

Medicinal Plants and Traditional Healing in Contemporary Rural South Africa

The sustainability of medicinal plant use in the local culture in Ongeluksnek, Eastern Cape, South Africa

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Preface

This study is part of the Interdisciplinary Land Use and Natural Resources Management (ILUNRM) course of the University of Copenhagen. As part of the course we went on a two-week field trip to

Eastern Cape, South Africa in February-March 2011. In the beginning of the trip we spent three days at the University of KwaZulu-Natal (UKZN) in Pietermaritzburg preparing the project with our South African counterpart. After this we proceeded to the villages of Moiketsi and Motseng in Ongeluksnek Ward where we spent seven days working on our research topic. We had the pleasure of experiencing the local culture through staying with families in the villages. After the field experience we returned to UKZN for two more days to draw initial conclusions on the data obtained.

This group work has been an interdisciplinary experience; we have been exposed to new approaches and ways of doing things based on our different backgrounds, as well as a variety of research methods. Further, it has helped us to recognize not only the strengths of our group members and ourselves, but the strengths of the different disciplines. This has been an important lesson for us in order to get a holistic understanding of the sustainability of medicinal plant use and a study of natural resource management in general.

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We would like to thank the villagers of Motseng, Lititjhereng and Thabatjhitja for being very welcoming and for taking their time to tell us about their uses of medicinal plants.

Last but not least, we give our thanks to the ancestors of Moiketsi and Motseng who, by diverting the storm, made the PRA session with the sangoma possible.



The grasshopper sent by the ancestors during the PRA session with the sangoma

Abstract

This paper presents the results of a study on the sustainability of medicinal plant use in the local culture of Ongeluksnek, South Africa. Research, based on social science, botanical and participatory rural appraisal methods, indicated that medicinal plants were frequently used by respondents and contributed to their ability to cope with health problems (both physical and spiritual). Knowledge of the plants within the area varied depending on what role they played in various peoples' lives. Furthermore, there was limited transfer of knowledge regarding the plants between generations and within sangomas' families. People in general though were flexible in their use of indigenous plant use and western healthcare. Medicinal plant extraction has been described as unsustainable in other areas in the region – a problem not found in the study area. Our project demonstrates the endurance of cultural practices in the face of external influences such as religion, urbanization and migration. Originally we thought that many of the external influences we studied may represent a threat. However, to the contrary the threat was more related to the management of the medicinal plant resource and the lack of knowledge surrounding harvesting. The findings of this study though should not be interpreted as illustrating definite future problems, but rather as pointing at the need to recognize the inevitable changes that are occurring with time and that although these may possibly threaten the use of medicinal plants in the future, in fact they can just as easily compliment the already rich local culture.

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1. Introduction

Traditional medicines are widely used in South Africa where, despite the influx of western treatments, around 27 million South Africans continue to use indigenous medicine (Cocks & Møller, 2002). The use of shrubs, herbs and trees for medicinal purposes is an ancient practice with long-standing importance to people from all levels of society. In the Eastern Cape Province, much reliance is still placed on natural resources, and traditional customs involving medicinal plants remain part of everyday life (Dold & Cocks, 2002).

The use of traditional healthcare comprising of plant-based medicines is not just with natural illnesses, but also for afflictions believed to be caused by the supernatural. In fact, a study of a South African village has shown that approximately one-third of the wild plants used served cultural and spiritual needs rather than basic utilitarian purposes (Cocks *et al.*, 2008). In South Africa there are an estimated 200,000 registered healers (Summerton, 2006) whose extensive knowledge and reported ability to connect with ancestors are in continuous demand. Furthermore, self-medication remains popular amongst the general public, especially for minor ailments such as coughing and diarrhea (Dahlberg & Trygger, 2009).

Consequently, a massive demand for medicinal plants exists in terms of both number and mass of plants used, and it has been estimated that more than 700 plant species are traded for medicinal purposes throughout South Africa (Keirungi & Fabricius, 2005; Mander, 1998). Many of these species are over-exploited thus causing a serious threat to biodiversity. More recently, invasive species such as *Acacia dealbata* have also begun to threaten local resources (De Neergaard *et al.*, 2005)

It should be recognized though that maintaining the medicinal plant resource is not only important in a biodiversity perspective, but also vital for sustaining local knowledge and culture. In recent times, especially since the end of apartheid, rural areas have seen the steady influx of development presenting new options for villagers in terms of health strategies and cultural practices. To add to this, as urban areas have grown, new phenomena surrounding the trade of medicinal plants such as commercialization and urban demand have reached many remote villages (Dold & Cocks, 2002). The combination of these influences is expected to affect the future use of medicinal plants within local cultures.

1.1. Research Objective

Reviewing historical practices that surround medicinal plants and recognizing the new circumstances and options presenting themselves to contemporary rural communities in South Africa, the following research objective was formulated:

“To investigate the sustainability of medicinal plant use in the local culture of Motseng, Lititjhereng and Thabatjhitja villages”

The objective was addressed through four specific questions and sub-questions:

What is the state of knowledge locally regarding medicinal plants and traditional healing?

- *What role do traditional beliefs play in the use of traditional healing?*
- *How is the knowledge about medicinal plants sustained and transferred?*
- *How is the use of traditional healing perceived by the local communities?*

How is this knowledge used in the local culture?

- *Who are the users of medicinal plants and traditional healing?*
- *Why are medicinal plants used?*
- *Which plants are used in traditional healing and how?*

How do users perceive changes in the availability and abundance of medicinal plants locally and how do they manage the plants?

- *Where are medicinal plants collected and has there been any change in their availability?*
- *Which factors influence sustainable management of the plant resources?*

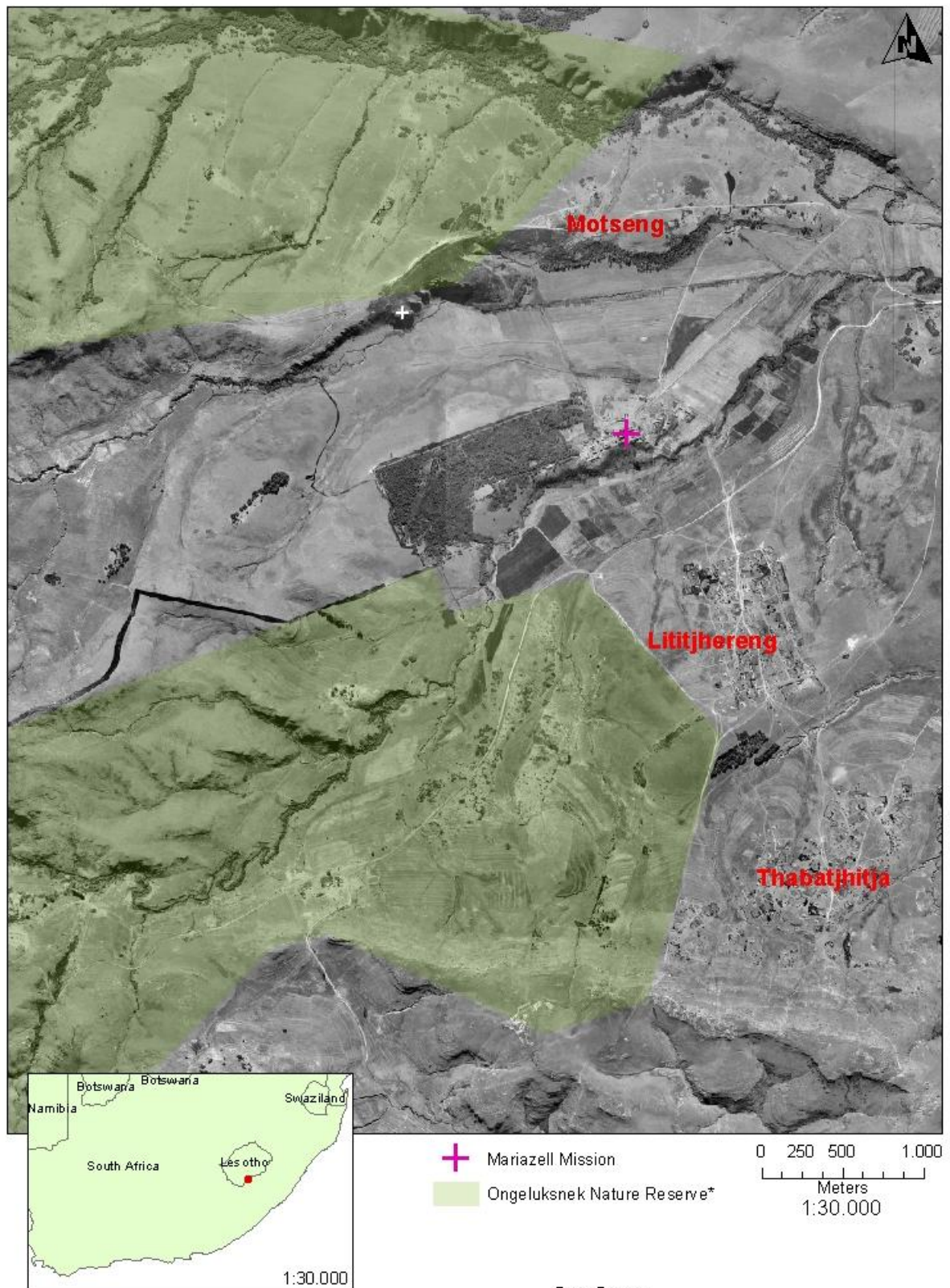
How do external factors influence the use of medicinal plants?

- *Which factors influence the use of medicinal plants?*
- *How strong are these influences and how do they affect the sustainability of the culture of medicinal plant use?*

The sustainability of medicinal plant use within a culture comprises two essential elements – the natural resource of the plants and the tradition of using these plants. The resource provides the means for people to practice traditional healing, and is constrained by the management customs by humans whereas the cultural practices of traditional healing place pressure on the resource. Simultaneously, external influences impact the traditional behaviors and can either increase or decrease the demand of traditional healing. Thus it is the two abovementioned elements that sustain each other when looking at the sustainability of medicinal plant use. With medicinal plants we refer to plants that are used in treating and preventing specific ailments and diseases (Srivastava *et al.*, 1996) whereas traditional healing is the application of knowledge, skills, and practices based on the experiences indigenous to a specific culture (World Health Organization, 2011).

2. Study area

The study area comprises two villages, Moiketsi (including two of the three sub-villages, Lititjhereng and Thabatjhitja) and Motseng, in Ongeluksnek Ward in Matatiele Municipality of Eastern Cape (Map 1). The communities are located at the southern Drakensberg Escarpment and surrounded by mountains with the Ongeluksnek Nature Reserve bordering the communities on the western side. Mariazell Mission which also has primary, secondary and high school is located between the two villages. The area is characterized by mountainous grasslands with two rivers crossing the communities. Summers in the area are warm, but winters are commonly cold and snowy in the mountains. Altitude in the area is near 1500 m and annual rainfall approximately 750 mm (Friends of Ongeluksnek, 2011). Based on our questionnaire (Appendix 3) the population in the study area is approximately 1590 (318 households) with Sotho and Xhosa being the major ethnic groups. Poverty is prevalent in the area; most people rely on pensions and grants. Land ownership belongs to the government in Moiketsi and the Mission in Motseng, but land tenure consists of communal systems. Traditional leaders (chiefs) act as local authorities in the area.



Map 1: Mobseng, Lititjhereng and Thabatjhitja, Eastern Cape, South Africa

3. Methods

Social science and botanical methods as well as participatory rural appraisal were used in this study (Appendix 1). The methods were primarily conducted with the help of our interpreter due to language barriers. Details of the informants are described in Appendix 2.

3.1. Questionnaire

A questionnaire on the extent of medicinal plant use (Appendix 3) was conducted in 30 households (Map 2). To incorporate potential variation on the reliance of medicinal plants, questionnaires were carried out in all three villages adjusted to the approximate total number of households in each village (12 households in Lititjhereng, 12 in Thabatjhitja and 6 in Motseng based on total households of 134, 136 and 48, respectively). The households were selected through simple random sampling by assigning every household a number based on pictures from Google Earth (year 2011) and an aerial photo (year 2004). A random number generator (Anonymous, 2011) was used for the sampling. In 14 cases no-one was at home in the selected household and the questionnaire was conducted in the nearest house instead. The questionnaires were done as structured interviews followed by some informal conversations.

Four wealth indicators were chosen in consultation with our interpreter based on the physical appearance of the homestead, and these were summed up into a general wealth index. In this index the quality of furniture was assigned 50% importance while house material had 25%, paint on the walls 15% and high quality fence 10% impact, respectively, on the total wealth indicator. In the results poor was ranked $\leq 25\%$, medium at 26-99% and rich at 100%.

3.2. Semi-structured interviews

Eight semi-structured interviews with an objective of obtaining a deeper insight into medicinal plant use in the area was conducted with key informants; three sangomas, the traditional leader of Moiketsi, the manager of Mariazell Mission, a priest from the Mission, the Ongeluksnek Nature Reserve manager, and a villager cultivating medicinal plants, one with each. The themes of interviews varied according to informant (Appendix 7, see interview guides). Sampling was done through snowballing (sangomas) or identification from the questionnaire (grower) in cases where the informant was not easy to identify.

3.3. Focus group discussions

Two focus group discussions were held with youngsters from the high school at Mariazell Mission. The first focus group consisted of five 15-16 year-old boys, while the second one was with five 15-17 year-old girls. The topic of the discussions was the students' use of, knowledge on and interest in medicinal plants.

3.4. Informal meetings

Four informal meetings were arranged: one with a guide from the Mehlooding Adventure Trail regarding the general use of medicinal plants in the area and the awareness of them as a resource, one with another guide (not living in the area) and our interpreter on their use of medicinal plants, and one with the chairman of the village council to clarify our findings and discuss the validity of some of our results. Informal conversations also started naturally with several villagers.

3.5. Plant inventory

Plant inventory was carried out in Motseng (Map 2) to record existing medicinal plants and compare the findings with the species mentioned to be collected by the sangomas along the rivers. A total of ten plots measuring 10×10 m were sampled for medicinal plants based on identification by Professor Hill, a master's student from UKZN and the group members. The location of the plots was decided to be at a grassland river flood plain with assumption of high species diversity and moister growth environment than in the hillside. Identified species were recorded on site and specimens of others collected for later identification.

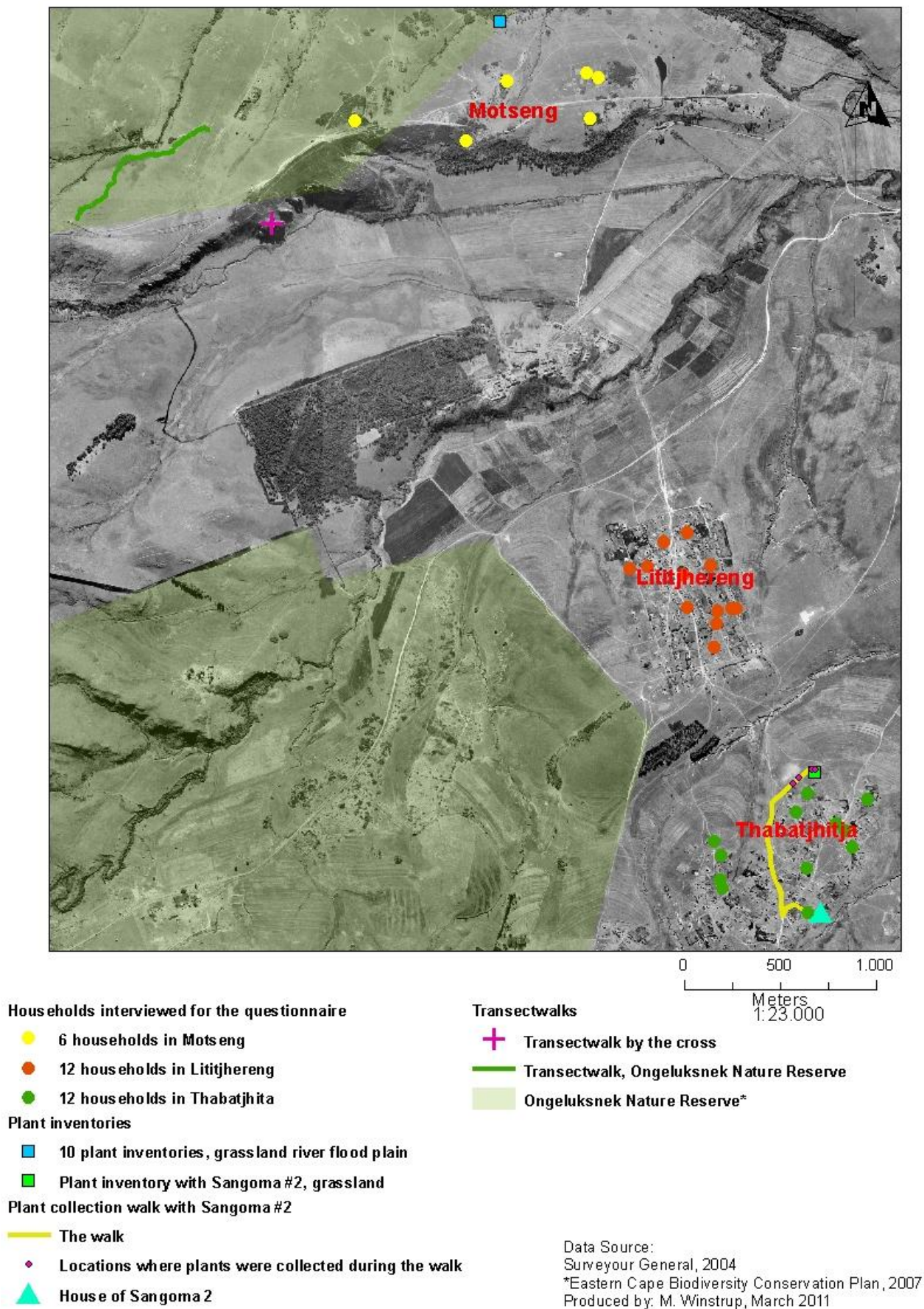
3.6. Transect walk

Two transect walks were conducted to identify medicinal plants in the study area (Map 2). The first walk was done around the cross with our interpreter who collects medicinal plants in the location. Plants identified by both the interpreter and by Professor Hill, a master's student from UKZN and the group members were recorded either on site or specimens collected for later identification. The second walk was done in the Ongeluksnek Nature Reserve just inside the gate with assumption that possible illegal collectors would not proceed far inside the reserve, and the ecology of the area, dry grassland slopes, gave contrast to the plot inventory. A distance of approximately 880 meters was covered to obtain similar area of sampling as with the plant inventory. Identification of plants was done as above, but without the interpreter.

3.7. Plant collection walk

A walk was arranged with a sangoma in Thabatjhitja to obtain information about a normal harvesting day, which plants are collected, where and how. The route of approximately 1100 meters was chosen by the sangoma and located in the grasslands near her home (Map 2). During the walk the sangoma pointed out medicinal plants which she collects, demonstrated the harvesting method and shared information on the uses, availability and spatial distribution of the plants.

Plant inventory was conducted during the walk to record the abundance of medicinal plants and compare it with the sangomas view on their availability. A random plot of 10×10 m was laid out along the path of collection and the species and their location within the plot were recorded based on the sangomas identification of medicinal plants. Resource mapping was combined with the walk.



Map 2: Locations where the different methods were used

3.8. Participatory resource mapping

Resource maps indicating the locations of medicinal plant collection were drawn with two sangomas. Information on the plant species found as well as the informants' perception on areas with changes in the availability of plants were recorded. Furthermore, mapping was done with our interpreter based on where he himself collects medicinal plants, but with less emphasis on the species found.

3.9. Ranking

A ranking exercise was conducted with one sangoma based on the frequency of collection of medicinal plants. The 12 species used in the ranking were presented to the interviewers by the sangoma herself. The availability of the plants was also recorded but was not used in ranking.

3.10. Seasonal calendar

A seasonal calendar exercise was conducted with one sangoma to identify the collection cycle throughout the year for her five most frequently collected medicinal plants. Together with this, she was asked to specify at what times of the year the most common illnesses associated with the plants were most prominent.

4. Results and discussion

4.1. The state of knowledge regarding medicinal plants and traditional healing and its use within the local culture

The use of medicinal plants and traditional healing is of considerable importance to people and the local culture in Motseng, Lititjhereng and Thabatjhitja as 97% of the interviewed villagers (29 households) reported that medicinal plants are used in their household. As stated very directly by Villager #4: *“the medicinal plants are very important to our culture”* referring to himself using medicinal plants for both curing illnesses and spiritual purposes. Most villagers know how to treat minor illnesses and spiritual problems with medicinal plants. However, as Villager #4 further explained *“people consult the sangomas on the unsure things”* meaning both personal problems and illnesses whose primary cause is unknown and possibly caused by evil spirits or ancestors.

4.1.1. The belief in ancestors

The belief in ancestors is very prominent amongst villagers. As well as being regarded as very knowledgeable, they play a continuous role in influencing their daily lives. Thus, good relations with the ancestors are perceived as important to secure good health and success in life. The villagers believe it is very dangerous not to follow advice from the ancestors. As stated by villager #3, *“People die because they do wrong by ancestors”*. To prevent illness, bad luck and tragedies people must therefore adhere to advice of the ancestors, and in special cases when a lot is asked for by people, a goat or a cow can be slaughtered as an offering.

The most common way to contact the ancestors, for instance in need of advice in life, is by burning the medicinal plant *Mpepo* in an ancestral house (a round house with a grass roof) - the only location where contact to the ancestors can be made. The smoke from *Mpepo* must be inhaled in order to ask for advice and the ancestors' answers will become visible in dreams. The burning of *Mpepo* is done on ordinary days as well as on some special occasions, for instance when a baby is introduced to the ancestors. Asking the ancestors for advice is often done privately and normally concerns family relationships, whereas if the villagers are not able to understand their answers or they have inexplicable illnesses, they seek advice from the sangoma who has a special contact to the ancestors.

4.1.2. Physical and spiritual uses of medicinal plants

The villagers' beliefs in their health as influenced by spiritual powers is an interesting notion of physical health and illness quite different from the Western perception hereof. It cannot be exclusively said how the informants perceive physical and spiritual purposes of using the plants (whether physical illness is seen as physical irrespective of its cause). However, no distinction is made between the causes of the physical illnesses in the following section.

Based on the questionnaire a vast majority (76%) of the households in the study area uses medicinal plants both for physical illnesses and spiritual purposes. However, in 21% of the households they were solely used to treat physical illnesses and in one household their usage was entirely for spiritual purposes (Fig. 1). The spatial distribution of the different uses appears rather equally distributed.

However, the highest percentage of households using medicinal plants for both illnesses and spiritual reasons are found in Motseng (Map 3).

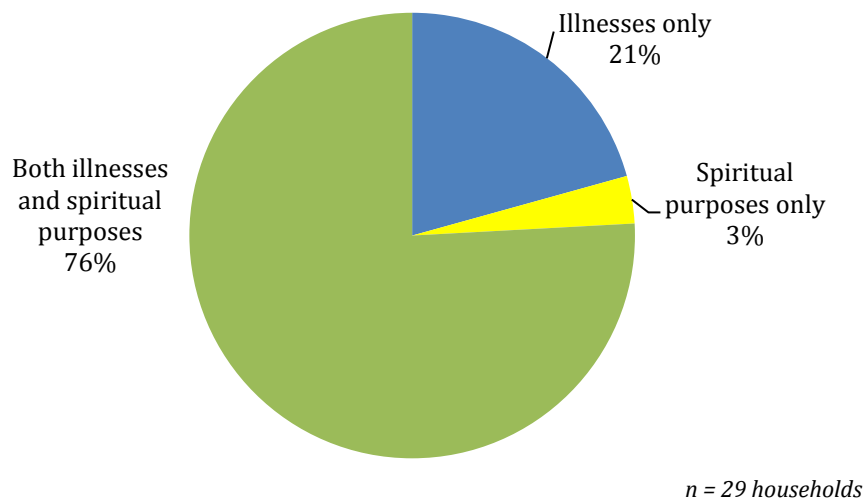
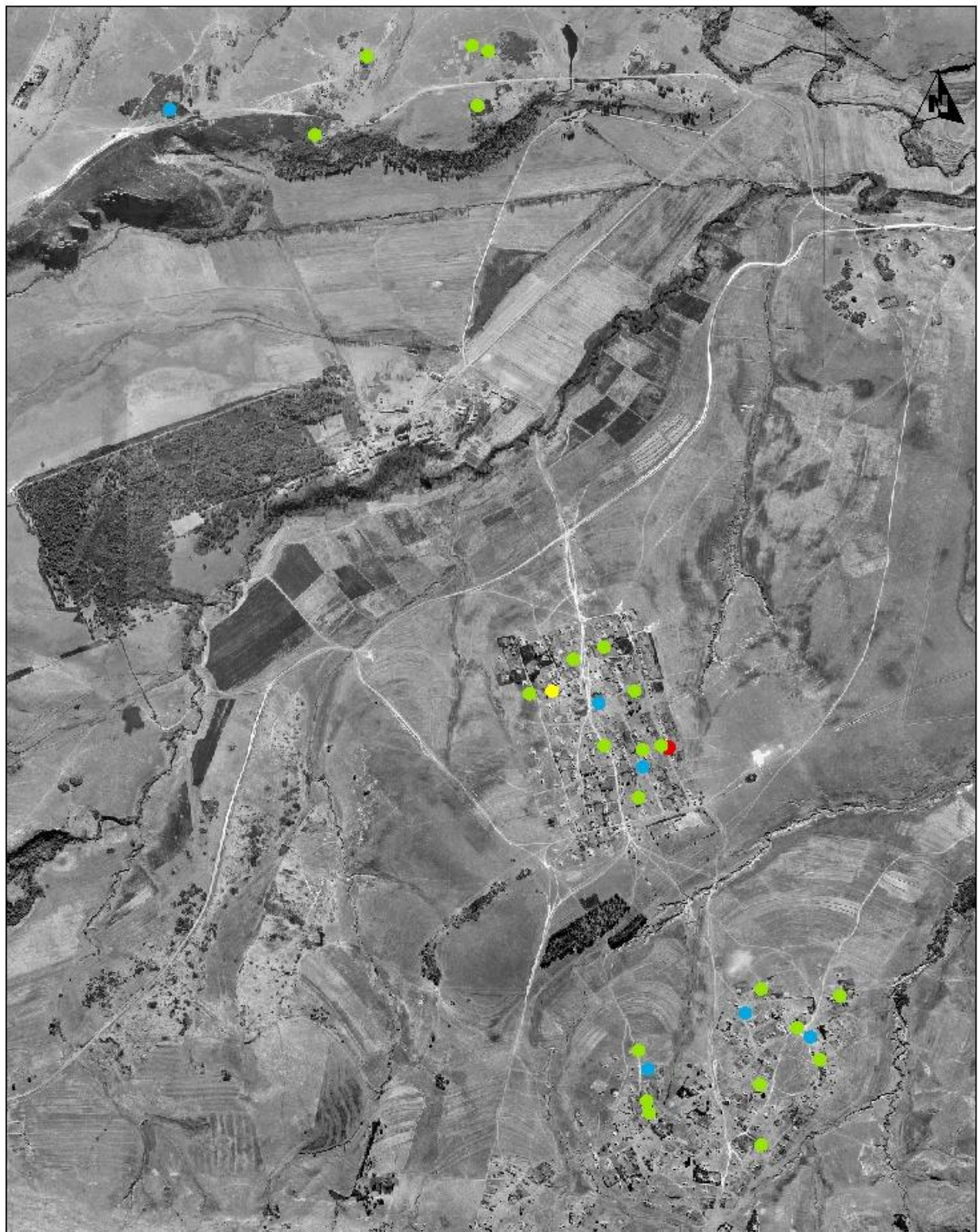


Figure 1: The uses of medicinal plants in 29 households (Appendix 3)

Interestingly the answers from the questionnaire indicate that the combination of both illnesses and spiritual purposes were more commonly the explanation for the use of medicinal plants within the households and the reason for visiting a sangoma. However, where the wealthier households seem to follow this trend, 36% of the poor ones visited a sangoma solely for treatment of physical illnesses (Fig. 2). Possibly this trend can be explained by Villager #6's statement: *"I can almost buy a cow for the same costs as visiting the sangoma"*. This villager further explained that in her household they only visit a sangoma in cases of serious illnesses; otherwise they were able to contact the ancestors themselves.



Uses of medicinal plants within 30 households

- Not using
- Illnesses only
- Spiritual purposes only
- Both illnesses and spiritual purposes

0 250 500 1.000
Meters
1:20.000

Data Source: Questionnaire, 2011
Imagery: Surveyor General, 2004
Produced by: M. Winstrup, March 2011

Map 3: Uses of medicinal plants within the villages of Motseng, Lititjhereng and Thabatjhitja

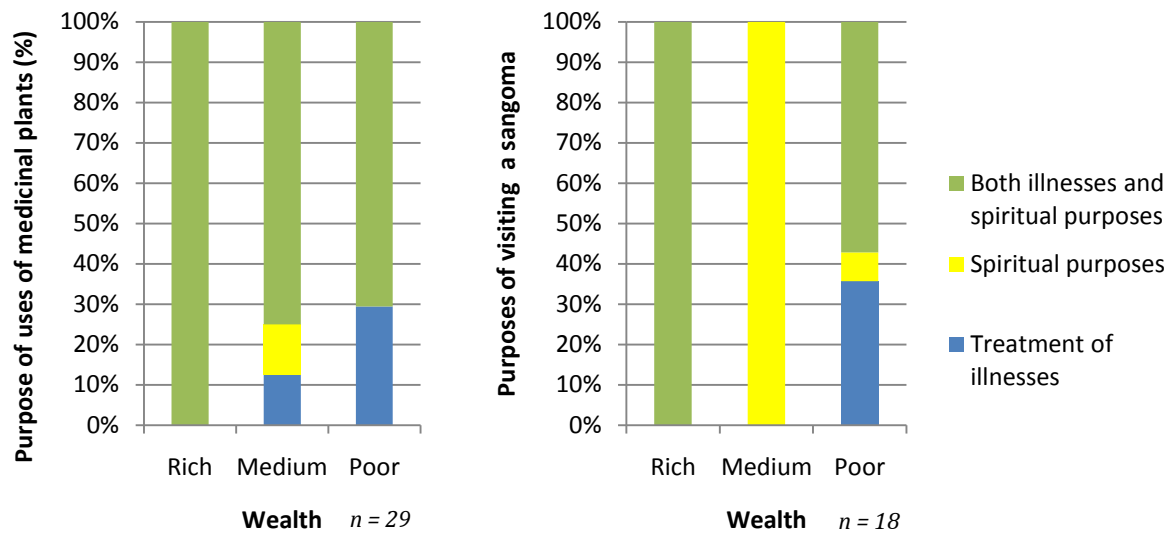


Figure 2: Impact of wealth on the use of medicinal plants within the households (left) and impact of wealth on the purpose of visiting a sangoma (right). (Appendix 3)

4.1.3. Medicinal plant species used locally

Since the division of medicinal plant usages into spiritual and physical cures might have fuzzy boundaries, the uses of medicinal plants noted by the informants are not divided into use categories according to the cause of illness, but their precise applications as mentioned in literature.

A total of 68 medicinal plants were recorded as collected in the study area (Table 1 and Appendix 4). Of these plants, 25 species were identified by their scientific names and their medicinal uses recorded from literature (Pooley, 1998; South African National Biodiversity Institute, 2011; van Wyk *et al.*, 1997). Additional 20 medicinal plants were identified during the transect walk and plant inventory (Appendix 5). It is possible that some of the unidentified species are found in the list of inventoried plants and that the same species might appear twice if the plants have several names used interchangeably by the villagers. Some of the names recorded by our interpreter were spelled slightly differently from the ones in literature; in such cases the species was assumed to be the same if plant morphology and ecology matched. The species appear in our results with their scientific names where applicable, otherwise the local name is used.

Table 1: Top 5 medicinal plants reported to be collected by informants and their uses. (Appendix 4)

Species			Uses (plant part used when available***)	Collected by				
Scientific name	Local name****	English name		Sangoma #2	Sangoma #3	Villager #1	Villager #2	Villager #3
<i>Alepidea amatymbica</i>	Lesoko	Giant Alepidea	Crushed and mixed with water to spray around one's homestead to keep away evil spirits. *		X	X		X
<i>Bulbine narcissifolia</i>	Khomo eabalisa	Strap-leaved bulbine	To treat wounds, diabetes and rheumatism. To counteract vomiting, diarrhea and urinary infections. Also used as mild purgative. (R) **		X		X	
<i>Dicoma anomala</i>	Hloenya	Fever bush	To treat cough, dysentery, toothache and sterility as well as gall sickness in stock and wounds on horses. (R) *	X		X		X
<i>Euphorbia clavarioides</i>	Sehloko	Lion's spoor	Swollen feet bathed in water, also used with other species to treat leprosy. *	X	X			
<i>Helichrysum aureonitens</i>	Mpepo	Golden everlasting	To invoke goodwill of ancestors, also used by diviners to induce trances. (L) *		X			X

Note: The list is based on species identified by their scientific name and *Eiyana* (local name) with also three collectors is left out. Species with two collectors are recorded in alphabetical order due to their higher number. A complete list of species recorded is found in Appendix 4.

* Pooley, 1998

** South African National Biodiversity Institute, 2011

*** L=leaves, R=roots

**** Local name as reported by the informant

Nearly 42% of the species collected by sangomas and villagers can be used to treat illnesses, approximately 21% to treat both physical illness and to serve spiritual purposes, and about 8% can solely be used for spiritual reasons (Fig. 3). Among the plants identified during inventories the use for treating physical illnesses as well as purely spiritual purposes was higher (63% and 21%, respectively).

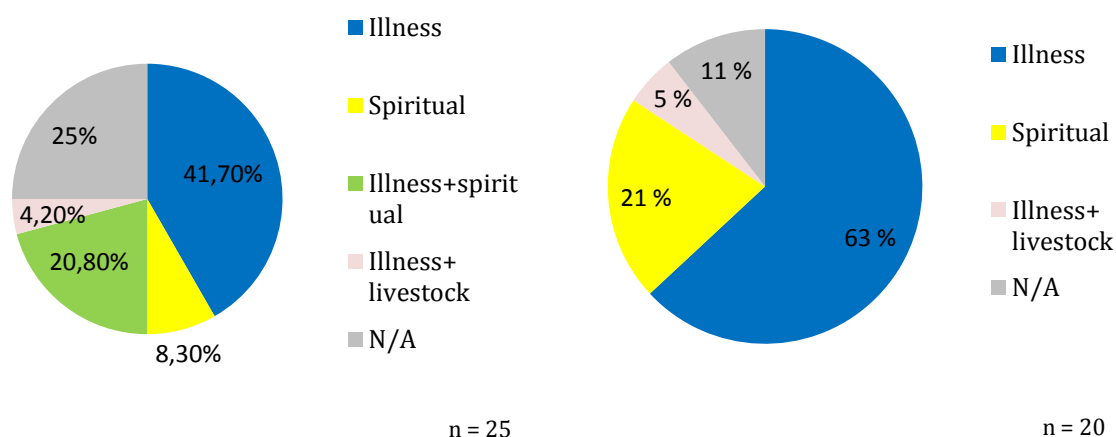


Figure 3: Use of medicinal plants for different purposes based on species collected by informants (left) and plant inventories (right). (Appendix 4 and 5)

The division of uses of the species mentioned by sangomas implies that sangomas have an important role in treating physical illnesses. However, it is not certain whether a specific plant having both physical and spiritual uses is used for either one or both purposes as this data was not obtained in many cases, but species used for purely spiritual purposes were clearly fewer. This is supported by the questionnaire where the most common reason for visiting a sangoma was for either both physical illnesses and spiritual reasons (55%) or entirely for physical illnesses (17%) (Fig. 4). However, the sangomas' expertise in solving spiritual problems is also largely used by the villagers.

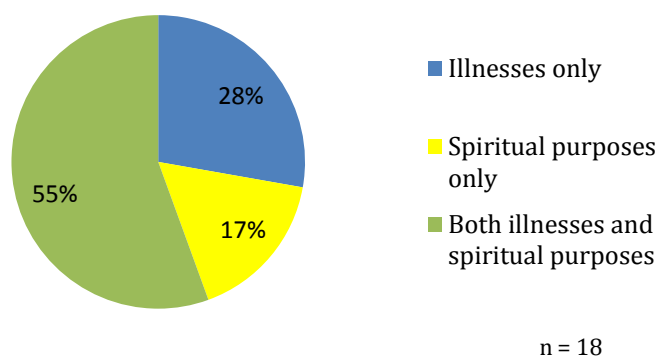


Figure 4: Reasons for visiting a sangoma. (Appendix 3)

The number of species mentioned by each informant differed from four to 38 and as this was not predetermined it does not allow direct comparisons between users. However, there did not appear to be a link between specific uses and which villagers were using them (Table 2). It is also noteworthy that in some cases the specific use of the plant was not mentioned in the literature and that all species unidentified by their scientific names are left out of the comparisons. It is possible that the sangomas and Villagers #1 and #2 identify more medicinal plants than other users because of their occupation. The most commonly used species are described in Box 1.

Box 1: Common medicinal plant species

The most common species collected as medicinal plants were *Dicoma anomala*, *Alepidea amatymbica* and *Eiyana*, each recorded by three respondents. Ten species were recorded by two people whereas the majority of species (55) were only mentioned by one user (Fig. 5). Considering the proximity by which the respondents live to each other and in most part have access to the same areas, this was a surprising result. Although this could be explained by the small number of informants, the trend was also found by Dahlberg and Trygger (2009) who interviewed a higher number of users of medicinal plants.

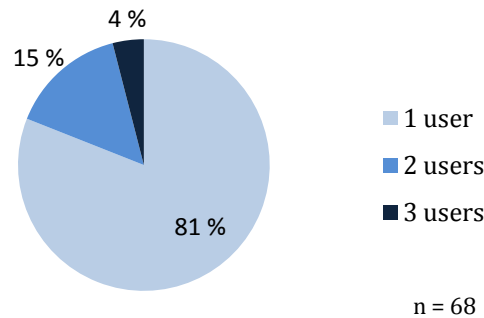


Figure 5: Percentage of users of 68 identified medicinal plant species (Appendix 4).

Table 2: Use categories of medicinal plants according to user

Use category	% of plants used for specific category by each informant				
	Sangoma #2	Sangoma #3	Villager #1	Villager #2	Villager #3
Illness	30	50	50	0	0
Spiritual	0	25	16,7	0	50
Illness+ spiritual	30	8,3	16,7	0	0
Illness+ livestock	10	0	16,7	0	25
N/A	30	16,7	0	100	25
Total	100	100	100,1*	100	100

* Rounding error

There were many partial or complete contradictions with previous literature regarding some of the uses of medicinal plants that we identified (Appendix 6). The use of *Scilla nervosa*, for example, is mentioned to be spiritual according to Sangoma #3, but in literature (Pooley, 1998) its use is mentioned for curing physical illness. Thus, the above assumptions based on the registered medicinal uses in literature might not completely explain the actual usages of medicinal plants in the villages. Another contradiction is found for *Chironia palustris* whose use is mentioned to be on treatment of physical illness both by Sangoma #2 and Pooley (1998), but for different diseases. The diversity of uses was also illustrated by Sangoma #2 who during the seasonal calendar activity mentioned that *Stimamollo* is used for clearing blood, whereas later she mentioned its use to be in treating rashes.

It is peculiar that *Helichrysum aureonitens* (*Mpepo*) is only mentioned by two users although many of the respondents we talked to mentioned *Mpepo* and its importance in contacting the ancestors, and there are no other plants within the identified species which have similar use. If it was only villager #3 using the plant it could mean that sangomas may have other means to communicate with the ancestors (e.g. through dreams and drums) and other healers, i.e. villagers #1 and #2, might also have alternative ways despite not having had the “calling” (Box 2).

Based on our findings it is evident that the practices related to and uses of medicinal plants within the villages are based on local and even personal knowledge. When comparing the plant species recorded to be used in the villages to the plant species identified in the plant inventories it appears that additional medicinal plants than the ones recorded are found in the study area. This could either be due to the relatively short time spent in the villages or it could indicate that some knowledge has not been sustained with time.

4.1.4. Knowledge on traditional healing

Transfer of knowledge is important in order to sustain the local knowledge and for the tradition of medicinal plant use to survive. In the villages the knowledge on the use of medicinal plants and traditional healing is an oral tradition transferred from generation to generation. Combined with information shared are observations the children make in their homes and prevailing practices. From the focus group it became clear that children have seen medicinal plants being prepared in their homes and some have visited sangomas with their parents. They also learn about the tradition when collecting the plants with older family members and this finding corresponds with the questionnaire where children and youth are reported to collect medicinal plants with an older household member in 20% of the households that do collect plants.

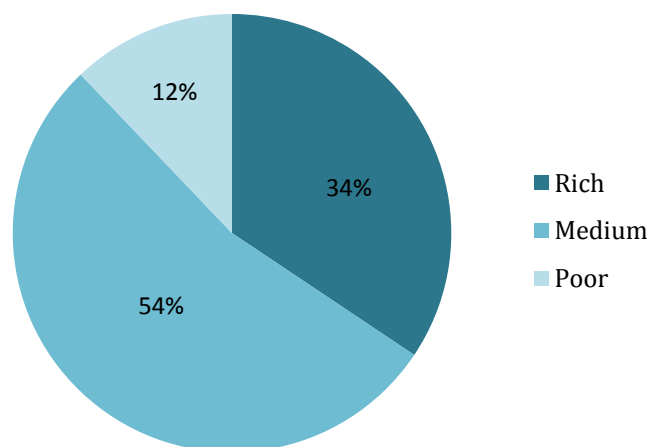
The sangomas also said to teach their children, but they emphasized that knowledge alone would not make one a sangoma as “the calling” from ancestors are also required (Box 2). However, sangomas do not share information on how their medicines work with the villagers. The secrets and the relation to the ancestors make the position of sangomas exclusive and place them in an indispensable position as specialists in the society. However, only 60% questionnaire respondents reported that their family visits a sangoma which might be due to negative connotations and perceptions of the sangoma in the villages.

Box 2: So you want to be a sangoma?

The sangomas claim to be able to cure nearly everything such as keeping away evil spirits (*Alepidea amatymbica* and *Mothokho* used), protection against thieves (*Mathitibala*) and healing of broken bones (*Mathunga*). The knowledge on traditional healing that all the sangomas in Thabatjhitja hold originates from the ancestors with whom the sangomas are in constant contact with. To become a sangoma and acquire the special contact to the ancestors requires a special “call” in a dream, which all sangomas told they had had. Whether it is locations of collecting plants, what to collect or how to mix and prepare a cure for an illness, the sangomas ask the ancestors for advice and his/her power and the skills of healing can therefore be said to lie in the relationship to the ancestors. When curing people the sangomas do not only use plants, but also special accessories such as wigs, candles, animal parts and powder from the chemist under the supervision of the ancestors. This is supposedly giving the mixtures and cures special power. How the curing and the mixtures are made exactly is kept a secret, but many of the ingredients are crushed and boiled.

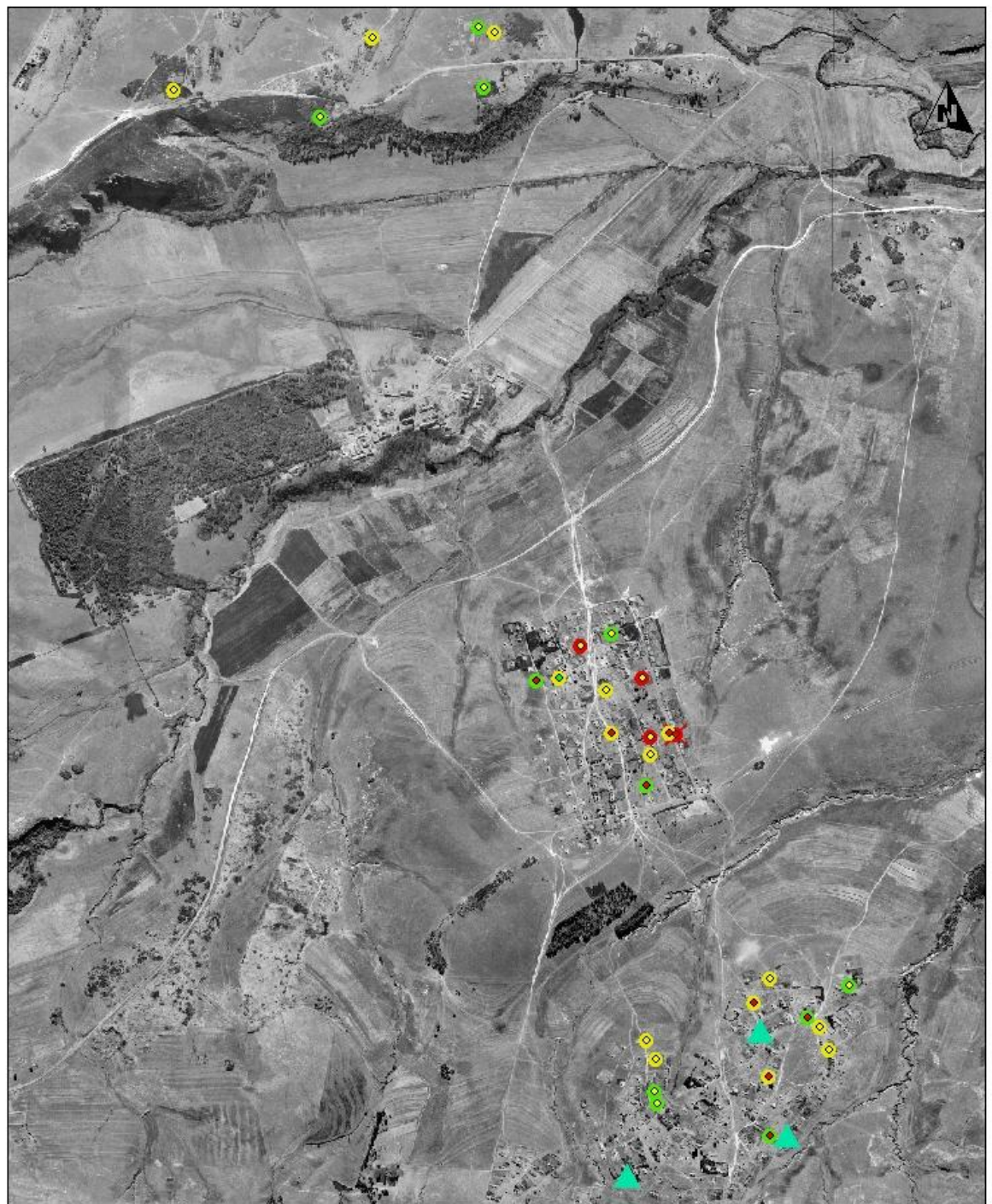
4.1.5. Perception of sangomas in the villages

According to the questionnaire the main reasons for not visiting sangomas were due to religion, distrust in sangomas’ abilities to treat illnesses and some people claimed to hold the same knowledge as the sangomas whereas others preferred only to go to the clinic. It seemed relatively common that the villagers did not trust sangomas because they thought the sangoma had too little knowledge of the medicinal plants which could lead to dangerous mixtures. Another common reason was stated very clearly by one of the respondents: “*the sangoma is lying*”. The sangomas being too expensive was another reason for not using their services, and according to Villager #6 the cost had increased. Based on the questionnaire it is evident that it is primarily the poorest households that do not visit a sangoma (Figure 6).



n = 12

Figure 6: The distribution of wealth of the households not visiting a sangoma, adjusted to the total amount of households within each wealth category (Appendix 3).



Collection and cultivation of medicinal plants within 30 households

- Not collecting or cultivating medicinal plants
- Collects but does not cultivates medicinal plants
- Collects and cultivates medicinal plants
- ✕ Does not use medicinal plants

Times visiting a sangoma in a year

- ◆ 0
- ◆ 1-3
- ◆ 4-10

0 250 500 1.000
Meters
1:20.000

Data Source: Questionnaire, 2011
Imagery: Surveyor General, 2004
Produced by: M. Winstrup, March 2011

Map 4: Acquisition of medicinal plants within the villages of Motseng, Lititjhereng and Thabatjhitja

The spatial distribution of the households visiting a sangoma shows that in Motseng all the households pay a visit to a sangoma at least once a year despite these villagers living the farthest away from the sangomas (Map 4). In fact the households nearest to the sangomas in Thabatjhitja never visit them, maybe because they know them too well, but it could also be a random coincidence. In all the households visiting a sangoma the frequency of the visits was rather low. Except from one household, the households visited the sangomas less than three times a year, in most instances only once a year. This was in contrast to the sangomas' telling that they had several customers in a day. However, according to Villager #5 most villagers are, without doubt, seeing sangomas on a regular basis. We were moreover told that one reason for people hesitating to talk about the frequency of the visit was due to us being white and hence known as looking down on traditional beliefs and the power of sangomas. Further, Guide #2 explained that many villagers know that sangomas are considered "*not modern*" by a lot of people, which could be another reason to lessen the frequency of the visits. An alternative explanation for not speaking openly about visits is that this indicates that people are having problems; just like in the Western world where physical, or not to mention psychological, problems are often seen as a taboo.

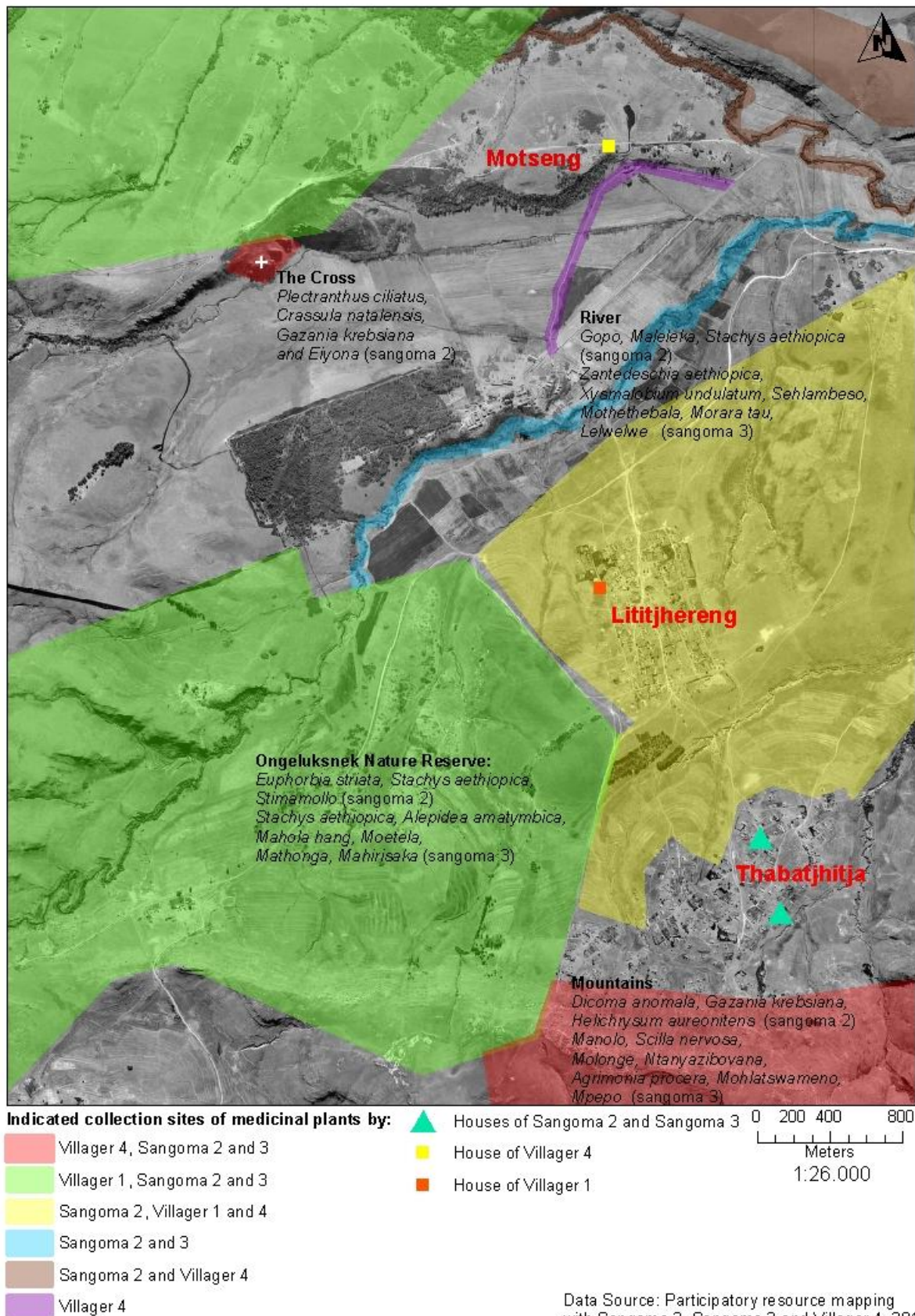
A more positive perception of the sangomas was encountered in the focus groups where a boy claimed that the sangomas can replace the clinic, but the clinic cannot replace sangomas. This indicates that spiritual problems are still perceived to have high importance, and emphasizes the importance of ancestors also in the new generation.

4.2. Perceptions of changes in availability and abundance of medicinal plants and the need for management

From the above chapters it is clear that medicinal plants are important for the villagers' healthcare and culture. Thus, it is of importance to investigate the pressure on medicinal plants within the villages.

4.2.1. Availability of the medicinal plant resource

According to the resource maps conducted with two sangomas the majority of the species used were present within a 15 kilometer radius of Thabatjhitja. Although many of the plants could be collected close to the homestead (within 1 km), it did not appear unusual for the sangomas to travel far for certain species. Locally, plants were collected by the cross, rivers and pastures in Motseng, Lititjhereng and Thabatjhitja (Map 5). However, 30 species (66%) of those listed were said to be found outside the immediate area including the mountains, nature reserve and even as far as Mount Fletcher and Pietermaritzburg. The need to travel to these places for particular species was contradicted by information from Villager #1 (Table 3).



Data Source: Participatory resource mapping with Sangoma 2, Sangoma 3 and Villager 4, 2011
Semi-structured interview with Villager 1
Imagery: Surveyor General, 2004
Produced by: M. Winstrup, March 2011

Map 5: Medicinal plant resource map within the villages of Motseng, Lititjhereng and Thabatjhitja

Table 3: Comparison of collection areas for seven species collected by Villager #1, Sangoma #2 and Sangoma #3

Species listed by Villager #1 that match those listed by Sangoma #2 & #3 (scientific name where possible)	Area collected according to Villager #1	Area collected according to Sangoma #2	Area collected according to Sangoma #3
Bolao-ba-litaola (<i>Stachys aethiopica</i>)	NR & Pastures	NR	Mountains
Lesoko (<i>Alepidea amatymbica</i>)	NR & Pastures	N/A	Mountains
Kgopo	NR & Pastures	River	N/A
Mahirisaka	NR & Pastures	N/A	Mountains
Hloenya (<i>Dicoma anomala</i>)	NR & Pastures	Mountains & Pastures	N/A
Duma	NR & Pastures		Pietermaritzburg
Mositsane (<i>Euphorbia striata</i>)	NR & Pastures	NR	N/A

Villager #1 claimed to collect five of the same species within the nearby pastures and the nature reserve that Sangomas #2 and #3 said they travelled much further to find. These included *Stachys aethiopica*, *Alepidea amatymbica* and *Dicoma anomala*, all of which the sangomas claimed were found in the mountains. That being said, Sangoma #2 also identified *Dicoma anomala* in the plot inventory in the nearby pastures. There are a variety of reasons that may explain these contradictions. First, the differences in perception may be related to what is most easily accessible to the people in question therefore naturally individuals will have better knowledge of some areas than others, e.g. Villager #3 lives in Motseng and the locations where he collects are generally closer to his home (Map 5). Secondly, Sangoma #2 claimed that plants from certain locations were more powerful in their ability to heal. Thirdly, the number of species recorded for each collection area was not predetermined, and the location of collection for Villager #1 was generally mentioned as pastures and nature reserve without specification for individual species.

All three sangomas claimed to collect from the nature reserve and it appeared to play an important role in where some species could be found. Two sangomas listed eight species together that could be found within the reserve, again including the commonly used *Stachys aethiopica* and *Alepidea amatymbica*, and the NR manager confirmed the presence of these species. In comparing species listed by the sangomas that were collected by the river and those identified during plant inventories, only one matched (*Zantedeschia aethiopica*). However, a more complete botanical survey would be needed to be a relevant complement to this study.

4.2.2. Change and abundance of the medicinal plants resource

Overall, perceptions regarding changes in the abundance of medicinal plants varied. Villager #4 and Sangoma #1 believed there had been a general decline in the resource; this opinion was contradicted by others who even mentioned that there had been an increase in species over the last ten years, specifically Sangoma #2. Sangoma #2 and #3 provided information of specific localities and species they believed had seen variations in the abundance of medicinal plants. Both observed an increase in abundance close to the river where it was believed to be better suited to the plants due to the wetter

soils. However, they provided conflicting reports on changes in abundance in the nature reserve. Sangoma #2 witnessed a decline due to increased burning of the area as opposed to the increase described by Sangoma #3 which she attributed to better conservation. The NR manager agree with Sangoma #2's reason and his explanation that veldfires continue to be a problem in the area was confirmed by the Ongeluksnek Tourism Information Report (Province of the Eastern Cape, 2011). Other areas said to have seen a decline included nearby pastures and the land between Thabatjhitja and Lititjhereng. A possible explanation for this may relate to the destructive harvesting practices observed primarily by Sangoma #2 in that area (see section 4.2.4).

Concerning specific species, both Sangoma #2 and #3 named mostly different plants that they collected making direct comparisons difficult. Both had witnessed an increase in *Stachys aethiopica* but in two very different ecological areas (mountains and by the river). There was a contradiction regarding the status of *Stimamollo* within the nature reserve where Sangoma #2 said there had been an increase but Sangoma #3 claimed it had become scarcer. Overall, the differences in perceptions between the two may be a reflection of variations in plants sought and where they go to find them.

4.2.3. Management of the medicinal plant resource

The sustainability of harvesting is under threat for species whose underground parts are used as the plants are either partially or totally removed causing it to die (Cocks and Dold, 2002). Of the 17 medicinal plant species of which detailed information was obtained from the sangomas (Appendix 6), 11 had either roots or bulbs as the plant part used. In three species both leaves and underground parts were used and only two species were harvested for their leaves only. This implies that the pressure on the medicinal plant resource is high as in most cases the whole plant needs to be uprooted. For all identified plant species collected by informants (Appendix 4), the plant part used was recorded for ten species; half were used for leaves and half for the underground parts. The lack of harvesting data among species however, does not allow extensive comparison.

4.2.4. Harvesting methods

The sangomas' knowledge on sustainable harvesting is questionable as one explained that it is in fact the act of uprooting the whole plant in the case of *Stimamollo* that will help the species to grow back and that continuous digging of plants in general increases their numbers. For *Chironia palustris* she only collects part of the root to aid the plant to regenerate, but with the common harvesting method (a metal rod used for digging and uprooting the plants) it is contentious whether only a part of the plant can be harvested without damaging the remaining part too severely. As substitution of plant parts might not be feasible due to its research requirements (Zschocka *et al.* 2000), a better way to enhance sustainability would be to restrict the number of plants collected or use alternative species.



Photo 1: Sangoma #2 harvesting *Lelem-la-khomo*

Substituting plants with others had apparently not been an option for the villagers who instead, if a particular species could not be found, would return without it. Cultivation as a conservation method has been recommended (Keirungi and Fabricius, 2005; Zschocke *et al.*, 2000; Dahlberg and Trygger, 2009), but based on the state of cultivation in the study area it does not seem a viable option, at least presently. Possibilities of cultivation in future should be considered, though.

4.2.5. Cultivation of medicinal plants

Based on observations and discussions with informants, it appeared that cultivation of medicinal plants is rare in the area. 37% of questionnaire respondents said they cultivated medicinal plants, and from the spatial distribution it appears that medicinal plants are primarily cultivated in Motseng and Thabatjhitja with 50% and 42% of the interviewed household reporting this, respectively (Map 4). In contrast only 25% of the households in Lititjhereng cultivated. However, based on observations it seemed that often only a few different species were growing in the homestead, mostly naturally among other vegetation, as opposed to organized cultivation. Many medicinal plants also have specific ecology and environment in which they naturally grow, e.g. mountains or caves, and this makes cultivation in home gardens difficult. This was supported by Sangoma #3 who, although cultivating some species in her garden, admitted the difficulty in doing so as many medicinal plants prefer mountainous areas and rocky soils.

It was also pointed out that the species which are easy to cultivate are not as commonly used as the ones that are more difficult to cultivate. If this is in fact the case then this does not bode well for future cultivation in the event of a serious threat to the resource. An additional challenge to cultivation was mentioned to be livestock and other animals that would eat the plants if they were grown. Other reasons for not cultivating could include abundance of plants in the wild, easy access and convenience of collection from the wild e.g. while herding. Another challenge with cultivation was noted by Sangoma #3 who said that cultivation of some plants was unsuitable because of the loss of healing power the plants possess. However, the other sangomas did not recognize it as a problem. Furthermore, Sangoma #3 had at least nine different species growing in her garden. Treatment of physical illnesses was the primary use of the identified species that were cultivated. It could be assumed that species used for spiritual purposes lose their power more easily if cultivated, and therefore considering that most medicinal plants are used for physical illnesses, this should not be a major constraint for cultivation.

4.2.6. Harvesting frequency

The frequency of harvesting also affects the sustainability of the resource. However, all sangomas and villagers collect only based on the current need for particular plants. For sangomas this depends on the number of people coming to see them and their illnesses and/or spiritual needs as they do not often keep stocks of the plants, but go collecting when a patient comes to be treated or if they have been informed beforehand by the ancestors. Only Villager #1 reported to collect a lot of plants at a time, but even he, as all the others, commonly sun-dries the plants for preservation to prevent spoiling and rotting. Sangoma #3 occasionally collects several plants when she is going to treat people in other towns, but otherwise she follows the same trend of collecting only what is known to be needed. All sangomas reported to collect plants on a daily basis. This could be because of the small quantities

collected at a time and the number of people visiting them, although the number of visitors may have been overstated after talking to villagers. Collection based on need and preservation could enhance future conservation of the resource.

4.2.7. Harvesting regulations

Two of the species identified, *Alepidea amatymbica* and *Xysmalobium undulatum* are in literature said to be scarce and protected species (Cocks and Dold, 2002; Cunningham, 1993). However, *Alepidea amatymbica* was one of the recorded most commonly used species in the villages, but no harvesting regulations were mentioned by our informants. In general based on our findings there do not seem to be many particular rules concerning the harvest of medicinal plants. According to Sangoma #2 there are no restrictions on which plants can be harvested in the village, but Sangoma #3 said she is required to have a permit for collecting on a private farm. The chief is, however, trying to inform sangomas to be careful when harvesting the plants and that they should also cover the holes after digging the plants. This is recognized by the sangomas although Sangoma #2 appeared not to always put the advice into practice as was observed during the collection walk. However, it can be questioned whether this has any impact on sustainability. People from outside the village need a permit from the village chief if they want to collect plants and the villagers are watchful for outsiders to confirm whether they have the permit or not.

To be allowed to collect medicinal plants in the Ongeluksnek Nature Reserve, collectors are given one-time permits based on the abundance and conservation status of specific species and are always supervised in their collection of plants. If people are found collecting outside designated areas they are taken to the local police. All sangomas admitted the need for the permit although one villager claimed that he did not need one because he used to work in the reserve for the Working for Water program. There are discrepancies concerning the permits as the nature reserve manager only recalled one instance during his 18 month employment when someone had applied for a permit. Ongeluksnek Nature Reserve only has six rangers in an area where many higher priorities exist (wattle elimination, drug trafficking). Therefore the likelihood of someone always being available to escort collectors of medicinal plants may be slim.

According to the NR manager the greatest threats to medicinal plants inside the reserve are the spreading wattle and continuous burning of the grassland by the villagers. Since 2002 and, the commencement of the Adventure Trail, no outsiders have been allowed to collect medicinal plants in the reserve. This act of conservation is a village rule. This could also explain why people are no longer coming from as far as Durban to buy collected plants in the village (Box 3). The nature reserve manager expressed the desire to train collectors in how to gather medicinal plants in a sustainable fashion if this were requested by the villagers, but this does not appear to have transferred down to village level.

Box 3: Trade in medicinal plants

Trading of medicinal plants did not appear to be a problem in the area despite already published literature stating so (e.g. Cunningham, 1993; Dold & Cocks, 2002). Of the 30 villagers asked whether they sell medicinal plants, only one answered that they did. Although there is no reason to doubt villagers' honesty, in such a poor area with a relatively rich resource the low number of sellers was relatively surprising. Villager #4's explanation that customary rules dictated that anyone could harvest medicinal plants as long as it was solely for their own use may partly explain our findings. Table 4 illustrates that there were few similarities between what plants Sangoma #3 is collecting and those most in demand in local regions. *Alepidea amatymbica* was the only plant that was listed which may lend further weight to its reported conservation status of "nearly threatened" (Dold and Cocks, 2002).

Table 4: Comparison of the 6 most collected plant species as listed by sangoma 3 with those most frequently sold in the Eastern Cape, Mpumalanga and KwaZulu-Natal.

No.	Frequency of collection Sangoma #3	Frequency sold Eastern Cape*	Frequency sold Mpumalanga*	Frequency sold KwaZulu-Natal*
1	<i>Bulbine narcissifolia</i>	<i>Hypoxis hemerocallidea</i>	<i>Alepidea amatymbica</i>	<i>Scilla natalensis</i>
2	<i>Aloe vera</i>	<i>Ilex mitis</i>	<i>Warburgia salutaris</i>	<i>Alepidea amatymbica</i>
3	<i>Scilla nervosa</i>	<i>Rhoicissus digitata</i>	<i>Acridocarpus natalitius</i>	<i>Ocotea bullata</i>
4	Mathunga (local name)	<i>Rubia petiolaris</i>	<i>Siphonochilus aethiopicus</i>	<i>Warburgia salutaris</i>
5	<i>Kniphofia ritualis</i>	<i>Helichrysum odoratissimum</i>	<i>Acacia xanthophloea</i>	<i>Eucomis autumnalis</i>
6	<i>Alepidea amatymbica</i>	<i>Curtisia dentata</i>	<i>Terminalia sericea</i>	<i>Curtisia dentata</i>

*Source: Dold and Cocks, 2002

Local trade may also be unrealistic as all sangomas claimed to collect only what they needed and just one said that he stored some plants. Accessibility to the markets is limited due to the remoteness of the study area even though there is daily transportation to Matatiele from the villages. As Dahlberg and Trygger (2009) reported, it might also be difficult to sell the plants locally because everyone has access and collects themselves.

4.3. External influences

4.3.1. Religion

An important influence on the traditional belief system and consequently the traditional healing in the community is the Mariazell catholic mission. The general picture from interviews we conducted at the mission was that the church's influence on the villagers regarding their use of traditional healing was limited. Father #1 stated *"The traditional beliefs don't fit with the church, but we'll have to accept it"*. Father #2 stated that he had no problem with the practice of traditional healing as long as it was not dangerous. In this way the church is not trying to influence people to stop using traditional healing, but both informants would nevertheless advise people to go to the clinic in the event that they are ill. Furthermore, we learnt that the mission was visited for both religious and social reasons, but it is not a place where people come for spiritual guidance. Father #2 told us: *"people do not often come for advice, but I will always be there if someone needs me"*. He also recognized that there had been a decline in the influence the mission has in the daily lives of the local villagers. Increased centralization and administration procedures by the national government forced the close of the mission's medication dispensary. From a physical illness perspective this led to a decrease in villagers coming for advice. Father #2 also recalled nuns who used to cultivate their own medicinal plants in the local gardens for minor ailments but this no longer occurs.

While conducting questionnaires, we did by chance discover another church in Lititjhereng, which was part of the St John Apostolic Faith Mission. After visiting the church we learned that healing was practiced here using blessed water. The informant representing the church told us that the same services were provided by her church as by the mission and sangomas, but no medicinal plants were used. Daily church services were attended by a small but reliable congregation apart from during holidays where services were usually full. From the questionnaires, we encountered one respondent who chose to attend this church for healing purposes rather than treat herself or visit the sangoma. Rather than state her belief in religious practices though, she said her distrust and fear of receiving dangerous medication was the reason for her not using medicinal plants. This is despite her parents sharing their knowledge of plants and ancestral beliefs with her. This concurs with other reports that amongst certain villagers there are worries about how reliable some of the increasing number of sangomas are.

4.3.1.1. Syncretism – religion and culture

Interviewing the villagers on their religious beliefs indicated that most people believe in both God and ancestors. A few villagers stated that the mix of these beliefs was wrong and would refrain from using plants for healing due to their loyalty to God. Generally though, it appeared that the ancestors were acting as an intermediary between villagers and God and that the contact to the ancestors was more intimate than the one to God. This possibly explains the limited use of the priest for spiritual guidance at the mission. This method of accessing God was reiterated by a sangoma from Pietermaritzburg. Furthermore, in the rural sangomas' houses as well as in villagers' huts, walls were decorated with crucifixes and rosaries were hanging from the roof. All sangomas confessed to be Christians, praying to God and going to church on a regular basis.

4.3.2. Health strategy

An important influence on what healthcare locals use is the modern western-style clinic. A mobile clinic is coming to the area every month and about 10 km away in Mabenyeng is a permanent clinic. All people we asked said that they were visiting the clinic, and some stated that they prefer the clinic to the sangoma when it comes to treatment for illnesses. When we asked the sangomas' opinions on modern health care they all told us that in the case that a very weak patient comes to them for care, they would send them to the clinic and tell them to come back when they felt better. Sangoma #1, when we asked whether he had any collaboration with the clinic, showed us a plastic glove and told us that he had visited the clinic, but that he was not providing any western healthcare himself. Sangoma #1 and #2 also presented many of their medications of which some consisted of a mix of herbal medicines and drugs bought from the chemist in Matatiele (photo 2). Sangoma #1 confirmed that what to buy was again based on advice from the ancestors.



Photo 2: Drugs that Sangoma #1 had bought from the chemist in Matatiele

As already mentioned, different forms of illnesses exist and the health strategy chosen is dependent on the nature of the problem or illness. According to our interpreter, a normal procedure amongst villagers when ill is to first consult the clinic. If the doctor says that nothing is wrong, but the pain persists, there might be a chance that the illness is being caused by the ancestors, therefore a trip to the sangoma is necessary. This indicates a division of work between the different healthcares, as the sangoma takes care of illnesses caused by ancestors as well as personal problems whereas the clinic takes care of purely physical illnesses. However, it was mentioned as a concern by Father #1 that people would misinterpret their illness and visit the sangoma and then be too late to be treated effectively by the western clinic later.

Simple medication such as painkillers and minor ailment medications were sold in the shop in Litihereng and presented a further option for villagers with minor medical problems. The shop owner, who had begun to stock these products only very recently, had mentioned they were selling well. The Chinese herbal medicine had gone on sale two months prior and she claimed to have sold 4 boxes already. We also witnessed her travelling around the various villages acting as a saleswoman for the new medication.

4.3.3. Urbanization and migration

During our research it became apparent that the expansion of urban areas in South Africa and the pull factor they have on rural communities was having an effect on local health practices. Early on, Father #2 said that he believed his regular congregation had become predominantly women due to the outflow of men to urban areas seeking jobs. This is reflected in local statistics that state that the local population is the majority women (Alfred Nzo District Municipality, 2011). This is important as those who migrate between rural and urban areas can collect new ideas and visions regarding healthcare.

From our focus group, one student who was based in Johannesburg said that no trust in sangomas existed and that the view was they were exploiting the black man. Others based in Cape Town though still continued to visit the sangoma according to their parents' beliefs. The children had also watched many movies portraying sangomas in a negative light which some attributed to their reason for not using medicinal plants.

As cities expand, so too does the access to clinics therefore they become a more obvious choice. The transfer of these ideas and visions may discourage the use of traditional medicine. Our findings indicate however that the transfer of new ideas may relate mostly to the use of medicinal plants for physical symptoms. Villager #6 confirmed that regularly family members come home from the city to worship their ancestors as a family. The main plant used here was *Mpepo*. This was corroborated by Villager #3 who stated that wintertime was often when families would reunite to worship their ancestors and hold a large feast for other villagers. This may act as a social mechanism to keep those people based inside and outside the village connected therefore helping to maintain the present culture of using medicinal plants for this activity.

5. Reflections

5.1. Sustainability of medicinal plant use in the culture

Every human may face uncertainties regarding illness and existentialism and turning to belief is a well-known way to feel less lost in an uncertain world (Eriksen, 2004). It was found that in the three study villages, people turn to their ancestors and to the sangomas, while elsewhere people may turn to God, a priest or another specialist to provide explanations and solutions. As Villager #5 explained, *"If you don't have faith – you are nothing"*, which reflects the importance of the faith to the people in the study area and how it possibly creates reason and meaning in their lives. Therefore, as long as there is faith in the community there will be a demand for the plants. This demand may be regarded as a threat to the resource, especially in an economical sense. However in this case, we found there to be very little trade. It appears that there is genuine cultural value placed on the plants because of the faith in their healing powers and their ability to connect to the ancestors. This in turn may positively encourage the users to sustain local biodiversity from a cultural perspective.

That being said, evidence suggests that potential threats exist to the future use of medicinal plants. In many circumstances the knowledge of the plants was transmitted to the younger generation however, with the ever-growing influence of urban areas and development that inevitably changes as new lifestyles and the influx of new ways of thinking take hold. In this respect it can be discussed whether knowledge and use between generations will be gradually lost. The area remains relatively isolated but many villagers stated their desire for the road to Matatiele to be improved, which if happens may hasten the speed at which knowledge and use is lost.

A reduction in use of the plants may serve to decrease their value therefore hindering efforts for effective management. That being said, according to Guide #1 there have been customary rules in place since 2002 with the rise of tourism that aim to control the exploitation of the plants and protect the nature reserve. However, various respondents do not hide the fact that they collect relatively freely. Appropriate management strategies to maintain the plant populations can only work through flexible and varied measures and that was reflected to an extent by the nature reserve manager. The manager emphasized the need to maintain a good relationship with the local communities and in this respect he appears fairly understanding of cultural practices. Furthermore, he is willing to train the sangomas. There also appear to be conscience action in terms of local vigilance, customary rules and plant collection based on need which help prevent the over exploitation of the resource from people outside the villages. Although it would appear that there is a general awareness in maintaining a healthy biodiversity in the local region, it may be too early to say what effect certain ecological stresses and a higher count of endangered species could have on how the plants are used in the culture. Presently there does not appear to be much will to cultivate medicinal plants amongst respondents. However, in the face of a threatened resource ecologically, as in other parts of South Africa, it may present itself as a viable option to conservation (Keirungi and Fabricius, 2005; Zschocke et al., 2000; Dahlberg and Trygger, 2009).

Access to medicinal plants as a locally occurring resource for use within the local culture appears to still be important. This was most apparent by the wide range of species that were identified for

collection by the various respondents. It is important to recognize however, that areas of collection varied between groups of respondents which may reflect the differences in access, beliefs and knowledge. Local dynamics surrounding access to the resource can have various effects on the sustainability of use within the culture for example reduced access may result in decreased knowledge through a decline in use.

5.1.1. A step further....

There is nothing to indicate that the traditional forms of belief and healthcare are disappearing at the moment in the three study villages though they are being affected and influenced by a free flow of ideas, goods and knowledge characterizing the global world (Andersen & Kaspersen, 2005). Though globalization in popular terms is described as a process “making the world a single place”, many social scientists¹ still argue that it is not necessarily a process of homogenization and perceive it rather as a process of organizing cultures in new ways and in accordance to the vantage point of the particular group (ibid.). As exactly observed in the study area, different new influences and worldviews from urban areas and abroad are due to rising trade, tourism and migration being mixed with traditional and local forms and thus creating a complex mix of old and new. Consequently, it can be discussed whether this process of global exchange of culture and knowledge is a threat to the sustainability of traditional healing and local culture in general and if it is possible to refer to cultural change with such moral indignation.

5.2. Success of methods

Our assumptions on the use of medicinal plants in the study area proved similar to the findings in previous literature in many parts. It was only cultivation and trade that did not seem to have importance in the area and thus the focus on the topics was discarded. The distinction between physical and spiritual uses of medicinal plants proved more complex than had been anticipated, leaving us uncertain of their true meaning. Three categories of methods were used to investigate the sustainability of medicinal plant use in the local culture. Each method had its strengths and weaknesses (Table 5) and some worked better than others in terms of data generation, usefulness and validity.

¹ Among others Giddens, Hannerz, Nederveen Pietersee (Andersen & Kaspersen, 2005)

Table 5: Strengths and weaknesses of methods applied in the study

Method	Strengths	Weaknesses
Questionnaire	<ul style="list-style-type: none"> -Random sampling -Coverage in short time - Overview of the topic -Representative of a common household in the area (based on gender distribution, family size, main source of income) 	<ul style="list-style-type: none"> -Possible stratification when randomly selected houses not available -Wealth index only relative -No time for proper pilot → missing questions -Distinction between household and personal use was not clear → general household information parameters proved less useful -Scope of questions very limited → not very informative without more clarifications -Translation/misunderstandings/wording
Semi-structured interviews	<ul style="list-style-type: none"> -Allowed clarifying questions -Not as big a problem with sensitive topic as with questionnaire -Using interview guide allowed comparisons -Provided clarification for questionnaires 	<ul style="list-style-type: none"> -One-time meetings → possibly informant did not remember everything/did not trust us yet -Translation/misunderstandings/wording
Informal conversations	<ul style="list-style-type: none"> -Allowed clarifying questions -Not as big a problem with sensitive topic as with questionnaire - Informant talked freely and new perspectives were discovered 	<ul style="list-style-type: none"> -One-time meetings → possibly informant did not remember everything/did not trust us yet -Translation/misunderstandings/wording
Focus group discussion	<ul style="list-style-type: none"> -Homogenous participants → easy to talk -Allowed clarifying questions - Group dynamics → we got an idea about what's sensitive/cool to say 	<ul style="list-style-type: none"> -Some did not participate much -Sensitive topic? → peer pressure - Not the perfect informants as they were not very interested in the topic of discussion → discussion was not flowing - Informants shy/not confident in our company
Participatory resource mapping	<ul style="list-style-type: none"> -Kept informant interested -Done outdoors with view over village → allowed for pointing a location if not able to put on map -Easy to ask several different questions based on the map 	<ul style="list-style-type: none"> -Dimensions → accuracy of collection area
Plant inventory	<ul style="list-style-type: none"> -Comparison with data from sangoma -Large area (in short time) → species diversity should have shown -Proximity to recorded collection site, ecology 	<ul style="list-style-type: none"> -Identification of species -Exact collection point not known -Time of year for collection not known
Transect walk	<ul style="list-style-type: none"> -Comparison with species collected -Large area -One walk with informant 	<ul style="list-style-type: none"> -Not done with more informants -Identification of species -Exact collection point not known -Time of year for collection not known
Plant collection walk	<ul style="list-style-type: none"> -Plant identification by sangoma (what she uses) -sangoma talked freely in this environment 	<ul style="list-style-type: none"> -Only one walk → no comparisons -Chosen by sangoma → validity (actual site of collection?) Would be better after mapping, based on random selection -Plant inventory not informative
Ranking	<ul style="list-style-type: none"> -Based on informant's perception -Lot of additional data on species 	<ul style="list-style-type: none"> -Could have been more participatory (lot of time used for other questions, not ranking) -Time consuming
Seasonal calendar	<ul style="list-style-type: none"> - An experience for us and her 	<ul style="list-style-type: none"> -Difficult to explain -No comparisons → usefulness limited

5.2.1. Social science methods

The questionnaire provided coverage in short time and was useful in obtaining a general overview on our topic. Although the sampling was random and sample size in each community adjusted to the existing number of households, 30 households were not representative enough to create broad conclusions. However, based on the general household information the households visited were representative of the general population in terms of household size, gender distribution and source of income (Alfred Nzo District Municipality, 2011). Some additional informal discussions held after the interview were very interesting and surprising, and gave ideas and new perspectives to be followed up in semi-structured interviews.

The limited time did not allow for an extensive pilot survey which would have helped in formulating more precise questions, for example in relation to causes and perceptions of illnesses. It is questionable whether the wealth index was representative, but the parameters were decided in consultation with our interpreter who agreed with the importance.

Semi-structured interviews and informal discussions allowed clarifying questions and explanations which were not possible with the questionnaire. A shortcoming of the interviews was that they were one-time exercises; it is possible that some information was not remembered or informants did not yet feel confident enough in our company to reveal information about visiting the sangoma. The discrepancies of what people said and did may be due to the above mentioned facts, but some were however solved through triangulation.

The focus group discussions had the above mentioned advantage of allowing clarifying questions and same gender and age category of the participants created a free environment for talking. However, some students were less participative. It could also be that the topic of traditional healing and personal opinions on the matter created peer pressure or the participants had simply nothing to say on the topic due to their age. Based on this experience; in a better focus group session we should have divided ourselves into gender, chosen another setting than the classroom and had more time with the students before the interview in order to make the atmosphere more fun. This could have made them more confident and responsive.

5.2.2. Botanical methods

The plant inventory and transect walk were restricted in their usefulness because of lack of species identification. This was both in identifying a species in the first place, but also in failing to find a scientific name for the plant leaving the majority of species unidentified and thus unsuitable for comparisons. The methods did, however, provide some triangulation with what had been told by the informants. Although the exact location of collection was not identified and thus the inventories cannot be said to represent fully the common collection areas, the overall location and selection of site based on ecology and the area covered were similar. In general, the botanical methods would have been more useful in data generation had they been done with the informants and in the indicated places of collection.

5.2.3. Participatory Rural Appraisal (PRA)

Participatory mapping proved to be most useful of the PRA methods because it gave an opportunity to generate lots of different data based on the map. Seeing the map also kept the informant interested in the exercise. The location outdoors was beneficial as the site of collection could be shown in the nature.

The plant collection walk provided demonstrations and identification of plants by the informant and the sangoma was talking much more freely in this environment than during the semi-structured interview in her house. The choice of route was selected by the sangoma which might limited the species found. It would have been better to do mapping first, then make a seasonal collecting calendar and based on this information choose the location for walk in a designated area. As arranged only once, it was not possible to make comparisons based on the data from the walk. The plant inventory during the walk proved uninformative because of only one plot sampled, thus it was left out of the results.

The ranking provided good data although based on only one informant, but since lots of questions were asked before getting to the ranking itself, the method felt less participatory. The seasonal calendar on the other hand was difficult to explain and the results are not used in the report due to lack of comparisons. However, as said in the above section conducting a seasonal collection calendar could have been useful for triangulation of data.

5.2.4. Final thoughts

More repetitions of methods would have been needed for statistical representativeness and comparisons, but looking at the existing literature on medicinal plant use in Eastern Cape, similarities as well as discrepancies were found. Medicinal plants are widely used for both physical and spiritual purposes, the management of the plant resource is suboptimal and the knowledge about traditional healing varies, but we neither found an obvious pressure on biodiversity, nor importance on cultivation and trade.

Although much more data could have been collected had time allowed, this study can be seen as a pilot on the sustainability of medicinal plant use in the local culture; it provides good baseline information about medicinal plant use in the study area to which improvements can and should be made based on the focus and scope of further studies.

There is much more to study in regard to sustainability of the medicinal plant use. The traditions that surround the practice of healing and use of medicinal plants in our study area will have developed to an extent according to the natural surroundings. Our study highlighted the ever-growing influence of external factors within the area and we believe it is of interest in the future to further explore how these factors may affect the local traditions. How durable are these traditions to the inevitable impact external factors will have on the natural surroundings? Will traditional healing continue to exist if the use of medicinal plants is lost? There has always been a historical reliance on the plants and how they can help cure villagers' problems. But is it possible with the growing influence of external factors for this bond between villagers and nature to continue or are traditional beliefs and cultural practices destined to change? Traditions never stay static, but how they develop and the dynamics behind this

are of great interest in order to develop our understanding of how sustainable the use of medicinal plants is locally and in similar settings throughout South Africa.

5. Conclusion

The use of medicinal plants and traditional healing has an important role in the lives of people in Motseng, Litichereng and Thabathjita. This is strongly influenced by traditional beliefs in which the ancestors are seen as a vital element in affecting peoples' health. It is not only natural causes of illnesses, but also issues associated with the ancestors that make people turn to traditional healing. A variety of medicinal plants are collected by sangomas and villagers to treat physical illnesses and for spiritual purposes and many plants have several uses. If an ailment cannot be cured by oneself at home, people commonly refer to sangomas before consulting the clinic. Although many people visit sangomas there is also distrust in their capabilities as well as a perception of them being old-fashioned.

The knowledge about medicinal plants and traditional healing is transferred from one generation to another, not only orally, but also in practice when children learn to collect plants with their parents. The influence of the catholic mission on villagers' choice of health care is limited as traditional beliefs and Christianity exist side by side. The influence of the modern clinic, on the other hand, is largely based on peoples' perceptions of the causes of illnesses.

Medicinal plants can be found in various locations in the villages and in different ecological environments. As well as that they are accessible to everyone on the village land. Despite their current abundance, decreases in the resource have been noticed. Regulations on the collection of medicinal plants are scarce and implementation of the rules insufficient. It should be noted however, that although the general picture regarding sustainability of medicinal plant use across the three villages remains stable, we recognize a number of possible influences which have the potential to evolve and become future threats.

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Appendix 1: List of methods used

Method	Times conducted
Questionnaire	30
Semi-structured interviews	8
Informal meetings	4 (+several unplanned informal conversations)
Focus group discussion	2
Participatory resource mapping	3
Plant inventory	2
Transect walk	1
Plant collection walk	1
Ranking	1
Seasonal calendar	1

Appendix 2: Details of informants

Informant*	Description		Details	Importance as informant
Sangoma #1	Traditional healer	(sangoma), practicing 6 years	Male, 42 years old, Sotho, from Thabatjhitja	Practitioner of traditional medicine with knowledge about medicinal plants, their use, availability and management
Sangoma #2	Traditional healer	(sangoma), practicing 13-14 years	Female, 50 years old, Sotho, from Thabatjhitja	Practitioner of traditional medicine with knowledge about medicinal plants, their use, availability and management
Sangoma #3	Traditional healer	(sangoma), practicing 15 years	Female, 51 years old, Xhosa, from Thabatjhitja	Practitioner of traditional medicine with knowledge about medicinal plants, their use, availability and management
Villager #1	Healer (not a sangoma)		Male, 32 years old, Sotho, from Litimjhereng	As with Sangomas, but also providing information on the difference between Sangomas and themselves
Villager #2	Healer (not a sangoma)		Female, 58 years old, Sotho, from Litimjhereng	As with Sangomas, but also providing information on the difference between Sangomas and themselves
Villager #3	Our interpreter		Male, 28 years old, Sotho, from Motseng	Information on medicinal plant use from a personal perspective
Villager #4	Traditional leader of Moiketsi		Male, Sotho, from Moiketsi	Information on rules and regulations of medicinal plant collection in the village as well as conservation
Villager #5	Chairman of village council		Male, from Motseng	Understanding of medicinal plant use in the study area because well acquainted with the people
Villager #6	Grower of medicinal plants		Female, 55 years old, Xhosa, from Thabatjhitja	Information on cultivation of medicinal plants
Villager #7	Shop owner (sells Chinese medicine)		Female, Sotho, from Litimjhereng	Information on medicinal plant use from a personal perspective; influence of alternative medication
Villager #8	Has St. John's Apostolic Faith Mission on her compound		Female, from Litimjhereng	Influence of religion on medicinal plant use and its acceptance
Villagers	Questionnaire respondents		See Appendix 3	Provide an overview of medicinal plant use in the area
Guide #1	Adventure Trail guide		Male	Information on medicinal plant use generally in the local culture
Guide #2	Adventure Trail guide		Female, from a rural village about 15 km East from study area	Information on medicinal plant use from a personal perspective and generally in local culture
NR manager	Ongeluksneg Nature Manager	Reserve	Male, worked in the nature reserve for 1,5 years, not from the area	Information on rules and regulations of medicinal plant collection form the reserve as well as conservation
Father #1	Mariazell Mission Manager		Male, 15 years at the mission, from Kenya	Influence of religion on medicinal plant use and its acceptance
Father #2	Priest at Mariazell Mission		Male, 45 years in the area, from Switzerland	Influence of religion on medicinal plant use and its acceptance
Students	High school students from Mariazell Mission		Boys 15-16 years old, girls 15-17, boarding (not from the area)	Young peoples' perspective on medicinal plant use

* Informant appears by this name in the report when applicable

- Few informants with specialized knowledge related to profession
- Few informants with both general knowledge and some specific knowledge on particular issues related to profession
- Restricted number of informants with specific information on a particular topic (traditional healing)
- Several informants with general information on village level
- Ordinary villager, but his opinions might be affected by our study and informants’ responses due to his role as our interpreter

Appendix 3: Questionnaire

			Moiketsi												Litichereng												Motseng						
	Household Number		51	136	48	42	78	89	129	125	110	122	132	119	38	25	53	56	58	63	115	135	86	114	108	110	16	21	26	31	47	40	
	GPS waypoint		13-Y	14-Y	15-Y	16-Y	11-G	12-G	14-G	15-G	16-G	17-G	18-G	19-G	8-G	27-Y	28-Y	29-Y	30-Y	31-Y	22-G	23-G	24-G	25-G	26-G	27-G	18-Y	19-Y	20-Y	21-Y	22-Y	23-Y	
	Interviewer (A.S/M.W/R.J/R.N/T.A)		A.S	A.S	A.S	A.S	A.S	A.S	A.S	A.S	T.A	T.A	T.A	T.A	M.W	A.S	A.S	A.S	A.S	A.S	R.N	T.A	T.A	T.A	T.A	T.A	R.N	R.N	R.N	R.N	R.N	R.N	
0.	Indicators of wealth	Painted house (Yes/No)	N	N	Y	Y	Y	N	N	Y	Y	N	N	N	N	Y	Y	Y	Y	N	N	N	N	N	Y	N	N	N	N	N	N	N	
		Furniture (Good/Basic)	B	B	G	G	B	B	B	B	G	G	B	B	B	G	B	B	G	B	B	B	B	B	B	B	B	B	B	B	G	B	
		House material (Blocks/Mud)	B	M	B	B	B	M	B	M	M	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	
		Fence (Good/Basic)	B	B	G	G	B	B	B	B	B	G	G	G	G	G	G	B	B	G	G	B	B	B	B	B	B	B	B	B	B	B	
		Wealth Score (0-100)	25	0	100	100	40	0	25	15	65	60	10	10	35	100	40	40	100	35	25	25	25	25	40	25	0	0	25	0	50	0	
		Wealth (Rich/Medium/Poor)	P	P	R	R	M	P	P	P	M	M	P	P	M	R	M	M	R	M	P	P	P	P	M	P	P	P	P	P	M	P	
1.	Gender	Female	X	X	X			X	X	X	X	X		X		X	X	X	X	X	X		X		X			X		X	X	X	
1.1.	Age		50	62	41	62	20	68	75	46	69	55	54	72	57	62	28	91	62	65	35	65	61	56	61	32	67	38	29	78	40	19	
		No school												X																			
	Highest education (one answer)	Primary	X	X			X	X	X	X	X	X	X			X		X	X	X		X	X		X	X		X	X	X			
		High School			X	X									X		X				X			X			X				X	X	
		University																															
2.	Household Size		5	6	8	8	2	3	6	1	6	5	5	11	1	7	4	2	2	5	5	11	6	4	5	4	8	7	3	2	4	4	
	Number of children (< 18 years)		2	4	3	2	0	2	1	0	4	1	3	7	0	5	2	1	0	4	3	1	3	1	1	2	0	2	1	0	1	0	
2.1.	Number of women in the household		1	2	7	6	1	3	3	1	4	4	2	4	0	5	2	2	1	3	1	4	2	3	3	3	3	3	2	1	2	4	
2.2.	Number of men in the household		4	4	1	2	1	0	3	0	2	1	3	7	1	2	2	0	1	2	4	7	4	1	2	1	5	4	1	1	2	0	
2.3.	Number of people in the household away from home		0	2	0	6	1	0	1	0	2	2	1	3	0	1	0	0	0	0	0	0	2	2	2	0	2	2	0	0	0	0	
3.	Tribe (one answer)	Sotho	X	X	X	X	X	X	X		X		X	X	X	X	X		X	X	X		X	X	X	X	X			X			
		Xhosa								X		X						X				X						X	X		X	X	
		Other																															
		No answer																															
4.	Main income sources (multiple answers)	Agriculture/ Livestock			X		X					X			X		X		X								X						
		Remittances															X				X												
		Pensions				X		X	X	X	X	X		X		X		X	X	X	X	X	X	X		X			X	X	X	X	
		Turism																															
		Other	X	X	X								X	X									X	X		X							
		No answer																															
5.	Does your family use medicinal plants? (one answer)	Yes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		
		No																X															
		No answer																															
5.1.	For what purpose? (multiple answers)	Illness/ preventing illness	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X		

		For luck or spiritual purposes	X		X	X	X	X	X		X	X	X			X	X		X	X	X		X	X	X	X	X	X	X	X	
					X							X	X			X	X		X		X	X		X	X	X	X				
		For livestock																													
		Other																													
		No answer																													
6.	Does your family collect medicinal plants? <i>(one answer)</i>	yes	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X			X	X	X	X	X	X	X	X
		no															X	X					X	X							
		No answer																													
6.1.	Who collects medicinal plants <i>(multiple answers)</i>	Mother	X	X		X			X	X	X			X		X			X		X			X			X		X	X	X
		Father				X	X					X	X	X	X				X			X				X	X		X		
		Children							X	X		X																			
		Grandparents						X						X																	
		Other																													
		Youth						X																							X
		No answer																													
7.	Does your household cultivate medicinal plants? <i>(one answer)</i>	Yes				X	X	X				X	X			X				X					X		X	X		X	
		No	X	X					X	X	X			X	X	X		X	X	X	X		X	X	X	X		X		X	X
		No answer																													
8.	Does your household sell medicinal plants? <i>(one answer)</i>	Yes																							X						
		No	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
9.	Does your family use modern medicine? <i>(one answer)</i>	Yes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		No																													
		No answer																													
10.	Does your family visit someone who provide traditional medicine? <i>(one answer)</i>	Yes	X	X	X	X			X	X			X		X					X	X	X	X			X	X	X	X		X
		No						X	X			X	X		X		X	X	X					X	X					X	
		No answer																													
10.2.	For what purpose? <i>(multiple answers)</i>	Illness/ preventative illness	X	X	X	X			X				X							X	X	X	X			X	X	X	X		X
		For luck or spiritual purposes	X	X	X	X			X	X			X		X		X									X	X	X	X		
		Other																													
		No answer																													
10.3.	How many times a year does your family visit the Sangoma <i>(one answer)</i>	<3	X	X	X	X			X	X			X		X		X			X	X	X	X								
		4-10																								X	X	X	X		X
		>10																													
		No answer																													

 N/A

Appendix 4: Medicinal plants recorded to be collected by sangomas and villagers

Species			Uses (plant part used when available****)	Sangoma #2	Sangoma #3	Used by		
Scientific name	Local name*****	English name				Villager #1	Villager #2	Villager #3
<i>Agrimonia procera</i>	Bohome	Agrimony	To treat cough and intestinal worms. *		X			
<i>Alepidea amatymbica</i>	Lesoko	Giant Alepidea	Crushed and mixed with water to spray around one's homestead to keep away evil spirits. *		X	X		X
<i>Aloe ferox</i>	Ntlaba	Bitter Aloe	Used as laxative and to treat arthritis. Reported to have wound healing properties. (L) **		X			
<i>Asclepias fruticosa</i>	Lereke-la-ntja	Milkweed	To treat headache, tuberculosis, stomach pain and used as emetic to strengthen the body. (L) *			X		
<i>Berkheya setifera</i>	Lelem-la-khomo	Buffalo-tongue Berkheya	To treat stomach complaints, also used to repel evil spirits. *	X				
<i>Bulbine narcissifolia</i>	Khomo ea balisa	Strap-leaved Bulbine	To treat wounds, diabetes and rheumatism. To counteract vomiting, diarrhea and urinary infections. Also used as mild purgative. (R) **		X		X	
<i>Chironia palustris</i>	Thjatjane	Marsh Chironia	To treat colic and diarrhea. *	X				
<i>Crassula natalensis</i>	Bohobe-ba-setsomi	N/A	N/A	X				
<i>Dicoma anomala</i>	Hloenya	Fever bush	To treat coughs, dysentery, toothache and sterility as well as gall sickness in stock and wounds on horses. (R) *	X		X		X
<i>Euclea undulata</i>	Radikokotwana	Common guarri	To treat heart diseases, headache and toothache (R) ***					X
<i>Euphorbia clavarioides</i>	Sehloko	Lion's spoor	Swollen feet bathed in water, also used with other species to treat leprosy. *	X	X			
<i>Euphorbia striata</i>	Mositsane	Milkweed	To treat stomach disorders. Used to flavor sour milk. *			X		
<i>Gazania krebsiana</i>	Tsikitlana	Common Gazania	To treat sickly babies, earache and sterility in women. *	X				
<i>Helichrysum aureonitens</i>	Mpepo	Golden everlasting	To invoke goodwill of ancestors, also used by diviners to induce trances. (L) *		X			X

Appendix 4 continued

Species			Uses (plant part used when available****)	Sangoma #2	Sangoma #3	Used by		
Scientific name	Local name*****	English name				Villager #1	Villager #2	Villager #3
<i>Helichrysum aureum</i>	Lebane	Yellow everlasting	N/A		X			
<i>Hermannia depressa</i>	Seletjana	Creeping red Hermannia	To treat diarrhea and coughs. Used as protective charm. *	X				
<i>Kniphofia ritualis</i>	Leloele	N/A	To treat pain. Used in initiation rituals for girls. *		X			
<i>Lantana rugosa</i>	Mabele-mabutsoa-pele	Bird's brandy	To treat abdominal complaints in children, sore eyes, coughs, sprains and rheumatism. *		X			
<i>Plectranthus ciliatus</i>	Lephele-phele	Speckled spur flower	N/A	X				
<i>Polygala hottentotta</i>	Lehlokoa-la-tsela	Small purple broom	To treat abdominal complaints and anthrax. Used as charms. (L) *			X		
<i>Scilla nervosa</i>	Seboka	White Scilla	To treat rheumatic fever and dysentery. (B) *		X			
<i>Senecio harvarianus</i>	Khotolia	Canary weed	N/A	X				
<i>Stachys aethiopica</i>	Bolao-ba-litaola	African Stachys	To cure feverish delirium. *		X	X		
<i>Xysmalobium undulatum</i>	Pohotshehele	Milkwort	To treat headache, dysentery and colic. Used as charms to divert storms, prevent poisoning and make dogs keen hunters. (R) *	X	X			
<i>Zantedeschia aethiopica</i>	Poneyaditswene	Arum lily	To treat headache, also used as poultice. (L) *		X			
N/A	Dinotsi	N/A	N/A	X				
N/A	Dikgopa	N/A	N/A	X				
N/A	Duma	N/A	N/A		X			

Appendix 4 continued

Scientific name	Species		Uses (plant part used when available****)	Sangoma #2	Sangoma #3	Used by		
	Local name*****	English name				Villager #1	Villager #2	Villager #3
N/A	Dumadumang	N/A	N/A			X		
N/A	Eiyana	N/A	N/A	X		X	X	
N/A	Kgopo	N/A	N/A	X		X		
N/A	Kgwara	N/A	N/A	X		X		
N/A	Labatheka	N/A	N/A			X	X	
N/A	Lekgala	N/A	N/A					X
N/A	Lelwelwe	N/A	N/A		X			
N/A	Letjwetlane	N/A	N/A			X		
N/A	Letsatsi	N/A	N/A	X				
N/A	Mahirisaka	N/A	N/A		X	X		
N/A	Mahola hang	N/A	N/A		X			
N/A	Maleleka	N/A	N/A	X				
N/A	Manolo	N/A	N/A		X			
N/A	Mathithibala	N/A	N/A		X			

Appendix 4 continued

Scientific name	Species		Uses (plant part used when available****)	Sangoma #2	Sangoma #3	Used by		
	Local name*****	English name				Villager #1	Villager #2	Villager #3
N/A	Mathunga	N/A	N/A		X			
N/A	Matlapaneny	N/A	N/A		X			
N/A	Mhlonetjhwa	N/A	N/A		X			
N/A	Moelela	N/A	N/A		X			
N/A	Mohlatswameno	N/A	N/A		X			
N/A	Mokgujwana	N/A	N/A	X				
N/A	Molonge	N/A	N/A		X			
N/A	Morara tau	N/A	N/A		X			
N/A	Mothokho	N/A	N/A		X			
N/A	Motshetshe	N/A	N/A	X				
N/A	Mthiontlantla	N/A	N/A		X			
N/A	Ntanyazibovana	N/A	N/A		X			
N/A	Ntelezi	N/A	N/A	X			X	
N/A	Ntsotelle	N/A	N/A			X		
N/A	Peka	N/A	N/A		X			

Appendix 4 continued

Scientific name	Species		Uses (plant part used when available****)	Sangoma #2	Sangoma #3	Used by		
	Local name*****	English name				Villager #1	Villager #2	Villager #3
N/A	Pelo dimaroba	N/A	N/A		X			
N/A	Pone hitsoene	ea N/A	N/A		X			
N/A	Qaqabolane	N/A	N/A		X			
N/A	Sebabetsane	N/A	N/A	X				
N/A	Sehlambeso	N/A	N/A		X			
N/A	Selepe	N/A	N/A		X			
N/A	Setumo	N/A	N/A		X			
N/A	Stimamollo	N/A	N/A	X				
N/A	Tlhaka kgomo	ya N/A	N/A	X				
N/A	Tshitabaloi	N/A	N/A		X			
N/A	Vukuhlambe	N/A	N/A		X			

* Pooley, 1998

** South African National Biodiversity Institute, 2011

*** Van Wyk *et al.*, 1997

**** L=leaves, R=roots, B=bulb

***** Local name as reported by the informant

Appendix 5: Medicinal plants identified during plant inventory and transect walk

Scientific name	Species Local name****	English name	Uses	Used by sangomas /villagers
<i>Albuca setosa</i>	Mototse	Small white Albuca	Used in ritual cleansing, as protective charm against lightning and to end quarrels between enemies. *	
<i>Artemisia afra</i>	Lengana	African wormwood	To treat coughs, cold, influenza, fever, loss of appetite, colic, headache, earache, malaria and intestinal worms. **	
<i>Centella asiatica</i>	N/A	Indian pennywort	To treat skin complaints, also used as alimentary for ulcers. *	
<i>Chironia palustris</i>	Thatjane	Marsh Chironia	To treat colic and diarrhea. *	X
<i>Commelina africana</i>	N/A	Yellow Commelina	To treat fits, pain, heart complaints, venereal disease and bladder ailment. *	
<i>Dicoma anomala</i>	Hloenya	Fever bush	To treat coughs, dysentery, toothache and sterility as well as gall sickness in stock and wounds on horses. *	X
<i>Euclea undulata</i>	Radikokotwana	Common guarri	To treat heart diseases, headache and toothache. **	X
<i>Gazania krebsiana</i>	Tsikitleana	Common Gazania	To treat sickly babies, earache and sterility in women. *	X
<i>Haplocarpha scaposa</i>	Sesweu	False gerbera	Used by sangomas when consulting divining bones. *	
<i>Helichrysum aureonitens</i>	Mpepo	Golden everlasting	To invoke goodwill of ancestors, also used by diviners to induce trances. *	X
<i>Helichrysum herbaceum</i>	N/A	Moneky-tail everlasting	Burnt to invoke goodwill of ancestors. *	
<i>Hibiscus trionum</i>	N/A	Bladder Hibiscus	To treat worms/intestinal parasites. *	
<i>Hypericum aethiopicum</i>	N/A	St. Johns Wort	To treat back ache in girls at puberty, kidney and abdominal complaints, heal sores and venereal diseases. *	
<i>Hypoxis hemerocallidea</i>	N/A	Yellow star	Used as strengthening tonic and during convalescence, and to treat tuberculosis and cancer. Also used as laxative and to treat intestinal worms. Anxiety, palpitation and depression also treated. Used for improving immune system of HIV/AIDS and cancer patients. ***	
<i>Kniphofia laxiflora</i>	N/A	Slender poker	To treat chest ailments. *	
<i>Leonotis dubia</i>	N/A	Forest Leonotis	Used as tonic and to treat nervous conditions. *	
<i>Scilla nervosa</i>	Seboka	White Scilla	To treat rheumatic fever and dysentery. *	X

Appendix 5 continued

Species			Uses	Used by sangomas /villagers
Scientific name	Local name****	English name		
<i>Solanum acanthoideum</i>	N/A	N/A	To treat ringworm and sandworm. *	
<i>Withania somnifera</i>	N/A	Poisonous gooseberry	To treat fever, intestinal infections, asthma and to heal sores. Also used to stimulate milk production in cows and treat gall sickness in cattle. *	X
<i>Zantedeschia aethiopica</i>	Poneyaditswene	Arum lily	To treat headache, also used as poultice. *	X

* Pooley, 1998

** Van Wyk *et al.*, 1997

*** South African National Biodiversity Institute, 2011

**** Local name as reported by the informant

Appendix 6: Uses of medicinal plants, their ecology and availability as reported by sangomas

Species			Plant used	part	Uses	Ecology	Availability			Frequency of collection****
Scientific name	Local name***	English name					Plenty	Some	Few	
Sangoma #3:										
Bulbine narcissifolia	Khomo ea balisa	Strap-leaved Bulbine	Roots		N/A	N/A			x	1
N/A	Pone hitsoene	ea N/A	Leaves, roots		Boiled in water and the water is used for washing oneself to clean out bad luck.	Mountaneous areas, wetlands	x			12
N/A	Mathitibala	N/A	Leaves		Boiled in water and the water used for bathing and spraying around one's compound to confuse enemies and make them forget.	Near rivers, wetlands	x			7
Aloe ferox	Ntlaba	Bitter Aloe	Leaves		Boiled in water and water drunk to treat asthma, dizziness and high blood pressure. Also mixed with other medicinal plants. **	Mountaneous and dry areas			x	2
Kniphofia ritualis	Leloele	N/A	Roots		Boiled in water and water given to babies to treat stomach pain and widows to cleanse their bodies. *	Mountaneous areas, along rivers			x	5
N/A	Mahirisaka	N/A	Roots		Burnt to bring good luck (e.g. when in need of a job). Connection with ancestors possible when speaking to the smoke.	Mountain tops			x	8
Xymalobium undulatum	Pohotshehele	Milkwort	Bulb		Ground powder inhaled to treat headaches. Boiled in water and water drunk to cure stomach ache and boost the immune system (especially in HIV/AIDS patients). *	Lowlands	x			9
Alepidea amatymbica	Lesoko la ditlou	Giant Alepidea	Bulb		Crushed and mixed with water to spray around one's homestead to keep away evil spirits.	Mountain tops	x			6

Appendix 6 continued

Species			Plant used	part	Uses	Ecology	Availability			Frequency of collection****
Scientific name	Local name***	English name					Plenty	Some	Few	
N/A	Mothokho	N/A	Bulb		Mixed with giant Alepidea to keep away evil spirits.	Pastures	x			10
<i>Euphorbia clavarioides</i>	Sehloko	Lion's spoor	N/A		Burnt to keep away evil spirits. Boiled in water and water used for curing sore feet. *	Mountaneous areas	x			11
N/A	Mathunga	N/A	Bulb		Boiled in water and water applied topically on fractures and drunk to treat internal wounds. Mixed with other medicinal plants to cure itching of the body especially in HIV/AIDS patients.	Mountain tops			x	4
<i>Scilla nervosa</i>	Seboka	White Scilla	Leaves, bulb		Leaves dried and mixed with salt and given to cattle to herd together. Roots boiled and water used for bathing to bring more customers to one's business. **	Mountaneous areas		x		3
Sangoma #2:										
N/A	Stimamollo	N/A	Roots		To treat rashes on the body, also used for dog illnesses	Pastures, areas	dry x			N/A
<i>Hermannia depressa</i>	Seletjana	Creeping Hermannia	Leaves, roots		Plant parts crushed to treat period pains and cancer **. More powerful when dried.	Pastures	x			N/A
<i>Dicoma anomala</i>	Hloenya	Fever bush	Roots/tuber		Crushed to treat stomach ache and fever, also used for cleansing the immune system **. Consumed either raw or boiled.	Everywhere	x			N/A

Appendix 6 continued

Species			Plant used	part Uses	Ecology	Availability			Frequency of collection****
Scientific name	Local name***	English name				Plenty	Some	Few	
<i>Berkheya setifera</i>	Lelem-la-khomo	Buffalo-tongue Berkheya	Roots	Boiled or crushed to treat tooth ache and used as tooth paste, also used for pregnant women to induce labor. **	Pastures, mountains	x			N/A
<i>Chironia palustris</i>	Thjatjane	Marsh Chironia	Roots	Crushed and sometimes mixed with milk to treat ulcers and rash **	Pastures	x			N/A

* Some differences in use compared with Pooley (1998)

** Completely different use compared with Pooley (1998)

*** Local name as reported by the informant

**** The rank for frequency of collection where 1=most frequently collected and 12=least frequently collected.
Ranking was not done with Sangoma #2.

Appendix 7

Final Synopsis

Interdisciplinary Land Use and Natural Resource Management (400006)

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Introduction

Traditional medicines are widely used in South Africa where, despite the influx of western treatments, 80% of black people continue to use traditional medicine as an alternative or complementary source of healthcare (Botha *et al.*, 2004; Mander, 1998). The use of shrubs, herbs and trees for medicinal purposes is an ancient practice with long-standing importance to people from all levels of society. In the Eastern Cape Province, much reliance is still placed on natural resources, and traditional customs involving medicinal plants remain part of everyday life (Dold & Cocks, 2002).

The use of traditional healthcare comprising of plant-based medicines is not just with natural illnesses, but also for afflictions believed to be caused by the supernatural. In fact, a study of a South African village has shown that approximately one-third of the wild plants used served cultural and spiritual needs rather than basic utilitarian purposes (Cocks *et al.*, 2008). In South Africa there are an estimated 200,000 registered healers (Summerton, 2006) whose extensive knowledge and reported ability to connect with ancestors are in continuous demand. However, self-medication remains popular amongst the general public, especially for minor ailments such as coughing and diarrhea (Dahlberg & Trygger, 2009). Consequently, a massive demand for medicinal plants exists in terms of both number and mass of plants used, and it has been estimated that more than 700 plant species are traded for medicinal purposes throughout South Africa (Keirungi & Fabricius, 2005; Mander, 1998). Many of these species are over-exploited thus causing a serious threat to biodiversity.

Historically, conservation of biodiversity in South Africa used a law enforcement approach, which was largely ineffective due to a lack of resources (Keirungi & Fabricius, 2005). Recently a change in tact has seen the greater involvement of user groups (local communities) and their cultural and social values are now recognized as important in obtaining successful and sustainable biodiversity conservation strategies (Makunga *et al.*, 2008). However, it should be recognized that maintaining the medicinal plant resource is not only important in a biodiversity or economic perspective, but also vital for sustaining local knowledge and culture.

Research Objective

Because of the extensive use of traditional medicine and its reliance on natural resources in South Africa, it is of interest to investigate the sustainability of the culture of medicinal plant use in Ongeluksnek, Eastern Cape. This objective will be met through four main questions:

- What are the physical characteristics of the medicinal plant resource base?
- How is the medicinal plant resource managed?
- How is the medicinal plant resource used?
- What is the importance of medicinal plants to the culture?

Details on how we intend to approach these questions can be found in Table 1. During our stay in the village we will observe and investigate if there are some influences or specific local context that we had not been aware of before visiting the village, but which should be included in our research.

Project Framework

The project framework (Figure 1) is based on a simple environmental/ social paradigm where by humans are accepted as part of the eco-biosystem and that any human actions on nature may rebound and impact social behaviors and practices. At the same time, nature is constrained by physical factors that without the direct influence of humans may limit social and economic dynamics. It can be either one or both of these models that characterizes our 'conceptual' relationship between the use of medicinal plants in the culture and the physical medicinal plant resource itself. However, in practice the relationship is defined by management customs therefore it is these three themes that will be studied in the field. Individual and comparative analysis of these themes will indicate the sustainability of medicinal plant use in the culture of the village community. Included in the framework is the acknowledgement of possible external threats, which may play a role in our study.

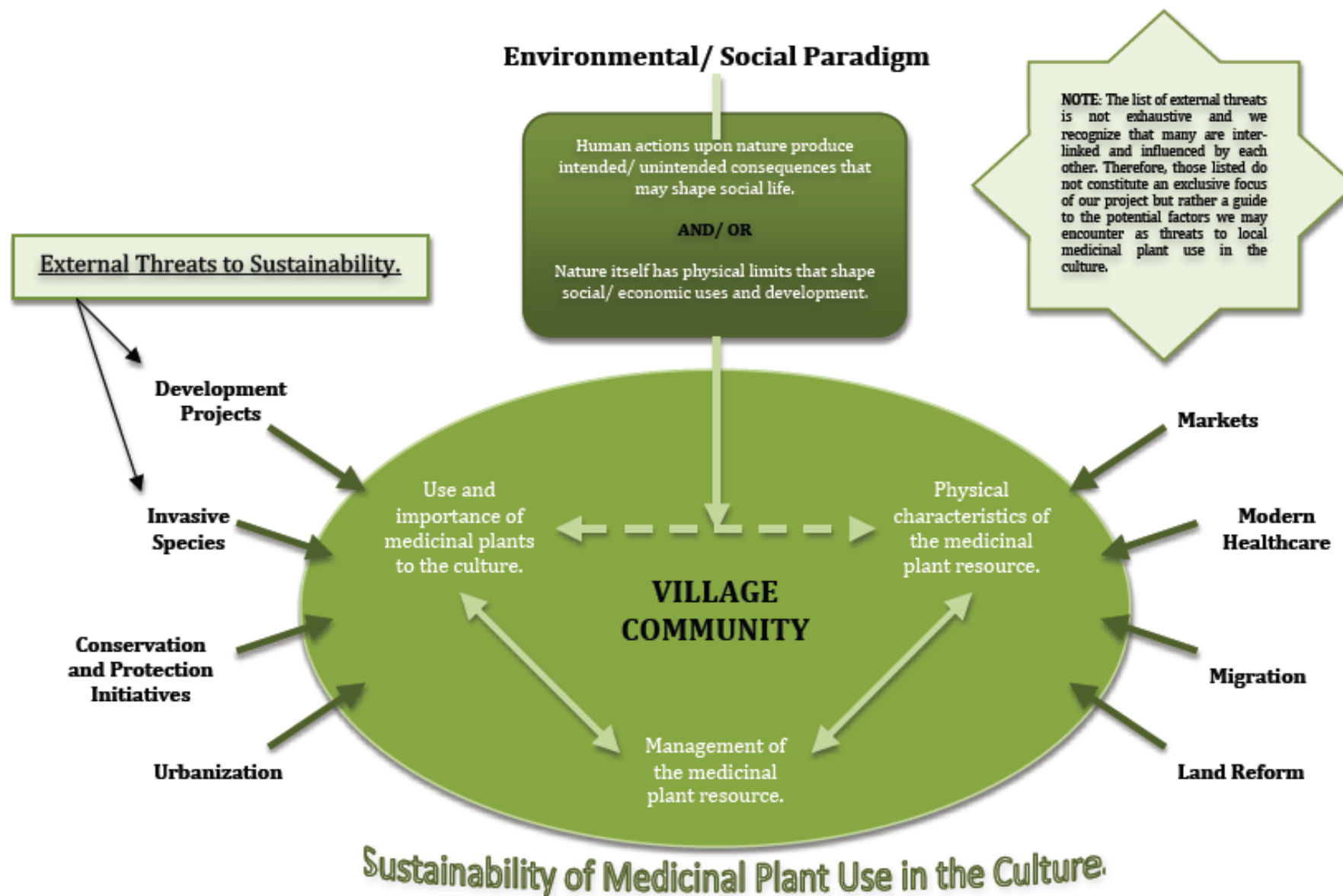


Figure 1: Project framework

Definitions

Rarely are definitions universal in interpretation therefore it is important to state exactly what we mean when referring to important key words in the project.

Medicinal Plants

Plants that are commonly used in treating and preventing specific ailments and diseases, and that are generally considered to play a beneficial role in health care (Srivastava *et al.*, 1996).

Biological Diversity

The variability among living organisms from all sources and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (United Nations, 1992).

Sustainability

Sustainability is defined as the ability to cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, without undermining the natural resource base (Chambers & Conway, 1992). In this project the focus is on biological and cultural sustainability.

Culture

Culture is a very broad and much debated concept, thus difficult to define. When studying culture in this project, we will be dealing with three fundamental aspects of human experience: what people do, what people know, and the things people make and use. These aspects are understood as cultural when they are shared and learned between members of a group (Spradley, 1980).

Local Context and Study Area

The area of Matatiele Local Municipality in Eastern Cape, South Africa, is characterized as grassland biome in which grasses are the dominant vegetation with very few woody plants. Matatiele is situated at the foothills of the western Drakensberg with high mountains and undulating hills and lowlands. Subsistence farming characterizes the land use in the area and the land is generally degraded (South African Government Department of Environmental Affairs, 2011a-2011d). The Ongeluksnek Nature Reserve is situated near to the study area.

Environmental Management

National legislation such as the Constitution and the National Environmental Management Biodiversity Act (2004) emphasize the nation's obligation to development and environmental sustainability of its landscapes and resources. Furthermore, the Eastern Cape Biodiversity Conservation Plan (2007) specifically recognizes the need for strong management of medicinal plants including the Matatiele region. Much of the local area has been outlined as part of 250ha of conservation units in an attempt to ensure protection of critically biodiversity and restrictions in development (Department of

Traditional Healthcare Legislation

Despite South Africa's long history of traditional medicine, it was not until 2004 that the traditional health practitioners' bill formally recognized and began regulating the practice of South Africa's traditional healers. Its overall objectives include establishing a practitioner's council, outlining training and practices as well as protecting the interests of the public. Four kinds of practitioners are recognized: diviners (sangomas), herbalists (izinyangas), traditional birth attendants, and traditional surgeons (iingcibi) (Department of Health, 2004).

The study area includes three

villages called Mot-seng, Litichereng and Moiketsi in Ongeluksnek ward (ward 14) located in Matatiele Municipality. According to the 2001 census there are approximately 8700 people in Ongeluksnek and 4600 people (1060 households) in the specific study area. The area is generally poor with under-developed infrastructure, and education levels in the ward are low with almost half of the population having no formal education and many having dropped out or finished only primary school. The majority of the population in Matatiele is Xhosa and Sotho with isiXhosa and seSotho being the dominant languages (ILUNRM lecture

notes, 2011). Mariazell Mission, which hosts a high school, is located between Motseng, Litichereng and Moiketsi.

Regional Land Tenure & Governance

The Matatiele region has had a complicated demarcation history related to former apartheid geography and government efforts to re-incorporate areas into the newly formed provinces. Recently, confusion has lied with the fact that under the apartheid system, the poor black areas of Matatiele (primarily in the north and west) were under the former Transkei homeland while the somewhat affluent town area fell under KwaZulu-Natal. However, as the result of a referendum, on the 1st March 2006, a new Matatiele Local Municipality (EC441) was established which was incorporated into the Alfred Nzo District of the Eastern Cape (Matatiele Local Municipality Annual Report, 2008/2009).

Local land tenure consists principally of communal and smallholder systems integrated with some larger private areas of commercial agriculture. Presently there is a struggle in South Africa for tribes to be recognized by authorities as legal entities of land tenure, therefore communal areas remain mostly as

'state'-owned lands (Ntsebeza, 1999). This has created tensions from what communities perceive as a basic undermining of their pre-existing rights. We recognize there may be remnants of this problem locally as Matatiele Municipality currently suffers from an unusually high occurrence of land claims (Matatiele IDP, 2010/2011).

Methods

In order to investigate the sustainability of the culture of medicinal plant use in the study area, a variety of methods from both social and natural sciences are chosen. Table 1 explains the informants, methods and materials needed to answer the specific questions required to investigate our main objective.

Table 1: Data collection matrix

Main question	Specific question	Output	Informant	Method (location)	Materials/inputs
What are the physical characteristics of the medicinal plant resource base?	What is the spatial distribution of medicinal plants in the village and its vicinity?	Map of current medicinal plant resources	Traditional healer Collector	Mapping Transect walk GPS points	Flip chart Markers (different colors) Post-it notes (different colors) GPS String (45 m) Measuring tape Pegs
	Has the distribution of medicinal plants changed over time?	Map with changes in the medicinal plant resources distribution Reasons for changes and perception of threats to the distribution of medicinal plants	Traditional healer Collector Nature reserve staff	Mapping Transect walk GPS points Semi-structured interview Plot inventory	Flip chart Markers (different colors) Post-it notes (different colors) GPS Notebooks Pens
How is the medicinal plant resource managed?	Who are collecting and growing medicinal plants?	Identification of plant collectors and growers	Traditional healer Villager Nature reserve staff	Semi-structured interview Participant observation Questionnaire	Notebooks Pens
	Which medicinal plants are collected and how?	List of collected species 5-10 most frequently collected species Seasonal variation in collection Harvesting method	Traditional healer Collector Nature reserve staff	Semi-structured interview Ranking Observation Seasonal calendar Transect walk	Notebooks Pens Flip chart Markers
	Are medicinal plants collected from the wild and/or are they cultivated?	List of species collected from the wild List of species cultivated Opportunities and challenges of cultivation	Traditional healer Collector Grower	Semi-structured interview Participant observation	Notebooks Pens Flip chart Markers

		List of 5-10 potential species for cultivation			
	Which plant parts are harvested for medicinal purposes?	List of used plant parts according to species Harvesting method Sustainability of harvesting method Possibilities for substituting plant parts	Traditional healer Collector Grower	Semi-structured interview Participant observation	Notebooks Pens
	What are the tenure arrangements for medicinal plants in local land?	Identification of people who have rights to use, extract, manage, exclude and sell land where medicinal plants grow	Chief Nature reserve staff	Semi-structured interview	Notebooks Pens
	Are there any national or local initiatives for medical plant resource conservation?	Current conservation strategies/programs/ initiatives Previous conservation strategies/programs/ initiatives Success of conservation	Traditional healer Collector Chief Nature reserve staff	Semi-structured interview	Notebooks Pens
How is the medicinal plant resource used?	Who are using medicinal plants?	Identification of users Changes in users over time	Traditional healer Collector	Semi-structured interview	Notebooks Pens
			Villagers	Structured interview/ questionnaire	Questionnaire forms Pens
	For what purposes are medicinal plants used (to treat physical illness/cultural use)?	List of species according to use (physical illness/culture) Possibilities for substituting plant parts	Traditional healer	Semi-structured interview	Notebooks Pens
			Villagers	Structured interview/ questionnaire	Questionnaire forms Pens

	Are medicinal plants collected for own use and/or for sale?	List of plants according to purpose of collection List of economically most important species Markets (formal/informal)	Traditional healer Collector Grower	Semi-structured interview Ranking Participant observation	Notebooks Pens Flip chart Markers
What is the importance of medicinal plants to the culture?	How is knowledge about medicinal plants learnt and shared?	Information on transfer of knowledge on collecting, cultivation, practicing Type of knowledge shared/not shared Power dynamics related to medicinal plant use	Traditional healer Villagers Collector Grower	Semi-structured interview Participant observation Participatory mapping Transect walk	Notebooks Pens
	How does medicinal plant use have an impact on social and cultural (and economical) capital?	Narratives on episodes when medicinal plants have had important impact on peoples' lives Motivation to use medicinal plants Social relations created by medicinal plants	Traditional healer Villagers Mission Clinic	Unstructured interview Participant observation	Notebooks Pens
	How are modern medicine and religious institutions influencing medicinal plant use?	Impact on local knowledge of medicinal plants Collaboration between modern and traditional medicine	Villagers Traditional healer Mission Clinic	Unstructured interview Participant observation	Notebooks Pens

Social Survey Methods

Questionnaire

A questionnaire will be conducted with around 30 households within the villages in order to obtain an overall idea of the extent of medicinal plant use and management in the study area from which trends could be observed (Appendix 1). Simple random sampling will be used based on household locations identified from aerial photos obtained from Google Earth. The latest images are from 2006 and this might affect the reliability of the sampling.

Semi-Structured Interviews

Semi-structured interviews are to be conducted with the key informants (Table 2, Appendix 2-11). The sampling strategy will be determined once in the field. Since interviews can be very time consuming, they will only be based on a relatively small sample, but they can provide plenty of information as they are not restricted to specific questions. Further, they can bring up useful issues we have not yet thought of. Certain sensitive issues can be better addressed through semi-structured interviews than in the questionnaire, as semi-structured interviews allow the interviewer to read the situation, and sense how to ask questions differently according to each respondent (Spradley, 1980).

Table 2: Key informants and interview themes

Key Informant	Reason for Selection	Themes for the Semi-Structured Interviews
Traditional healer	An important actor in the culture of medicinal plant use thus likely to have information on plant resources, use, management and how the “skills” are learnt and shared. Able to identify other stakeholders.	Physical characteristics of medicinal plant resource Management of medicinal plant resource Use of medicinal plants Importance of medicinal plants to the culture (Appendix 3)
Chief of the village	Knows about legislation, land tenure and management plans.	Management of medicinal plant resource (Appendix 4)
Collectors of medicinal plants	Have information on plant resources, resource management, use of medicinal plants and marketing.	Physical characteristics of medicinal plant resource Management of medicinal plant resource Use of medicinal plants (Appendix 5)
Villagers using medicinal plants for cultural purposes	Have information on the uses of medicinal plants and how the use of medicinal plants is learnt.	Use of medicinal plants Importance of medicinal plants to the culture (Appendix 6)
Villagers cultivating medicinal plants	Able to explain cultivation related issues, e.g. reasons for cultivation, challenges, possible marketing	Management of medicinal plant resource (Appendix 7)
Nature reserve staff	Have information on whether medicinal plants are collected from the nature reserve or not, how this	Management of medicinal plant resource (Appendix 8)

	affects biodiversity/sustainability and land tenure in the reserve	
Mission staff	Can give the missions' view on medicinal plant use and explain modern vs. traditional medicine issues	Importance of medicinal plants to the culture (Appendix 9)
Clinic staff	Help to understand modern vs. traditional medicine, their view on traditional medicine, threats/opportunities of medicinal plant use, collaboration with traditional healers	Importance of medicinal plants to the culture (Appendix 10)
Others?		

Focus Group

We will consider conducting a focus group discussion with villagers to obtain information on the importance of medicinal plants to the culture. The exact details will be determined when in the field.

Participatory Rural Appraisal

Participatory Mapping

Participatory mapping with traditional healers and collectors is used to understand the general spatial distribution of medicinal plants and to get information on temporal changes in the distribution. Interest is placed on information as far back as the healer has knowledge of changes. During the mapping, an estimation of the availability of medicinal plant species is done by placing papers of different color, each color representing specific species, in the different areas on the map. Depending on the number of species, focus can be placed on the most important ones (e.g. 10-15 species). Alternatively, a list of species in each area can be written down. Elements of the resource may be secret and as a result certain details may be lacking in our final map.

Transect Walk

Transect walk(s) with traditional healers and other collectors are conducted in order to obtain information on the spatial distribution of medicinal plants and knowledge of changes in the distribution. During the walk, informal interviews will be conducted on plant resource management and uses of medicinal plants and the species found will be recorded. The entire route will be tracked with a GPS-deviser and recordings of x and y-coordinates (waypoints) will be noted at sites where species are collected. The number of walks required will be determined at the site depending on the size of the area and the informants' schedules etc. Information on the area, vegetation, elevation, slopes etc. will be recorded during the walks.

Matrix Ranking

Ranking of the 5-10 most important medicinal plant species according to frequency of collection, scarcity and economic importance will be conducted with traditional healers and collectors (Appendix 12). The

ranking will be based on the lists of plants acquired during the mapping, transect walks and informal interviews. The purpose of the exercise is to identify important species in order to evaluate the sustainability of their use.

Seasonal Calendar

During the semi-structured interviews, a seasonal calendar of activities related to medicinal plants use will be made with traditional healers. The seasonal calendar will provide us with an understanding of the demand for medicinal plants and the management during the whole year and not just during our stay in the field.

Ethnographic Methods

Participant Observation

Participant observation is the core of ethnographical data collection and is applied in order to get an understanding of the underlying logics of social relations and encounters (Spradley, 1980). Participant observation is about living and staying close to the people being studied and immersing oneself in their lives in order to empathize with their way of seeing and interpreting the world (Brockington & Sullivan, 2003). Participant observation will be an important aspect of the study and will be used in all activities both for information collection and understanding and interpretation. Misinterpretations are possible due to our cultural background, but this is taken into consideration and an understanding of the local context will be achieved as closely as possible through close communication with our interpreter.

Unstructured Interviews

Unstructured interviews will primarily be with traditional healers and the users of medicinal plants (e.g. host families) to understand the importance of medicinal plants to the culture, i.e. the influence on social, cultural and economic capital. Oral histories collected through unstructured interviews/conversations will be conducted in order to get personal views and ideas on medicinal plant use. Questions are open-ended, and the informants choose the direction of the interview. The stories people tell are consequently a meaning making mechanism where meaning becomes constructed in retrospect and the plots of the stories will indicate what is of importance from the informants' point of view.

Botanical Methods

Plant Inventory

A medicinal plant inventory will be conducted over two plots measuring 10m×10m, either with the traditional healer and/ or another specified collector. This will be a comparative study in which the participating informant will select two areas that they perceive to be showing signs of degradation and non-degradation respectively. Once a species from our informant's 'top-five list' has been identified, this will act as our center point for measuring out the plot. Then, with the help of the informant, the number of

each species from the ranking list will be counted and recorded. Added to this data will also be information regarding the location and features surrounding the plot. This will include GPS co-ordinates, surrounding vegetation, and slope characteristics (orientation and inclination).

Data Analysis

Data collected from each method will be analyzed individually as well as in combination in order to triangulate our findings to ensure a higher validity. Data collected will determine what kind of analysis we will conduct. However, data from the questionnaire will be analyzed with excel and potential correlations other than those listed in Figure 2 will be investigated.

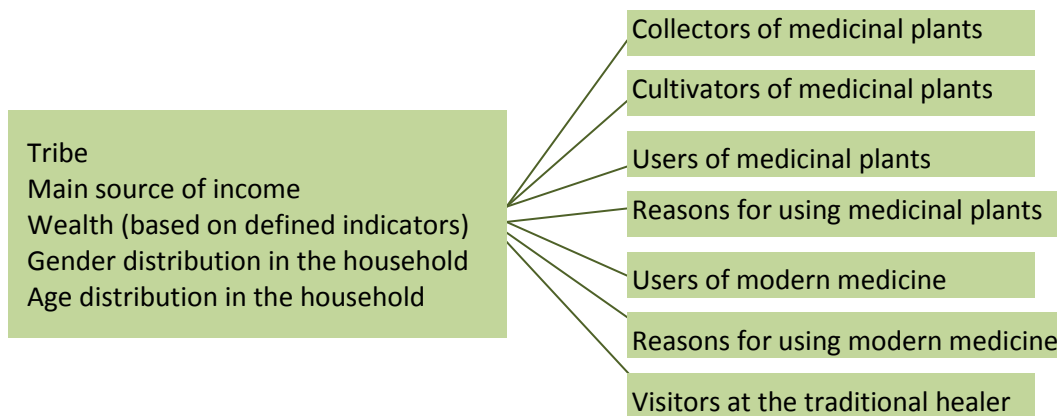


Figure 2: Potential correlations to be investigated

Locations obtained during the participatory mapping will be mapped in ArcMap and information on temporal changes will be compared to both an aerial photo from 2002 and satellite imagery obtained in 2008 from the high resolution SPOT satellite. The waypoints and tracks obtained during the transect walk will be processed in a geo-database and analyzed in ArcMap. Based on information from traditional healers, collectors and villagers we want to draw a resource flow map, but the quantities of medicinal plants will not be included in this drawing.

The responses from the interviews will be recorded and analyzed. The frameworks that will be used for the interview data analysis will depend on the answers we will get. Participant observations will be used to figure out if people do as they say.

Ethnographic data collected through participant observation and the resource flow map will be used to make a simple actor-network analysis. The analysis is made in order to understand how the medicinal plants impact the social relations of the villagers and consequently their social capital. The network analysis is about following and describing the effects of a relationship between actors (both subjects and objects), which in our case are persons and the medicinal plants. We want to investigate how the actors

affect each other and how their relationship is shaping a network of other relations and actions, and all this in order to understand the value of a certain object and how this is affecting social life (Latour, 2005).

Time Schedule

Table 3: Overall time schedule of research study

Period	Location	Activities
31th of January - 14th of February	KU, DK	Literature review, synopsis
14th of February (11 pm)	KU, DK	Submitting draft synopsis
16th of February (9 am)	KU, DK	Presentation of synopsis
16th of February - 22th of February	KU, DK	Revising synopsis and submitting final synopsis
22th of February (12 am)	KU, DK	Submitting final synopsis
24th of February - 25th of February	UKZN, SA	Discussion of field work with counterparts in South Africa
27th of February - 6th of March	ON, SA	Data collection
8th of February	UKZN, SA	Presentation of results
14th of March - 1st of April	KU, DK	Data processing and analysis, report writing
1st of April (1 pm)	KU, DK	Submitting report
<i>KU, DK = University of Copenhagen, Denmark; UKZN, SA = University of KwaZulu-Natal, South Africa; ON, SA = Ongeluksnek, South Africa</i>		

Table 4: Time schedule for field work

Activities	Location	February						March							
		23	24	25	26	27	28	1	2	3	4	5	6	7	8
		W	Th	F	Sa	Su	M	Tu	W	Th	F	Sa	Su	M	Tu
Arrival	Pietermaritzburg	x													
Meeting with counterparts	UKZN		x												
Study preparations	UKZN		x	x											
Travel to field site	Villages				x										
Explore study area	Villages				x	x									
Questionnaires	Villages					x	x								
Semi-structured interview with chief	Villages					x									
Arrangements with Sangoma	Villages						x								
Transect walk + PRA + semi-structured interview with sangoma	Villages							x	x						
Transect walk + PRA + semi-structured interview with collector	Villages								x	X					
Semi-structured interview with grower	Villages							x							
Semi-structured interview with villager	Villages								x						
Unstructured interview with villager	Villages									X	x				
Semi-structured interview with nature reserve staff	Villages											x			
Semi-structured interview with mission staff	Villages											x			
Rounding up	Villages											x	x		
Depart villages Preliminary data analysis and presentation	UKZN												x	x	x

Ethical Considerations

Ethnographic information about humans can be interesting and educative, but also potentially sensitive and there is a constant need for scientific researchers to manage the ethics of gathering and representing data and information. Researchers can be both an asset and a burden to a group of participants and the researcher needs to be aware of how burdensome their presence can be in the everyday lives of the participants (Scheyvens *et al.*, 2003). We suggest in order to avoid discomfort, embarrassment and anger, that the informants should be notified from the start of issues such as confidentiality, effort and amount of time required of them. It is also important that everyone involved knows what the aims and intentions are of the research.

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Appendix 1: Draft Questionnaire for Small Scale Survey

We hope to get at least 30 households' answers on our questionnaire. The questionnaire contains both basic information on the person interviewed and her/his household as well as closed-ended questions regarding their dependence on medicinal plants.

Information on the wealth of the household is important, but since questions regarding income might be sensitive, indirect indicators of wealth will be discussed with our counterparts or determined when we have arrived and got an impression of the village, if this is the case; rows will be left empty in the questionnaire and the final "questions" will be added in the field. A pilot-survey will be conducted with our interpreter.

The questions in the survey will be read and, depending on the respondent's ability to understand English, be translated by the interpreter.

Structure of the interview:

1. Introduction: We, a group of students from both the University of Copenhagen, Denmark, and University of KwaZulu-Natal, South Africa, study the use of medicinal plants in your village. We kindly ask you to participate in the questionnaire survey. Your answers will confidentially be kept anonymous.
2. The interview (*Note: By household we mean people who contribute to and benefit from the same income in the house*)
3. Thank you for your time. We appreciate it!

	Household Number												
	GPS waypoint												
	Interviewer (A.S/M.W/R.J/R.N/T.A)												
0.	Indicators of wealth will be figured out when in Pietermaritzburg or when we arrive in the village												
1.	Gender	Female											
		Male											
1.1.	Age												
1.2.	Highest education (one answer)	Illiterate											
		Primary											
		Secondary											
		High School											
		University											

2.	Household Size													
	Number of children (< 18 years)													
	2.1. Number of women in the household													
	2.2. Number of men in the household													
	2.3. Number of people in the household away from home													
3.	Tribe (one answer)	Sotho												
		Xhosa												
		Other												
		No answer												
4.	Main income sources (multiple answers)	Agriculture												
		Remittances												
		Pensions												
		Handcraft												
		Other												
		No answer												
5.	Does your family use medicinal plants? (one answer)	yes												
		no												
		No answer												
	5.1.	For what purpose? (multiple answers)	illness/ preventing illness											
			For luck or spiritual purposes											
			Other											
			No answer											
6.	Does your family collect medicinal plants? (one answer)	yes												
		no												
		No answer												
	6.1.	For what use? (multiple answers)	For own use											
For the animals														
For sale														
No answer														
6.2.	Who collects medicinal plants (multiple answers)	Mother												
		Father												
		Children												
		Grandparents												
		Other												
No answer														
7.	Does your household cultivate medicinal plants? (one answer)	Yes												
		No												
		No answer												
7.1.	For what use?	For own use												

7.2.	(multiple answers)	For the animals											
		For sale											
		No answer											
	IF SALE: What is your annual income from medicinal plants (one answer)	< 1000 R											
		1000 - 3000 R											
		< 3001 R											
8.	Does your family use modern medicine? (one answer)	yes											
		no											
		No answer											
	8.1.	For what purpose? (multiple answers)	Illness/ preventative illness										
			For luck or spiritual purposes										
			Other										
No answer													
9.	Does your family visit a traditional healer? (one answer)	Yes											
		No											
		No answer											
	9.1.	IF YES: Who? (multiple answers)	Izinyanga										
			Sangoma										
			Other										
No answer													
9.2.	For what purpose? (multiple answers)	Illness/ preventative illness											
		For luck or spiritual purposes											
		Other											
		No answer											
9.3.	How many times a year does your family visit the Sangoma (one answer)	>3											
		4-10											
		< 10											
		No answer											

Appendix 2: General Information for each Semi-Structured Interview

Time and date for the interview	
Location	
Interviewer(s) (A.S/M.W/R.J/R.N/T.A)	
Referent(s) (A.S/M.W/R.J/R.N/T.A)	
Others attending the interview (except from the informant)	

The following table is to be filled out in the beginning of each semi-structured interview.

Data on semi-structured interview with:	
--	--

Informant					
Name:		Highest Education	Illiterate	Tribe	Sotho
Gender	Female		Primary		Xhose
	Male		Secondary		No answer
Age			High School		Other
			University		If other, what?

Household information					
Household Size (total)		Number of children (<18 years)	Number of women	Number of men	Number of people away from home
Main source of income	Agriculture				
	Remittances				
	Pensions				
	Handcraft				
	No answer				
	Other				
	If other, what?				

Pictures	
Which camera	
Photo-numbers	

Other remarks:

Appendix 3: Interview Guide – Traditional Healer

Introduction with informant

- How long have you been practicing?
- Why did you become a healer?
- How did you learn to heal?
- Where are you born?

Acquisition of medicinal plants

- How do you acquire medicinal plants?
- Do you collect medicinal plants?
- Can you describe a normal day of collecting medicinal plants?
- How often do you collect?
- Can you collect plants wherever you want?
- Do you know others who collect medicinal plants?
- Do you buy medicinal plants
- From whom do you buy medicinal plants?

Clients

- The typical patient: age, sex, tribe etc.
- How many clients do you have every day?
- For what reasons do people visit you?
- Do you use plants for curing physical illnesses?
- Do you use plants for any other purposes?

[Seasonal calendar]

Medicinal plants species used

- List of species *[ranking session]*
- Do you use any other plants when you cannot find the right plants?
- Is it possible to substitute medicinal plant parts (leaves instead of roots etc.)?

Description of his/her use of the medicinal plants

- Preparation of medicinal plants (dry/fresh, mix of plants?)
- What makes the plants powerful (rituals?)
- (How do you know?)
- Do you tell people why and how the plants are working and curing them?

Cultivation of medicinal plants

- Do you cultivate medicinal plants?
- Do the plants maintain their healing properties if they are cultivated?
- (Can some plants be cultivated while others not?)

Role in the society in terms of healthcare

- How do you see your role in the village health care?

Modern medicine

- What is your opinion on modern medicine?
- Do you use it in your work?

Collaboration with others

- Are you certified as a traditional healer?
- Are you part of an association of traditional healers?
- If not, would you like to be?
- Do you collaborate with the clinic (mission)?

DURING THE TRANSECT WALK**Harvesting of medicinal plants**

- Which plants are collected?
- Which plant parts are collected?
- How are they harvested?
- How much do you collect at a time?
- How often do you collect?

Sustainability of medicinal plant resource

- Have you experienced any scarcity (over time)?
- What do you consider as constraints to the plant resource?
- Are you aware of any program or projects dealing with conservation of biodiversity?

Appendix 4: Interview Guide - Chief

General village information

- (What are your responsibilities as a village chief?)
- Who owns the village land and land in the immediate vicinity of the village?
- Who has the rights to use, extract, manage, exclude and sell the land (where medicinal plants are grown)?

Medicinal plants in the village

- Are you concerned about the biodiversity of medicinal plants in the village?
- Are you aware of any biodiversity conservation programs for medicinal plants in the area?
- What would you consider as threats/constraints/possibilities to medicinal plant resource?

Maybe: The chief's use of medicinal plants

- What is your opinion on medicinal plants?
- Conduct the questionnaire (→ Does he use medicinal plants?)

Appendix 5: Interview Guide – Collector (Villager)

Introduction with the informant

- How long have lived in the village?
- How long have you been collecting medicinal plants?
- How did you learn to collect medicinal plants?
- Why do you collect medicinal plants (own use/sale?)

Acquisition of medicinal plants

- List of species
- Can you describe a normal day of collecting medicinal plants?
- How often do you collect?
- Can you collect plants wherever you want?
- Do you buy medicinal plants?
- (From whom do buy medicinal plants?)
- Do you know others who collect medicinal plants?

Trading of medicinal plants

- To whom do you sell (traditional healer? Typical customer: age, sex, tribe etc.)?
- Where are the markets?
- Can you explain the procedures of selling?

- Is there a difference in the plants you collect and the plants you sell?
- Which are the high-value species? [*ranking*]
- Why are some more valuable than others? Are these more difficult to collect?

- Are medicinal plants your only source of income?
- How important are medicinal plants to your income?

Cultivation of medicinal plants

- Do you cultivate medicinal plants?
- Why do you cultivate medicinal plants?
- (Can some plants be cultivated while others not?)

DURING THE TRANSECT WALK

Harvesting of medicinal plants

- Which plants are collected?
- Which plant parts are collected?
- How are they harvested?
- How much do you collect at a time?
- How often do you collect?

Sustainability of medicinal plant resource

- Have you experienced any scarcity (over time)?
- What do you consider as constraints to the plant resource?
- Are you aware of any program or projects dealing with conservation of biodiversity?

Appendix 6: Interview Guide – Villager Using Medicinal Plants for Cultural Purposes

Semi-structured interview

Introduction with the informant

- How long have lived in the village?
- Who in the family uses medicinal plants?
- How did you learn to use medicinal plants?
- Do you share the knowledge/information with anyone else?

Cultural uses of medicinal plants

- Do you know in which social settings medicinal plants are used?
- Who are participating and why (age, gender etc.)?
- Who are not participating and why (age, gender etc.)?

- Do you worry about the future of indigenous knowledge on medicinal plants (in your culture)?

Modern medicine

- Do your religious beliefs influence your use of medicinal plants?
- Do you believe in modern medicine?
- Do you use it yourself?
- For which purposes do you take western medicine and why?

Unstructured interview

Can you tell us about the actions taking place in a certain situation where traditional medicine is used?

- Social settings
- Importance
- After the session

Appendix 7: Interview Guide - Grower

Introduction with the informant

- How long have lived in the village?
- How long have you been cultivating medicinal plants?
- How did you learn to cultivate medicinal plants?
- Do you share the knowledge/information with anyone else?
- Do you also collect medicinal plants from the wild? Which ones and why?

Cultivation of medicinal plants

- Do you use the cultivated plants yourself or do you sell them?
- (To whom? What are the markets?)
- (How important is it as a source of income?)
- Which species are cultivated?
- Is there a difference between harvesting methods from a wild plant and a cultivated one?
- What determines viability?
- What are the constraints to cultivation?
- Do you have any suggestions on how to improve cultivation?

Appendix 8: Interview Guide - Nature Reserve Staff

Introduction with the informant

- Where do you live? (In the *village*?)
- How long have you worked in the reserve?
- What are your responsibilities in the Nature Reserve?
- Who owns the nature reserve land?

Management of medicinal plant resource within the Nature Reserve

- Are there any medicinal plants here?
- Is it allowed to collect medicinal plants?
- Are there any restrictions of what can be collected?
- Do people collect medicinal plants?
- Who are collecting? (from the village or outside the village)

- Are more people collecting medicinal plants now than earlier years?
- Is the collection a problem and why? (scarcity)

Conservation of medicinal plants

- Are there any programs/projects to increase/conservate biodiversity in the nature reserve?
- Have there been any projects before?
- How successful have they been?
- How would you conserve the medicinal plant resources (suggestions)?

Appendix 9: Interview Guide - Mission Staff

Introduction with the informant

- Where do you live? (In the mission?)
- How long have you worked at the mission?
- What are your responsibilities in the mission?

Modern medicine – traditional medicine

- How do you regard your role as a “spiritual leader” in the village?
- How do you think the villagers regard your role as a “spiritual leader” in the village?
- What is the mission’s opinion on medicinal plant use?
- Do you have experiences of people coming to the mission to search for spiritual guidance etc. which they cannot get from the traditional healing?
- Are you able to influence people’s behaviors in terms of medicinal plant/traditional healing use? Examples?

Appendix 10: Interview Guide - Clinic Staff

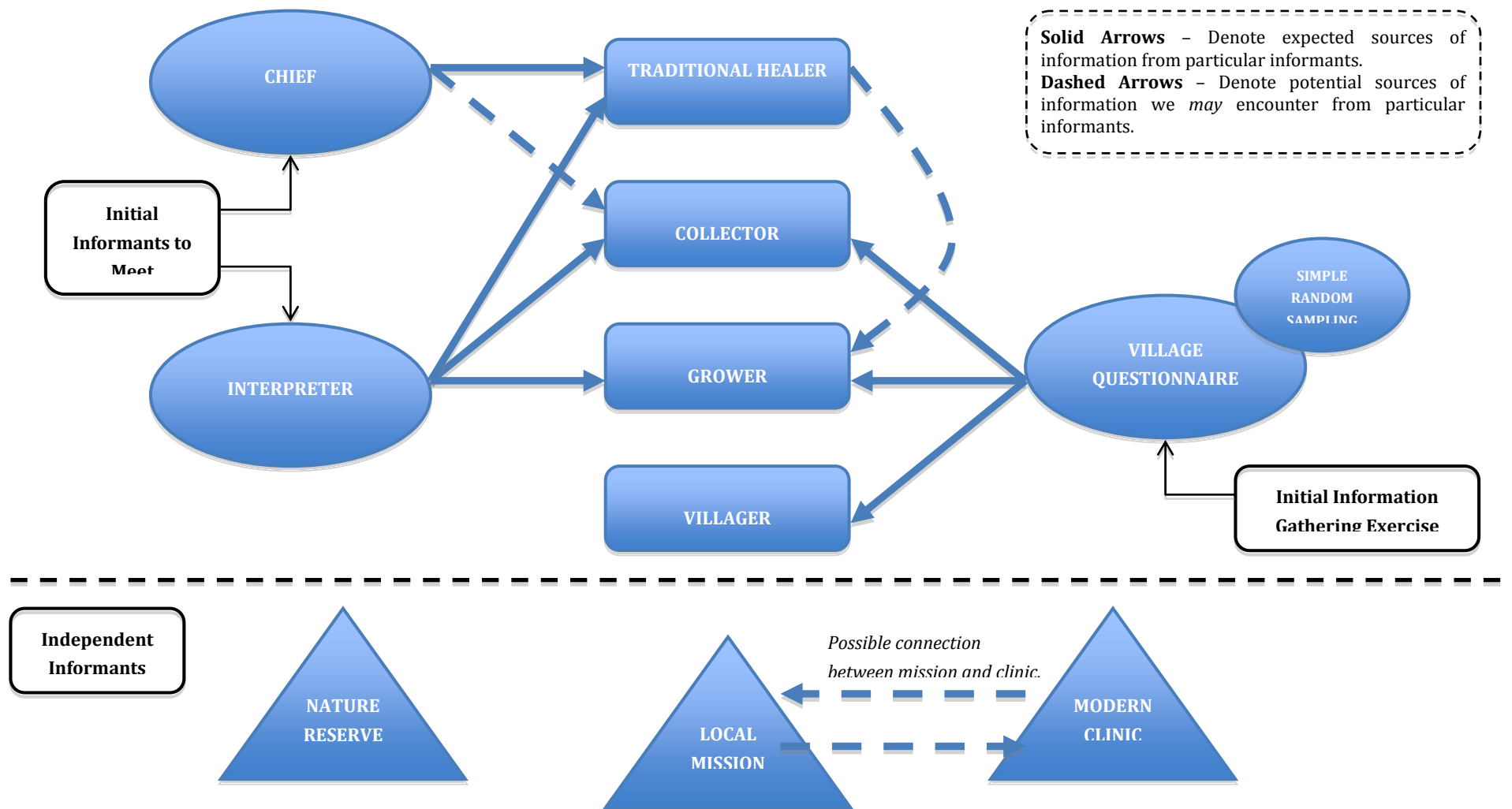
Introduction with the informant

- Where do you live? (In the *village*?)
- How long have you worked at the clinic?
- What are your responsibilities in the clinic?

Modern medicine – traditional medicine

- How do you regard your role in the village health care?
- How do you think the villagers regard your role in the village health care?
- What is the clinic's opinion on medicinal plant use?
- Are there any examples where people choose modern instead of traditional medicine? What about vice versa?
- Do you receive patients who have consulted traditional healers first, without success, and then come to the clinic? How serious are these cases?
- Do you collaborate with traditional healers? With whom and how?
- Do you use/prescribe any herbal medicines at the clinic?
- Do you think traditional and modern medicine can be successfully combined in the long term? How?

Appendix 11: Intended Path to Identifying Key Informants



Appendix 12: Preliminary Datasheet for Ranking Exercise

Plant species			Growth habit (tree/shrub/herb)	Plant part used	Purpose of use (physical illness/spiritual)	Ecology (short description)	Importance in terms of		
Scientific name	Local name	English name					Collection	Economic	Scarcity