

**Use and conservation status of medicinal plants in the Cape Peninsula,
Western Cape Province of South Africa**

By

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Declaration

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Abstract

The use of medicinal plants for primary healthcare needs has been practiced by local populations across the world for centuries and still exists in their lifestyles at present. In South Africa, several species of medicinal plants are used by many ethnic groups for the treatment of various ailments in both humans and domestic animals. There are also many policy and legal frameworks that bear on the exploitation of the country's natural resources, including medicinal plants. Consequently, the primary purpose of this study was to quantify the plant species used for medicinal purposes by local communities in the Cape Peninsula and the surrounding areas and also to assess their conservation status in respect to prevailing conservation policy and legal frameworks. This aim was accomplished by conducting personal observations, fieldtrips, formal interviews as well as informal interactions with traditional and Rastafarian healthcare practitioners. Accordingly, the views of local communities were assessed on three major themes: their awareness of the depletion of natural plants in the wild; their knowledge of the current conservation policies and laws that define access to and control of natural remedy; and the community views on natural resource accessibility.

The findings of the study revealed *firstly*, that the majority of the key respondents originated from the Eastern Cape and Western Cape provinces. They were mainly African people and most of them considered traditional medicine as a full-time activity. *Secondly*, this study recorded 112 plant species which have been identified to their scientific and common names (Afrikaans, isiXhosa, isiZulu and English). These comprise plants of different life-forms such as climbers, dwarf shrubs, epiphytes, geophytes, herbs, shrubs and trees that are currently being used in the Cape Peninsula and the neighbouring areas to treat a variety of both simple and complex ailments. *Thirdly*, the conservation status of 13 medicinal plant species was established, with four species being classified as *Declining* (*Agathosma betulina*, *Agathosma crenulata*, *Clivia miniata*, *Ocotea bullata*), four others as *Near Threatened* (*Cotyledon orbiculata*, *Dioscorea elephantipes*, *Dioscorea sylvatica*, *Stangeria eriopus*), two as *Protected* (*Boophane disticha*, *Xysmalobium undulatum*) and one species each for the categories *Least Concern* (*Agathosma ovata*), *Vulnerable* (*Bowiea volubilis*) and *Critically Endangered* (*Siphonochilus aethiopicus*), respectively. It was further indicated that these species were mostly collected from wild populations across South Africa. The study also revealed the Eastern Cape Province to be the main supply source of medicinal plant resources used in the study area followed by the Western Cape Province. *Finally*, the investigation revealed that the local communities in the Cape Peninsula and the surrounding areas have some good knowledge of the effectiveness of plant species to treat a wide range of health disorders. Effective encouragement and implementation of community-based natural resource management initiatives in protected areas throughout South Africa has been identified as a strategic intervention for sustainable management of biodiversity, including medicinal plant resources. This is feasible as the need for effective collaborative management of biodiversity in partnership with local communities has been well institutionalised in conservation related policy and legal frameworks in the country.

Opsomming

Medisinale plante word reg oor die wêreld reeds eeue lank deur plaaslike gemeenskappe gebruik vir primêre gesondheidsorgbehoefes en vorm vandag steeds deel van hul lewenstyl. In Suid-Afrika word verskeie spesies medisinale plante deur vele etniese groepe gebruik vir kwale in beide mense en huisdiere. Daar is ook verskeie beleids- en regsraamwerke rakende die uitbuiting van die land se natuurlike hulpbronne, wat medisinale plante insluit. Gevolglik is die hoofdoel van hierdie studie om die plantspesies wat vir medisinale doeleindes deur plaaslike gemeenskappe in die Kaapse Skiereiland en aangrensende gebiede gebruik word te kwantifiseer, en ook om die bewaringstatus van sodanige spesies vas te stel aan die hand van huidige bewaringsbeleid- en regsraamwerke. Hierdie doel is bereik deur persoonlike observasies, veldwerk, formele onderhoude asook informele interaksie met tradisionele en Rastafariër-gesondheidsorgverskaffers. Die sienings van plaaslike gemeenskappe is volgens drie temas geëvalueer: hul bewustheid van die vermindering van natuurlike plante in die veld; hul kennis van die huidige bewaringsbeleide en –wette wat toegang tot en beheer van natuurlike rate definieer; en die gemeenskapsienings oor die toeganklikheid van natuurlike hulpbronne.

Die bevindinge van die studie was *eerstens* dat die meerderheid van die sleutelrespondente uit die Oos- en Wes-Kaapprovinsies afkomstig was. Hulle was meestal Afrikane, en die meeste van hulle het hulself as voltydse tradisionele mediese praktisyns beskou. Hierdie studie het *tweedens* 112 plantspesies volgens hul wetenskaplike en alledaagse name (Afrikaans, isiXhosa, isiZulu en English) gedokumenteer. Hierdie spesies sluit verskillende lewensvorme in, onder andere rankers, dwergstruike, epifiete, geofiete, kruie, struike en bome wat tans in die Kaapse Skiereiland en aangrensende gebiede gebruik word om 'n verskeidendheid kwale, beide eenvoudig en gekompliseerd, te behandel. *Derdens* is die bewaringstatus van 13 medisinale plantspesies vasgestel, waarvan vier spesies geklassifiseer is as *Afnemend* (*Agathosma betulina*, *Agathosma crenulata*, *Clivia miniata*, *Ocotea bullata*), vier as *Bykans Bedreig* (*Cotyledon orbiculata*, *Dioscorea elephantipes*, *Dioscorea sylvatica*, *Stangeria eriopus*), twee as *Beskermd* (*Boophane disticha*, *Xysmalobium undulatum*) en een elk as *Minste Kommer* (*Agathosma ovata*), *Kwesbaar* (*Bowiea volubilis*) en *Kritiek Bedreig* (*Siphonochilus aethiopicus*). Daar is verder aangedui dat hierdie spesies meestal uit wilde populasies oor Suid-Afrika heen versamel is. Die studie het ook die Oos-Kaapprovinsie aangedui as die hoofverskaffer van medisinale planthulpbronne, gevolg deur die Wes-Kaapprovinsie. *Laastens* het die ondersoek laat blyk dat die plaaslike gemeenskappe in die Kaapse Skiereiland en aangrensende gebiede oor goeie kennis beskik van hoe plantspesies 'n wye reeks gesondheidsongesteldhede effektief kan behandel. Effektiewe aanmoediging en implementering van gemeenskapsgebaseerde natuurlike hulpbron bestuursinisiatiewe in beskermd gebiede reg oor Suid-Afrika is geïdentifiseer as 'n strategiese intervensiemetode vir die volhoubare bestuur van biodiversiteit, insluitende medisinale planthulpbronne. Dit is lewensvatbaar, aangesien die behoefte aan effektiewe samewerkende bestuur van biodiversiteit in vennootskap met plaaslike gemeenskappe reeds goed geïnstusionaliseer is in bewaringsverwante beleids- en regsraamwerke van die land.

Résumé

L'utilisation des plantes médicinales pour les besoins primaires de soins de santé a été pratiquée par les populations locales à travers le monde pendant des siècles et existe toujours dans leurs styles de vie actuellement. En Afrique du Sud, plusieurs espèces des plantes médicinales sont utilisées par plusieurs groupes ethniques pour le traitement de divers maux chez des humains et des animaux domestiques. Il y a également plusieurs lois qui régulent l'exploitation des ressources naturelles du pays, y compris les plantes médicinales. Par conséquent, le but primaire de cette étude est d'identifier les espèces de plantes utilisées pour des buts médicaux par les communautés locales du Cape Peninsula et des environs, et d'évaluer également leur statut de conservation. Ce but a été atteint en conduisant des observations personnelles, excursions, entrevues formelles et informelles avec les tradipraticiens locaux. Par conséquent, les vues des communautés locales ont été évaluées sur trois thèmes principaux : leur conscience sur l'épuisement des plantes médicinales dans la nature ; leur connaissance des lois environnementales ; et les vues de la communauté sur l'accessibilité des ressources naturelles.

Les résultats de l'étude ont indiqué *premièrement*, que la majorité des principaux répondants a provenu des provinces du Eastern Cape et du Western Cape. Ils étaient principalement des africains noirs et la plupart d'entre eux a considéré la médecine traditionnelle comme activité principale. *Deuxièmement*, cette étude a enregistré 112 espèces de plantes qui ont été identifiées à travers leurs noms scientifiques et communs (afrikaans, isiXhosa, isiZulu et anglais). Celles-ci comportent des espèces de différentes formes de vie telles que les grimpeurs, les arbustes nains, les épiphytes, les géophytes, les herbes, les arbustes et les arbres qui sont actuellement utilisées dans le Cape Peninsula et les environs pour traiter une variété de maux simples et complexes. *Troisièmement*, le statut de conservation de 13 espèces de plantes médicinales a été établi, avec quatre espèces étant classifiées comme *Réduites* (*Agathosma betulina*, *Agathosma crenulata*, *Clivia miniata*, *Ocotea bullata*), quatre autres comme *Près d'être menacées* (*Cotyledon orbiculata*, *Dioscorea elephantipes*, *Dioscorea sylvatica*, *Stangeria eriopus*), deux comme *Protégées* (*Boophone disticha*, *Xysmalobium undulatum*) et une espèce pour chaque catégorie comme *Moindre souci* (*Agathosma ovata*), *Vulnérable* (*Bowiea volubilis*) et *mise en danger* (*Siphonochilus aethiopicus*), respectivement. Il a été indiqué que ces espèces ont été la plupart du temps rassemblées des populations sauvages à travers l'Afrique du Sud. L'étude a également indiqué que la province du Eastern Cape est la source principale d'approvisionnement des plantes médicinales utilisées dans la région d'étude suivi de la province du Western Cape. *Enfin*, cette recherche a indiqué que les communautés locales dans le Cape Peninsula et des environs ont une bonne connaissance de l'efficacité des espèces utilisées pour traiter un éventail de maux. L'encouragement et l'exécution efficaces des initiatives de gestion de ressources naturelles en collaboration avec les populations dans des aires protégées de l'Afrique du Sud ont été identifiés comme intervention stratégique pour la gestion durable de la biodiversité, y compris des plantes médicinales. Ceci est faisable car la gestion efficace de la biodiversité avec l'association les communautés locales a été bien institutionnalisée dans les cadres juridiques reliés à la conservation du patrimoine naturel du pays.

Dedication

This thesis is dedicated to my late and beloved father Antoine Nzue Ondo, my mother Colette Nzue Ondo, born Atangana Abada, my uncle Antoine Mintsa Mi Ondo and my fiancée Perrine Nkene Mba who sacrificed their energy, time and needs for my interest. Dad, you will always have a special place in my heart.

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Chapter 1: Introduction

1.1. Introduction

The principal objective of this study was to quantify the plant species used for medicinal purposes by local communities in the Cape Peninsula and to identify their conservation status. This aim was achieved by reviewing the available literature and by conducting interviews within the concerned communities. The first chapter gives a background to the research problem, describes the study area, outlines the objectives of the study and provides a background to the surveyed respondents as well as the main methods used in this investigation. It also illustrates South Africa's legal frameworks for natural resource conservation. The second chapter provides an overview of medicinal plant utilization throughout the world, based on the literature.

Chapters 3, 4 and 5 comprise the results obtained from the semi-structured questionnaires (Appendix C) administered in local communities across the Cape Peninsula and the neighbouring areas: Bellville Train Station, Cape Town-Parade, Du Noon, Fisante Kraal (Durbanville), Grabouw, Gugulethu, Harare, Khayelitsha (sections B, C & F), Kraaifontein, Langa, Macassar, Meltonrose, Mfuleni, Paarl (Chicago & Mbekweni), Philippi and Stellenbosch (Kayamandi). The third chapter presents the most important plant species used for medicinal purposes and the treated ailments mentioned by the key informants. The community members' responses were analyzed by determining the frequency of citations for each species and by comparing them with uses in other parts of the world. The fourth chapter deals with the techniques of obtaining medicinal plants, their origin and their availability in the wild. The results were discussed by comparing the different proportions of respondents' responses. Chapter 5 consists of the legal status of the most used plant species. The key informants' views on the accessibility of nature reserves and their awareness of conservation policies and laws were also discussed in this chapter.

The concluding chapter (Chapter 6) makes recommendations to CapeNature, with the aim of empowering them to achieve better management of their nature reserves. In addition, this chapter provides local communities with valuable suggestions to meet the sustainable use of natural resources. The achievement and limitations of the study were also highlighted in the sixth chapter.

1.2. Background to the study

The past 50 years have witnessed a major evolution in our understanding of conservation and its inter-relationship with the elusive goal of sustainable development. The concept of conservation significantly changed following the United Nations Conference on the Environment and Development in Rio de Janeiro in 1992. The subsequent ratification by most of the world's governments of the Convention on Biological Diversity (CBD) marked a turning point and has placed the subject of biodiversity firmly on the political agenda (Heywood & Iriondo, 2003). Similarly, Ghimire and Pimbert (1997) mentioned the emergence of major environmental organizations such as the International Union for Conservation of Nature (IUCN), the World Wide Fund for Nature (WWF) and the United Nations Environmental Programme (UNEP), as well as a number of powerful environmental campaigning organizations such as Greenpeace and Friends of the Earth, as a tuning point in the history of conservation.

In South Africa, conservation has been the bastion of an older paradigm that was less people friendly, especially with regard to the poor. With this paradigm, conservation represented the values and principles of the apartheid approach and discourse (Fakir, 2001). Explicitly, apartheid has been a profoundly unnatural system, a system of removal and separation. It alienated people from their traditional role as guardians of the land. It forced large numbers of people into unsuitable environments, putting disproportionate pressure on natural resources and carving deep fissures into valleys and hillsides. It had broken urban areas into fragments: some green, spacious and healthy, and others cramped unwholesome and degraded (Ramphela, 1991). In addition, the practice of conservation was dependent on and determined by, the prevailing policies and legal frameworks, so as to ensure the exclusion of the majority, and benefit a minority. However, with the emergence of a new political order in April 1994, the language of conservation began to change. Indeed, a formerly conservative fraternity now rather suddenly adopted a language, which spoke of community-based conservation, social upliftment and rural development (Fakir, 2001).

South Africa is home to a rich temperate flora, possessing approximately 24, 000 species comprising more than 10% of the world's vascular plant flora (Germishuizen & Meyer, 2003). It is also blessed with a rich cultural diversity, which is reflected in the formal and informal systems of medicine that are presently practised in different parts of the country (Van Wyk *et al.*, 1997). Consequently, it is estimated that some 28 million people in South Africa consume in the region of 19,500 tonnes of plant material per annum during 90 million incidents of use (Mander, 1998). Additionally, approximately 3,000 species are used by an estimated 200,000 indigenous traditional healers in South Africa, and up to 60% of the

citizens consult these healers, usually in combination with the use of modern biochemical products (Van Wyk *et al.*, 1997). A significant proportion of the medicines, which laypersons require and consider appropriate for the medication of self and family can be obtained from *amayeza* (*isiXhosa*) stores. These are also known as *muthi* stores in Zulu-speaking regions of South Africa. *Amayeza* stores can be described as “African chemists”. Directly translated from the Xhosa language, *amayeza isiXhosa* means “Xhosa medicine”, comprising medicines for physical illness and for culturally related afflictions (Cocks & Møller, 2002).

1.2.1. South Africa’s legal frameworks for conservation

The Republic of South Africa is a party to a number of international environmental conventions, including the World Heritage Convention which was adopted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1972 and ratified on 10th July 1997; the Convention on Biological Diversity (CBD) signed on 4th June 1993 and ratified on 2nd November 1995 (Fabricius *et al.*, 2003); the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1973 where Zimbabwe, Botswana and South Africa opposed many First World countries which wanted to ban ivory trade outright (Ramphela, 1991); and the Convention on Wetlands of International Importance, especially as Waterfowl Habitat (RAMSAR) agreed upon in February 1971 and ratified by South Africa in 1975 (Fabricius *et al.*, 2003).

As far as the country’s biodiversity is concerned, there are several policies and laws in South Africa that bear on the exploitation of its natural resources. Firstly, the Constitution (Act No. 108 of 1996) makes it clear that all South Africa’s citizens not only have the right to a healthy and well-conserved environment, but also have the right to benefit from natural resources for economic and social development. For example, section 24(a) provides everyone the right to an environment that is not harmful to a person’s health and well-being. Section 24(b) provides everyone the right to have the environment protected through reasonable legislative and other measures (Government of South Africa, 1996).

Secondly, the National Environmental Management Act (NEMA, Act No.107 of 1998) promotes the sustainable use of natural resources, co-operative governance in environmental management and equitable access to natural resources. Section 2(2) states that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. Section 2(4)(d) states that equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by

unfair discrimination. Section 2(4)(h) states that community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means (Government of South Africa, 1998a).

Thirdly, the Biodiversity Act (Act No.10 of 2004) provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act of 1998 that seeks the protection of species and ecosystems that warrant national protection. It also provides for the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. Section 2 clearly states the objectives of the Act (Government of South Africa, 2004).

Fourthly, the Protected Areas Act (Act No.57 of 2003) provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its landscapes and seascapes. It also provides for the management of those areas in accordance with the national norms and standards for intergovernmental co-operation and public consultation in matters concerning protected areas. For example, section 2(e) promotes sustainable utilization of protected areas for the benefits of people, in a manner that would preserve the ecological character of such areas. Similarly, section 2(f) promotes participation of local communities in the management of protected areas, where appropriate (Government of South Africa, 2003).

Finally, the National Forests Act (Act No.84 of 1998) reforms the law on forests and provides for related matters. Section 1(a) promotes the sustainable management and development of forests for the benefit of all. Section 1(c) provides special measures for the protection of certain forests and trees. Section 1(d) promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. Furthermore, section 1(f) provides for greater participation in all aspects of forestry and the forest industry by persons disadvantaged by unfair discrimination (Government of South Africa, 1998b).

1.3. Problem statement

The White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity visualized South Africa as a prosperous, environmentally conscious nation, whose people are in harmonious coexistence with the natural environment, and derives lasting benefits from the conservation and sustainable use of its rich diversity (Department of Environmental Affairs and Tourism, 1997). This is indeed necessary as Kidd (1996) had

noted that much of the original vegetation of the Cape Peninsula had already disappeared due to urban expansion, the spread of invasive exotic plants, too frequent fires and flower picking. She indicated that the Cape Peninsula had some 167 plant species which were threatened with overexploitation and urbanization. Most importantly, urbanization and agriculture have transformed 18 172 ha (37%) of the original area of natural vegetation of the Cape Peninsula. Almost half of the urbanization has occurred in one vegetation type (sandplain proteoid fynbos) (Richardson *et al.*, 1996). Similarly, 90% of agricultural transformation has occurred in three lowland vegetation types (sandplain proteoid fynbos, mesic mesotrophic proteoid fynbos and wet mesotrophic proteoid fynbos). In fact, these two categories of land transformation have together destroyed 48% of dune asteraceous fynbos, 77% of sandplain proteoid fynbos, 75% of wetlands, 70% of wet mesotrophic proteoid fynbos, 60% of renosterveld and grassland plus 32% of the area of vleis (Richardson *et al.*, 1996). Furthermore, of the 30 955 ha of natural vegetation remaining on the Cape Peninsula (that is not affected by agriculture or urbanisation), 3 313 ha (10.7%) are covered in dense stands (>25% canopy cover) of invasive alien trees and shrubs and another 10 184 ha (32.9%) is lightly invaded (<25% canopy cover). The large dense stands in this vegetation type, comprising mainly *Acacia cyclops* and *Eucalyptus* spp. are affecting 23 (14.3%) of the special taxa on the Peninsula (Richardson *et al.*, 1996).

Consequently, the Western CapeNature Conservation Board, hereafter, CapeNature, as a key player in conservation issues of the Cape flora, needs adequate information on the exploitation of medicinal plants to inform future management decisions. In order to enhance conservation within the areas of CapeNature's competence, there is a need to undertake an investigation aimed at identifying the most demanded plant species, the key users and the purposes of these uses. There is also a need to investigate the implementation of the laws related to plant diversity conservation and whether the local communities are aware of these policies and laws.

1.4. Research objectives

During a meeting held in December 2005 on the premises of the Stellenbosch University, officials from CapeNature (mainly Community Conservation Managers), especially from the Cape Metro and Boland Mountain Business Units, raised major concerns about the use of plant species for medicinal purposes across the Cape Peninsula. They expressed their determination to assist researchers/students in understanding the dynamics of medicinal plant utilization. As a result, five key objectives were formulated for this investigation:

- 1) to identify the kinds of plants used by local communities for medicinal purposes through their common, traditional and scientific names;
- 2) to determine the distribution and the availability of natural plants used for medicinal purposes;
- 3) to determine the legal status of natural plant species used for medicinal purposes;
- 4) to assess and hopefully develop awareness on conservation laws and policies that affect harvested products and harvesting areas amongst local communities; and
- 5) to make recommendations for overcoming the drawbacks of present natural resource management and use practices in the study area.

1.5. Description of the study area

The Cape Peninsula is an area of about 500 km² that accommodates over 2,600 species of flowering plants. This represents more than the total number of species found in South Australia. It also has over 150 rare and threatened plants (Kidd, 1996). As far as the geology and the soils are concerned, the Cape Peninsula has all scenic qualities of a great national park, with a magnificent 50 km chain of steep rugged mountains, broken by small coastal valleys that form miniature landscapes ringed by bold cliffs on the skyline. The mountains are composed of pale coloured quartzitic sandstone, typical of the Table Mountain Sandstone, which has been greyed by the growth of lichens. Below the sandstone, the Malmesbury Shale gives the smooth, rounded contour to the Lion's Rump and underlies central Cape Town (Kidd, 1996). In terms of climate, the Cape Peninsula enjoys a Mediterranean climate, with warm, dry summers and cold, wet winters. The predominant vegetation is fynbos, the famous heath, reed and protea flora found in the coastal plains and mountains of the south-western and southern Cape and the evergreen forest that includes yellowwood, stinkwood, assegai and ironwood (Kidd, 1996).

The proper and precise description of the study area highlights the different localities visited during the administration of the semi-structured questionnaires (Appendix C) designed to meet the objectives of the present study. These areas, presented in Figure 1, include the Bellville Train Station; the Parade in Cape Town; Du Noon; Fisante Kraal (Durbanville); Grabouw; Gugulethu; Harare; the B, C and the F-sections of Khayelitsha; Kraaifontein; Langa; Macassar; Meltonrose; Mfuleni; Paarl (Chicago and Mbekweni); Philippi and Stellenbosch (Kayamandi). It is important to mention that the interviews mainly took place in community halls reserved by officials of CapeNature. Only a small number of respondents were interviewed in their respective workplaces and homes.

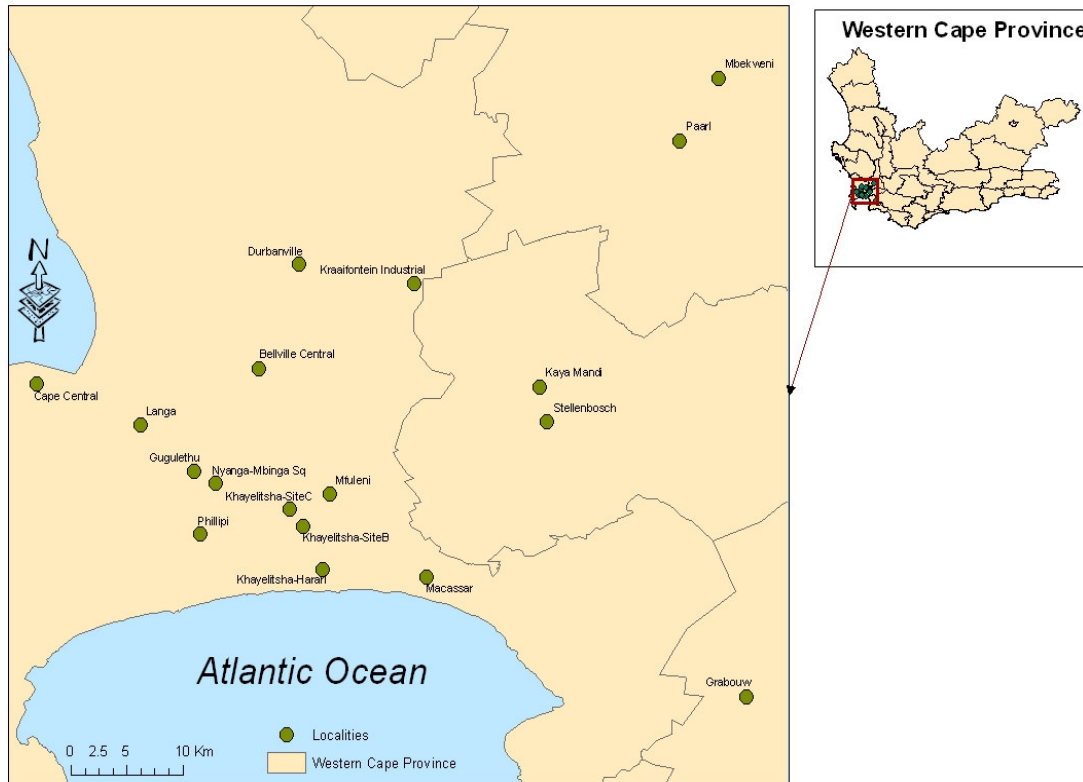


Figure 1: Map of the Western Cape Province of South Africa showing the study area

1.6. Background to the respondents surveyed

Medicinal plants are an important aspect of the daily lives of many people and a central element of the South African cultural heritage (Van Wyk *et al.*, 1997). In the Western Cape, traditional health practitioners are mainly composed of Xhosa and Rastafarian, ‘bossies-dokters’ (bush-doctors), with different ideologies and knowledge of plants of the province (Makunga *et al.*, 2008). Historically, the Cape region of South Africa has been part of the traditional home of Khoikhoi or Khoekhoe (Hottentots) herders and San (Bushman) hunter-gatherers. These highly diverse cultural groups are sometimes collectively and simplistically referred to as Khoi-San people (Van Wyk, 2008). In the second half of the 17th century, the region became inhabited by Europeans, mainly of Dutch, German and French descent. Through geographical isolation, these people developed into a cultural group known as the Cape Dutch and later as Cape Afrikaners. The interactions between Khoi-San and Cape Dutch people resulted in a distinct healing culture, known as Khoi-San or Cape Dutch medicine (Van Wyk, 2008).

1.6.1. Rastafarians

Rastafarianism has been around for only about 70 years. It is a deeply patriarchal religion that remains completely beholden to the Bible. Rastafarians believe that Emperor Haile Selassie, who dramatically struggled to remove the Italians from his homeland of Ethiopia (the first African nation to effectively oust, by force, a colonial power), is the returned Messiah, that he is Jah or God. They regard western society as part of Babylon – a system and a place that is the enemy of the black people of the world. For the Rastafarians, the land mass of Africa is the Promised Land (Edmonds, 2003). Additionally, Rastafarians are committed to *ital* living, commitment to using things in their natural or organic states.

Central to the ideal of *ital* living is the belief in herbal healing. Rastafarians believe that the entire universe is organically related and that the key to health, both physical and social, is to live in accordance with organic principles. In addition to the Rastafarian commitment to a virtually vegetarian diet, there is a commitment to the use of various herbs, which they believe promotes human well-being. Foremost among the herbs that they treasure is ganja (*Cannabis sativa*), which they often refer to as “holy herb” or “wisdom weed” (Edmonds, 2003). Indeed, the Rastafarian healers are mainly “coloured”. This group of people aligns themselves with the practice of using Khoi-San methods of healing.

1.6.2. Traditional healers

Traditional healers in South Africa are most commonly known as “inyanga” and “isangoma” (Zulu), “ixwele” and “amaqira” (Xhosa), “nqaka” (Sotho), “bossiedokter” and “kruiedoktor” (Western Cape). The terms “inyanga” and “isangoma” used to refer exclusively to herbalists and diviners, respectively, but in modern times the distinction has become blurred, with some healers practising both arts (Van Wyk *et al.*, 1997). In addition to the herbalists and diviners, who are believed to be spiritually empowered, there are traditional birth attendants, prophets, spiritual healers (Zulu: “abathandazi”), spirit mediums, intuitives and dreamers. Most elderly folk in rural areas have knowledge of herbal lore and function as first-aid healers with a family repertoire of herbal remedies or “kruierate” (Van Wyk *et al.*, 1997).

Traditional healers treat all age groups and all problems, using medicines that are readily available and affordable. Their treatment tends to be holistic, dealing with the psychosocial aspects of diseases as well as with the physical symptoms (Felhaber & Mayeng, 1997). In the present study, the traditional healers interviewed were mainly Xhosa-speaking people who originated from the Eastern Cape Province where the plant species used for medicinal purposes were collected on a regular basis.

1.7. Methods

Triangulation was the principal method used in collecting data for the present study. Triangulation means looking at the same phenomenon, or research question, from more than one source of data. Information coming from different angles can be used to corroborate, elaborate or illuminate the research problem (Decrop, 1999). According to Babbie and Mouton (2001), triangulation is generally considered to be one of the best ways to enhance validity and reliability in qualitative research. The method utilizes a variety of techniques, but the following were particularly used in this investigation:

Literature review

Assessment of the utilization of medicinal plants throughout the world occurred through the reviewing of the available and current literature. This provides an understanding of the crucial role played by plant diversity within communities as far as primary healthcare needs are concerned and the importance of introducing the concept of sustainable use of natural resources amongst indigenous people.

Interviews

Face-to-face meetings were held with key informants. Formal and informal discussions were also conducted with these informants. For example, a meeting was organized in the locality of Grabouw in the presence of a municipal councillor, traditional healers and CapeNature's officials in order to familiarize key respondents with the questionnaires that were being administered. Similarly, another meeting was held in Paarl with members of the Rastafarian Herbal Council for the same purpose. Useful insights were gained from these interactions and it consequently shaped the final content of the semi-structured questionnaires.

Semi-structured questionnaires (Appendix C)

Semi-structured questionnaires were used to gather relevant information from all the natural resource users, including traders, collectors and healers. This was done through open-ended and close-ended questions in the questionnaires. In order to overcome the language barrier, questions were asked in isiXhosa for those who could not communicate properly in English. It is worth mentioning that at the start of each interview, we identified ourselves as a non-governmental, but academic group interested in the continuous availability of these plants in the wild in order to ensure their ability for sustainable harvest. This information was crucial in order to obtain the most objective responses from the key informants.

Personal observations

The author's personal observations legitimized or refuted the responses given by key informants. A verification of what was stated was crucial. For example, many Rastafarians have constantly mentioned that they do practice sustainable harvesting methods. It was possible to observe whether there is a concordance between what is said and what is done during the fieldtrips organized to collect samples of the most used plant species mentioned in the questionnaires. Accordingly, personal observations are critically important because they endow the observer with opportunities for rejecting erroneous information to support the results from the semi-structured interviews.

Plant collection and identification

A significant number of fieldtrips were organized with willing Rastafarians, traditional healers from Paarl (Chicago and Mbekweni) and field rangers from CapeNature (working at the Limietberg Nature Reserve), to collect the plant species mentioned in vernacular names (isiXhosa and Afrikaans) during the survey. These plants were mainly collected from mountains (Du Toitskloof, Bainskloof, Paarl Mountain Nature Reserve, and Donkerkloof) and home-gardens. The Rastafarians, who have been involved for several decades in herbal medicine, were in charge of the collection of the samples. Digital pictures of the plants were taken in the natural state (before harvesting the plant in the wild). Dry specimens and their respective photographs were, therefore, sent to Cape Vegetation Surveys for proper identification. Additionally, published books (Watt & Breyer-Brandwijk, 1932; Smith, 1966; Hutchings *et al.*, 1996; Van Wyk *et al.*, 1997; Van Wyk & Gericke, 2000) and primary scientific literature on medicinal plant uses in South Africa (Grierson & Afolayan, 1999; Kelmanson *et al.*, 2000; Dold & Cocks, 2001; Dold & Cocks, 2002; Steenkamp, 2003; Erasto *et al.*, 2005; Buwa & Van Staden, 2006; Thring & Weitz, 2006) were consulted to confirm local and botanical names of these plants. Similarly, a guided tour was taken in Kirstenbosch National Botanical Garden with a horticulturist from the South African National Biodiversity Institute to confirm the plant identities.

1.7.1. The survey

Surveys are chiefly used in studies that have individual people as the units of analysis. Although this method can be used for other units of analysis, such as interactions, some individual persons must serve as respondents/informants (Babbie & Mouton, 2001). In the present study, traditional healers and Rastafarians represented the key informants. The survey

was carried out from 1st August 2006 to 28th July 2007 amongst selected local communities across the Cape Peninsula and neighbouring areas. The selection of communities was essentially based on CapeNature's involvement with certain groups of natural resource users in their areas of jurisdiction through their Community Conservation Managers. It is worth pointing out that the aim of the study was to survey all known natural plant users, including healers, collectors and traders. It would be unfeasible and unrealistic to survey all the residents of a particular location due to the fact that traditional medicine is a specialized activity. As it was noted by Van Wyk (2008) in many parts of the Cape that although many people have a sound knowledge of herbs and use them regularly, the term "bossiedokter" is a designation of honour, reserved for highly skilled and experienced herbalists.

In a multilingual society like South Africa, it is crucial that respondents are interviewed and answer questions in a language they are comfortable with (Babbie & Mouton 2001). Consequently, we used native Xhosa-speaking individuals who worked as community outreach officers and game rangers for CapeNature to administer the questionnaires. One-hundred and thirty-one adult traditional health practitioners were interviewed by means of a semi-structured questionnaire to gather information for meeting the objectives of this investigation. Questions were directed at sangomas in isiXhosa and the answers were recorded in English. In the case of Rastafarians, no particular problems were encountered because of their bilingual skills, being able to communicate in English and Afrikaans. For both groups, the names of the used plants were recorded in Afrikaans and isiXhosa. The interviews took place in the form of a face-to-face conversation. Refreshments, gadgets with CapeNature's logo and transport were provided as incentives for participating community members.

1.7.2. Data analysis

The data obtained from the semi-structured questionnaires were used to identify the plants used for medicinal purposes, their origin and their conservation status. The data were also used to determine the socio-economic characteristics of the respondents. Finally, the data were used to determine whether there were differences in the perceptions of access to natural resources and the needs expressed by the informants. The information was assessed and categorized according to the responses expressed by the respondents. The data were entered into Microsoft Excel and analyzed using Statistica 8.0. Chi-square tests were performed to determine significant differences at a 95% confidence interval. The frequency of citations for each plant was also determined.

1.8. Significance of the study

During the period from May 2003 to May 2005, the Department of Environmental Affairs and Tourism (DEAT) prepared the National Biodiversity Strategy and Action Plan (NBSAP). NBSAP sets out a framework and a plan of action for the conservation and sustainable use of South Africa's biological diversity and the equitable sharing of benefits derived from this use (Department of Environmental Affairs and Tourism, 2005). This reflects the determination of the South African Government to reach the goals of conservation of natural resources as well as sustainable rural development. However, it is crucial to assess the implementation, at the local community level, of this action plan. This is one of the main reasons a study of this nature was necessary to examine the contribution of local communities to this process in order to provide a proper understanding of natural resources (medicinal plants) utilization.

The goal of NBSAP is to conserve and manage terrestrial and aquatic biodiversity to ensure sustainable and equitable benefits to the people of South Africa, now and in the future. In support of this goal, five key strategic objectives have been identified (Department of Environmental Affairs and Tourism, 2005). Particular attention was paid to the first and the fourth strategic objectives, which state that an enabling policy and legislative framework should integrate biodiversity management objectives into the economy; and human development and well-being should be enhanced through sustainable use of biological resources and equitable sharing of benefits (Department of Environmental Affairs and Tourism, 2005). This type of study would make a valuable contribution to meeting this strategic goal by equipping role-players in nature conservation with the necessary and relevant information.

1.9. Expected outcomes and contributions of the study

This study aimed to quantify the plant species used for medicinal purposes and identify their conservation status. Compilation of the views expressed by selected natural resource users would enhance better management and conservation of nature reserves in the Cape Peninsula and elsewhere in South Africa. It should also make a considerable contribution to the process of conservation policy development initiated by the Government of South Africa as well as stimulate community-based-natural resource management. This would also facilitate the development of a biodiversity issue-centered policy and strategy by CapeNature.

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Chapter 2: Importance of natural plants in traditional medicine

2.1. Introduction

This chapter explores the utilization of natural plants for medicinal purposes by a diverse range of communities. It also emphasizes the crucial role played by these plant species as far as primary healthcare needs are concerned. The chapter tackles the use of medicinal plants at three levels: the world, the African continent and at the local South African level. According to the World Health Organization (WHO), as many as 80% of the world's population depends today on traditional medicine for their primary healthcare (Azaizeh *et al.*, 2003). The use of plant remedies appears to be well documented. A considerable number of studies has been conducted in different parts of the world, such as Argentina, Bulgaria, China, Honduras, India, Nepal, Spain, Cameroon, Democratic Republic of Congo, Ethiopia, Kenya, Morocco, Sudan, Uganda and Zimbabwe. The following sections present some of the findings of these scientific investigations.

2.2. Use of medicinal plants in the world

In the north-western Argentine Chaco, plant remedies are used for the treatment of almost all kinds of ailments, ranging from life threatening conditions to problems like dandruff (Scarpa, 2004). Furthermore, these plant species are used as antimycotic, cicatrizant, anti-inflammatory, antiseptic, diuretic, general preventive, contraceptive, antidiarrheic, vulnerary, blood depurative, antitussive, expectorant, abortive, laxative, excipient, galactogenous, anti-peristaltic, sedative, antiasthmatic, antipyretic, hypotensive, aperitive, antiarthritic, decongestive, antiaacid, cardio tonic, antiveneral, emetic, haemostatic and as antiemmenagonic (Scarpa, 2004). Similarly, in San Martin de los Andes, north-western Patagonia, the Curruhuinca community reported several plant usages for cases such as gastrointestinal ailments, liver, lungs, heart, stomach, bladder and blood symptoms, "pasma" (described as an increase of internal heat caused by having been cold, associated with appearance of pimples on the face, and eye and throat inflammation), evil eye and tumour. These plants also have therapeutic effects on hepatic-intestinal, analgesic, antitussive, gynaecological, dermatologic, circulatory and urinary conditions (Estomba *et al.*, 2006).

In Bolivia, medicinal plants are used by rural communities for the treatment of several diseases such as cholelithiasis, enteralgia, luxations, contusions, enuresis, tremor, dysorexia, tachycardia, colporrhagia and odontalgia (Fernandez *et al.*, 2003). Similarly, in Bulgaria, medicinal plants are traditionally used for the treatment of a wide range of ailments such as gastrointestinal tract, liver diseases, gall and bladder diseases, urinary disorders and

Parkinson's disease. Some of these plants have been used as immunostimulant and antihemorrhage, among others (Ivancheva & Stantcheva, 2000).

In the Cree Nation of Eeyou Istchee (CEI) in Québec, Canada, medicinal plants are used for the treatment of type II diabetes (T2D) by local communities (Leduc *et al.*, 2006). In the Yunnan Province of China, the red-headed Yao people have used medicinal plant species traditionally to treat a wide variety of cases like bellyache, numbness of limbs, quinsy, adynamia, sarcoma, tingle, scour, quadriplegia, hepatocirrhosis, and hemiplegia. These medicinal plants have also been used as invigorant, constitutional and as galactopoietic substances (Long & Li, 2004).

In the two southern provinces of Ecuador (Loja and Zamora-Chinchi), medicinal plants are used for the treatment of a variety of ailments, including kidney problems, inflammations, lacerations, "espanto" (a typical ill-defined Andean pathology, in which psychosomatic problems, originating from phobic factors, produce profound biological and psychological weakness), liver problems, heart problems, prostate disturbances, ear infections and hangover. They have also been used as hair tonic, relaxant and as purgative (Tene *et al.*, 2007). Similarly, in Honduras, plant remedies are traditionally used in midwifery which is an age-old practice of delivering children. Firstly, plants are used during pregnancy to prevent miscarriage, to alleviate morning sicknesses, swelling of legs, ankles and abdominal pains. Secondly, plants are used during birth to accelerate contractions during labour, to expel the retained placenta and to treat "nerbios" during labour. Thirdly, plants are used to stop postpartum haemorrhaging, to alleviate postpartum abdominal pains, as purgative to cleanse womb after birth, to encourage lactation and to treat eye discharge in newborns. Finally, these plants have been used to encourage conception, to prevent conception and to induce abortion (Ticktin & Dalle, 2005).

In India, medicinal plants appear to be considerably used throughout the country. Firstly, medicinal plants are used for the treatment of pains, mucous secretion, wounds of injured animals, constipation, gastric troubles, dizziness, sore tongue in children and fungal infections, in Nagaland. These plants have also been used as anthelmintic, antipruritic and as antidote in food poisoning (Jamir *et al.*, 1999). Secondly, in Spiti, a sub-division of Himachal Pradesh in the Indian Trans-Himalaya, local communities reported the use of medicinal plants to treat blisters, jaundice, cutaneous diseases, blood vomiting and internal injuries. These plants have also been used as aphrodisiac and blood purifier (Kala, 2000). Thirdly, the native people in Mizoram traditionally use herbal drugs for the treatment of conditions like gout, cancer, mental and nervous disorders and pre-menstrual tension. These herbal drugs have also been used as mouthwash, fat reducer and as antitetanus agent (Dolui, 2001).

Additionally, in Uttara Kannada, Dharwad and Shimoga, the three districts of Karnataka, India, medicinal plant species are traditionally used by local herbal practitioners and the Kunabi people to treat a wide range of discomforts like colds, aphthous ulcer in the mouth, hair follicle infections, breast infections in mothers, seminal discharge, toothache, plaque, carries, pyorrhoea, herpes simplex, cholera and paralysis (Harsha *et al.*, 2002; Hebbar *et al.*, 2004; Mahishi *et al.*, 2005). Similarly, in the Sitamata Wildlife Sanctuary of Chittorgarh and Udaipur districts of Rajasthan, medicinal plant species are used by local communities to treat various conditions such as sunstroke, tumour in abdomen, impotency in men, body swelling, swollen gums, giddiness and to treat cracks in foot sole. These plant species have also been used as antinematodal and for the treatment of carbuncles (Jain *et al.*, 2005). Furthermore, in Kouthalai of Tirunelveli hills in Tumi Nadu, herbal remedies are used by the Kani tribes for the treatment of sterility in men and women, rabies infections and hydrocele. These herbal remedies have also been used as a semen production booster and body tonic (Ayyanar & Ignacimuthu, 2005). In the Assam and Amravati districts of Maharashtra, medicinal plants are used by local people for healing a number of ailments like pediculosis, cellulitis, dhobi's itch, prickly heat, wrinkled skin, white discharge from the vagina, prolapse in cattle, addiction to liquor/wine, non-bleeding injuries, heavy perspiration, loose motions and encephalitis. These plants have also been used as delivery facilitator (Saikia *et al.*, 2006; Jagtap *et al.*, 2006). Finally, in the Leh–Ladakh region, traditional remedies are used by the Boto (the Buddhists) tribal community for the treatment of cold, cough and fever (Ballabh & Chaurasia, 2007).

In Israel, in the Golan Heights and the West Bank Region, plant species are still in use in Arab traditional medicine for the treatment of various diseases such as tremors, eczema, respiratory infections, ulcers of duodenum, bed wetting and halitosis. Medicinal plants have also been used for weight loss, blood circulation and also as cholesterol regulator (Said *et al.*, 2002). In the neighbouring Jordan, medicinal plants are used by herbalists for the treatment of several ailments like gynaecological disorders, nervousity, hyperactivity, male hypersexuality, lactation deficiency, hypercholesterolemia and loss of memory (Abu-Irmaileh & Afifi, 2003).

In Dolomiti Lucane, Central Lucania and Montecorvino Rovella, inland Campania in Italy, medicinal plants are traditionally used for healing purulent skin abscesses, drunkenness, cyst, contusions and rhagades. Additionally, these natural plants have been used as tranquiliser, anti-depressant, diaphoretic, menses regulator and as partum enhancer (Pieroni *et al.*, 2004; De Natale & Pollio, 2007).

In Lao People's Democratic Republic, species of plants are used in day-to-day medical therapy. Healers traditionally use herbal remedies to cure fatigue, colon cancer, liver parasite and nervous system disorders (Libman *et al.*, 2006). Similarly, in the Kali Gandaki Watershed and in the highlands of Dolakha District of Nepal, local people rely on traditional medicinal plants for the treatment of a number of ailments like anorexia, intoxication, fish bone problem, white leprosy and veterinary problems (Joshi & Joshi, 2000; Shrestha & Dhillon, 2003).

In the Bocas Del Toro Province of Panama, medicinal plants are used by the Teribe Amerindians to treat their health problems such as malnutrition, vertigo, post measles, leishmaniasis, breast pain and painful breathing (Gupta *et al.*, 2005). Similarly, in Canta, a small town, located 180 Km from the Peruvian Capital of Lima, medicinal plants are traditionally used by local Andean people to treat a various range of illnesses like bronchitis, intestinal parasites, fractures in domestic animals, jaundice, prostate inflammations, inflammation of the vesicle, "bad air" and "scare disease" in children (De-la-Cruz *et al.*, 2007).

In Arrabida Natural Park, a Portuguese protected area in the Southwest of the Iberian Peninsula, medicinal plants are used by local communities for the treatment of hoarseness, coqueluche (a violent cough), influenza, sea-sickness, varicose veins, chap, fistulas, severe constipation and arterial sclerosis (Novais *et al.*, 2004). Similarly, in the Barros Area, Badajoz Province and in El Caurel rural region of Galicia in the Lugo Province of Spain, plant species are used for the treatment of various human and animal diseases like gastric hyperacidity, haematomas, renal and billar calculi, insomnia, nettle rash of *Urtica* species and erysipelas. These herbal remedies have also been used as collyrium, vasodilator, rubefacient and tooth growth stimulator (Várquez *et al.*, 1997; Blanco *et al.*, 1999). Finally, in the southern Appalachian region in the United States of America, medicinal plants are traditionally used by native inhabitants for the treatment of croup, skin eruptions associated with chicken pox, poison ivy and warts. These plant remedies are also used as blood builder and eyesight improver (Cavender, 2006).

2.3. Use of medicinal plants in Africa

Traditional remedies are part of the cultural and religious life of African people. The seemingly wide use of traditional medicine is attributable to its accessibility and affordability (Steenkamp, 2003). For example, in the Kadiogo Province of Burkina Faso, medicinal plants are used in the management of the following oral health concerns: acute necrotizing

gingivitis, loose teeth, dental abscesses, sores in the mouth, on the tongue and lips (Tapsoba & Deschamps, 2006).

In Cameroon's Mbalmayo region and in the Dja Biosphere Reserve and its adjacent areas in East and South provinces, medicinal plants are traditionally used by Baka Pygmies and other groups for the treatment of stomach ailments believed to come from witchcraft, magic practice or vampirism, lumbago, round-worms, hernia, hook-worms and "child-cross" (ailment characterized by the loss of weight in babies between one and 10 months, when the two parents have not respected certain rituals before sex) (Noumi & Dibakto, 2000; Noumi & Yomi, 2001; Betti, 2004). Similarly, in Benin, West Africa, medicinal plants are traditionally used to treat malaria (Weniger *et al.*, 2004). In the Bushi area, South Kivu Province of the Democratic Republic of Congo, local people also use medicinal plants for the treatment of a variety of conditions such as ascariasis, myalgia, orchiocele (scrotal hernia), dislocations, madness, coryza (acute catarrhal condition of the nasal mucous membrane), agalactia, elephantiasis, defective fontanel, athlete's foot, taeniasis, intercoastal pains and framboesia (yaws). These plant species have also been used as healing ointment and insect repellent (Chifundera, 2001).

In Lake Ziway, in the Ethiopian Rift Valley, and in the Butajira District, south of Addis Ababa, and in the Debre Libanos monastery, medicinal plants are locally used by the Zay people and other people for the treatment of diverse human and livestock ailments like "mich" (illness mainly characterized by fever, headache and sweating), tapeworm infection, typhoid fever, herpes zoster, external injuries, epistaxis, lymphadenopathy, devil diseases, black leg, anthrax, "aloye" (diseases of cattle characterised by the falling-off of hair, skin lesion, constipation, failing to urinate and swelling of the body) and "geregelcha" (equine disease characterized by mucous secretion coming out of the nostrils of the sick animal continuously) (Giday *et al.*, 2003; Gedif & Hahn, 2003; Teklehaymanot *et al.*, 2007). It is also worth noting that in the two sub-districts of Dibatie and Guangua, local socio-cultural groups, such as the Amharao, Shinashas and Agew-Awis have been using medicinal plants for the prevention of human ailments such as intestinal worms, miscarriage, giardiasis, trachoma, gastro-intestinal complaints, taeniasis, gland tuberculosis and "mewejber" (child illness mainly characterized by confused mental state). These plants have also been used as a female attractant (Giday *et al.*, 2007).

In the Wechiau Community Hippopotamus Sanctuary of Ghana, medicinal plants are traditionally used by indigenous people to mainly treat malaria and other diseases like stomachaches, fever, mouth sores, eye problems and swellings (Asase *et al.*, 2005).

In the Bondo District, Nyanza Province of Kenya, medicinal plants are traditionally used by rural Luo mothers for the treatment of false teeth, mouth infections, congested nose in children, constipation, swelling, worms and labour pains (Geissler *et al.*, 2002).

In Bandiagara, Dogonland and Niono, in Mali, medicinal plants are used by traditional healers and herbalists for treating otitis, internal wounds caused by bilharzia, guinea worm, wounds in the nostrils and urinary and intestinal schistosomiasis (Inngjerdigen *et al.*, 2004; Bah *et al.*, 2006). On the other hand, in the Tafilet region of Morocco, medicinal plants are traditionally used by local people for the treatment of diabetes mellitus, hypertension and cardiac diseases (Eddouks *et al.*, 2002).

In the Bauchi, Kaduna and Kano states of Nigeria, medicinal plants are locally used by the Hausa, Fulani and other tribes for the treatment of a wide range of illnesses such as fibrosis, fish poisoning, emesis, gastroenteritis, manajitis, leukaemia, waist pains, appendicitis, bleeding and post-circumcision pains (Adamu *et al.*, 2005; Abubakar *et al.*, 2007).

In the villages around the riverside forests of the southern Blue Nile in Sudan, medicinal plants are traditionally used by local inhabitants to treat ailments like diarrhoea, indigestion, jaundice, dropsy, scorpion sting, chest diseases and asthma (Kamali & Khalifa, 1999).

In Coast, Dar es Salaam, Morogoro and Tanga regions of Tanzania, medicinal plants are locally used by traditional healers for the treatment of *Candida* infections, including oral candidiasis, vaginal candidiasis, oesophageal candidiasis and skin fungal infections (Runyoro *et al.*, 2006). In the Bulamogi County, Kamuli District of Uganda, medicinal plants are used by local farmers to treat cattle (*Bos indicus*) ailments like East Coast Fever (ECF), abdominal worms, cataract, itching skin, wounds, measles, diarrhoea and cough. Similarly, around the Bwindi Impenetrable National Park, herbal remedies are used for dental care, diarrhoeal disease (khitwa), ears or livestock groin (ekibagarila), mastitis, swellings of the udders, teats of cows and also to improve the aggressiveness, sense of smell and hunting ability of dogs (Cunningham, 1996). Furthermore, in the Bushenyi and Kasese districts, plants are locally used by traditional birth attendants to induce and maintain labour, help remove the retained placenta and to regulate post-partum bleeding (Tabuti *et al.*, 2003; Kamatenesi–Mugisha & Oryem–Origa, 2007). Finally, in the Guruve District of Zimbabwe, medicinal plants are used by traditional herbalists and knowledgeable rural dwellers for the treatment of sexually transmitted diseases (STDs), including gonorrhoea, genital herpes, syphilis and hepatitis (Kambizi & Afolayan, 2001).

2.4. Use of medicinal plants in South Africa

The South African population consists of the Nguni, comprising the Zulu, Xhosa, Ndebele and Swazi people; Sotho-Tswana, including the Southern, Northern and Western Sotho (Tswana people); Tsonga and Venda; Afrikaners; English; Coloured (a group which included the descendants of unions between indigenous and European people and a Muslim minority who became known as the “Cape Malays”); Indians; and a few members of the Khoi and the San (Burger, 2007). It is worth noting that this diverse assemblage of people depend on several species of medicinal plants for the treatment of various ailments in both humans and domestic animals (Masika & Afolayan, 2002). With South Africa’s remarkable biodiversity and cultural diversity, it is not surprising to find that approximately 3 000 species of plants are used as medicines (Van Wyk *et al.*, 1997). Thus, traditional healers make use of a plethora of plants to treat convulsions, epilepsy, depression and disorders associated with old age such as, Alzheimer’s disease and Parkinson’s disease (Stafford *et al.*, 2008). For example, plant species are used in Zulu traditional medicine for the treatment of various ailments such as sores, boils, aching joints, wounds in humans and animals, toothache, rheumatism, snake bite, dysentery, burns and infections (Kelmanson *et al.*, 2000). Traditional herbal remedies are used by women for gynaecological complaints and disorders, including menorrhoea, dysmenorrhoea, irregular menstruation, breast cancer, amenorrhoea, uterine cancer and infections related to infertility. These herbal remedies are also used as antiabortifacient, contraceptive and as abortifacient (Steenkamp, 2003). Similarly, plant species have been used by local traditional healers for the treatment of venereal diseases such as gonorrhoea and syphilis and also for the control of lice and urinary infections (Buwa & Van Staden, 2006).

In the Eastern Cape Province, medicinal plants are locally used by the sangomas, herbalists and rural dwellers for the treatment of diabetes mellitus (Erasto *et al.*, 2005). Additionally, plant remedies are used for the treatment of a range of ailments, including burns, rashes, itches, scratches, ulcers, boils, abscesses, open cuts, swellings, pimples and skin eruptions (Grierson & Afolayan, 1999). Furthermore, indigenous medicines are used to enhance the personal well-being of many inhabitants in the province. These medicines are primarily used as protection against evil spirits, for luck both in the general sense as well as in relationships and in the courtroom, for cleansing the blood and for removing poison inflicted through witchcraft (Cocks & Møller, 2002). In the Alice District, members of the Masakane community rely on traditional veterinary medicine to treat common livestock diseases such as gall sicknesses, bloat, conjunctivitis, diarrhoea, distemper, dystocia, endometritis, foot-rot,

fowl typhoid, heartwater, internal parasites, mange, sheep scab, red-water, retained afterbirth, vaginitis, shock, broken bones and to increase lactation in cattle (Dold & Cocks, 2001).

In Uthungulu, Umkhanyakude and Zululand, three district municipalities of northern KwaZulu Natal, medicinal plants are used traditionally for sprinkling as love and protective charms (to ward off evil spirits), for the treatment of headache, skin diseases, wounds, stomach ailments, diarrhoea, male impotency, female infertility, uterine diseases, asthma, fever, influenza, dysentery, sexually transmitted diseases, cough, toothache, malaria, lice, to hasten childbirth and to clarify dreams or their interpretation (Ndawonde *et al.*, 2007).

Similarly, in the localities of Mentz, Botlokwa and Seshego of the Capricorn District of the Limpopo Province, plant species are used for treating diarrhoea by traditional healers (Mathabe *et al.*, 2006). Conversely, in the Bredasdorp/Elim region and the Southern Overberg of the Western Cape Province, medicinal plants are traditionally used by individuals of the “Coloured” population group for the treatment of liver problems, arthritis, backache, fever, rheumatism, worms, earache, high blood pressure, convulsions, heart problems, sleeplessness, stomach ailments, bladder disorders, cough, kidney disorders, colds, influenza, headache, chest pains, inflammations, corns, stiff muscles, cancer, sinuses, sunburn, mouth ulcers, sore throat, sprains, thrush and tuberculosis. These plant species have additionally been used as milk stimulant in pregnant women and as a diuretic for weight loss (Thring & Weitz, 2006). In the districts of Graaff-Reinet and Murraysburg, two small Karoo towns situated near the boundary between the Western Cape, Northern Cape and Eastern Cape Provinces, plant species are used to treat madness (severe nervous conditions), colds, asthma, back pain, kidney failure, constipation, callosities, boils, sore throat, chest problem in infants, toothache, influenza, infertility, painful lungs, oral thrush, measles, high blood pressure, weak heart, syphilis warts, cancer, diabetes, liver problems, infertility in women, heartburn, eye ailments, tuberculosis, lice, pimples, jaundice and to remove persistent umbilical cord (Van Wyk *et al.*, 2008).

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Chapter 3: Natural plant species used for medicinal purposes

3.1. Introduction

Humans have been closely related to their natural habitat from the beginning of time. They have modified their natural environment, whilst being influenced by the nature that surrounded them. As a result of this two-way interaction, humans now have a large and widely known catalogue of useful species (Bonet & Vallès, 2007). For example, Steenkamp (2003) maintains that traditional remedies are elements of the culture and religious life of the African people. This extensive use of traditional medicine is attributable to its accessibility and affordability. In fact, medicinal and food uses are two of the most popular uses of plants. They are among the most persistent ones, even in cultures that are steadily losing their close relationships with nature (Bonet & Vallès, 2007). Southern Africa is exceptionally rich in plant diversity with some 30 000 species of flowering plants, accounting for almost 10% of the world's higher plants. The region's great cultural diversity has meant that many people still use a wide variety of plants in their daily lives for food, water, shelter, fuel, medicine and other necessities of life (Van Wyk & Gericke, 2000). Accordingly, in South Africa, several people still use plants as medicines as an alternative or supplement to western healthcare. It is estimated that up to 60 % of the population consult 250 000 indigenous or traditional healers (Van Wyk *et al.*, 1997).

Thus, the purpose of the present study is to understand the dynamics of medicinal plant usage across the Cape Peninsula. It is worth noting that one of the five objectives of the study was to identify the kinds of plant species used by local communities for medicinal purposes through their common and scientific names. This objective was met by administering semi-structured questionnaires to known African traditional healers and Rastafarians in the Cape Peninsula and the surrounding areas.

The data, presented and discussed in this chapter, were obtained from the first and second sections of the semi-structured questionnaire (Appendix C). The first section provided general information on the interviewees, especially their socio-economic characteristics of the surveyed respondents, while the second section derived information on medicinal plant species used and the variety of the patients using them. This information from the second section of the questionnaire constitutes the results presented and discussed in the third, fourth and fifth chapters of the thesis. It suffices to note that the results of the survey were discussed in a manner that compares the responses of the community members in the visited localities of the Cape Peninsula and the surrounding areas with other community responses elsewhere.

3.2. Results

The data captured from the semi-structured questionnaire (Appendix C) were entered into Microsoft Excel worksheets and analyzed. The classification of the plant species was done after determining the frequency of citations. Percentages were also calculated for each category of responses.

3.2.1. Surveyed localities

During this survey, 131 community members were interviewed across the Cape Peninsula and the neighbouring areas in 16 different towns or townships (Table 3(i)). The localities of Grabouw and Khayelitsha comprised the highest number of the respondents with 22 and 21 traditional healers, respectively. Conversely, Harare and Meltonrose had the lowest number with only one traditional healer each. A total of 46 Rastafarians and 85 traditional healers were interviewed to derive the necessary data for answering the objectives of this study.

Table 3(i): Synopsis of the surveyed locations

Locations	Categories of respondents		
	Rastafarians	Traditional Healers	Total
Bellville	3	0	3
Cape Town-Parade	3	0	3
Du Noon	0	12	12
Fisante Kraal	5	9	14
Grabouw	0	22	22
Gugulethu	0	3	3
Harare	0	1	1
Khayelitsha	0	21	21
Kraaifontein	14	2	16
Langa	0	3	3
Macassar	1	1	2
Meltonrose	0	1	1
Mfuleni	5	0	5
Paarl	11	0	11
Philippi	0	2	2
Stellenbosch	4	8	12
All groups total	46	85	131

3.2.2. Most frequently reported plant species

The most frequently used plant species in the Cape Peninsula and the surrounding areas are presented in Table 3(ii). These plants are recorded by their frequency of citations, i.e., the number of times they were mentioned, scientific, family, Afrikaans, isiXhosa, isiZulu and English names. Empty entries indicate that the names were not readily known in those

particular languages. It is worth pointing out that the compilation of these names was completed using relevant published books on medicinal plants (Watt & Breyer-Brandwijk, 1932; Smith, 1966; Roberts, 1990; Hutchings *et al.*, 1996; Van Wyk *et al.*, 1997; Van Wyk & Gericke, 2000; Goldblatt & Manning, 2000; Germishuizen & Meyer, 2003).

Initially, 183 plant species reported to be customarily used for medicinal purposes were recorded. After the determination of the frequency of citations for each plant mentioned, 112 frequency categories that varied from 63 to 2 were entered. This means that plants with a frequency of one were excluded. Of the 112 plant species, 92% (n=103) were identified and 8% (n=9) were unidentified. *Helichrysum* species (Kooigoed/imPhepho) had the highest frequency with 63 references, followed by *Agathosma betulina* (Boegoe/iBuchu), *Tulbaghia violacea* (wilde knoffel/wild garlic) and *Hypoxis hemerocallidea* (iNongwe/African potato) with 48, 41 and 34 citations, respectively. However, 25 species were referred only twice by the key informants during the survey.

Table 3(ii): The most frequently used plants in order of frequency*

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
1	63	<i>Helichrysum</i> spp. [1]; [2]; [3]; [4]; [5]; [6]	Asteraceae	Kooigoed	imPhepho	imPhepho	Everlasting
2	48	<i>Agathosma betulina</i> (P.J.Bergius) Pillans [1]; [2]; [3]; [5]	Rutaceae	Boegoe	iBuchu	_____	Round-leaf buchu
3	41	<i>Tulbaghia violacea</i> Harv. [1]; [2]; [3]; [4]; [5]; [6]	Alliaceae	Wilde knoffel	iVimba- 'mpunzi	isiHaqa	Wild garlic
4	34	<i>Hypoxis hemerocallidea</i> Fisch.Mey. & Ave-Lall. [1]; [2]; [6]	Hypoxidaceae	_____	iNongwe	inKomfe	African potato
5	23	<i>Bulbine frutescens</i> (L.) Willd. [5]; [6]	Asphodelaceae	Katstert	inTelezi	iBhucu	Cat's tail
6	22	<i>Lichtensteina lacera</i> Cham. & Schltdl. [3]; [4]	Apiaceae	Kalmoes	iQwili	_____	Larger tinsel flower
7	21	<i>Sutherlandia frutescens</i> (L.) R.Br. [1]; [2]; [3]; [4]; [5]	Fabaceae	Kankerbossie	umNwele	umNwele	Cancer bush
8	20	<i>Chironia baccifera</i> L. [1]; [2]; [3]; [4]; [5]	Gentianaceae	Bitterbossie	_____	_____	Christmas berry
9	20	<i>Artemisia afra</i> Jacq.ex Willd [1]; [2]; [3]; [4]; [5]; [6]	Asteraceae	Wilde-als	uMhlonyane	uMhlonyane	African wormwood
10	20	<i>Rhoicissus digitata</i> (L.f.) Gilg & M.Brandt [3]; [6]	Vitaceae	Wildepatat	uChithibhunga	isiNwazi	_____
11	19	<i>Cissampelos capensis</i> L.f [1]; [2]; [4]; [6]	Minespermaceae	Dawidjiewortel	uMayisake	_____	David root
12	19	<i>Haemanthus albiflos</i> Jacq. [3]; [6]	Amaryllidaceae	Poeierkwas	uMathunga	uZaneke	Paintbrush
13	16	Unidentified	Unidentified	Unidentified	Unidentified	Unidentified	Red carrot

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
14	14	<i>Eucalyptus globulus</i> Labill [3]	Myrtaceae	Bloekom	_____	_____	Bluegum
15	14	<i>Rapanea melanophloes</i> (L.) Mez [3]; [6]	Myrsinaceae	Kaapse boekenhout	uMaphipha	iKhubalwane	Cape beech
16	13	<i>Peucedanum galbanum</i> H. Wolff [3]; [4]	Apiaceae	Bergseldery	_____	_____	Blister bush
17	13	<i>Aloe speciosa</i> Baker [3]	Asphodelaceae	Spaansaalwyn	iKhala	_____	Title-head-aloe
18	12	<i>Eriocephalus africanus</i> L. [1]; [3]; [5]	Asteraceae	Wilde roosmaryn	_____	_____	Wild rosemary
19	12	<i>Hippobromus pauciflorus</i> (L.f.) Radlk. [3]; [6]	Sapindaceae	Perdepis	uLatile	umFazi- othethayo	Horsewood
20	12	<i>Helinus integrifolius</i> (Lam.) Kuntze [2]; [3]; [6]	Rhamnaceae	Seepbos	isiLawu	uBhubhubu	Soap plant
21	11	Unidentified	Unidentified	Bitterpatat	Unidentified	Unidentified	Unidentified
22	11	<i>Lobostemon fruticosus</i> (L.) H. Buek [1]; [2]; [3]; [4]; [5]	Boraginaceae	Agdaegeneesbos	_____	_____	Eight-day healing bush
23	10	<i>Lavandula</i> spp. [4]	Lamiaceae	_____	_____	_____	Lavender
24	10	<i>Leonotis leonurus</i> (L.) R.Br [1]; [2]; [3]; [4]; [5]; [6]	Lamiaceae	Wildedagga	umFincafincane	uMunyane	Wild dagga
25	10	<i>Strychnos henningsii</i> Gilg. [1]; [3]; [6]	Loganiaceae	Rooibitterbessie	umNonono	umQaloti	Red bitterberry
26	10	<i>Drimia elata</i> Jacq. [1]; [3]; [6]	Hyacinthaceae	Brandui	umRedeni	isiKlenama	_____
27	9	<i>Dodonaea angustifolia</i> L.f.	Sapindaceae	Ysterhouttoppe	_____	_____	Sand olive

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
28	9	[1]; [2] <i>Ranunculus multifidus</i> Forssk.	Rununculaceae	Brandblare	umVuthuza	isiJojokazana	_____
29	8	[3]; [6] <i>Hyraceum</i>	_____	Dassiepis	_____	_____	_____
30	8	[2] <i>Ocimum</i> spp.	Lamiaceae	Timie	_____	_____	Thyme
31	8	[4] <i>Cannabis sativa</i> L.	Cannabaceae	Dagga	umYa	inSangu	Marijuana
32	8	[1]; [2]; [3]; [4]; [6] <i>Xysmalobium undulatum</i> (L.) W.T. Aiton	Apocynaceae	Bitterwortel	iTshongwe	iShongwe	Milk bush
33	7	[1]; [2]; [3]; [4]; [5]; [6] <i>Aristea africana</i> (L.) Hoffmanns	Iridaceae	Moerbos	_____	_____	_____
34	7	[3] <i>Pelargonium triste</i> (L.) L'Hér.	Geraniaceae	Kaneelbol	_____	_____	Sad geranium
35	7	[4] <i>Cliffortia odorata</i> L.f.	Rosaceae	Wilde wingerd	_____	_____	Wild grape
36	7	[3]; [4]; [5] <i>Pittosporum viridiflorum</i> Sims	Pittosporaceae	Kasuur	umKhwenkhwe	umFusamvu	Cheesewood
37	7	[1]; [3]; [4]; [6] <i>Bowiea volubilis</i> Harv.ex Hook.f.	Hyacinthaceae	Knolklimop	uMagaqana	iGibisila	_____
38	7	[1]; [2]; [3]; [4]; [6] <i>Pentania prunelloides</i> (Klotzsch ex Eckl. & Zeyh.) Walp. Var. <i>prunelloides</i>	Rubiaceae	Sooibrandbossie	iCimamlilo	iRubuxa	Wild verbena
39	6	[1]; [2]; [3]; [5]; [6] <i>Elytropappus rhinocerotis</i> (L.f.) Less.	Asteraceae	Renosterbos	_____	_____	Rhenoster bush
		[1]; [2]; [3]; [4]					

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
40	6	<i>Rauvolfia caffra</i> Sond. [3]; [6]	Apocynaceae	Koorsboom	_____	umJele	Quinine tree
41	6	<i>Solanum aculeastrum</i> Dun. [3]; [4]; [6]	Solanaceae	Bitterappel	_____	umThuma	Goat apple
42	6	<i>Cinnamomum camphora</i> (L.) J. Presl [1]; [3]; [6]	Lauraceae	Kamferboom	uRoselina	uLoselina	Camphor tree
43	6	<i>Albuca setosa</i> Jacq. [6]	Hyacinthaceae	_____	inQwebeba	inGcino	_____
44	6	<i>Hypoxis colchicifolia</i> Bak. [6]	Hypoxidaceae	_____	iLabatheka	_____	_____
45	5	<i>Salvia africana-coerulea</i> L. [2]; [3]; [5]	Lamiaceae	Bloublomsalie	_____	_____	Blue sage
46	5	<i>Mentha longifolia</i> (L.) Huds. [1]; [2]; [3]; [4]; [6]	Lamiaceae	Kruisement	iniXina	uFuthane lomhlange	Wild mint
47	5	<i>Thesium</i> spp. L.f. [1]	Santalaceae	Witstorm	_____	_____	White storm
48	5	<i>Sarcophyte sanguinea</i> Sparm. [3]; [6]	Balanophoraceae	Wolwekos	uMavumbuka	uMafumbuka	
49	5	<i>Gunnera perpensa</i> L. [1]; [2]; [3]; [4]; [6]	Gunneraceae	Wilde-ramenas	iPhuzi	uGhobo	River pumpkin
50	5	Unidentified	Unidentified	Unidentified	iXonya	Unidentified	Unidentified
51	5	<i>Curtisia dentata</i> (Burm.f.) C.A.Sm. [1]; [2]; [3]; [6]	Cornaceae	Assegaihout	umLahleni	umLahlenisefile	Assegaiwood
52	5	<i>Cyrtanthus breviflorus</i> Harv. [6]	Amaryllidaceae	Vuurlelie	_____	uVelabahleke	Wild crocus
53	5	<i>Dioscorea sylvatica</i> (Kunth) Eckl. [2]; [3]; [6]	Dioscoreaceae	Skilpadknol	Usikolipati	uFudu	Wild yam
54	4	<i>Rafnia amplexicaulis</i> (L.)	Fabaceae	Soethoutwortel	_____	_____	Sweet root

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
55	4	Thunb. [2]; [3] <i>Bulbine latifolia</i> (L.f.) Roem. & Schult	Asphodelaceae	Rooiwortel	inCelwane	iBucu	Broad-leaved-bulbine
56	4	[1]; [3]; [4]; [6] <i>Viscum capense</i> L.f.	Viscaceae	Voëlent	_____	_____	Cape mistletoe
57	4	[1]; [3]; [4] <i>Bulbine alooides</i> (L.) Willd.	Asphodelaceae	Rooistorm	_____	iBhucu	Red storm
58	4	[1]; [3]; [6] <i>Melianthus major</i> L.	Melianthaceae	Kruidjie-roer-my-nie	uBulungubema mba	iBonya	Honey flower
59	4	[1]; [2]; [3]; [4]; [5]; [6] Unidentified	Unidentified	Unidentified	Unidentified	Unidentified	Fever root
60	4	<i>Myrothamnus flabellifolius</i> Welw.	Myrothamnaceae	Bergboegoe	_____	uVukwabafile	Resurrection bush
61	4	[1]; [2]; [3]; [4]; [5]; [6] <i>Schotia brachypetala</i> Sond.	Fabaceae	Boerboon	uVovovo	umGxamu	Weeping Schotia
62	4	[2]; [3]; [4]; [5]; [6] <i>Loxostylis alata</i> Spreng.f.ex Reichb.	Anacardiaceae	Tierhoot	isiBara	uFuthu	Wild pepper tree
63	4	[3]; [6] <i>Tulbaghia alliacea</i> L.f.	Alliaceae	Wildekofflok	uMwelela	uMwelela	Wild garlic
64	4	[3]; [4]; [5]; [6] <i>Afzelia quanzensis</i> Welw.	Fabaceae	Peulmahonie	umHlavusi	umDlavusa	Lucky bean
65	4	[6] <i>Talinum caffrum</i> (Thunb.) Eckl. & Zeyh	Portulacaceae	Osbossie	uPhuncuka bemphethe	inKucula	_____
66	4	[2]; [3]; [4]; [6] <i>Olea europea</i> L. subsp. <i>africana</i> (Mill.) P.S.Green	Oleaceae	Olienhout	uMnquma	uMnquma	Wild olive
67	4	[1]; [2]; [3]; [5]; [6] <i>Buddleja salviifolia</i> (L.) Lam.	Loganiaceae	Salie	_____	iLoshane	Mountain sage

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
68	3	[3]; [4]; [6] <i>Lycium ferocissimum</i> Miers	Solanaceae	Slangbessie	_____	_____	_____
69	3	[3] <i>Vernonia oligocephala</i> (DC.) Sch.Bip.ex Walp.	Asteraceae	Groenamara	_____	inLambihloshane	_____
70	3	[1]; [2]; [3]; [6] <i>Cnicus benedictus</i> L.	Asteraceae	Karmedik	_____	_____	Holy thistle
71	3	[1]; [2]; [4] <i>Dioscorea elephantipes</i> (L'Hér.) Engl.	Dioscoreaceae	Hottentotsbrood	Nakaa	inGweva	Elephant's foot
72	3	[2]; [3]; [5] <i>Geranium incanum</i> Burm.f.	Geraniaceae	Bergtee	Tlako	_____	Carpet geranium
73	3	[1]; [2]; [3]; [4] <i>Ruta graveolens</i> L.	Rutaceae	Wynruit/Rue	_____	_____	Herb of grace
74	3	[1]; [2]; [3]; [4] <i>Stangeria eriopus</i> (Kunze) Baill.	Stangeriaceae	Bobbejaankos	imFingwane	imFingo	Stangeria
75	3	[1]; [2]; [3]; [6] <i>Trichilia dregeana</i> Sond.	Meliaceae	Bosrooiessenhout	umKhuhlu	umKhuhla	Cape/Natal mahogany
76	3	[1]; [2]; [6] <i>Dolichos falciformis</i> E. Mey.	Fabaceae	_____	uVuma	_____	_____
77	3	[6] <i>Selago</i> spp.	Scrophulariaceae	_____	_____	umHlabelo	_____
78	3	[6] <i>Euphorbia natalensis</i> Bernh.	Euphorbiaceae	_____	_____	inKalamazane	_____
79	3	[6] <i>Rhoicissus tomentosa</i> (Lam.) Wild & R.B. Drumm.	Vitaceae	Bobbejaantou	imPinda bamshaye	isiNwazi	Wild forest grape
80	3	[2]; [3]; [6] <i>Rhipsalis baccifera</i> (J.Mill.) Stearn subsp. <i>mauritiana</i>	Cactaceae	Bostou	_____	uGebeleweni	_____

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
		(DC.) Barthlott [3]; [6]					
81	3	<i>Aloe aristata</i> Haw.	Asphodelaceae	_____	_____	uMathithibala	_____
		[6]					
82	3	<i>Osteospermum imbricatum</i> L. subsp. <i>nervatum</i> (DC.) T.Norl.	Asteraceae	_____	inKhupuhlana	_____	_____
		[6]					
83	3	<i>Cordia caffra</i> Sond.	Boraginaceae	Septee	_____	umKhanyakude	_____
		[3]; [6]					
84	3	Unidentified	Unidentified	Unidentified	Unidentified	Thuvane	Unidentified
85	3	<i>Combretum apiculatum</i> Sond. Subsp. <i>apiculatum</i>	Combretaceae	Rooibos	_____	umBondo	Red bush willow
		[2]; [3]; [6]					
86	3	Unidentified	Unidentified	Unidentified	Unidentified	umChamo wemfene	Unidentified
87	3	<i>Eucomis comosa</i> (Houtt.) Wehrh. Var. <i>comosa</i>	Hyacinthaceae	Krulkoppie	umPhompo	uBhuhlungu- becanti	Pineapple flower
		[6]					
88	2	Unidentified	Unidentified	Unidentified	Unidentified	Unidentified	Red onion
89	2	<i>Ballota africana</i> (L.) Benth.	Lamiaceae	Kattekrui	_____	_____	Cat herb
		[1]; [3]; [4]					
90	2	<i>Adenandra uniflora</i> (L.) Willd.	Rutaceae	Anysboegoe	_____	_____	Anys-buchu
		[3]; [5]					
91	2	<i>Solanum</i> spp.	Solanaceae	Bitterappel	_____	_____	Bitter apple
		[3]					
92	2	<i>Tetradenia riparia</i> (Hochst.) Codd	Lamiaceae	Watersalie	_____	iBoza	Ginger bush
		[1]; [2]; [5]					
93	2	<i>Croton gratissimus</i> Burch.	Euphorbiaceae	Leventelbos	_____	uMahlab'- ekufeni	Lavender croton
		[1]; [3]; [4]					

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
94	2	<i>Antidesma venosum</i> E.Mey.ex Tul [6]	Euphorbiaceae	Tosselbessie	_____	iSangowane	_____
95	2	<i>Zanthoxylum capense</i> (Thunb.) Harv. [1]; [2]; [5]; [6]	Rutaceae	Kleinperdepram	umLungumabel e	umLungumabel e	Small knobwood
96	2	<i>Boophane disticha</i> (L.f.) Herb [1]; [2]; [5]; [6]	Amaryllidaceae	Kopseerblom	iShwadi	inCwadi	Cape poison bulb
97	2	<i>Cotyledon orbiculata</i> L. [1]; [3]; [4]; [5]; [6]	Crassulaceae	Koutrei	imPhewula	iPewula	Pig's ear
98	2	<i>Ptaeroxylon obliquum</i> (Thunb.) Radlk. [1]; [2]; [3]; [6]	Rutaceae	Nieshout	umThathe	umBaqha	Sneezewood
99	2	<i>Peucedanum thodei</i> Arnold [6]	Apiaceae	_____	_____	imPondovu	_____
100	2	<i>Polygala serpentaria</i> Eckl. & Zeyh. [3]; [4]; [6]	Polygalaceae	Slangwortel	inCeba	inHlanhlenkulu	_____
101	2	<i>Ocotea bullata</i> (Burch.) Baill. [1]; [2]; [3]; [4]; [6]	Lauraceae	Stinkhout	umNukane	umNukani	Black stinkwood
102	2	<i>Glycyrrhiza glabra</i> L. [1]; [2]; [3]	Fabaceae	Soethout	_____	Mlomo-mnandi	Liquorice
103	2	<i>Bersama lucens</i> (Hochst.) Szyszyl. [1]; [2]; [4]; [6]	Meliantaceae	Blinkblaarwitessen hout	isiNdiyandiya	isiNdiyandiya	Glossy bersama
104	2	<i>Allium dregeanum</i> Kunth [3]	Alliaceae	Wildeui	_____	_____	Wild onion
105	2	<i>Siphonochilus aethiopicus</i> (Schweinf.) B.L.Burt [1]; [2]; [6]	Zingiberaceae	_____	_____	isiPhephetho	Wild ginger
106	2	<i>Rumex steudelii</i> Hochst. Ex.	Polygonaceae	Beestongblaar	iDololenkonyan	iDololenkonyan	Dock

No	Frequency	Scientific names	Family	Afrikaans names	Xhosa names	Zulu names	English names
		A. Rich. [3]			e	e	
107	2	<i>Dianthus thunbergii</i> Hooper [3]	Caryophyllaceae	Wilde-angelier	uNgcana	_____	Wild pink
108	2	<i>Tritonia lineata</i> (Salisb.) Ker- Gawl. [3]; [6]	Iridaceae	Bergkatjietee	isiLawu esibomvu	isiDwi esimpofu	_____
109	2	<i>Asparagus suaveolens</i> Burch. [3]	Asparagaceae	Katbossie	isiLawu esimholophe	_____	Wild Asparagus
110	2	<i>Gnidia cuneata</i> Meisn. [3]; [6]	Thymelaeaceae	Koorsbossie	_____	isiDikili	_____
111	2	Unidentified	Unidentified	Unidentified	Indonya	Unidentified	_____
112	2	Unidentified	Unidentified	Slangblaar	Unidentified	Unidentified	_____

*Frequency refers to the number of respondents from each medicinal plant user group who listed the plant species amongst their top 10 most commonly used plant species.

Key for column 3 (Scientific names):

[1] = Van Wyk *et al.*, 1997; [2] = Van Wyk & Gericke, 2000; [3] = Smith, 1966; [4] = Watt & Breyer-Brandwijk, 1932; [5] = Roberts, 1990; [6] = Hutchings *et al.*, 1996.

3.2.3. Most frequently reported plant species with the most varied uses

The most frequently used plant species in the study area and their various therapeutic uses are presented in Table 3(iii). These plants are recorded by their frequency of citations, i.e., the number of therapeutic uses mentioned for each plant, scientific names, therapeutic indications and the different parts of the plant used. It is worth mentioning that the list of therapeutic claims came from both Rastafarians and traditional healers in the study area.

Amongst the 112 plant species recorded based on the frequency of citations, only the identified ones (92%: n=103) were considered. Accordingly, 102 plants were traditionally used by Rastafarians and traditional healers across the Cape Peninsula and the surrounding areas. Of the 102 medicinal plants, those with the widest use were *Tulbaghia violacea* (22 different uses), *Agathosma betulina* (21), *Helichrysum* species (17), *Hypoxis hemerocallidea* (14), *Cissampelos capensis* (14), *Artemisia afra* (11), *Chironia baccifera* (10), *Eriocephalus africanus* (10) and *Cannabis sativa* (10). However, 16 medicinal plant species, including *Curtisia dentata*, *Dioscorea elephantipes*, *Boophane disticha* and *Gnidia cuneata* were reported to treat only one ailment.

Table 3(iii): The most frequently used plants with their therapeutic indications in order of magnitude*

No.	Frequency	Scientific names	Therapeutic indications	Parts used
1	22	<i>Tulbaghia violacea</i> Harv.	High cholesterol, immune system booster, fever, influenza, liver ailments, high blood pressure, tuberculosis, cough, colds, sinusitis, cancer, diabetes, blood purifier, antibiotic, constipation, asthma, antiseptic, heart problems, stomach cleaning, headache, chest complaints, wounds.	Bulb, leaves, root
2	21	<i>Agathosma betulina</i> (P.J.Bergius) Pillans	Physical weakness, influenza, arthritis, colds, bronchitis, vomiting, headache, fever, stomach complaints, immune system booster, bladder and kidney problems, cough, diabetes, nervous system ailments, high blood pressure, tuberculosis, blood purifier, diuretic, chest complaints, body cleansing, backache.	Leaves, stem
3	17	<i>Helichrysum</i> spp.	Stomach complaints, chase away evil spirits, lightening, bladder and kidney problems, heart problems, headache, vomiting, fever, backache, wounds, blood purifier, spiritual connection medicine for sangomas with ancestors, chest complaints, skin infections, lung cleaning, stroke, high blood pressure.	Leaves, root, stem
4	14	<i>Hypoxis hemerocallidea</i> Fisch.Mey. & Ave-Lall	Blood purifier, immune system booster, rheumatism, diabetes, high blood pressure, stomach complaints, bladder and kidney problems, body cleansing, appetizer, bone strengthening, cancer, anti poison, fatigue, stroke.	Corm, root
5	14	<i>Cissampelos capensis</i> L.f.	High blood pressure, good luck during court cases, stomach complaints, cancer, sinusitis, chase away evil spirits, pains, headache, low blood pressure, heart problems, tuberculosis, toothache, sores, laxative.	Root
6	11	<i>Artemisia afra</i> Jacq.ex Willd	Influenza, colds, asthma, headache, cough, fever, stomach complaints, blood purifier, pains, tuberculosis, rushes.	Leaves, stem
7	10	<i>Chironia baccifera</i> L.	High blood pressure, arthritis, cancer, epilepsy, diabetes, stomach complaints, haemorrhoids, immune system booster, infertility, low blood pressure.	Whole plant
8	10	<i>Eriocephalus africanus</i> L.	Stomach complaints, heart problems, hair growth, arthritis, skin problems, low blood pressure, fatigue, blood purifier, headache, nervous system ailments.	Leaves, stem

No.	Frequency	Scientific names	Therapeutic indications	Parts used
9	10	<i>Cannabis sativa</i> L.	Cancer, asthma, tuberculosis, healthy mind state, high blood pressure, stomach complaints, immune system booster, eye diseases, blood disorder, dysmenorrhoea.	Leaves
10	9	<i>Ocimum</i> spp.	Stomach complaints, nervous system ailments, headache, colds, influenza, chest complaints, cancer, heart problems, sores.	Leaves, stem
11	8	<i>Eucalyptus globulus</i> Labill	High blood pressure, liver ailments, influenza, immune system booster, high cholesterol, chest complaints, colds, fever.	Leaves
12	8	<i>Lichtensteina lacera</i> Cham. & Schltdl.	Stomach complaints, cough, asthma, self-protection against enemies, ulcers, fever, headache, chest complaints.	Whole plant
13	8	<i>Sutherlandia frutescens</i> (L.) R.Br.	Cancer, blood purifier, immune system booster, fever, backache, diabetes, high blood pressure, epilepsy.	Whole plant
14	8	<i>Hippobromus pauciflorus</i> (L.f.) Radlk.	Body cleansing, headache, toothache, colds, influenza, skin irritation, bladder and kidney problems, blood purifier.	Leaves, root, stem
15	8	<i>Lobostemon fruticosus</i> (L.) H. Buek	Skin infections, body cleansing, pains, antiseptic, uterus cleaning, blood purifier, worms, swelling body.	Whole plant
16	8	<i>Leonotis leonurus</i> (L.) R.Br	Asthma, high blood pressure, diabetes, epilepsy, bladder and kidney problems, worms, tuberculosis, cancer.	Leaves, stem
17	8	<i>Cliffortia odorata</i> L.f.	Asthma, colds, bladder and kidney problems, influenza, immune system booster, backache, water in body reducer, pains.	Leaves, root, stem
18	7	<i>Bulbine frutescens</i> (L.) Willd.	Body cleansing, vomiting, chase away evil spirits, acne, rushes, stomach complaints, swelling legs.	Whole plant
19	7	<i>Rhoicissus digitata</i> (L.f.) Gilg & M. Brandt	Body cleansing, good luck during court cases, chase away evil spirits, good luck in relationships, blood purifier, vomiting, stomach complaints.	Bulb, root
20	7	<i>Haemanthus albiflos</i> Jacq.	Broken bones, sexually transmitted infections, body cleansing, pains, blood purifier, arthritis.	Whole plant
21	7	<i>Peucedanum galbanum</i> H. Wolff	Water in bones reducer, chest complaints, diabetes, bladder and kidney problems, weight loss, swelling legs, high blood pressure.	Leaves, stem
22	7	<i>Aloe speciosa</i> Baker	Stomach complaints, chase away evil spirits, blood purifier, skin problems, purgative, ear infections, diabetes.	Leaves, root
23	6	<i>Dodonaea angustifolia</i> L.f.	Sore throat, chest complaints, cough, pains in muscles, backache, immune system booster.	Leaves, stem

No.	Frequency	Scientific names	Therapeutic indications	Parts used
24	6	<i>Pelargonium triste</i> (L.) L'Hér.	Vomiting, abscesses, blood purifier, pains, bladder and kidney problems.	Corm, root
25	6	<i>Salvia africana-coerulea</i> L.	Stomach complaints, body cleansing, sores, wounds, bronchitis, bladder and kidney problems.	Leaves
26	6	<i>Olea europea</i> L. subsp. <i>africana</i> (Mill.) P.S.Green	Body cleansing, nervous system ailments, stomach complaints, cancer, sores, heart problems.	Leaves, root
27	6	<i>Geranium incanum</i> Burm.f.	Sinusitis, heart problems, blood purifier, chest complaints, diabetes, relaxation.	Leaves, stem
28	5	<i>Lavandula</i> spp.	Insomnia, pains, chase away evil spirits, nervous system ailments, colds.	Leaves, stem
29	5	<i>Bowiea volubilis</i> Harv.ex.Hook.f.	Stomach complaints, infertility, body cleansing, asthma, chase away evil spirits.	Bulb, root
30	5	<i>Elytropappus rhinoceratis</i> (L.f.) Less.	Chest complaints, sore throat, bladder and kidney problems, afterbirth conditions, fatigue.	Leaves
31	5	<i>Rafnia amplexicaulis</i> (L.) Thunb.	Good luck during court cases, diabetes, fatigue, weight loss, cough.	Whole plant
32	5	<i>Dioscorea sylvatica</i> (Kunth) Eckl.	Epilepsy, good luck, wounds, vomiting, chase away evil spirits.	Root
33	5	<i>Tulbaghia alliacea</i> L.f.	Fear, body cleansing, stomach cleaning, chase away evil spirits, good luck in relationships.	Bark, bulb, root
34	4	<i>Rapanea melanophloes</i> (L.) Mez	Body cleansing, good luck during court cases, stomach complaints, vomiting.	Bark, leaves
35	4	<i>Helinus integrifolius</i> (Lam.) Kuntze	Spiritual connection medicine for sangomas with ancestors, good luck for job hunting, nervous system ailments, pimples.	Root
36	4	<i>Ranunculus multifidus</i> Forssk.	Pig's lices, sexually transmitted infections, chase away evil spirits, body refresher.	Leaves, root
37	4	<i>Pittosporum viridiflorum</i> Sims	Insomnia, stomach complaints, lung cleaning, asthma.	Bark
38	4	<i>Pentanisia prunelloides</i> (Klotzsch ex Eckl. & Zeyh.) Walp var <i>prunelloides</i>	Body cleansing, knee problems, pains, high blood pressure.	Leaves, root, stem
39	4	<i>Hypoxis colchicifolia</i> Bak.	Arthritis, immune system booster, body cleansing, skin irritation.	Bulb, root
40	4	<i>Mentha longifolia</i> (L.) Huds.	Fever, colds, asthma, water in bones reducer.	Leaves, stem
41	4	<i>Bulbine latifolia</i> (L.f) Roem.	Blood disorder, impotence in men, bladder and kidney problems,	Root

No.	Frequency	Scientific names	Therapeutic indications	Parts used
		& Schult	afterbirth conditions.	
42	4	<i>Loxostylis alata</i> Spreng.f.ex Reichb.	Pimples, asthma, cough, chest complaints.	Bark
43	4	<i>Afzelia quanzensis</i> Welw.	Leg problems, insanity, stomach complaints, laxative.	Bark, root
44	4	<i>Talinum caffrum</i> (Thunb.) Eckl. & Zeyh	Good luck during court cases, body cleansing, vomiting, gall.	Bulb, root
45	4	<i>Lycium ferocissimum</i> Miers	Stomach complaints, chase away evil spirits, asthma, chest complaints.	Whole plant
46	4	<i>Ruta graveolens</i> L.	Fever, stomach complaints, headache, diabetes.	Leaves, stem
47	4	<i>Ptaeroxylon obliquum</i> (Thunb.) Radlk.	Sinusitis, bleeding from nose, insomnia, headache.	Bark, root
48	3	<i>Drimia elata</i> Jacq.	Stomach complaints, skin problems, body cleansing.	Bulb, leaves
49	3	<i>Rauvolfia caffra</i> Sond.	Stomach cleaning, infertility, anti-poison.	Bark, root
50	3	<i>Solanum aculeastrum</i> Dun.	Sexually transmitted infections, pains, waist problems.	Bulb
51	3	<i>Albuca setosa</i> Jacq.	Body cleansing, insanity, chase away evil spirits.	Bulb, root
52	3	<i>Thesium</i> spp.	Urinary system cleaning, blood disorder, infertility.	Root
53	3	<i>Sarcophyte sanguinea</i> Sparrm	Pig's lice, stomach complaints, vomiting.	Root
54	3	<i>Gunnera perpensa</i> L.	Infertility in women, bladder and kidney problems, body cleansing.	Root
55	3	<i>Viscum capense</i> L.f.	Tuberculosis, asthma, ulcers in stomach.	Leaves, stem
56	3	<i>Bulbine alooides</i> (L.) Willd.	Good luck in business, blood purifier, nervous system ailments.	Root
57	3	<i>Melianthus major</i> L.	Wounds, blood purifier, chest complaints.	Leaves, stem
58	3	<i>Myrothamnus flabellifolius</i> Welw.	Aphrodisiac, abortion, infections.	Bark, stem
59	3	<i>Schotia brachypetala</i> Sond.	Infertility in women, stomach complaints, backache.	Bark, leaves
60	3	<i>Buddleja salviifolia</i> (L.) Lam.	Sores, high cholesterol, fever.	Leaves, stem
61	3	<i>Selago</i> spp.	Broken bones, pimples, pains.	Bulb
62	3	<i>Rhoicissus tomentosa</i> (Lam.) Wild & R.B. Drumm.	Chase away evil spirits, body cleansing, pains.	Leaves, root, stem
63	3	<i>Rhipsalis baccifera</i> (J.Mill.) Stearn subsp. <i>mauritanica</i> (DC.) Barthlott	Body cleansing, stomach complaints, chest complaints.	Root, stem
64	3	<i>Osteospermum imbricatum</i> L.	Internal healing, chest complaints, stomach complaints in children.	Bulb, root

No.	Frequency	Scientific names	Therapeutic indications	Parts used
65	3	subsp. <i>nervatum</i> (DC.) T.Norl. <i>Combretum apiculatum</i> Sond. Subsp. <i>apiculatum</i>	Chest complaints, stomach complaints, bladder and kidney problems.	Bulb
66	3	<i>Antidesma venosum</i> E.Mey.ex Tul	Chase away evil spirits, body cleansing, headache.	Bulb
67	3	<i>Polygala serpentaria</i> Eckl & Zeyh	Stomach complaints, body cleansing, vomiting.	Root
68	2	<i>Strychnos henningsii</i> Gilg.	Stomach cleaning, anti-poison.	Bark, root
69	2	<i>Xysmalobium undulatum</i> (L.) W.T. Aiton	Stomach complaints, headache.	Root, stem
70	2	<i>Aristea africana</i> (L.) Hoffmanns	Bladder and kidney problems, uterus cleaning.	Whole plant
71	2	<i>Cinnamomum camphora</i> (L.) J. Presl	Body cleansing, vomiting.	Bark, root
72	2	<i>Cyrtanthus breviflorus</i> Harv.	Body cleansing, stomach cleaning.	Bark, root
73	2	<i>Cnicus benedictus</i> L.	Pains in muscles, afterbirth conditions.	Leaves, stem
74	2	<i>Trichilia dregeana</i> Sond.	Immune system booster, cancer in legs.	Bark, root, stem
75	2	<i>Dolichos falciformis</i> E. Mey.	Body cleansing, blood purifier.	Bulb, root
76	2	<i>Euphorbia natalensis</i> Bernh.	Toothache, body cleansing.	Root
77	2	<i>Cordia caffra</i> Sond.	Stomach cleaning, good luck in relationships.	Bark
78	2	<i>Eucomis comosa</i> (Houtt.) Wehrh. Var. <i>comosa</i>	Spiritual connection medicine for sangomas with ancestor, vomiting.	Bark, leaves
79	2	<i>Ballota africana</i> (L.) Benth.	Uterus infections, high blood pressure.	Leaves, stem
80	2	<i>Adenandra uniflora</i> (L.) Willd.	Stomach complaints, pains.	Leaves
81	2	<i>Tetradenia riparia</i> (Hochst.) Codd.	Influenza, sore throat.	Leaves
82	2	<i>Zanthoxylum capense</i> (Thunb.) Harv.	Epilepsy, body cleansing.	Bark
83	2	<i>Ocotea bullata</i> (Burch.) Baill.	Body cleansing, stomach complaints.	Bark
84	2	<i>Bersama lucens</i> (Hochst.)	Stomach complaints, body cleansing.	Root, stem

No.	Frequency	Scientific names	Therapeutic indications	Parts used
85	2	Szyszl. <i>Siphonochilus aethiopicus</i> (Schweinf.) B.L.Burt	Self-protection against enemies, body cleansing.	Bark, root
86	2	<i>Dianthus thunbergii</i> Hooper	Body cleansing, stomach complaints	Root
87	1	<i>Curtisia dentata</i> (Burm.f.) C.A.Sm.	Skin irritation	Stem
88	1	<i>Vernonia oligocephala</i> (DC.) Sch.Bip.ex Walp.	Stomach complaints	Leaves
89	1	<i>Dioscorea elephantipes</i> (L'Hér.) Engl.	Body cleansing	Root
90	1	<i>Stangeria eriopus</i> (Kunze) Baill.	Insomnia	Root
91	1	<i>Aloe aristata</i> Haw.	Headache	Root
92	1	<i>Solanum sp.</i>	Blood purifier	Bulb
93	1	<i>Croton gratissimus</i> Burch.	Stomach complaints	Root
94	1	<i>Boophane disticha</i> (L.f.) Herb	Constipation	Whole plant
95	1	<i>Cotyledon orbiculata</i> L.	Ear infections	Leaves, root
96	1	<i>Peucedanum thodei</i> Arnold	Lightening	Root
97	1	<i>Glycyrrhiza glabra</i> L.	Good luck for job hunting	Root
98	1	<i>Allium dregeanum</i> Kunth	Body cleansing	Root
99	1	<i>Rumex steudelii</i> Hochst. Ex. A. Rich.	Stomach complaints	Root
100	1	<i>Tritonia lineata</i> (Salisb.) Ker- Gawl.	Body cleansing	Root
101	1	<i>Asparagus suaveolens</i> Burch.	Body cleansing	Root
102	1	<i>Gnidia cuneata</i> Meisn.	Fever	Leaves, stem

*Frequency refers to the number of therapeutic uses mentioned by the key informants for each plant listed amongst their top 10 commonly used plant species.

3.2.4. Life-forms of the plant species used for medicinal purposes

The results of this study revealed that 102 plants were traditionally used by local health practitioners all over the Cape Peninsula and the neighbouring areas at the time of this investigation. These medicinal plants belong to 93 genera and 53 families. The 93 genera were distributed among seven different types of life-forms which were climber (3 species), dwarf shrub (5), epiphyte (1), geophyte (15), herb (29), shrub (29) and tree (20), as shown in Figure 3. It is worth mentioning that the different life-forms were ascribed to the concerned plant species based on the works of Goldblatt & Manning (2000) and Germishuizen & Meyer (2003).

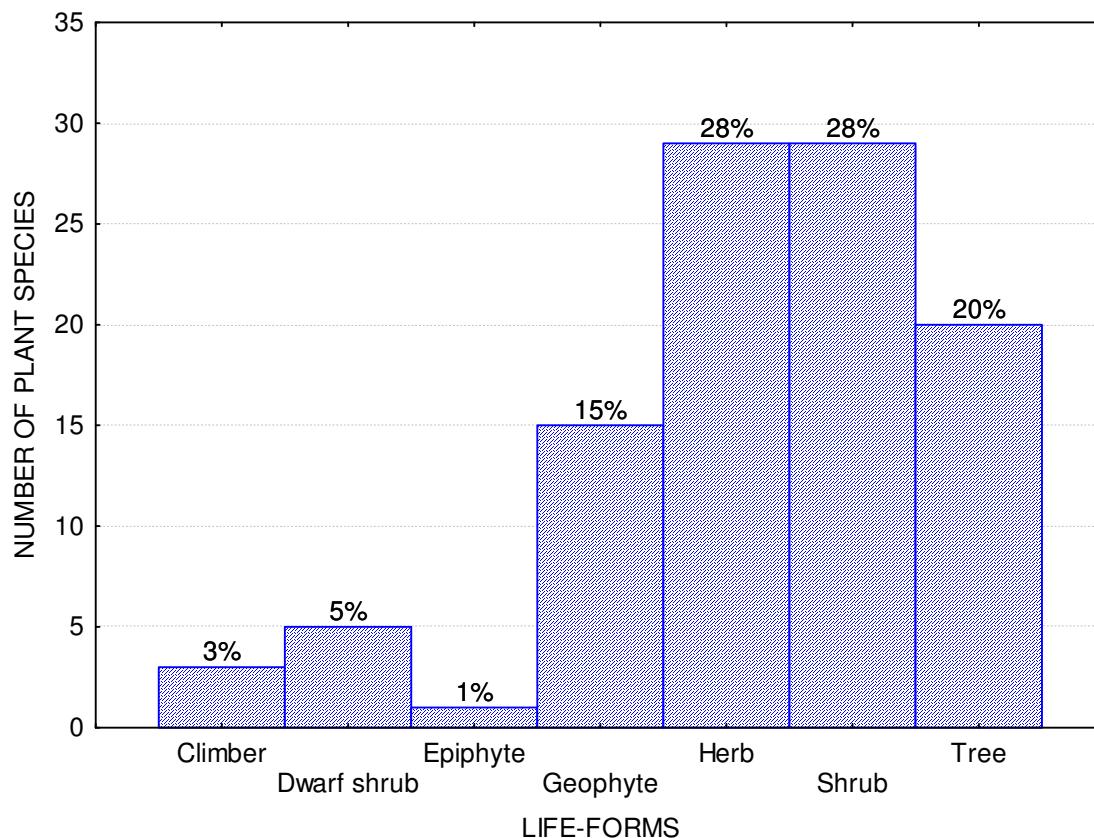


Figure 3: Life-forms of the plant species used for medicinal purposes

3.2.5. Socio-economic characteristics of the key informants

During the survey for the present study, 131 traditional healthcare practitioners were interviewed. Table 3(iv) displays the socio-economic profiles of the key informants (traditional healers and Rastafarians). Amongst the 131, 45% (n=59) of the respondents were females and 55% (n=72) were males. Twenty-seven percent (n=35) of the key informants

spoke Afrikaans and 71% (n=93) had isiXhosa as their native language. The last 2% (n=3) consisted of two Tswana-speaking persons and one Zulu-speaking person. Furthermore, the 131 surveyed respondents comprised “African” people, who represented 73% (n=96) and “Coloured” people, who represented 27% (n=35). Sixty-two percent (n=81) of the respondents came from the Eastern Cape Province and 35% (n=46) originated from the Western Cape, whilst 3% (n=4) consisted of informants from KwaZulu-Natal (2 people), Northern Cape (1 person) and Swaziland (1 person).

The educational level of the informants represents an important aspect of their socio-economic attributes. The results showed that only 3% (n=4) of the respondents reached the tertiary level of education; 55% (n=63) and 35% (n=40) attained high school and primary school levels of education, respectively; and 7% (n=8) had no formal schooling. The employment status revealed that 50% (n=66) of the respondents were unemployed, 37% (n=48) were considered as self-employed, 12% (n=16) were employed and only one person was a retiree.

It is worth noting that a large number of the surveyed respondents were involved in traditional medicinal plant use for treating various ailments. For example, 83% (n=101) of the respondents were involved full-time and only 17% (n=20) were involved part-time. This involvement was justified by cultural belief that was mentioned by 94% (n=119) of the respondents, economic reasons (2%: n=3) and both cultural and economic reasons (4%: n=5). The results also showed the years of involvement in the practice of traditional medicine. Accordingly, 15% (n=19) of the informants had spent 1 to 5 years in medicinal plant use, 20% (n=25) had spent 5 to 10 years, 21% (n=26) had spent 10 to 15 years, 9% (n=11) had spent 15 to 20 years, 18% (n=22) had been involved in medicinal plant usage for 20 to 25 years, 6% (n=8) had spent 25 to 30 years and another 6% (n=7) had been in traditional medicine for 30 to 35 years, 2% (n=3) had spent 35 to 40 years, only 1% (n=1) had been in this practice for 40 to 45 years and 2% (n=2) had been involved in medicinal plant usage for 45 to 50 years.

Finally, the results illustrated the age distribution of the surveyed respondents (Table 3(v)). For example, 12% (n=15) of the respondents’ ages varied from 20 to 30 years, 42% (n=55) varied from 31 to 40 year, 39% (n=51) aged from 41 to 50 years old and 7% (n=9) were 51 years old and above.

Table 3(iv): Socio-economic attributes of the surveyed respondents

Gender	Proportions
Female	45% (n=59)
Male	55% (n=72)
Native languages	

Afrikaans	27% (n=35)
isiXhosa	71% (n=93)
Other (isiZulu, Tswana)	2% (n=3)
Ethnicity	
African	73% (n=96)
Coloured	27% (n=35)
Province of birth	
Eastern Cape	62% (n=81)
Western Cape	35% (n=46)
Other (KwaZulu Natal, Northern Cape, Swaziland)	3% (n=4)
Educational level	
Tertiary	3% (n=4)
Secondary	55% (n=63)
Primary	35% (n=40)
No formal school education	7% (n=8)
Employment status	
Employed	12% (n=16)
Retired	1% (n=1)
Self-employed	37% (n=48)
Unemployed	50% (n=66)
Involvement in medicinal plants use	
Full-time	83% (n=101)
Part-time	17% (n=20)
Reasons for the involvement in medicinal plants	
Cultural belief	94% (n=119)
Economic reasons	2% (n=3)
Cultural and economic reasons	4% (n=5)
Years of involvement in medicinal plants use	
[1 – 5]	15% (n=19)
[5 – 10]	20% (n=25)
[10 – 15]	21% (n=26)
[15 – 20]	9% (n=11)
[20 – 25]	18% (n=22)
[25 – 30]	6% (n=8)
[30 – 35]	6% (n=7)
[35 – 40]	2% (n=3)
[40 – 45]	1% (n=1)
[45 – 50]	2% (n=2)

Table 3(v): Age distribution of the surveyed respondents

Age groups	Rastafarians	Traditional healers	Total	Proportions (%)
[20 – 30]	10	5	15	12
[31 – 40]	26	29	55	42
[41 – 50]	8	43	51	39
51+	0	9	9	7
All groups total	44	86	130	100

3.2.6. Behavioural characteristics of the patients

The survey showed the dynamics of the patients who consulted Rastafarians and traditional healers. Table 3(vi) displays the results of the analysis. The patients came from two specific areas: 71% (n=85) of them originated from local communities, neighbouring towns and provinces, while 29% (n=34) mostly originated from traditional healthcare practitioners' own community members. In terms of variation in the number of patients throughout the years of experience in traditional medicine, 63% (n=73) of the surveyed respondents noticed an increase in the number of patients, 27% (n=31) stated the number to be constant, 7% (n=8) reported that the number of patients had declined and only 3% (n=4) had no concrete observation. The season of affluence showed that the majority of the respondents (46%: n=52) reported a permanent affluence throughout the year. However, 28% (n=32) of them mentioned summer as the best season and for 24% (n=27), winter was the appropriate season. Indeed, a very small number of key informants (2%: n=2) referred to spring as the optimal season for consultations.

Table 3(vi): Behavioural aspects of the patients who consulted the surveyed respondents

Provenance of patients	Proportions
Mostly from own local communities	29% (n=34)
From local communities, neighbouring towns and provinces	71% (n=85)
Variation of the number of patients through the years	
Increase	63% (n=73)
Decrease	7% (n=8)
Stable	27% (n=31)
Unknown	3% (n=4)
Season of affluence for traditional healthcare practitioners	
Spring	2% (n=2)
Summer	28% (n=32)
Winter	24% (n=27)
Whole year	46% (n=52)

3.3. Discussion

This section illustrates the crucial role played by medicinal plants within communities and compares the findings of the present research with others elsewhere based on literature. This study, conducted in the Cape Peninsula and the surrounding areas, aimed to capture knowledge from “African” and “Coloured” population groups who make use of plants for healthcare in the hope that it may contribute useful knowledge to the understanding of the dynamics of medicinal plant usage in the study area. Needless to say, such knowledge is critical for planning the sustainable management of medicinal plants in the Cape Peninsula and the surrounding areas.

3.3.1. Plant species most frequently reported with the most varied uses

One-hundred-and-two plant species belonging to 53 families were found to be used in the study area (Table 3(iii)). The traditional healthcare practitioners interviewed used numerous methods of preparation of traditional medicines to treat the ailments of their patients. The preparation of remedies was essentially based on the utilization of diverse parts of plants, including leaves, bulbs, roots, stems, corms and barks. Depending on the sickness to be treated, infusions in boiling water from a handful of leaves are made and taken as tea as well as poultice and decoctions. Additionally, some plants are burnt and others are chewed raw. For example, *Helichrysum* species (Kooigoed/imPhepho) was reported to be burnt to chase away evil spirits by several Rastafarians. Another example is *Lichtensteina lacera* (Kalmoes/iQwili) from which a cup of tea is made and taken to cure coughing. It is worth pointing out that the surveyed respondents were scrupulous about the freshness of the used medicinal plants. Consequently, those unused within a period of three to four days after harvesting in the wild are, firstly, washed, dried, packed in old newspapers or black plastic bags and kept in places where temperatures are cool and where no sunlight could penetrate. Indeed with this storage condition, the plants could be used for a period ranging from 6 to 12 months.

Studies similar to this have successfully been performed in many parts of the world as illustrated in Chapter 2. Accordingly, in South Africa, 50 of the 102 plants documented during the survey for this study have also been recorded as incredibly useful for medicinal purposes in the Eastern Cape (Grierson & Afolayan, 1999; Dold & Cocks, 2001; Erasto *et al.*, 2005; Buwa & Van Staden, 2006), KwaZulu-Natal (Kelmanson *et al.*, 2000; Ndawonde *et al.*, 2007), Limpopo (Mathabe *et al.*, 2006) and the Western Cape provinces (Thring & Weitz, 2006; Van Wyk *et al.*, 2008). This represents a proportion of 49%, and includes species like *Artemisia afra*, *Bowiea volubilis*, *Cissampelos capensis*, *Dodonaea angustifolia*, *Elytropappus rhinoceratis*, *Gunnera perpensa*, *Hypoxis hemerocallidea*, *Sutherlandia frutescens* and *Viscum capense*. This confirms both the relevance and the considerable contribution made by this investigation as far as scientific knowledge is concerned.

In addition, four species of the 102 have been documented to be used in traditional medicine on the African continent. These plants include *Cannabis sativa* in Cameroon (Noumi & Dibakto, 2000) and Uganda (Tabuti *et al.*, 2003); *Dodonaea angustifolia* (Giday *et al.*, 2007) and *Rumex steudelii* in Ethiopia (Teklehaymanot *et al.*, 2007); and *Eucalyptus globulus* in Ethiopia (Gedif & Hahn, 2003) and Morocco (Eddouks *et al.*, 2002). Finally, only two species of the documented 102 in the Cape Peninsula and the surrounding areas were

noted in the literature to have been used in other parts of the world. *Cannabis sativa* was found to be used in Italy (Guarrera *et al.*, 2005) and Nepal (Joshi & Joshi, 2000; Shrestha & Dhillon, 2003) and *Eucalyptus globulus* in Argentina (Estomba *et al.*, 2006), India (Jamir *et al.*, 1999), Portugal (Novais *et al.*, 2004) and Spain (Blanco *et al.*, 1999). In other words, the 102 plant species claimed by the key informants to have therapeutic uses are not limited to the study area. Some of these plants have also been documented in other provinces in South Africa and other countries elsewhere in the world. Furthermore, it would be fair to state that many of the plant genera recorded in this observation have already been noted in other parts of the world.

3.3.2. Main infections treated

The present study indicates that local communities in the study area strongly rely on traditional remedies for their primary healthcare needs. Rastafarians, also considered as herbalists and sangomas both play a vital role in treating these health problems. It is important to note that 457 use-reports were recorded for the 102 medicinal plants used to treat the diversity of ailments presented in Table 3(iii). The surveyed respondents also mentioned the utilization of a combination of plants to treat ailments. This is similar to the findings of Bonet and Vallès (2007) who reported 365 plant mixtures, prepared under the belief of a synergic effect between different species and with a high degree of variation and originality. Ninety-five percent (n=108) of the interviewees reported to had used combinations of plant species when preparing medication, while only 5% (n=6) responded negatively to the use of combinations. For example, *Agathosma betulina*, *Dodonaea angustifolia* and *Tulbaghia violacea* are mixed to treat chest and lung problems, colds and cough. Among others, *Helichrysum* species, *Bulbine alooides*, *Thesium lineatum* and *Cissampelos capensis* are combined to alleviate nervous system ailments. This evidently shows that plant mixtures are administered to patients by traditional healthcare practitioners in the Cape Peninsula and the neighbouring areas.

Furthermore, the most treated conditions were classified into eight groups to determine the effectiveness of medicinal plants in treating these ailments. Indeed, literature shows that these frequently cited conditions have successfully been treated in South Africa, as shown in the following sections.

3.3.2.1. Gastro-intestinal infections

This category represents 62 of the 457 use-reports recorded, including stomach complaints, vomiting, stomach cleaning, ulcers, haemorrhoids, constipation, laxative and

purgative. Some of these ailments have already been recorded in Zulu traditional medicine (Kelmanson *et al.*, 2000; Ndawonde *et al.*, 2007) and in the provinces of Limpopo (Mathabe *et al.*, 2006) and Western Cape (Thring & Weitz, 2006; Van Wyk *et al.*, 2008).

3.3.2.2. Immune and inflammatory diseases

Fifty-five use-reports were recorded in this category, consisting of abscesses, rheumatism, swelling body, arthritis, fever, immune system booster, asthma and diabetes. Studies carried out in the Eastern Cape (Grierson & Afolayan, 1999; Erasto *et al.*, 2005; Ndawonde *et al.*, 2007) and the Western Cape (Thring & Weitz, 2006; Van Wyk *et al.*, 2008) provinces recorded some of these mentioned ailments.

3.3.2.3. Physical pains

This grouping consists of dysmenorrhoea, knee problems, sores, sore throat, backache, pains, headache and toothache, representing 48 citations. Ailments such as sores, backache, toothache, dysmenorrhoea, sore throat and headache have been recorded (Grierson & Afolayan, 1999; Kelmanson *et al.*, 2000; Steenkamp, 2003; Thring & Weitz, 2006; Ndawonde *et al.*, 2007; Van Wyk *et al.*, 2008).

3.3.2.4. Detoxication/Revigorator

In this group (44 citations), anti-poison, fatigue, body cleansing and body freshener were the therapeutic uses. Kelmanson *et al.* (2000) as well as Cocks and Møller (2002) documented the efficacy of certain plant species to remove poison.

3.3.2.5. Parapsychological events

This category (33 citations) comprises uses like self-protection against enemies, spiritual connection medicine for sangomas with ancestors and luck in the general sense as well as in business, relationships and in the court room. This is similar to the findings of Cocks and Møller (2002) and Ndawonde *et al.* (2007).

3.3.2.6. Respiratory diseases

Thirty-one of the 457 use-reports were distributed among bronchitis, lung cleaning, sinusitis, cough, influenza and colds. Thring and Weitz (2006), during their research in the Southern Overberg, documented medicinal plants to have treated cough, influenza and colds. Similarly, Van Wyk *et al.* (2008) have noted the ability of medicinal plants to treat cold, influenza and cough in the southeastern Karoo.

3.3.2.7. Cardio-vascular diseases

This category represents 28 use-reports, including stroke, high cholesterol, low blood pressure, heart problems and high blood pressure. These findings were similar to those presented by Thring and Weitz (2006). Van Wyk *et al.* (2008) have also documented the ability of medicinal plants to treat high blood pressure and weak heart. Ndawonde *et al.* (2007) made similar observation for high blood pressure in their study.

3.3.2.8. Dermal infections

Dermal diseases (25 citations) comprise acne, gall, rashes, skin infections, pimples, skin irritations, pig's lice and wounds. Previous studies conducted in South Africa reported medicinal plants to have been used in the treatment of wounds, rashes, pimples, skin eruptions and lice (Grierson & Afolayan, 1999; Kelmanson *et al.*, 2000; Buwa & Van Staden, 2006; Thring & Weitz, 2006; Ndawonde *et al.*, 2007; Van Wyk *et al.*, 2008).

3.3.3. Effects of ethnicity and gender on medicinal plant use

In this section, two attributes, consisting of ethnicity and gender of the surveyed respondents are discussed both at the local South African level and at the global level.

3.3.3.1. Ethnicity and traditional medicine

The present study revealed that 73% (n=96) of the 131 respondents were “African” and 27% (n=35) were “Coloured” people. With reference to the studies undertaken in South Africa, the documentation of “African” people’s knowledge appears to be significantly dominant. For example, a diversity of plant uses has been documented in KwaZulu-Natal amongst Zulu-speaking traditional medicine practitioners (Kelmanson *et al.*, 2000; Ndawonde *et al.*, 2007), in the Eastern Cape Province among Xhosa-speaking traditional healthcare practitioners (Grierson & Afolayan, 1999; Dold & Cocks, 2001; Cocks & Møller, 2002; Masika & Afolayan, 2002; Erasto *et al.*, 2005; Buwa & Van Staden, 2006) and in the Limpopo Province among Vhenda-speaking traditional healers (Mathabe *et al.*, 2006). In contrast, only the study undertaken by Thring and Weitz (2006) in the Bredasdorp/Elim region and the recent ethnobotanical appraisal conducted by Van Wyk *et al.* (2008) in the Graaff-Reinet and Murraysburg districts of the southeastern Karoo, captured the knowledge from individuals of the “Coloured” population group. It indicates that there is less attention paid to the “Coloured” population in terms of traditional medicine.

3.3.3.2. Gender and traditional medicine

The survey for the present study was carried out by interviewing 72 males and 59 females. This clearly illustrates that men were dominant amongst the selected key informants of the study area. Noticeably, the involvement in traditional medicine is shared by both genders. For example, in some regions, one gender could be more dominant than the other. According to studies conducted in other parts of the world like Argentina (Estomba *et al.*, 2006), Bolivia (Fernandez *et al.*, 2003), Cameroon (Betti, 2004), Honduras (Ticktin & Dalle, 2005), Italy (Pieroni *et al.*, 2004; Guarrera *et al.*, 2005; De Natale & Pollio, 2007), Kenya (Geissler *et al.*, 2002; Jeruto *et al.*, 2008), Portugal (Novais *et al.*, 2004), South Africa (Thring & Weitz, 2006), Spain (Bonet & Vallès, 2007) and United States (Cavender, 2006), women were the major fraction of the selected respondents. This was attributable to the position occupied by women within the community, especially as mothers. For example, Geissler *et al.* (2002) stated that women were selected because knowledge and use of plant medicine is mainly a female domain. Similarly, Betti (2004) stated that women knew medicinal plants better than men and younger people.

In contrast, knowledge of the usefulness of a range of medicinal plant species was also documented in regions where males were more dominant as key informants. This is exemplified by studies conducted in Argentina (Scarpa, 2004), Ethiopia (Giday *et al.*, 2003; Giday *et al.*, 2007; Teklehaymanot *et al.*, 2007), India (Mahishi *et al.*, 2005; Ballabh & Chaurasia, 2007), Mali (Inngjerdingen *et al.*, 2004; Bah *et al.*, 2006), Nepal (Shrestha & Dhillion, 2003), Nigeria (Abubakar *et al.*, 2007), Panama (Gupta *et al.*, 2005) and Spain (Agelet & Vallès, 2001). Inngjerdingen *et al.* (2004) considered men as the most mature based on their age, thereby giving them competitive edge over women. Similarly, Mahishi *et al.* (2005) believed that men had good knowledge of the medicinal property of plant species. Notwithstanding, there are studies where the numbers of men and women are equal as illustrated by Mathabe *et al.* (2006) in their results.

3.4. Conclusion

An important finding of the present study is that local community members of the study area possess a good knowledge of plants and their particularity to treat a wide range of ailments. During the survey, 16 localities were visited and 131 key informants (Rastafarians and traditional healers) were interviewed. This indeed was the number of known traditional healthcare practitioners in the area at the time of this investigation. They reported 102 plant species belonging to 93 genera and 53 families distributed amongst different life-forms

(climber, dwarf shrub, epiphyte, geophyte, herb, shrub and tree). It is noteworthy that 457 use-reports were recorded during this study. These were grouped into main categories, including gastro-intestinal infections, immune and inflammatory diseases, physical pains, detoxication, parapsychological events, respiratory diseases, cardio-vascular diseases and dermal infections, among others.

In the Cape Peninsula and the neighbouring areas, the tradition of using medicinal plants on a daily basis is still alive as shown by the high number of plant species documented during the survey. Indeed, it is fundamental, before formulating any conservation policies and guidelines to have the necessary understanding of all the aspects involved in natural resource usage. The preservation of the indigenous flora appears to be crucial for the protection of both biological and cultural diversity of these two population groups: “African” and “Coloured” people. This fact stresses out the need to promote locally based conservation and management projects in order to preserve the inestimable knowledge that could improve the quality of life of many families inhabiting the Cape Peninsula, particularly and South Africa, in general.

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Chapter 4: Distribution and availability of natural plants used for medicinal purposes

4.1. Introduction

The speed at which the earth's genetic resources are currently being depleted threatens species with extinction of a magnitude unparalleled in human history. The most widely accepted estimate by the International Union for Conservation of Nature and Natural Resources (IUCN) and the World Wide Fund for Nature (WWF) is that 60 000 higher plant species could become extinct or near extinction by the middle of the next century if present trends continue (Etkin, 1998).

In many developing countries, over-exploitation of natural plant resources for medicinal purposes is closely linked to rapid population growth and increasing urbanization. In such countries where western medicine is inaccessible, too expensive, or not accepted by the people, the majority of the population still relies on traditional herbal remedies. Whereas in Europe, China and India, medicinal plants are often cultivated on a large scale to meet the growing demand for herbal medicine, the most common practice in Africa is still to collect medicinal plants from wild populations (Zschocke *et al.*, 2000).

South Africa has a rich and spectacular array of ecosystems and landscapes, ranging from desert to subtropical forest, as well as a great diversity of marine and coastal systems. These resources underpin the livelihoods of millions of South Africans and contribute significantly to the country's economy. As a result, South Africa's biodiversity is one of the most threatened on the planet (Wynberg, 2002). Wild medicinal plant resources are increasingly under threat from habitat destruction as a result of agricultural, industrial and housing development (Van Wyk *et al.*, 1997). In fact, the single greatest threat to terrestrial biodiversity in South Africa is the transformation of ecosystems and habitats by cultivation, grazing, urban developments, afforestation, mining, dams and alien plant invasions (Wynberg, 2002). Consequently, cultivation is considered to be the single largest factor responsible for habitat transformation in the country, as current estimates put 12.2% (14.9 million hectares) of the country under arable use (Fairbanks *et al.*, 2000). Grazing areas have also declined in all provinces except the Free State, mainly resulting from rapid urbanization or settlement expansion (Hoffman & Ashwell, 2001).

Furthermore, invasive alien species pose one of the gravest threats to South Africa's biodiversity. An estimated 8%, or 10 million hectares, of the country has been invaded by about 161 different alien species (Versveld *et al.*, 1998). These invading alien plants use

about 3.3 billion m³ of water annually, accounting for 6.7% of the water that would otherwise flow into South Africa's rivers. They reduce water availability (McGeoch, 2002).

The purpose of this study is to determine the distribution and the availability of the used medicinal plant species. This objective was achieved by asking 131 known medicinal plant stakeholders in the Cape Peninsula and the neighbouring localities a range of questions. The selection of community participants in this investigation was mainly influenced by their knowledge of the dynamics of medicinal plants in the Cape Peninsula and the surrounding areas. Accordingly, the questions featured: (1) the provinces from where the plant species were harvested; (2) the means of obtaining these plants; (3) the harvesting seasons; (4) awareness of resource users on the depletion of the natural plants in the wild; and (5) the different plant species used as substitutes. The results were discussed with special reference to the socio-economic attributes of the surveyed respondents. It is worth noting that these findings were compared with similar studies undertaken in other parts of Africa and the rest of the world.

4.2. Results

The data derived from the semi-structured questionnaire (Appendix C) were entered into Microsoft Excel and analyzed using Statistica 8.0. Chi-square tests were done to determine significant differences with a 95% confidence interval.

4.2.1. Provinces of origin of the plant species used for medicinal purposes

One-hundred-and-two plant species belonging to 93 genera and 53 families were reported to be traditionally used by local healthcare practitioners across the study area (Table 3(ii)). These plants were collected mainly from the Eastern and Western Cape provinces of South Africa as illustrated by Table 4(i) and Figure 4a. Table 4(i) also includes information on the geographical distribution of the concerned medicinal plants based on the work of Germishuizen *et al.* (2006). It is important to note that the origin represents the different localities from where the stakeholders surveyed in this study amassed their plant materials.

Table 4(i): Medicinal plant species with their provinces of origin and geographical distribution

No	Scientific names	Family	Origin	Geographical distribution
1	<i>Helichrysum</i> spp.	Asteraceae	EC, WC	WC, EC
2	<i>Agathosma betulina</i> (P.J.Bergius) Pillans	Rutaceae	EC, WC	WC
3	<i>Tulbaghia violacea</i> Harv.	Alliaceae	EC, WC	EC, WC, KZN
4	<i>Hypoxis hemerocallidea</i> Fisch.Mey. & Ave-Lall.	Hypoxidaceae	EC, KZN, WC	B, LIM, NW, G, M, S, FS, KZN, L, EC
5	<i>Bulbine frutescens</i> (L.) Willd.	Asphodelaceae	EC, KZN, WC	N, G, S, FS, KZN, L, NC, WC, EC
6	<i>Lichtensteina lacera</i> Cham. & Schltdl.	Apiaceae	EC, WC	WC
7	<i>Sutherlandia frutescens</i> (L.) R.Br.	Fabaceae	WC	N, B, M, FS, KZN, L, NC, WC, EC
8	<i>Chironia baccifera</i> L.	Gentianaceae	EC, WC	KZN, NC, WC, EC
9	<i>Artemisia afra</i> Jacq.ex Willd	Asteraceae	EC, WC	N, B, LIM, NW, G, M, S, FS, KZN, L, WC, EC
10	<i>Rhoicissus digitata</i> (L.f.) Gilg & M.Brandt	Vitaceae	EC, KZN	KZN, WC, EC
11	<i>Cissampelos capensis</i> L.f	Minespermaceae	EC, WC	N, NC, WC, EC
12	<i>Haemanthus albiflos</i> Jacq.	Amaryllidaceae	EC, GP, KZN, WC	KZN, WC, EC
13	<i>Eucalyptus globulus</i> Labill	Myrtaceae	WC	FS
14	<i>Rapanea melanophloes</i> (L.) Mez	Myrsinaceae	EC, KZN, WC	LIM, M, S, KZN, WC, EC
15	<i>Peucedanum galbanum</i> H. Wolff	Apiaceae	WC	WC
16	<i>Aloe speciosa</i> Baker	Asphodelaceae	EC	WC, EC
17	<i>Eriosephalus africanus</i> L.	Asteraceae	EC, WC	WC
18	<i>Hippobromus pauciflorus</i> (L.f.) Radlk.	Sapindaceae	EC, WC	LIM, M, S, KZN, EC
19	<i>Helinus integrifolius</i> (Lam.) Kuntze	Rhamnaceae	EC, WC	N, M, LIM, NW, G, M, S, FS, KZN, WC, EC
20	<i>Lobostemon fruticosus</i> (L.) H. Buek	Boraginaceae	WC	WC
21	<i>Lavandula</i> spp.	Lamiaceae	EC, WC	
22	<i>Leonotis leonurus</i> (L.) R.Br	Lamiaceae	WC	LIM, M, KZN, WC, EC
23	<i>Strychnos henningsii</i> Gilg.	Loganiaceae	EC	LIM, M, S, KZN, EC
24	<i>Drimia elata</i> Jacq.	Hyacinthaceae	EC, KZN	B, LIM, NW, G, M, S, FS, KZN, NC, WC, EC
25	<i>Dodonaea angustifolia</i> L.f.	Sapindaceae	WC	B, LIM, NW, G, M, S, KZN, NC, WC, EC

No	Scientific names	Family	Origin	Geographical distribution
26	<i>Ranunculus multifidus</i> Forssk.	Rununculaceae	EC	N, B, LIM, NW, G, M, S, FS, KZN, L, NC, WC, EC
27	<i>Ocimum</i> spp.	Lamiaceae	WC	
28	<i>Cannabis sativa</i> L.	Cannabaceae	EC, WC	B, LIM, NW, G, M, KZN, L, WC, EC
29	<i>Xysmalobium undulatum</i> (L.) W.T. Aiton	Apocynaceae	EC	N, B, LIM, NW, G, M, S, FS, KZN, L, NC, WC, EC
30	<i>Aristea africana</i> (L.) Hoffmanns	Iridaceae	WC	WC
31	<i>Pelargonium triste</i> (L.) L'Hér.	Geraniaceae	WC	NC, WC
32	<i>Cliffortia odorata</i> L.f.	Rosaceae	EC, WC	WC, EC
33	<i>Pittosporum viridiflorum</i> Sims	Pittosporaceae	EC	LIM, NW, G, M, S, FS, KZN, L, WC, EC
34	<i>Bowiea volubilis</i> Harv.ex Hook.f.	Hyacinthaceae	EC, WC	N, NC
35	<i>Pentanisia prunelloides</i> (Klotzsch ex Eckl. & Zeyh.) Walp.var. <i>prunelloides</i>	Rubiaceae	EC, WC	LIM, G, M, S, FS, KZN, L, NC, EC
36	<i>Elytropappus rhinoceratis</i> (L.f.) Less.	Asteraceae	WC	WC
37	<i>Rauvolfia caffra</i> Sond.	Apocynaceae	EC	LIM, NW, G, M, S, KZN, WC, EC
38	<i>Solanum aculeastrum</i> Dun.	Solanaceae	EC	LIM, M, S, KZN, WC, EC
39	<i>Cinnamomum camphora</i> (L.) J. Presl	Lauraceae	EC, WC	
40	<i>Albuca setosa</i> Jacq.	Hyacinthaceae	EC	KZN, NC, WC, EC
41	<i>Hypoxis colchicifolia</i> Bak.	Hypoxidaceae	EC	KZN, EC
42	<i>Salvia africana-coerulea</i> L.	Lamiaceae	WC	NC, WC, EC
43	<i>Mentha longifolia</i> (L.) Huds.	Lamiaceae	WC	N, NC, WC
44	<i>Thesium lineatum</i> L.f.	Santalaceae	WC	N, NW, FS, NC, WC, EC
45	<i>Sarcophyte sanguinea</i> Sparrm.	Balanophoraceae	EC, GP, KZN	LIM, M, KZN, EC
46	<i>Gunnera perpensa</i> L.	Gunneraceae	EC	LIM, NW, G, M, S, FS, KZN, EC
47	<i>Curtisia dentata</i> (Burm.f.) C.A.Sm.	Cornaceae	EC, GP, KZN	LIM, M, S, KZN, WC, EC
48	<i>Cyrtanthus breviflorus</i> Harv.	Amaryllidaceae	EC	LIM, G, M, S, FS, KZN, L, EC
49	<i>Dioscorea sylvatica</i> (Kunth) Eckl.	Dioscoreaceae	EC	EC
50	<i>Rafnia amplexicaulis</i> (L.) Thunb.	Fabaceae	WC	NC, WC
51	<i>Bulbine latifolia</i> (L.f.) Roem. & Schult	Asphodelaceae	EC, WC	G, KZN, WC, EC
52	<i>Viscum capense</i> L.f.	Viscaceae	WC	N, LIM, M, NC, WC

No	Scientific names	Family	Origin	Geographical distribution
53	<i>Bulbine alooides</i> (L.) Willd.	Asphodelaceae	WC	LIM, G, KZN, WC, EC
54	<i>Melianthus major</i> L.	Melianthaceae	WC	NC, WC, EC
55	<i>Myrothamnus flabellifolius</i> Welw.	Myrothamnaceae	EC, GP	N, B, LIM, NW, G, M, S, KZN
56	<i>Schotia brachypetala</i> Sond.	Fabaceae	EC, WC	M, S, KZN, EC
57	<i>Loxostylis alata</i> Spreng.f.ex Reichb.	Anacardiaceae	EC	KZN, WC, EC
58	<i>Tulbaghia alliacea</i> L.f.	Alliaceae	EC, KZN	EC, WC
59	<i>Afzelia quanzensis</i> Welw.	Fabaceae	EC	N, B, LIM, M, S, KZN
60	<i>Talinum caffrum</i> (Thunb.) Eckl. & Zeyh	Portulacaceae	EC	N, B, LIM, NW, G, M, S, FS, KZN, L, NC, WC, EC
61	<i>Olea europea</i> L.subsp. <i>africana</i> (Mill.) P.S.Green	Oleaceae	EC	N, B, LIM, NW, G, M, S, FS, KZN, L, NC, WC, EC
62	<i>Buddleja salviifolia</i> (L.) Lam.	Loganiaceae	WC	LIM, NW, G, M, S, FS, KZN, L, NC, WC, EC
63	<i>Lycium ferocissimum</i> Miers	Solanaceae	WC	FS, L, WC, EC
64	<i>Vernonia oligocephala</i> (DC.) Sch.Bip.ex Walp.	Asteraceae	WC	LIM, NW, G, M, S, FS, KZN, L, NC, EC
65	<i>Cnicus benedictus</i> L.	Asteraceae	NC	LIM, G, FS, WC
66	<i>Dioscorea elephantipes</i> (L'Hér.) Engl.	Dioscoreaceae	WC	WC, EC
67	<i>Geranium incanum</i> Burm.f.	Geraniaceae	WC	WC, EC
68	<i>Ruta graveolens</i> L.	Rutaceae	WC	M, NC, WC, EC
69	<i>Stangeria eriopus</i> (Kunze) Baill.	Stangeriaceae	EC	KZN, EC
70	<i>Trichilia dregeana</i> Sond.	Meliaceae	EC	LIM, M, KZN, EC
71	<i>Dolichos falciformis</i> E. Mey.	Fabaceae	EC, KZN	LIM, NW, G, M, S, KZN, WC, EC
72	<i>Selago</i> spp.	Scrophulariaceae	EC, WC	
73	<i>Euphorbia natalensis</i> Bernh.	Euphorbiaceae	EC	KZN, L, EC
74	<i>Rhoicissus tomentosa</i> (Lam.) Wild & R.B. Drumm.	Vitaceae	EC, WC	LIM, M, S, KZN, WC, EC
75	<i>Rhipsalis baccifera</i> (J.Mill.) Stearn subsp. <i>mauritiana</i> (DC.) Barthlott	Cactaceae	EC	M, S, KZN, EC
76	<i>Aloe aristata</i> Haw.	Asphodelaceae	EC	FS, KZN, L, WC, EC
77	<i>Osteospermum imbricatum</i> L.subsp. <i>nervatum</i>	Asteraceae	EC	KZN, WC, EC

No	Scientific names	Family	Origin	Geographical distribution
	(DC.) T.Norl.			
78	<i>Cordia caffra</i> Sond.	Boraginaceae	EC	LIM, M, S, KZN, EC
79	<i>Combretum apiculatum</i> Sond.subsp. <i>apiculatum</i>	Combretaceae	EC, WC	N, B, LIM, NW, G, M, S, KZN
80	<i>Eucomis comosa</i> (Houtt.) Wehrh. Var. <i>comosa</i>	Hyacinthaceae	EC	EC
81	<i>Ballota africana</i> (L.) Benth.	Lamiaceae	WC	N, FS, NC, WC, EC
82	<i>Adenandra uniflora</i> (L.) Willd.	Rutaceae	WC	WC
83	<i>Solanum</i> sp.	Solanaceae	WC	
84	<i>Tetradenia riparia</i> (Hochst.) Codd	Lamiaceae	EC, WC	N, B, LIM, G, M, S, KZN
85	<i>Croton gratissimus</i> Burch.	Euphorbiaceae	EC	N, B, LIM, NW, G, M, S, KZN, NC
86	<i>Antidesma venosum</i> E.Mey.ex Tul	Euphorbiaceae	EC	N, B, LIM, M, S, KZN, EC
87	<i>Zanthoxylum capense</i> (Thunb.) Harv.	Rutaceae	EC	LIM, NW, G, M, S, FS, KZN, WC, EC
88	<i>Boophane disticha</i> (L.f.) Herb	Amaryllidaceae	EC	N, B, LIM, G, M, S, FS, KZN, L, WC, EC
89	<i>Cotyledon orbiculata</i> L.	Crassulaceae	EC, WC	N, NC, WC, EC
90	<i>Ptaeroxylon obliquum</i> (Thunb.) Radlk.	Rutaceae	EC	N, B, LIM, M, S, KZN, WC, EC
91	<i>Peucedanum thodei</i> Arnold	Apiaceae	EC	M, KZN, L, NC, EC
92	<i>Polygala serpentaria</i> Eckl. & Zeyh.	Polygalaceae	EC	LIM, G, M, S, KZN, EC
93	<i>Ocotea bullata</i> (Burch.) Baill.	Lauraceae	EC	LIM, M, KZN, L, WC, EC
94	<i>Glycyrrhiza glabra</i> L.	Fabaceae	EC	WC, EC
95	<i>Bersama lucens</i> (Hochst.) Szyszyl.	Meliantaceae	EC	M, S, KZN, EC
96	<i>Allium dregeanum</i> Kunth	Alliaceae	EC, WC	FS, NC, WC, EC
97	<i>Siphonochilus aethiopicus</i> (Schweinf.) B.L.Burt	Zingiberaceae	EC	LIM, M, S, KZN, EC
98	<i>Rumex steudelii</i> Hochst. Ex. A. Rich.	Polygonaceae	EC	NW, G, M, FS, KZN, L, NC, WC, EC
99	<i>Dianthus thunbergii</i> Hooper	Caryophyllaceae	EC	WC, EC
100	<i>Tritonia lineata</i> (Salisb.) Ker-Gawl.	Iridaceae	EC	M, FS, KZN, L, WC, EC
101	<i>Asparagus suaveolens</i> Burch.	Asparagaceae	EC	N, B, LIM, NW, G, M, S, FS, KZN, L, NC, WC, EC
102	<i>Gnidia cuneata</i> Meisn.	Thymelaeaceae	WC	KZN, EC

Abbreviations: N – Namibia; B – Botswana; LIM – Limpopo Province; NW – North-West Province; G – Gauteng Province; M – Mpumalanga Province; S – Swaziland; FS – Free State Province; KZN – KwaZulu-Natal Province; L – Lesotho; NC – Northern Cape Province; WC – Western Cape Province; EC – Eastern Cape Province.

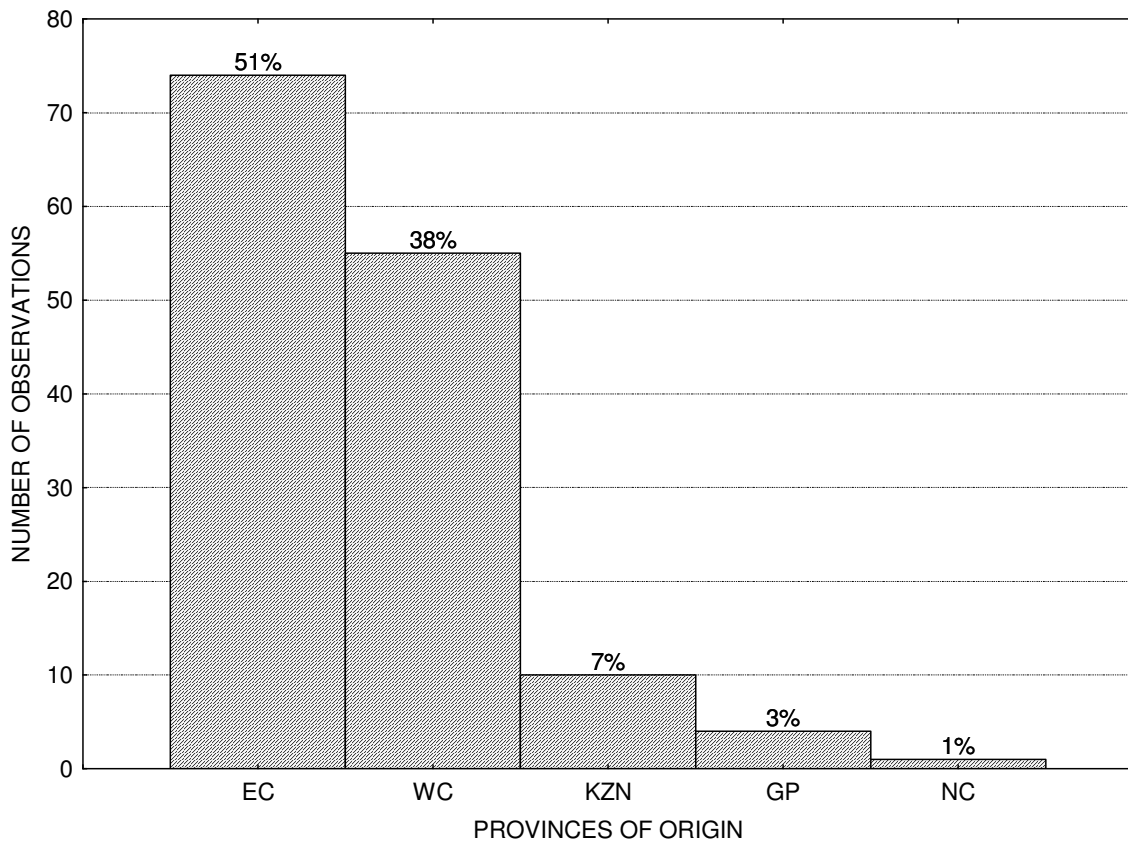


Figure 4a: Origin of plant species used for medicinal purposes

4.2.2. Procedures for obtaining natural plant species used for medicinal purposes

It was noted during the survey that 57% (n=70) of the respondents collected plant materials from the wild, 17% (n=21) collected plants from the wild and bought a significant number of species from sellers and 9% (n=11) amassed species from the wild and from cultivated home-gardens (Table 4(ii)). Similarly, the harvesting of plant species from the wild as well as the exchange of locally unavailable ones with other goods was practiced by 4% (n=5) of the respondents who were mostly Rastafarians. Some of the respondents (5%: n=6) combined collection from the wild, purchase and gardening of medicinal plants. Another 5% (n=6) focused on purchasing their plant materials from sellers and a small number of respondents was involved in both purchasing and gardening (2%: n=2). Equally, a small number of informants was involved in the gardening of medicinal plants exclusively (1%: n=1).

The respondents were also asked about how often they harvested natural plant species. Accordingly, 62% (n=75) of them disclosed that they harvest once a month. Six percent (n=7) and 1% (n=1) collect plant materials twice a month and three times per month,

respectively, while 15% (n=18) visit harvesting areas every week. Similarly, a number of users chose the year as their time scale. For example, 7% (n=8) reported to collect plants once a year and 1% (n=1), 2% (n=3) and 3% (n=4) of the respondents collect medicinal plants twice a year, three times per year and four times per year, respectively. Only 3% (n=4) of the respondents reported that they harvest medicinal plants on a daily basis.

The degree of difficulty in obtaining medicinal plants revealed that a high number of the informants (69%: n=81) encountered serious obstacles in the field during the gathering of the traditionally used plants for medicinal purposes, with only 31% (n=37) who found it less complicated to gather the plant species needed. Conversely, 68% (n=67) of the informants reported noting the presence of intruders in the areas of harvesting, 26% (n=26) of them noticed no presence of intruders and 6% (n=6) did not pay attention to whether there were outsiders or not.

In terms of the depletion of natural plant species in the wild, the results showed that a high number of traditional health practitioners (86%: n=102) were much aware of this global phenomenon, while 14% (n=16) responded negatively to the depletion of the used medicinal plants. Most importantly, the surveyed respondents were asked if they were familiar with the utilization of substitute plant species. Eighty percent (n=83) of the respondents confirmed that they use a number of plants as substitutes when the most frequently used ones were out of stock, while 20% (n=21) reported no use of substitutes. Finally, the results of this study illustrate that the majority of the surveyed respondents (94%: n=113) had a considerable knowledge of the role played by the seasonality in the availability of natural plant species and 6% (n=7) did not pay any attention to this environmental factor.

Table 4(ii): The characteristics of the exploitation of medicinal plants

Procedures for obtaining medicinal plants	Proportions
Collect from wild	57% (n=70)
Collect from wild & buy	17% (n=21)
Collect from wild & grow	9% (n=11)
Collect from wild & exchange	4% (n=5)
Collect from wild, buy & grow	5% (n=6)
Buy	5% (n=6)
Buy & grow	2% (n=2)
Grow	1% (n=1)
Frequency of harvesting	
Monthly	62% (n=75)
Twice a month	6% (n=7)
Weekly	15% (n=18)
Yearly	7% (n=8)
3 times per year	2% (n=3)
4 times per year	3% (n=4)

Daily	3% (n=4)
Twice a year	1% (n=1)
3 times per month	1% (n=1)
Degree of difficulty in obtaining medicinal plants	
Easy	31% (n=37)
Difficult	69% (n=81)
Presence of outsiders in areas of harvesting	
Yes	68% (n=67)
No	26% (n=26)
Do not know	6% (n=6)
Awareness of the depletion of medicinal plants in the wild	
Yes	86% (n=102)
No	14% (n=16)
Use of substitutes	
Yes	80% (n=83)
No	20% (n=21)
Knowledge of the influence of seasonality	
Yes	94% (n=113)
No	6% (n=7)

4.2.3. Natural plant species used as substitutes

Table 4(iii) comprises the most frequently used plant species for medicinal purposes by the respondents surveyed and their substitutes. It is important to note that six new species have been added to the 112 species previously recorded in Table 3(ii). These species include *Cyclopia intermedia*, *Agathosma crenulata*, *Agathosma ovata*, *Scilla natalensis*, *Coleonema juniperinum* and *Clivia miniata*. The scientific, family, Afrikaans, isiXhosa, isiZulu and English names of these species were derived from published information (e.g., Hutchings *et al.*, 1996; Van Wyk & Gericke, 2000; Goldblatt & Manning, 2000).

Table 4(iii): Medicinal plants used as substitutes

No	Used plant species	Substitute plant species
1	<i>Rhipsalis baccifera</i> (J. Mill.) Stearn subsp. <i>mauritiana</i> (DC) Barthlott; (Cactaceae); Bostou (A); uGebeleweni (Z)	<i>Curtisia dentata</i> (Burm. F.) C.A.Sm.; (Cornaceae); Assegaai (A); umLahleni (X); umLahlenisefile (Z)
2	<i>Hypoxis hemerocallidea</i> Fisch. Mey. & Ave-Lall.; (Hypoxidaceae); iNongwe (X); inKomfe (Z); African potato (E)	<i>Sutherlandia frutescens</i> (L.) R.Br.; (Fabaceae); Kankerbossie (A); umNwele (X, Z); Cancer bush (E)
3	<i>Leonotis leonurus</i> (L.) R.Br.; (Lamiaceae); Wildedagga (A); umFincafinca (X); uMunyane (Z); Wild dagga (E)	<i>Agathosma betulina</i> (P. J Bergius) Pillans; (Rutaceae); Boegoe (A); iBuchu (X); Round-leaf buchu (E)
4	<i>Agathosma betulina</i> (P. J Bergius) Pillans; (Rutaceae); Boegoe (A); iBuchu (X); Round-leaf buchu (E)	<i>Cyclopia intermedia</i> E. Mey.; (Fabaceae); Bergtee (A); Honey bush (E) <i>Agathosma crenulata</i> (L.) Pillans; (Rutaceae); Anysboegoe (A); Oval-

No	Used plant species	Substitute plant species
		leaf buchu (E) <i>Agathosma ovata</i> (Thunb.) Pillans; (Rutaceae); Basterboegoe (A); False buchu (E) <i>Eucalyptus globulus</i> Labill; (Myrtaceae); Bloekom (A); Bluegum (E) <i>Lavandula</i> spp.; (Lamiaceae); Lavender <i>Tulbaghia violacea</i> Harv.; (Alliaceae); Wilde knoffel (A); iVimba-'mpunzi (X); isiHaqa (Z); Wild garlic (E)
5	<i>Pentanisia prunelloides</i> (Klotzsch ex Eckl. & Zeyh.) Walp. Var. <i>prunelloides</i> ; (Rutaceae); Sooi-brandbossie (A); iCimamlilo (X); Wild verbena (E)	<i>Bowiea volubilis</i> Harv. Ex Hook.f.; (Hyacinthaceae); Knolklimp (A); uMagaqana (X); iGibisila (Z)
6	<i>Lobostemon fruticosus</i> (L.) H. Buek; (Boraginaceae); Agdaeengeesbos (A); Eight-day healing bush (E)	<i>Salvia Africana-coerulea</i> L.; (Lamiaceae); Bloublomsalie (A); Blue sage (E)
7	<i>Lavandula</i> spp.; (Lamiaceae); Lavender	Red carrot (E); (Unidentified)
8	<i>Eucalyptus globulus</i> Labill; (Myrtaceae); Bloekom (A); Bluegum (E)	<i>Tulbaghia violacea</i> Harv.; (Alliaceae); Wilde knoffel (A); iVimba-'mpunzi (X); isiHaqa (Z); Wild garlic (E)
9	<i>Lichtensteina lacera</i> Cham. & Schltl.; (Apiaceae); Kalmoes (A); iQwili (X); Larger tinsel flower (E)	<i>Scilla natalensis</i> Planch. ; (Hyacinthaceae) ; Blouberglelie (A) ; iNguduza (Z) <i>Artemisia afra</i> Jacq. ex Willd; (Asteraceae); Wilde-als (A); uMhlonyane (X, Z); African wormwood (E)
10	<i>Tulbaghia violacea</i> Harv.; (Alliaceae); Wilde knoffel (A); iVimba-'mpunzi (X); isiHaqa (Z); Wild garlic (E)	<i>Hippobromus pauciflorus</i> (L.f.) Radlk.; (Sapindaceae); Perdepis (A); uLatile (X); umFazi-othethayo (Z); Horsewood (E) <i>Helichrysum</i> spp.; (Asteraceae); Kooigoed (A); imPhepho (X, Z); Everlasting (E)
11	<i>Tulbaghia alliaceae</i> L.f.; (Alliaceae); Wildekoffok (A); uMwelela (X, Z); Wild garlic (E)	<i>Lichtensteina lacera</i> Cham. & Schltl.; (Apiaceae); Kalmoes (A); iQwili (X); Larger tinsel flower (E)
12	<i>Sutherlandia frutescens</i> (L.) R.Br.; (Fabaceae); Kankerbossie (A); umNwele (X, Z); Cancer bush (E)	<i>Leonotis leonurus</i> (L.) R.Br; (Lamiaceae); Wildedagga (A); umFincafinca (X); uMunyane (Z); Wild dagga (E)
13	<i>Mentha longifolia</i> (L.) Huds.; (Lamiaceae); Kruisement (A); iniXina (X); uFuthanelomhlange (Z); Wild mint (E)	<i>Agathosma betulina</i> (P. J Bergius) Pillans; (Rutaceae); Boegoe (A); iBuchu (X); Round-leaf buchu (E)
14	<i>Bulbine frutescens</i> (L.) Willd.; (Asphodelaceae); Katstert (A); inTelezi (X); Cat's tail (E)	iXonya (X); (Unidentified) <i>Albuca setosa</i> Jacq.;

No	Used plant species	Substitute plant species
		(Hyacinthaceae); inQwebeba (X); inGcino (Z)
15	<i>Glycyrrhiza glabra</i> L.; (Fabaceae); Mlomonandi (Z); Liquorice (E)	<i>Cyrtanthus breviflorus</i> Harv.; (Amaryllidaceae); Vuurlelie (A); uVelabahleke (Z); Wild crocus (E)
16	<i>Dodonaea angustifolia</i> L.f.; (Sapindaceae); Ysterhoutoppe (A); Sand olive (E)	<i>Coleonema juniperinum</i> Sond.; (Rutaceae); Koorsbos (A); Fever bush (E)
17	<i>Strychnos henningsii</i> Gilg.; (Loganiaceae); Rooibitterbessie (A); umNonono (X); umQaloti (Z); Red bitterberry (E)	<i>Xysmalobium undulatum</i> (L.) W.T. Aiton; (Apocynaceae); Bitterwortel (A); iTshongwe (X); iShongwe (Z); Milk bush (E)
18	<i>Rhoicissus digita</i> (L.f) Gilg & M. Brandt; (Vitaceae); Wildepatat (A); uChithibhunga (X); isiNwazi (Z)	<i>Clivia miniata</i> (Lindl.) Regel var. <i>miniata</i> ; (Amaryllidaceae); Boslelie (A); uMayime (Z); Orange lily (E)
19	<i>Helichrysum</i> spp.; (Asteraceae); Kooigoed (A); imPhepho (X, Z); Everlasting (E)	Red carrot (E); (Unidentified) <i>Agathosma betulina</i> (P. J Bergius) Pillans; (Rutaceae); Boegoe (A); iBuchu (X); Round-leaf buchu (E)
20	<i>Cissampelos capensis</i> L.f; (Minespermaceae); Dawidjiewortel (A); uMayisake (X); David root (E)	<i>Helichrysum petiolare</i> Hilliard & B.L. Burt; (Asteraceae); Kooigoed (A); imPhepho (X, Z); Everlasting (E)
21	<i>Pittosporum viriflorum</i> Sims; (Pittosporaceae); Kasuur (A); umKwenkwe (X); umFusamvu (Z); Cheesewood (E)	<i>Hypoxis hemerocallidea</i> Fisch. Mey. & Ave-Lall.; (Hypoxidaceae); iNongwe (X); inKomfe (Z); African potato (E)

4.2.4. Responses of traditional healthcare practitioners to the exploitation of medicinal plants

The majority of the key informants interviewed expressed their views on the aspects that characterize the exploitation of medicinal plants. For example, profiling respondents by gender revealed that more men (50%: n=59) than women (36%: n=43) were aware that medicinal plant resources are depleting in the wild. Conversely, more women (9%: n=11) than men (4%: n=5) were unaware of the fact that medicinal plants are diminishing in the wild. Figure 4b shows that there is a significant difference (p=0.0471) between the selected community members who were aware of the exhaustion of plants and their gender.

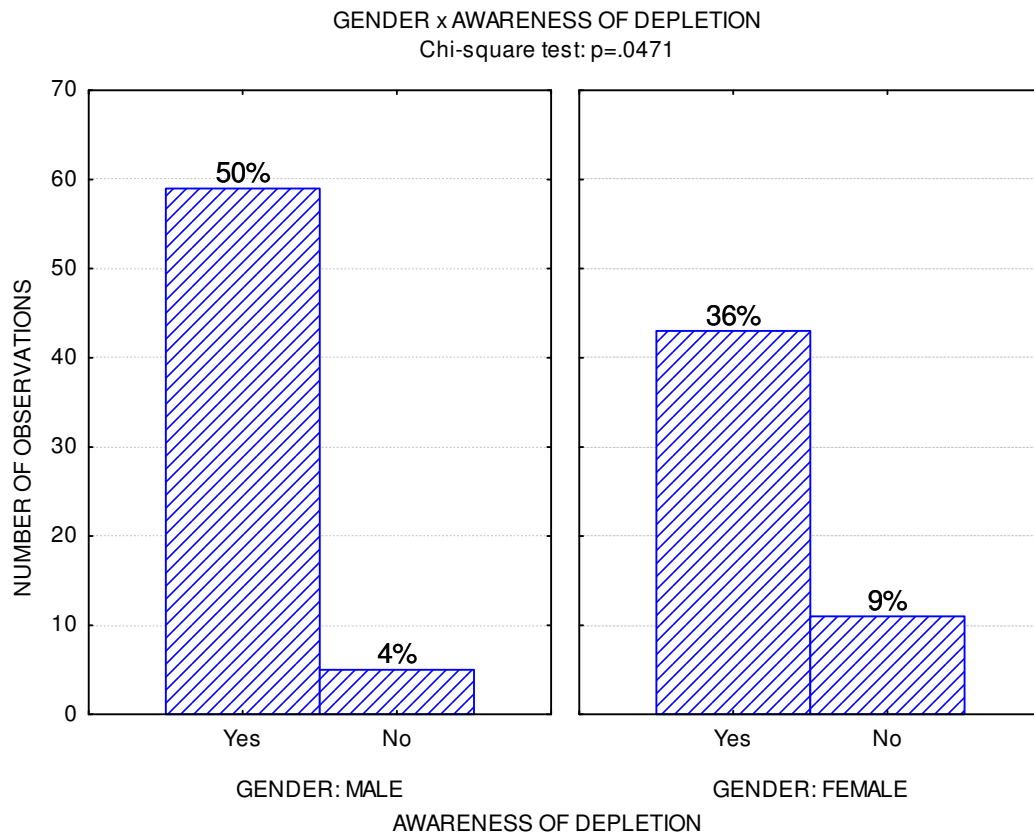


Figure 4b: Effects of gender on traditional healthcare practitioner awareness of the depletion of medicinal plants

Similarly, there is a significant difference ($p=0.0374$) between the traditional healthcare practitioners who are aware of the decline of medicinal plants and their ethnicity. Fifty nine percent ($n=70$) of the “African” respondents and 27% ($n=32$) of the “Coloured” respondents expressed their awareness of the decline of natural plants that are being used for medicinal purposes. Conversely, more “African” respondents (13%: $n=15$) than “Coloured” respondents (1%: $n=1$) were unaware that medicinal plant species are depleting in the wild as shown in Figure 4c.

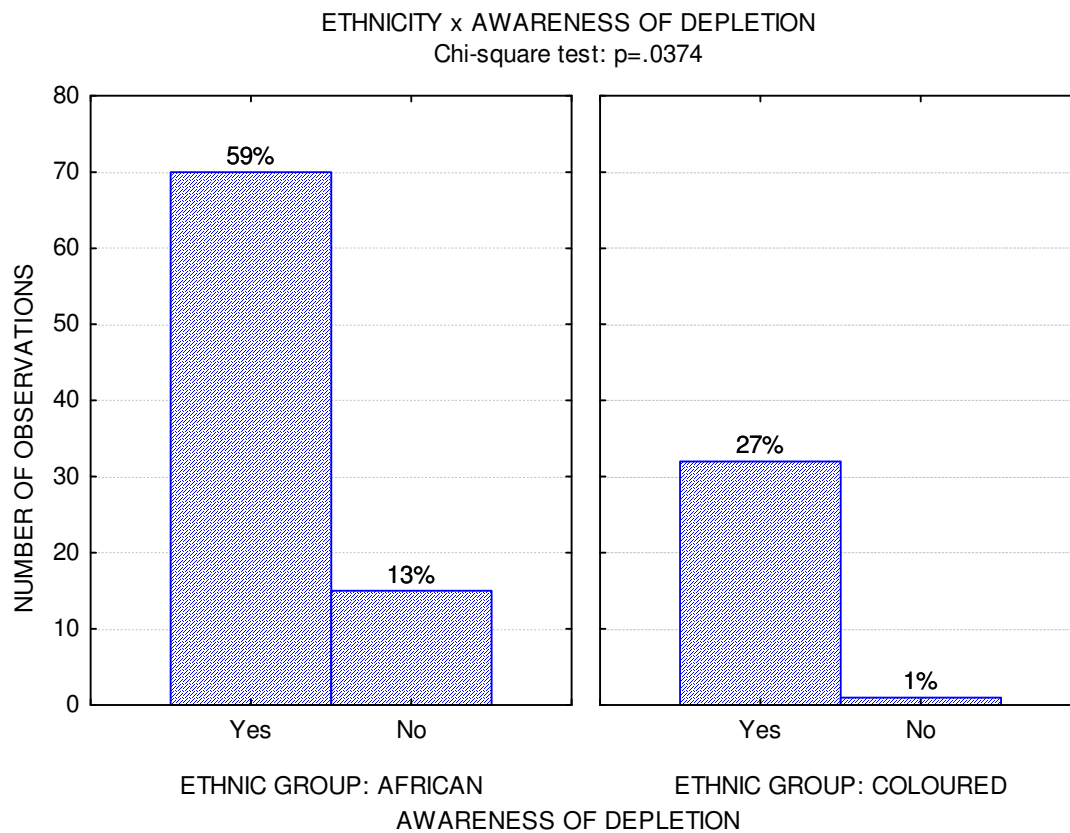


Figure 4c: Effects of ethnicity on traditional healthcare practitioner awareness of the depletion of medicinal plants

There is also a highly significant difference ($p=0.0045$) between the degree of difficulty encountered in obtaining useful medicinal plant species and the key informants' involvement in traditional medicine. For example, 61% ($n=68$) of the respondents who consider traditional healing as a full-time activity, found it more difficult to gather the different medicinal plants essential for pursuing their activity, whereas only 6% ($n=7$) of those involved part-time in traditional healing, found it so in the process of gathering the plant species needed for the preparation of medicine. On the other hand, obtaining necessary medicinal plants appeared to be easier for the full-time traditional health practitioners (23%: $n=25$) than the part-time healthcare practitioners (10%: $n=11$) as illustrated by Figure 4d.

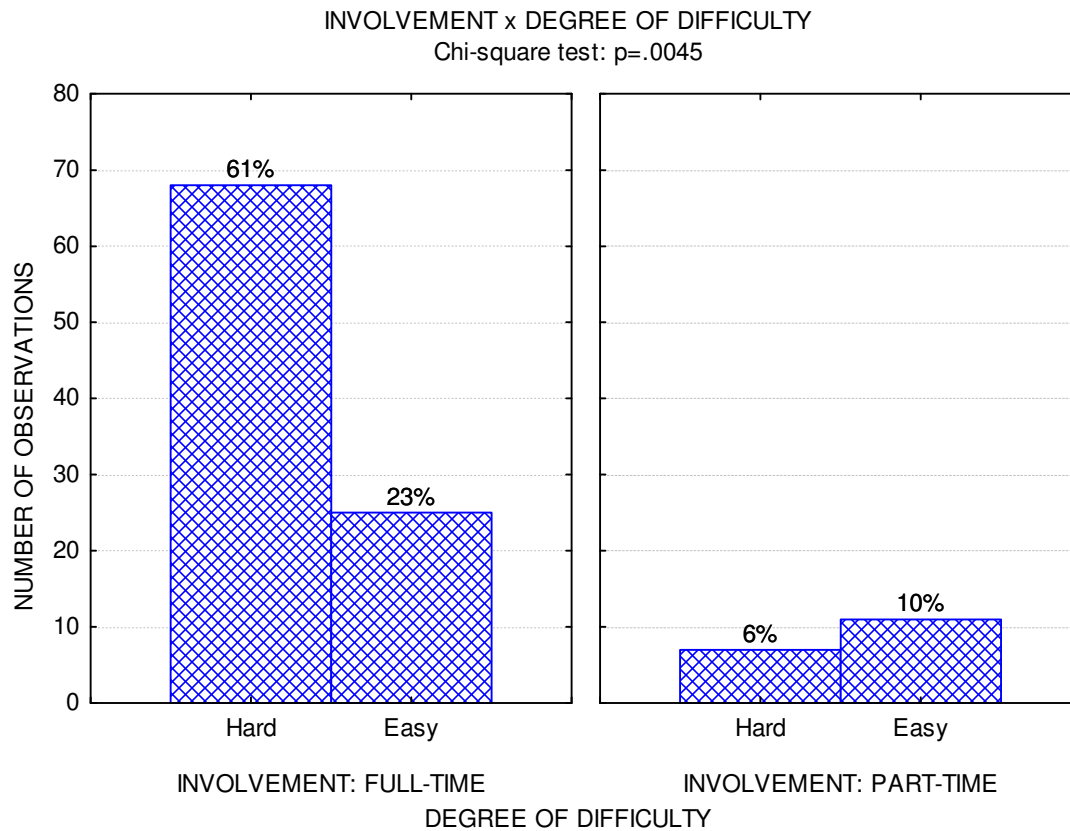


Figure 4d: Effects of involvement on the degree of difficulty in obtaining medicinal plants

Figure 4e reveals that there is a significant difference ($p=0.0121$) between the traditional healthcare practitioners who are aware of the diminution of medicinal plant species in the wild and their respective years of involvement. For example, 13% ($n=15$), 19% ($n=22$), 15% ($n=17$), 9% ($n=11$), 18% ($n=21$), 5% ($n=6$) and 2% ($n=2$) of the respondents, who were involved in traditional medicine for 1 to 5 years, 5 to 10 years, 10 to 15 years, 15 to 20 years, 20 to 25 years, 25 to 30 years and 30 to 35 years, 35 to 40 and 40 to 45 years and 45 to 50 years, respectively, are aware of the exhaustion of medicinal plant species in the wild.

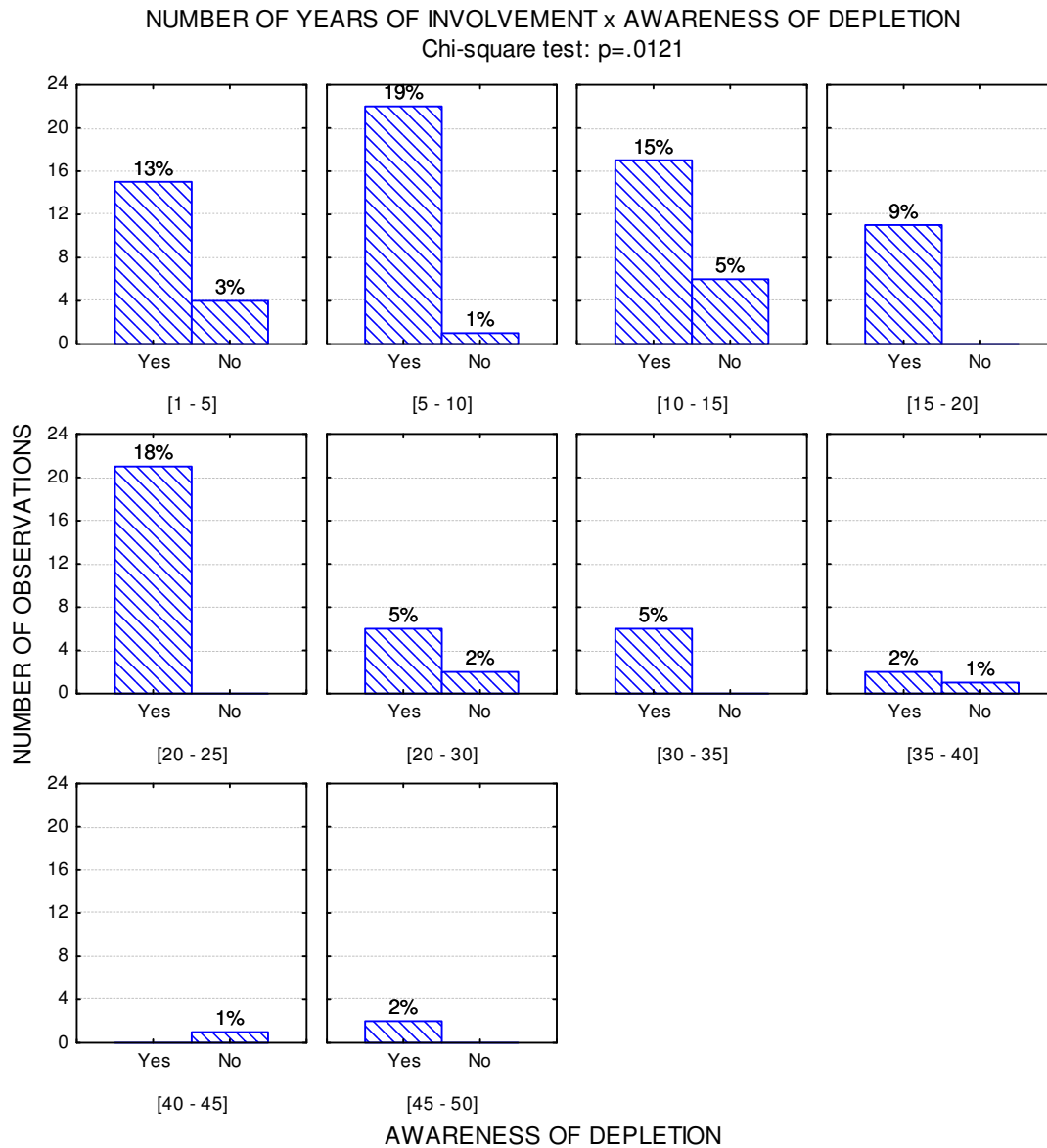


Figure 4e: Effects of the number of years of involvement on the traditional healthcare practitioner awareness of the depletion of medicinal plants

Finally, the results revealed a significant difference ($p=0.0329$) between the years of involvement of the respondents and their knowledge of the influence of seasonality. As shown in Figure 4f, 15% ($n=17$), 19% ($n=23$), 20% ($n=24$), 8% ($n=9$), 18% ($n=21$), 6% ($n=7$), 2% ($n=2$) and 1% ($n=1$) of the key informants, who were involved for 1 to 5 years, 5 to 10 years, 10 to 15 years, 15 to 20 years, 20 to 25 years, 25 to 30 and 30 to 35 years, 35 to 40 years and 40 to 45 and 45 to 50, years respectively, expressed their understanding of the influence of seasons on the availability of medicinal plant species.

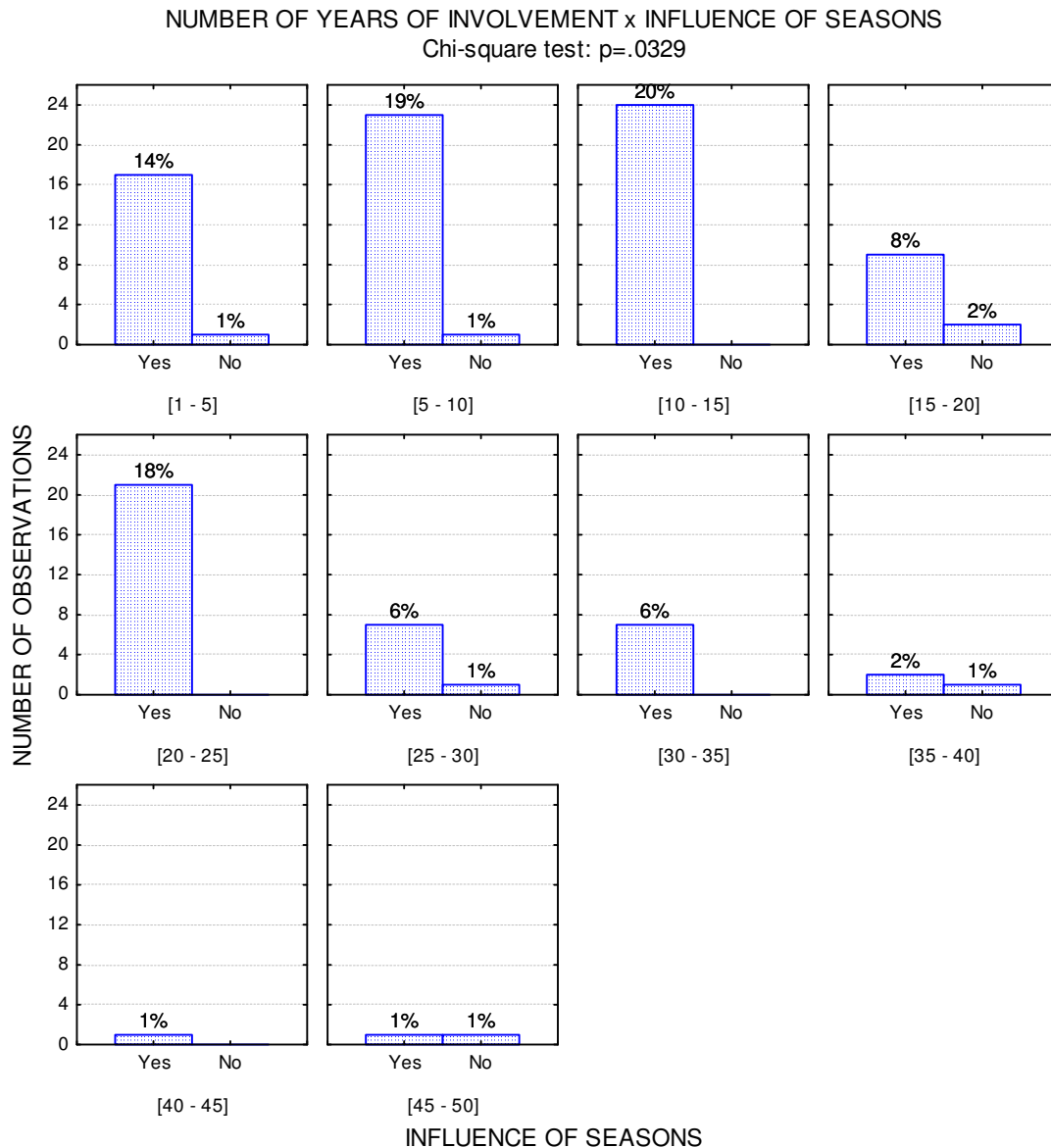


Figure 4f: Effects of the number of years of involvement on traditional healthcare practitioner knowledge of the influence of seasons

4.3. Discussion

Africa, and especially southern Africa, has a rich diversity of plants. Recent statistics show that about 25% of the total number of higher plants in the world is found in Africa south of the Sahara (Van Wyk, 2008). Somewhere in the region of 4 000 species are used as medicines in southern Africa (Van Wyk & Gericke, 2000). With South Africa's remarkable biodiversity and cultural diversity, it is not surprising to find that approximately 3 000 species of plants are used as medicines. Nevertheless, wild medicinal plant resources are increasingly under threat from habitat transformation as a result of agricultural, industrial and housing expansion (Van Wyk *et al.*, 1997). For example, Zschocke *et al.* (2000) noted that a

surprisingly high proportion (32%) of the most commonly used medicinal plants are trees (42 trees out of 132 medicinal plants listed by Van Wyk *et al.* (1997)) and for 83% of these trees, only the bark was reportedly used. Notwithstanding, ring-barking has been recognized as the most destructive harvesting practice as it often means that the debarked tree has no chance of survival, especially if the ring-barking is done by unskilled collectors (Zschocke *et al.*, 2000). Equally, Street *et al.* (2008) acknowledge that many South African plants are harvested from the wild. This not only threatens medicinal plant biodiversity and population stability but also leads to speculation with regard to safety as industrial encroachment has often led to contamination of water sources and natural habitats.

4.3.1. Collection of plants traditionally used for healing purposes

The 131 known local traditional healthcare practitioners interviewed during the survey listed 112 plant species that are used for medicinal purposes. In fact, traditional health practitioners used various practices to gather these plants, but collection from the wild appeared to be the most widespread practice (mentioned by 57%: n=70 of the respondents). This agrees with Zschocke *et al.* (2000) who reported that in Africa, the most common practice to meet growing demand for herbal medicine is still to collect medicinal plants from wild populations. As a result, the majority of plants was harvested from the Eastern Cape (51%: n=74) and Western Cape (38%: n=55) provinces (Figure 4a). These results could be explained by the key informants' provinces of birth, where the Eastern Cape (82 people) and the Western Cape (45 people) appear to be the main areas of origin (Table 3(iv) in Chapter 3). It emerged that traditional healers from the Eastern Cape had not lost their cultural roots to the province even though they had settled in the Western Cape Province. For example, some of the respondents reported that they travel regularly to their homelands in the Eastern Cape to collect the necessary plants for their healing activity.

In addition, the data revealed a highly significant difference ($p=0.0045$) between the involvement status of the respondents and the difficulty in obtaining medicinal plant species. For example, 61% (n=68) of the key informants, involved full-time, found it very difficult to gather all the needed plants (Figure 4d). The degree of difficulty was substantiated by important factors like the occurrence of used plants within protected areas and private lands; the amount of physical efforts needed to overcome the geographic and climatic constraints; the scarcity of a number of species; and the high cost of travelling. In fact, this information shows that the key role players, who are fully involved in the utilization of medicinal plants, are well disposed to provide researchers and natural resource managers with accurate information on the present status of plants in the wild.

Similarly, the presence of intruders in the harvesting areas negatively influenced the availability of medicinal plants. This could be considered as a leading cause of over-exploitation, as 68% (n=67) of the surveyed respondents reported to have encountered a large number of people from neighbouring and distant areas in the local harvesting spots. Natural resources of the current harvesting areas appear to be under a considerable pressure because of the high number of plant collectors. In the case of the Cape Peninsula, collectors generally come from Knysna, Simonstown, Villiersdorp and Worcester to gather plants in mountains like Bainskloof, Jonkershoek, Paarl Mountain Nature Reserve, Du Toitskloof and Palmiet-Berg.

The periods of harvesting reported by the respondents described a non-uniform behaviour of natural resource users (Table 4(ii)). For example, monthly visits to the harvesting areas dominated (62%: n=75), followed by weekly visits (15%: n=18). These results denote the huge pressure exercised on medicinal plants. Even though some respondents indicated that they implemented sustainable harvesting methods such as switching the harvesting spots, the current harvesting rate may not meet the entire annual demand. In fact, Lewu *et al.* (2007) reported in their investigation on *Pelargonium sidoides* that the second year of the regeneration study yielded 50% less biomass compared to the initial yield. They concluded that if left for some years after the first harvesting, the population of *P. sidoides* would be able to recover slowly. Explicitly, in the Eastern Cape, gatherers, from the rural communities, rely on this species for subsistence through direct use or resale. Apart from the local uses, the plant is used to prepare Umckaloabo®, a medicine produced by a German company, Schwabe Pharmaceuticals. This has led to a high demand for the plant for export, and as a result, its harvesting rate and the number of plant gatherers have recently increased (Lewu *et al.*, 2007). This explains that the harvesting frequencies adopted by the selected community members were clearly inadequate for reaching the sustainable natural plant utilization as plant species may need several years to recover.

4.3.2. Awareness of the depletion of medicinal plant species in the wild

It is encouraging for natural resource managers and conservation that 86% (n=102) of the surveyed respondents were well aware of the decline of medicinal plants in the wild. It indicates that local community members, depending on these resources, would be willing to collaborate with the Western Cape Nature Conservation Board through their reserve managers in order to conserve these indispensable plant species. The results revealed a diverse awareness among the respondents.

To get a better understanding of the depletion phenomenon from the respondents surveyed, they were asked to mention possible causes. Illegal harvesting reflected by irresponsible harvesting was mentioned several times, followed by causes like the lack of knowledge of sustainable harvesting methods; veld fires; housing development; increasing numbers of actors in the medicinal plant industry; lack of effective control mechanisms; the inappropriate choice of harvesting seasons; soil erosion; socio-economic constraints (poverty) and climate change. This agreed with the report of the Department of Environmental Affairs and Tourism that states that the loss and degradation of natural habitat is the biggest cause of biodiversity loss and decline in ecosystem functioning. Nearly 18% of South Africa's land cover is transformed, mainly through cultivation (10.46%), urbanization (1.51%) and plantation forestry (1.41%) (Department of Environmental Affairs and Tourism, 2006). Similarly, Wells (2003) stated that protected areas and biodiversity are often most threatened by large-scale activities such as the construction of roads and hydro-dams, large-scale land conversion projects, industrial-scale forestry and mining. Based on the reasons listed by the surveyed respondents, appropriate solutions could be generated, especially the organization of workshops for sustainable harvesting methods of natural plants for resource users and the implementation of community-based natural resource management projects. In other words, this study agrees with Wells (2003) who stated that protected area management projects involving local communities offer the most attractive prospect of contributing to three of the most sought-after goals on the sustainable development agenda: more effective biodiversity conservation; increased local community participation in conservation and development; and economic development for rural poor.

4.3.3. Utilization of plant substitutes

The majority of the respondents surveyed (80%: n=83) admitted to using other plant species as substitutes (Table 4(iii)). This use of substitutes by local community members could be considered as an approach toward the development of sustainable exploitation of natural resources. Zschocke *et al.* (2000) stated that the concept of plant substitution appears to be highly promising. Their investigations on four of the most important and most threatened South African medicinal plants revealed that traditional healers substitute *Eucomis autumnalis* (Hyacinthaceae), *Siphonochilus aethiopicus* (Zingiberaceae), *Ocotea bullata* (Lauraceae) and *Warburgia salutaris* (Canellaceae) with a new plant. Additionally, some healers substitute parts of the same plant. This second practice was better accepted by their patients.

4.4. Conclusion

The present study has firstly revealed that local communities in the Cape Peninsula and the surrounding areas still strongly rely on medicinal plants collected from the wild populations in the Eastern Cape and the Western Cape provinces for their primary healthcare needs. Secondly, it was found that a high number of natural resources users were aware of the consistent depletion of a number of plant species used for healing purposes. This, in fact, represents an important starting-point to tackle the over-exploitation of plants in the wild. Finally, to help satisfy the cultural and livelihood needs of local community members, the use of plant substitutes emerged to be promising and was already practiced successfully by traditional healthcare practitioners in South Africa. Certainly, this study agrees with Zschocke *et al.* (2000) that plant part substitution and plant species substitution should become an important strategy for the conservation of medicinal plants in southern Africa. This approach may protect more species from extinction and allow the recovery of several threatened medicinal plant species.

Thus, it is recommended that environmental education campaigns be conducted on sustainable harvesting methods. There is also a great need to implement community-based natural resource management projects throughout the nature reserves managed by the Western CapeNature Conservation Board and other governmental and non-governmental agencies in the area.

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Chapter 5: Conservation status of plant species used for medicinal purposes and local community perceptions of natural resources accessibility

5.1. Introduction

According to Kvist *et al.* (2001), the extraction and use of plant products is a dynamic cultural attribute in the ever-changing world today. At present, the major threats to the survival of threatened species in South Africa appear to be agricultural activities that have historically done the most damage in the grassland and lowland fynbos biomes, and also ongoing urbanisation. Whereas, agricultural threats now operate on a much smaller scale than before, as most arable land is already transformed, harvesting of medicinal plants is on the increase because of greater accessibility (better roads and transport), a growing population and an increase in economic potential (Golding, 2002). Illegal collection for commercial trade is also targeted toward specific taxonomic groups and still represents the main threat faced by sought-after species such as cycads and many succulent groups, with other taxa such as aloe species in reprieve (Golding, 2002).

Resource inventory is fundamental to the assessment of the conservation status of wild plant populations and a prerequisite for addressing sustainable harvesting of target species (Russell-Smith *et al.*, 2006). The International Union for Conservation of Nature (IUCN) has, in fact, developed a clear set of categories and criteria to assess the risk of extinction of a species. For example, assessed species are listed in a publication known as the IUCN Red List under categories that indicate the varying degrees of their probability of extinction. Since their adoption by the International Union for Conservation of Nature Council in 1994, the IUCN Red List Categories have become widely recognized internationally and they are now used in a range of publications and listings produced by IUCN as well as by numerous governmental and non-governmental organizations (IUCN, 2001). For example, a total of 948 taxa were assessed in South Africa. Among these taxa, 15 were classified as *Extinct*, 19 *Critically Endangered*, 58 *Endangered*, 322 *Vulnerable*, 92 *Near Threatened*, 334 of *Least Concern* and 108 classified as *Data Deficient* (Golding, 2002).

Therefore, the purpose of this study was to assess the conservation status of the plant species reportedly used as traditional remedies by the surveyed 131 community members and also to determine their perceptions on the accessibility of natural resources in and around the Cape Peninsula. This aim was achieved by reviewing the available relevant literature on the conservation status of plant species and also by analysing the responses of the surveyed community members. The key informants in the study area were asked about (1) the need for conservation of natural resources; (2) their degree of information on the protection status of

the used plants; (3) their awareness of conservation policies and laws; and (4) their views on access to nature reserves. The results of this investigation were discussed with particular attention to the socio-economic characteristics of the respondents surveyed. These results were compared with relevant studies undertaken elsewhere.

5.2. Results

The data captured from the semi-structured questionnaire (Appendix C) were entered into Microsoft Excel worksheets and analyzed using Statistica 8.0. Chi-square tests were performed to determine significant differences between certain variables with a 95% confidence interval.

5.2.1. Conservation status of the recorded plant species used for medicinal purposes

One-hundred-and-twelve plant species were recorded through the present study as illustrated by Table 3(ii). Subsequently, the literature was surveyed to determine the conservation status of these plant species. As a result, the legal status of 13 plant species was established: four were considered to be *Declining*, four categorized as *Near Threatened*, two as *Protected* and one species each in the respective categories of *Least Concern*, *Vulnerable* and *Critically Endangered* (Table 5(i)). Figure 5a represents a graphic illustration of the recorded plant species traditionally used for medicinal purposes according to their conservation status.

Table 5(i): Medicinal plant species and their conservation status

No	Botanical names	Family	National status	References
1	<i>Agathosma betulina</i> (P.J.Bergius) Pillans	Rutaceae	Declining	SANBI, 2007
2	<i>Agathosma crenulata</i> (L.) Pillans	Rutaceae	Declining	SANBI, 2007
3	<i>Agathosma ovata</i> (Thunb.) Pillans	Rutaceae	Least Concern	Golding, 2002
4	<i>Boophane disticha</i> (L.f.) Herb	Amaryllidaceae	Protected	Cape Nature, 1997
5	<i>Bowiea volubilis</i> Harv.ex Hook.f.	Hyacinthaceae	Vulnerable	SANBI, 2007
6	<i>Clivia miniata</i> (Lindl.) Regel var. <i>miniata</i>	Amaryllidaceae	Declining	SANBI, 2007
7	<i>Cotyledon orbiculata</i> L.	Crassulaceae	Near Threatened	SANBI, 2007
8	<i>Dioscorea elephantipes</i> (L'Hér.) Engl.	Dioscoreaceae	Near Threatened	SANBI, 2007
9	<i>Dioscorea sylvatica</i> (Kunth) Eckl.	Dioscoreaceae	Near Threatened	SANBI, 2007

10	<i>Ocotea bullata</i> (Burch.) Baill.	Lauraceae	Declining	SANBI, 2007
11	<i>Siphonochilus aethiopicus</i> (Schweinf.) B.L.Burt	Zingiberaceae	Critically Endangered	SANBI, 2007
12	<i>Stangeria eriopus</i> (Kunze) Baill	Stangeriaceae	Near Threatened Protected	SANBI, 2007 DEAT, 2007
13	<i>Xysmalobium undulatum</i> (L.) W.T. Aiton	Apocynaceae	Protected	Cape Nature, 1997

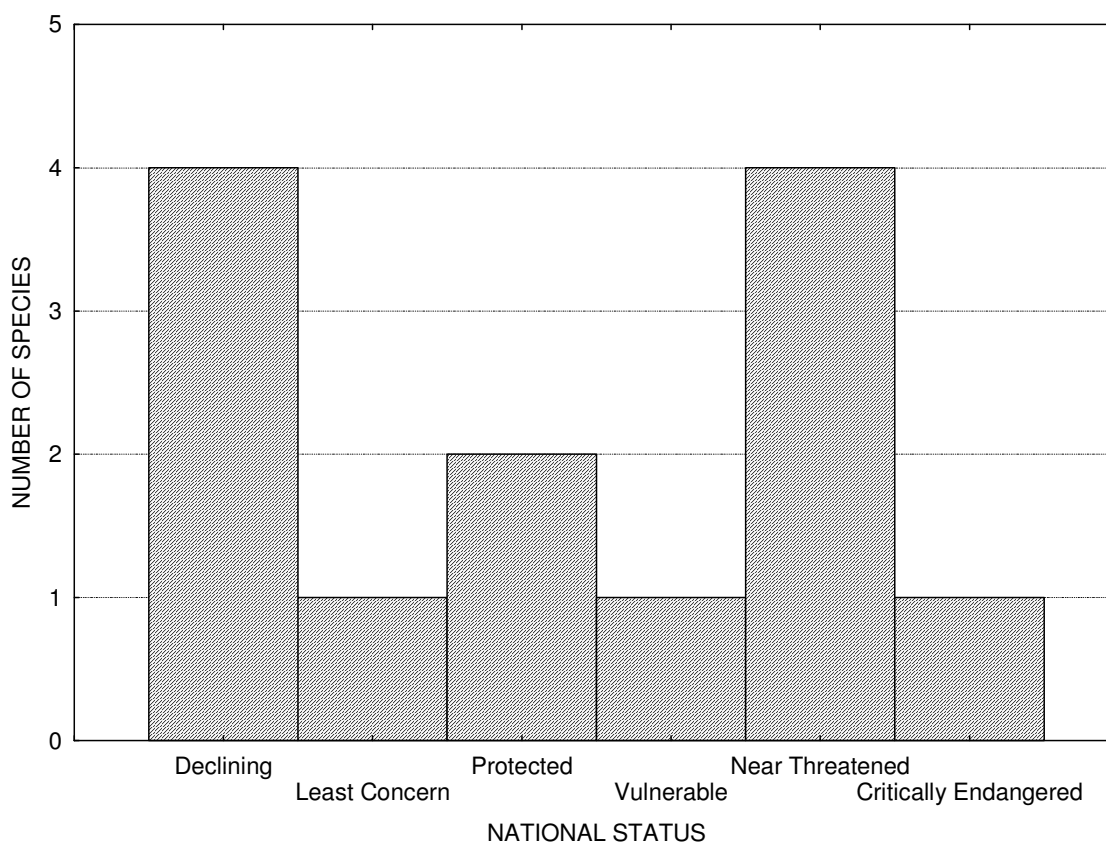


Figure 5a: Medicinal plants and their conservation status

5.2.2. Local community perceptions of natural resources accessibility

Most of the respondents surveyed clearly expressed their views on the accessibility of medicinal plants. Accordingly, 94% (n=120) of them were convinced of the need for conservation of plant diversity, while only 6% (n=7) did not confirm the need for the conservation of plant species. In terms of knowledge of the protection status of the plants used, 80% (n=100) of the key informants admitted that the plants harvested for healing purposes were protected based on the establishment of nature reserves and the existence of private properties, but 17% (n=20) had no information on this matter.

Furthermore, 73% (n=81) of the respondents confirmed their awareness of the existence of a number of conservation policies and laws, while 27% (n=30) were not aware of

these environmental laws and policies. There is also a highly significant difference ($p=0.00252$) between the medicinal plant users mindful of these policies and laws and their involvement in the practice of traditional medicine. For example, 61% ($n=69$) of the surveyed respondents who considered traditional healing as a full-time activity, had no or little knowledge of environmental legislation, only 6% ($n=7$) of the key informants involved part-time in the use of medicinal plants were aware of these policies and laws (Figure 5b).

Finally, even though 79% ($n=73$) of the respondents surveyed stressed the difficulty in accessing nature reserves across the Western Cape Province, 21% ($n=19$) stated that entering nature reserves was easy as long as one belongs to a recognized association of traditional health practitioners or when one adheres to the procedure of acquiring a permit.

Table 5(ii): Local community responses to natural resource accessibility

Awareness of the need for conservation of natural resources	Proportions
Yes	94% ($n=120$)
No	6% ($n=7$)
Information on the protection status of the used plants	
Yes	83% ($n=100$)
No	17% ($n=20$)
Awareness of conservation policies and laws	
Yes	73% ($n=81$)
No	27% ($n=30$)
Views on the accessibility of nature reserves	
Easy	21% ($n=19$)
Difficult	79% ($n=73$)

INVOLVEMENT x AWARENESS OF CONSERVATION POLICIES AND LAWS
 Chi-square test: p=.00252

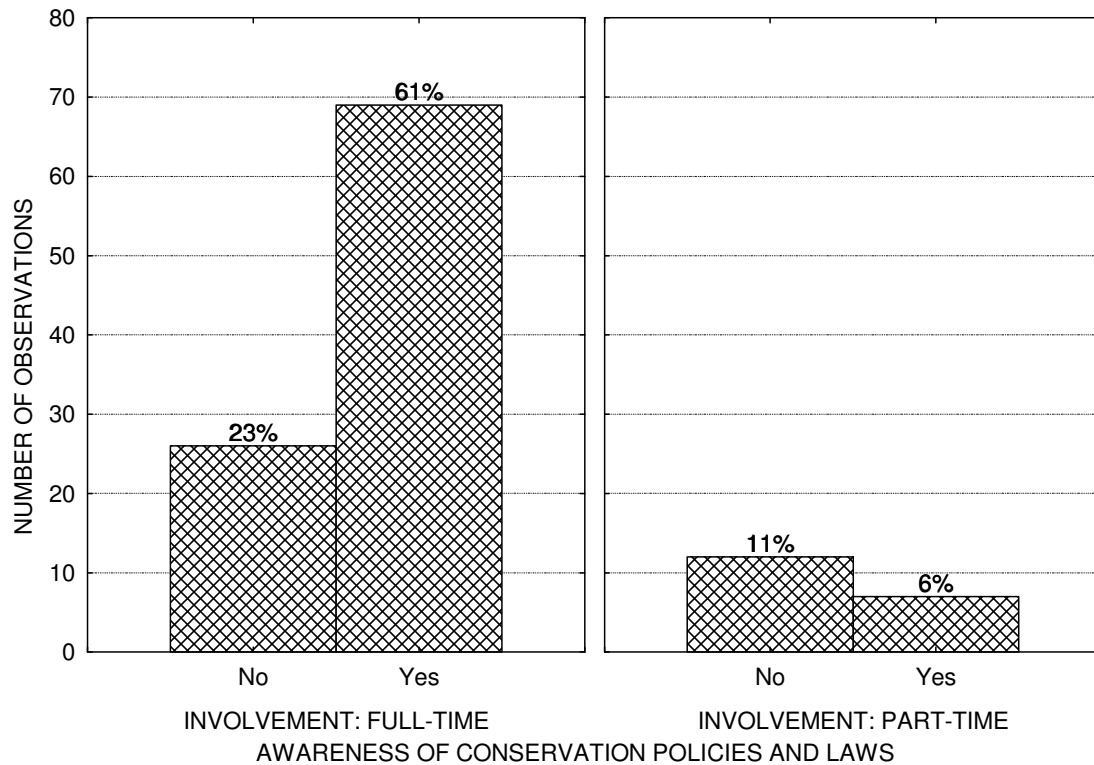


Figure 5b: Effects of involvement on the traditional healthcare practitioner awareness of conservation policies and laws

5.3. Discussion

In many developing countries where Western medicine is inaccessible, too expensive or not accepted by the people, the majority of the population still relies on traditional herbal remedies (Zschocke *et al.*, 2000). In the case of populations of plants that provide medicinal products for subsistence or commerce, a prediction for successful management is to identify the relevant species to determine which of them are or may become depleted, the importance and value of their particular uses as well as the habitats from where the particular species are extracted (Kvist *et al.*, 2001). Accordingly, this section discusses the conservation status of the reported plant species used for medicinal purposes, focusing on the local communities' awareness of conservation policies and laws. Attention is also paid to their views on the accessibility of nature reserves from where they collect medicinal plants.

5.3.1. Conservation status of the plant species traditionally used for medicinal purposes

One-hundred-and-eight plant species were identified during the survey through their scientific names. Amongst these species, 13 were found to be classified under the nine clearly defined IUCN Categories which are *Extinct* (Ex), *Extinct in the Wild* (EW), *Critically Endangered* (CR), *Endangered* (EN), *Vulnerable* (VU), *Near Threatened* (NT), *Least Concern* (LC), *Data Deficient* (DD) and *Not Evaluated* (NE) (IUCN, 2001) (Table 5(i)).

These IUCN Red List Categories and Criteria have several specific aims, including:

- to provide a system that can be applied consistently by different people;
- to improve objectivity by providing users with clear guidance on how to evaluate different factors which affect the risk of extinction;
- to provide a system which will facilitate comparisons across widely different taxa; and
- to convey to people using threatened species a better understanding of how individual species were classified (IUCN, 2001).

Based on the Interim Red Data List of South Africa Plant Taxa produced by the South African National Biodiversity Institute (2007), 10 plant species were classified at a global scale. For example, *Agathosma betulina*, which is declining nationally, was classified as of *Least Concern* globally. This species was also listed among the commercially important southern African medicinal plants (Van Wyk, 2008). However, conservation measures should still be taken as this plant was ranked second in the most frequently used plants by the surveyed respondents (Table 3(ii) in Chapter 3). Similarly, *Agathosma crenulata*, *Clivia miniata* and *Ocotea bullata*, also reported to be declining in South Africa, were classified as of *Least Concern* on the global scale. *Ocotea bullata*, for example, was reported to be unsustainably harvested and sold for only R60 per kg in the Eastern Cape Province where approximately 525 tonnes of plant material, valued at roughly R27 million per annum, were traded (Dold & Cocks, 2002).

Nevertheless, *Bowiea volubilis*, considered as *Vulnerable* in South Africa, has not been evaluated globally and was also mentioned seven times by the surveyed respondents (Table 3(ii)). This plant, sold for only R29 per kg, has been ranked 40th among the 60 most traded plants in the Eastern Cape (Dold & Cocks, 2002). It means that conservationists and resource users need to strongly collaborate to avoid the extinction of this particular species as the threat is presently looming. Further investigations should also be undertaken for proper ecological understanding of this species.

In contrast, species like *Cotyledon orbiculata*, *Dioscorea elephantipes*, *Dioscorea sylvatica* and *Stangeria eriopus*, were categorized *Near Threatened* both nationally and

globally. These four species are part of the daily ingredients used for the preparation of remedies by traditional healthcare practitioners. As a matter of fact, natural resource managers should find means of regulating their harvest and inform plant users of the current status to harmonize the quotas to be collected from the wild in the Eastern Cape and the Western Cape provinces from where they were reported to be recurrently gathered (Table 4(i) in Chapter 4). It suffices to note that *Dioscorea sylvatica* was mentioned by 25 respondents amongst the most commonly sold plant species in the Eastern Cape Province (Dold & Cocks, 2002).

Finally, *Siphonochilus aethiopicus* has been classified as *Critically Endangered* at the national level and *Not Evaluated* on the global scale. Even though the key informants only mentioned it twice, the status of this plant appeals for an immediate assessment across the Eastern Cape Province from where it was reportedly mostly collected (Table 3(ii) and Table 4(i)). Additionally, this plant is one of the commercially important medicinal plants in southern Africa (Van Wyk, 2008). Adequate conservation measures should be implemented for the sustainable management of the species on a national and worldwide scale after such an assessment.

5.3.2. Local community perceptions of natural resources accessibility

The use of plants in medicine is booming. Using traditional medicine is the mainstay of primary healthcare virtually in all developing countries. The reasons for this frequent use of traditional medicine being (i) the strong association of people with local flora and their belief in traditional medicine; (ii) easy availability of local medicinal plants; (iii) relatively poor access to allopathic drugs and their high cost; and (iv) low economic profile of the rural people (Parveen *et al.*, 2007). Similarly, the majority of the interviewed community members in the Cape Peninsula and the surrounding localities (94%: n=119) listed cultural belief as the main reason for their involvement in traditional medicine. Additionally, 63% (n=73) of the surveyed respondents noticed an increase in the number of patients and only 12% (n=16) of them were employed.

5.3.2.1. Awareness on issues surrounding the conservation of natural plants

It is encouraging for conservation practitioners and for biodiversity conservation that 94% (n=120) of the surveyed respondents acknowledged the urgent need for conservation of plant biodiversity. These results clearly corroborated the responses of 86% (n=102) of the key informants who were aware of the depletion of medicinal plants in the wild (Table 4(ii) in Chapter 4). It would, therefore, be safe to assume that local communities in the study area are

aware of the need to conserve natural resources. Thus, there could be opportunities for partnership between natural resource managers and consumers to enhance natural resource sustainability. After all, the respondents had confirmed the crucial role and the dependency of local communities on plant species for healing purposes. This agrees with Kala (2000) who stated that close to 3 billion people rely on plants for medicine and Ballabh and Chaurasia (2007) who noted that wild plants have always been a major source of primary healthcare and other necessities of daily life for tribal communities throughout the world. In the case of South Africa, the use of traditional medicine is widespread and it is estimated that as high as 80% of the black population consult traditional healers (Stafford *et al.*, 2008). They also acknowledged the need to preserve the environment for future generations for the pursuit of cultural ceremonies or rituals. This is consistent with section 24 of the South African Constitution (Act No.108 of 1996) which states that everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures (Government of South Africa, 1996).

The knowledge of the protection status of the plant species used by the respondents appeared ambiguous. Even though 83% (n=100) of them affirmed to have information on these species, the interviews revealed that this knowledge was superficial. As a result, only two taxa were mentioned to be known as protected, including *Agathosma* species (buchu) and *Protea* species. In fact, this minimum information was acquired principally from limited workshops organized by CapeNature management officials. Some of the key informants who claimed to be aware of the conservation status of some of the species currently used for medicinal purposes were reportedly informed by older community members (mentors), through radio and television programmes, brochures and most importantly after being arrested by law enforcement officers. It emerged that there is a genuine need for environmental education among local populations across the Western Cape Province, particularly and throughout South Africa as a whole, based on the facts stated.

Similarly, 73% (n=81) of the respondents declared their awareness of environmental laws and policies. In fact, this knowledge was mainly facilitated by the compulsory requirement for local people to possess a permit to access nature reserves and to travel with plant species. They also indicated that (1) over-harvesting was prohibited; (2) the picking of flowers was illegal; (3) fires and plastics were not allowed in nature reserves; and most importantly (4) they had a general knowledge of the existence of policies and laws dealing with environmental protection. In fact, local communities throughout the Cape Peninsula and the neighbouring areas have some understanding of conservation laws and policies. A more

accentuated interaction between natural resource managers and plant users could considerably improve the current situation of information stagnation on environmental legislation. The highly significant difference ($p=0.00252$) between plant users who are aware of conservation policies and laws and their involvement in the practice of traditional medicine clearly indicates that there is a strong correlation between the degree of involvement in an activity and the understanding of the processes characterizing this activity. This is demonstrated by the 61% ($n=69$) of the respondents who were involved full-time and were aware of environmental policies and laws (Figure 5b).

5.3.2.2. Views on the accessibility of nature reserves

The views of local natural resource users on the accessibility of neighbouring nature reserves were assessed. Accordingly, 79% ($n=73$) of the respondents surveyed stated that it was very difficult to enter the reserves. This fact raised concerns about the relationship between resource managers and local communities. Heywood and Iriondo (2003) noted that there has been a move away from the “fortress” concept of a protected area to a more participatory approach, with neighbours of a protected area being treated as partners in conservation. Even though conservation in South Africa has moved squarely into a socio-political arena concerned with human rights, access to natural resources, equity and environmental sustainability (Wynberg, 2002), the practicality of this approach within the reserves managed by CapeNature is questionable. For example, most of the key informants emphasized the acquirement of permit to be the major issue. They also qualified the procedure as tremendously time-consuming and complicated. They mentioned that the fees for the permit were high and a considerable number of community members were not clearly informed of the procedure leading to the granting of a permit. They equally stressed the unwillingness of private landowners to allow medicinal plant users to harvest from their properties. This increases the focus on species growing in nature reserves, as alternative sites on private holdings become inaccessible. According to some of the respondents actively involved in the collection in the field, private lands encompass a variety of annual plants, which are not used by landowners.

Indeed, this study is in agreement with Brosius and Russell (2003) who noted that no species, no habitat, no piece of land can be “saved” without a community. It is necessary to maintain *community* and *participation* as central precepts of conservation. There should be an approach that requires a shift from a perspective that views local communities as threats to one that explores ways to support local institutions as a primary goal of conservation. In addition, the experience does suggest that conservationists need to be more open and honest

with other stakeholders by defining and clearly communicating their interests and objectives in terms of how an ecosystem should be managed or conserved (Wells, 2003). For example, participatory schemes which involve the conservationists and user groups of medicinal plants (local communities) are beginning to consider gender, cultural, ethnic and other social values in managing biodiversity. Several successful community-based programmes have lately been implemented in South Africa (Makunga *et al.*, 2008). As a result of socio-cultural influences and regional biodiversity threats, there are differences in conservation and commercialization priorities of medicinal plants within the country. In KwaZulu-Natal, conservation of forest species is one of the key priorities as unsustainable bark stripping is affecting species like *Warburgia salutaris* (G.Bertol.) Chiov. and *Ocotea bullata* (Burch.) Baill. Species such as *Bowiea volubilis* Harv. Ex Hook.f.subsp. *volubilis* and *Siphonochilus aethiopus* (Schweinf.) B.L. Burt are part of the priority list for KwaZulu-Natal, whereas the effect of over-harvesting of *Pelargonium* species in the Eastern Cape is a major concern. The conservation programmes in the Western Cape focus mainly on fynbos and other Cape Floristic Region (CFR) species, including those of medicinal value. Cape Action for People and Environment (CAPE) was established to monitor regional biodiversity in the Western Cape Province (Makunga *et al.*, 2008).

5.4. Conclusion

The current study brought insight into the perceptions of local communities across the Cape Peninsula and the surrounding areas on natural resource accessibility and the conservation status of a number of plant species used in traditional medicine. It revealed a limited knowledge of the surveyed respondents on the conservation status of plant species which are currently used in traditional healthcare. A review of the literature revealed that four species have been classified as *Declining*, four as *Near Threatened*, two as *Protected* and one species each in the categories *Least Concern*, *Vulnerable* and *Critically Endangered*. Therefore, further investigation into the medicinal plant species recorded during the survey is suggested to contribute to the improvement of the IUCN Red Data List of Threatened Species, which, according to Rodrigues *et al.* (2006), are used to guide management of natural resources at multiple scales, including at individual sites, in national development of policies and legislation and multilateral agreements.

It is also important to note that the key informants recognized the immediate need for conservation of plant biodiversity, mainly for future generations and for the pursuit of cultural activities. They expressed a superficial knowledge of environmental laws and policies similar to their understanding of the protection status of the plants harvested for traditional medicine.

Thus, there is a need for a concrete environmental education programme, including the explanation of the relevant sections of the legislation dealing with the protection of natural resources through the organization of workshops and distribution of brochures summarizing the important aspects of the concerned laws.

Furthermore, it emerged that there is a perpetual lack of interaction between local populations and nature reserve managers. This was exemplified by the cumbersome process of granting permits to access nature reserves. There is, therefore, a need for better communication between the management of the reserves and the neighbouring communities. This could lead to a better understanding of conservation objectives and priorities. After all, Maikhuri *et al.* (2001) suggested that local people's participation in management planning and monitoring could reduce the prevailing conservation-people conflicts. Another important suggestion would be the collaboration between the Western Cape Nature Conservation Board, private landowners and the surrounding communities as far as natural resource management and conservation is concerned throughout the Western Cape Province, with the aim of extending the concept to other parts of South Africa.

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Chapter 6: Conclusions and recommendations

6.1. Introduction

This study was formulated to determine the plant species which are being used for medicinal purposes by local communities in the Cape Peninsula and the neighbouring localities and to subsequently identify their conservation status. The research was conducted in 16 localities: Bellville Train Station, Cape Town (Parade), Du Noon, Fisantekraal (Durbanville), Grabouw, Gugulethu, Harare, Khayelitsha (sections B, C & F), Kraaifontein, Langa, Macassar, Meltonrose, Mfuleni, Paarl (Chicago & Mbekweni), Philippi and Stellenbosch (Kayamandi). The communities of these localities were selected to participate in this investigation firstly, by virtue of the presence of traditional health practitioners amongst them; and secondly, due to CapeNature's involvement with certain groups of plant users in the Cape Peninsula and the surrounding areas. The author's personal observations and experiences of the study area during the survey contributed useful information to the data, which were derived mainly from semi-structured questionnaires (Appendix C). The key objectives of this study were addressed by examining five specific research objectives, including: (1) the identification of the kinds of plant species traditionally used for medicinal purposes through their common and scientific names; (2) determination of the distribution and the availability of these medicinal plant species; (3) determination of the conservation status of the plants used for medicinal purposes; (4) assessment of the respondents' awareness of conservation laws and policies that affect harvested products and harvesting areas; and (5) the identification of opportunities for overcoming the drawbacks of the present natural resource management and use practices in the study area.

6.2. Characteristics of medicinal plant users

This investigation was carried out from 1st August 2006 to 28th July 2007 and resulted in the surveying of 131 local community members, consisting of 46 Rastafarians and 85 traditional healers. Amongst the key informants, the majority were involved full-time in traditional medicine, men were more dominant and isiXhosa was the most spoken native language, followed by Afrikaans. It is noteworthy that a large number of the surveyed respondents originated from the Eastern Cape Province, followed by the Western Cape and the rest from other areas. Only a few of the respondents surveyed reached the tertiary level of education, whereas more than a half obtained primary and high school education, with the rest having no formal education.

6.2.1. Most frequently used plant species for medicinal purposes

Initially, 183 plant species were reported to be customarily used for medicinal purposes through their common names (Afrikaans & isiXhosa). After the determination of the frequency of citations for each plant mentioned, 112 frequency categories that varied from 63 to 2 were entered. The identification process revealed a list of 102 plant species through their scientific and common names (Afrikaans, isiXhosa, isiZulu & English), belonging to 93 genera and 53 families, which were distributed among seven types of life-form (climbers, dwarf shrubs, epiphytes, geophytes, herbs, shrubs and trees). These different plants were collected from diverse areas across South Africa. For example, the Eastern Cape was the most mentioned province, followed by the Western Cape, KwaZulu-Natal, Gauteng and the Northern Cape. Additionally, half of the respondents disclosed that they collect plant materials from the wild and a few of them combined harvesting from wild stocks with purchase from other suppliers. Similarly, a high number of the respondents confirmed that they had used other plant species as substitutes.

The diversity of plants shown in Appendix A is used to treat various known diseases, from simple illnesses like cough to serious bodily infections and psychological health. The key finding in the present study is that local communities in the Cape Peninsula and the neighbouring areas possess a good knowledge of plants and their distinctiveness to treat a wide range of ailments. Indeed, the tradition of using medicinal plants on a daily basis is alive as shown by the high number of use-reports recorded.

6.2.2. Conservation status of the most frequently used plant species

The International Union for Conservation of Nature (IUCN) has developed a clear set of categories and criteria to assess the risk of extinction of a species. Since their adoption in 1994 by the IUCN Council, the IUCN Red List Categories have become widely recognized internationally. As a result, they are now used by numerous governmental and non-governmental organizations (IUCN, 2001).

The South African National Biodiversity Institute (SANBI) has published the Red Data List of South African Plant Taxa. Based on that list and additional literature, the conservation status of 13 plant species commonly used for medicinal purposes was determined. Accordingly, four species were categorized as *Declining* (*Agathosma betulina*, *Agathosma crenulata*, *Clivia miniata*, *Ocotea bullata*), four others as *Near Threatened* (*Cotyledon orbiculata*, *Dioscorea elephantipes*, *Dioscorea sylvatica*, *Stangeria eriopus*), two as *Protected* (*Boophane distichia*, *Xysmalobium undulatum*) and one species classified as

Least Concern (Agathosma ovata), Vulnerable (Bowia volubilis) and Critically Endangered (Siphonochilus aethiopicus). There is evidence that there is a limited knowledge of the conservation status of the plants which are currently used for natural remedy in South Africa, especially amongst local traditional healthcare practitioners in the study area. For example, even though the majority of the surveyed respondents stated to have been familiar with the protection status of harvested plant species for healing purposes and had acknowledged their awareness of conservation laws and policies, the interviews revealed that this knowledge is superficial. The respondents surveyed could only list *Agathosma* and *Protea* species as the protected ones. Their knowledge of environmental policy and legislation was also limited to the stringent requirements for a permit to enter protected areas and to travel with plant materials. Furthermore, there is a high significant difference between plant users who were conscious of environmental policies and laws and their involvement in the practice of traditional medicine. This illustrates a strong correlation between the degree of involvement and the awareness of conservation laws and policies. Overall, local communities in the Cape Peninsula and the surrounding areas strongly rely on medicinal plants. Unfortunately, these plants are collected without considering their national conservation status and the environmental policies and laws that govern their usage.

6.3. Local community perceptions of natural resource accessibility

The use of traditional medicine is the mainstay of primary healthcare practitioners in all developing countries. The reasons for this frequent use of traditional medicine are: (i) the strong association of people with local flora and their belief in traditional knowledge regarding plants as medicine; (ii) easy availability of local medicinal plants; (iii) relatively poor access to allopathic drugs and their high cost; and (iv) lower economic profile of the rural people (Parveen *et al.*, 2007). Similarly, the majority of the interviewed community members in the study area listed cultural belief as the main reason for their involvement in traditional medicine. Many of the respondents also noticed an increase in the number of patients, thereby increasing demand for medicinal plants. This agrees with the findings of Dold and Cocks (2002) in the Eastern Cape Province where several traditional healers indicated an increase in the number of patients they had attended to over the last five years. They also predicted a further increase in the next five years, citing the HIV/AIDS pandemic as the main reason.

6.3.1. Awareness of the depletion of medicinal plant species in the wild

The results of this study revealed that a high number of traditional healthcare practitioners acknowledged the immediate need for conservation of the plants that are currently being used for medicinal purposes. These findings corroborated the statements of more than a half of the surveyed respondents who were aware of the depletion of a number of plant species in the wild. This awareness was contingent on certain socio-economic characteristics of the respondents. For example, there was a significant difference between the selected community members who were aware of the exhaustion of plants and their gender. Similarly, there was a significant difference between the traditional health practitioners who were conscious of the decline of medicinal plants and their ethnicity. There was also a significant difference between the traditional health practitioners who were mindful of the disappearance of plant species and their respective years of involvement. An important viewpoint that emerged from the key informants was that the environment should be preserved for future generations. This is consistent with section 24 of South Africa's Constitution (Act No. 108 of 1996), which states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations (Government of South Africa, 1996).

6.3.2. Local community views on the accessibility of nature reserves

The opinions of natural plant users in the Cape Peninsula and the surrounding areas on accessibility to neighbouring nature reserves were captured during this investigation. Accordingly, the majority of the surveyed respondents affirmed that it was very difficult to enter the reserves managed by CapeNature. This restriction to access was mainly attributed to the procedure for securing permits; they qualified the procedure as time-consuming and complicated. They also mentioned that a considerable number of community members were not clearly informed about the procedure and they also complained about the soaring fees. This is attributable to the fact that a half of the surveyed respondents were unemployed, others were self-employed and only a few of them were working at the time of the survey.

It is worth noting that conservation in South Africa has moved squarely into a socio-political arena concerned with human rights, access to natural resources, equity and environmental sustainability (Wynberg, 2002). However, the practicality of this approach seems to be undermined or it is only partially adopted by CapeNature's reserve management as the minority of the surveyed respondents declared that entering the reserves was easy as long as a person belongs to a recognized association of traditional health practitioners or when

one fully adheres to the procedure of acquiring permit. Indeed, there should be an approach that requires a shift from a perspective that views local communities as threats to one that explores ways to support local communities and their institutions as a primary goal of conservation (Brosius & Russell, 2003).

6.4. Recommendations

At the beginning of the 21st century, conservation has emerged as a central element in the civic and political debates in the nations of both the North and the South. A rapid propagation of efforts to strengthen the links between environmental science and management and a transformation of the institutional landscape has been witnessed. Accompanying these shifts, bottom-up models under the rubrics of community-based conservation (CBC) and community-based natural resource management (CBNRM) have emerged (Brosius & Russell, 2003). In the Republic of South Africa, there are many laws and policies that bear on the exploitation of natural resources. For example, the National Environmental Management Act (Act No. 107 of 1998) states in section 2(2) that environmental management must place people and their needs at the forefront of its concern and serve their physical, psychological, developmental, cultural and social interests equitably. Section 2(4) elaborates more by requesting equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being. It specifically emphasizes that special measures may be taken to ensure access to environment resources by categories of persons disadvantaged by unfair discrimination. The legislation further affirms that all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation in environmental governance; and also requires that decisions on environmental matters must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge. The law requires that community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and by other appropriate means (Government of South Africa, 1998).

Community access, involvement in the management of natural resources, well-being and empowerment appear to be well institutionalized in protected area management policy and legal frameworks that influence environmental management and use in South Africa. It is crucial that the privileges, rights and obligations in these laws and policies are made available to the majority of the community members in the Cape Peninsula for them to contribute to the conservation of medicinal plant species in a meaningful way. This would help them to

understand the requirements for protection of certain species. However, this entails major shifts in the implementation of the current policies, laws and strategies. Both CapeNature and the local communities need to co-operate to find a common understanding necessary for achieving environmental sustainability. Similarly, the Western CapeNature Conservation Board needs to implement the requirements of the National Environmental Management Act faithfully to transform local community attitudes.

6.4.1. Formulating new approaches for CapeNature

Section 2(4) (h) of NEMA clearly states that community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, and the sharing of knowledge and experience (Government of South Africa, 1998). In fact, this should be the mandate for the CapeNature in the management of nature reserves. However, to execute this mandate requires regular communication between resource users and resource managers. Wells (2003) suggests that conservation practitioners need to be honest with other stakeholders by defining and clearly communicating their interests and objectives in terms of how an ecosystem should be managed or conserved. Thus, CapeNature needs to develop strategies to accentuate environmental education. For example, local communities should be informed of the current laws and policies dealing with biodiversity exploitation and preservation, especially the protection status of plant species and the procedure for acquiring permit. They also need to be trained in the sustainable harvesting practices of natural resources and on the potential for plant species part substitution (leaves for roots). Geldenhuys (2004) points out that training involving all stakeholders is an essential component in the development of sustainable resource use from natural areas. Local communities should also be empowered through community-based management projects that generate job opportunities for community members and make them feel involved in resource management. Appropriate resource management with involvement of potential resource users is, in fact, critical to develop shared responsibility in natural resource management (Geldenhuys, 2004). An example of the marriage of social and biological conservation initiatives was the educational training on medicinal plant propagation organized by the South African National Parks (SANParks), a governmental agency, that has created a forum in which groups of healers (Rastafarian bush-doctors and Xhosa healers) share traditional knowledge of herbal medicines while learning how to produce their own plant materials (Makunga *et al.*, 2008). Furthermore, CapeNature should develop agreements facilitating collaboration between local communities, municipal nature reserve managers, private landowners and themselves. This could prevent the

extinction of threatened species in certain areas. Finally, CapeNature needs to play an effective role in the development of nurseries, especially for the most commonly used plant species both to encourage ex-situ and in-situ conservation of those highly desired species through appropriate enrichment plantings in the wild.

6.4.2. Reorganization amongst local communities

One of the prime complaints repeatedly expressed by traditional healthcare practitioners in the study area was the restricted access to nature reserves due to the difficulty in the acquisition of permits. It is easier to deal with groups than individuals as Geldenhuys (2004) noted that working through specific user groups rather than the entire community streamlines the process, because user groups have a vested interest in the successful development of sustainable resource management strategies. A number of surveyed respondents mentioned that access to nature reserves was easy as long as an individual belongs to an organization of traditional health practitioners. It is, therefore, recommended that the local communities in the Cape Peninsula and the neighbouring areas organize themselves into associations of traditional health practitioners with a leading committee that will be speaking on behalf of the whole community. The creation of such social structures is feasible as the experience in the field during the survey revealed the existence of community leaders, commonly called elders, among traditional healer and Rastafarian populations. These organizations should then develop an internal constitution regulating them. Thereafter, negotiations should be initiated with CapeNature management with the aim of developing and signing a Memorandum of Understanding (MoU). The major challenge for community leaders would be to maintain cohesion among members, but the motivation is that these types of processes have already been successful in South Africa. For example, in May 2002, the Department of Water Affairs and Forestry (DWAF) issued a General License under sections 7, 15 and 23 of the National Forests Act (1998) to the Sizamimphilo Association for harvesting bark in the Umzimkulu District, in the Eastern Cape (Geldenhuys, 2002). Local traditional health practitioners should also establish a network allowing exchange of knowledge and leadership skills between them and other communities elsewhere in South Africa. Finally, community leaders need to be proactive by inviting conservation practitioners and researchers to inform them about current environmental issues.

6.4.3. Areas for future research

The author recommends that further investigations be undertaken in the near future, where the results of this study are used as baseline data. Accordingly, future studies should proceed to medicinal plant inventory throughout the protected areas of the Cape Peninsula and the surrounding areas. The data should include variables that provide information on the population status of the species harvested, the intensity of harvesting, the impacts and the responses of the harvested species. It would be suitable for future studies to assess the impact of climate change on medicinal plant species and their responses.

Additional investigations should also test the toxicity and the chemical composition of the different plant parts used for healing purposes, especially the leaves and other aerial parts. This could enhance the use of plant substitutes in traditional medicine. Similarly, the responses of these plant species to cultivation outside of their natural habitats (nurseries) should be investigated as a substantial number of the surveyed respondents questioned the efficacy of the plants not collected from the wild in the mountains. These recommended investigations will contribute useful information to the South African Red Data List of Threatened Species. They may also protect more species from extinction and allow the recovery of endangered medicinal plants in the Cape Peninsula, in particular and in South Africa as a whole.

6.5. Achievement of the study

The primary and most important finding of this study is that local communities across the Cape Peninsula and the adjacent areas have some good knowledge of the effectiveness of plant species to treat a wide range of ailments. The tradition of using medicinal plants is still alive as confirmed by the high number of species and use-reports recorded. Secondly, traditional health practitioners have a superficial knowledge of the conservation status of the used medicinal plants and environmental policies and laws regulating biodiversity exploitation in the country. Improving the relationship between protected area managers in the Cape Peninsula and the adjoining communities represents the greatest challenge in reinforcing synergies between sustainable rural development and plant protection in the area. Thirdly, this study provides baseline data for future investigations on the utilization of plant species for medicinal purposes. This should provide the Department of Environmental Affairs and Tourism and particularly CapeNature with reliable information on the flora and the community views and needs to assist governmental agencies in future policy development to achieve environmental sustainability. Finally, this research provides evidence to support the concept that community-based natural resource management should be encouraged and

initiated in protected areas throughout South Africa. It clearly emerged that conservation practitioners and governmental agencies have not done everything in their power to actively embrace local communities in ways that might make them true participants and beneficiaries of biodiversity conservation interventions.

6.6. Limitations of the study

The main limiting factor of this study was the initial lack of trust the local communities had in the author, which led to a longer period of data gathering and the expansion of the study area than originally envisaged. This initial reaction was attributed to the fact that a large number of community members had been involved in research projects previously, but the absence of feedbacks from these studies had negatively influenced the communities' willingness to share information unreservedly with outsiders. Similarly, local communities had participated in plant propagation projects with CapeNature, but unfortunately these initiatives had not borne fruit. However, this obstacle was progressively overcome by establishing close relationships with certain community members by informally visiting them in their homes and phoning them regularly. Repeatedly explaining the objectives of the study and participating in local communities' cultural activities also helped to develop the degree of trust needed between the communities and the author. They became gradually more supportive of the research project.

Another issue was the lack of proper communication between CapeNature's Business Units and the reserve managers. It occurred that certain reserve managers were not sufficiently informed about the objectives and process of this investigation. Thus, no proper assistance was rendered, although CapeNature encouraged them to assist. Furthermore, the lack of additional explanatory sessions of the semi-structured questionnaires and the fact that Community Conservation Officers admitted to fully understanding the questions included in the semi-structured questionnaire (Appendix C) became problematic in the end. Accordingly, during the data analysis, several responses were reported in isiXhosa instead of English and some responses did not reflect the answers expected from the questions formulated. In contrast, as mentioned by Van Wyk *et al.* (2008), the use of a common language such as Afrikaans during the survey in the districts of Graaff-Reinet and Murraysburg, allowed them to capture and accurately record subtle nuances that would normally be lost during interpretation and translation.

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Appendices

Appendix A: List of the recorded most frequently used plant species for medicinal purposes

Botanical names	Family	Afrikaans names	Xhosa names	Zulu names	English names
<i>Adenandra uniflora</i> (L.) Willd.	Rutaceae	Anysboegoe	_____	_____	Anys-buchu
<i>Afzelia quanzensis</i> Welw.	Fabaceae	_____	_____	umDlavusa	Lucky bean
<i>Agathosma betulina</i> (P.J.Bergius) Pillans	Rutaceae	Boegoe	iBuchu	_____	Roud-leaf buch
<i>Agathosma crenulata</i> (L.) Pillans	Rutaceae	Anysboegoe	_____	_____	Oval-leaf buchu
<i>Agathosma ovata</i> (Thunb.) Pillans	Rutaceae	Basterboegoe	_____	_____	False buchu
<i>Albuca setosa</i> Jacq.	Hyacinthaceae	_____	inQwebeba	inGcino	_____
<i>Allium dregeanum</i> Kunth	Alliaceae	Wildeui	_____	_____	Wild onion
<i>Aloe aristata</i> Harw.	Asphodelaceae	_____	_____	uMathithibala	_____
<i>Aloe speciosa</i> Baker	Asphodelaceae	Spaansaalwyn	iKhala	_____	Title-head-aloe
<i>Antidesma venosum</i> E.Mey.ex Tul	Euphorbiaceae	Tosselbessie	_____	iSangowane	_____
<i>Aristea africana</i> (L.) Hoffmanns	Iridaceae	Moerbos	_____	_____	_____
<i>Artemisia afra</i> Jacq.ex Willd	Asteraceae	Wilde-als	uMhlonyane	uMhlonyane	African wormwood
<i>Asparagus suaveolens</i> Burch.	Asparagaceae	_____	isiLawu esimholophe	_____	_____
<i>Ballota africana</i> (L.) Benth.	Lamiaceae	Kattekruie	_____	_____	Cat herb
<i>Bersama lucens</i> (Hochst.) Szyszyl.	Melanthaceae	Blinkblaarwitesse nhout	isiNdiyandiya	isiNdiyandiya	Glossy bersama
<i>Boophane disticha</i> (L.f.) Herb	Amaryllidaceae	Kopseerblom	iShwadi	inCwadi	Cape poison bulb
<i>Bowiea volubilis</i> Harv.ex Hook.f.	Hyacinthaceae	Knolklimop	uMagaqana	iGibisila	_____
<i>Buddleja salviifolia</i> (L.) Lam.	Loganiaceae	Salie	_____	iLoshane	Mountain sage
<i>Bulbine alooides</i> (L.) Willd.	Asphodelaceae	Rooistorm	_____	_____	Red storm
<i>Bulbine frutescens</i> (L.) Willd.	Asphodelaceae	Katstert	inTelezi	_____	Cat's tail
<i>Bulbine latifolia</i> (L.f.) Roem. & Schult	Asphodelaceae	Rooiwortel	inCelwane	_____	Broad-leaved-bulbine
<i>Cannabis sativa</i> L.	Cannabaceae	Dagga	umYa	_____	Marijuana
<i>Chironia baccifera</i> L.	Gentianaceae	Bitterbossie	_____	_____	Christmas berry
<i>Cinnamomum camphora</i> (L.) J. Presl	Lauraceae	Kamferboom	uRoselina	uLoselina	Camphor tree

Botanical names	Family	Afrikaans names	Xhosa names	Zulu names	English names
<i>Cissampelos capensis</i> L.f	Minespermaceae	Dawidjiewortel	uMayisake	_____	David root
<i>Cliffortia odorata</i> L.f.	Rosaceae	Wilde wingerd	_____	_____	Wild grape
<i>Clivia miniata</i> (Lindl.) Regel var <i>miniata</i>	Amaryllidaceae	Boslelie	_____	uMayime	Orange lily
<i>Cnicus benedictus</i> L.	Asteraceae	Karmedik	_____	_____	Holy thistle
<i>Coleonema juniperinum</i> Sond.	Rutaceae	Koorsbos	_____	_____	Fever bush
<i>Combretum apiculatum</i> Sond.subsp. <i>apiculatum</i>	Combretaceae	Rooibos	_____	umBondo	Red bush willow
<i>Cordia caffra</i> Sond.	Boraginaceae	Septee	_____	umKhanyakude	_____
<i>Cotyledon orbiculata</i> L.	Crassulaceae	Koutrei	imPhewula	iPewula	Pig's ear
<i>Croton gratissimus</i> Burch.	Euphorbiaceae	Leventelbos	_____	uMahlab'-ekufeni	Lavender croton
<i>Curtisia dentata</i> (Burm.f.) C.A.Sm.	Cornaceae	Assegai	umLahleni	umLahlenisefile	_____
<i>Cyclopia intermedia</i> E. Mey.	Fabaceae	Bergtee	_____	_____	Honey bush
<i>Cyrtanthus breviflorus</i> Harv.	Amaryllidaceae	Vuurlelie	_____	uVelabahleke	Wild crocus
<i>Dianthus thunbergii</i> Hooper	Caryophyllaceae	_____	uNgcana	_____	_____
<i>Dioscorea elephantipes</i> (L'Hér.) Engl.	Dioscoreaceae	Hottentotsbrood	Nakaa	inGweva	Elephant's foot
<i>Dioscorea sylvatica</i> (Kunth) Eckl.	Dioscoreaceae	_____	Usikolipati	uFudu	_____
<i>Dodonaea angustifolia</i> L.f.	Sapindaceae	Ysterhouttoppe	_____	_____	Sand olive
<i>Dolichos falciformis</i> E. Mey.	Fabaceae	_____	uVuma	_____	_____
<i>Drimia elata</i> Jacq.	Hyacinthaceae	Brandui	umRedeni	isiKlenama	_____
<i>Elytropappus rhinoceratis</i> (L.f.) Less.	Asteraceae	Renosterbos	_____	_____	Rhenoster bush
<i>Eriocephalus africanus</i> L.	Asteraceae	Wilde roosmaryn	_____	_____	Wild rosemary
<i>Eucalyptus globulus</i> Labill	Myrtaceae	Bloekom	_____	_____	Bluegum
<i>Eucomis comosa</i> (Houtt.) Wehrh. var. <i>comosa</i>	Hyacinthaceae	Krulkoppie	umPhompo	uBhuhlungu- becanti	Pineapple flower
<i>Euphorbia natalensis</i> Bernh.	Euphorbiaceae	_____	_____	inKalamazane	_____
<i>Geranium incanum</i> Burm.f.	Geraniaceae	Bergtee	Tlako	_____	Carpet geranium
<i>Glycyrrhiza glabra</i> L.	Fabaceae	_____	_____	Mlomo-mnandi	Liquorice
<i>Gnidia cuneata</i> Meisn.	Thymelaeaceae	Koorsbossie	_____	isiDikili	_____
<i>Gunnera perperna</i> L.	Gunneraceae	Wilde-ramenas	iPhuzi	uGhobo	River pumpkin

Botanical names	Family	Afrikaans names	Xhosa names	Zulu names	English names
<i>Haemanthus albiflos</i> Jacq.	Amaryllidaceae	Poeierkwas	uMathunga	uZaneke	Paintbrush
<i>Helichrysum</i> spp.	Asteraceae	Kooigoed	imPhepho	imPhepho	Everlasting
<i>Helinus integrifolius</i> (Lam.) Kuntze	Rhamnaceae	Seepbos	isiLawu	uBhubhubu	Soap plant
<i>Hippobromus pauciflorus</i> (L.f.) Radlk.	Sapindaceae	Perdepis	uLatile	umFazi- othethayo	Horsewood
<i>Hypoxis colchicifolia</i> Bak.	Hypoxidaceae	_____	iLabatheka	_____	_____
<i>Hypoxis hemerocallidea</i> Fisch.Mey. & Ave-Lall.	Hypoxidaceae	_____	iNongwe	inKomfe	African potato
<i>Hyraceum</i>	_____	Dassiepis	_____	_____	_____
<i>Lavandula</i> spp.	Lamiaceae	_____	_____	_____	Lavender
<i>Leonotis leonurus</i> (L.) R.Br	Lamiaceae	Wildedagga	umFincafinane	uMunyane	Wild dagga
<i>Lichtensteina lacera</i> Cham. & Schltl.	Apiaceae	Kalmoes	iQwili	_____	Larger tinsel flower
<i>Lobostemon fruticosus</i> (L.) H. Buek	Boraginaceae	Agdaegeneesbos	_____	_____	Eight-day healing bush
<i>Loxostylis alata</i> Spreng.f.ex Reichb.	Anacardiaceae	Tierhoot	isiBara	_____	Wild pepper tree
<i>Lycium ferocissimum</i> Miers	Solanaceae	Slangbessie	_____	_____	_____
<i>Melianthus major</i> L.	Melanthaceae	Kruidjie-roer-my- nie	uBulungubemam ba	iBonya	Honey flower
<i>Mentha longifolia</i> (L.) Huds.	Lamiaceae	Kruisement	inXina	uFuthanelomhla nge	Wild mint
<i>Myrothamnus flabellifolius</i> Welw.	Myrothamnaceae	Bergboegoe	_____	uVukwabafile	Resurrection bush
<i>Ocimum</i> spp.	Lamiaceae	Timie	_____	_____	Thyme
<i>Ocotea bullata</i> (Burch.) Baill.	Lauraceae	Stinkhout	umNukane	umNukani	Black stinkwood
<i>Olea europea</i> L.subsp. <i>africana</i> (Mill.) P.S.Green	Oleaceae	Olienhout	uMnquma	uMnquma	Wild olive
<i>Osteospermum imbricatum</i> L.subsp. <i>nervatum</i> (DC.) T.Norl.	Asteraceae	_____	inKhupuhlana	_____	_____
<i>Pelargonium triste</i> (L.) L'Hér.	Geraniaceae	Kaneelbol	_____	_____	Sad geranium
<i>Pentanisia prunelloides</i> (Klotzsch ex Eckl. &	Rubiaceae	Sooibrandbossie	iCimamlilo	_____	Wild verbena

Botanical names	Family	Afrikaans names	Xhosa names	Zulu names	English names
<i>Zeyh.</i>) Walp.var. <i>prunelloides</i>					
<i>Peucedanum galbaniopse</i> H. Wolff	Apiaceae	Bergseldery	_____	_____	Blister bush
<i>Peucedanum thodei</i> Arnold	Apiaceae		_____	imPondovu	_____
<i>Pittosporum viridiflorum</i> Sims	Pittosporaceae	Kasuur	umKhwenkhwe	umFusamvu	Cheesewood
<i>Polygala serpentaria</i> Eckl. & Zeyh.	Polygalaceae	Slangwortel	inCeba	inHlanhlenkulu	_____
<i>Ptaeroxylon obliquum</i> (Thunb.) Radlk.	Rutaceae	Nieshout	umThathe	umBaqha	Sneezewood
<i>Rafnia amplexicaulis</i> (L.) Thunb.	Fabaceae	Soethoutwortel	_____	_____	Sweet root
<i>Ranunculus multifidus</i> Forssk.	Rununculaceae	Brandblare	umVuthuza	isiJokkazana	_____
<i>Rapanea melanophloes</i> (L.) Mez	Myrsinaceae	Kaapse boekenhout	uMaphipha	iKhubalwane	Cape beech
<i>Rauvolfia caffra</i> Sond.	Apocynaceae	Koorsboom	_____	umJele	Quinine tree
<i>Rhipsalis baccifera</i> (J.Mill.) Stearn	Cactaceae	Bostou	_____	uGebeleweni	_____
subsp. <i>mauritanica</i> (DC.) Barthlott					
<i>Rhoicissus digitata</i> (L.f.) Gilg & M.Brandt	Vitaceae	Wildepataat	uChithibhunga	isiNwazi	_____
<i>Rhoicissus tomentosa</i> (Lam.) Wild & R.B. Drummm.	Vitaceae	Bobbejaantou	imPinda	isiNwazi	Wild forest grape
			bamshaye		
<i>Rumex steudelii</i> Hochst. ex. A. Rich.	Polygonaceae	_____	iDololenkonyane	iDololenkonyane	_____
<i>Ruta graveolens</i> L.	Rutaceae	Wynruit/Rue	_____	_____	_____
<i>Salvia africana-coerulea</i> L.	Lamiaceae	Bloublomsalie	_____	_____	Blue sage
<i>Sarcophyte sanguinea</i> Sparrm.	Balanophoraceae	Wolwekos	uMavumbuka	uMafumbuka	_____
<i>Schotia brachypetala</i> Sond.	Fabaceae	Boerboon	_____	umGxamu	Weeping Schotia
<i>Scilla natalensis</i> Planch.	Hyacinthaceae	Blouberglelie	_____	iNguduza	_____
<i>Selago</i> spp.	Scrophulariaceae	_____	_____	umHlabelo	_____
<i>Siphonochilus aethiopicus</i> (Schweinf.) B.L.Burt	Zingiberaceae	_____	_____	isiPhephetho	Wild ginger
<i>Solanum aculeastrum</i> Dun.	Solanaceae	Bitterappel	_____	umThuma	Goat apple
<i>Solanum</i> spp.	Solanaceae	aartappel	_____	_____	_____
<i>Stangeria eriopus</i> (Kunze) Baill.	Stangeriaceae	Bobbejaankos	imFingwane	imFingo	Stangeria
<i>Strychnos henningsii</i> Gilg.	Loganiaceae	Rooibitterbessie	umNonono	umQaloti	Red bitterberry
<i>Sutherlandia frutescens</i> (L.) R.Br.	Fabaceae	Kankerbossie	umNwele	umNwele	Cancer bush
<i>Talinum caffrum</i> (Thunb.) Eckl. & Zeyh	Portulacaceae	Osbossie	uPhuncuka	inKucula	_____

Botanical names	Family	Afrikaans names	Xhosa names	Zulu names	English names
<i>Tetradenia riparia</i> (Hochst.) Codd	Lamiaceae	Watersalie	bemphethe	iBoza	Ginger bush
<i>Thesium lineatum</i> L.f.	Santalaceae	Witstorm	_____	_____	White storm
<i>Trichilia dregeana</i> Sond.	Meliaceae	Basteressenhout	umKhuhlu	umKhuhlwa	Cape/Natal mahogany
<i>Tritonia lineata</i> (Salisb.) Ker-Gawl.	Iridaceae	Bergkatjietee	isiLawu esibomvu	isiDwi esimpofu	_____
<i>Tulbaghia alliacea</i> L.f.	Alliaceae	Wildekofflok	uMwelela	uMwelela	Wild garlic
<i>Tulbaghia violacea</i> Harv.	Alliaceae	Wilde knoffel	iVimba-'mpunzi	isiHaqa	Wild garlic
Unidentified	Unidentified	Unidentified	Unidentified	Unidentified	Red carrot
Unidentified	Unidentified	Bitterpatat	Unidentified	Unidentified	Unidentified
Unidentified	Unidentified	Unidentified	iXonya	Unidentified	Unidentified
Unidentified	Unidentified	Unidentified	Unidentified	Unidentified	Fever root
Unidentified	Unidentified	Unidentified	Unidentified	Thuvane	Unidentified
Unidentified	Unidentified	Unidentified	Unidentified	umChamo	Unidentified
Unidentified	Unidentified	Unidentified	Unidentified	wemfene	_____
Unidentified	Unidentified	Unidentified	Unidentified	Unidentified	Red onion
Unidentified	Unidentified	Unidentified	Indonya	Unidentified	_____
Unidentified	Unidentified	Slangblaar	Unidentified	Unidentified	Unidentified
<i>Vernonia oligocephala</i> (DC.) Sch.Bip.ex Walp.	Asteraceae	Groenamara	_____	_____	_____
<i>Viscum capense</i> L.f.	Viscaceae	Voëlent	_____	_____	Cape mistletoe
<i>Xysmalobium undulatum</i> (L.) W.T. Aiton	Apocynaceae	Bitterwortel	iTshongwe	iShongwe	Milk bush
<i>Zanthoxylum capense</i> (Thunb.) Harv.	Rutaceae	Kleinperdepram	umLungumabele	umLungumabele	Small knobwood

Appendix B: Pictures of certain medicinal plants traditionally used by the surveyed respondents



Picture 1: *Hypoxis hemerocallidea*; iNongwe (X); inKomfe (Z); African potato (E)



Picture 2: *Agathosma betulina*; Boegoe (A); iBuchu (X); Round leaf-buchu (E)



Picture 3: *Helichrysum* spp.; Kooigoed (A); imPhepho (X, Z); Everlasting (E)



Picture 4: *Hippobromus pauciflorus*; Perdepis (A); uLatile (X); umFazi-othethayo (Z); Horsewood (E)



Picture 5: *Elytropappus rhinocerotis*; Renosterbos (A); Rhenoster bush (E)



Picture 6: *Haemanthus albiflos*; Poeierkwas (A); uMathunga (X); uZaneke (Z); Paintbrush (E)



Picture 7: *Tulbaghia violacea*; Wilde knoffel (A); iVimba-‘mpunzi (X); isiHaqa (Z); Wild garlic (E)



Picture 8: *Dodonaea angustifolia*; Ysterhouttoppe (A); umRedeni (X); isiKlenama (Z)

Appendix C: The semi-structured questionnaire used for data collection during the survey of the present study

Questionnaire:

1. General information

Location: _____

Date: _____

Interviewee: _____

Spoken Language: _____

Respondent profession: _____

Gender: [M] [F]

Race: [African] [White] [Coloured]

Age group: [<10] [10-20] [20-35] [>35]

Educational Level: [No Schooling] [Primary] [Secondary] [Tertiary]

Province of origin: _____

Status in medicinal plant usage: (1) **Trader** (2) **Healer** (3) **Collector**

2. Kinds of plants used/sold by the local communities

a. Why did you become a sangoma? (**Healer**)

b. Is it a full or part-time activity? (**Trader, Healer & Collector**)

c. What season do you receive more patients? (**Healer**)

If any, please explain why? _____

d. Has the number of patients changed compared to the past? [Decrease] [Increase] [Stable] [Do not know] (**Trader, Healer & Collector**)

e. How do you describe the demand for medicinal plants in the future? [Decrease] [Increase] [Stable] [Do not know] (**Trader, Healer & Collector**)

Please motivate your answer: _____

f. Do you use a combination of plants? [Yes] [No] (**Healer**)

If yes, please mention some of them: _____

g. Where do most of your customers/patients come from? **(Trader, Healer & Collector)**

3. The distribution and availability of the natural plants used for medicinal purposes

a. How long have you been healing people? **(Healer)**

b. How do you obtain these plants: [grow] [buy] [collect from wild]? **(Trader, Healer & Collector)**

If you collect, please mention where? _____

c. Are these plants easy to find? [Yes] [No] **(Trader, Healer & Collector)**

If not, why? _____

d. Have you noticed any change in terms of the availability of these plants? [Yes] [No] **(Trader, Healer & Collector)**

Please motivate your answer: _____

e. Can any other plant(s) be substituted when the above plants are not available? [Yes] [No] **(Trader, Healer & Collector)**

Please mention some of them: _____

f. Does the season influence the availability of these plants? [Yes] [No] **(Trader, Healer & Collector)**

Please motivate your answer: _____

g. How often do you harvest these plants? [Daily] [Weekly] [Monthly] **(Trader, Healer & Collector)**

h. Do people from outside collect these plants in the area? [Yes] [No] **(Trader, Healer & Collector)**

If yes, where might they come from? _____

4. Conservation status of the used plants and alternatives to alleviate pressure on the most popular species

a. Should we conserve natural plant species? [Yes] [No] **(Trader, Healer & Collector)**

Please motivate your answer: _____

b. Are you aware of the reduction of some medicinal plants in the wild? [Yes] [No] **(Trader, Healer & Collector)**

If yes, what do you think are the reasons of this reduction? _____

c. Do you know if the plants you have been using are protected? [Yes] [No] (**Trader, Healer & Collector**)

If yes, how did you get informed? _____

d. Are you aware of conservation laws and policies? [Yes] [No] (**Trader, Healer & Collector**)

If yes could you please list some of them? _____

e. What do you think of the access to nature reserves? [Easy] [Difficult] (**Trader, Healer & Collector**)

Please motivate your answer: _____

f. What could be done to improve your activity? (**Trader, Healer & Collector**)

Most important plants used/sold by stakeholders in the area

No	Plant names	Conditions treated	Parts used	Extraction methods	Storage conditions	Provinces of origin
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Thank you very much for your contribution