

https://dspace.org/

The perceptions, attitudes and knowledge of traditional healers and traders about using cultivated plants in South Africa.

Mbongwa, Nolwazi Sinqobile

2018

https://hdl.handle.net/10539/26736

Mbongwa, Nolwazi Sinqobile, (2018) The perceptions, attitudes and knowledge of traditional healers and traders about using cultivated plants in South Africa, University of the Witwatersrand, Johannesburg, https://hdl.handle.net/10539/26736.

Downloaded from a DSpace repository. https://dspace.org/

The perceptions, attitudes and knowledge of traditional healers and traders about using cultivated plants in South Africa.

Nolwazi Sinqobile Mbongwa

A Dissertation submitted to the Faculty of Science,
University of the Witwatersrand,
in fulfilment of the requirements
for the degree of Master of Science,
Johannesburg, South Africa.

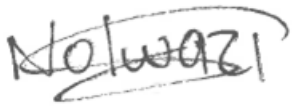
Supervisors: Professor Wayne Twine & Dr Vivienne L. Williams

DECLARATION

Johannesburg, August 2018

I, Nolwazi Sinqobile Mbongwa, hereby declare that this dissertation is my own, unaided work. It is being submitted for a Master of Science degree at the University of the Witwatersrand. This dissertation has not been submitted before for any degree or examination in any other university.

Date: 24 August 2018



Name: Nolwazi Sinqobile Mbongwa

ABSTRACT

Afrocentric worldviews believe in the existence of ancestors, and traditional healers are consulted for communication with them. Traditional healers dispense various animal and plant parts to rid their clients of the problems that they might be facing. Animal and plant parts that are considered medicinal in the broad sense are therefore vital in African belief systems. Medicinal plants are rapidly declining in the wild due to over-harvesting, development and urbanisation, and various initiatives such as law enforcement have been used to combat the decline, but they have not been successful. Cultivation is one of the methods that has been used to mitigate the decline of medicinal plants. Cultivation is viable because healers and traders can easily practice it, if they have the necessary requirements for it such as land, water, propagation material and time. Importantly, however, there is limited scientific knowledge about the acceptability of cultivated medicinal plants by healers and traders. The aim of the study is to determine the perceptions, attitudes and knowledge of traditional healers and traders about medicinal plant cultivation, and identify plants that are a priority to healers and traders, to contribute to a greater understanding of the cultural opportunities and challenges for cultivating medicinal plants as a conservation strategy. Five markets were surveyed: Marabastad, Mona, Faraday, Ezimbuzini and Warwick. Healers from Soweto, Nhlungwane and Umlazi were surveyed. Two residential areas and three markets are located in KwaZulu-Natal province. Two markets and one residential area were surveyed in Gauteng province. Semi-structured questionnaires were used to survey the places and overall 114 respondents (42 healers and 72 healers) were interviewed. The results of the study show that healers and traders accept using and selling cultivated medicinal plants. Nevertheless, certain aspects of the spiritual and cultural entities of medicinal plants need to be sustained and ensured even when cultivating. Plants that are used for rituals and those that are chosen by ancestors via dreams are specifically required to be collected in the wild. Healers and traders have different knowledge about spiritual limitation concerning medicinal plants. However, the perceptions are not significantly different to a point in which they would be approached separately in conservation plans. Furthermore, location and ethnicity also have a great influence in both healers and traders perception about cultivated medicinal plants.

Keywords: ancestors; cultivation; cultural and spiritual norms; ethnospecies; medicinal plants; locality; rituals; worldviews.

Ngicela ukuqala ngokubonga umvelinqangi ngokuba seduze kwami noma izivunguvungu bezingihlasela. Ngibonge nako babamkhulu ngokuhlale beyisibani phezu kwempilo yam. NgiyaThokoza eMakhosini ngithi azikhule njalo indlondlo.

This Masters dissertation is dedicated to my parents Tholani and Dumisani Mbongwa for never giving up on me no matter the circumstances. Ngiyanithanda kakhulu Tshosho no Mbuyisa.

ACKNOWLEDGEMENTS

- I would like to give my whole-hearted thanks to my supervisor and co-supervisor Professor Wayne Twine and Dr Vivienne Williams for their patience, guidance and love that they showed throughout my personal dilemmas.
- This study would not have been possible without the acceptance and support of traders from Mona, Marabastad, Faraday, Ezimbuzini and Warwick market. In addition, healers from Nhlungwane, Soweto and Umlazi. Thank you very for your trust and assistance, without all of you this study would have not been a success.
- Thank you to my siblings Mvelo, Khulekani, Zanele and Siphesihle Mbongwa for running around with me and ensuring that I heal and carry on with my studies. Ngiyanithanda kakhulu futhi Ngiyabonga kakhulu Bo Mbuyisa nina eningaphekelwa amavila eniphekelwa ikhuthalikazi.
- To the rest of my family: Mamkhulu Monica, Babomdala Bonokwakhe Mbongwa and Zama, Mihli, Anele, Njinga, Siphamandla and Thokozani Mbongwa. Niyabonga kakhulu Bo Hlubi.
- A special thank you to my sister from another mother, Nolwandle Nolen Khumalo. You have been with me through it all. If it was not for your support, I do not think I would have carried on with my Masters after the long medical break that I had.
- Thank you to all my friends, Dikeledi Maluleke, Buyisiwe Hlongwane, Tshifhiwa Rasila and Khulisile MaNyembe Ndlela. Even though you are away from me, I have never felt the distance because of the enormous love that you have shown and motivating me to never give up.
- A ‘significant’ thank you to Thando Caroline Thwala for being my stats guru and friend, none of the stats would be part of this study if it were not for you.
- A big thank you to Thibedi Jacob Moshoeu for his help with maps for study sites, harvest and market location. Friend you have been with me from the start of my Masters journey…your technology guidance did not go to waste. I finally made it!
- Gratitude also goes to Siphosenkosi Mbonani and Nokukhanya Nozipho Mhlongo, I might have not known you for a long time but your support has been heartfelt. I love you.
- Heartfelt thank you to all my APES colleagues and friends for visiting me when I was sick and motivating me, you are deeply loved.
- This study would not be possible without the funding assistance of the National Research Foundation (NRF) and the University of the Witwatersrand, Thank you.

Table of Contents

ABSTRACT ii
ACKNOWLEDGEMENTS iv
CHAPTER 1 1
Introduction 1
1.1 INTRODUCTION 1
1.1.1 Background 1
1.1.2 Rationale 2
1.1.3 Aims, objectives and research questions 4
1.2 LITERATURE REVIEW 6
1.2.1 Traditional healing 6
1.2.2 Traditional medicine: use, harvesting and vulnerability 8
1.2.3 Medicinal plant trade in South Africa 10
1.2.4 Cultivation of medicinal plants in South Africa 11
1.3 DISSERTATION STRUCTURE AND OVERVIEW 14
1.4 REFERENCES 15

CHAPTER 2 19
Methodology 19
2.1 OVERVIEW OF THE STUDY APPROACH 19
2.2 PRE-SURVEY INTERVIEWS 20
2.3 PROTOCOL AND ETHICS 20
2.4 STUDY AREA 20
2.4.1 Residential areas 22
2.4.2 Medicinal markets 22
2.5 SURVEYS 23
2.5.1 Healer surveys 23
2.5.2 Market surveys 24
2.6 DATA PROCESSING AND ANALYSIS 25
2.7 REFERENCES 27

CHAPTER 3 29
Cultivated Medicinal Plants: Availability and Cultural Norms 29
ABSTRACT 29
3.1 INTRODUCTION 30
3.2 METHODS 32
3.3 RESULTS 33

3.3.1 Ethnospecies that may or may not be cultivated 33
3.3.2 Ethnospecies requiring rituals before harvesting 39
3.3.3 How plant material is obtained and Conservation status of cited ethnospecies 40
3.3.4 Harvesting localities 42
3.3.5 Market localities 42
3.4 DISCUSSION 48
3.4.1 Ethnospecies that may or may not be cultivated 48
3.4.2 Ethnospecies requiring rituals before harvest 50
3.4.3 How plant material is obtained and Conservation status of cited ethnospecies 51
3.4.4 Harvesting localities 52
3.4.5 Market localities 53
3.5 CONCLUSION 53
3.6 REFERENCES 55

CHAPTER 4 57
The Influence of Traditional Healing Practices on Medicinal Plant Cultivation 57
ABSTRACT 57
4.1 INTRODUCTION 58
4.2 METHODS 60
4.3 RESULTS 60
4.4 DISCUSSION 63
4.5 CONCLUSION 65
4.6 REFERENCES 66

CHAPTER 5 68
Comparing Perceptions, Attitudes and Knowledge of Using Cultivated Medicinal Plants between Healers and Traders. 68
ABSTRACT 68
5.1 INTRODUCTION 69
5.2 METHODS 70
5.3 RESULTS 71
5.4 DISCUSSION 74
5.5 CONCLUSION 77
5.6 REFERENCES 78

CHAPTER 6 80
Overall Discussion and Conclusions 80
6.1 OVERALL DISCUSSION AND CONCLUSIONS 80
6.2 RECOMMENDATIONS FOR FUTURE RESEARCH 83

6.3 PERSONAL EXPERIENCES FROM THE STUDY 83
6.4 REFERENCES 87
APPENDICES 89
APPENDIX 1 89
APPENDIX 2 91
APPENDIX 3 96
APPENDIX 4 101
APPENDIX 5 103
APPENDIX 6 106
APPENDIX 7 108
APPENDIX 8 110
APPENDIX 9 114
APPENDIX 10 115
APPENDIX 11 117

TABLE OF FIGURES

CHAPTER 2

Figure 2.1. Map showing location of the study sites in the provinces of Gauteng and KwaZulu-Natal. 21

Table 2.1. Demographic information* at the site where healers were surveyed. 22

Table 2.2. Demographic information of the respondents from the current study (August 2016–March 2017), indicating socio-demographic differences between the markets. 23

Table 2.3. Trader and healer surveys conducted between August 2016 and March 2017. 23

Figure 2.2. Illustrations of how plant material is packaged and sold in the various markets: a) Faraday market (Johannesburg), b) Ezimbuzini market (Durban), c) Mona market (Nongoma) and d) Marabastad (Pretoria). 25

CHAPTER 3

Table 3.1. Summary of the ethnospecies (S_e) and the categories of plants based on questions asked relating to cultivation (allowed or want), rituals and availability. 34

Table 3.2. Summary of the seven ethnospecies that were most frequently cited by respondents as ‘not allowed to be cultivated’ (n=114 respondents; total S_e=68 ethnospecies). (Full list of species in Appendix 6). 34

Table 3.3. Summary of the 21 ethnospecies that were most frequently cited by respondents as ‘want/are allowed to be cultivated’ (n=114 respondents; total S_e=98 ethnospecies). (Full list of species in Appendix 5) 35

Table 3.4. Summary of the 17 ethnospecies that were most frequently cited by respondents as ‘decreasing’ (i.e. in the wild and/or in the markets) (n=114 respondents; total S_e=79 ethnospecies). (Full list of species in Appendix 4). 36

Figure 3.3. Comparison between species mentioned as ‘decreasing’ and those that respondents ‘want/are allowed to cultivate’. The Spearman’s rank correlation for this graph indicates there is no relationship between

the ranks of plants that are 'decreasing' and the ranks of plants that are 'allowed, or want to, be cultivated' (R^2=0.04; p=0.14). Ethnospecies corresponding to these species are in Figure 3.2. 37

Figure 3.4. The number of ethnospecies per category that were cited as being 'allowed' and/or 'not allowed' to be cultivated by respondents. 38

Figure 3.5. Comparison between the species that healers (x-axis) and market traders (y-axis) cited as 'want/are allowed to be cultivated'. The Spearman's rank correlation for this graph indicates there is no relationship between the ranks of healers and traders citations of plants that are 'allowed, or want to, be cultivated' (R^2=0.16; p=0.67). 39

Table 3.5. Summary of the plants that respondents cited as requiring rituals before they can be harvested. (Full list of species in Appendix 7) 40

Figure 3.6. Percentage of healers and traders acquisition of plant materials that they use or sell. Differences between healers and market traders were not significant (χ^2=4.0033, df=2, p=0.14). 41

Figure 3.7. Red List categories for all plants cited during the research by respondents. CR=Critically Endangered, EN=Endangered, VU=Vulnerable, NT=Near Threatened, LC=Least Concern, DDT=Data Deficient Taxonomically, NE=Not Evaluated. 41

Figure 3.8. Study sites, markets and areas where plants are harvested. Respondents were interviewed at the study sites shown in bold letters within two provinces (shaded grey). Abbreviations for study sites: h=Marabastad (Pretoria); HH=Faraday market and Soweto (Johannesburg); o=Mona market (Nongoma); p=Nhlungwane (Ulundi); GG=Warwick market (Durban); DD=Ezimbuzini market and Umlazi (Umlazi). Abbreviations for harvesting sites mentioned by the respondents are labelled from a to z, and the names of the harvest areas are given in Appendix 9. 43

Table 3.6. Summary of the harvest locations cited by the respondents. (*=Metropolitan (densely populated urban core)). 44

Table 3.7. Summary of the market locations and their frequency of citation by respondents from each study site. (*=Metropolitan). 48

CHAPTER 4

Figure 4.1. Proportion of the types of healing training that healers participating in this study went through during initiation (other = *Nyasa, Dlozi elimhlophe, Abalozi, Mnono)* (Total number of respondents, n = 42). ... 61

Table 4.1. Comparison the influence that the type of training has on the healer's awareness of cultivating and using medicinal plants. 61

Figure 4.2. Percentages of healers indicating how effective cultivated medicinal plants are in healing their patients, in three different residential sample sites. Fishers Exact test: p=0.40. 62

Table 4.2. Comparing healers' responses to their ancestor's role in the acceptance/disapproval of cultivated medicinal plants (N=42). 62

CHAPTER 5

Table 5.1. Comparing the acceptability and limitations of using cultivated medicinal plants between healers and raders, whether respondents are already cultivating and if they perceive cultivation as a solution for declining

wild populations [H=Healers (n=42), T=Traders (n=72)]……71
Figure 5.1. Reasons mentioned by healers and traders for not cultivating medicinal plants (Healers (n=27), Traders (n=46)). χ^2=10.226, df=2, p<0.05. 71

Figure 5.2. Comparison of where healers and traders obtain the materials that they use to cultivate (Healers (n=15), Traders (n=26)). χ^2=1.026, df=1, p=0.31. 72

Figure 5.3. Methods mentioned by healers and traders as preferences for cultivating medicinal plants (Healers (n=42), Traders (n=72)). χ^2=2.404, df=2, p=0.30. 73

Figure 5.4. Comparison between healers and traders on their perception of whether harvesters perform rituals while harvesting plants (Healers (n=42), Traders (n=72)). χ^2=2.216, df=2, p=0.33. 73

Figure 5.5. Percentage comparison of the likelihood that healers and traders would purchase cultivated medicinal plants (if they were available), where 1=unlikely, 2=least likely, 3=neutral, 4=likely, 5=most likely (Healers (n=42), Traders (n=72)). χ^2=22.64, df=4, p<0.0001. 74

CHAPTER 1
Introduction

1.1 INTRODUCTION
1.1.1 Background

Africans have relied on traditional medicines for centuries, and medicinal plants are integral to health care systems in African countries (van Wyk *et al*., 1997). In contrast to western medication that is analytical and technically based, traditional medicine takes a holistic approach in healing illnesses and disease, and promoting good health (Hammond-Tooke, 1989). In traditional medicine systems, misfortune or success are not seen as coincidences but are believed to be related to the patients' behaviour and ancestral spirits according to the relationships that individuals have with the environment and their ancestors (Hammond-Tooke, 1989). Although people living in rural areas mostly consult traditional healers, a large number of urban dwellers also consult with them (Cheikhyoussef *et al.*, 2011). The urban demand for traditional medicinal is largely met by informal medicinal markets (Williams, 2003). The reasons for consulting healers are common to both urban and rural areas: (i) the cost associated with western medicine, (ii) the belief that some diseases cannot be treated using western medicine, and (iii) the deep-rooted belief in the existence of ancestors (Mahwasane *et al*., 2013).

Due to over-harvesting, development, and increase in human populations, there is a substantial decline in many wild medicinal plant populations such that traditional healers and traders typically have to travel long distances to obtain the required plant material for treatment (Coopoosamy and Naidoo, 2012). In addition, some healers have resorted to using substitutes to sustain their practices (Coopoosamy and Naidoo, 2012). There are many medicinal markets located in various parts of the country. Markets in Gauteng, KwaZulu-Natal, Free State, Limpopo, Mpumalanga and Eastern Cape have been studied in relation to the plant species that are being traded, the sources of these plants, the contribution of the trade to the traders' livelihoods, and the harvesting techniques used. (e.g. Cunningham, 1988; Dold and Cocks, 2002; Williams, 2003; Botha *et al*., 2004; Mander *et al*., 2007; Moeng, 2010; Ah Goo, 2012; Brueton, 2013; Wojtasik, 2013; Ndawonde, 2015). Previously, better law enforcement was recommended for eradicating exploitation of medicinal plants in the wild, but this was shown to be ineffective (Keirungi and Fabricius, 2005; Diederichs *et al*., 2006).

Cultivation has been considered as an alternative to wild harvesting, as this could help relieve harvesting pressure on natural populations of medicinal plants (Keirungi and Fabricius, 2005; Mander and Le Breton, 2006; Ah Goo, 2012; Ndawonde, 2015). However, there have been concerns that cultivation is impractical for commercial purposes because some plants take a long time to reach

maturity and a harvestable size (Botha, (2001; 2006); Mander and Le Breton, 2006; Moeng, 2010). Furthermore, traditional healers and traders commonly collect their plants from the wild because of perceptions by both patients and healers that cultivated medicinal plants 'lose their healing power' quickly and can be ineffective in treating certain illnesses (Semenya and Potgieter, 2014). On the other hand, the continuing demand for scarce medicinal plants can create opportunities for cultivation to benefit people who no longer have easy access to wild plants. Researchers have documented many plants that are important to healers such as *Warburgia salutaris, Siphonochilus aethiopicus, Encephalartos* spp. and *Ocotea bullata* that are cause for concern due to high levels of demand but low supply from the wild (Botha, 2001,2006; Mander and Le Breton, 2006; Moeng, 2010; Brueton, 2013; Williams *et al*., 2013).

Despite the potential issues with cultivated plants pertaining to their perceived lower potency, there is evidence of some healers cultivating some medicinal plants under certain circumstances. For example, healers in the Malolotja area in Swaziland and some parts of South Africa accepted cultivated plants as an alternative to medicinal plants harvested in the natural environment (Cunningham, 1990). The decline of medicinal plants in the wild and increased distances to harvesting areas has been a factor in the acceptability of some cultivated species (Cunningham, 1990). However, healers and traders have been relatively reluctant to cultivate their own plants, traders have rarely been included in cultivation programmes, and cultural views on cultivation have typically not been assessed in detail (Botha, 2001; Ndawonde, 2015). A few medicinal plant nurseries have succeeded, but the majority have failed, often due to the unwillingness of traders and healers to participate in these programmes (Botha, 2006).

1.1.2 Rationale

The lack of knowledge among scientist about the acceptability of cultivated medicinal plants by the traditional healers and medicinal plant traders is one of the reasons for failures of medicinal nurseries and other cultivation initiatives. Furthermore, the research emphasis has mostly been on healers and not traders (Wiersum *et al*., 2006; Moeng, 2010; Semenya and Potgieter, 2014), and the information supplied by research participants was not specified according to locality. Moreover, there is lack of information on species that healers and traders would like to have cultivated (Wiersum *et al*., 2006). The use of traditional medicine by diviners is guided by ancestors, and influenced by deeply rooted cultural beliefs for herbalists. Therefore, cultural affiliations are very important to consumers (both the customers of traders and the patients of healers). The perceptions about using cultivated medicinal plants are complex and differ based on location and ethnicity (Kelatwang and Abbot, 2002; Wiersum *et al*., 2006). Moreover, some cultural customs and beliefs regarding traditional medicinal use are not being taken into consideration by researchers (Kelatwang and Abbot, 2002).

Even though traditional healing appears uniform, it actually differs between the ethnic groups – and these differences in beliefs may affect the acceptability of cultivated medicinal plants. The ancestral belief in treating patients is very important to healers and traders (Wiersum *et al*., 2006). Botha (2001) showed that success of medicinal plant conservation depends strongly on the attitudes, values and perceptions that people associate with natural resources, and that these vary from place to place. Therefore, acquiring knowledge on how these beliefs can be incorporated into cultivating medicinal plants will better ensure acceptability of cultivated medicinal plants by consumers and will potentially improve already existing nurseries that are failing to attract traders and healers. In addition, it is important to understand healers and traders' perspectives on what makes wild-collected species effective and more powerful. In addition to the previously mentioned factors such as ancestral and cultural affiliations of medicinal plants, there are plants that are culturally acceptable for cultivation, but also some that are not allowed to be cultivated because of cultural and spiritual norms (Wiersum *et al*., 2006; Moeng, 2010).

Wiersum *et al*. (2006) conducted a study comparing species that local people wanted to cultivate with those that are prioritized for conservation, and there was only a 50% similarity between the two. These results indicated that what researchers conclude as being important is sometimes different from the resource users' perception. The researcher's perspective of what is important for cultivation typically originates from assessments that have been made on vulnerability of a medicinal plant population and its ability to recover from harvesting. In addition, high frequency of a particular plant in the market, 'popularity' in the market (as determined by traders), and species that have already been assessed as being of conservation concern by the national IUCN Red List assessments (Williams *et al*., 2013; Moyo *et al*., 2015; van Andel *et al*., 2015). These perspectives need to be integrated with traders and healers' priorities to ensure a holistic approach in medicinal plant conservation. Healers and traders should identify plants that are culturally accepted for cultivation, thus creating awareness of plants for which cultivation near residential areas is not culturally acceptable (e.g. species that are perceived to be too dangerous because they are believed to attract lightning and bad spirits). Since the healers and traders would have identified these species, it would show that they are culturally acceptable for cultivation. For some traders and healers, establishing their own medicinal gardens or taking part in existing nurseries might be impractical – hence the likelihood of them purchasing cultivated plants was assessed.

Given the above, this MSc research project therefore aimed to investigate and document the varying cultural perceptions, attitudes and knowledge associated with the use of cultivated medicinal plants and the acceptability of cultivated material through investigating healers and traders in various parts of South Africa to: (i) understand the complexity of perceptions concerning using cultivated medicinal plants; (ii) assess knowledge and use of nurseries by traders and healers; (iii) identify plants that

traders and healers would most want to have cultivated; and (iv) identify which cultivation methods healers and traders prefer (e.g. home gardens or nurseries). The findings of the study add much needed information for existing nurseries to expand, and avoid disinterest and conflicting views between researchers and users and traders of traditional medicine. Furthermore, the study will add information regarding the conservation of threatened and endangered medicinal plant species.

As part of South Africa's Strategy for Plant Conservation, the South African National Biodiversity Institute (SANBI) prepared targets to be achieved by 2020 that align with the Global Strategy for Plant Conservation (GSPC) (SANBI, 2016). Some of these targets involve expanding medicinal nurseries and encourages the involvement of resource users in decision-making (SANBI, 2016). The GSPC targets that are relevant to my study are:

- Target 8: 60% of threatened plants conserved *ex situ*: SANBI aims to expand and maintain existing nurseries by providing the relevant training and resources that are required. The goal is also to identify species that are useful to people and include them in these nurseries.
- Target 12.1: A landscape approach to the conservation of medicinal plants developed and implemented to identify places surrounding urban areas, which have high diversity of medicinal plants and plants used for rituals.
- Target 12.2: The option of substituting wild sourced medicinal plants with cultivated plants investigated: The objective is to try to ensure the feasibility of cultivated medicine by acknowledging the previous, current and future trends in medicinal plant markets based on the social context and reviews of the demand for medicinal plants.
- Target 13: Studies conducted to capture indigenous knowledge related to plant use by ethnic groups in regions not yet definitively researched. Identify differences in perceptions and knowledge between communities and compare these between individuals.

My Dissertation will (i) contribute much needed information for the research gaps that have been identified, (ii) provide baseline data for future monitoring of changes in the perceptions, attitudes and knowledge of resource users concerning cultivated plants over time, (iii) contribute to future management recommendations for the country, and (iv) thus contribute information necessary to meet targets for the GSPC.

1.1.3 Aims, objectives and research questions

The study aims to determine the perceptions, attitudes and knowledge of traditional healers and traders about medicinal plant cultivation, and identify plants that are a conservation priority to healers and traders, in order to contribute to a greater understanding of the cultural opportunities and challenges for cultivating medicinal plants as a conservation strategy.

Objective 1

Determine the plant species and their characteristics that traditional healers and traders would want, or be prepared, to cultivate (Chapter 3).

Key questions:

- What characteristics allow a plant to be cultivated?
- What role do ancestral beliefs play in acceptance and use of cultivated medicinal plants?

Objective 2

Investigate the differences in perceptions, attitudes and knowledge of using cultivated plants amongst traditional healers (Chapter 4).

Key questions:

- What are the perceptions, attitudes and knowledge of healers about cultivated medicinal plants?
- How do perceptions, attitudes and knowledge about cultivated medicinal plants differ amongst healers?
- How does the training practice of healers influence perceptions and knowledge on using cultivated plants?

Objective 3

Investigate the differences in perceptions, attitudes and knowledge of using cultivated plants between traders, and to compare this with healers (Chapter 5).

Key questions:

- What are the perceptions, attitudes and knowledge of traders about cultivated medicinal plants?
- How do perceptions, attitudes and knowledge about cultivated medicinal plants differ between traders and healers?

Objective 4

Determine the traditional healers' and traders' level of knowledge on plant cultivation methods in their respective geographic areas (Chapter 5).

Key questions:

- What methods do healers and traders think should be used to conserve medicinal plants?
- Have healers and traders used these methods before?
- What are the healers and traders views on medicinal nurseries?
- Which method of cultivation (viz. home garden or nursery) do healers and traders prefer?

Objective 5

Assess the practicality of using cultivated plants (Chapter 5).

Key questions:

- What challenges dissuade traders and/or healers from cultivation?
- What is the likelihood of healers and traders purchasing cultivated medicinal plants if they cannot cultivate plants themselves?
- Are cultivated medicinal plants accepted in the healing/trade community?

1.2 LITERATURE REVIEW

1.2.1 Traditional healing

Traditional healing is a sacred practice that is well respected in African culture. In South Africa there are two distinguishable types of healers: the herbalist (Sotho *ngaka*; Zulu *inyanga*; Xhosa *ixhwele*; Tsonga *nyanga*), and the diviner (Sotho *selaodi*; Zulu *isangoma*; Xhosa *igqirha*; Tsonga *mungome*) (Hammond-Tooke, 1989). After the introduction of the Bible in Africa, 'prophets' became part of the traditional healing community (Hammond-Tooke, 1989; Sobiecki, 2012). While ancestors guide the practices of the diviners to heal and diagnose diseases, ancestors do not guide the healing practices of herbalists (Truter, 2007).

Diviners are healers that are guided by ancestors to diagnose illnesses, the reasons behind misfortunes and 'bad luck' that might be causing diseases to manifest in patients (Sobiecki, 2014). Furthermore, ancestors guide diviners on which plant species to use and the locations where particular plants can be found (Sobiecki, 2014). The ancestors 'choose' an individual that they see fit to carry out healing practices; in most cases, the person is born with the gift (Hammond-Tooke, 1989). Throughout a diviner's life there are signs that indicate they might have the calling (e.g. having visions of things that will occur, or being able to predict certain events such as death in the family, or dreams of sacred place that the person is directed to visit) (Holland, 2001). When the ancestors feel that an individual is ready to fully commit to the calling, various symptoms and sets of events, tend to occur.

Some individuals have symptoms that affect their health and state of mind, such as hallucinations, stomach-ache, back pains, and having episodes of unconsciousness (Hammond-Tooke, 1989, Holland, 2001). In situations where the individual refuses the calling, these symptoms are intensified and the individual is alienated from society and sometimes lose their employment and relationships, and in rare cases, some result in death (Hammond-Tooke, 1989). Concurrent to the symptoms and social changes, the individual is shown in a dream and/or in visions the qualified and experienced diviner that has been chosen as their trainer (Hammond-Tooke, 1989). During this phase, which is called

ukuthwasa in isiZulu, the chosen diviner will teach the individual about the various aspects of traditional healing (Hammond-Tooke, 1989).

Traditional healers believe that humans' existence depends on the relationships between nature, humans and supernatural worlds (Petrus and Bogopa, 2007). Adhering to this worldview, a diviner and herbalist will prescribe animal- mineral- or plant-based medicines, and often these medicines are used in association with certain rituals or customs that are believed to have been guided by the ancestors (Petrus and Bogopa, 2007; Sobiecki, 2014). Traditional healing practices have always been sacred, including rituals and customs that ensured plant survival after harvest (Petersen *et al*., 2014). However, due to an increase in human population and poverty, circumstances have changed and people who are not diviners or herbalists sell and make use of medicinal plants, further exacerbating the pressure on wild populations.

There are different types of ancestral spirits that guide a healers practice and use of natural resources. Each ancestral spirit has its own unique origin and purpose in a healer's life, and healers often practice with a combination of these types of ancestral spirits, but one is more dominant than the other during the initiation phase (Meveni, 2014; Muzondi, 2014; Chipanje, 2016). For this study, the focus was on '*Umndawu'* and '*Amakhosi'* ancestral spirits because they are more prevalent in South Africa. *Umndawu* and *Amakhosi* trainees use different herbal mixtures to communicate with their ancestors during training. Furthermore, *Umndawu* and *Amakhosi* healers require different significant bones for divination, and lastly their traditional regalia are different. There are many misconceptions amongst the public concerning how each spirit functions in a person's body and these misconceptions have created a misunderstanding of the different ancestral spirits associated with healing.

Umndawu/Ndau originates from the east coast of Africa, and was introduced by Nguni tribes of South Africa to eastern Zimbabwe (Junod, 1962) and Mozambique where it is termed *Ndau*. Due to cultural association and the fact that the Shangaan people can be traced back to Zululand in the 1800s, *Umndawu* can be associated with the Zulu community and other ethnic groups in South Africa (Muzondi, 2014; Chipanje, 2016). Therefore, there is an ancestral linkage between South Africans and the *Ndau* ancestors. However, *Umndawu* has evolved within the South African healing community and adopted certain practices (such as regarding the lion as a sacred animal) that might not be common to the *Ndau*-speaking community of Mozambique (Mlisa, 2009; Muzondi, 2014). *Amakhosi* are originally from the northern part of KwaZulu-Natal, and their trainees are mostly associated with red, white and blue beads, with leopard printed cloths, and their sacred animal are leopards (Meveni, 2014). *Amakhosi*-trained healers' ancestors are linked with sacred forests; hence, they require certain aspects of nature to be untouched by humans so that they can adequately communicate with their ancestors (Meveni, 2014).

1.2.2 Traditional medicine: use, harvesting and vulnerability

Traditional medicine has been defined as *"the combination of knowledge, beliefs, experiences and practices based on theories which are native to various cultures that are used to ensure treatment of mental and physical illnesses in order to maintain and improve health"* (WHO, 2008). Many African consumers depend on traditional medicine due to lack of alternative medical services within the vicinity of their homes (Mander, 1997; Oladele *et al*., 2011). In addition, traditional medicine is widely used by Africans because of the belief that some sicknesses are caused by the interactions of the living with the ancestors (Mander, 1997; Amujoyegbe *et al*., 2012). Therefore, people believe that these interactions can only be treated holistically using traditional medicine via consultations with traditional healers (Mander, 1997).

At least 2,062 plant species are documented as being used and/or traded in South Africa (Williams *et al*., 2013). Most of these plants are harvested from the wild in communal or private land (Mander and Le Breton, 2006). The exploitation of natural resources for financial gain and/or livelihood support has resulted in local extirpation of certain plant species, and threatened the survival of others. Certain harvesting methods, such as ring-barking or removal of many whole individuals, leads to population declines, and populations that have an abundance of young individuals (Geldenhuys, 2004). The vulnerability of plants to harvesting differs due to their biological and environmental characteristics (Brueton, 2013).

A study conducted by Geldenhuys (2004) in Eastern Mistbelt Forests in Umzimkhulu District (KwaZulu-Natal), for example, showed that most *Ocotea bullata* trees had 80% of their stem circumference ring-barked, and most of these trees were dying. However, some plant species from the Fabaceae family (e.g. *Albizia adianthifolia*) are able to tolerate debarking better than sensitive species such as *Elaeodendron transvaalense*, which has shown poor bark re-growth capacity (Williams *et al.*, 2013). Families such as Zamiaceae and Stangeriaceae have restricted distributions, reproduce slowly and cannot effectively recolonize after harvesting, and hence even small rates of harvesting can be detrimental (Williams *et al*., 2013). On the contrary, for example, the species *Elephantorrhiza elephantina* is heavily harvested in the Eastern Cape and has also been located in Mpumalanga and Johannesburg (Botha *et al.,* 2001); but, it has not shown any signs of being threatened despite it being in demand and popular in the traditional medicine trade (Williams, 2007). *Elephantorrhiza elephantina* is resilient to over-harvesting because of its biological characteristics such as an extensive underground woody rootstock, growing in large colonies, and it is believed that the underground stem coppices after harvesting, thus decreasing its risk to over-exploitation (Williams *et al.,* 2013).

A positive relationship exists between the volume of plant material that is available to harvest and species population size (Brueton, 2013). The relationship is influenced by a number of factors

including life history traits of the plant, species ecology, the reproductive and growth capacity, and the response of this capacity to harvesting (Brueton, 2013). Furthermore, the amount of harvestable quantities differs with season, location and plant part harvested (Brueton, 2013). Moreover, the geographical proximity of many medicinal plants to each other and in relation to traditional users also has an influence in their susceptibility (Williams *et al.*, 2013). Botha *et al.* (2004) showed that harvesting intensity often decreases with increased distance from transport routes, human settlement and decreased accessibility to harvesting sites.

There are cultural restrictions to using medicinal plants. For example, using a plant that was used by another healer would be detrimental to a patient because a sickness was associated with that plant (Ndawonde, 2015). Therefore, treating a patient with material that comes from a plant that has already been harvested and is treating someone else would be ineffective, and in some cases worsen the condition of the patient because sicknesses are transferred to the plant until a person is healed (Ndawonde, 2015). Furthermore, there are certain plants that are only harvested in selected seasons. For example, in Swaziland and South Africa, cultural taboos prevent the summer collection of *Agapanthus campanulatus, S. aethiopicus* and *Alepidea amatymbica*, as in each case; there was a belief that if the plants were collected in summer they would cause lightning and storms (Cunningham, 1990). In the past, restricting medicinal plant use to only healers who gathered plants for subsistence and not commercial use ensured that the wild population was not heavily exploited (Cunningham, 1990).

The breakdown of traditional authorities, conservation agencies and law enforcement has caused access to medicinal plants to be unregulated (Cunningham, 1990). Decrease in medicinal plant availability affects ecological processes and has changed the patterns of use by consumers. A study conducted by Mander (1997) showed that 85% of the healers interviewed in the Bushbuckridge area (Mpumalanga) indicated that stocks of medicinal plants were decreasing and healers had to travel long distances to obtain plant materials and harvest them on commercial farms and private lands. Due to the decline in wild medicinal plant populations, some medicinal users harvest and/or buy their material from neighbouring countries e.g. Zimbabwe, Malawi, Swaziland, Mozambique and Botswana (Botha *et al*., 2004). Approximately 85% of plants traded in Mpumalanga in one study were imported from Mozambique (Botha, 2001). Medicinal plant substitutes are not commonly used, mostly due to the traditional beliefs that specific plants treat certain diseases (Botha, 2001).

A study conducted by Williams *et al.* (2013) indicated that 2.6% of the medicinal species in South Africa are at the risk of extinction if no management actions are taken. The harvesting of medicinal plants is not the only cause of diminishing wild populations; the transformation of land because of development has been observed to have a tremendous impact on medicinal plant availability

(Fairbanks *et al.*, 2000). Forests are destroyed to allow for agriculture, infrastructure development and expansion of urban areas, and some plants are extracted for pharmaceuticals (Fairbanks *et al.*, 2000). The susceptibility of species to these disturbances varies, with some plants being more affected than others (Dale *et al.*, 2005). Therefore, conservation has to be a holistic effort and decision-making cannot happen in isolation (Dale *et al.*, 2005). Furthermore, we need to understand the cultural importance of plants in order to attain a better understanding of human-plant interaction

1.2.3 Medicinal plant trade in South Africa

The trade in medicinal plants has increased due to various social reasons such as: increase in human population, increase in cost of living, unemployment, and an influx of people from rural to urban areas (Botha, 2004; Moeng, 2010; Coopoosamy and Naidoo, 2012; Brueton, 2013) There are many markets located in various parts of the country. The Faraday market located in central Johannesburg is the largest informal market, followed by Warwick market located in central Durban, and trade occurs on smaller scales in other provinces such as Mpumalanga, Eastern Cape, Free State and Limpopo (Botha *et al*., 2001; Williams, 2003; Mahwasane *et al*., 2013; Wojtasik, 2013). The majority of these markets operate on a daily basis and require a steady supply of plant material. As a result of urbanisation, the medicinal trade is not only confined to trained traditional healers, but has also attracted a large proportion of untrained commercial gatherers, who provide plant material to urban areas, further expanding the informal trade especially in cities and towns (Mander, 1997). Furthermore, traditional medicine is regarded as accessible, affordable, and greatly accepted than western medicine (Williams *et al.*, 2000; Williams, 2003).

Medicinal plant trade has two categories: informal and formal markets. Informal traders usually sell on pavements, stalls and roadsides (Mander and Le Breton, 2006). Most plant material is not processed (i.e. using machinery or science-based methods); the only processing is either cutting the bark into small bits and/or crushing the material to powder-form. In contrast, formal traders sell in herbal pharmacies, and products that have undergone some form of technological processing to produce cosmetics, medicine in forms of tablets etc. (Mander and Le Breton, 2006). Mander and Le Breton (2006) reported that informal trade had attracted over 400,000 traditional healers in the southern African region.

More than a decade ago, consumer surveys conducted in South Africa estimated that between 35,000 and 70,000 tonnes of plant material were traded in the country annually (Mander and Le Breton, 2006). Some traders bought their material in bulk from gatherers, although, some harvested the plants themselves (Mander and Le Breton, 2006). The plant parts used include whole plants, stems, seeds, tubers, fruit, leaves, bulbs, roots and bark (van Wyk *et al*., 1997; van Wyk and Gericke, 2003; Williams *et al*., 2000; Mahwasane *et al*., 2013). A study conducted by Botha *et al*. (2004) documented

176 medicinal plants traded in Mpumalanga. The medicinal plant trade in Gauteng was estimated to be worth ZAR 27 million per annum (Mander *et al*., 2007). The documented information shows that South African markets are not uniform, as surveys have shown that species composition differs between markets (Mander, 1997; Dold and Cocks, 2002; Williams, 2003; Botha *et al.*, 2004).

Ancestral belief plays a huge role in medicinal use and influences the demand and/or preference of medicinal plants by consumers (Oladele *et al*., 2011). A study conducted by Ndawonde (2007) showed that there was a demand for *Hypoxis hemerocallidea* by consumers at the Mona market in Nongoma (KZN) because of the belief that it can treat symptoms associated with HIV/AIDS. A study conducted by Mahwasane *et al.* (2013) found that Fabaceae (44%) followed by Verbenaceae (19%) were predominantly traded in markets of Lwamondo (Limpopo province) as they were in demand and 'preferred' by customers. The expansion of trading markets needs to be monitored to deduce effective conservation and regulation measures because, with the growing human population, one can expect consumer demand to increase and further pressure wild populations.

1.2.4 Cultivation of medicinal plants in South Africa

The overexploitation of medicinal plants is a cause for concern and requires immediate attention on how diminishing wild populations can be conserved (Amujoyegbe *et al*., 2012). Therefore, in response to the unsustainable harvesting of medicinal plants in South Africa, some conservation efforts have focused on establishing medicinal plant nurseries (Jager and van Staden, 2000). Moreover, cultivation is viewed as a way to encourage biodiversity conservation while alleviating poverty (Wiersum *et al*., 2006; Amujoyegbe *et al*., 2012). There has been evidence of traditional healers growing medicinal plants at their home gardens for use in their practices (Oladele *et al*., 2011; Amujoyegbe *et al*., 2012). Moreover, there are projects in South Africa and the rest of the continent that provide material and encourage traditional healers to cultivate (Mander and Le Breton, 2006; L. Swemmer, pers. comm., 2018)

A study conducted by Semenya and Potgieter (2014) among Bapedi traditional healers, showed that the majority of healers had home gardens for medicinal plants. The main reasons for their cultivation included: their dual use as medicine and as shade providers, food and as ornamentals, for emergency purposes, easy access to the resources, and most importantly their scarcity in the wild (Semenya and Potgieter, 2014). The study also showed that the decrease in wild medicinal plants had caused some traditional healers to opt for cultivated plants in their home gardens in order to sustain their practices (Semenya and Potgieter, 2014).

The expansion of medicinal plant nurseries has been viewed as a necessity for mitigating the impacts on medicinal plants in the wild (Botha, (2001; 2006); Ndawonde, 2007; Amujoyegbe *et al*., 2012;

Ndawonde, 2015). Crouch and Edwards (2004) documented that the first functioning medicinal nursery was established at the Silverglen Nature Reserve by the Durban Parks Department in 1983. Initiatives have been put forward to enhance the cultivation of medicinal plants. The Council for Scientific and Industrial Research's (CSIR) program produces tissue culture to provide propagation material that can be used to cultivate medicinal plants that are rapidly decreasing in the wild (Ndawonde, 2015). This programme is a collaboration between the Agricultural Research Institute and the CSIR in the sector of plant biotechnology (Ndawonde, 2015). The overall objective of such programmes is to provide propagation materials to healers and traders in the form of cuttings and stock plants, seedlings and seeds (Ndawonde, 2015).

Seed propagation of indigenous plants including *Merwilla plumbea*, *Eucomis autumnalis*, *Bulbine frutescens* and *Bowiea volubilis* was established in the Msunduze Valley Nursery, KZN (Diederichs, 2006). *Haworthia limifolia* was propagated from stem and leaf cuttings in Silverglen Nursery, Chatsworth in KZN (Nichols, 2005). These are examples of just a few initiatives that were undertaken to conserve threatened medicinal plant species using cultivation. Involving traders, gatherers and harvesters in such initiatives will help lessen the impact on wild population. However, medicinal plant traders have raised concerns about medicinal plant cultivation. One frequently stated concern is that cultivated plants take long to mature, meaning that it would take longer for them to be able to harvest the plant and benefit financially (Ndawonde, 2015), and this results in longer duration for traders to get financial returns on their products.

Botha (2001) concluded that to enhance the economic status of cultivated plants, conservation officials should focus on fast growing species such as *Acacia xanthophloea*, *Carpobrotus edulis*, *Rapanea melanophloeos*, *W. salutaris*, *S. aethiopicus*, all of which are in demand by consumers. Nevertheless, a study conducted by Meke *et al.* (2017) documented that 67% traders interviewed in southern and central Malawi mentioned propagation as a feasible conservation strategy for declining medicinal plants. Many practitioners regard a successful project as one that is financially feasible and does not wholly depend on external funding (Botha, (2001; 2006); Ndawonde, 2015). In these instances, traders/healers should be provided with the propagation material and encouraged to develop their own medicinal gardens (Botha, 2001). Providing traders and healers with propagation material would allow the programmes to continue even without the regular monitoring of the implementation agency and will require less infrastructure to be built, as people will be using resources from their homes.

There are also concerns about whether cultivated plants will be able to fulfil traditional and/or ritual requirements, and there is a belief that some cultivated plants are inferior to wild plants (Ndawonde, 2015). The belief is that medicinal plants lose their potency when handled by witches or 'polluted'

people (Ndawonde, 2015). For example, a person is considered 'polluted' when they are involved in witchcraft, after childbirth, if they have had an abortion or sexual intercourse, or if there is death in the family, and/or during menstruation (Ndawonde, 2015). Some studies have shown that there are biological and physiological differences between cultivated and wild plants (Pirbalouti *et al*., 2013), and these differences might be a reason why some would regard cultivated plants to be less 'powerful' than wild ones (Moyo *et al*., 2015). Pirbalouti *et al*. (2013) conducted a study on the differences in essential oils in cultivated and wild of *Thymus vulgaris* and *Thymus daenensis*, and found that there was no significant effect on growth characteristics of the two species, but the quality and quantity of their essential oils were different. The results of a study by Pirbalouti *et al*. (2013) indicated that environmental conditions have an impact on the biological properties of a plant, thus in turn affecting its healing properties.

Nevertheless, a study conducted in the Eastern Cape documented that four of five traditional healers interviewed were already cultivating some plants in their home gardens and said that most medicinal plants could be cultivated there (Keirungi and Fabricius, 2005) – provided the seeds were easily available, do not require lots of water, and have low impacts on vegetables and other garden plants (Keirungi and Fabricius, 2005). Furthermore, Botha (2001) documented that 40 traditional healers from Ukukhanya Kwemvelo (Mpumalanga province) had already started their own communal nursery. They started cultivating their own plants because they wanted to collect plant material from the vicinity of their homes and prevent the material from being handled in a way that compromises its healing ability (Botha, 2001). The necessity for the healers to know the source of their plant material shows that cultural constraints are very important and needs to be taken into account in cultivation programmes (Amujoyegbe *et al*., 2012).

Some traditional healers in the Amatola area in Eastern Cape Province strongly recommend that cultivated species should be harvested following the performance of ritual ceremonies, and those that have been indicated by the ancestors either by a vision or dream should be exclusively harvested from wild populations to ensure that they remain effective (Wiersum *et al*., 2006). Traditional healers realise that it is not always feasible to have information on the 'purity' of people that visit nurseries; therefore, certain medicinal plants are used to ensure that the nursery is protected against these possible influences (Prins, 1996). The best-known medicinal plant for protecting medicinal plants from impurities is *isiqunga* (*Cymbopogon* spp.), a wild grass that should be sprinkled around a nursery and be planted in front of its entrance (Prins, 1996). It is therefore essential that cultivation take into consideration the cultural values of medicinal plants to ensure that there is a general optimistic approach towards conservation (Prins, 1996; Amujoyegbe *et al*., 2012). Despite the challenges associated with cultivated medicinal plants, plant traders need to be encouraged to have medicinal plants in their home yards (Amujoyegbe *et al*., 2012; Semenya *et al*., 2013).

1.3 DISSERTATION STRUCTURE AND OVERVIEW

There are six chapters in this Dissertation. A synthesis of the motivation for the study, literature review and the aim and objectives for the study are presented in *Chapter 1*, and the methodology is outlined in *Chapter 2*. *Chapter 3* presents a detailed summary of the species/ethnospecies mentioned by respondents during the study, including plants identified as: decreasing; 'want and/or are allowed' to be cultivated; requiring rituals; 'not allowed to be cultivated'. Furthermore, the Red List categories for plants that were 'decreasing', 'allowed' to be cultivated, 'not allowed' to cultivated, and/or required rituals before harvesting are documented. *Chapter 4* focuses on traditional healers' perceptions, attitudes and knowledge about the use of medicinal plants in their practices and further outlines the differences/similarities brought about by the different training practices. The use and effectiveness of cultivated medicinal plants in healing and the acceptability/disapproval of these plants by ancestors are also reported on in *Chapter 4*. *Chapter 5* documents the comparisons of perceptions, attitudes and knowledge with regard to cultivated medicinal plants between healers and traders. Furthermore, the practicalities of using cultivated medicinal plants by both groups are presented in this chapter. *Chapter 6* presents general discussion, conclusions and recommendations.

1.4 REFERENCES

Ah Goo, D.F.S. 2012. *The Contribution of the Trade in Medicinal Plants to Urban Livelihoods: a Case Study of the Informal Markets in the Nelson Mandela Bay Municipality, Eastern Cape*. MSc. Nelson Mandela Metropolitan University, Port Elizabeth.

Amujoyegbe, B.J., Agbedahunsi, J.M. and Amujoyegbe, O.O. 2012. Cultivation of medicinal plants in developing nations: means of conservation and poverty alleviation. *International Journal of Medicinal and Aromatic Plants* 2: 345–353.

Botha, J. 2001. *Perceptions of Species Availability and Values of Medicinal Plants Traded in Areas Adjacent to the Kruger National Park*. MSc. University of the Witwatersrand, Johannesburg.

Botha, J. 2006. *The Viability of Conservation and Social Forestry Outreach Nurseries in South Africa*. PhD. University of the Witwatersrand, Johannesburg.

Botha, J., Witkowski, E.T.F. and Shackleton, C.M. 2004. Market profiles and medicinal plants in the Lowveld, South Africa. *Environmental Conservation* 31: 38–46.

Botha, J., Witkowski, E.T.F. and Shackleton, C.M. 2001. An inventory of the medicinal plants traded on the western boundary of the Kruger National Park, South Africa. *Koedoe* 44: 7–46.

Brueton, V.J. 2013. *Trade in Commonly Used Medicinal Bulbs: Value and Ecological Implications.* MSc. University of the Witwatersrand, Johannesburg.

Cheikhyoussef, A., Shapi, M., Matengu, K. and Ashekele, H.M.U. 2011. Ethnobotanical study of indigenous knowledge on medicinal plant use by traditional healers in Oshikoto region, Namibia. *Journal of Ethnobiology and Ethnomedicine* 7: 10–17.

Chipanje, A.L. 2016. *A Study of Indigenous Knowledge on the Treatment of Stroke in Chipenge District 1980-2015*. BA Honours. Midlands states University.

Coopoosamy, R.M. 2011. Traditional information and antibacterial activity of four Bulbine species. *African Journal of Biotechnology* 10: 220–224.

Coopoosamy, R.M. and Naidoo, K.K. 2012. An ethnobotanical study of medicinal plants used by traditional healers in Durban, South Africa. *African Journal of Ethnopharmacology* 6: 818–823.

Cunningham, A.B. 1988. *An Investigation of the Herbal Medicine Trade in Natal/KwaZulu. Investigational Report No. 29*. Institute of Natural Resources, Pietermaritzburg.

Cunningham, A.B. 1990. *African Medicinal Plants: Setting Priorities at the Interface of Conservation and Primary Health Care*. Plants Conservation Section, WWF.

Dale, V., Archer, S., Chang, M. and Ojima, D. 2005. Ecological impacts and mitigation strategies for rural land management. *Ecological Applications* 15: 1879–1892.

Diederichs, N., McKean, S. and Wynberg, R.P. 2006. Conservation and trade regulations for medicinal plants, in Diederichs, N (Eds.), *Commercialising Medicinal Plants: a Southern African Guide*. Sun Press, Stellenbosch, pp. 9–19.

Dold, A.P. and Cocks. M.L. 2002. The trade in medicinal plants in the Eastern Cape Province, South Africa. *South African Journal of Science* 98: 589–597.

Fairbanks, D.H.K., Thompson, M.W., Vink, D.E., Newby, T.S., Van den Berg, H.M. and Everard, D.A. 2000. The South African Land-Cover Database: a synopsis of the landscape. *South African Journal of Science* 96: 69–82.

Geldenhuys, C.J. 2004. Bark Harvesting for Traditional Medicine: From Illegal Resource Degradation to Participatory Management. *Scandinavian Journal of Forest Research* 19: 103–115.

Hammond-Tooke, W.D. 1989. *Rituals and Medicines: Indigenous Healing in South Africa*. Ad Donker, Johannesburg.

Holland, H. 2001. *African Magic: Traditional Ideas that Heal a Continent*. Penguin Books, South Africa.

Jäger, A.K. and van Staden, J. 2000. The need for cultivation of medicinal plants in southern Africa. *Outlook on Agriculture* 29: 283–284.

Junod, H. A. 1962. *The Life of a South African Tribe: II Mental Life*. University Books, New York.

Keirungi, J. and Fabricius, C. 2005. Selecting medicinal plants for cultivation at Nqabara on the Eastern Cape Wild Coast, South Africa. *South African Journal of Science* 101: 497–501.

Kelatwang, S. and Abbot, P.G. 2002. *Medicinal Plant Gardens: Promoting Plant Conservation or Rural Economic Development.* Report for Department of Water Affairs and Forestry, Pretoria

Mahwasane, S.T., Middleton, L. and Boaduo, N. 2013. An ethnobotanical survey of indigenous knowledge on medicinal plants used by the traditional healers of the Lwamondo area, Limpopo Province, South Africa. *South African Journal of Botany* 88: 69–75.

Mander, M. 1997. *Medicinal Plant Marketing and Strategies for Sustaining the Plant Supply in the Bushbuckridge Area and Mpumalanga, South Africa*. Department of Water Affairs and Forestry, Pretoria.

Mander, M. and Le Breton, G. 2006. Overview of the medicinal plants industry in southern Africa. In: Diederichs, N (Ed), *Commercialising Medicinal Plants: A Southern African Guide*. Sun Press, Stellenbosch, pp: 1–9.

Mander, M., Ntuli, L., Diedrichs, N. and Mavundla. K. 2007. *Economics of the Traditional Medicine Trade in South Africa.* Future Works Report for Ezemvelo KZN Wildlife, South Africa.

Meveni, S. D. 2014. *Spirit Possession and Social Panic: Amakhosi Possession and Behaviour among Learners in Selected Schools in Mdantsane Township*. MSc. University of Fort Hare, Eastern Cape.

Meke, G.S., Mumba, R.F.E., Bwanali, R.J. and Williams, V.L. 2017. The trade and marketing of traditional medicines in southern and central Malawi. *International Journal of Sustainable Development & World Ecology* 24: 73–87.

Mlisa, L S. 2009. *Ukuthwasa, Initiation of Amagqirha: Identity Construction and Training of Xhosa Women as Traditional Healers*. PhD. University of Free State, Bloemfontein.

Moeng, T.E. 2010. *An Investigation into the Trade of Medicinal Plants by Muthi Shops and Street Vendors in the Limpopo Province, South Africa*. MSc. University of Limpopo, Polokwane.

Moyo, M., Aremu, A.O. and van Staden, J. 2015. Medicinal plants: an invaluable, dwindling resource in sub-Saharan Africa. *Journal of Ethnopharmacology* 174: 595–606.

Muzondi, N. 2014. *The Contribution of Traditional Belief Systems in Biodiversity Conservation among the Ndau People in Nyagadza Community in Chipenge*. MSc. Midlands States University.

Nichols, G. 2005. *Growing Rare Plants: a Practical Handbook on Propagating the Threatened Plants of Southern Africa*. Southern African Diversity Network Report No. 36.

Ndawonde, B.G. 2007. *Medicinal Plant Sales: a Case Study in Northern Zululand*. MSc. University of Zululand, Richards Bay.

Ndawonde, B.G. 2015. *Education for Sustainable Development of Medicinal Plant Sellers-Challenges in Relation to Marketing, Sales, Storage and Conservation*. PhD. University of Zululand, Richards Bay.

Oladele, G.O., Alade, A.T. and Omobuwajo, O.R. 2011. Medicinal plants conservation and cultivation by traditional medicine practitioners (TMPs) in Aiyedaade Local Government Area of Osun State, Nigeria. *Agriculture and Biology Journal of North America* 2: 476–487.

Petersen, L.M., Andrew J.E., Charman, E.J., Moll, J., Collins, P. and Hockings, M.T. 2014. 'Doctors and Wild Medicine': The Scale of Trade in Cape Town's Informal Economy of Wild-Harvested Medicine and Traditional Healing. *Society and Natural Resources* 27: 315–336.

Petrus, T.S. and Bogopa. D.L. 2007. Natural and supernatural: intersections between the spiritual and natural worlds in African witchcraft and healing in reference to Southern Africa. *Indo-Pacific Journal of Phenomenology* 7: 10–19.

Philander, A.L. 2011. An ethnobotany of Western Cape Rastafarian bush medicine. *Journal of Ethnopharmacology* 138: 578–594.

Pirbalouti, A.G., Hashemi, M. and Ghahfarokhi, F.T. 2013. Essential oil and chemical compositions of wild and cultivated *Thymus daenensis Celak* and *Thymus vulgaris L*. *Industrial Crops and Products* 48: 43–48.

Prins, F.E. 1996. Prohibitions and pollution at a medicinal plant nursery: customary implications associated with ethnobotanical reserves in conservation areas of KwaZulu-Natal. *South African Journal of Humanities* 8: 81–93.

SANBI, 2016. Plant conservation strategy. http://biodiversityadvisor.sanbi.org/planning-and-assessment/plant-conservation-strategy/

Semenya, S.S. and Potgieter, M.J. 2014. Medicinal plants cultivated in Bapedi traditional healers home gardens, Limpopo Province, South Africa. *African Journal of Traditional, Complementary and Alternative Medicines* 11: 126–132.

Semenya, S.S., Potgieter, M.J. and Erasmus, L.J.C. 2013. Indigenous plant species used by Bapedi healers to treat sexually transmitted infections: their distribution, harvesting, conservation and threats. *South African Journal of Botany* 87: 66–75.

Sobiecki, J.F. 2012. Psychoactive *ubulawu* spiritual medicines and healing dynamics in the initiation process of Southern Bantu diviners. *Journal of Psychoactive Drugs* 44: 216–223.

Sobiecki, J.F. 2014. The intersection of culture and science in South African traditional medicine. *Indo-Pacific Journal of Phenomenology* 14: 1–11.

Truter, I. 2007. African traditional healers: cultural and religious beliefs intertwined in a holistic way. *Journal of Complementary Alternative Medicine* 74: 56–60.

van Andel, T.R., Croft, S., van Loon, E.E., Quiroz, D., Towns, A.M. and Raes, N. 2015. Prioritizing West African medicinal plants for conservation and sustainable extraction studies based on market surveys and species distribution models. *Biological Conservation* 181: 173–181.

van Wyk, B.E., and Gericke, N. 2003. *People's Plants, a Guide to Useful Plants of Southern Africa*. Briza, Pretoria.

van Wyk, B.E., Van Oudtshoorn, B. and Gericke, N. 1997. *Medicinal Plants of South Africa*. Briza Publications, Pretoria.

Wiersum, K. F., Dold, A. P., Husselman, M., and Cocks, M. L. 2006. Cultivation of medicinal plants as a tool for biodiversity conservation and poverty alleviation in the Amatola region, South Africa., In Bogers, R. (Eds), *Medicinal and Aromatic Plants*. Springer, Dordrecht.

Williams, V.L. 2003. *Hawkers of Health: an investigation of the Faraday Street Traditional Medicinal Market in Johannesburg, Gauteng*. Gauteng Directorate for Nature Conservation, Plant Ecology & Conservation Series No. 15.

Williams, V.L. 2007. *The Design of a Risk Assessment Model to Determine the Impact of the Herbal Medicine Trade on the Witwatersrand on Resources of Indigenous Plant Species*. PhD. University of the Witwatersrand, Johannesburg.

Williams, V.L., Balkwill, K. and Witkowski, E.T.F. 2000. Unravelling the market for commercial medicinal plants and plant parts on the Witwatersrand, South Africa. *Economic Botany* 54: 310–327.

Williams, V.L., Victor, J.E. and Crouch, N.R. 2013. Red Listed Medicinal plants of South Africa: status, trends, and assessment challenges. *South African Journal of Botany* 86: 2–35.

Wojtasik, E.M. 2013. *Richness and Diversity of Alien Ethnomedicinal Plant Taxa Used and Sold for Traditional Medicine in South Africa*. MSc. University of the Witwatersrand, Johannesburg.

World Health Organization (WHO). 2008. *Traditional medicine*. Fact sheet No.134. December 2008. http://www.who.int/mediacentre/factsheets/fs123/en/.

CHAPTER 2
Methodology

2.1 OVERVIEW OF THE STUDY APPROACH

The research was conducted in medicinal markets and with healers because they are the people that mostly use and/or derive a livelihood from traditional medicinal plants, and would thus be the potential primary stakeholders and beneficiaries from cultivated medicinal plants. Healers and traders have knowledge on cultural norms and the acceptability of cultivation associated with using traditional medicines. Furthermore, healers and traders might provide insights into other methods that they perceive as being suitable to mitigating the decline in wild populations. Market traders are not always trained to work with traditional medicines, and their association with the trade appears mostly to be associated with income generation (Williams, 2007; Oladele *et al*., 2011). Therefore, traders' perceptions on the uses for cultivated medicinal plants might differ from healers'. In order for cultivation to be done on a large scale there needs to be an understanding of the cultural norms associated with medicines in markets (Botha, 2001; Kelatwang and Abbot, 2002; Giblette, 2006).

Healers in selected rural and urban areas were interviewed for the study. Healers from rural areas generally have easier access to medicinal plants compared to healers in urban areas; nevertheless, some rural healers make use of large urban (?) informal markets to acquire material not found in their area and/or which has declined in the wild. Most urban healers, however, are likely to use the informal markets to acquire plants because they are not close to the resource base (Oladele *et al*., 2011). Some healers may have already established their own nurseries or home gardens. Hence, this study gave healers the opportunity to list all the species that they would want cultivated in the future.

Sampling of the respondents was stratified by profession (healer vs. trader) and by locality, and proportional sampling was taken into account during the surveys. A semi-structured questionnaire was used (Appendix 1), which was designed to assess aspects such as: (i) socio-cultural demographics; (ii) sources for plant materials; (iii) perceptions and attitudes towards the use of cultivated medicinal plants; (iv) healers and traders actual involvement in any cultivation activities; and (v) the healers and traders knowledge of existing medicinal nurseries. Some of the questions were derived from Botha (2001; 2006). The questionnaire was translated into isiZulu, which was the common language within the respective study areas (see Table 2.1). The data collected were subject to qualitative and quantitative analyses. Samples of the plants mentioned during the interviews were bought from some of the traders (if they consented and/or if they had material). Where possible, the specimens were identified from samples shown to experts at the University of the Witwatersrand and/or by matching the vernacular names to botanical names from studies that have been published.

2.2 PRE-SURVEY INTERVIEWS

The main purpose of the pre-survey interviews was to test if the questionnaire was adequate, and therefore refine it accordingly to be able to get answers that could be analysed and interpreted in context of the aims of the study. Consenting traders and healers from the Faraday market (Johannesburg) and Nhlungwane Village (KwaZulu-Natal) respectively were randomly selected to participate in the pre-survey interviews in July 2016. Approximately 10 respondents from Nhlungwane village were interviewed for the preliminary study. The visit to the Faraday market was also used to provide an opportunity to develop a relationship with the traders and to become familiar with the plants that are in demand. Following the preliminary surveys, the main survey was carried out from August 2016 to March 2017 with traders in urban and rural markets, and healers in urban and rural residential areas.

2.3 PROTOCOL AND ETHICS

Ethics clearance for this research was obtained from the University of the Witwatersrand (H/16/06/18). Pre-survey meetings with the chief/headman of particular survey areas were scheduled to request permission for the research to be conducted in their area of jurisdiction. Moreover, I cooperated with local traditional healers associations to locate healers. I also enquired about the telephone numbers of the chairpersons of the respective markets (Faraday, Warwick, Ezimbuzini and Mona). I contacted the respective market chairpersons to ask for permission to conduct the surveys in their markets. At each meeting, I supplied a participant information sheet explaining the research to potential respondents and outlining what would be expected from them if they agreed to participate. It was made clear to each respondent that their participation was voluntary and anonymous. Respondents were also told that they did not have to answer questions they were not comfortable with, and that they could stop the interview at any time. I will provide feedback to the participants about the results of this research once the Dissertation has been finalised.

2.4 STUDY AREA

The study took place in Gauteng and KwaZulu-Natal provinces over a period of seven months. The sample sites in KZN were three markets (Warwick, Ezimbuzini and Mona), a township (Umlazi) and a village (Nhlungwane) (Figure 2.1). The sample sites in Gauteng were two markets (Marabastad and Faraday) and a township (Soweto) (Figure 2.1). The traders were in five localities and the healers in three. The study was done in KZN and Gauteng because research has shown that these provinces are the hubs of medicinal plant use and trade. Furthermore, with the increase in urbanisation, these two provinces accommodate people from various areas and urbanisation has been documented to be one of the factors that have intensified the commercialisation of *muthi* trade.

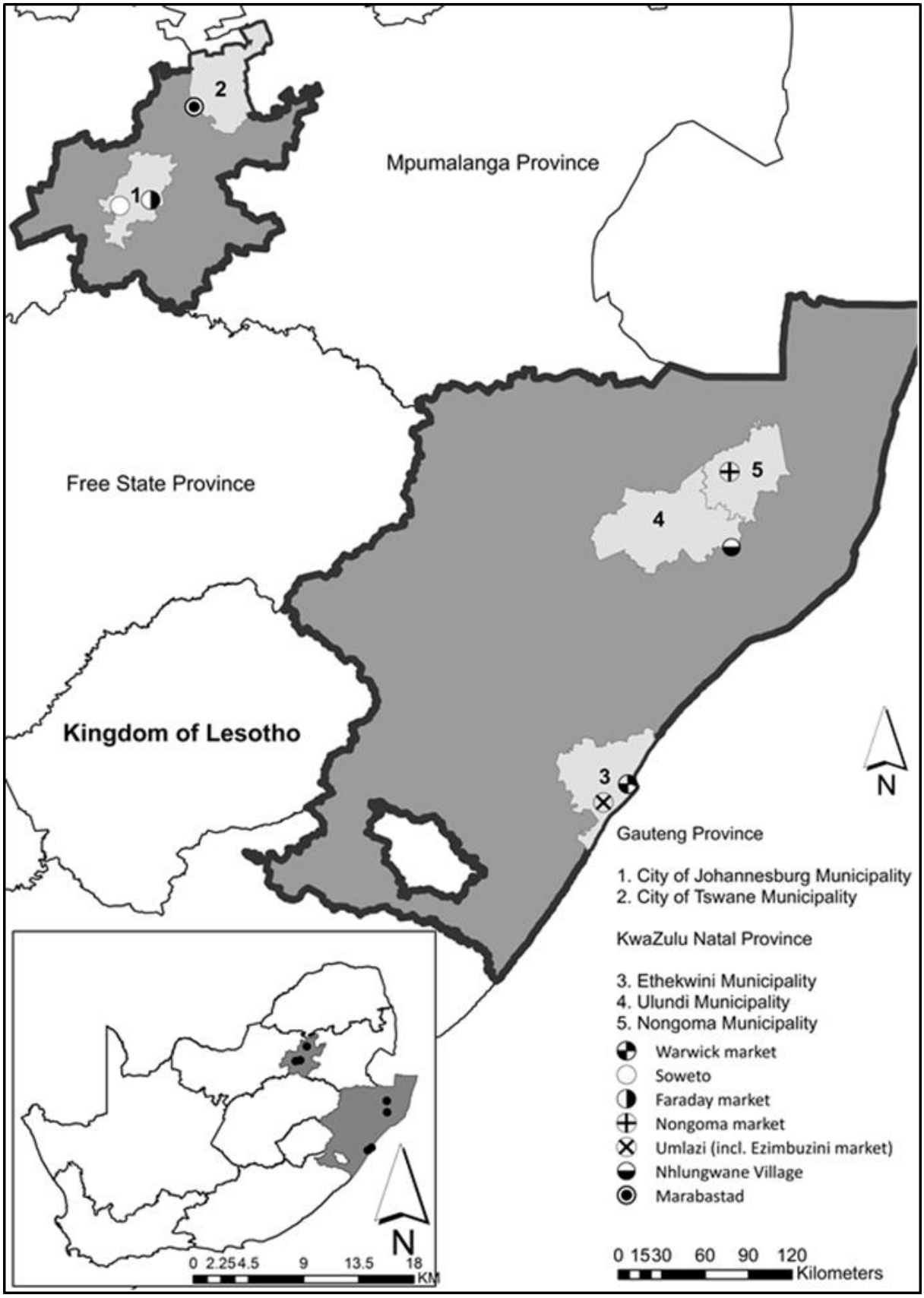


Figure 2.1. Map showing location of the study sites in the provinces of Gauteng and KwaZulu-Natal.

2.4.1 Residential areas

Healers were selected from the following residential areas: Umlazi (KZN), Soweto (Gauteng) and Nhlungwane (KZN) (Table 2.1; Figure 2.1). People that migrate from rural areas typically dominate urban areas, and most healers that live in these areas rarely go back home to harvest plants. Hence, healers are obliged to make use of medicinal markets to obtain medicine (NS Mbongwa, pers. obs.), and they influence the extent to which medicinal plant use has been commercialised. Healers from rural areas are in closer proximity to the natural environment; previously, they would have harvested their own materials, and would seldom have made use of markets (Giblette, 2006).

Table 2.1. Demographic information* at the site where healers were surveyed.

Province		**KwaZulu-Natal**	**Gauteng**	**KwaZulu-Natal**
Local municipality		**eThekwini**	**City of Johannesburg**	**Ulundi**
Sampling location		Umlazi	Soweto	Nhlungwane (Dindi)
Population		404,811	1, 271,628	3,485
Population working age (15–64)		71%	71%	50%
Unemployment rate		38%	25%	49%
Education level	**No schooling**	3.4%	3.1%	22%
	Matric	40%	38%	30%
	Tertiary	9.5%	9.3%	3%
Households	**Number**	104,914	355,331	565
	Female headed	44%	40%	59%
	No income	22%	19%	8%
Common language		IsiZulu	IsiZulu	IsiZulu

*Source: Statistics South Africa (2011)

2.4.2 Medicinal markets

The Faraday market (Johannesburg CBD), Warwick (Durban CBD) and Ezimbuzini (Umlazi Township in Durban) (Table 2.2; Figure 2.1) operate on a daily basis as dedicated traditional medicine markets and there is a designated place where traders sell products. Mona market is located in the Nongoma local municipality in KwaZulu-Natal (Table 2.2; Figure 2.1), and is a regional market that does not run on a daily basis; the market only opens for a week near end of the month and/or on pension days (Botha, 2001; Ndawonde, 2015). Even though Mona market does not operate daily, it is widely used by people in rural areas that are in close proximity to it. Traders from Marabastad (Pretoria CBD) (Table 2.2; Figure 2.1) do not have dedicated markets to use, and hence, they sell their material on pavements, roadsides and *muthi* shops.

The Warwick and Faraday markets had approximately 370 and 220 traders respectively c. October 2015 (Williams and Whiting, 2016). While the Warwick and Faraday markets have been extensively studied by various researchers, no study has focused on the traders perceptions with regards to cultural beliefs on using cultivated plants (although Williams included a question on the acceptability of cultivated plants in the 2001 Faraday survey (Williams, 2003). Traders in the Ezimbuzini, Mona

and Marabastad markets have not been studied in detail by researchers concerning their knowledge of existing nurseries and sustainable harvesting of medicinal plants.

Table 2.2. Demographic information of the respondents from the current study (August 2016–March 2017), indicating socio-demographic differences between the markets.

		Faraday Market	Warwick Market	Mona Market	Ezimbuzini Market	Marabastad Market
Gender	**Female**	43%	58%	64%	58%	42%
	Male	57%	42%	36%	42%	58%
Age profile (years)	**20 – 30**	43%	39%	27%	9%	17%
	31 – 40	37%	21%	18%	11%	33%
	41 – 50	3.0%	11%	18%	17%	33%
	51 – 60	3.0%	16%	23%	33%	17%
	>61	14%	13%	14%	30%	0.0%
Level of education	**No schooling**	29%	26%	36%	42%	42%
	Primary school	14%	16%	15%	17%	17%
	High school	57%	58%	12%	41%	41%
	Tertiary	0.0%	0.0%	0.0%	0.0%	0.0%
Healer status	**Healers**	25%	26%	32%	25%	42%
	Non-healers	75%	74%	68%	75%	58%

2.5 SURVEYS

2.5.1 Healer surveys

The healers were sampled using the 'snowball' method, whereby respondents were asked to tell the researcher about other healers that they knew in their area (Table 2.3). The selection was also based on referrals, either from traditional healers associations that exist in the area or from healers known to the researcher. Although the use of referrals might result in a biased sample (e.g. only members who are a registered with a particular association), an attempt was made to interview a wide range of respondents from more than one association.

Table 2.3. Trader and healer surveys conducted between August 2016 and March 2017.

Study site	Healer or Trader	Method used	Number of respondents (n)
Residential area			(n=42)
Umlazi	Healer	Snowball and semi-structured questionnaire	10
Nhlungwane	Healer	Snowball and semi-structured questionnaire	11
Soweto	Healer	Snowball and semi-structured questionnaire	21
Markets			(n=72)
Marabastad market	Trader	Semi-structured questionnaire	12
Faraday market	Trader	Semi-structured questionnaire	7
Warwick market	Trader	Semi-structured questionnaire	19
Ezimbuzini market	Trader	Semi-structured questionnaire	12
Mona market	Trader	Semi-structured questionnaire	22
Total			**114**

The residential areas were chosen because of the respondents' reported use and dependence on natural resources such as traditional medicine. In order to obtain a qualitative understanding of the effect of cultivated plants when treating patients, healers were asked if they had used cultivated plants before in their practices and whether cultivated plants were as effective as wild harvested plants. Healers were also asked if they had been taught about using cultivated plants while they were in training, and if cultivated plants are allowed or prohibited during training. Since healers have been reported to cultivate their own plants, I also asked each healer if they cultivated their own medicinal plants and the reasons for their responses; species that the healers would want to cultivate were thus identified. Some medicinal plants are sacred and should never be cultivated, hence, participants were also asked to name these plants.

2.5.2 Market surveys

The Faraday, Marabastad, Warwick, Mona and Ezimbuzini markets were surveyed (Figure 2.2). A random sample method taking into account willingness to participate was used to select the traders (Table 2.3). The focus was on traders that sold plant material (including traders that sold plants and animal parts). Samples of the plants that were identified as priority species in terms of cultivation were purchased. In order to gain a qualitative understanding of the acceptability of cultivated plants to consumers, the research participants were asked if they sold cultivated plants to customers. In order to obtain an understanding of the respondents' knowledge of existing nurseries, traders were asked if they had bought cultivated medicinal plants to sell to their customers. If they had not sold cultivated plants, the respondents were asked to list the reasons why. Respondents were asked of any rituals associated with harvesting and if these are still considered when harvesting even for commercial purposes. Furthermore, the traders were asked if there are cultural limitations with using cultivated plants, and they were asked to list plants that they would want and/or are allowed to be cultivated.



Figure 2.2. Illustrations of how plant material is packaged and sold in the various markets: a) Faraday market (Johannesburg), b) Ezimbuzini market (Durban), c) Mona market (Nongoma) and d) Marabastad (Pretoria).

2.6 DATA PROCESSING AND ANALYSIS

The data were captured on Excel spreadsheets (one for healers and the other for traders), and coded into categories depending on the nature of the responses from respondents. Excel was further used to 'clean' the data and to construct graphs and tables. Thereafter, the data was merged into one data table for analysis in *Rcommander* (a package in Rstudio) for all the data documented in this study. Geographic Information System (GIS) was used to generate maps to gain an understanding of the links and relationships within the medicinal plant trade and to show places that are cited as harvest areas. All the plants cited by respondents were grouped into one Excel spreadsheet and separated into plants mentioned as declining ('decreasing'), 'want/are' to cultivate, requiring rituals, and those that are not allowed to be cultivated.

The following literature was used to identify the vernacular 'ethnospecies' recorded during the survey: Cunningham, 1988; Pooley, 1993; Hutchings *et al*., 1996; Mander, 1997; Pooley, 1998; Botha, 2001; Botha *et al*., 2001; Williams *et al*., 2001; von Ahlefeldt *et al*., 2003; Williams, 2003; Botha, 2006; Williams, 2007; Moeng, 2010; Brueton, 2013; Meke *et al*., 2017. Medicinal plants are traded as material with vernacular names but these names do not always correspond with the scientific plant names. Hence, local species entitles can be defined as ethnospecies and can over-differentiate, under-differentiate or match as compared to scientific species (Otieno *et al*., 2015). Generally, indigenous classifications of medicinal plants have an excess of monotypic taxa, but vernacular names

reported in the market could be generics with unreported polytypic diversity (Otieno *et al*., 2015). Therefore, the plant generics could constitute of a number of species that either are within or related in the same genus (Otieno *et al*., 2015). Hence, documenting ethnospecies is essential because some plants cannot always be identified to their scientific names without having identifiable plant specimens. Hence, some of the ethnospecies identified to genus or species level are 'potentially' used or cited species.

2.7 REFERENCES

Botha, J. 2001. *Perceptions of Species Availability and Values of Medicinal Plants Traded in Areas Adjacent to the Kruger National Park*. MSc. University of the Witwatersrand, Johannesburg.

Botha, J. 2006. *The Viability of Conservation and Social Forestry Outreach Nurseries in South Africa*. PhD. University of the Witwatersrand, Johannesburg.

Botha, J., Witkowski, E.T.F. and Shackleton, C.M. 2001. An inventory of the medicinal plants traded on the western boundary of the Kruger National Park, South Africa. *Koedoe* 44: 7–46.

Brueton, V.J. 2013. *Trade in Commonly Used Medicinal Bulbs: Value and Ecological Implications.* MSc, University of the Witwatersrand, Johannesburg.

Cunningham, A.B. 1988. *An Investigation of the Herbal Medicine Trade in Natal/KwaZulu. Investigational Report No. 29*. Institute of Natural Resources, Pietermaritzburg.

Giblette, J. 2006. The Role of Cultivation in Conserving Medicinal Plants. In: Call, E (Ed), *Mending the Web of Life: Chinese Medicine and Species Conservation.* International Fund for Animal Welfare, Massachusetts.

Hutchings, A., Scott, A.H., Lewis, G. and Cunningham, A.B. 1996. *Zulu Medicinal Plants, an Inventory*. University of Natal Press, Pietermaritzburg.

Kelatwang, S. and Abbot, P.G. 2002. *Medicinal Plant Gardens: Promoting Plant Conservation or Rural Economic Development.* Report for Department of Water Affairs and Forestry, Pretoria.

Mander, M. 1997. *Medicinal Plant Marketing and Strategies for Sustaining the Plant Supply in the Bushbuckridge Area and Mpumalanga, South Africa*. Department of Water Affairs and Forestry, Pretoria.

Meke, G.S., Mumba, R.F.E., Bwanali, R.J. and Williams, V.L. 2017. The trade and marketing of traditional medicines in southern and central Malawi. *International Journal of Sustainable Development and World Ecology* 24: 73–87.

Moeng, T.E. 2010. *An Investigation into the Trade of Medicinal Plants by Muthi Shops and Street Vendors in the Limpopo Province, South Africa*. MSc. University of Limpopo, Polokwane.

Ndawonde, B.G. 2015. *Education for Sustainable Development of Medicinal Plant Sellers-Challenges in Relation to Marketing, Sales, Storage and Conservation*. PhD. University of Zululand, Richards Bay.

Oladele, G.O., Alade, A.T. and Omobuwajo O.R. 2011. Medicinal plants conservation and cultivation by traditional medicine practitioners (TMPs) in Aiyedaade Local Government Area of Osun State, Nigeria. *Agriculture and Biology Journal of North America* 2: 476–487.

Otieno, J., Abihudi, S., Veldman, S., Nahashon, M., van Andel, T. and de Boer, H.J. 2015. Vernacular dominance in folk taxonomy: a case study of ethnospecies in medicinal plant trade in Tanzania. *Journal of Ethnobiology and Ethnomedicine* 11: 1–7

Pooley. E. 1993. *The Complete Field Guide to Trees of Natal, Zululand and Transkei*. Natal Flora Publications Trust, Durban.

Pooley. E. 1998. *A Field Guide to Wild Flowers: KwaZulu–Natal and the Eastern Region*. Natal Flora Publications Trust, Durban.

von Ahlefeldt, D., Crouch, N.R., Nichols, G., Symmonds, R., McKean, S., Sibiya, H. and Cele, M.P. 2003. *Medicinal Plants Traded on South Africa's Eastern Seaboard*. Ethekwini Parks Department, Durban.

Williams, V.L. 2003. *Hawkers of Health: an Investigation of the Faraday Street Traditional Medicinal Market in Johannesburg, Gauteng*. Gauteng Directorate for Nature Conservation, Plant Ecology & Conservation Series No. 15.

Williams, V.L. 2007. *The Design of a Risk Assessment Model to Determine the Impact of the Herbal Medicine Trade on the Witwatersrand on Resources of Indigenous Plant Species*. PhD. University of the Witwatersrand, Johannesburg.

Williams, V.L. and Whiting, M.J. 2016. A picture of health? Animal use and the Faraday traditional medicine market, South Africa. *Journal of Ethnopharmacology* 179: 265–273.

Williams, V.L., Balkwill, K. and Witkowski, E.T.F. 2001. A lexicon of plants traded in the Witwatersrand umuthi shops, South Africa. *Bothalia* 31: 71–98.

CHAPTER 3

Cultivated Medicinal Plants: Availability and Cultural Norms

ABSTRACT

There is frequently a lack of awareness by researchers about cultural norms associated with medicinal plants, more especially plants that are culturally acceptable for cultivation. The aim of the chapter was to document the medicinal plants that are culturally accepted for cultivation and require rituals before being harvested. In response to questions on cultivation, cultural norms and 'decreasing' availability, respondents cited 215 ethnospecies. There was no correlation between plants species mentioned as 'decreasing' in availability and those that respondents 'want/are allowed to cultivate'. *Impunyu* (*Talinum caffrum)* was not mentioned as 'decreasing' in availability, but had a high desirability for cultivation; *isibhaha* (*Warburgia salutaris),* however, had a high mention of 'decreasing' in availability and was also a priority for cultivation, whereas *ingwavuma* (*Elaeodendron transvaalense)* was a species that had low mentions for cultivation but high for 'decreasing' availability. Ninety-eight plants were cited as 'allowed to be cultivated', 68 were 'not allowed to be cultivated', and 23 were cited as both 'allowed' and 'not allowed' to be cultivated by different respondents. There was no correlation between the plant species chosen by healers and traders as 'want/are allowed to be cultivated'. Certain plants such as *umdlebe (Eucalyptus* spp.*; Eucalyptus cupularis), amakhosikancamane*[1], *umlahlankosi (Strychnos decussata; Hilliardiella aristata*) and *umganu* (*Sclerocarya birrea)* require rituals before harvesting. Most healers and traders buy plants and there was no significant difference in how they acquired their materials. Most ethnospecies recorded were in the Least Concern (S_e=114) Red List status conservation category. The most frequently cited area for harvesting medicinal plants was Umhlabuyalingana (Maputaland in northern KZN), followed by Nongoma. KwaZulu-Natal was cited as the province plants are mostly harvested from, followed by the Eastern Cape. Faraday was market most frequently cited as a source for plants, followed by Mona, Warwick and Ezimbuzini. Local traditions and customs play a huge role in determining what is acceptable for cultivation. Furthermore, most of the healers and some traders' worldviews are centred on the belief of the workings of ancestors; therefore, respecting spiritual norms is essential to them.

Keywords: ancestors; cultivation; customs; local traditions; spiritual norms; rituals.

[1] Unidentified ethnospecies

3.1 INTRODUCTION

Many Africans use medicinal plants, and with the increase in western health care delivery, one might expect this use to decrease. However, medicinal plant use has not declined among African people because of the deeply rooted cultural associations and belief in the existence of ancestors. The majority of medicinal plants used in South Africa are harvested from KwaZulu-Natal, and some medicinal plants such as *Elaeodendron transvaalense* are already locally scarce and require immediate attention in order to conserve populations (Williams *et al.*, 2000; Williams, 2007). Since the 1900s, *Siphonochilus aethiopicus* has declined drastically in one of its documented location in the Umdloti and Inanda valleys because of its trade with Lesotho (Cunningham, 1993). Furthermore, Williams and Crouch (2017) compared the current and former ranges of *S. aethiopicus* and indicated that it is extinct over most of its South African range. Oladele *et al*. (2011) reported that 94% of healers from Osun State (Nigeria) were aware of the decreases in medicinal plants, although 87% of them still collected from the wild and 11% bought from medicinal trade markets. A reason healers still collected their own material was to ensure proper identification of the plants. Most traders (93%) from Nelson Mandela Bay Metropolitan, however, attributed plant scarcities to accessibility and geographic proximity to the resources rather than over-harvesting – and this was because respondents were in urban areas and could not easily access medicinal plants (Ah Goo, 2012).

Traditional and formal conservation measures such as legislation implementation in South Africa have not produced positive results (Marshall, 1999; Dold and Cocks, 2002; Cocks *et al*, 2004). In addition, cultivation of medicinal plants has not expanded, as one would expect it to. The lack of commercialisation of cultivated medicinal plants is mainly due to limited information on *muthi* market expansions and locations, gaps in the knowledge of medicinal plant farming technologies and limited documentation on cultural norms associated with medicinal plant use (Mander and Le Breton, 2006). Cultivation has emphasized the importance of factors such as leadership, power relations between stakeholders, land and resource tenure as essential with regard to effective implementation of plans (Botha, 2001; Mahwasane *et al*., 2013).

Cultivation of medicinal plants can be unprofitable; people growing species have to compete with other people who have access to wild populations and no expenses associated with cultivation (Mander and Le Breton, 2006). On the other hand, the growing demand of scarce wild medicinal plants motivates the use of cultivated material because people would have easier access compared to less accessible plants from the wild. The majority of medicinal nurseries were established for traditional healers who do not harvest plant material in bulk for commercial purposes (Ndawonde, 2015). There are traditional healers and community groups who grow medicinal plants in community or home gardens for subsistence use, but the quantity of plants grown does not fulfil the demand of their practices (Mander and Le Breton, 2006). In order to sustain their practices, traditional healers are

pressured by the decline in wild medicinal plants to opt for cultivation in their home gardens (Wiersum *et al*., 2006). Nurseries have been used to try to alleviate declines in medicinal plants, and encourage healers and traders to make use of cultivated material. However, there has been little success in that regard. Therefore, one needs to identify factors that would enable the successful expansion of cultivation schemes. Approximately 41% of the nursery projects assessed by Botha (2006) experienced problems in relation to weather and climatic conditions; water supply also played a huge role in the success of a nursery.

Overall, cultivation is one method for alleviating the pressures on declining wild populations – but there also needs to be an understanding that there are various growth factors that allow plants to be culturally suitable for cultivation. For instance, plants that are prolific seed producers and have seeds that germinate readily are easy to cultivate (Kulkarni *et al*., 2005). Furthermore, a study conducted by Masondo *et al*. (2013) showed that cultivated *Bowiea volubilis* was able to proliferate like plants in the wild. There are certain threatened genera such as *Encephalartos* that are difficult to cultivate due to their growth form (Williams, pers. comm., 2017); hence, not all declining species can be cultivated with ease. Some medicinal species face a larger risk of extinction compared to others, and this is also influenced by the demand and supply of that plant. For example, *Warburgia salutaris, Acacia xanthophloea,* and *Ocotea bullata* are in high demand in medicinal markets, and their populations are highly influenced by harvesting (Ndawonde, 2006). In addition, other medicinal species like *Sclerocarya birrea* are a priority to resources users because they have more than one purpose e.g. its fruit is used for beer (Ah Goo, 2012). It is evident that the decline in medicinal plants is not only observed by conservationists but has also been reported by traditional healers and traders, showing that it requires an intervention.

There is also limited knowledge by scientists about the cultivation of indigenous medicinal plants (Mander and Le Breton, 2006). Recognizing the beliefs and spiritual norms of medicinal plants can result in improved relations between resource users and conservationists and the willingness of people to participate in cultivation programmes (Botha, 2006). Documenting plants that are a priority and of conservation concern to the resource users is therefore essential in conserving medicinal plants. The majority of conservation efforts are targeted at healers; while healers play a crucial role into conservation, collaboration efforts with market traders and harvesters is essential because of their interactions with the natural resources.

This chapter presents the results of the first research objective, namely: to document medicinal plant species that are culturally acceptable for cultivation by healers and traders, and the characteristics that would permit them to be cultivated based on cultural and spiritual norms. Furthermore, this chapter also investigates and documents: (i) plants cited by healers and traders as ones that, according to

cultural norms, 'are allowed' or 'not allowed to be cultivated', and those that are 'decreasing' (in population size), (ii) how these plants are acquired, (iii) the Red List statuses of the cited plants to assess which species are of conservation concern, (iv) the areas cited as harvesting localities, and (v) the location of traditional medicine markets. All this information will assist authorities with designing appropriate strategies that are in line with the observations and perceptions of the resource users.

3.2 METHODS

Details of the survey strategy are given in Chapter 2. To achieve the objectives of the chapter, healers and traders were asked to cite the common names or ethnospecies in the dissertation, ethnospecies is abbreviated as Se) of: (i) plant species they know are 'decreasing' (either from their harvesting experience or from observations in *muthi* markets); (ii) plants that require rituals before harvesting (details of the rituals were not asked, but some respondents mentioned certain rituals that are required before harvesting can start); (iii) plants that are, according to cultural norms, not allowed to be cultivated; and (iv) plants that are allowed to be cultivated. In addition, respondents were asked to mention areas where harvesting takes place. The responses from the participants was documented and then summarized the results in terms of plants mentioned by both healers and traders, and where possible, plants were identified to species. Some species have more than one vernacular name. For figure 3.2 and 3.3, the respondents mentioned plants that were 'decreasing' and 'want/are allowed to cultivate' and these were compared using correlation, and I described what the respondents said into quadrats of priority for conservation, depending on the frequency of mention of the particular plants.

The SANBI Red List website (http://redlist.sanbi.org, accessed November 2017) was used to categorise the threat statuses for all species mentioned so that the cited plants could be analysed accordingly. Species recorded as 'decreasing' and 'want/are' allowed to be cultivated' were compared and analysed using correlation to assess if respondents consider species that are 'decreasing' in availability as a priority for cultivation. Furthermore, species mentioned for cultivation by healers and traders were compared using Spearman's rank. Plants mentioned as 'not allowed to cultivate' and those that are 'allowed to cultivate' were also compared using a bar graph. Pearson's chi-squared (χ^2) test was used to test for differences between ways of obtaining plant material by both healers and traders. Maps were created for areas cited as harvesting localities to highlight places that are frequent source of supply to the respondents, and to show the location of traditional medicine markets (as cited by the respondents).

3.3 RESULTS

3.3.1 Ethnospecies that may or may not be cultivated

One hundred and fourteen respondents cited 215 ethnospecies (S_e) in response to questions on cultivation, cultural norms, and 'decreasing' availability (Appendix 2 and 3). Of these ethnospecies, 86% of the names were in isiZulu and 9% were Chichewa (MW) (Figure 3.1). A number of the ethnospecies cited by the traders and healers are 'not allowed to be cultivated' [S_e=122 (57%) and S_e=75 (35%) for traders and healers respectively], and a higher proportion of traders cited plants that 'are allowed to be cultivated' [S_e=191 (89%) and S_e=52 (24%) for traders and healers respectively] (Table 3.1). Moreover, some ethnospecies were cited by healers and traders as requiring rituals before they are harvested [S_e=55 (26%) and S_e=98 (46%) for traders and healers respectively] (Table 3.1). Respondents showed insights into the reality of declining wild medicinal plant populations. The number of ethnospecies cited by the healers and traders as 'decreasing' in availability in the wild [S_e=42 (20%) and S_e=68 (32%) for traders and healers respectively], and a higher proportion of healers and traders cited plants that are 'decreasing' in availability in the markets [S_e=64 (30%) and S_e=101 (47%) for traders and healers respectively] (Table 3.1).

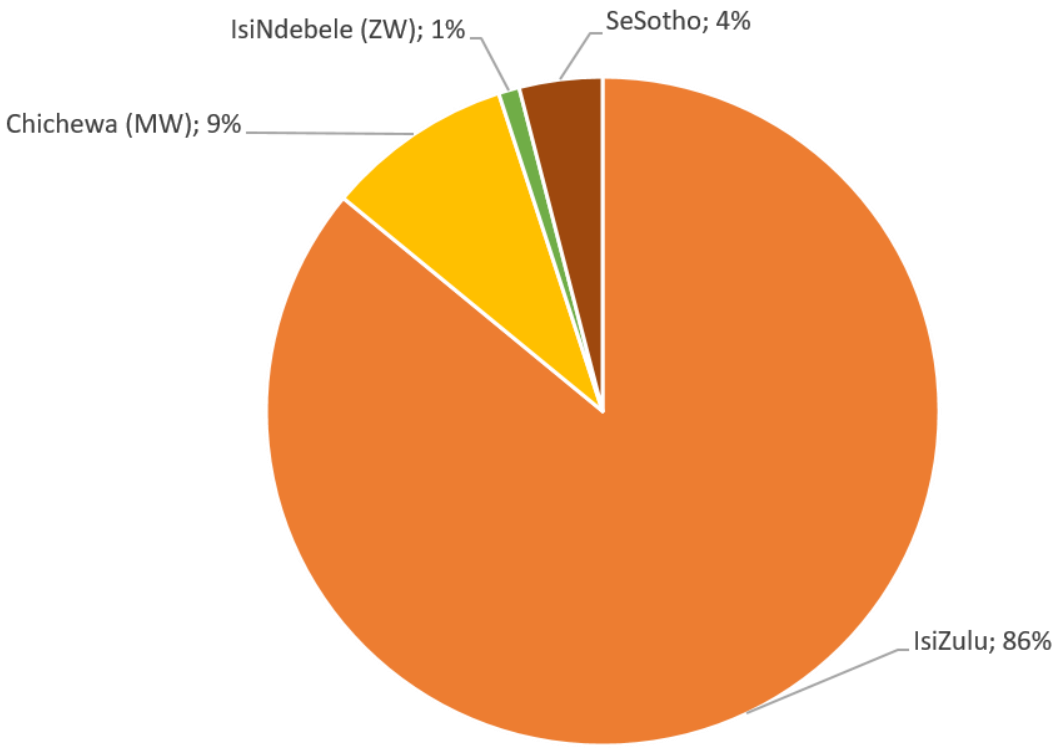


Figure 3.1. Percentages of the 215 ethnospecies names in the various languages recorded during the study for all categories of plants (derived from n=114 respondents). MW=Malawi, ZW=Zimbabwe.

Table 3.1. Summary of the ethnospecies (S_e) and the categories of plants based on questions asked relating to cultivation (allowed or want), rituals and availability.

Questions on ethnospecies cultivation, cultural norms, and availability: categories of plants	**No. of ethnospecies (S_e) reported per respondent type per question/plant category (S_e=215 ethnospecies; n=114 respondents)**		
	Healers (S_e=202; n=42 respondents)	**Traders (S_e= 211; n=72 respondents)**	**Number of S_e in common**
'Allowed' and/or 'want to be' cultivated	52	191	23
'Not allowed' to be cultivated	73	122	14
Requires rituals before harvesting	55	98	10
Decreased availability (in the wild)	42	68	33
Decreased availability (in the markets)	64	101	64

A number of ethnospecies were cited as 'not allowed to be cultivated', including: *umdlebe* (*Eucalyptus* spp.; *Euphorbia cupularis*; n=28), *isigqiki-somkhovu* (*Encephalartos* spp.; n=20) and *umkhaya* (*Vachellia sieberiana*; *Senegalia burkei*; n=9) (Table 3.2). Plants that respondents most frequently said can (i.e. 'allowed to be cultivated') include *impunyu/phunyuka* (*Talinum caffrum*; n=21), followed by *indongana-zibomvana* (*Drimia* spp.; *Urginea* spp.; n=18), *umavumbuka* (*Hydnora africana; Hydnora abyssinica; Sarcophyte sanguinea*; n=17) and *isibhaha* (*W. salutaris*; n=14) (Table 3.3). Regarding plants that are 'decreasing' in availability (in the wild and/or in the markets), *unukani* (*O. bullata*) was cited 21 times, followed by *ingwavuma* (*E. transvaalense*; n=20), *isibhaha* (*W. salutaris*; n=18), *umganu* (*S. birrea*; n=12) and *ikhokhelo* (*Justicia capensis*; n=11) (Table 3.4).

Table 3.2. Summary of the seven ethnospecies that were most frequently cited by respondents as 'not allowed to be cultivated' (n=114 respondents; total S_e=68 ethnospecies). (Full list of species in Appendix 6).

Common name/ethnospecies	**Species**	**No. of times cited as *'not allowed to be cultivated'***
umdlebe	*Eucalyptus* spp.; *Euphorbia cupularis*	28
isigqiki-somkhovu	*Encephalartos* spp.	20
umkhaya	*Vachellia sieberiana; Senegalia burkei*	9
mopatladi; umabusane	*Capparis* spp. (*C. brassii, C. tomentosa*)	7
ukalumuzi	*Acorus calamus*	6
indongana-zimbomvana	*Drimia* spp.; *Urginea* spp.	6
amafuthaomhlaba; impila	*Callilepis laureola*	5

Table 3.3. Summary of the 21 ethnospecies that were most frequently cited by respondents as 'want/are allowed to be cultivated' (n=114 respondents; total S_e=98 ethnospecies). (Full list of species in Appendix 5)

Common name/ethnospecies	Species	No. of times cited as *'allowed, or want, to be cultivated'*
impunyu; phunyuka	*Talinum caffrum*	21
indongana-zimbomvana	*Drimia spp.; Urginea spp.*	18
umavumbuka	*Hydnora spp. (H. africana; H. abyssinica)*; Sarcophyte sanguinea*	17
isibhaha	*Warburgia salutaris*	14
umathithibala	*Aloe spp.; Haworthia spp.*	13
isigqiki-somkhovu	*Encephalartos spp.*	10
ilabatheka	*Hypoxis spp.*	9
umababaza	*Albuca bracteata*	8
umganu	*Sclerocarya birrea*	7
isiphephetho; serokolo	*Siphonochilus aethiopicus*	7
umaphipha	*Rapanea melanophloeos*	7
umkhuhlu	*Trichilia spp. (T. dregeana, T. emetica)*	6
unukani	*Ocotea bullata*	5
umkhanyakude	*Acacia xanthophloea*	5
isiklenama	*Drimia spp.; Urginea spp.*	5
umahlalanyosi	*Antidesma venosum*	5
incotho	*Boophone disticha*	5
ilethi	*Croton gratissimus; Gerrardina foliosa; Myrica serrata; Phyllanthus meyerianus*	5
isiqunga	*Cymbopogon spp.*	5
umvongothi	*Kigelia africana*	5
imfeyenkawu	*Ansellia africana*	5

*****most likely *Hydnora* spp. based on research by Williams *et al* (2011)

Table 3.4. Summary of the 17 ethnospecies that were most frequently cited by respondents as 'decreasing' (i.e. in the wild and/or in the markets) (n=114 respondents; total S_e=79 ethnospecies). (Full list of species in Appendix 4).

Common name/ethnospecies	**Species**	**No. of times cited as *'decreasing'***
unukani	*Ocotea bullata*	21
ingwavuma	*Elaeodendron transvaalense*	20
isibhaha	*Warburgia salutaris*	18
umganu	*Sclerocarya birrea*	12
ikhokhelo	*Justicia capensis*	11
ikhathazo	*Alepidea* spp.	8
iphamba	*Eulophia* spp.	8
uvuma-omhlophe	*Synaptolepis oliveriana*	8
umkhanyakude	*Acacia xanthophloea*	7
isigqiki-somkhovu	*Encephalartos* spp.	7
inhlanhla-emhlophe	*Passiflora suberosa*	7
ubhubhubhu	*Crotalaria globifera*; *Helinus integrifolius*	6
isiklenama	*Drimia* spp.; *Urginea* spp.	6
undiyaza	*Bersama* spp. (*B. lucens, B. swinnyi, B. tysoniana*); *Dioscorea dregeana*	5
umlahleni	*Curtisia dentata; Heteropyxis natalensis*	5
ihluze; umgxamu	*Schotia brachypetala*	5
isiphephetho; serokolo	*Siphonochilus aethiopicus*	5

There was no evidence of a correlation between ethnospecies and species mentioned by respondents as 'decreasing' and those that are 'allowed, or want, to be cultivated'. The Spearman's rank correlation for this graph indicates there is no relationship between the ranks of plants that are 'decreasing' and the ranks of plants that are 'allowed, or want to, be cultivated' (R2=0.04; p=0.14) (Figure 3.2 for ethnospecies, and Figure 3.3 for corresponding species). The graph was divided into four quadrants to indicate priorities for cultivation depending on how frequently the ethnospecies were cited as 'decreasing' and 'allowed to be cultivated'. Four ethnospecies, viz. *impunyu* (*T. caffrum), indongana-zibomvana* (*Drimia* spp.*; Urginea* spp.), *umavumbuka (Hydnora* spp.*)* and, *umathithibala (Aloe* spp.*; Haworthia* spp.), were in the medium-low priority quadrant (higher citations for 'decreasing' availability but lower for desirability for cultivation) (Figure 3.2; 3.3). However ethnospecies such as *isigqiki-somkhovu* (*Encephalartos* spp.), *ilabatheka* (*Hypoxis* spp.), *isiphephetho (S. aethiopicus), isiklenama (Drimia* spp.*; Urginea* spp.), *umkhanyakude (A. xanthophloea), ubhubhubhu* (*Crotalaria globifera; Helinus integrifolius)* were in the lower priority quadrant because of relatively low mentions for both 'decreasing' and 'allowed to be cultivated' (Figure 3.2; 3.3). *Isibhaha* (*W. salutaris)* is the only species within the high priority quadrant (high mention of 'decreasing' and cultivation priority), whereas *ingwavuma* (*E. transvaalense), umganu (S.*

birrea), ikhokhelo (*J. capensis)* and *unukani* (*O. bullata)* fall in the medium-high priority quadrant (low mentions for cultivation but high for 'decreasing') (Figure 3.2; 3.3).

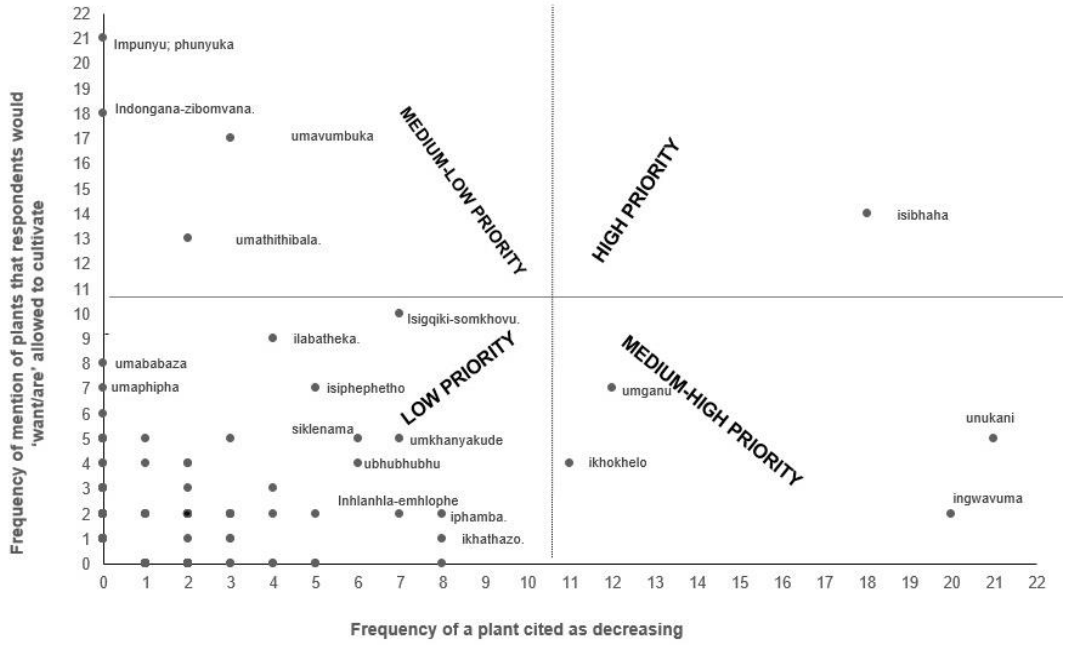


Figure 3.2. Comparison between ethnospecies mentioned as 'decreasing' and those that respondents 'want/are allowed to cultivate'. Species corresponding to these ethnospecies are in Figure 3.3. The Spearman's rank correlation for this graph indicates there is no relationship between the ranks of plants that are 'decreasing' and the ranks of plants that are 'allowed, or want to, be cultivated' (R2=0.04; p=0.14).

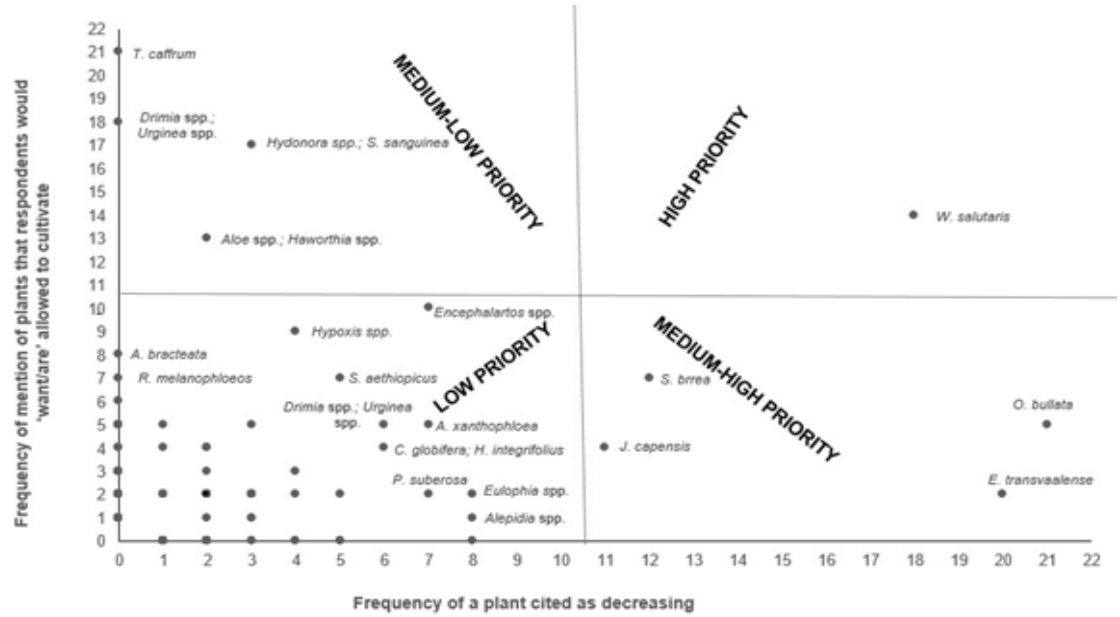


Figure 3.3. Comparison between species mentioned as 'decreasing' and those that respondents 'want/are allowed to cultivate'. The Spearman's rank correlation for this graph indicates there is no relationship between the ranks of plants that are 'decreasing' and the ranks of plants that are 'allowed, or want to, be cultivated' (R^2=0.04; p=0.14). Ethnospecies corresponding to these species are in Figure 3.2.

Nighty-eight ethnospecies were mentioned as 'allowed to be cultivated', 68 as 'not allowed' and 23 were cited both 'as allowed' and 'not allowed' by different respondents (Figure 3.4). Ethnospecies that were mentioned for both categories ('allowed' and 'not allowed') include: *umababaza* (*Albuca bracteata*), *umkhuhlu* (*Trichilia* spp.), *indongana-zibomvana* (*Drimia* spp.*; Urginea* spp.); *umayime* (*Clivia* spp.), *ilabatheka* (*Hypoxis* spp.) and *isigqiki-somkhovu* (*Encephalartos* spp.). Ethnospecies that were exclusively mentioned as 'want/are allowed to cultivated' include: *impunyu* (*T. caffrum*), *isibhaha* (*W. salutaris*), *umathithibala* (*Aloe* spp.*; Haworthia* spp.), *umaphipha* (*Rapanea melanophloeos), umganu* (*S. birrea*) and *isiphephetho* (*S. aethiopicus*) (Figure 3.4). Ethnospecies that were exclusively mentioned as 'not allowed to be cultivated' include: *ukalumuzi* (*Acorus calamus*), *umabusane* (*Capparis* spp.), *umkhaya* (*V. sieberiana; S. burkei), umdlebe* (*Eucalyptus* spp.*; E. cupularis)* (Figure 3.4). A full list of these species can be found in Appendices 5 and 6.

There was also no evidence of a correlation between the ethnospecies cited by healers and traders as 'want/are allowed to be cultivated'. The Spearman's rank correlation for this graph indicates there is no relationship between the ranks of healers and traders citations of plants that are 'allowed, or want to, be cultivated' (R^2=0.16; p=0.67) (Figure 3.5). The ethnospecies that were mentioned by both healers and traders include: *umababaza* (*A. bracteata), umaphipha (R. melanophloeos), umayime* (*Clivia* spp.), *vukakwabafile* (*Myrothamnus flabellifolia), isigqiki-somkhovu (Encephalartos* spp.), and *umganu (S. birrea)* (Figure 3.5).

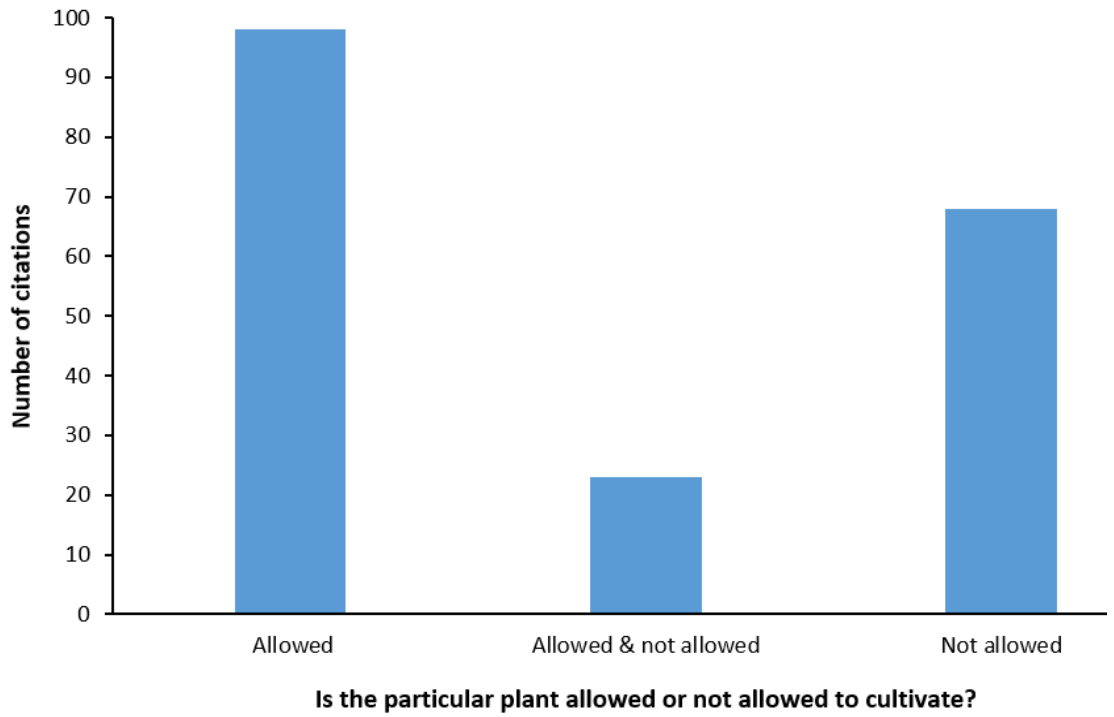


Figure 3.4. The number of ethnospecies per category that were cited as being 'allowed' and/or 'not allowed' to be cultivated by respondents.

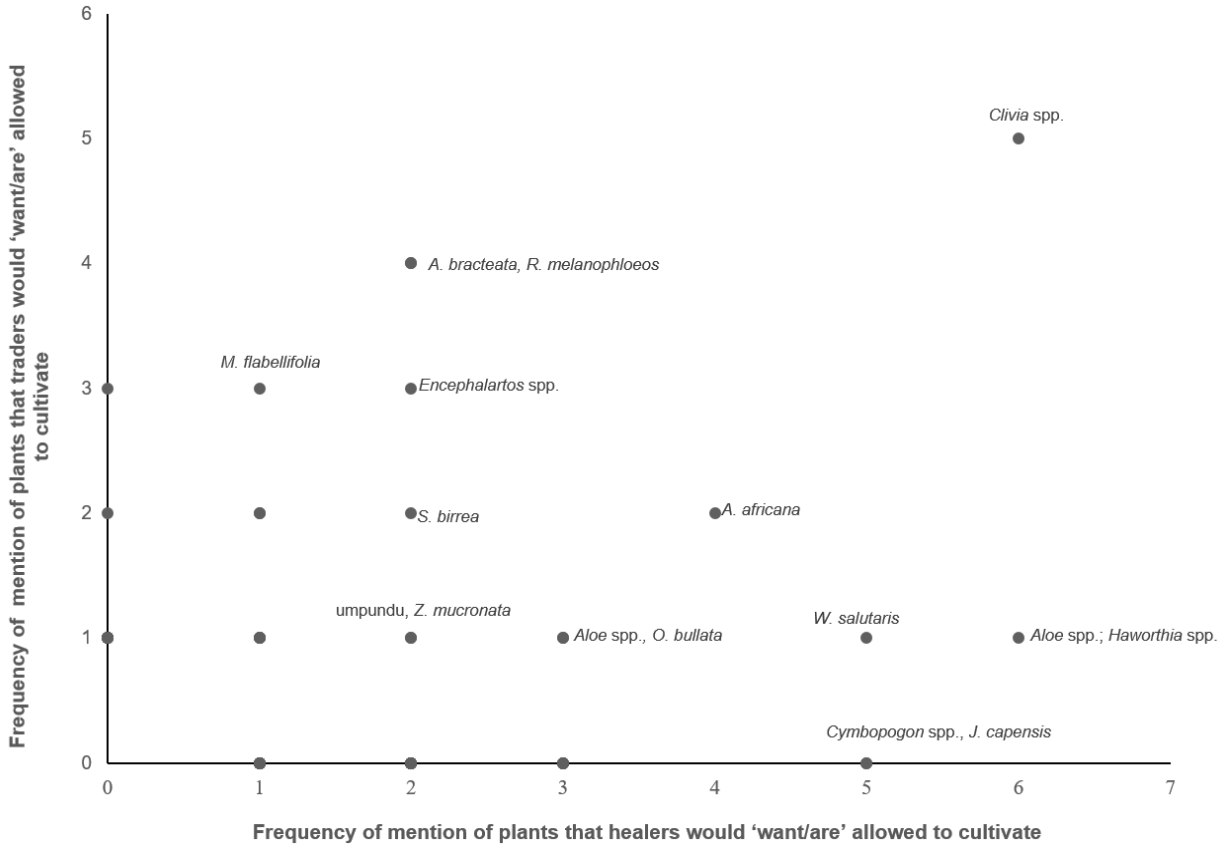


Figure 3.5. Comparison between the species that healers (x-axis) and market traders (y-axis) cited as 'want/are allowed to be cultivated'. The Spearman's rank correlation for this graph indicates there is no relationship between the ranks of healers and traders citations of plants that are 'allowed, or want to, be cultivated' (R^2=0.16; p=0.67).

3.3.2 Ethnospecies requiring rituals before harvesting

Umdlebe (*Eucalyptus* spp.*; E. cupularis*) had the highest frequency (n=15) of mentions as a plant that requires rituals before it can be harvested, followed by the unidentified ethnospecies *amakhosikancamane*[2] (n=11), and *umlahlankosi* (*Strychnos decussata; Hilliardiella aristata*; n=7) and *umganu* (*S. birrea*; n=6) (Table 3.5). Ethnospecies that were mentioned once (n=32) are listed in Appendix 7.

[2]Unidentified ethnospecies

Table 3.5. Summary of the plants that respondents cited as requiring rituals before they can be harvested. (Full list of species in Appendix 7)

Common name	Species	No. of citations
umdlebe	*Eucalyptus* spp.*; Euphorbia cupularis*	15
amakhosikancamane	unidentified	11
umlahlankosi	*Strychnos decussata; Hilliardiella aristata*	7
umganu	*Sclerocarya birrea*	6
impindamshaye	*Adenia gummifera*	4
ubhubhubhu	*Crotalaria globifera; Helinus integrifolius*	4
umgadankawu	*Albizia adianthifolia*	4
umkhanyakude	*Acacia xanthophloea*	4
uvuma-omhlophe	*Synaptolepis oliveriana*	4
chisomo: uvukakwabafile	*Myrothamnus flabellifolia*	2
inhlanhla-emhlophe	*Passiflora suberosa*	2
iphengulula	*Utricularia prehensilis*	2
isigqiki-somkhovu	*Encephalartos* spp.	2
kakhomu	*Croton gratissimus*	2
maswirisingo	unidentified species	2
sehlangengubo	unidentified species	2
skhuniphenduka	unidentified species	2
ubangalala	unidentified species	2
umabusane	*Capparis* spp. *(C. brassii, C. tomentosa)*	2
umhlonishwa	*Phymaspermum acerosum; Psoralea pinnata*	2
umthathe	*Ptaeroxylon obliquum*	2
uqhume	*Hippobromus pauciflorus*	2
Zibankwa	unidentified species	2

3.3.3 How plant material is obtained and Conservation status of cited ethnospecies

There was no significant difference in how healers and traders acquired plants (χ^2 =4.003, df=2, p=0.14), with most buying the plant material (Figure 3.6). Where ethnospecies could be identified to species, they were categorised according to their South African IUCN Red List status; 141 are Least Concern, three are Endangered, five are Vulnerable, eight are Near Threatened, two are Critically Rare, one is Data Deficient Taxonomically, and one is Not Evaluated (Figure 3.7). (Details of the IUCN Red List statuses for each species are in Appendix 8).

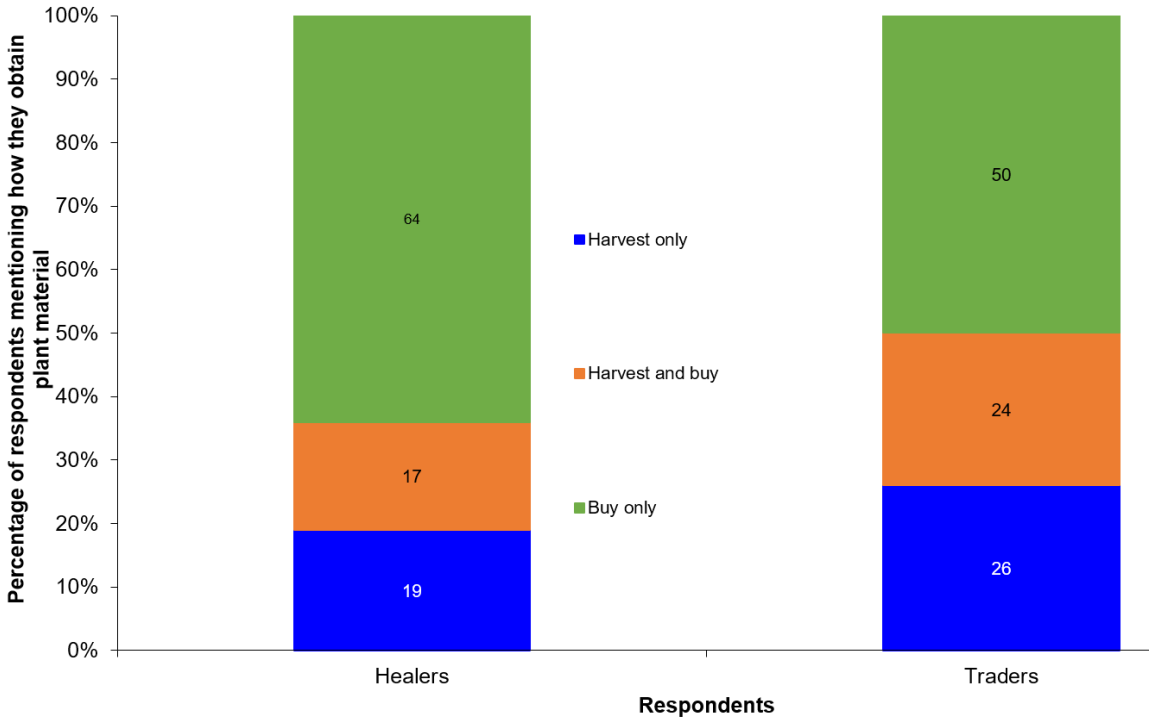


Figure 3.6. Percentage of healers and traders acquisition of plant materials that they use or sell. Differences between healers and market traders were not significant (χ^2=4.0033, df=2, p=0.14).

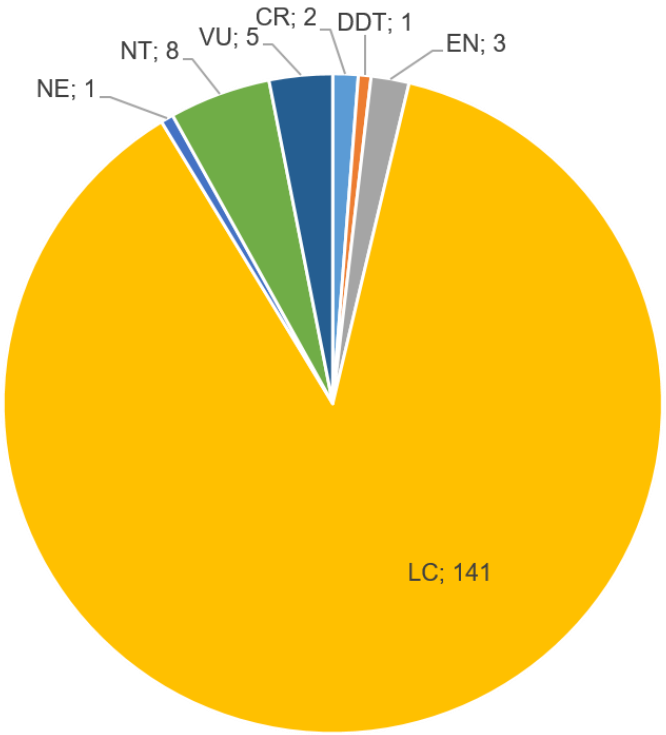


Figure 3.7. Red List categories for all plants cited during the research by respondents. CR=Critically Endangered, EN=Endangered, VU=Vulnerable, NT=Near Threatened, LC=Least Concern, DDT=Data Deficient Taxonomically, NE=Not Evaluated.

3.3.4 Harvesting localities

Umhlabuyalingana (Maputaland in northern KZN) was most frequently mentioned (n=22) across six study sites as the area used by respondents and/or gatherers for harvesting plants, followed by Nongoma (n=15). However, other respondents did not specify the places in KZN that were frequently used as harvesting, only the province was mentioned (n=18) (Table 3.6). Overall, KZN and Eastern Cape were the provinces most frequently cited as harvesting localities. It is essential to note the mention of other countries as sites for harvesting, viz. Mozambique (n=6), Malawi (n=4), Swaziland (n=6) and Lesotho (n=1) (Figure 3.8; Table 3.6).

3.3.5 Market localities

Faraday was the market most frequently cited as a source for purchased plants (n=32) by respondents at Warwick, Mona, Marabastad, Umlazi, Nhlungwane and Soweto, followed by Mona Market (n=25; in seven study sites), Warwick Market (n=21; in six study sites) and Ezimbuzini Market (n=15; in five study sites) (Table 3.7). Gauteng (City of Tshwane and City of Johannesburg) and KZN (eThekwini) province were the provinces that had the most citations of market presence (Figure 3.9).

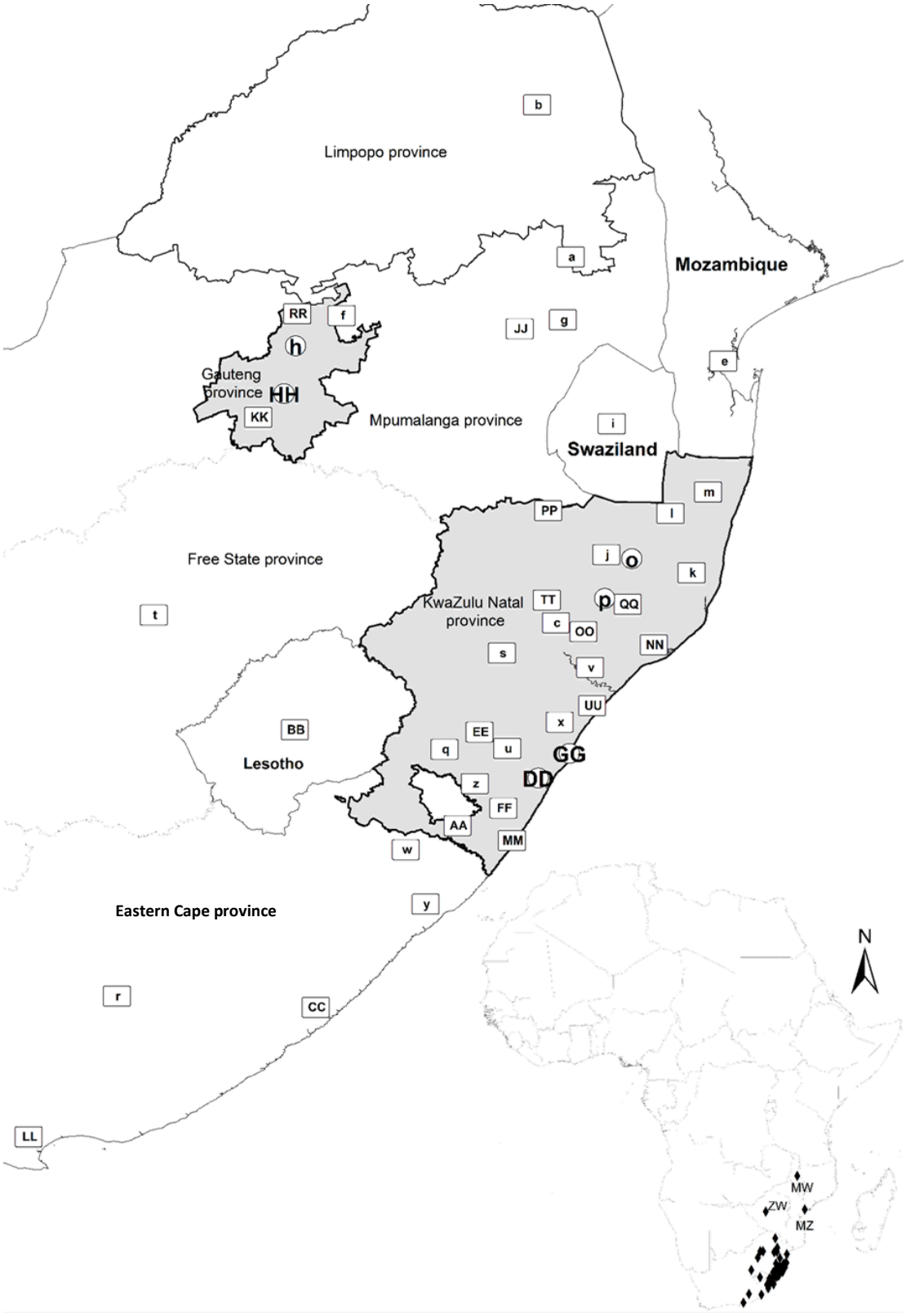


Figure 3.8. Study sites, markets and areas where plants are harvested. Respondents were interviewed at the study sites shown in bold letters within two provinces (shaded grey). Abbreviations for study sites: h=Marabastad (Pretoria); **HH**=Faraday market and Soweto (Johannesburg); **o**=Mona market (Nongoma); **p**=Nhlungwane (Ulundi); **GG**=Warwick market (Durban); **DD**=Ezimbuzini market and Umlazi (Umlazi). Abbreviations for harvesting sites mentioned by the respondents are labelled from a to z, and the names of the harvest areas are given in Appendix 9.

Table 3.6. Summary of the harvest locations cited by the respondents. (*=Metropolitan (densely populated urban core)).

Cited plant harvesting localities	No. of study sites that cited that mentioned harvest locality	Sum of frequency of mention by respondents from the respective study sites	Locality type	Local Municipality for harvesting locality	District Municipality for harvesting locality	Province of harvesting locality
South Africa						
Eastern Cape	4	7	Province			EC
Lusikisiki	1	1	Town	Ingquza Hill	OR Tambo	EC
Mbizana	1	1	Local Municipality	Mbizana	Alfred Nzo	EC
Port Elizabeth	1	1	City		Nelson Mandela Bay*	EC
Free-State	1	1	Province			FS
Gauteng	1	1	Province			GP
Hammanskraal	1	1	Town		City of Tshwane*	GP
Lenasia	1	3	Township		City of Johannesburg*	GP
Orange Farm	1	1	Township		City of Johannesburg*	GP
Pretoria	2	4	City		City of Tshwane*	GP
KZN	5	18	Province			KZN
Bulwer	1	1	Town	Dr Nkosazana Dlamini Zuma	Harry Gwala District	KZN
Dumbe	1	1	Town	eDumbe	Zululand	KZN
Durban	2	3	City		eThekwini*	KZN
Empangeni	1	1	Town	City of uMhlathuze	King Cetshwayo	KZN
Engome	2	6	Village	Abaqulusi	Zululand	KZN
Engonyameni	1	1	Village		eThekwini*	KZN
Ezinqolweni	1	1	Town	Ray Nkonyeni	Ugu	KZN
Harding	1	1	Town	Umuziwabantu	Ugu	KZN
Hlabisa	1	1	Village	Big 5 Hlabisa	uMkhanyakude	KZN
Hluhluwe	1	2	Town	Big 5 Hlabisa	uMkhanyakude	KZN

Ixopo	3	3	Town	Ubuhlebezwe	Harry Gwala	KZN
Jozini	3	7	Town	Jozini	uMkhanyakude	KZN
Mount Ayliff	1	1	Town	Umzimvubu	Alfred Nzo	KZN
Ndwedwe	1	4	Town	Ndwedwe	iLembe	KZN
Nhlazuko	1	1	Village		uMgungundlovu	KZN
Nhlungwane	1	1	Village	Ulundi	Zululand	KZN
Nkandla	2	3	Town	Nkandla	King Cetshwayo	KZN
Nongoma	6	15	Town	Nongoma	Zululand	KZN
Nquthu	1	1	Town	Nquthu	uMzinyathi	KZN
Port Shepstone	1	1	Town	Ray Nkonyeni	Ugu	KZN
Stanger	1	1	Town	KwaDukuza	iLembe	KZN
Ulundi	2	3	Town	Ulundi	Zululand	KZN
Umbumbulu	1	1	Town		eThekwini*	KZN
Umhlabuyalingana	6	22	Local Municipality	Umhlabuyalingana	uMkhanyakude	KZN
uMkhanyakude	1	1	District Municipality		uMkhanyakude	KZN
UmKhomazi	2	2	Town		eThekwini*	KZN
Giyani	2	2	Town	Greater Giyani	Mopani	LP
Mpumalanga	2	2	Province			MP
Bushbuckridge	1	1	Town	Bushbuckridge	Ehlanzeni	MP
kwaMhlanga	1	1	Town	Thembisile Hani	Nkangala	MP
KwaNdebele	1	1	Village	Thembisile Hani	Nkangala	MP
Nelspruit	1	1	City	City of Mbombela	Ehlanzeni	MP
Other countries or regions						
Southern Africa	1	1	Countries			Region
Lesotho	1	1	Country			LE
Malawi	2	4	Country			MW
Maputo	3	4	City			MZ

Mozambique	2	2	Country			MZ
Swaziland	2	6	Country			SZ
Zimbabwe	1	2	Country			ZW



Figure 3.9. Locations of markets in the provincial study areas: a – Chatsworth, b – Dalton, c – Ezimbuzini, D – Faraday, e – Isiphingo, f – KwaMashu, g – Mai Mai, h – Makhokhoba (Zimbabwe), I – Marabastad, J – Mona, k – Nyavini, L – Pretoria, m – Vryheid, N – Warwick.

Table 3.7. Summary of the market locations and their frequency of citation by respondents from each study site. (*=Metropolitan (densely populated urban core)).

Cited market	No. of times cited in study sites	Sum of frequency of mention	Street or market traders	Local Municipality	District Municipality	Province
South Africa						
Faraday	6	33	Market		City of Johannesburg*	GP
Mai Mai	1	2	Market		City of Johannesburg*	GP
Marabastad	2	5	Market		City of Tshwane*	GP
Mona	7	25	Market	Nongoma	Zululand	GP
Chatsworth	1	1	Street		eThekwini*	KZN
Dalton	2	4	Street	uMshwathi	uMgungundlovu	KZN
Ezimbuzini	5	16	Market		eThekwini*	KZN
Isiphingo	1	3	Street		eThekwini*	KZN
KwaMashu	1	1	Street		eThekwini*	KZN
Nyavini	1	1	Street	Thulamela	Vhembe	KZN
Warwick	6	21	Market		eThekwini*	KZN
Westville	1	1	Street		eThekwini*	KZN
Vryheid	2	7	Street	Abaqulusi	Zululand	LP
Other country						
Makhokhoba	1	2	Market	Bulawayo	Zimbabwe	

3.4 DISCUSSION

3.4.1 Ethnospecies that may or may not be cultivated

Healers and traders typically only know medicinal plants from their vernacular names, thus identifying plants to their scientific names can be a challenge (especially in the absence of voucher specimens for proper identification). Overall, 215 ethnospecies were mentioned by the respondents, with the majority of plants being cited in isiZulu. Most plant materials are harvested from KwaZulu-Natal and the chosen study sites mostly use isiZulu as a common language of communication.

There was no correlation between plants mentioned by respondents as ‘decreasing’ and ‘want/are allowed to be cultivated’. Hence, some respondents mentioned plants that they ‘want/are allowed to cultivate’ based on popularity within and between markets, and not because of their vulnerability and declining status in the wild. This result could be related to most healers and traders buying, rather than harvesting their plant materials. Furthermore, this result indicates that ‘decreases’ in availability cited by resources users is not only related to the species population dynamics, but is also related to whether people can still acquire plants from areas that are in close vicinity to their homes. The results are consistent with a study by van Andel *et al*. (2015), where they reported that *Khaya senegalensis*

was previously collected in the wild but, due to its decline, it is now being harvested from individuals planted as shade trees along the major roads in Cotonou (Benin) and Accra (Ghana). Other respondents form the current study mentioned that certain plants are no longer available in their area, but they can still acquire them from markets, so they did not regard them as 'decreasing' in availability. For respondents that bought medicinal plants, the prices of the material gave them an indication as to whether the particular plant was scarce or still readily available in the wild, because scarce plants prices tended to be higher than those that are easily available.

Warburgia salutaris is the only species in the high priority category, meaning that most respondents mentioned it as 'decreasing' in abundance in the wild and as a 'want/are allowed to cultivate'. *Warburgia salutaris* is already locally extinct in some parts of northern KZN and is a conservation priority for conservation (Botha *et al*., 2004; Williams *et al*., 2013; Williams and Crouch, 2017). *Warburgia salutaris* has been cultivated in various areas in South Africa but it has not been massively propagated (Botha *et al*., 2004). The species is vulnerable to harvesting because of its localized population and limited distribution – hence, it has declined in its natural environment. In addition, *W. salutaris* takes time to heal from wounding caused by debarking, and because it is in high demand by resource users it is mostly subjected to heavy ring barking. Botha *et al*. (2004) showed that commercially harvested areas had more young individuals of *W. salutaris* than protected areas.

Even though healers from Venda collected species at different places to avoid over-exploitation, species with limited distributions such as *Brackenridgea zanguebarica* were highly threatened (Tshisikhawe *et al.*, 2012). *Ocotea bullata, S. birrea, J. capensis* and *E. transvaalense* are within the medium-high priority for cultivation (Figures 3.2 and 3.3); they were frequently mentioned as 'decreasing', but only a few respondents mentioned them as 'want/are allowed to cultivate'. The results indicate that what healers and traders perceive as 'decreasing' is not always a priority for cultivation, and that perceived spiritual characteristics of the plants might prevent them from being easily cultivated. *Ocotea bullata* and *E. transvaalense* are scarce in their previously known abundant areas, and these are also very susceptible to debarking and take time to recover from harvesting.

It is concerning that *Encephalartos* spp. falls within the low priority category, especially considering that some of the species of the genus are Endangered and protected by law due to over-harvesting and the horticultural trade (Cousins *et al*., 2011). The respondents' belief that *Encephalartos* cannot be cultivated might be inadvertently related to some of the species being difficult to cultivate as some take longer and do not produce seeds that can be stored and massively propagated. Some respondents also regarded this plant as powerful and should not be cultivated near homesteads because it can bring about lightning and death in the family, and social unrest within the community and/or family.

Ethnospecies corresponding to *T. caffrum, Drimia* spp./*Urginea* spp., *Hydnora* spp./*Sarcophyte sanguinea* and *Aloe* spp./*Haworthia* spp., were mentioned most frequently as allowed 'to be cultivated' but very few respondents mentioned them as 'decreasing'. The results are concerning especially for *Drimia* spp. / *Urginea* spp. as the whole plant (bulb) is harvested during plant collection (Brueton, 2013). However, their mention for cultivation is not a surprise as these species can be easily cultivated unlike *O. bullata* and *E. transvaalense*, which produce fewer seeds, have low germination rates and may be recalcitrant in nature; hence, they require proper infrastructure and training in order to attain a greater yields (Sarasan *et al*., 2011). *Merwilla plumbea* can be easily propagated because it produces numerous seeds and their survival rates are high during germination. However, the species can take 15 years to reach reproductive maturity (Street and Prinsloo, 2012).

There was no correlation between plants mentioned as 'want/are allowed to be cultivated' by healers to those cited by traders, meaning that respondents mostly did not mention the same plants for the category. The non-existent relationship may be attributed to traders not being 'called' to work with medicinal plants; most traders are part of the traditional medicine trade as a livelihood strategy for their households. Species such as *Trichilia* spp., *P. reticulata, and A. bracteata* were only mentioned by market traders as 'want/are allowed to cultivate', whereas traditional healers chose only *E. elephantina, uvulakuvaliwe*[3], *P. capensis* and *Cymbopogon* spp. The use of *Cymbopogon* spp. for purification rituals involving plants bought from the markets might be a reason why it is a priority to healers.

3.4.2 Ethnospecies requiring rituals before harvest

Rituals performed during harvests were once the main conservation strategy for medicinal plants, and upholding rituals was possible because only trained healer's harvested plants (Cunningham, 1994; Ndawonde, 2006). In my study, rituals such as communicating with the ancestors using silver coins, white beads and prayer before harvesting plants were mentioned for ethnospecies such as *Eucalyptus* spp./*Euphorbia cupularis, amakhosikancamane*[4], *Strychnos decussata* and *S. birrea*. Likewise, a study conducted by Cocks and Wiersum (2003) showed that 16 species were selected for ritual practice, particularly *Ptaeroxylon obliquum* and *Olea europaea*. These plants are important in rituals as they are used as a platter on which the remains of sacrificed animals are placed.

Eucalyptus spp. and *E. cupularis* are regarded as the 'danger' plant by some healers and traders because they are believed to hold the power to bring about death and lightning strikes to households. Hence, they require specific rituals when harvested; it is believed that these rituals allow ancestors to protect one from the 'dangers' when using or selling the plant. *Sclerocarya birrea* fruits are used to

[3] Unidentified ethnospecies
[4] Unidentified ethnospecies

make marula beer, which is offered to the ancestors by the chief to welcome summer at community gatherings in Limpopo, and ancestors therefore need to be notified when the fruits are harvested. The branches of *S. decussata* are used to 'collect' the spirit of someone who has died from where they took their last breathe to their homes. Therefore, healers and some traders believe that if the plant is not collected correctly then it will be unable to maintain its function.

There was a belief that bark removed from *O. bullata* gained medical and healing powers only after the wound on the harvested tree had healed (Prins, 1996). However, in the current study sites, this ritual for *O. bullata* is likely no longer widely practised, and this is possibly partly evident by the rapid decline of *O. bullata* (i.e. harvested trees are not given time to heal before the next harvest). Respondents explained that failure to adhere to rituals for these plants could result in the species losing their power to heal. The ethnospecies *amakhosikancamane*[5] was explained as being harvested by a young child that has not reached puberty, or an elder that has reached menopause. Tshisikhawe *et al*. (2012) observed rituals during harvesting that included spitting on epiphytes, followed by prayers and praises to the ancestors; the healers further emphasised that plants should remain alive in order for them to be effective.

3.4.3 How plant material is obtained and Conservation status of cited ethnospecies

The majority of respondents said that they buy plants that they either sell or use in their practices. The increase in people buying plant material shows that the role of the intermediary 'gatherers' is more prominent. Delbanco *et al.* (2017) study in Northern Kenya indicated that 30 species were found to be traded in Moyale and Marsabit towns, of which only *Myrsine africana* was collected in the wild. Some respondents from this study explained that most plants are not in close proximity to them and they have to rely on gatherers to go out and look for material and sell to them, as they cannot afford transport costs. The results of the study are consistent with a study by Meke *et al*. (2017), which found that traders from urban areas in Malawi collected proportionally less plant material themselves and were dependent on gatherers for material, and 50% of those traders depended on medicinal plants to sustain their household income. The Malawian study mentioned 27 species (25%) as being regularly traded with South African traders (Meke *et al*., 2017)

IUCN Red List categories indicate the extent to which species are nationally threatened. Most plants mentioned (S_e=141) in this study are Least Concern, while only three are Endangered. However, the results of the current study further support the important point that plant conservation priorities selected by conservationists and resource users are not always aligned with each other. Petersen *et al*.

[5] Unidentified ethnospecies

(2012) reported that of the 250 medicinal plants collected by respondents in Cape Town, 132 (53%) were of Least Concern and 69 (28%) Data Deficient Taxonomically.

Siphonochilus aethiopicus and *B. zanguebarica* were the only mentioned plants that are Critically Endangered. *Siphonochilus aethiopicus* is extinct in the wild in KZN (Botha, 2001; Botha, 2006; Williams *et al*., 2013), and some respondents mentioned that traders and gatherers are sourcing it from Mozambique. There are estimated to be <250 mature *S. aethiopicus* individuals in the wild (SANBI, 2017). The results of the current study are concerning, because both these species are still in demand in markets, i.e. one can expect their population to further decline in the next decade. A study conducted by Williams *et al*. (2000) at *muthi* shops and stalls in the Witwatersrand region showed that traders had unanimously viewed *S. aethiopicus* as the most scarce plant in *muthi* trade followed by *Eucomis autumnalis* and *Bowiea volubilis*. Nonetheless, *S. aethiopicus* can be easily cultivated because their seeds grow and mature underground, however they are difficult to find and use for propagation (Street and Prinsloo, 2012). *Warburgia salutaris*, *Mondia whitei* and *O. bullata* are Endangered as they are in demand and highly utilised by healers. *Ocotea bullata* is not only impacted by harvesting but also by the furniture industry and forest destruction (Williams *et al*., 2000).

3.4.4 Harvesting localities

Harvesting locations were mapped in order to locate the proximity of these sites to each other and assess areas that may be over-harvested, and those that are vulnerable due to the increase in commercial harvesting of medicinal plants. The most mentioned harvest site is Umhlabuyalingana (part of Maputaland centre of endemism) in KZN; this area is found in the savanna biome, but also includes both sand forest and coastal dune forest (Cousins *et al*., 2011). The study confirms what other studies have reported. For example, Williams *et al*. (2000) documented that species sold were mostly harvested from KZN (42%), Gauteng (15.2%), Limpopo (7.2%), Swaziland (6.3%) and Mpumalanga (3.2%). Savanna is the most harvested biome and it occupies the largest total area (46%) in southern Africa (Williams *et al.,* 2000). Furthermore, healers and traders make use of bark and roots, which are predominant in the savanna biome rather than grasslands, where grasses and geophytes dominate (Williams *et al.,* 2000).

Furthermore, van Andel *et al*. (2015) conducted a study in West Africa and found that most of the commercially used medicinal plants such as *Daniellia olivieri, Khaya senegalensis, Pteleopsis suberosa, and Securidaca longipendunculata* occur in habitats that correspond with the West African Savanna belt that ranges from Ivory Coast and Ghana and cover some parts of Benin. Moreover, 21-39% of the savanna species studied by van Andel *et al*. (2015) are no longer surrounded by natural vegetation. A study done by Meke *et al*. (2017) in Malawi showed that only 14 species of the 108 mentioned were non-woody plants, showing that grasses are less dominant in markets.

The harvest localities map (Figure 3.8) also indicates harvesting areas are expanding and that certain areas (e.g. Vryheid) that are not commonly mentioned in studies as being harvest sites need to be documented and monitored, and that other areas that are also under threat to harvesting need to be identified. Another study reported that healers get their material from Gauteng, Thengwe Territorial Council (Limpopo province), KZN and Mpumalanga (Tshisikhawe *et al.*, 2012). The respondents of this study also frequently mentioned Nongoma as a known harvest site. In terms of cycads, Cousins *et al.* (2011) reported that Ndwedwe (82%) was the most cited harvest area by Warwick traders; and they reported other harvest areas cited by traders were Umhlabuyalingana (18%), UmKhomazi (18%) and Nongoma (14%). Furthermore, the results shows the prominent relationship between harvesters of neighbouring countries and South Africa as some material is known to come from Mozambique, Malawi, Zimbabwe and Swaziland.

3.4.5 Market localities

Ethnobotanists are able to monitor the supply and demand of medicinal plants mostly by using markets. Markets trade with other markets, and some traders travel from their designated selling sites to buy from other markets. Mona market in Nongoma has become a hub for traders from various markets such as Faraday and Warwick. Mona is becoming prominent because traders from there are closer to wild populations in comparison to traders from urban areas. Therefore, traders of Mona are expected to have easier access to wild populations. Faraday and Warwick are still preferred by resource users. This could be due to the markets being centrally located in business districts, allowing for easy access. Resource harvesters are aware of changes in plant population structure, abundance and availability in the material that they use. Resource users also hold valuable information because they are using these plant materials on a daily basis to sustain their livelihoods or healing practices; hence, the decline of medicinal plants in the wild affects them. Van Andel *et al.* (2015) conducted a species distribution model for West African medicinal plants and noted that monitoring market networks helps assess potential species vulnerability and prioritize markets that are rapidly growing.

3.5 CONCLUSION

It is concerning that; KZN is the dominant area of harvest, clearly indicating the intense pressure on its wild medicinal plant populations. Faraday, Mona and Warwick are the markets most used by healers and traders. The results show where trade and harvesting occurs and thus, where people are more likely to acquire plants from. Conservation officials need to keep note of this and ensure that harvesting intermediaries are identified and involved in conservation strategies. *Warburgia salutaris* and *S. aethiopicus* are species that are observed to be declining and are thus a cultivation priority for the respondents. The majority of the ethnospecies in this study are currently Least Concern, and hence less of a conservation priority.

Ethnicity, geographical location and type of practice influence plants that resource users regard as requiring rituals and are a priority for cultivation. The distinction between what is ‘allowed’ and what is ‘not allowed’ shows that conservation efforts should always consider local traditions and customs when trying to encourage sustainable use of resources, in order to avoid conflict of interest. Furthermore, respecting ancient rituals and cultural norms is very essential to African communities as most of their worldviews are centred on the existence of ancestors. Even though times have changed, rituals and cultural norms associated with cultivating medicinal plants are still respected by both healers and traders.

3.6 REFERENCES

Ah Goo, D.F.S. 2012. *The Contribution of the Trade in Medicinal Plants to Urban Livelihoods: A Case Study of the Informal Markets in the Nelson Mandela Bay Municipality, Eastern Cape.* MSc, Nelson Mandela Metropolitan University, Port Elizabeth.

Botha, J. 2001. *Perceptions of Species Availability and Values of Medicinal Plants Traded in Areas Adjacent to the Kruger National Park*. MSc. University of the Witwatersrand, Johannesburg.

Botha, J. 2006. *The viability of conservation and social forestry outreach nurseries in South Africa*. PhD. University of the Witwatersrand, Johannesburg.

Brueton, V.J. 2013. *Trade in Commonly Used Medicinal Bulbs: Value and Ecological Implications.* MSc. University of the Witwatersrand, Johannesburg.

Cocks, M.L. and Wiersum, K.F. 2003. The significance of plant diversity to rural households in Eastern Cape Province of South Africa. *Forests, Trees and Livelihoods* 13: 39–58.

Cousins, S.R., Williams, V.L. and Witkowski, E.T.F. 2011. Quantifying the trade in cycads (*Encephalartos* spp.) in the traditional medicine markets of Johannesburg and Durban, South Africa. *Economic Botany* 65: 356–370.

Cunningham, A.B. 1993. *African Medicinal Plants: Setting Priorities at the Interface between Conservation and Primary Healthcare*. People and plants working paper 1 UNESCO, Paris.

Cunningham, A.B. 1994. Integrating local plant resources and habitat management. *Biodiversity & Conservation* 3: 104–115.

Delbanco, A, Burgess, N.D. and Cuni-Sanchez, A. 2017. Medicinal plant trade in Northern Kenya: economic importance, uses and origin. *Economic Botany* 71: 13–31.

Dold, A.P. and Cocks. M.L. 2002. The trade in medicinal plants in the Eastern Cape Province, South Africa. *South African Journal of Science* 98: 589–597.

Mahwasane, S.T., Middleton, L. and Boaduo, N. 2013. An ethnobotanical survey of indigenous knowledge on medicinal plants used by the traditional healers of the Lwamondo area, Limpopo Province, South Africa. *South African Journal of Botany* 88: 69–75.

Mander, M. and Le Breton, G. 2006. Overview of the medicinal plants industry in southern Africa. In: Diederichs, N (Ed), *Commercialising Medicinal Plants: A Southern African Guide*. Sun Press, Stellenbosch, pp: 1–9.

Masondo, N. A., Ndhlala, A. R., Aremu, A. O., Van Staden, J. and Finnie, J. F. 2013. A comparison of the pharmacological properties of garden cultivated and muthi market-sold *Bowiea volubilis*. *South African journal of botany*, 86: 135–138.

Meke, G.S., Mumba, R.F.E., Bwanali, R.J. and Williams, V.L. 2017. The trade and marketing of traditional medicines in southern and central Malawi. *International Journal of Sustainable Development & World Ecology* 24: 73–87.

Ndawonde, B.G. 2006. *Medicinal Plant Sales: A Case Study in Northern Zululand*. PhD. University of Zululand, Richards Bay.

Oladele, G.O., Alade, A.T. and Omobuwajo O.R. 2011. Medicinal plants conservation and cultivation by traditional medicine practitioners (TMPs) in Aiyedaade Local Government Area of Osun State, Nigeria. *Agriculture and Biology Journal of North America* 2: 476–487.

Petersen, L., Moll, E., Collins, R. and Hockings, M. 2012. Development of a compendium of local, wild-harvested species used in the informal economy trade, Cape Town, South Africa. *Ecology and Society* 17: 7–16

Prins, F.E. 1996. Prohibitions and pollution at a medicinal plant nursery: customary implications associated with ethnobotanical reserves in conservation areas of KwaZulu-Natal. *South African Journal of Humanities* 8: 81–93.

SANBI. 2017. Red list plants categories. http://redlist.sanbi.org/

Sarasan, V., Kite, G.C., Sileshi, G.W. and Stevenson, P.C. 2011. Applications of phytochemical and in vitro techniques for reducing over-harvesting of medicinal and pesticidal plants and generating income for the rural poor. *Plant Cell Reports* 30: 1163–1172.

Street, R.A. and Prinsloo, G. 2012. Commercially important medicinal plants of South Africa: a review. *Journal of Chemistry* 2: 1–16.

Tshisikhawe, M.P., van Rooyen, M.W. and Bhat, R.B. 2012. An evaluation of the extent and threat of bark harvesting of medicinal plant species in the Venda Region, Limpopo Province, South Africa. *International Journal of Experimental Botany* 81: 89–100.

van Andel, T.R., Croft, S., van Loon, E.E., Quiroz, D., Towns, A.M. and Raes, N. 2015. Prioritizing West African medicinal plants for conservation and sustainable extraction studies based on market surveys and species distribution models. *Biological Conservation* 181: 173–181.

Williams, V.L. 2007. *The Design of a Risk Assessment Model to Determine the Impact of the Herbal Medicine Trade on the Witwatersrand on Resources of Indigenous Plant Species*. PhD. University of the Witwatersrand, Johannesburg.

Williams, V.L., Balkwill, K. and Witkowski, E.T.F. 2000. Unravelling the market for commercial medicinal plants and plant parts on the Witwatersrand, South Africa. *Economic Botany* 54: 310–327.

Williams, V.L. and Crouch, N.R. 2017. Locating sufficient plant distribution data for accurate estimation of geographic range: The relative value of herbaria and other sources. *South African Journal of Botany* 109: 116–127.

Williams, V.L., Victor, J.E. and Crouch, N.R. 2013. Red Listed medicinal plants of South Africa: status, trends, and assessment challenges. *South African Journal of Botany* 86: 2–35.

Williams, V.L., Wojtasik, E.M. and Witkowski, E.T.F. 2011. Ethno-ecological evidence for Hydnora abyssinica occurring in Johannesburg and Durban traditional medicine markets. *South African Journal of Botany* 77: 268–279.

CHAPTER 4

The Influence of Traditional Healing Practices on Medicinal Plant Cultivation

ABSTRACT

Spiritual guidance is the driving force for traditional healers and guides them on how to conduct themselves and how to heal using medicinal plants. Hence, ancestors are regarded as the foremost entity in medicinal plant use. The aim of the chapter is to outline the differences and similarities regarding using cultivated medicinal plants amongst traditional healers of different healing practices and locations. Forty-three percent of the healers in this study were trained in the tradition of *Amakhosi*, 36% *Umndawu* and 21% 'other' (*Nyasa, Dlozi elimhlophe, Abalozi* or *Mnono)*. The type of training had no significant effect on a healer's attitude towards cultivating medicinal plants. There was no significant difference for the use of cultivated medicinal plants between the different study sites in residential areas. The majority of healers said that cultivated medicinal plants were very effective in healing their patients: Soweto had highest acceptance at 71%, followed by Umlazi at 50% and Nhlungwane at 45%. Ancestors played a significant role in guiding the use of cultivated medicinal plants by healers. Certain rituals are essential during training, and ancestors specifically require wild medicinal plants. However, the knowledge or perceptions amongst healers are not uniform and there are significant differences between them on whether wild medicinal plants are required in rituals during training. Most of the healers from this study ensured that they 'purified' material bought from markets and other healers, but the difference between the study sites was not significant. The results emphasize the role played by ancestors, and highlight the dependence of healers on ancestral guidance in order to use medicinal plants and effectively heal their patients. Furthermore, the type of training and ethnicity has an influence on the attitudes and perception of healers on cultivated medicinal plant, consequently influencing a healer's perception on conservation practices.

Keywords: conservation; ethnicity; knowledge; perception; purify; spiritual guidance; type of training.

4.1 INTRODUCTION

Traditional healers are an integral part of the African healing community. They are able to 'connect' people with the sacred world of ancestors, and this is essential to Afrocentric believers, because they believe in existence and workings of ancestors (Farrand, 1962). Traditional healers are 'called' by ancestors who come in various forms of spirits (Farrand, 1962). These spirits 'possess' an ordinary person when they are being called to train, and do not necessarily possess someone that is of the same ethnic and geographical background as they are (Farrand, 1962). The spirits are aligned with the ancestor(s) that are choosing and guiding the person to train. Traditional healing is not uniform; various forms of spirits can train a healer, but the main ancestors' spirit is the leader in the process. The different spiritual traditions are likely to have different beliefs and rituals associated with cultivation.

Beliefs about spirit possession are culturally and geographically contained, hence spirits are different from each other even though there are similar trends between them (Meveni, 2014). *Umndawu, Amandiki, Abalozi* and *Amakhosi* are various forms of spirits that possess healers, and are associated with healing in South Africa. *Umndawu* is also prevalent in other areas of African countries; they are regarded as 'go-between' spirits as they link various cultures (Meveni, 2014). *Amandiki and Amakhosi* are both of South African origin and were reported in South Africa in the mid-1890s (Meveni, 2014). In November 1910, women ranging from 14 to 30 years were brought before the tribal court of Eshowe in KZN and charged with witchcraft (Meveni, 2014). However, these women insisted that they had been possessed by the *Amandiki* spirits that caused them mental and physical suffering (Meveni, 2014). These spirits have persisted in the healing communities and are aligned with the *Amakhosi* possessions. Xhosa people regard the *Amakhosi* spirits as good spirits. *Amakhosi* is a Zulu plural word for King, and these spirits are regarded as the gods of spiritual possession (Meveni, 2014).

Amakhosi are known to come from the northern areas of South Africa and have permeated the healing training of the amaZulu and amaXhosa (Meveni, 2014). *Amakhosi* are more prevalent among the Zionist churches, and the priests of these churches utilise them in order to prophesise and heal by incorporating them into their services (Meveni, 2014). People possessing these spirits are said to be associated with the whistle blowers *Abalozi* and are very sensitive to whistle blowing (Meveni, 2014). *Abalozi* are not covered in this Dissertation because they were not encountered during the research. *Abalozi* healers make use of whistles to connect with their ancestors and the diviner interprets these whistle patterns in order to be able to help the patient (Singleton, 2010). The Abalozi healers regard birds as their sacred animal because they use the patterns of bird sounds to efficiently communicate with their ancestors during training. The Zulu kingdom and the Xhosa were left with the *Amakhosi*

ways of healing; nevertheless, there are healers from both these tribes that are possessed by *Umndawu*.

Some indigenous *Ndau* speaking people trace their historic origin from the western Zululand in South Africa and are related to people in various areas of Mozambique (Muzondi, 2014). Hence, the *Ndau* speaking people share some cultural characteristics with people in Zululand (Muzondi, 2014). Because of territorial fights during '*Mfecane'* in the 1800s, King Soshangaan moved to south-eastern Zimbabwe and settled at Gaza in Chipinge. Some of Soshangaan people moved to Maputo (Mozambique), and hence there are relations between them (Muzondi, 2014). King Shaka Zulu then banished the *Ndau* people from his clan and Soshangaan thrived with the *Ndau* tribe in Mozambique.

Traditional healing is a practice that conforms to cultural and spiritual norms that are linked with the belief of ancestor existence. In order to fulfil their duties, healers use various plant and animal parts. Consequently, plant material has a cultural value to healers and hence they are spiritually attached to them (Wiersum *et al.,* 2006). It is also believed that ancestors are responsible for the healing properties and strengths of medicinal plants, hence healers use plants relating to the choices of their ancestors (Conco, 1972; Wiersum *et al.,* 2006). Certain plant species are not only used for healing but also play a crucial role in rituals. For example, Xhosa healers use *Silene undulata, Rubia petiolaris, Ptaeroxylon obliquum* and *Olea europaea* during a ritual when an animal is sacrificed on behalf of the ancestors (Wiersum *et al*., 2006).

There are specific ways in which healers handle medicinal plants; mostly, they should be distanced from any form of impurity e.g. handling them during menstruation, after a funeral, after sexual intercourse etc. (Prins, 1996; Wiersum *et al.,* 2006). However, exposure of medicinal plants to 'pollutants' can be counteracted by incorporating specific plants into the mixtures (e.g. some healers in the Eastern Cape incorporate *Drimia capensis*) (Prins, 1996; Wiersum *et al.,* 2006). Cultivating medicinal plants in secluded places is deemed more practical as this minimises the chances of medicinal plants being polluted. In relation to this, Wiersum *et al*. (2006) reported that 28% of their respondents preferred keeping their cultivation sites a secret from other healers and people. Additionally, out of the 42% of the healers that cultivated in the Amatola region, only a quarter of the respondents had cultivated more than three species (Wiersum *et al*., 2006). Their results show that even though some healers cultivate their own plants, it is at a small scale and not effective in minimising the impact of harvesting on wild populations.

Since traditional healers undergo training in different ways, assessing their perceptions of cultivation is essential because they might differ and/or be similar to each other. It has been alleged that cultivated medicinal plants lose power and potency in comparison to those from the wild. This is true

for some healers, but gradual shifts of culture and cultural associations have changed the historic norms on perceptions of cultivation (Prins, 1996; Wiersum *et al*., 2006). Due to the differences in the ancestral spirits that train healers, and the association of ancestors with medicinal plants, there should be an understanding of what role is played by ancestral spirits in influencing the use of cultivated medicinal plants. Therefore, this chapter aims to document differences and/or similarities in perceptions, attitudes and knowledge of using cultivated plants amongst traditional healers. Furthermore, this study also investigates and documents: (i) the type of training healers received (e.g. *Umndawu* or *Amakhosi*), (ii) whether healers are taught about cultivation during their training, (iii) how the type of training influences their perceptions of using cultivated medicinal plants, (iv) the role played by ancestors in choosing whether a healer should use wild or cultivated medicinal plants, especially during training, and (v) rituals used for purification of 'polluted' medicinal plants.

4.2 METHODS

Chapter 2 details the methodology relating to this chapter. The type of training a healer received (i.e. *Umndawu* and *Amakhosi*) was analysed to assess its influence on a healer's knowledge/perceptions of cultivating medicinal plants. Healers were asked about the effectiveness of cultivated medicinal plants in healing patients, and the results were compared between the three study areas and within a study site. Healers were also asked about the role played by ancestors in guiding healing practices, and the ancestral influence was assessed concerning their role in accepting the use of cultivated medicinal plants by a healer. Furthermore, healers were questioned whether ancestors require only wild medicinal plants during training; the results were compared between and within sites. Lastly, potency and purity is very important to healers, hence healers were asked whether they made use of purification rituals to rid plants acquired from markets and other people of pollution. Pearson's χ^2 and Fishers Exact test was used for statistical analysis because it was categorical data and some values were ≤ 5. Pearson's χ^2 was used to analyse the influence that the type of training has on a healers understanding and use of cultivated medicinal plants. Fisher's Exact test was then used to compare awareness of using and/or cultivating plant material by healers, effectiveness of cultivated medicinal plants on patients, ancestor's role about acceptance/disapproval of cultivating medicinal plants and the use of cultural methods to purify.

4.3 RESULTS

Forty-three percent of the healers were trained in the tradition of *Amakhosi*, 36% with *Umndawu* and 21% with 'other' (*Nyasa, Dlozi elimhlophe, Abalozi* or *Mnono)* (Figure 4.1). The type of training significantly influenced a healer's knowledge and/or perception of cultivating medicinal plants: 61% of the *Amakhosi* and 56% 'other' trained healers said they were not taught about cultivation, and 53% of *Umndawu* trained healers said they were (Table 4.1). Overall, healers said they used cultivated

medicinal plants to heal their patients and there was no significant difference in the use of cultivated medicinal plants among the respondents at the different study sites (p=0.99) (Table 4.1).

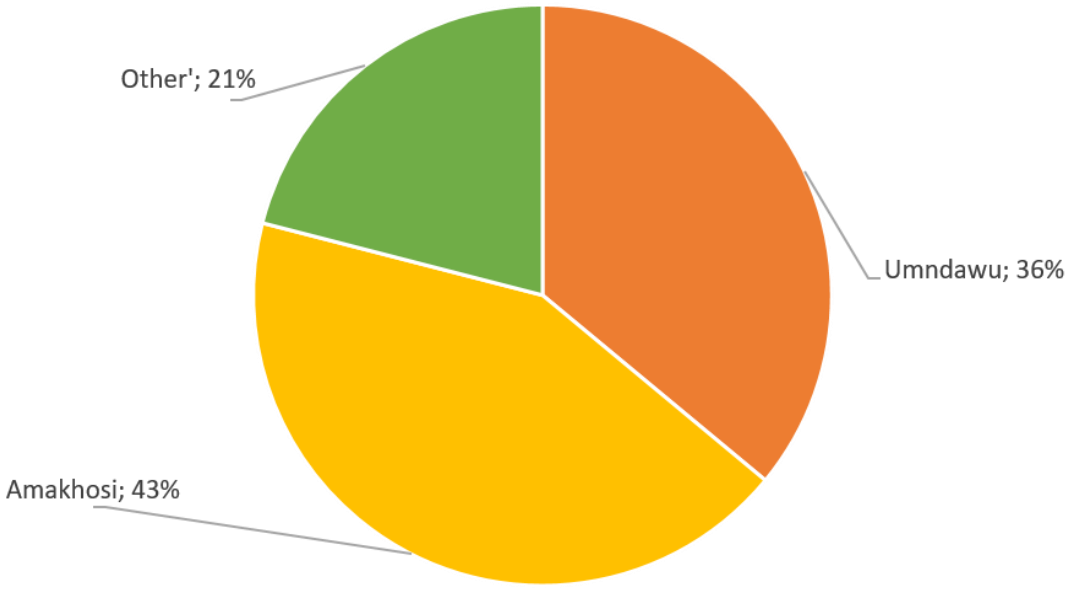


Figure 4.1. Proportion of the types of healing training that healers participating in this study went through during initiation (other = *Nyasa, Dlozi elimhlophe, Abalozi, Mnono)* (Total number of respondents, n = 42).

Table 4.1. Comparison the influence that the type of training has on the healer's awareness of cultivating and using medicinal plants.

Response	**Were you taught about cultivation during training?[1]**				**Have you used cultivated medicinal plants in your practice?[2]**			
	Umndawu	Amakhosi	'Other'	Total	Umlazi	Nhlungwane	Soweto	Total
Yes	8 (53%)	7 (39%)	4 (44%)	19 (45%)	8 (80%)	9 (82%)	17 (81%)	34 (81%)
No	7 (47%)	11 (61%)	5 (56%)	23 (55%)	2 (20%)	2 (18%)	4 (19%)	8 (19%)
Total, n	15	18	9	42	10	11	21	42

[1]= χ^2=4.062, df=2, p<0.05, [2]=χ^2=0.0112, df=2, p=0.99.

The majority of healers said that cultivated medicinal plants were very effective in healing their patients; more Soweto healers reported cultivated plants being 'very effective' (71%), followed by Umlazi (50%) and Nhlungwane (45%) (Figure 4.2). There was a significant difference amongst healers with regard to the role played by ancestors with healers using cultivated medicinal plants in their practices (p<0.001) (Table 4.2), but overall 62% said there are situations in which the ancestors will disregard the use of cultivated medicinal plants (i.e. refuse the use of cultivated medicinal plants). Furthermore, healers from different areas sometimes had opposing views about wild medicinal plants being required by ancestors in certain rituals during training (p<0.05) (Table 4.2). The majority of healers from Umlazi (80%) and Soweto (76%) said 'yes' to ancestors requiring wild medicinal plants during training, whereas 73% of healers from Nhlungwane said that ancestors do not necessarily require wild medicinal plants for rituals during training (Table 4.2). The majority of healers said they

made use of traditional 'purifying' methods on the material that they acquired from markets and/or other healers, but the differences between the sites was not significant (Table 4.3).

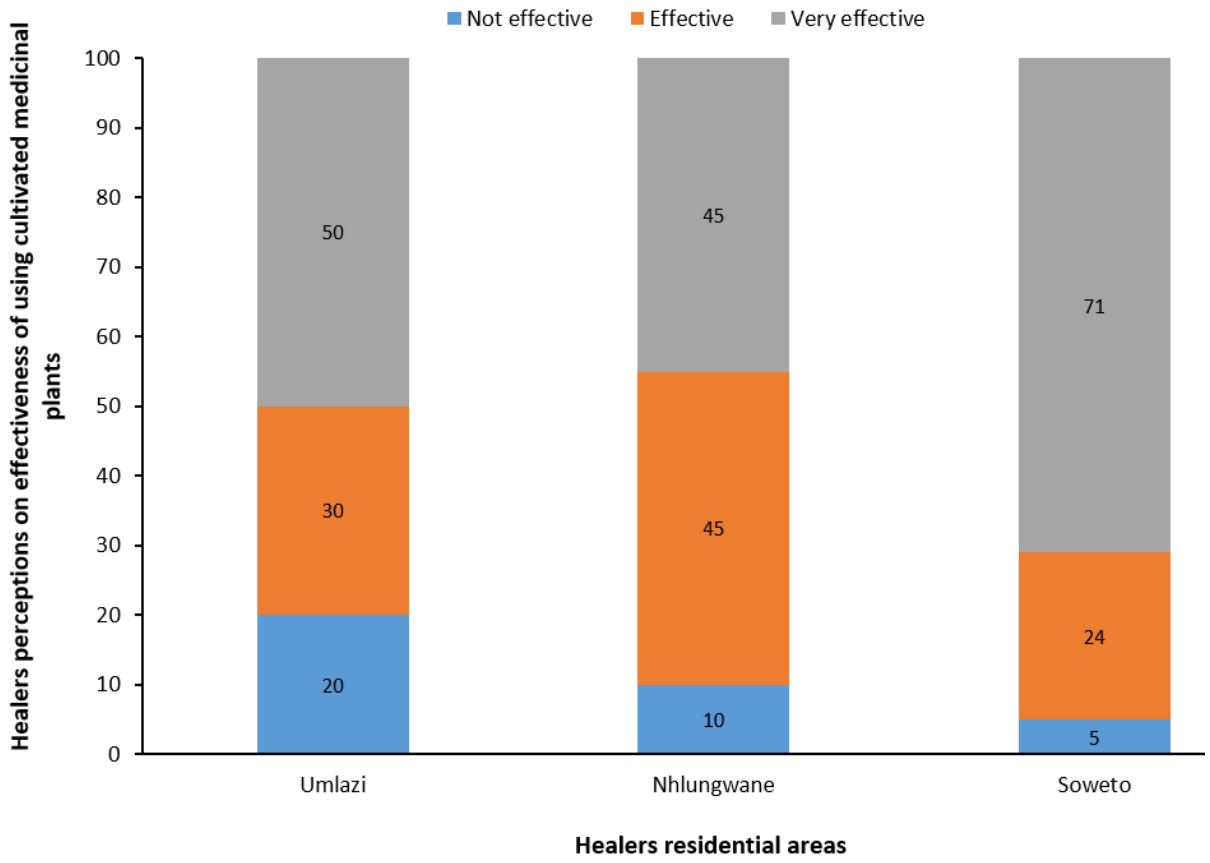


Figure 4.2. Percentages of healers indicating how effective cultivated medicinal plants are in healing their patients, in three different residential sample sites. Fishers Exact test: p=0.40.

Table 4.2. Comparing healers' responses to their ancestor's role in the acceptance/disapproval of cultivated medicinal plants (N=42).

Response	Are there situations whereby ancestors disregard use of cultivated medicinal plants? [1]				Do ancestors require only wild plants in certain procedures during training? [2]			
	Umlazi	Nhlungwane	Soweto	Total	Umlazi	Nhlungwane	Soweto	Total
Yes	6 (60%)	2 (18%)	18 (86%)	26 (62%)	8 (80%)	3 (27%)	16 (76%)	27 (64%)
No	4 (40%)	9 (82%)	3 (14%)	16 (38%)	2 (20%)	8 (73%)	5 (24%)	15 (36%)
Total, n	10	11	21	42	10	11	21	42

[1] Fishers Exact test= 1: p<0.001; [2] Fishers Exact test= 1: p<0.05

Table 4.3. **Comparison of whether cultural methods should be used by healers to 'purify' plant materials bought from markets and/or other healers (N=42) [%]. Fishers Exact test: p=0.36.**

Response	Umlazi	Nhlungwane	Soweto	Total
Yes	9 (90%)	7 (64%)	11 (52%)	27 (64%)
No	1 (10%)	4 (36%)	10 (48%)	15 (36%)
Total, n	10	11	21	42

4.4 DISCUSSION

Spiritual guidance is essential in traditional healing and influences how healers heal and use medicinal plants. The role played by ancestors is essential because they are responsible for selecting a person that they see fit to uphold healing practices. As already explained, healing practices differ amongst healers and these differences are further influenced by ethnicity and geographical location. There were healers from other countries, namely, Malawi, Zimbabwe and Lesotho – hence there is the 'other' category as some of their healing practices were not *Umndawu* or *Amakhosi*.

The results of this study show that the type of healing did not influence a healer's knowledge and perceptions of cultivating plants, with both types of healing practices having healers that cultivate and use cultivated medicinal plants. *Umndawu* trained healers had more (53%) respondents that were taught cultivation during training whereas, the majority (61%) of *Amakhosi* trained healers were not taught. Oladele *et al*. (2011) documented that 87% healers from Osun state (Nigeria) make use of cultivated medicinal plants if they are made available to them, and this shows that some healing traditions are adapting to using cultivated medicinal plants – which is a positive result for conservation interventions.

The significant difference in healers being taught about cultivation between *Umndawu* and *Amakhosi* trained healers can be attributed to the different ways in which healers are trained. Despite the differences, the increased interactions between healers of different practices have allowed healers to gain access to information from various areas. If healers perceive these other practices to be beneficial to them, then they are frequently incorporated into their own practices. Nevertheless, the result that most *Amakhosi*–trained healers were not taught about cultivation during training is concerning because it shows that even though wild populations are declining, there are still trainers who do not see the need to teach their trainees about cultivation. A study by Ibrahim *et al*. (2015) in Nasawara state (Nigeria) researched a different concept about healers using cultivated medicinal plants and documented that some healers (58%) had the belief that medicinal plants will be there forever; therefore, they did not see the need to cultivate them or to teach others about cultivation. Ibrahim *et al*. (2015) results show the kind of impact that types of training have on prospects for conservation.

The spiritual dimension of using cultivated medicinal plants has not been thoroughly presented in the literature. Some healers were not previously exposed to medicinal plants until they accepted the calling and trained to become healers. Therefore, their primary medicinal plant knowledge is dependent on their trainers' perceptions and knowledge, and the guidance of the trainees' ancestral spirits. Farrand (1962) emphasised that an understanding of the different healing practices allows researchers to understand the role played by healers in indigenous cultures and the use of medicinal plants. The majority of the healers in this study had used cultivated medicinal plants in their practices,

and agreed that they are as effective as wild collected plants when healing their patients. Using cultivated medicinal plants seems to be a gradual shift in what was previously believed about cultivated medicinal plants being less potent when compared to wild. Consistent to the current study, 92% of healers from Blouberg area (Limpopo Province) said they would use cultivated plants if they were available and they would appreciate having a nursery in their area (Mathibela *et al*., 2015). Furthermore, 11% of those healers were already growing medicinal plants and using them in their practices. The results from Mathibela *et al*. (2015) emphasised that wild populations are gradually declining and healers have no option but to cultivate plants in order to sustain their practices. Even though healers are gradually accepting the use of cultivated medicinal plants, they have to ensure that certain purification rituals are upheld to prevent compromising the healing qualities of that plant.

Some respondents emphasised that it is essential to mix the cultivated medicinal plant with wild ones to ensure better performance of the medicine. The majority of the interviewed healers indicated that they make use of purification methods for cultivated medicinal plants and there was no significant difference between the three research sites – further emphasising the importance for healers to purify their medicinal plants before use. Most of the purification rituals involve spraying plants with a mixture made of *Cymbopogon* spp., chicken blood and bile and white beads before medicinal plants that are either bought or cultivated are cut into pieces and crushed to powder. It is believed that this mixture cleanses plants from any form of pollution and allows it to be effective when used for healing. The results are similar to a study by Prins (1996), in which healers that were cultivating made use of purification methods such as sprinkling the entrance to home gardens with *Cymbopogon* spp.

A study by Mishra *et al*. (2009) showed that socio-cultural backgrounds, interactions of local communities and age influence a person's level of traditional knowledge. Training is a very delicate and significant process in the healing community. The results of my study showed that healers had opposing views with regard to wild medicinal plants being required by ancestors during training. Similarly, Kelatwang and Abbot (2002) found that there are significant associations between the types of plants a healer uses and the type of healer, further emphasising the differences between healers and the role played by ancestors. The majority of healers emphasized that it is essential to have wild medicinal plants only as they are believed to be highly connected with ancestors. On the other hand, some healers emphasised that as long as a plant is properly harvested and prepared by the trainer for the trainee, it does not really matter whether it is cultivated or wild. One healer explained that certain procedures have changed because training practices have gradually changed from what they used to be, and certain processes or customs are not adhered to anymore. The loss of certain procedures during training might be influenced by monetary reasons, because some trainers only focus on financial gain and disregard the guidance of the ancestors. Thus, the differences in the use and acceptance of cultivated medicinal plants can be related to how a healer was trained and the

geographical location of the training (as one would expect trainees from rural areas to be closer to wild plants than trainees from urban areas) (Dold and Cocks, 2002). Therefore, discrepancies between cultural and utilitarian uses of wild medicinal species are not absolute but relative (Cocks and Wiersum, 2003).

The majority of healers from Blouberg, Limpopo province (82%) do not use their trainees to collect plants because healers believe that trainees are not fully equipped to observe the relevant rituals when collecting plants (Mathibela *et al*., 2015). Nonetheless, according to Venda traditional healers in South Africa, they train their trainees to be as good as them when collecting plant material and ensure that ritual knowledge is passed down to them before they graduate (Mathibela *et al*., 2015). The results of the findings from Adekola and Egbo's (2016) study in Enugu state (Nigeria) showed that people resist and reject any community programme/development that does not respect and/or conform to their customs and traditions. Therefore, it is essential that researchers understand resource users cultures to ensure that cultural values are assimilated in conserving biodiversity (Cocks and Dold, 2006).

4.5 CONCLUSION

Ancestors guide cultural customs and rituals performed and upheld by healers. The type of training and geographical location influences the level of knowledge that a healer has concerning medicinal plant use, and consequently influences their perceptions and knowledge on the use of cultivated medicinal plants. Most healers are gradually accepting the use of cultivated medicinal plants and this is a step in the right direction. Approaching conservation practices from the basis of the type of training received by the healers of that particular area can ensure that beliefs of all stakeholders involved are respected and included in decision-making processes. The results indicate that conservation initiatives, such as cultivation, should start locally and be site-specific as there was evidence of opposing views about ancestors accepting the use of cultivated medicinal plants.

Purification rituals are essential to healers to ensure that their healing materials are culturally appropriate before they are administered. Cultural customs associated with using cultivated medicinal plants needs to be studied in detail to make certain that 'pollutants' at cultivation sites are minimised. Healers from urban areas are generally more exposed to different types of healing traditions due to interactions with immigrant healers from various parts of Africa and other parts of the world. Hence, their views are somewhat different from healers in rural areas, who are mostly exposed to what they were only taught by their trainer. Therefore, different healing practices in Africa need to be studied further and evaluated. Furthermore, the study highlighted that these healing practices have an impact on conservation strategies of healers and that can help conservationists to implement management plans that are more culturally appropriate.

4.6 REFERENCES

Adekola, G. and Egbo, N. C. 2016. Traditions and customs in community development: the case of Nkanu West and Nkanu East Local Government Areas of Enugu State, Nigeria. *Journal of Education and Practice* 18: 120–127.

Cocks, M.L. and Dold, A.P. 2006. Cultural significance of biodiversity: the role of medicinal plants in urban African cultural practices in the Eastern Cape, South Africa. *Journal of Ethnobiology* 26: 6–81.

Cocks, M.L. and Wiersum, K.F. 2003. The significance of plant diversity to rural households in Eastern Cape Province of South Africa. *Forests, Trees and Livelihoods* 13: 39–58.

Conco, W.Z. 1972. The African Bantu traditional practice of medicine: some preliminary observations. *Social Science and Medicine* 6: 283–322.

Dold, A.P. and Cocks, M.L. 2002. The trade in medicinal plants in the Eastern Cape Province, South Africa. *South African Journal of Science* 98: 589–597.

Farrand, D. 1962. *An Analysis of Indigenous Healing in Suburban Johannesburg*. MSc. University of the Witwatersrand, Johannesburg.

Ibrahim, J.A., Henry, O., Adeola, E., Jegede, I., Ugbabe, G.E., Muazzam, I., Kunle, O.F. and Karniyus S.G. 2015. Medicinal plants used and the perception of plant endangerment by the traditional medicine practitioners of Nasarawa State, Nigeria: a pilot study. *International Journal of Biodiversity and Conservation* 8: 8–20.

Kelatwang, S. and Abbot, P.G. 2002. *Medicinal Plant Gardens: Promoting Plant Conservation or Rural Economic Development.* Report for Department of Water Affairs and Forestry, Pretoria.

Mathibela, M.K., Egan, B. A., Du Plessis, H.J. and Potgieter, M.J. 2015. Socio-cultural profile of Bapedi traditional healers as indigenous knowledge custodians and conservation partners in the Blouberg area, Limpopo Province, South Africa. *Journal of Ethnobiology and Ethnomedicine* 11: 49–54.

Meveni, S.D. 2014. *Spirit Possession and Social Panic: Amakhosi Possession and Behaviour among Learners in Selected Schools in Mdantsane Township*. MSc. University of Fort Hare, Eastern Cape.

Mishra, S., Singh, R.K. and Singh, A. 2009. Dynamics of Adi women's traditional foods in varying socio-ecological systems of Arunachal Pradesh: a source of learning and inspiration. In: A. Lindgreen and M.K. Hingley, Eds. *The New Cultures of Food: Marketing Opportunities from Ethnic, Religious and Cultural Diversity*. Farnham, Gower. pp: 203–222.

Muzondi, N. 2014. *The Contribution of Traditional Belief Systems in Biodiversity Conservation among the Ndau People in Nyagadza Community in Chipenge*. MSc. Midlands states University.

Oladele, G.O., Alade, A.T. and Omobuwajo O.R. 2011. Medicinal plants conservation and cultivation by traditional medicine practitioners (TMPs) in Aiyedaade Local Government Area of Osun State, Nigeria. *Agriculture and Biology Journal of North America* 2: 476–487.

Prins, F.E. 1996. Prohibitions and pollution at a medicinal plant nursery: customary implications associated with ethnobotanical reserves in conservation areas of KwaZulu-Natal. *South African Journal of Humanities* 8: 81–93.

Singh, R.K., Pretty, J. and Sarah Pilgrim, S. 2010. Traditional knowledge and biocultural diversity: learning from tribal communities for sustainable development in northeast India. *Journal of Environmental Planning and Management* 53: 511–533.

Wiersum, K. F., Dold, A. P., Husselman, M., and Cocks, M. L. 2006. Cultivation of medicinal plants as a tool for biodiversity conservation and poverty alleviation in the Amatola region, South Africa, in Bogers, R. (Ed), *Medicinal and Aromatic Plants*. Springer, Dordrecht.

CHAPTER 5

Comparing Perceptions, Attitudes and Knowledge of Using Cultivated Medicinal Plants between Healers and Traders.

ABSTRACT

A relationship between culture and nature exists, and it is important to communities and individuals that wholly and/or partly depend on the natural environment for their livelihoods. Traditional medicine is a socio-cultural entity and embraces customs, practices and traditions, which are part of distinctive African cultures. The aim of the chapter was to compare perceptions, attitudes and knowledge between healers and traders about spiritual and cultural limitations concerning cultivated medicinal plants. Furthermore, assess the practicality of using cultivated medicinal plants. There was a significant difference between healers and traders about knowledge of cultural and/or spiritual limitations with using cultivated medicinal plants. The majority of healers (67%) were aware of the limitations, but most traders (54%) were not. Similarly, the majority of healers and traders did not cultivate medicinal plants (64% each). However, the majority of healers and traders perceived cultivation as a solution to declining wild medicinal plants (74% and 83% of the healers and traders respectively). Most healers (55%) said they do not cultivate due to lack of water resources, whereas the majority of traders (54%) mentioned that time prevented them from cultivating. Hence, there was a significant difference between the reasons given by healers and traders. Furthermore, healers and traders that cultivated plants obtained most of their propagation materials from the wild (67% and 81% respectively). The majority of healers and traders (58% each) would prefer that stakeholders such as 'other' (farming) be at the forefront of commercialising medicinal plant cultivation. Both healers and traders mentioned that ritual practices during harvesting are no longer common, and there is no significant difference between their perceptions. Healers and traders are mostly interested in buying cultivated medicinal plants if they were available. The study indicates that there are some differences between healers and traders in perceptions, attitudes and knowledge about cultivated medicinal plants; however, these differences are not significant enough to address healers and traders separately concerning conservation initiatives. More importantly, just like healers, traders should be more involved in conservation and management plans.

Keywords: African cultures; cultivation; cultural imitations; socio-cultural; spiritual limitations; traditional medicine.

5.1 INTRODUCTION

The relationship between culture and nature is essential in communities where there is a greater dependence of humans on the natural environment (Louw, 2016). Traditional medicine is a socio-cultural reality and includes medical activities that involve customs, practices and traditions. Kajawu *et al*. (2016) showed that in Zimbabwe, patients with mental disorders prefer that traditional medicine be part of their treatment because it meets all their cultural expectations, and it involves spiritual power and rituals that are essential for their social wellbeing.

Medicinal plant traders and healers are the primary custodians of the *muthi* trade. Healers and traders generate incomes and livelihoods from either the practice or trade of medicinal plants. Meke *et al*. (2017) in Malawi reported that for 90% of the people surveyed, >50% of the household income was derived from selling medicinal plants traders. During training, healers are taught how to use and administer medicinal plants (Hammond-Tooke, 1989). On the other hand, traders do not necessarily have ancestors that guide them on how to work with medicinal plants; instead, traders depend on information that they get from other traders and/or elders in their family that are healers and/or who have knowledge of medicinal plants. Healers and traders tend to have a lot of knowledge with reference to medicinal plants, even though their knowledge is acquired in different ways.

Cultivation has been considered a means to remove the pressure on wild medicinal plants. Healers and some traders previously viewed cultivation as a non-viable solution to declining medicinal plants, with some healers cultivating only if they had a home garden or a secluded place (Kelatwang and Abbot, 2002). For instance, herbalists in Dire Dawa, Eastern Ethiopia, said that they needed to keep traditional knowledge confidential; therefore, most herbalists were not interested in cultivating medicinal plants (Kebede *et al*., 2017).

Most traders require plant material on a weekly or monthly basis in order to sustain their business. Therefore, traders have perceived cultivation as something that will put pressure on their business due to the time required for the plants to grow, time taken to irrigate, and land to cultivate the plants (Ah Goo, 2012). Nonetheless, due to the decline in wild medicinal plants, some healers and traders are accepting of cultivated medicinal plants. Loundou (2008) conducted a study in Western Cape and reported that 78% of respondents were willing to use and buy cultivated medicinal plants. Moreover, some respondents from Louw's (2016) study indicated that they would buy seeds of particular plants if they could not get propagation material from wild populations' cuttings. The study further noted that cultivation results in the respondents keeping their culture while treating their own ailments.

Cultural controls on how medicinal plants were harvested once existed (Tshisikhawe *et al*., 2012; Rankoana, 2016). For example, in Benin and Gabon most plants that are used for rituals to prevent and treat culture-bound illnesses should be harvested from the wild (Quiroz *et al*., 2016). One difference between healers and traders is that some healers ensure that plants they get from the markets are purified (Prins, 1996). Some traders are not aware of purification rituals and it is not a common practice among traders. Traders are more worried about selling their stock (because some of their clients are not healers) (Ah Goo, 2012). On the other hand, healers want to appease the ancestor, even though some of the material they use is bought from markets (Bhat, 2014).

Healers and traders believe that there are certain spiritual limitations to using cultivated medicinal plants. The knowledge and perception of medicinal plant uses are linked with spiritual powers that go beyond the limits of pure empirical scientific study, and are adhered to by rituals such as animal sacrifice and appeasing the ancestors (Bhat, 2014). Traders work with medicinal plants daily, yet their essential perceptions on cultivated medicinal plants are rarely researched. Furthermore, some healers have accused traders of being the reason why wild populations are declining. Therefore, this chapter investigates the differences and/or similarities in perceptions, attitudes and knowledge of using cultivated medicinal plants between healers and traders, and assesses the practicality of using cultivated medicinal plants. Furthermore, this study also investigates and/or documents: (i) the acceptability and limitations of using cultivated medicinal plants between healers and traders, (ii) how healers and traders get propagation material, (iii) cultivation methods that are generally preferred by healers and traders, (iv) whether harvesting rituals are still common, and (v) the likelihood of healers and traders purchasing cultivated medicinal plants if they were available to them.

5.2 METHODS

The outline of how surveys were conducted and analysis of data are documented in Chapter 2. The acceptability and limitations of using cultivated medicinal plants was tabulated and compared between healers and traders. Respondents were not specifically asked to name the cultural and spiritual limitations; however, some were able to mention a few. Healers and traders that were not able to cultivate gave reasons for not doing so. Their responses were graphed and compared between the two groups. Healers and traders that said they are already cultivating were asked where they obtain propagation material; their responses were graphed and compared. Healers and traders were also asked to name their preferred cultivation method, and responses were compared between the two groups. Healers and traders were asked if rituals are still common during harvesting, and their responses were compared between the two groups. The study surveyed how many healers and/or traders would buy cultivated plants if they were available. Healers and traders responses were ranked from least likely to most likely to buy cultivated material. All results were statistically analysed using χ^2 tests.

5.3 RESULTS

Knowledge of cultural and/or spiritual limitations about using cultivated medicinal plants differed significantly between healers and traders ($p<0.05$). Most healers (67%) were aware of limitations, whereas most traders (54%) were not (Table 5.1). Most healers and traders (64% each) did not cultivate medicinal plants. Nevertheless, the majority of respondents agreed that cultivation is a solution to over-harvesting (74% and 83% of healers and traders respectively); the differences were not significant for both categories ($p=0.97$ and $p=0.22$ respectively) (Table 5.1). Most healers (55%) said they do not cultivate due to lack of water resources, while the majority of traders (54%) mentioned lack of time as the reason. The difference in reasons that limit cultivation given by healers and traders is significant ($p<0.05$) (Figure 5.1).

Table 5.1. Comparing the acceptability and limitations of using cultivated medicinal plants between healers and traders, whether respondents are already cultivating and if they perceive cultivation as a solution for declining wild populations [H=Healers (n=42), T=Traders (n=72)].

Response	Are there cultural/spiritual limitations to using cultivated plants?[1]		Are respondents cultivating plants?[2]		Is cultivation a solution to over-harvesting?[3]	
	H	T	H	T	H	T
Yes	28 [67%]	29 [40%]	15 [36%]	26 [36%]	11 [26%]	12 [16%]
No	11 [26%]	39 [54%]	27 [64%]	46 [64%]	31 [74%]	60 [83%]
Don't know	3 [7%]	4 [6%]	-	-	-	-

[1] $\chi^2 = 8.537$, df=1, $p<0.05$; [2] $\chi^2 = 0.002$, df=1, $p=0.97$; [3] $\chi^2 = 1.494$, df=1, $p=0.22$.

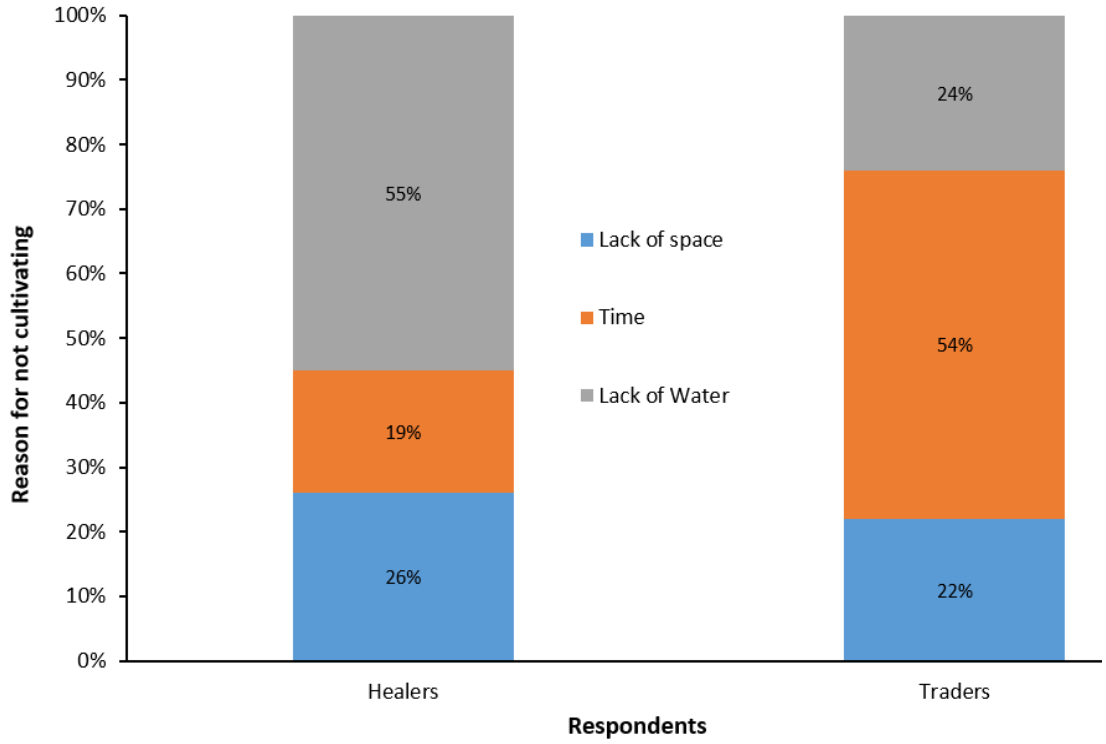


Figure 5.1. Reasons mentioned by healers and traders for not cultivating medicinal plants (Healers (n=27), Traders (n=46)). $\chi^2=10.226$, df=2, $p<0.05$.

Healers and traders that cultivated plants (n= 15 and 26 respectively) acquired most of their propagation material from natural populations (i.e. from the wild) (67% and 81% respectively) (Figure 5.2). The majority of healers and traders (58% each) mentioned 'other' (farming) as a way that can be used to ensure massive propagation of medicinal plants to allow wild medicinal plants to recover from over-harvesting; while some traders (17%) and healers (7%) preferred nurseries, other healers (25%) and traders (35%) preferred for home gardens (Figure 5.3). Both healers and traders mentioned that ritual practices during harvesting are not common anymore and are most likely not performed (50% and 51% of that opinion respectively) (Figure 5.4); there is no significant difference between their perceptions (p=0.33). Healers and traders varied significantly (p<0.0001) in their likelihood to purchase cultivated plants (Figure 5.5). Seventy-four percent of traders and 36% of healers would 'most likely' purchase medicinal plants if they were available, whereas only 10% and 7% of traders and healers respectively are unlikely to do so (Figure 5.5).

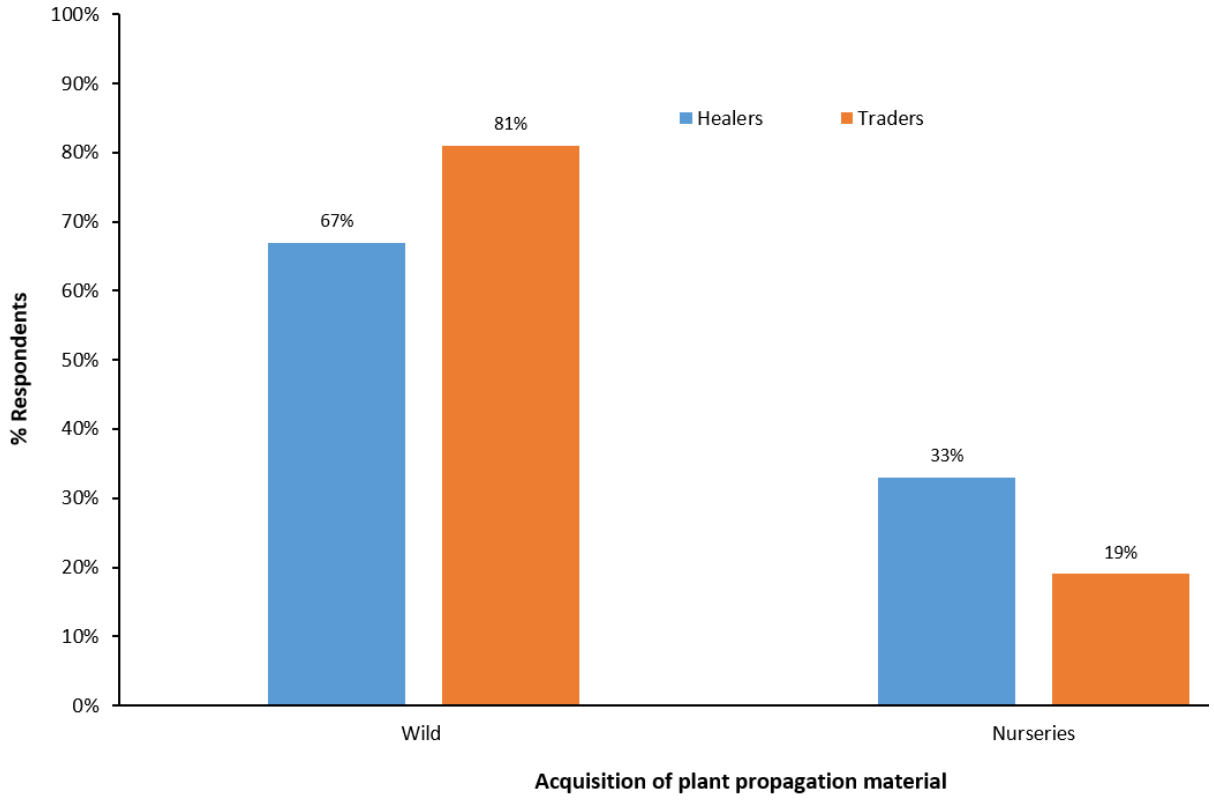


Figure 5.2. Comparison of where healers and traders obtain the materials that they use to cultivate (Healers (n=15), Traders (n=26)). χ^2=1.026, df=1, p=0.31**.**

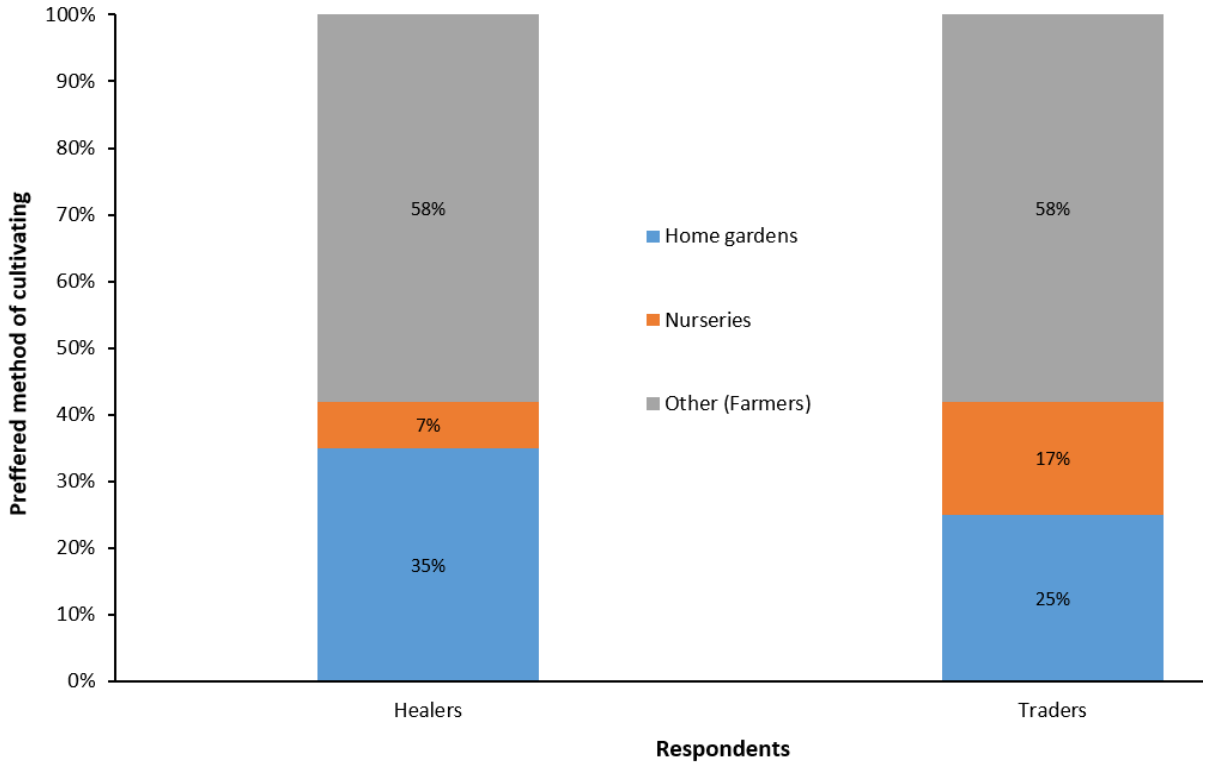


Figure 5.3. Methods mentioned by healers and traders as preferences for cultivating medicinal plants (Healers (n=42), Traders (n=72)). χ^2=2.404, df=2, p=0.30.

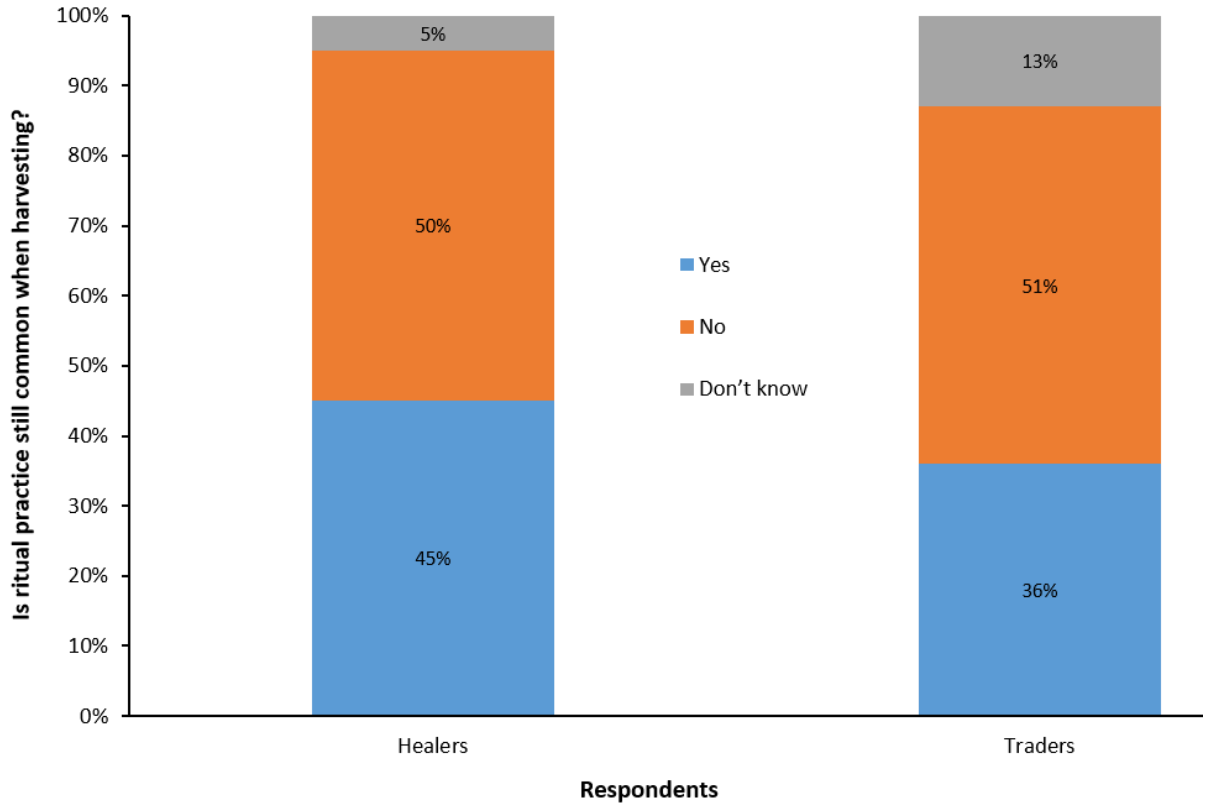


Figure 5.4. Comparison between healers and traders on their perception of whether harvesters perform rituals while harvesting plants (Healers (n=42), Traders (n=72)). χ^2=2.216, df=2, p=0.33.

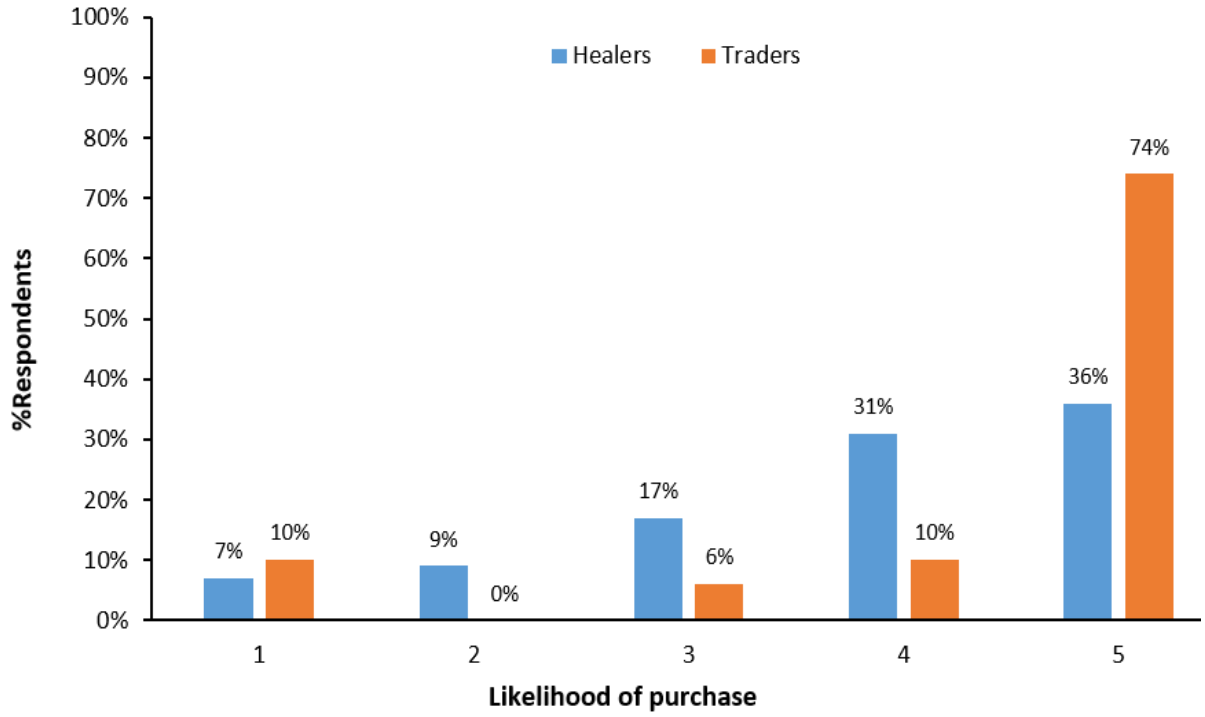


Figure 5.5. Percentage comparison of the likelihood that healers and traders would purchase cultivated medicinal plants (if they were available), where 1=unlikely, 2=least likely, 3=neutral, 4=likely, 5=most likely (Healers (n=42), Traders (n=72)). χ^2=22.64, df=4, p<0.0001.

5.4 DISCUSSION

The current study showed that while some similarities do exist between traders and healers, there are important differences in their perceptions and attitudes towards cultivated medicinal plants. Cultural and spiritual norms of using cultivated medicinal plants are mostly mentioned during healer training. However, traders rarely have access to this information unless their relatives and/or parents are trained healers. Some traders make it their responsibility to access to this information from other healers to ensure that they sell the right medicinal plants to their clients (who are mostly healers). Traders risk losing clients if they do not have correct information about cultural norms of medicinal plants. There was a significant difference in opinion as to whether there are spiritual and cultural limitations to using medicinal plants, between healers and traders: 67% of healers said there are limitations whereas 54% traders said there are not. The results also indicate that traders are working with medicinal plants to earn an income, and most are unaware of spiritual limitations. Even though the majority of healers declared that there are spiritual limitations, the few that were not aware of them indicates that cultural customs are not uniform within the healing community. Furthermore, a persons' ethnicity and/or tribe influence cultural customs, which sometimes results in conflicting perceptions and knowledge about cultural and spiritual limitations of cultivated medicinal plants.

Some healers and traders mentioned that certain rituals require wild medicinal plants only and that cultivated medicinal plants would not be adequate. Ngubeni (2015) documented that healers indicated

that plants that were show to them via dreams, should be collected from the wild. Plants from the wild are specifically required for rituals, such as those done to prevent lightning from striking homes, protecting homes from 'witchcraft', and ridding a person of bad luck. Wild medicinal plants are said to be required in these rituals because they are believed to be more affiliated with the ancestors and gods, and have less human influence because they do not grow near homesteads.

It is essential to document the reasons that deter healers and traders from cultivation. Of the 64% healers that said they do not cultivate, the majority (55%) said that lack of water was the primary reason. On the other hand, of the 64% traders that said they do not cultivate, 54% mentioned that cultivation takes time. Most traders mentioned time (a factor that dissuades them from cultivating) because some plants take time to grow and every day traders are required to be at their selling stations. Healers mentioned that they mostly make use of the space in their homesteads, but it is a challenge to commercially propagate and cultivate medicinal plants due to water scarcity. Hence, some healers do not cultivate plants. A study conducted by Louw (2016) showed that 40% of respondents do not cultivate because the plants grow near their home and they believed that the seeds would be pushed by the wind and end up in their yards. In contrast, 40% said they do not cultivate because of their working hours so they are too tired to work in their gardens when they get home (Louw, 2016). The varying reasons for not cultivating indicates that perceptions and knowledge are not uniform, and are shaped by worldviews and, in some instances, by experience and household circumstances.

Water is a scarce resource and a factor that hinders mass propagation. The results of this study are consistent with the study by Wiersum *et al*. (2006), in which they found that cultivation is slowed down by lack of water for irrigation. They further found that lack of experience and knowledge on how to properly cultivate with respect to light and soil conditions hindered expansion of local cultivation by healers. On the other hand, a study by Oladele *et al.* (2011) in Nigeria found that 47% of healers said 'lack of land' was their reason for not cultivating and 22% had no time to cultivate. Furthermore, Oladele *et al.* (2011) documented a significant difference between healers that cultivate, and those that buy cultivated medicinal plants and mentioned that once healers have access to material they can buy, they are less likely to grow plants themselves.

Healers and traders said they use cuttings from the wild to cultivate, and are not given propagation materials by nurseries or any government departments or projects. Healers and traders are aware of the declining wild medicinal plants – hence some of them are slowly adapting to using cultivated medicinal plants. The results of this study corresponds to a study by Ngubeni (2015) in which more than 50% of the respondents' indicated a willingness to cultivate, 30% were willing to buy and cultivate medicinal plants, and 18% were willing to buy cultivated plants. The adaptation of resources

users to cultivation is an achievement because it creates a platform for engagement between resource user and environmental managers. A study conducted in Himalaya by Kuniyal *et al*. (2014) showed that lack of propagating material reduced yield from cultivation because traders and healers had to wait longer periods to propagate materials, thus leading to slower progress of mass propagation. Lack of propagation material from other sources besides the wild might be due to some healers and/or traders not being nearer to nurseries that can possibly provide (sell and/or give away) propagation material.

Wiersum *et al*. (2006) found that most healers in the Amatola region were cultivating bulbous and herbaceous plants because they were easy to cultivate and took less time to reach reproductive stages. Furthermore, most propagated material was collected from the wild and transplanted in their home gardens (Wiersum *et al*., 2006). Problems such as lack of land and propagation materials have encouraged healers to carry on collecting materials from the wild. In addition, it is concerning that healers and traders depend on the wild for cuttings because of declining populations in the wild, i.e. they might not be able to cultivate a certain species if it is not available in their area. In order to obtain good conservation revenue from cultivation, ways should be identified as to how propagation material will reach resource users; this will also help healers and traders to depend less on wild populations as this might further decrease the already declining populations.

The results of this study showed that most healers and traders perceive cultivation as a solution to declining wild populations; however, they would prefer that cultivation be the responsibility of other stakeholders like farmers. Even though healers and traders perceive cultivation as a solution, they do not want to take personal responsibility to massively and/or commercially propagate. The results confirm the reality that most healers and traders do not have access to land, farming resources and water. Hence, extensive propagation has been a challenge for those healers and traders that have already started cultivating. Meke *et al.* (2017) showed that 67% traders from markets in Malawi perceive propagation as the solution, 26% sustainable harvesting and 7% said that restricting harvesting would mitigate the impact on wild populations. Furthermore, Meke *et al.* (2017) documented that 69% of the traders acknowledge that it is their responsibility to ensure that medicinal plants are conserved, 21% said it is the governments', 7% said there should be collaboration from all stakeholders and 3% believed that NGOs should be included. By contrast, Kelatwang and Abbot (2002) showed in their study that healers perceived nurseries as the most viable option; but their emphasis on this method was on it being an income generation option.

Previously, some plant species such as *Osyridicarpos schimperianus* and *Jasminum angulare* were only collected on days when there was a full moon (Prins, 1996). The majority of healers and traders said that rituals before harvest are now uncommon. The decline in performing rituals before

harvesting plants is concerning, because this means that there is a decline in 'cultural control' over how plants are accessed. Hence, the rapid decline in wild population, and this shows that the problem might persist in the forthcoming years. Furthermore, having intermediaries such as gatherers puts a further strain on medicinal plant resources, as intermediaries are not easily accessible to researchers to attain their perceptions on declining wild populations.

It is encouraging though that healers and traders are willing to buy cultivated medicinal plants if they are made available. This willingness of healers and traders to purchase cultivated medicinal plants indicates that there is a shift in cultures and certain customs because, previously, healers and traders were reluctant to buy and use cultivated material. Louw (2016) documented that some of the respondents that do not play an active role in cultivation purchase from Rastafarians and community members that have medicinal plants in their home gardens. It is anticipated though that trader are most likely to buy cultivated medicinal plants as they are less likely to adhere to cultural and spiritual limitations of cultivated medicinal plants, because they need to sell to sustain their livelihoods and some of their clients are not healers. A study by Oladele *et al.* (2011) showed that there is a negative correlation ($r=-0,284$, $p<0.05$) between medicinal plant cultivation and resource users willingness to buy from cultivated sources. The results indicate that once healers and traders are able to cultivate their own medicinal plants, they are less likely to buy cultivated medicinal plants from someone else.

5.5 CONCLUSION

Knowledge of cultural and spiritual limitation about using cultivated medicinal plants differed between healers and traders. The differences might be attributed to healers being trained on how to use medicinal plants, whereas traders acquire knowledge from 'hearsay' and/or other members of their family and/or community. It is concerning that rituals and cultural control are no longer common during harvesting, and this gradual cultural shift is compounding the strain on wild populations. For example, certain rituals such as harvesting a particular species in winter because it was believed to cause lightning when harvested in summer ensured that a species was given enough time to recover before the subsequent harvest. Healers and traders acknowledge the decline in wild plants, and are able to suggest methods that can be used to mitigate the declines. Furthermore, healers and traders indicated that they are willing to buy cultivated medicinal plants should these plants be available. It is encouraging that some healers and traders are already cultivating their own plants. Even though healers and traders are optimistic, there are still issues like, water, land and lack of propagation materials that restrict them from cultivating. Overall, the respondents perceive cultivation as the solution, but they believe that it would be more viable to work with farmers if ever they would commercialise the cultivation of medicinal plants.

5.6 REFERENCES

Ah Goo, D.F.S. 2012. *The Contribution of the Trade in Medicinal Plants to Urban Livelihoods: a Case Study of the Informal Markets in the Nelson Mandela Bay municipality, Eastern Cape.* MSc. Nelson Mandela Metropolitan University, Port Elizabeth.

Bhat, R. B. 2014. Medicinal plants and traditional practices of Xhosa people in the Transkei region of Eastern Cape, South Africa. *Indian Journal of Traditional Knowledge* 13: 292–298.

Hammond-Tooke, W.D. 1989. *Rituals and Medicines: Indigenous Healing in South Africa*. Ad Donker, Johannesburg.

Kajawu, L., Chingarande, S. D., Jack, H., Ward, C. and Taylor, T. 2016. What do African traditional medical practitioners do in the treatment of mental disorders in Zimbabwe?. *International Journal of Culture and Mental Health* 9: 44–55.

Kebede, A., Ayalew, S., Mesfin, A. and Mulualem, G. 2017. Assessment on the Use, Knowledge and Conservation of Medicinal Plants in Selected Kebeles of Dire Dawa Administration, Eastern Ethiopia. *Journal of Plant Sciences* 5: 56–64.

Kelatwang, S. and Abbot, P.G. 2002. *Medicinal Plant Gardens: Promoting Plant Conservation or Rural Economic Development.* Report for Department of Water Affairs and Forestry, Pretoria

Kuniyal, C.P., Bhatt, V.P., Bhatt, V.P., Butola, J.S. and Sundriyal, R.C. 2014. Promoting nursery enterprise in high altitude villages: a participatory approach for conservation and commercialization of Himalayan threatened medicinal plants. *Journal of Medicinal Plants Research* 8: 1399–1407.

Louw, M. 2016. *The Social Practices of Cultivation and Gathering of Medicinal Plants in Ebenhaezer, Matzikama, Western Cape, South Africa.* MSc. University of the Western Cape, Western Cape.

Meke, G.S., Mumba, R.F.E., Bwanali, R.J. and Williams, V.L. 2017. The trade and marketing of traditional medicines in southern and central Malawi. *International Journal of Sustainable Development and World Ecology* 24: 73–87.

Ngubeni, N. 2015. *Bark Re-growth and Wood Decay in Response to Bark Stripping for Medicinal Use*. MSc. Stellenbosch University, Stellenbosch.

Oladele, G.O., Alade, A.T. and Omobuwajo O.R. 2011. Medicinal plants conservation and cultivation by traditional medicine practitioners (TMPs) in Aiyedaade Local Government Area of Osun State, Nigeria. *Agriculture and Biology Journal of North America* 2: 476–487.

Prins, F.E. 1996. Prohibitions and pollution at a medicinal plant nursery: customary implications associated with ethnobotanical reserves in conservation areas of KwaZulu-Natal. *South African Journal of Humanities* 8: 81–93.

Quiroz, D., Sosef, M. and Van Andel, T. 2016. Why ritual plant use has ethnopharmacological relevance. *Journal of Ethnopharmacology* 188: 48–56.

Rankoana, S.A. 2016. Sustainable use and management of indigenous plant resources: a case of Mantheding community in Limpopo Province, South Africa. *Sustainability* 8: 221–233.

Tshisikhawe, M.P., Van Rooyen, M.W. and Bhat, R.B. 2012. An evaluation of the extent and threat of bark harvesting of medicinal plant species in the Venda Region, Limpopo Province, South Africa. *International Journal of Experimental Botany* 81: 89–100.

Wiersum, K. F., Dold, A. P., Husselman, M., and Cocks, M. L. 2006. Cultivation of medicinal plants as a tool for biodiversity conservation and poverty alleviation in the Amatola region, South Africa, in Bogers, R. (Ed.), *Medicinal and Aromatic Plants*. Springer, Dordrecht.

CHAPTER 6

Overall Discussion and Conclusions

6.1 OVERALL DISCUSSION AND CONCLUSIONS

Traditions and cultural values of people perpetually govern their psyche, which in turn influences their choice of health care (Gyasi *et al*., 2016). Traditional medicine is still commonly used because it harmonises with the spiritual, cultural and religious beliefs of certain people (Gyasi *et al*., 2016). Culture influences health-seeking behaviour, and hence the co-dependence of Africans on their own traditional healing practices (Ndlovu, 2016). Medicinal plants do not only serve a healing purpose, but they are able to accommodate interactions between the physical and spiritual well-being of the sick person (Shirungu, 2016).

Vernacular names of medicinal plants vary regionally (Bhat, 2014); hence identifying ethnospecies is essential in ethnobotany. KwaZulu-Natal is the main source of medicinal plant material in my study, and the province has three prominent markets: Mona, Warwick and Ezimbuzini. The most prominent markets are located in the metropolitans, and the results showed that traders sometimes buy from each other. Monitoring trade would be beneficial because it could be possible to trace (with the help of DNA analysis) the origins of medicinal plants from their place of harvest to the respective markets. Furthermore, mapping out the distributions of species, their harvest and market locations is essential because it provides information about the trends between markets and healers (van Andel *et al.*, 2015).

Cultivation is an initiative that has been explored to mitigate the decline in wild medicinal plants; in some instances, healers and trader are already cultivating medicinal plants because they cannot get easier access to them from the wild. Some healers perceived cultivated medicinal plants as being inferior to wild medicinal plants. Nevertheless, it is evident from the results of the current study that the belief that cultivated plants lack potency is decreasing. Instead, healers have started to use purification rituals to eliminate any pollution a plant might have been exposed to. Furthermore, biologically, cultivation has pharmacological advantages over wild plants because environmental conditions can be controlled to produce required secondary metabolites, and it decreases the prospects of misidentification (Louw, 2016).

The absence of a relationship between ‘decreasing’ availability and being ‘allowed to cultivate’ certain plants indicates that resources users do not necessarily consider declining species to be a

cultivation priority. These results may be attributed to the respondents' personal knowledge of biological, ecological, cultural and spiritual aspects of particular species. Even though some resource users also consider the biological traits of plants, most of their perception of medicinal plant decrease is based on the availability of that particular plant in the market. Furthermore, plants that are perceived to be suitable for cultivation are selected based on traditional customs, which should be adhered to in order to ensure the efficacy of the plant is not compromised. Certain plant species are regarded as sacred medicinal plants, and thus are prioritized for conservation and the reason for the prioritization is influenced by the ecological, economic and most importantly spiritual factors, of the species (Msuya and Kideghesho, 2009).

Some species have certain ecological limitations (e.g. special soil and susceptibility to pests) and biological features (slow growth rate, low germination rates), which makes them difficult to cultivate (Sher and Alyemeni, 2010). The results showed that species like *Encephalartos* spp. (*isigqiki-somkhovu*) could not be cultivated near homesteads due to the belief that it will attract lighting, cause death in the family, and fights. Similarly, *Encephalartos* spp. is biologically regarded as a plant that is difficult to cultivate due to its biology, physiology and ecological characteristics (Cousins *et al*., 2011). Besides cultural factors, what some healers and traders regard as decreasing is not for them a priority for conservation (Maunguja, 2016). Healers and traders make use of traditional medicine for different reasons; even though these two groups did not mention similar species as 'want/are allowed to be cultivated', their perception that cultivation is a solution was similar. This similarity is a positive result and highlights that healers and traders do not need to be addressed independently of each other when conservation matters are concerned. However, healers and traders personal views would both have to be taken into consideration.

Rituals in traditional healing have spiritual significance and are used to nurture relationships and culture building (Kwame, 2016). Rituals are important in African medicine (Kwame, 2016), and the study echoes this in the context of cultivation of medicinal plants. A study conducted in Gabon and Benin by Quiroz *et al.* (2016) documented that species that were used in rituals had relevant biological activity that were similar to the ethnomedical claims made by the participants. In another example of rituals, respondents in a Tanzanian study believed that medicinal plants are more effective if harvested from the western and eastern sides of trees, rather than the northern and southern sides (Msuya and Kideghesho, 2009). The current study found that the number of respondents (healers and traders) that actually harvest plants has decreased, and thus certain harvesting rituals that were once essential tend to be disregarded. Hence, cultural control on its own is no longer effective in mitigating the decline in wild medicinal plants.

Healers and traders are cultivating plants in their home gardens; those that are not cultivating have cited reason as to why (e.g. limited access to water, and historical exclusion from access to land). Hence, they regard farmers to be the main stakeholders to assist in commercializing cultivation. Another limitation to cultivation was time; traders that spent most of their time at their stalls did not have time to cultivate plants. The mention of farmers by respondents also gives an indication that even though cultivation is acknowledged as a solution, resources users do not want to take full responsibility. Nevertheless, the majority of healers and traders mentioned that they would most likely buy cultivated medicinal plants should these plants be available. Therefore, there would be consumer demand if ever farmers explored opportunities to be part of initiatives to commercialise cultivated medicinal plants.

Knowledge, perception and attitude are influenced by a persons' upbringing, experience, culture and way of being (Ngubeni, 2015; Ndlovu, 2016; Chilisa, 2017). Hence, there was varying knowledge on spiritual and cultural limitations of using cultivated medicinal plants generally or during training. The majority of traders that are part of the *muthi* trade are not necessarily obliged to know the spiritual limitations. On the other hand, the ancestors guide healers on what medicinal plants to use, therefore cultural and spiritual matters are essential for them to maintain a functioning practice. However, even within the healers, the type of training, geographical location and experience influences their knowledge and perceptions about cultural norms associated with cultivation.

Medicinal plants are believed to possess certain 'powers' that are guided by the ancestors; traditional healers have the ability to drive these powers to yield a healing effect on a sick person (Shirungu, 2016). Furthermore, the knowledge of medicinal plants is strongly embedded in beliefs, ways of knowing and local cultural practices (Shirungu, 2016). Training is an important stage of a healers' journey. In most cases, healers are unaware of the use of traditional medicine until they are 'called' by their ancestors. The results from the current study also indicated that lack of proper monitoring of the training of traditional healers has exacerbated the lack of ritual knowledge because some healers are not equipped to train. Instead, they train others for monetary reasons and in such instances; trainees are not effectively educated on essential rituals. Therefore, a healers' knowledge on uses of medicinal plants is obtained from their trainers during training and in some instances by dreams (Kwame, 2016). It is therefore concerning that; the majority of healers are not taught how to cultivate medicinal plants while in training. Nonetheless, the existence of modern technology and globalisation allows healers to get essential information from other healers about methods that could be used to conserve medicinal plants (Lichtenstein *et al*., 2017). Moreover, the training process is rigidly dependent on the 'power' of the ancestors. Hence, some healers emphasize that certain rituals and procedures during training strictly required wild medicinal plants, and this should be respected even if cultivation is commercialised.

The plants that ‘are not allowed to be cultivated’ were mentioned based on a persons’ experience, because some of those plant species that were mentioned as ‘want/are allowed’ to be cultivated’ were cited as ‘not allowed’ by other respondents. Numerous healers and different tribes may use the same plant for dissimilar grievances, which implies that the place and ancestral spirit, rather than pharmacological effects, are doing the healing (Cumes, 2013). Medicinal plants are a reflection of the culture of indigenous communities and play a role in society as an important source of income (Amechi, 2015; Foo *et al*., 2016). The results of the current study suggest that knowledge and perceptions are influenced by geographical location and worldviews. South Africa is enriched with various cultures and traditions; hence, there are varying views on some norms of cultivated medicinal plants. Therefore, traditional management systems should be incorporated in conservation strategies.

6.2 RECOMMENDATIONS FOR FUTURE RESEARCH

With cultivation of medicinal plants becoming more necessary, there is opportunity for comparison and monitoring of demand and supply of plants and documentation of the prevalence of cultivation amongst healers and traders. Some important studies that might be considered in the future are:

- Survey more healers to report other ancestral spirits from South African and neighbouring countries to investigate to what extent they influence healers’ perceptions concerning the use of cultivated medicinal plants. Furthermore, investigate how those perceptions differ, or are similar, between different ancestral spirits.
- Repeat the current study in other South African provinces and compare differences and/or similarities between urban and rural *muthi* markets. Additionally, ensure that voucher specimens are bought for more accurate identification of the reported ethnospecies.
- Investigate how healer organisations influence knowledge on medicinal plant cultivation.
- Map out other areas that are frequently harvested and the markets that traders and healers are using, in order to trace movements of medicinal plants.
- Survey farmers and investigate if they are willing to be part of medicinal plant cultivation initiatives, and whether they see economic successes for commercialising cultivated medicinal plants.

6.3 PERSONAL EXPERIENCES FROM THE STUDY

Ethnobotany is the study of the interaction between humans and their indigenous plant use. My first exposure to this field was in 2015 during a field trip in Mpumalanga and I was highly fascinated with how our rural communities are still in touch with their natural surroundings. I was particularly impressed by the uses of traditional medicines and the establishment of a nursery by healers in the

area we visited. Back in 2014, I discovered that I had a *sangoma* calling and it was evident that it was my late paternal grandfather through dreams and visions. I accepted the calling. Little did I know that it would be the foundation of my current study. My first experience with a medicinal market was in 2014 when I was in training and I was fascinated with the different herbal and animal products on display.

One would expect my research/data collection to be easy because of my cultural background. However, that was not the case – especially in markets as some committee members were suspicious of my intentions because of their previous experience with researchers. Many respondents explained how researchers have exploited them – hence they were reluctant to be part of the research. At one market, the head of the committee member requested that I pay ZAR 2500 for interviews with 20 traders. He said I should pay so that they at least gain financially from the research because they feel they do not gain anything from it. Instead, they feel that they uplift researchers and help them get their degrees without being appropriately acknowledged. Sadly, doing interviews in these markets will soon become a money-making scheme and for those researchers that cannot afford, they will not be able to do adequate research. Mai Mai market in Johannesburg was less accessible as a research locality than in previous years (V.L. Williams, pers. comm., 2017). However, even though I am a healer, I was not allowed to do interviews there because of the trust that has been broken by some researchers and the media.

It appears that some researchers do not conduct their research ethically. Although research ethics committees might require the researcher to state how they will give feedback to stakeholder communities after their research, this is never followed up after the research is completed. Participants feel like their own knowledge is looked down upon, whereas some of the knowledge attained from healers and traders has been the foundation for the majority of ethnobotanical research. There has to be an understanding of the cultural and ethical backgrounds of ethnobotanical research in order to ensure that resource users are interested in being part of the engagements to conserve wild medicinal plants. There have been initiatives in places like Skukuza where the National Park encouraged healers to plant *W. salutaris* (L. Swemmer, pers. comm., 2018). That project is a success because healers were part of the engagement talks before implementation; nothing was imposed on them, and I personally regard healers and traders as ‘ethnobotanists without degrees’. Cultural formalities are important, and understanding the lifestyle establishes trust. Furthermore, context matters and people are more welcoming to their ‘own’ traditions and customs. The research community need to be cautious of publishing plant (and animal) uses, as this can lead to false (and even private) information being made public because some survey respondents are not properly trained but sell to alleviate household poverty.

When doing market surveys, we should expect to be unconsciously part of the market dilemmas. In Warwick market, the committee had granted me permission to conduct the survey and no money was required – but due to unforeseen circumstances, other traders were questioning my visit. When I went into Warwick market, there were internal controversies because the week before I commenced the survey a human head was found in the market. As a result, police officers patrolled the market on a daily basis before my visit. Due to the patrols, most people were not comfortable with being part of the research because they thought I was an undercover environmental officer. To avoid being part of controversy, researchers should make themselves familiar with the conditions of their survey area, and ensure that they thoroughly explain their intentions. Furthermore, they should show some form of valid identification (e.g. a student card) and ensure that there are no false promises made. That said, we should always be aware that some people will say 'no' regardless of how well you present yourself and a 'no' response is still a valid quantifiable response (V.L. Williams, pers. comm., 2016) (e.g. there may be certain reasons influencing that response, which should be documented to help future researchers to plan efficiently for their studies).

Being a researcher and healer can make other healers doubt your healing ability as others thought that I am 'used' by what they perceive as 'western forces' in their work. To overcome the challenges, I took the time to explain myself to each respondent that I approached. With others, the response was positive even though they disagreed to be part of the research. Healers were more welcoming than traders and being a healer myself worked to my advantage as I was given more information than I had required. Some healers were very happy as they said that someone of their 'own' was going to report their knowledge even though at first instance others were sceptical of my intentions.

Ethnobotanical researchers need to be more aware of the cultural context of the information that we obtain from our participants and report it in such a way that does not compromise the cultural norms of medicinal plant use; instead, it should empower cultural diversity. Furthermore, I observed that rural markets are more welcoming than urban ones, and this might be because they have not been intensively researched and so they do not have that much experience in dealing with researchers in comparison to urban markets. In Mona market, the traders were welcoming and even accompanied me in the market trying to encourage others to be part of the research; as a result, all of the participants I approached in that market agreed to be part of the research.

Human context, in which ethnobotanical studies are embedded, is dynamic and complex; therefore, a researcher has to adequately understand the traditional practices of their study sites to ensure successful research. For example, it is essential to understand respondents' reasons for being part of the trade, and their future aspirations. Furthermore, understanding their background allows a researcher to report information with some form of empathy. In order to curb the exploitation, one

needs to fully understand the reasons behind the exploitation. Respect is essential with these studies; learn how people live before coming into their space to do interviews. For instance, researchers arriving at a rural place where wearing a cap is not allowed inside a persons' yards because it is deemed disrespectful – hence the researcher will not get the required information. Gathering background information is thus paramount, and pilot surveys are a very necessary requirement for ethnobotanical research.

One of the traders I interviewed was actually a young woman my age (24) who admitted that harvesting is unsustainable and detrimental, but that she was participating in the trade to save money for her studies. She also said that her stall belonged to her mother who had passed away two weeks prior to the interview. She has dreams and aspirations, but due to unforeseen circumstances, she has to sell *muthi* at the market to support her younger siblings. Talking to her gave me insight that we have passed the prevention stage and we need to focus on mitigating the impact on wild populations. In addition, with the growing population and inequality in our country we should always expect medicinal markets to be a tool that some people use to alleviate poverty.

6.4 REFERENCES

Amechi, E.P., 2015. Leveraging traditional knowledge on the medicinal uses of plants within the patent system: The digitisation and disclosure of knowledge in South Africa. *Potchefstroomse Elektroniese Regsblad* 18: 3072–3101.

Chilisa, B. 2017. Decolonising transdisciplinary research approaches: an African perspective for enhancing knowledge integration in sustainability science. *Sustainability Science* 12: 813–827.

Cumes, D., 2013. South African indigenous healing: how it works. *The Journal of Science and Healing* 9: 58–65.

Foo, J., Latiff, A., Omar, M. and Amir, A.A. 2016. Women's perception on medicinal plants in traditional Tamu, West Coast, Sabah, Malaysia. *Malayan Nature Journal* 68: 95–104.

Gyasi, R.M., Asante, F., Abass, K., Yeboah, J.Y., Adu-Gyamfi, S. and Amoah, P.A. 2016. Do health beliefs explain traditional medical therapies utilisation? Evidence from Ghana. *Cogent Social Sciences* 2: 1–14.

Jusu, A. and Sanchez, A.C. 2014. Medicinal plant trade in Sierra Leone: threats and opportunities for conservation. *Economic Botany* 68: 16–29.

Kwame, A. 2016. *Traditional Medicine and Healing Among the Dagomba of Ghana*. MSc. UiT Norges arktiske universitet, Ghana.

Lichtenstein, A.H., Berger, A. and Cheng, M.J. 2017. Definitions of healing and healing interventions across different cultures. *Annals of palliative medicine* 6: 248–252.

Maunguja, A.B., 2016. *Assessment of Plant Diversity and Utilization of Wild Medicinal Species by Households Proximate to Arabuko Sokoke Forest in Kilifi County of Kenya*. MSc. University of Nairobi, Nairobi.

Msuya, T.S. and Kideghesho, J.R. 2009. The role of traditional management practices in enhancing sustainable use and conservation of medicinal plants in West Usambara Mountains, Tanzania. *Tropical Conservation Science* 2: 88–105.

Ndlovu, S.S. 2016. *Traditional Healing in KwaZulu-Natal Province: A Study of University Students' Assessment, Perceptions and Attitudes*. PhD. University of KwaZulu-Natal, Pietermaritzburg.

Quiroz, D., Sosef, M. and Van Andel, T. 2016. Why ritual plant use has ethnopharmacological relevance. *Journal of Ethnopharmacology* 188: 48–56.

Sher, H. and Alyemeni, M.N. 2010. Cultivation and domestication study of high value medicinal plant species (its economic potential and linkages with commercialization). *African Journal of Agricultural Research 5*: 2462–2470.

Shirungu, M.M., 2016. *The Use of Medicinal Plants to Treat Mental Illness in Kavango East and West Regions, Namibia*. PhD. University of Western Cape, Western Cape.

van Andel, T.R., Croft, S., van Loon, E.E., Quiroz, D., Towns, A.M. and Raes, N. 2015. Prioritizing West African medicinal plants for conservation and sustainable extraction studies based on market surveys and species distribution models. *Biological Conservation* 181: 173–181.

APPENDICES

APPENDIX 1

Survey Questionnaire

NOTE: Questions in *italics* are for traders only, whereas questions in **bold** are for healers only.

Trader/Healer	Age	Sex (M/F)	Years in trade/healing	Education level

Demand and use of medicinal plants

1. Do you harvest your own plants?	Yes	No	Both

2a. Where do you harvest your plants?	2b. Where do you buy your plants?
	2c. Where does your seller buy/harvest their plants
3a. Which species were abundant before in the local area but have gradually decreased? And why?	3b. Which species were easy to buy before but have gradually become scarce? And why?
4a. What strategies do you use to ensure that there are plants to harvest in the future?	4b. Are you aware of any strategies that your seller uses to ensure that there are plants to harvest in the future?
5. Where are the *muthi* markets located?	
6. Are there any plants that require certain rituals before harvesting? If Yes, please name them	
7. Is ritual practice still common when harvesting? If No, what do you think has caused this?	

Perceptions, attitudes and knowledge on cultivated plants

1. Would taking a wild plant and planting it in your garden constitute cultivation? If No, what constitutes cultivation
2. Are any rituals performed when harvesting cultivated plants? If Yes, please name them
3. Do you know of any cultural or spiritual limitations to using cultivated plants? If so please explain them
4. Are there any medicinal plant species that should not be cultivated because of traditional beliefs? If yes, please name them (and indicate why?)
5. Do you or your family members cultivate plants in a home garden? if No, why; If Yes, where do you get the material from
6a. What factors allow a plant to be cultivated? Please name them and the plants that are allowed
6b. If the species you listed were made available, what is the likelihood that you would purchase them (1, 2, 3, 4, 5; 1- least likely, 5- most likely).

1	2	3	4	5

7. Do you think that cultivating by either home gardens and/or nurseries will allow wild plant populations in the area to recover from harvesting and/or exploitation? Please explain your answer
8. Do you sell cultivated plants? If No, why?
9. Do you think customers would buy if they knew that the plants were cultivated? If No, why?
10. Have you ever treated a patient with a plant that you cultivated or knew was cultivated by someone else? If yes, were they effective as wild plants, please explain
11. Were you taught about cultivating your own plants during training?
12. Are there any situations whereby the ancestors disregarded the use of a plant because it was cultivated? please explain
13. Are any rituals associated with training requiring only wild medicinal plants? (please name those rituals and plants)
14. What purification rituals do you perform to 'clean' 'polluted' plants obtained from markets?
15. Are those rituals the same for purifying plants 'polluted' by cultivation? If not, which ones are used?
16. Were you trained by *Umndawu* or *Amakhosi*?

APPENDIX 2

Common names to species.

(Chichewa (C)=Malawian, E=English, IsiNdebele (N)=Zimbabwean, S=Sesotho, Z=isiZulu)

Common name	Species	Language
abanqonqozi	*Araucaria heterophylla*; Cupressus* sp.**; Podocarpus henkelii*	Z
African potato	*Hypoxis* spp.	E
amafuthaomhlaba	*Callilepis laureola*	Z
amakhosikancamane	unidentified species	Z
amampunzane	*Salacia leptoclada*	Z
amanzamnyama	*Anemone fanninii*; *Pelargonium alchemilloides* (umangqengqe)*	Z
chimweme	unidentified species	C
chisomo	*Myrothamnus flabellifolia*	C
chotnhela	unidentified species	C
hlokwana-latsela	*Dianthus basuticus*	S
ibhekamina-ngedwa	*Afrosciadium magalismontanum;* Pimpinella caffra*;* Scabiosa columbaria	Z
ibohlololo	*Aptenia cordifolia*	Z
ibunga	unidentified species	Z
icabashela	unidentified species	Z
icena	*Aloe* spp.	Z
ichithamuzi	*Euclea* spp. (*E. daphnoides*, *E. divinorum*, *E. natalensis*)	Z
ichiwa	*Afromosia angolensis*	Z
icubudwana	*Ledebouria* spp.	Z
idungamuzi	*Euclea* spp. (*E. crispa* sspp. *crispa, E. daphnoides*, *E. divinorum*, *E. natalensis*); *Cenchrus ciliaris*; *Scolopia mundii*	Z
ifelemamba	*Secamone gerrardii*	Z
igobandlovu	*Balanites maughamii*; *Garcinia livingstonei; Pterocelastrus echinatus*	Z
igobongo	unidentified species	Z
ihluze	*Schotia brachypetala*	Z
ikhambi-lentwala	*Microglossa mespilifolia*; *Microgramma lycopodiodes*	Z
ikhathazo	*Alepidea* spp.	Z
ikhokhelo	*Justicia capensis*	Z
ikhubalo	unidentified species	Z
ilabatheka	*Hypoxis* spp.	Z
ilethi	*Croton gratissimus*; *Gerrardina foliosa*; *Myrica serrata*; *Phyllanthus meyerianus*	Z
imbola	*Eucomis bicolor*	Z
imboziso	*Anethum graveolens*; *Foeniculum vulgare**; *Mentha aquatica*; *Lichtensteinia interrupta; Plectranthus hadiensis* var. *tomentosa*	Z
imfeyenkawu	*Ansellia africana*	Z
imfingo	*Stangeria eriopus*	Z
impela	*Justicia flava*	Z
impetso	*Acridocarpus natalitius*	C
impila	*Callilepis laureola*	Z
impindamshaye	*Adenia gummifera*	Z
impindamumva	unidentified species	Z
impundulo	unidentified species	Z

impungane	unidentified species	Z
impunyu	*Talinum caffrum*	Z
incotho	*Boophone disticha*	Z
indaba-ingehlele	*Anredera cordifolia**; *Basella paniculata**	Z
indlabaloyi	*Voacanga thouarsii*	Z
indongana-zimbomvana	*Drimia* spp.; *Urginea* spp.	Z
indukuzabafana	unidentified species	Z
indumbahlozi	unidentified species	Z
inguduza	*Merwilla plumbea*	Z
ingwavuma	*Elaeodendron transvaalense*	Z
ingwevu	*Dioscorea sylvatica*	Z
inhlaba	*Aloe* spp.	Z
inhlanhla-emhlophe	*Passiflora suberosa**	Z
inhlazuko	unidentified species	Z
inhliziyonkulu	*Dombeya rotundifolia*	Z
injoka	unidentified species	C
inkungwini	*Plectranthus* sp.; *Maytenus acuminata*	Z
insulansula	*Eriospermum* spp. (*E. mackenii*, *E.* sp.); *Spermacoce natalensis*	Z
intelezi	Many species	Z
intolwane	*Elephantorrhiza elephantina*	Z
inyazangoma	*Prunus africana*; Searsia chirindensis	Z
iphakama	*Oncocalyx quinquenervius*; *Viscum* spp. (*V. verrucosum*)*	Z
iphamba	*Eulophia* spp.	Z
iphande	unidentified species	Z
iphengulula	*Utricularia prehensilis*	Z
ishaladi	*Tulbaghia* spp. (*T. alliacea*, *T. simmleri*, *T.* sp.)	Z
isibhaha	*Warburgia salutaris*	Z
Isidala	*Dianthus* spp. (*D. crenatus, D. zeyheri*); *Monopsis scabra*; *Tephrosia marginella*	Z
isigqiki-somkhovu	*Encephalartos* spp.	Z
isiklenama	*Drimia* spp.; *Urginea* spp.	Z
isiphephetho	*Siphonochilus aethiopicus*	Z
isiqunga	*Cymbopogon* spp.	Z
isithendesezulu	unidentified species	Z
isizukulwane	unidentified species	Z
isola	*Manulea parviflora*	Z
isolemamba	*Cassinopsis tinifolia*; *Syncolostemon densiflorus*	Z
kakhomu	Croton gratissimus	C
kasambasinko	unidentified species	C
kudlabantwana	unidentified species	Z
lekgwama	unidentified species	S
lijwa	unidentified species	C
lingalo	*Haplocarpha scaposa*	C
lozana	*Plectranthus* spp.; *Tephrosia* spp.	C
lubani	*Canarium schweinfurthii**	N

maswirisingo	unidentified species	C
mchamowemfene	unidentified species	C
mchithazulu	unidentified species	Z
mdima	*Psorospermum febrifugum*	C
mopatladi	*Capparis* spp. (*C. brassii*, *C. tomentosa*)	S
mphandazewula	*Philenoptera violacea*	Z
musirombombo	*Syzygium guineense*	C
muuyaino	*Adansonia digitata*	C
mwavi	*Erythrophleum suaveolens*	C
nimo	unidentified species	C
njwane	unidentified species	C
ntoma	unidentified species	C
olinangwan wankulu	unidentified species	C
phalabashimane	Aristea spp.	S
phondweni	unidentified species	Z
phunyuka	*Talinum caffrum*	Z
Sassa	*Brachystegia spiciformis*	C
sehlangengubo	unidentified species	Z
serokolo	*Siphonochilus aethiopicus*	S
shwawu	unidentified species	C
skhuniphenduka	unidentified species	Z
thovane	unidentified species	Z
ubangalala	unidentified species	Z
ubhubhubhu	*Crotalaria globifera*; *Helinus integrifolius*	Z
udakwa	*Dioscorea* spp. (*D. dregeana, D. multiloba*)	Z
udelunina	*Asclepias cucullata*	Z
udukanezwe	unidentified species	Z
ugibeleweni	*Croton sylvaticus*; *Rhipsalis baccifera*; *Mesembryanthemum* sp.	Z
ugobho	*Gunnera perpensa*	Z
ugodide	*Jatropha* spp. (*J. hirsuta*, *J. zeyheri*)	Z
uhlunguhlungu	*Vernonia* spp. (*V. corymbosa*, *V. tigna*); *Brachylaena elliptica*; *Printzia pyrifolia*	Z
ujundu	*Curtisia dentata*	Z
ukalumuzi	*Acorus calamus**	Z
umababaza	*Ornithogalum longebracteatum*	Z
umabopha	*Acridocarpus natalitius*; *Spermacoce natalensis*	Z
umabusane	*Capparis* spp. (*C. brassii*, *C. tomentosa*)	Z
umacasha	unidentified species	Z
umadlozana	*Argyrolobium tomentosum*; *Berchemia discolor*; *Margaritaria discoidea*; *Ochna natalitia*; *Turraea floribunda*	Z
umafosi	*Aristea ecklonii*	Z
umahlabasindi	*Brackenridgea zanguebarica*	Z
umahlabekufeni	*Croton* spp. (*C. gratissimus*, *C. sylvaticus*); *Kedrostis* sp.	Z
umahlalanyosi	*Antidesma venosum*	Z
umahlanganisa	*Urginea sp.*	Z
umakwakwa	Strychnos spp. (S. innocua, S. pungens, S. dysophylla, S. gerrardii)	C

umaphipha	*Rapanea melanophloeos*	Z
umashiqolo	*Osteospermum imbricatum*	Z
umasixabane	unidentified species	Z
umathanganisa	unidentified species	Z
umathanjana	*Rotheca* spp. (*Rotheca hirsuta, Rotheca myricoides)*; *Raphionacme* sp.	Z
umathithibala	*Aloe* spp.; *Haworthia* spp.	Z
umathubadifala	unidentified species	S
umathunga	*Eucomis autumnalis*	Z
umavumbuka	*Hydnora* spp. (*H. africana*; *H. abyssinica*); *Sarcophyte sanguinea*	Z
umayime	*Clivia* spp. (*C. caulescens*, *C. gardenii*, *C. miniata*, *C. nobilis, C. robusta*)	Z
umayisaka	*Agathosma ovata; Thesium pallidum; Muraltia lancifolia*	Z
umdabu	*Elephantorrhiza elephantina*	Z
umdlebe	*Eucalyptus* spp.*; *Euphorbia cupularis*	Z
umdletshane	*Euphorbia cupulare*	Z
umdoni	*Syzygium cordatum*	Z
umdumbulu	unidentified species	Z
umembesa	*Andrachne ovalis*	Z
umembeza	*Andrachne ovalis; Clutia pulchella*	Z
umemezi-obomvu	*Cassipourea* spp. (*C. flanaganii*, *C. gerrardii, C. malosana*)	Z
umemezi-omhlophe	*Calodendrum capense*	Z
umgadankawu	*Albizia adianthifolia*	Z
umganu	*Sclerocarya birrea*	Z
umgwaqane	Croton sylvaticus	Z
umgxamu	*Schotia brachypetala*	Z
umhlabamanzi	*Voacanga thouarsii*	Z
umhlabelo	*Urginea* spp.	Z
umhlahlampethu	*Chenopodium ambrosioides**	Z
umhlakaza	*Bersama* spp. (*B. lucens*, *B. swinnyi*)	Z
umhlakuva	*Afzelia quanzensis*; *Ricinus communis**	Z
umhlonishwa	*Phymaspermum acerosum*; *Psoralea pinnata*	Z
umhlonyana	*Artemisia afra*	Z
umkhamba	*Vachellia sieberiana*	Z
umkhanyakude	*Acacia xanthophloea*	Z
umkhaya	*Vachellia sieberiana; Senegalia burkei*	Z
umkhiwane	*Ficus sur*	Z
umkhokha	*Abrus precatorius*	Z
umkhondweni	*Cryptocarya* spp. (*C. latifolia*, *C. myrtifolia*)	Z
umkhuhlu	*Trichilia* spp. (*T. dregeana*, *T. emetica*)	Z
umkhwangu	*Erythrophleum lasianthum*	Z
umlahlabantu	*Ziziphus mucronata*	Z
umlahlankosi	*Strychnos decussata*; *Hilliardiella aristata*	Z
umlahleni	*Curtisia dentata; Heteropyxis natalensis*	Z
umlomomnandi	*Anthospermum rigidum*; *Argyrolobium tomentosum*	Z
umncaka	*Berchemia zeyheri*	Z

umnduze	*Euphorbia tirucalli*	Z
umnsinsi-wokuyimilela	*Erythrina lysistemon*	Z
umnukelambimba	*Clausena anisata*	Z
umnyamathi	*Ekebergia capensis*	Z
umondi	*Mondia whitei*	Z
umphafa	*Ziziphus mucronata*	Z
umsehla	*Peltophorum africanum*	Z
umshitatlou	unidentified species	S
umshwilishwili	*Plumbago auriculata*	Z
umsinsi	*Erythrina* spp. (*E. caffra*; *E. lysistemon*)	Z
umsululu	*Euphorbia tirucalli*	Z
umthathe	*Ptaeroxylon obliquum*	Z
umthombothi	*Spirostachys africana*	Z
umthwalume	unidentified species	Z
umvangazi	*Pterocarpus angolensis*; *Trema orientalis*	Z
umvongothi	*Kigelia africana*	Z
umvuma	*Pappea capensis*; *Turraea floribunda*	Z
umvusankunzi	*Carissa bispinosa*	Z
umvuthuza	*Crassula* spp. (*C. multicava, C. sarmentosa*); *Kalanchoe* spp.; *Anemone bracteata*	Z
umyezane	*Salix mucronata*	Z
umzaneno	*Olinia radiata*	Z
umziwawula	unidentified species	Z
undiyaza	*Bersama* spp. (*B. lucens, B. swinnyi, B. tysoniana*); *Dioscorea dregeana*	Z
undlela-zimhlope	unidentified species	Z
unukani	*Ocotea bullata*	Z
unyenye	*Rhamnus prinoides*	Z
uphamaphuce	*Aspilia natalensis; Eclipta prostrata*	Z
uphondo-lukabhejane	*Sansevieria* spp (incl. *S. cylindrica**)	Z
uqhume	*Hippobromus pauciflorus*	Z
uroslina	*Cinnamomum camphora**	Z
usahlulamanye	*Pterocelastrus* spp. (*P. Echinatus, P. Tricuspidatus)*	Z
usehlulamanye	*Elaeodendron croceum*	Z
ushisizwe	*Portulaca* spp. (inc. *P. pilosa*; *P. quadrifida*)	Z
usilephe	unidentified species	Z
usukasambe	*Cymbopogon* spp.	Z
uvelabahleke	*Acalypha villicaulis; Celosia trigyna; Crotalaria* spp.; *Cyrtanthus breviflorus*	Z
uvelemoyeni	unidentified species	Z
uvukakwabafile	*Myrothamnus flabellifolia*	Z
uvulakuvaliwe	unidentified species	Z
uvuma-obomvu	*Pappea capensis*	Z
uvuma-omhlophe	*Synaptolepis oliveriana*	Z
uzililo	*Stapelia gigantea*	Z
zibankwa	unidentified species	Z

APPENDIX 3

Species to common names. The species corresponding with the common names represent the probable species.

*** = Species not endemic to South Africa.**

(Chichewa (C)=Malawian, E=English, IsiNdebele (N)=Zimbabwean, S=Sesotho, Z=isiZulu)

Common name	Species	Language
umkhokha	*Abrus precatorius*	Z
umkhanyakude	*Acacia xanthophloea*	Z
uvelabahleke	*Acalypha villicaulis; Celosia trigyna; Crotalaria* spp.; *Cyrtanthus breviflorus*	Z
ukalumuzi	*Acorus calamus**	Z
impetso	*Acridocarpus natalitius*	C
umabopha	*Acridocarpus natalitius*; *Spermacoce natalensis*	Z
muuyaino	*Adansonia digitata*	C
impindamshaye	*Adenia gummifera*	Z
ichiwa	*Afromosia angolensis*	Z
ibhekamina-ngedwa	*Afrosciadium magalismontanum;* Pimpinella caffra*;* Scabiosa columbaria	Z
umhlakuva	*Afzelia quanzensis*; *Ricinus communis**	Z
umayisaka	*Agathosma ovata; Thesium pallidum; Muraltia lancifolia*	Z
umgadankawu	*Albizia adianthifolia*	Z
ikhathazo	*Alepidea* spp.	Z
icena	*Aloe* spp.	Z
inhlaba	*Aloe* spp.	Z
umathithibala	*Aloe* spp.; *Haworthia* spp.	Z
umembesa	*Andrachne ovalis*	Z
umembeza	*Andrachne ovalis; Clutia pulchella*	Z
amanzamnyama	*Anemone fanninii*; *Pelargonium alchemilloides* (umangqengqe)*	Z
imboziso	*Anethum graveolens*; *Foeniculum vulgare**; *Mentha aquatica*; *Lichtensteinia interrupta; Plectranthus hadiensis* var. *tomentosa*	Z
indaba-ingehlele	*Anredera cordifolia**; *Basella paniculata**	Z
imfeyenkawu	*Ansellia africana*	Z
umlomomnandi	*Anthospermum rigidum*; *Argyrolobium tomentosum*	Z
umahlalanyosi	*Antidesma venosum*	Z
ibohlololo	*Aptenia cordifolia*	Z
abanqonqozi	*Araucaria heterophylla*; Cupressus* sp.**; Podocarpus henkelii*	Z
umadlozana	*Argyrolobium tomentosum*; *Berchemia discolor*; *Margaritaria discoidea*; *Ochna natalitia*; *Turraea floribunda*	Z
umafosi	*Aristea ecklonii*	Z
Phalabashimane	*Aristea* spp.	S
umhlonyana	*Artemisia afra*	Z
udelunina	*Asclepias cucullata*	Z
uphamaphuce	*Aspilia natalensis; Eclipta prostrata*	Z
igobandlovu	*Balanites maughamii*; *Garcinia livingstonei; Pterocelastrus echinatus*	Z
umncaka	*Berchemia zeyheri*	Z
umhlakaza	*Bersama* spp. (*B. lucens*, *B. swinnyi*)	Z

undiyaza	*Bersama* spp. (*B. lucens, B. swinnyi, B. tysoniana*); *Dioscorea dregeana*	Z
incotho	*Boophone disticha*	Z
Sassa	*Brachystegia spiciformis*	C
umahlabasindi	*Brackenridgea zanguebarica*	Z
amafuthaomhlaba; impila	*Callilepis laureola*	Z
umemezi-omhlophe	*Calodendrum capense*	Z
lubani	Canarium schweinfurthii*	N
mopatladi; umabusane	*Capparis* spp. (*C. brassii*, *C. tomentosa*)	S
umvusankunzi	*Carissa bispinosa*	Z
isolemamba	*Cassinopsis tinifolia*; *Syncolostemon densiflorus*	Z
umemezi-obomvu	*Cassipourea* spp. (*C. flanaganii*, *C. gerrardii, C. malosana*)	Z
umhlahlampethu	*Chenopodium ambrosioides**	Z
uroslina	*Cinnamomum camphora**	Z
umnukelambimba	*Clausena anisata*	Z
umayime	*Clivia* spp. (*C. caulescens*, *C. gardenii*, *C. miniata*, *C. nobilis, C. robusta*)	Z
umvuthuza	*Crassula* spp. (*C. multicava, C. sarmentosa*); *Kalanchoe* spp.; *Anemone bracteata*	Z
ubhubhubhu	*Crotalaria globifera*; *Helinus integrifolius*	Z
kakhomu	Croton gratissimus	C
ilethi	*Croton gratissimus*; *Gerrardina foliosa*; *Myrica serrata*; *Phyllanthus meyerianus*	Z
umahlabekufeni	*Croton* spp. (*C. gratissimus*, *C. sylvaticus*); *Kedrostis* sp.	Z
umgwaqane	*Croton sylvaticus*	Z
ugibeleweni	*Croton sylvaticus*; *Rhipsalis baccifera*; *Mesembryanthemum* sp.	Z
umkhondweni	*Cryptocarya* spp. (*C. latifolia*, *C. myrtifolia*)	Z
ujundu	*Curtisia dentata*	Z
umlahleni	*Curtisia dentata; Heteropyxis natalensis*	Z
isiqunga	*Cymbopogon* spp.	Z
usukasambe	*Cymbopogon* spp.	Z
hlokwana-latsela	*Dianthus basuticus*	S
Isidala	*Dianthus* spp. (*D. crenatus, D. zeyheri*); *Monopsis scabra*; *Tephrosia marginella*	Z
udakwa	*Dioscorea* spp. (*D. dregeana, D. multiloba*)	Z
ingwevu	*Dioscorea sylvatica*	Z
inhliziyonkulu	*Dombeya rotundifolia*	Z
isiklenama	*Drimia* spp.; *Urginea* spp.	Z
indongana-zimbomvana	*Drimia* spp.; *Urginea* spp.	Z
umnyamathi	*Ekebergia capensis*	Z
usehlulamanye	*Elaeodendron croceum*	Z
iigwavuma	*Elaeodendron transvaalense*	Z
intolwane; umdabu	*Elephantorrhiza elephantina*	Z
isigqiki-somkhovu	*Encephalartos* spp.	Z
insulansula	*Eriospermum* spp. (*E. mackenii*, *E.* sp.); *Spermacoce natalensis*	Z
umnsinsi-wokuyimilela	*Erythrina lysistemon*	Z
umsinsi	*Erythrina* spp. (*E. caffra*; *E. lysistemon*)	Z
umkhwangu	*Erythrophleum lasianthum*	Z
mwavi	*Erythrophleum suaveolens*	C

umdlebe	*Eucalyptus* spp.*; *Euphorbia cupularis*	Z
idungamuzi	*Euclea* spp. (*E. crispa, E. daphnoides*, *E. divinorum*, *E. natalensis*); *Cenchrus ciliaris*; *Scolopia mundii*	Z
ichithamuzi	*Euclea* spp. (*E. daphnoides*, *E. divinorum*, *E. natalensis*)	Z
umathunga	*Eucomis autumnalis*	Z
imbola	*Eucomis bicolor*	Z
iphamba	*Eulophia* spp.	Z
umdletshane	*Euphorbia cupulare*	Z
umnduze; umsululu	*Euphorbia tirucalli*	Z
umsululu	*Euphorbia tirucalli*	Z
umkhiwane	*Ficus sur*	Z
ugobho	*Gunnera perpensa*	Z
lingalo	*Haplocarpha scaposa*	C
uqhume	*Hippobromus pauciflorus*	Z
umavumbuka	*Hydnora* spp. (*H. africana*; *H. abyssinica*); *Sarcophyte sanguinea*	Z
ilabatheka; African potato	*Hypoxis* spp.	Z
ugodide	*Jatropha* spp. (*J. hirsuta*, *J. zeyheri*)	Z
ikhokhelo	*Justicia capensis*	Z
impela	*Justicia flava*	Z
umvongothi	*Kigelia africana*	Z
icubudwana	*Ledebouria* spp.	Z
isola	*Manulea parviflora*	Z
intelezi	Many species	Z
inguduza	*Merwilla plumbea*	Z
ikhambi-lentwala	*Microglossa mespilifolia*; *Microgramma lycopodiodes*	Z
umondi	*Mondia whitei*	Z
uvukakwabafile; chisomo	*Myrothamnus flabellifolia*	Z
unukani	*Ocotea bullata*	Z
umzaneno	*Olinia radiata*	Z
iphakama	*Oncocalyx quinquenervius*; *Viscum* spp. (*V. verrucosum*.)*	Z
umababaza	*Ornithogalum longebracteatum*	Z
umashiqolo	*Osteospermum imbricatum*	Z
uvuma-obomvu	*Pappea capensis*	Z
umvuma	*Pappea capensis*; *Turraea floribunda*	Z
inhlanhla-emhlophe	*Passiflora suberosa**	Z
umsehla	*Peltophorum africanum*	Z
Mphandazewula	*Philenoptera violacea*	Z
umhlonishwa	*Phymaspermum acerosum*; *Psoralea pinnata*	Z
inkungwini	*Plectranthus* sp.; *Maytenus acuminata*	Z
lozana	*Plectranthus* spp.; *Tephrosia* spp.	C
umshwilishwili	*Plumbago auriculata*	Z
ushisizwe	*Portulaca* spp. (inc. *P. pilosa*; *P. quadrifida*)	Z
inyazangoma	*Prunus africana*; Searsia chirindensis	Z
mdima	*Psorospermum febrifugum*	C
umthathe	*Ptaeroxylon obliquum*	Z

umvangazi	*Pterocarpus angolensis*; *Trema orientalis*	Z
usahlulamanye	*Pterocelastrus* spp. (*P. Echinatus, P. Tricuspidatus)*	Z
umaphipha	*Rapanea melanophloeos*	Z
unyenye	*Rhamnus prinoides*	Z
umathanjana	*Rotheca* spp. (*Rotheca hirsuta,Rotheca myricoides)*; *Raphionacme* sp.	Z
amampunzane	*Salacia leptoclada*	Z
umyezane	*Salix mucronata*	Z
uphondo-lukabhejane	*Sansevieria* spp (incl. *S. cylindrica**)	Z
ihluze; umgxamu	*Schotia brachypetala*	Z
umganu	*Sclerocarya birrea*	Z
ifelemamba	*Secamone gerrardii*	Z
isiphephetho; serokolo	*Siphonochilus aethiopicus*	Z
umthombothi	*Spirostachys africana*	Z
imfingo	*Stangeria eriopus*	Z
uzililo	*Stapelia gigantea*	Z
umlahlankosi	*Strychnos decussata*; *Hilliardiella aristata*	Z
umakwakwa	*Strychnos* spp. (*S. innocua, S. pungens, S. dysophylla, S. gerrardii*)	C
uvuma-omhlophe	*Synaptolepis oliveriana*	Z
umdoni	*Syzygium cordatum*	Z
musirombombo	*Syzygium guineense*	C
impunyu; phunyuka	*Talinum caffrum*	Z
umkhuhlu	*Trichilia* spp. (*T. dregeana*, *T. emetica*)	Z
ishaladi	*Tulbaghia* spp. (*T. alliacea*, *T. simmleri*, *T.* sp.)	Z
amakhosikancamane	unidentified species	Z
chotnhela	unidentified species	C
ibunga	unidentified species	Z
icabashela	unidentified species	Z
igobongo	unidentified species	Z
ikhubalo	unidentified species	Z
impindamumva	unidentified species	Z
impundulo	unidentified species	Z
impungane	unidentified species	Z
indukuzabafana	unidentified species	Z
inhlazuko	unidentified species	Z
iphande	unidentified species	Z
isithendesezulu	unidentified species	Z
isizukulwane	unidentified species	Z
chimweme	unidentified species	C
Kasambasinko	unidentified species	C
kudlabantwana	unidentified species	Z
lekgwama	unidentified species	S
lijwa	unidentified species	C
maswirisingo	unidentified species	C
umathubadifala	unidentified species	S

mchamowemfene	unidentified species	C
mchithazulu	unidentified species	Z
umshitatlou	unidentified species	S
undlela-zimhlope	unidentified species	Z
nimo	unidentified species	C
njwane	unidentified species	C
injoka	unidentified species	C
indumbahlozi	unidentified species	Z
ntoma	unidentified species	C
olinangwan wankulu	unidentified species	C
phondweni	unidentified species	Z
sehlangengubo	unidentified species	Z
usilephe	unidentified species	Z
Shwawu	unidentified species	C
skhuniphenduka	unidentified species	Z
thovane	unidentified species	Z
ubangalala	unidentified species	Z
udukanezwe	unidentified species	Z
umasixabane	unidentified species	Z
umathanganisa	unidentified species	Z
umdumbulu	unidentified species	Z
umthwalume	unidentified species	Z
umziwawula	unidentified species	Z
uvelemoyeni	unidentified species	Z
uvulakuvaliwe	unidentified species	Z
umahlanganisa	*Urginea* spp.	Z
umhlabelo	*Urginea* spp.	Z
iphengulula	*Utricularia prehensilis*	Z
umkhamba	*Vachellia sieberiana*	Z
umkhaya	*Vachellia sieberiana; Senegalia burkei*	Z
uhlunguhlungu	*Vernonia* spp. (*V. corymbosa*, *V. tigna*); *Brachylaena elliptica*; *Printzia pyrifolia*	Z
indlabaloyi; umhlabamanzi	*Voacanga thouarsii*	Z
isibhaha	*Warburgia salutaris*	Z
umlahlabantu; umphafa	*Ziziphus mucronata*	Z

APPENDIX 4

Species cited by respondents as 'decreasing' in availability (wild and markets).

* = Species not endemic to South Africa.

Common name	Species	Number of times cited as 'decreasing'
umkhanyakude	*Acacia xanthophloea*	7
uvelabahleke	*Acalypha villicaulis; Celosia trigyna; Crotalaria* spp.; *Cyrtanthus breviflorus*	4
impetso	*Acridocarpus natalitius*	2
umabopha	*Acridocarpus natalitius*; *Spermacoce natalensis*	2
impindamshaye	*Adenia gummifera*	1
ibhekamina-ngedwa	*Afrosciadium magalismontanum;* Pimpinella caffra*;* Scabiosa columbaria	3
umayisaka	*Agathosma ovata; Thesium pallidum; Muraltia lancifolia*	2
umgadankawu	*Albizia adianthifolia*	2
ikhathazo	*Alepidea* spp.	8
umathithibala	*Aloe* spp.; *Haworthia* spp.	2
imboziso	*Anethum graveolens*; *Foeniculum vulgare**; *Mentha aquatica*; *Lichtensteinia interrupta; Plectranthus hadiensis* var. *tomentosa*	1
indaba-ingehlele	*Anredera cordifolia**; *Basella paniculata**	2
imfeyenkawu	*Ansellia africana*	1
umlomomnandi	*Anthospermum rigidum*; *Argyrolobium tomentosum*	1
umadlozana	*Argyrolobium tomentosum*; *Berchemia discolor*; *Margaritaria discoidea*; *Ochna natalitia*; *Turraea floribunda*	2
umafosi	*Aristea ecklonii*	2
igobandlovu	*Balanites maughamii*; *Garcinia livingstonei; Pterocelastrus echinatus*	1
umncaka	*Berchemia zeyheri*	2
undiyaza	*Bersama* spp. (*B. lucens, B. swinnyi, B. tysoniana*); *Dioscorea dregeana*	5
umemezi-omhlophe	*Calodendrum capense*	3
isolemamba	*Cassinopsis tinifolia*; *Syncolostemon densiflorus*	2
umemezi-obomvu	*Cassipourea* spp. (*C. flanaganii*, *C. gerrardii, C. malosana*)	2
umhlahlampethu	*Chenopodium ambrosioides**	2
uroslina	*Cinnamomum camphora**	3
umnukelambimba	*Clausena anisata*	2
ubhubhubhu	*Crotalaria globifera*; *Helinus integrifolius*	6
ilethi	*Croton gratissimus*; *Gerrardina foliosa*; *Myrica serrata*; *Phyllanthus meyerianus*	3
umkhondweni	*Cryptocarya* spp. (*C. latifolia*, *C. myrtifolia*)	2
ujundu	*Curtisia dentata*	3
umlahleni	*Curtisia dentata; Heteropyxis natalensis*	5
inhliziyonkulu	*Dombeya rotundifolia*	1
isiklenama	*Drimia* spp.; *Urginea* spp.	6
ingwavuma	*Elaeodendron transvaalense*	20
isigqiki-somkhovu	*Encephalartos* spp.	7
insulansula	*Eriospermum* spp. (*E. mackenii*, *E.* sp.); *Spermacoce natalensis*	1
umathunga	*Eucomis autumnalis*	2
iphamba	*Eulophia* spp.	8

uqhume	*Hippobromus pauciflorus*	2
umavumbuka	*Hydnora* spp. (*H. africana*; *H. abyssinica*); *Sarcophyte sanguinea*	3
ilabatheka	*Hypoxis* spp.	4
ikhokhelo	*Justicia capensis*	11
intelezi	Many species	2
uvukakwabafile; chisomo	*Myrothamnus flabellifolia*	2
unukani	*Ocotea bullata*	21
umashiqolo	*Osteospermum imbricatum*	2
uvuma-obomvu	*Pappea capensis*	2
inhlanhla-emhlophe	*Passiflora suberosa**	7
inyazangoma	*Prunus africana*; Searsia chirindensis	1
umvangazi	*Pterocarpus angolensis*; *Trema orientalis*	2
usahlulamanye	*Pterocelastrus* spp. (*P. Echinatus, P. Tricuspidatus);Elaeodendron croceum*	3
umathanjana	*Rotheca* spp. (*Rotheca hirsuta,Rotheca myricoides)*; *Raphionacme* sp.	2
amampunzane	*Salacia leptoclada*	3
ihluze; umgxamu	*Schotia brachypetala*	5
umganu	*Sclerocarya birrea*	12
isiphephetho; serokolo	*Siphonochilus aethiopicus*	5
umlahlankosi	*Strychnos decussata*; *Hilliardiella aristata*	4
uvuma-omhlophe	*Synaptolepis oliveriana*	8
amakhosikancamane	unidentified species	1
ikhubalo	unidentified species	2
impindamumva	unidentified species	1
impundulo	unidentified species	1
impungane	unidentified species	1
indukuzabafana	unidentified species	2
isithendesezulu	unidentified species	2
mchamowemfene	unidentified species	4
njwane	unidentified species	1
ubangalala	unidentified species	2
umhlakaza	unidentified species	2
umathubadifala	unidentified species	3
umathubadifala	unidentified species	4
usilephe	unidentified species	2
uvelemoyeni	unidentified species	1
uvulakuvaliwe	unidentified species	2
umahlanganisa	*Urginea* spp.	2
iphengulula	*Utricularia prehensilis*	1
uhlunguhlungu	*Vernonia* spp. (*V. corymbosa*, *V. tigna*); *Brachylaena elliptica*; *Printzia pyrifolia*	2
indlabaloyi; umhlabamanzi	*Voacanga thouarsii*	2
isibhaha	*Warburgia salutaris*	18
umphafa	*Ziziphus mucronata*	2

APPENDIX 5

Species cited by respondents as priority for cultivation.

* = Species not endemic to South Africa.

Common name	Species	Number of times cited as 'want/are' allowed to cultivate
umkhanyakude	*Acacia xanthophloea*	5
impetso	*Acridocarpus natalitius*	2
muuyaino	*Adansonia digitata*	2
impindamshaye	*Adenia gummifera*	2
ubanga	*Afromosia angolensis*	1
umhlakuva	*Afzelia quanzensis*; *Ricinus communis**	2
umayisaka	*Agathosma ovata; Thesium pallidum; Muraltia lancifolia*	3
umgadankawu	*Albizia adianthifolia*	2
umababaza	*Albuca bracteata*	8
ikhathazo	*Alepidea* spp.	1
icena	*Aloe* spp.	1
inhlaba	*Aloe* spp.	2
umathithibala	*Aloe* spp.; *Haworthia* spp.	13
umembeza	*Andrachne ovalis; Clutia pulchella*	2
imboziso	*Anethum graveolens*; *Foeniculum vulgare**; *Mentha aquatica*; *Lichtensteinia interrupta; Plectranthus hadiensis* var. *tomentosa*	2
imfeyenkawu	*Ansellia africana*	5
umahlalanyosi	*Antidesma venosum*	5
ibohlololo	*Aptenia cordifolia*	1
abanqonqozi	*Araucaria heterophylla*; Cupressus* sp.*; Podocarpus henkelii*	1
umadlozana	*Argyrolobium tomentosum*; *Berchemia discolor*; *Margaritaria discoidea*; *Ochna natalitia*; *Turraea floribunda*	2
Phalabashimane	Aristea spp.	2
umhlonyana	*Artemisia afra*	2
umncaka	*Berchemia zeyheri*	2
umhlakaza	*Bersama* spp*. (B. lucens, B. swinnyi)*	2
undiyaza	*Bersama* spp*. (B. lucens, B. swinnyi, B. tysoniana); Dioscorea dregeana*	2
incotho	*Boophone disticha*	5
Sassa	*Brachystegia spiciformis*	2
amafuthaomhlaba; impila	*Callilepis laureola*	2
umemezi-omhlophe	*Calodendrum capense*	2
lubani	Canarium schweinfurthii*	2
umemezi-obomvu	*Cassipourea* spp. (*C. flanaganii*, *C. gerrardii, C. malosana*)	2
uroslina	*Cinnamomum camphora**	2
umayime	*Clivia* spp. (*C. caulescens*, *C. gardenii*, *C. miniata*, *C. nobilis, C. robusta*)	17
umvuthuza	*Crassula* spp. (*C. multicava, C. sarmentosa*); *Kalanchoe* spp.; *Anemone bracteata*	3
ubhubhubhu	*Crotalaria globifera*; *Helinus integrifolius*	4
ilethi	*Croton gratissimus*; *Gerrardina foliosa*; *Myrica serrata*; *Phyllanthus meyerianus*	5

ujundu	*Curtisia dentata*	1
isiqunga	*Cymbopogon* spp.	5
udakwa	*Dioscorea* spp. (*D. dregeana, D. multiloba*)	2
ingwevu	*Dioscorea sylvatica*	2
indongana-zimbomvana	*Drimia* spp.; *Urginea* spp.	18
isiklenama	*Drimia* spp.; *Urginea* spp.	5
umnyamathi	*Ekebergia capensis*	2
ingwavuma	*Elaeodendron transvaalense*	2
intolwane	*Elephantorrhiza elephantina*	2
isigqiki-somkhovu	*Encephalartos* spp.	10
umnsinsi-wokuyimilela	*Erythrina lysistemon*	2
umkhwangu	*Erythrophleum lasianthum*	2
umathunga	*Eucomis autumnalis*	2
iphamba	*Eulophia* spp.	2
umdletshane	*Euphorbia cupulare*	2
umnduze; umsululu	*Euphorbia tirucalli*	2
umkhiwane	*Ficus sur*	4
ugobho	*Gunnera perpensa*	2
lingalo	*Haplocarpha scaposa*	2
African potato; ilabatheka	*Hypoxis* spp.	15
ikhokhelo	*Justicia capensis*	4
umvongothi	*Kigelia africana*	5
icubudwana	*Ledebouria* spp.	3
intelezi	Many species	4
ikhambi-lentwala	*Microglossa mespilifolia*; *Microgramma lycopodiodes*	1
uvukakwabafile; chisomo	*Myrothamnus flabellifolia*	3
unukani	*Ocotea bullata*	5
inhlanhla-emhlophe	*Passiflora suberosa**	2
ushisizwe	*Portulaca* spp. (inc. *P. pilosa*; *P. quadrifida*)	2
usahlulamanye	*Pterocelastrus* spp. (*P. Echinatus, P. Tricuspidatus);Elaeodendron croceum*	2
umaphipha	*Rapanea melanophloeos*	7
amampunzane	*Salacia leptoclada*	2
umyezane	*Salix mucronata*	2
uphondo-lukabhejane	*Sansevieria* spp. (incl. *S. cylindrica**)	3
umganu	*Sclerocarya birrea*	7
ifelemamba	*Secamone gerrardii*	1
isiphephetho; serokolo	*Siphonochilus aethiopicus*	7
imfingo	*Stangeria eriopus*	1
uzililo	*Stapelia gigantea*	2
umlahlankosi	*Strychnos decussata*; *Hilliardiella aristata*	3
umakwakwa	Strychnos spp. (S. innocua, S. pungens, S. dysophylla, S. gerrardii)	2
umdoni	*Syzygium cordatum*	2
impunyu; phunyuka	*Talinum caffrum*	21

umkhuhlu	*Trichilia* spp. (*T. dregeana*, *T. emetica*)	6
ishaladi	*Tulbaghia* spp. (*T. alliacea*, *T. simmleri*, *T.* sp.)	2
chimweme	Unidentified	2
chotnhela	Unidentified	1
igobongo	Unidentified	2
ikhubalo	Unidentified	1
impindamumva	Unidentified	2
impundulo	Unidentified	4
Kasambasinko	Unidentified	2
Lekgwama	Unidentified	2
umathanganisa	Unidentified	2
umthwalume	Unidentified	2
umziwawula	Unidentified	2
uvulakuvaliwe	Unidentified	4
umahlanganisa	*Urginea* spp.	2
umhlabelo	*Urginea* spp.	3
umhlabamanzi	*Voacanga thouarsii*	2
isibhaha	*Warburgia salutaris*	14
umlahlabantu; umphafa	*Ziziphus mucronata*	2

APPENDIX 6

Plants cited by respondents as 'not allowed to be cultivated'.

*** = Species not endemic to South Africa.**

Common name	Species	Number of times cited as 'not allowed to be cultivated'
umkhokha	*Abrus precatorius*	2
umkhanyakude	*Acacia xanthophloea*	4
uvelabahleke	*Acalypha villicaulis; Celosia trigyna; Crotalaria* spp.; *Cyrtanthus breviflorus*	1
ukalumuzi	*Acorus calamus**	6
umababaza	*Albuca bracteata*	1
ikhathazo	*Alepidea* spp.	2
amanzamnyama	*Anemone fanninii*; *Pelargonium alchemilloides* (umangqengqe)*	1
imboziso	*Anethum graveolens*; *Foeniculum vulgare**; *Mentha aquatica*; *Lichtensteinia interrupta; Plectranthus hadiensis* var. *tomentosa*	1
abanqonqozi	*Araucaria heterophylla*; Cupressus* sp.*; Podocarpus henkelii*	2
udelunina	*Asclepias cucullata*	2
umahlabasindi	*Brackenridgea zanguebarica*	2
amafuthaomhlaba; impila	*Callilepis laureola*	5
lubani	Canarium schweinfurthii*	2
umvusankunzi	*Carissa bispinosa*	4
umemezi-obomvu	*Cassipourea* spp. (*C. flanaganii*, *C. gerrardii, C. malosana*)	3
uroslina	*Cinnamomum camphora**	2
ubhubhubhu	*Crotalaria globifera*; *Helinus integrifolius*	2
kakhomu	*Croton gratissimus*	4
umgwaqane	*Croton sylvaticus*	1
ujundu	*Curtisia dentata*	2
isiqunga	*Cymbopogon* spp.	2
ingwevu	*Dioscorea sylvatica*	2
umnyamathi	*Ekebergia capensis*	2
ingwavuma	*Elaeodendron transvaalense*	6
umkhwangu	*Erythrophleum lasianthum*	20
idungamuzi	*Euclea* spp. (*E. crispa* spp. *crispa, E. daphnoides*, *E. divinorum*, *E. natalensis*); *Cenchrus ciliaris*; *Scolopia mundii*	2
umathunga	*Eucomis autumnalis*	28
iphamba	*Eulophia* spp.	2
umdletshane	*Euphorbia cupulare*	1
uqhume	*Hippobromus pauciflorus*	2
icubudwana	*Ledebouria* spp.	2
isola	*Manulea parviflora*	1
umsehla	*Peltophorum africanum*	2
umhlonishwa	*Phymaspermum acerosum*; *Psoralea pinnata*	4
umaphipha	*Rapanea melanophloeos*	2
amampunzane	*Salacia leptoclada*	2
umyezane	*Salix mucronata*	2

uphondo-lukabhejane	*Sansevieria* spp. (incl. *S. cylindrica**)	2
ifelemamba	*Secamone gerrardii*	2
isiphephetho; serokolo	*Siphonochilus aethiopicus*	2
uzililo	*Stapelia gigantea*	1
umkhuhlu	*Trichilia* spp. (*T. dregeana*, *T. emetica*)	3
chimweme	Unidentified	2
impindamumva	Unidentified	2
isizukulwane	Unidentified	1
Kasambasinko	Unidentified	2
lijwa	Unidentified	2
mchithazulu	Unidentified	2
nimo	Unidentified	3
nnjoka	Unidentified	1
udukanezwe	Unidentified	2
umacasha	Unidentified	3
umdumbulu	Unidentified	2
umshitatlou	Unidentified	2
umthwalume	Unidentified	2
umuzongaphi	Unidentified	2
umziwawula	Unidentified	2
uvulakuvaliwe	Unidentified	2
umahlanganisa	*Urginea* spp.	2
umhlabelo	*Urginea* spp.	2
iphengulula	*Utricularia prehensilis*	2
umkhamba	*Vachellia sieberiana*	2
umkhaya	*Vachellia sieberiana; Senegalia burkei*	9
isibhaha	*Warburgia salutaris*	2

APPENDIX 7

Species cited by respondents as requiring rituals before harvest.

* = Species not endemic to South Africa.

Species	Common name	Number of times cited as requiring rituals
Abrus precatorius	umkhokha	1
Acacia xanthophloea	umkhanyakude	4
Acalypha villicaulis; Celosia trigyna; Crotalaria spp.; *Cyrtanthus breviflorus*	uvelabahleke	1
Acridocarpus natalitius; *Spermacoce natalensis*	umabopha	1
Adenia gummifera	impindamshaye	4
Afrosciadium magalismontanum; Pimpinella caffra; Scabiosa columbaria	ibhekamina-ngedwa	1
Afzelia quanzensis; *Ricinus communis**	umhlakuva	1
Albizia adianthifolia	umgadankawu	4
Albuca bracteata	umababaza	1
Araucaria heterophylla; Cupressus* sp.*; Podocarpus henkelii*	abanqonqozi	1
Aristea ecklonii	umafosi	1
Capparis spp. (*C. brassii*, *C. tomentosa*)	umabusane	2
Crotalaria globifera; *Helinus integrifolius*	ubhubhubhu	4
Croton gratissimus	kakhomu	2
Cymbopogon spp.	isiqunga	1
Dianthus basuticus	hlokwana-latsela	1
Dianthus spp. (*D. crenatus, D. zeyheri*); *Monopsis scabra*; *Tephrosia marginella*	isidala	1
Encephalartos spp.	isigqiki-somkhovu	2
Erythrophleum lasianthum	umkhwangu	1
Erythrophleum suaveolens	mwavi	1
Eucalyptus spp.*; *Euphorbia cupularis*	umdlebe	15
Eucomis autumnalis	umathunga	1
Eulophia spp.	iphamba	1
Hippobromus pauciflorus	uqhume	2
Hypoxis spp.	ilabatheka	1
Myrothamnus flabellifolia	chisomo	2
Olinia radiata	umzaneno	1
Pappea capensis; *Turraea floribunda*	umvuma	1
*Passiflora suberosa**	inhlanhla-emhlophe	2
Philenoptera violacea	mphandazewula	1
Phymaspermum acerosum; *Psoralea pinnata*	umhlonishwa	2
Plectranthus spp.; *Tephrosia* spp.	lozana	1
Ptaeroxylon obliquum	umthathe	2
Sclerocarya birrea	umganu	6
Spirostachys africana	umthombothi	1
Strychnos decussata; *Hilliardiella aristata*	umlahlankosi	7
Synaptolepis oliveriana	uvuma-omhlophe	4
unidentified species	amakhosikancamane	11

unidentified species	maswirisingo	2
unidentified species	sehlangengubo	2
unidentified species	skhuniphenduka	2
unidentified species	zibankwa	2
unidentified species	ubangalala	2
unidentified species	ibunga	1
unidentified species	igobongo	1
unidentified species	iphande	1
unidentified species	isizukulwane	1
unidentified species	indukuzabafana	1
unidentified species	njwane	1
unidentified species	indumbahlozi	1
unidentified species	olinangwan-wankulu	1
unidentified species	thovane	1
Urginea spp.	umhlabelo	1
Utricularia prehensilis	iphengulula	2
Voacanga thouarsii	umhlabamanzi	1

APPENDIX 8

Conservation status of the species cited as 'decreasing' in availability (wild and markets), 'want/are' and 'not allowed' to cultivate' and requiring rituals before harvest. [LC=Least Concern, NT=Near Threatened, CR=Critically Rare, VU=Vulnerable, EN=Endangered DDT=Data Deficient Taxonomically, NE=Not Evaluated (SANBI, 2017)]

Species	Red List status
Abrus precatorius	LC
Acacia xanthophloea	LC
Acalypha villicaulis	LC
Acridocarpus natalitius	LC
Adansonia digitata	LC
Adenia gummifera	LC
Afrosciadium magalismontanum	LC
Afzelia quanzensis	LC
Agathosma ovata	LC
Albizia adianthifolia	LC
Albuca bracteata	LC
Andrachne ovalis	LC
Anemone fanninii	NT
Anethum graveolens	LC
*Anredera cordifolia**	LC
Ansellia africana	LC
Anthospermum rigidum	LC
Antidesma venosum	LC
Aptenia cordifolia	LC
Argyrolobium tomentosum	LC
Argyrolobium tomentosum	LC
Aristea ecklonii	LC
Aristea spp.	LC
Artemisia afra	LC
Asclepias cucullata	LC
Aspilia natalensis	LC
Balanites maughamii	LC
Berchemia discolor	LC
Berchemia zeyheri	LC
Bersama swinnyi	LC
Bersama lucens	LC
Boophone disticha	LC
Brachystegia spiciformis	LC
Brackenridgea zanguebarica	CR
Callilepis laureola	LC
Calodendrum capense	LC
Capparis brassii	LC

Capparis tomentosa	LC
Carissa bispinosa	LC
Cassinopsis tinifolia	LC
Celosia trigyna	LC
Cenchrus ciliari	LC
Clausena anisata	LC
Clutia pulchella	LC
Crotalaria globifera	LC
Croton gratissimus	LC
Croton sylvaticus	LC
Cryptocarya latifolia	LC
Cryptocarya myrtifolia	VU
Curtisia dentata	NT
Cymbopogon spp.	LC
Cyrtanthus breviflorus	LC
Dianthus basuticus	LC
Dianthus crenatus	LC
Dianthus zeyheri	LC
Dioscorea dregeana	LC
Dioscorea dregeana	LC
Dioscorea multiloba	LC
Dioscorea sylvatica	VU
Dombeya rotundifolia	LC
Ekebergia capensis	LC
Elaeodendron croceum	LC
Elaeodendron transvaalense	NT
Elephantorrhiza elephantina	LC
Eriospermum mackenii	LC
Erythrina lysistemon	LC
Erythrophleum lasianthum	NT
Erythrophleum suaveolens	NT
Euclea divinorum	LC
Euclea daphnoides	LC
Euclea natalensis	LC
Eucomis autumnalis	LC
Eucomis bicolor	NT
Euphorbia cupulare	LC
Euphorbia cupularis	LC
Euphorbia tirucalli	LC
Ficus sur	LC
Garcinia livingstonei	LC
Gerrardina foliosa	LC
Gunnera perpensa	LC
Haplocarpha scaposa	LC

Helinus integrifolius	LC
Hilliardiella aristata	LC
Hippobromus pauciflorus	LC
Jatropha hirsuta	LC
Jatropha zeyheri	LC
Justicia capensis	LC
Justicia flava	LC
Kigelia africana	LC
Lichtensteinia interrupta	LC
Manulea parviflora	LC
Margaritaria discoidea	LC
Mentha aquatica	LC
Merwilla plumbea	NT
Microglossa mespilifolia	LC
Mondia whitei	EN
Monopsis scabra	VU
Muraltia lancifolia	LC
Myrica serrata	LC
Myrothamnus flabellifolia	DDT
Ochna natalitia	LC
Ocotea bullata	EN
Olinia radiata	LC
Osteospermum imbricatum	LC
Pappea capensis	LC
Pelargonium alchemilloides	LC
Peltophorum africanum	LC
Philenoptera violacea	LC
Phyllanthus meyerianus	LC
Phymaspermum acerosum	LC
Pimpinella caffra	LC
Plectranthus hadiensis var. tomentosa	LC
Plumbago auriculata	LC
Podocarpus henkelii	LC
Prunus africana	VU
Psoralea pinnata	LC
Ptaeroxylon obliquum	LC
Pterocarpus angolensis	LC
Pterocelastrus echinatus	LC
Rapanea melanophloeos	LC
Rhamnus prinoides	LC
Rhipsalis baccifera	LC
Salacia leptoclada	LC
Salix mucronata	LC
Sarcophyte sanguinea	LC

Scabiosa columbaria	LC
Schotia brachypetala	LC
Sclerocarya birrea	LC
Scolopia mundii	LC
Searsia chirindensis	LC
Secamone gerrardii	LC
Senegalia burkei	LC
Siphonochilus aethiopicus	CR
Spermacoce natalensis	LC
Spermacoce natalensis	LC
Spirostachys africana	LC
Stangeria eriopus	VU
Stapelia gigantea	LC
Strychnos decussata	LC
Strychnos gerrardii	LC
Synaptolepis oliveriana	NT
Syncolostemon densiflorus	LC
Syzygium cordatum	LC
Syzygium guineense	LC
Talinum caffrum	LC
Tephrosia marginella	NE
Thesium pallidum	LC
Trema orientalis	LC
Trichilia dregeana	LC
Trichilia emetica	LC
Turraea floribunda	LC
Turraea floribunda	LC
Utricularia prehensilis	LC
Vachellia sieberiana	LC
Voacanga thouarsii	LC
Warburgia salutaris	EN
Yncolostemon densiflorus	LC
Ziziphus mucronata	LC

APPENDIX 9

Harvest location map key

Key	Location
a	Bushbuckridge
AA	Harding
b	Giyani
BB	Lesotho
c	KZN
CC	eMapondweni
d	Malawi
e	Maputo
EE	Nhlazuko
f	KwaMhlanga
FF	Nyavini
g	Nelspruit
i	Swaziland
II	uMkhanyakude
j	Engome
JJ	Mpumalanga
k	Hluhluwe
KK	Orange Farm
l	Jozini
LL	Port Elizabeth
m	Umhlabuyalingana
MM	Port Shepstone
n	Mozambique
NN	Empangeni
OO	Nkandla
PP	Dumbe
q	Bulwer
QQ	Nhlungwane
r	Eastern Cape
RR	Hammanskraal
s	Engonyameni
t	Free-State
TT	Nquthu
u	UmKhomazi
UU	Stanger
v	Mbizana
VV	Zimbabwe
w	Mount Ayliff
x	Ndwedwe
y	Lusikisiki
z	Ixopo

APPENDIX 10

Harvest areas that were mentioned by the respondents from each study site.

Study site	Cited harvest area	Frequency of mention
Marabastad	Bushbuckridge	1
	Giyani	1
	KZN province	6
	Malawi	2
	Maputo	1
	Ndebele	1
	Nelspruit	1
	Pretoria	1
	Southern Africa	1
	Swaziland	4
Mona	Engome	3
	Hlabisa	1
	Hluhluwe	2
	Jozini	5
	KZN province	1
	Umhlabuyalingana	1
	Mozambique	1
	Nongoma	3
	Ulundi	2
Warwick	Bulwer	1
	Eastern Cape	2
	Engonyameni	1
	Free State province	1
	Jozini	1
	UmKhomazi	1
	Mbizana	1
	Umhlabuyalingana	7
	Mont Ayliff	1
	Ndwedwe	4
	Nongoma	7
	Lusikisiki	1
	Ixopo	1
Ezimbuzini	Durban	1
	Eastern Cape province	3
	Harding	1
	Lesotho	1
	Mapondweni	1
	Mbumbulu	1
	Umhlabuyalingana	6
	Mozambique	1
	Nhlazuko	1
	Nongoma	1
	Nyavini	1
	Ulundi	1
	Ixopo	1
Faraday	Durban	2
	Gauteng	1
	Umhlabuyalingana	5
	Umkhanyakude	1
	UmKhomazi	1
	Mpumalanga	1
	Nongoma	1
	Orange Farm	1
	Port Elizabeth	1
	Port Shepstone	1

	Swaziland	2
	Ixopo	1
Umlazi	Eastern Cape province	1
	Empangeni	1
	KZN province	2
	Umhlabuyalingana	2
	Nkandla	1
	Nongoma	1
Nhlungwane	Dumbe	1
	Engome	3
	Jozini	1
	KZN province	1
	Maputo	1
	Umhlabuyalingana	1
	Nhlungwane	1
	Nongoma	2
Soweto	Giyani	1
	Hammanskraal	1
	KZN province	8
	Lenasia	3
	Malawi	2
	Maputo	2
	kwaMhlanga	1
	Mpumalanga province	1
	Nkandla	2
	Nquthu	1
	Pretoria	3
	Stanger	1
	Zimbabwe	2
	Eastern Cape province	1

APPENDIX 11

Markets used and/or known by the respondents from each study site.

Study site	Market cited	Frequency of mention
Faraday	Warwick	3
	Ezimbuzini	1
	Mai Mai	2
	Mona	3
Ezimbuzini	Chatsworth	1
	Ezimbuzini	1
	Mona	2
	Warwick	6
Warwick	Dalton	3
	Ezimbuzini	10
	Faraday	2
	Isiphingo	3
	KwaMashu	1
	Mona	4
Mona	Faraday	4
	Mona	1
	Vryheid	5
	Warwick	3
Marabastad	Faraday	5
	Pretoria	1
	Warwick	1
Umlazi	Dalton	1
	Ezimbuzini	3
	Faraday	3
	Mona	3
	Warwick	6
Nhlungwane	Ezimbuzini	1
	Faraday	1
	Mona	8
	Vryheid	2
Soweto	Faraday	18
	Makhokhoba	2
	Marabastad	4
	Mona	4
	Warwick	2