmers would use their profit(s) to develop and sustain their enterprises. Secondly, the provision of formal education on indigenous vegetable farming in the form of short courses as part of skills training, would help to open more opportunities for the promotion of the indigenous vegetable value chain. This assertion is supported by Tierney, Tweddell and Willmore, (2015) who report that education is one of the most effective tools that can be used to enhance sustainable development.

### **Step 8: Market linkages**

Strengthening relations with markets and linking farmers with reliable markets is the last stage of the value chain. At present, the challenge that is mostly experienced by indigenous vegetable producers is market accessibility (Muhanji, Roothaert, Webo and Stanley (2011). Provided that the previous steps are well executed, including value-adding, farmers would have the likelihood of meeting market demands and be able to commercialise their produce in the formal market. However, information dissemination regarding linking farmers to markets is vital.

## **8.4 CONCLUSION AND IMPLICATIONS**

The study was set out to explore the association between three phenomena of interest, namely indigenous vegetables, agrobiodiversity, and food security – as a means of determining the impact of indigenous vegetables on agrobiodiversity and food security. The general theoretical literature on this subject in the context of NRKZN, is inconclusive, thus the study sought to provide a logical conclusion to the questions and objectives. Empirical findings of the study indicate that the utilised indigenous vegetables in the three district municipalities provide convenience to the communities

by saving them money that could be used for other household needs rather than spending it on food. In addition to this, note was taken that they help to save money that could be used for: (i) energy since some of them can be consumed uncooked, (ii) medicine, some indigenous crops are perceived to have medicinal value, (iii) production inputs, the likes of chemical fertilisers and pesticides are not often used during production since indigenous vegetables have the suitability to grow and fully develop under diverse conditions without the use of growth stimulants. (iv) although further research is needed on this, they were perceived to have a positive impact to environmental well-being and contributed to household food security. (v) Indigenous vegetables were also found to have a perceived potential for commercialisation which would help improve the socio-economic status of the rural communities that are actively producing these crops. At present, these vegetables are mostly sold in the informal market and do not have a competitive advantage in the formal market in comparison to their exotic counterparts.

To address this and in response to the last objective of the study which sought to devise a strategy that is driven towards promoting indigenous vegetables as important components of agrobiodiversity and food security, the researcher introduces a three-phased framework that is driven towards strengthening the value chain of indigenous vegetables (Figure 8.1). However, this framework is theoretically informed and as part of ongoing research by the researcher, its feasibility will be verified through a series of pilot experimentations that are set to be conducted in collaboration with institutions that have interest in promoting indigenous vegetables.

In spite of the general belief that indigenous vegetables are 'foods for the poor', they have been found to play a significant role to communities, particularly rural communities that fall under a low socioeconomic status (SES). Literature and perceptions from participants in this study indicate that that indigenous vegetables are highly nutritious, with some surpassing their exotic counterparts. This gives an indication that the use of these vegetables has the potential to be utilised by all people regardless of their socio-economic standing. However, there is still a need for researchers in the food studies to test the nutritional composition of these indigenous vegetables before they can be popularised.

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## APPENDIX A: ETHICS CLEARANCE LETTER



### GENERAL/HUMAN RESEARCH ETHICS COMMITTEE (GHREC)

06-Apr-2020

Dear Mr Qwabe, Qinisani Nhlakanipho QN

#### **Application Approved**

Research Project Title:

**Devising a strategy for the production and utilization of indigenous vegetables: Towards agrobiodiversity management and food security in South African communal areas**

Ethical Clearance number:

**UFS-HSD2020/0080/0604**

We are pleased to inform you that your application for ethical clearance has been approved. Your ethical clearance is valid for twelve (12) months from the date of issue. We request that any changes that may take place during the course of your study/research project be submitted to the ethics office to ensure ethical transparency. Furthermore, you are requested to submit the final report of your study/research project to the ethics office. Should you require more time to complete this research, please apply for an extension. Thank you for submitting your proposal for ethical clearance; we wish you the best of luck and success with your research.

Yours sincerely

**Prof Derek Litthauer**

**Chairperson: General/Human Research Ethics Committee**

Digitally signed  
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## APPENDIX B: PARTICIPANT'S CONSENT LETTER

### CONSENT TO PARTICIPATE IN THE STUDY

I understand and confirm that the person asking my consent to take part in this research has explained to me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read and have been verbally informed about the study as explained in the information sheet. I have had sufficient opportunity to ask questions and am prepared to participate in the study. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty. I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the *insert specific data collection method*.

I have also received a signed copy of the informed consent agreement.

.....

Signature

.....

Date

## APPENDIX C: QUESTIONNAIRE

Respondent number: \_\_\_\_\_ District & Area: \_\_\_\_\_

### Demographic Data

1. How many members are in the household?

<5

6-10

10-15

>16

2. What is the gender of the household head?

Male

Female

3. Marital Status:

Single

Married

Divorced

Widow/Widower

4. Age of household head:

20-39

40-59

60-79

80-100

5. Educational level:

Primary

Secondary

Tertiary

Non-formal

6. Religion:

Christian

Non-Christian

7. Occupation:

Govt. employee

Self-employed

NGO

Unemployed

Other

8. Monthly income (*optional*):

<R1000

R1001 – R3000

R3001 – R4000

>R5000

**Objective no.1: To identify existing indigenous vegetables related to agrobiodiversity management among the selected communities.**

**1.1 Are there any indigenous vegetable foods that are grown in the area?**

Yes

No

**1.2 Are there any wild vegetables that are collected from the forests and other land places**

Yes

No

**1.3 Between indigenous and exotic vegetables, which are considered to be the favourite in the community?**

Indigenous vegetables

Exotic vegetables

**1.3.1 What is the reason for this preference?** *Choose one*

a. They are part of peoples heritage

b. They are more nicer

c. More used to them

d. Easily accessible

**1.4 What kinds of foods are used for convenience purposes and only used when there is nothing available?**

Indigenous vegetables

exotic vegetables

**1.5 Are there any indigenous vegetables used for environmental purposes and not necessarily for household utilization?**

Yes

No

**1.5.1 If yes, which are those vegetables?**

Indigenous vegetables

Exotic vegetables

**1.5.2 Are they planted or they grow naturally?**

Planted

Grow naturally

**1.6 Are there any stories that involve indigenous foods which are or may have been common in the past?**

Yes

No

**1.7 In what kinds of places are indigenous vegetables used in this area usually found?**

Dry areas

rain fed areas

Both

**1.8 Are there any traditional regulations for harvesting any of the mentioned indigenous vegetables?**

Yes

No

**1.9 Are the mentioned indigenous vegetables originally from this community or are they considered to come from elsewhere?**

Originally from the community

From elsewhere

**Objective no. 2: To determine how indigenous vegetables contribute to food security within the households.**

**2.1 What are the common uses of indigenous vegetables?**

- a. Selling
- b. Household consumption
- c. Medicine
- d. Other

**2.2 Do people use indigenous vegetables as substitutes of conventional foods in times of food scarcity?**

Yes  No

**2.3 In terms of availability, how often are indigenous foods available for utilization?**

- a. Throughout the year
- b. Seasonal
- c. Winter
- e. Summer

**2.4 Are indigenous vegetables easily accessible?**

Yes  No

**2.5 Is there any known nutritional significance brought by indigenous vegetables?**

Yes  No

**2.6 Are there any indigenous vegetables that are difficult to grow?**

Yes

No

**2.7 Are there any indigenous vegetables that can be eaten uncooked?**

Yes

No

**2.8 Based on your experience with indigenous and exotic vegetables, which of the two would you say play an important role in this community?**

Indigenous vegetables

exotic vegetables

**2.9 Are indigenous vegetables preserved?**

Yes

No



**Objective no.3:** to examine the barriers hindering access to and use of indigenous vegetables when measuring agrobiodiversity.

**3.1 Are there any indigenous vegetables that people need permission for before being utilized?**

Yes

No

**3.2 If so, which indigenous vegetables are those?**

Vegetables used for medicine  Vegetables used for consumption

**3.3 Are there any indigenous vegetables that are perceived to have any health risks when consumed?**

Yes

No

**3.4. Is there any other reason why certain indigenous vegetables may not be easy to access?**

Yes

No

**3.5 Do agents such as health workers and extensionists educate people about the importance of indigenous foods?**

Yes

No

**3.6 Has this information helped in increasing the production rate and utilization of indigenous vegetables?**

Yes

No

**3.7 Do the varying climatic conditions affect the production of both cultivated and wild indigenous vegetables?**

Yes

No

**3.8** When compared to exotic vegetables, which of the two yield well considering a host of production factors such as weather conditions and farming inputs?

Indigenous vegetables

Exotic vegetables

**3.9** Are there any traditional methods used to overcome threats during production?

Yes

No

**3.10** Are there any post-harvest techniques used for the storage of indigenous foods?

Yes

No

**3.11** How do people ensure that there is enough seed for sowing for the following growing season?

Buy seeds

Ask neighbours

Keep from harvest

**Objective no.4: To measure the extent to which the use of indigenous vegetables on agrobiodiversity management contributes to rural livelihoods.**

**4.1 Is there any environmental impact of indigenous vegetables?**

Yes

No

**4.2 Is there any role played by indigenous vegetables on biodiversity?**

Yes

No

**4.3 Is there any association between wild and/or domesticated animals and indigenous vegetables in the area?**

Yes

No

**4.4 Is there any cultural significance of the indigenous vegetables used in the community?**

Yes

No

**4.5 Is there any way in which people in the area use these indigenous vegetables for income generation?**

Yes

No

**4.6 Does the younger generation perceive the indigenous foods produced in the community useful?**

Yes

No

**4.7 Certain crops such as *amadumbe* are believed to grow well in wetland areas do you agree with this statement?**

Yes

No

**4.8 With the heavy rains and severe drought that have hit South Africa lately, are indigenous vegetables able to withstand such threats?**

Yes

No

**4.9 Are alien species able to withstand these threats?**

Yes

No

**4.10 With regards to sustained livelihoods, which of the two would you say play a major role between indigenous vegetables and exotic vegetables?**

Indigenous vegetables

exotic vegetables

**Objective no.5: To make policy recommendations on the production and use of indigenous vegetables to agrobiodiversity management and food security.**

**5.1 Do you know of any technologies could be integrated to the traditional production systems?**

Yes

No

**5.2 Do you think indigenous vegetables have the potential to be commercialized?**

Yes

No

**5.3 Would there be any negative effect if indigenous vegetables were to be extinct in the community?**

Yes

No

**5.4 Do you think people can make suggestions to government and other policy-makers to take in order to promote indigenous vegetables?**

Yes

No

**5.5 Do you think that the youth be involved in the production of indigenous vegetables to maintain diversity?**

Yes

No

**5.7 Do you think that indigenous vegetables can contribute to food security?**

Yes

No

STARTING TIME: \_\_\_\_\_

ENDING TIME : \_\_\_\_\_

TOTAL TIME : \_\_\_\_\_

## APPENDIX D: INTERVIEW SCHEDULE (FOCUS GROUP INTERVIEWS)



**UNIVERSITY OF THE FREE STATE**

**CENTRE FOR SUSTAINABLE AGRICULTURE, RURAL DEVELOPMENT AND EXTENSION**

**Devising a strategy for the production and utilization of indigenous vegetables: Towards agrobiodiversity management and food security in South African communal areas**

### **FOCUS GROUP DISCUSSION**

**NAME OF DISTRICT MUNICIPALITY** : .....

**NAME OF COMMUNITY** : .....

**INTERVIEWER** : .....

**STARTING TIME** : .....

**FINISHING TIME** : .....

**DURATION** : .....

**GROUP NUMBER**

1. In your understanding, what is meant by indigenous vegetables?
2. What would you say is the difference between indigenous vegetables and exotic vegetables?
3. Would you say people make use of wild indigenous vegetables in this community and its surroundings?
4. Between indigenous and exotic vegetables, which are considered to be the favourite in the community and what is the reason for this preference?
5. In times of food scarcity, what do people in this community normally rely on?
6. Are there any indigenous vegetables used for environmental purposes and not necessarily for consumption?
7. Would you say there are any teachings in the community concerning indigenous vegetables, and does the older generation ever share stories to the younger generation about indigenous foods in general?
8. In what kinds of places are indigenous vegetables usually found?
9. Would you say that indigenous vegetables are easily accessible?
10. Based on your experience with indigenous and exotic vegetables, which of the two would you say play an important role in this community? State the reason.
11. How are indigenous vegetables processed and preserved?
12. Are there any indigenous vegetables that are perceived to have any health risks when consumed? Please explain.
13. Are there any other reasons why certain indigenous vegetables may not be easy to access? Please explain.
14. Do agents such as community workers and extensionists educate people about the importance of indigenous foods?
15. In what manner do the varying climatic conditions affect the production of both cultivated and wild indigenous vegetables?
16. When compared to exotic vegetables, which of the two yield well considering a host of production factors such as weather conditions and farming inputs?

17. How do people ensure that there is enough seed for sowing for the following growing season?
18. Other than household consumption, what other roles do indigenous vegetables play in this community?
19. What role do indigenous vegetables play on agricultural biodiversity?
20. What is the cultural significance of the indigenous vegetables utilized in the community?
21. In what way do people use these indigenous vegetables for income generation?
22. With the severe drought and heavy rains that has hit some parts of South Africa lately, how have indigenous vegetables responded to this threat?
23. How have exotic vegetables responded to these threats?
24. Tell me about the technologies that you know of that are used in farming.
25. With the latest advancements in the techno-world, please explain how you think new technologies could be integrated to the traditional production systems.
26. What do you think can be done to get indigenous vegetables in the market countrywide like their exotic counterparts?
26. What would be the effect of the extinction of indigenous vegetables in the community?
27. What measure would you suggest for the government and other policymakers to take to support the continued production and use of indigenous vegetables?
28. How can the youth be involved in the production of indigenous vegetables to maintain biodiversity?
29. In what manner would you say indigenous vegetables can contribute towards hunger alleviation?