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Comparative use patterns of plant resources in rural areas of South Africa and Zimbabwe

Patrones comparativos de uso de los recursos vegetales en zonas rurales de Sudáfrica y Zimbabwe

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Abstract. Documentation of use patterns of plants across national boundaries is of relevance in understanding the importance of plant resources to livelihood strategies of different ethnic groups. Plant resources have gained prominence as a natural asset through which families derive food, firewood, income, medicines and timber, enabling particularly poor communities to achieve self-sufficiency. The objective of this study was to investigate the trends in plant usage in South Africa and Zimbabwe. An ethnobotanical investigation was conducted between January 2012 and January 2013 in the Limpopo Province, South Africa and the Midlands Province, Zimbabwe. The study used questionnaire surveys and interviews with a total of 143 participants to explore plant use patterns in South Africa and Zimbabwe. A total of 98 plant species were identified, with Zimbabwe contributing 70 species and 47 species from South Africa. The uses were classified into 15 categories, major use categories were firewood, food plants, medicine and timber. Food plant was a major plant use category in Zimbabwe, contributing 55.1%, followed by medicinal plants (36.8%), firewood (35.7%) and timber (31.6%). In contrast, firewood was the major plant use category in South Africa, contributing 18.4%, followed by food plants (17.3%), medicinal (14.3%) and timber (1.0%). Comparison of the two countries demonstrated remarkable differences in plant use patterns. The results showed that rural households in Zimbabwe were more reliant on plant resources than their counterparts in South Africa. Such a trend could be attributed to a close relationship between the local people, and their natural and agricultural environment leading to a rich knowledge base on plants, plant use and related practices. This comparative analysis strengthens the firm belief that utilization of plant resources represents an important shared heritage, preserved over the centuries, which must be exploited in order to provide further new and useful body of ethnobotanical knowledge.

Keywords: Ethnobotany; Plant use; Rural communities; South Africa; Zimbabwe.

Resumen. Documentar los patrones de uso de plantas a través de las fronteras nacionales es de relevancia para entender la importancia de los recursos vegetales para las estrategias de sustento de los diferentes grupos étnicos. Los recursos vegetales han ganado un lugar prominente como bienes naturales por medio de los cuales las familias obtienen alimentos, leña, ingreso, medicinas y madera, permitiéndole particularmente a las comunidades más pobres alcanzar la autosuficiencia. El objetivo de este estudio fue investigar las tendencias en el uso de plantas en Sudáfrica y Zimbabwe. Una investigación etnobotánica fue llevada a cabo entre enero del 2012 y enero del 2013 en la provincia de Limpopo, Sudáfrica y la provincia de Midlands, Zimbabwe. Se realizaron encuestas y entrevistas a un total de 143 participantes, por medio de las cuales se exploraron los patrones de uso de plantas en Sudáfrica y Zimbabwe. Se identificó un total de 98 especies de plantas, de las cuales Zimbabwe contribuyó con 70, mientras que Sudáfrica lo hizo con 47 especies. Los usos fueron clasificados en 15 categorías, siendo leña, plantas comestibles, plantas medicinales y maderas las más importantes. La categoría plantas comestibles fue la de mayor importancia en Zimbabwe contribuyendo con 55,1% del total, seguido por las plantas medicinales (36.8%), leña (35,7 %) y madera (31,6 %). En contraste, el uso de plantas para la obtención de leña fue la categoría de uso más importante en Sudáfrica (18,4%), seguido de plantas alimenticias (17,3%), plantas medicinales (14,3%), y maderas (1,0%). La comparación entre los dos países mostró diferencias muy notorias en el patrón de uso de plantas. Los resultados mostraron que los hogares en zonas rurales de Zimbabwe eran más dependientes de los recursos vegetales que sus homólogos en Sudáfrica. Esta tendencia podría atribuirse a la relación cercana entre la población local y su entorno natural y agrícola, lo cual implica una base de conocimientos abundante acerca de las plantas, sus usos y otras prácticas. Este análisis comparativo refuerza la firme creencia que el uso de los recursos vegetales representa una importante herencia compartida, preservada a través de los siglos, y que debe ser aprovechada para seguir proveyendo un cuerpo de conocimiento etnobotánico nuevo y útil.

Palabras clave: Etnobotánica; Uso de las plantas; Comunidades rurales; Sudáfrica; Zimbabwe.

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INTRODUCTION

Plants provide people with food, fuel and medicine, as well as materials for construction and manufacturing of crafts and many other products (Hamilton et al., 2003). Several ethnobotanical studies in tropical Africa (Lykke et al., 2004; Theilade et al., 2007; Ayantunde et al., 2008) and in similar regions in the rest of the world (Albuquerque et al., 2005; Ladio et al., 2007) have emphasized the relative importance of plant species to the livelihoods of local communities. Plants in South Africa provide a wide range of goods and services, predominantly fruits and shade to rural households, which when incorporated into their livelihood strategies, help reduce their vulnerability to adversity (Paumgarten et al., 2005). Research by Shisanya (2011) showed that ethnobotanical inventory in any given geographical setting is regarded as important in response to the rapid loss of plant diversity and genetic resources, and the associated loss of ethnobotanical knowledge. This type of knowledge often referred to as traditional ecological knowledge (TEK) is a cumulative body of knowledge about the relationships that living organisms (including people) have with each other and with their environment, that is handed down across generations through cultural transmission (Berkes, 1999). Traditional ecological knowledge is dynamic and evolves as people build on their experiences, observations, experimentation, interaction with other knowledge systems, and adaptation to changing environmental conditions over time (Charnley et al., 2007). Local communities are known to harbour important information on valuable plants and vegetation dynamics that is fundamental for management strategies aimed at sustainable use and conservation of natural vegetation (Lykke, 2000). In view of the fact that most people in rural communities in developing countries collect non-timber forest products (NTFPs) for livelihood or as a survival strategy, there is need for sustainable use of these resources to guard against deforestation and loss of biodiversity. Previous research by Ayantunde et al. (2008) showed that a good understanding of local knowledge of native plant species enhanced sustainable natural resource management in southwestern Niger.

The Human Development Index (HDI) gives the degree of progress with respect to life expectancy, adult literacy, school enrolment and per capita income. This index is higher for the Limpopo (0.5943) (South Africa Human Development Report, 2003) than the Midlands Province (0.401) (Zimbabwe Human Development Report, 2003). Previous research in South Africa by Cunningham & Davis (1997) showed that fuelwood, fencing and building materials constituted the highest volume of plant materials used annually. Similarly, research in Zimbabwe showed that rural inhabitants, who comprise over 80% of the national population, utilize wood as their major source of energy for cooking and heating (Grundy et al., 1993). The livelihood of the majority of people in Midlands Province, Zimbabwe is inextricably linked to the environment because subsistence and livestock farming are the predominant livelihood activities (Maroyi, 2011). Apart from subsistence and livestock farming, most households in the Midlands Province derive part of their livelihoods from harvesting NTFPs such as firewood and wild fruits from the wild (Maroyi, 2011). Rural communities in the Limpopo Province are known to depend on land-based activities such as cultivation of home gardens, subsistence arable and livestock farming and extensive collection of natural resources from the surrounding communal lands (Paumgarten et al., 2005; Rasethe et al., 2013). Given such dependence on plant resources to meet their daily livelihood needs, there is a need to investigate the trends in plant usage by different cultures or ethnic groups in these two southern African countries.

A large number of people in southern Zimbabwe (Masvingo, Midlands and Matebeleland Provinces) share historical, kinship and linguistic ties with people in the Limpopo Province (northern part) of South Africa. For example, languages such as Ndebele, Tsonga and Venda are spoken on both the Zimbabwean and South African sides of the Limpopo River. Mobility of people in southern Africa predates artificial colonial borders. Even after the establishment of these borders, people tend to ignore them as they continue to visit their relatives across national borders (Mlambo, 2010). The study sites are still to a large degree characterized by low capital, poor infrastructure, high unemployment and high population density (Paumgarten et al., 2005; Maroyi, 2011).

Although indigenous knowledge of local communities is recognized as a vital input in plant resource management (Ayantunde et al., 2008), relatively little comparative studies have been done on utilization of plants by various cultures or ethnic groups in the African continent. The majority of case studies carried out so far are from the developed world (Díaz-Betancourt et al., 1999; Leporatti & Ivancheva 2003; Pieroni & Quave 2005; Leonti et al., 2006; Pardo-de-Santayana et al., 2007; Leporatti & Ghedira 2009), which are highly urbanised and with relatively low population growth rates. Such comparative studies assist in exploring potential analogies and differences in plant use as a result of reciprocal exchanges that have taken place over the centuries (Leporatti & Ivancheva 2003). Research by Leporatti & Ghedira (2009) showed that such comparative analysis strengthens the firm belief that ethnobotanical findings represent not only an important shared heritage, developed over the centuries, but also a considerable mass of data that should be exploited in order to provide new and useful knowledge. It is within this context that we sought to identify plant use patterns in South Africa and Zimbabwe.

MATERIALS AND METHODS

Study area. The study was conducted in two villages (Ga-Sekgopo and Monywaneng) in the Limpopo Province, South Africa and seven villages (Chikato, Donga, Gamwa, Gundura, Hanke, Tongogara and Zvamatenga) in the Midlands Province, Zimbabwe (Fig. 1, Table 1). These two selected provinces in South Africa and Zimbabwe are characterized by direct contact and sharing of several environmental and physiographic traits (Table 1). The study sites were chosen based on similar environmental and physical factors in terms of vegetation, cultivated crops, average annual temperature, rainfall and elevation (Table 1).

Data collection. In order to document plant use patterns in South Africa and Zimbabwe, several field surveys were car-

Fig. 1. Map of southern Africa illustrating the geographical position of the study sites.
Fig. 1. Mapa de África meridional ilustrando la posición geográfica de los sitios de estudio.

Table 1. Summary of characteristics of the two major ethnic groups interviewed as well as environmental characteristics of the study sites (*).
Tabla 1. Resumen de las características de los dos grupos étnicos principales entrevistados, y de las características ambientales de los sitios de estudio (*).

	Bapedi (n=60)	**Karanga (=83)**
Origins and description of the ethnic group	Bapedi is a subgroup of the northern Sotho people, the largest ethnic group in the Limpopo Province of South Africa	Karanga is a dialectical group of the Shona people, the largest ethnic group in Zimbabwe
Vernacular language	Sepedi	ChiKaranga
Location	Ga-Sekgopo and Monywaneng villages, Limpopo Province, South Africa	Chikato, Donga, Gamwa, Gundura, Hanke, Tongogara and Zvamatenga villages, Midlands Province, Zimbabwe
Altitude	1377 m	1200 m
Latitude	23° 53' S - 23° 54' S	19° 57' S - 20° 30' S
Longitude	29° 27' E - 29° 48' E	30° 00' E - 30° 58' E
Mean annual precipitation	495 mm	700 mm
Rainy season	Summer (October-March)	Summer (November-March)
Mean annual temperature	17 °C	19 °C
Vegetation	Semi-arid savanna, dominated by Acacia spp, Albizia spp, Combretum spp, Gymnosporia spp, Grewia spp, Sclerocarya spp and Terminalia spp.	Drier miombo woodland, dominated by Brachystegia spiciformis Benth., and Julbernardia globiflora (Benth.) Troupin, Hyparrhenia spp, Eragrostis spp, Heteropogon spp and Digitaria spp.
Soil type	Dominated by gneissic and granite rocks, with Hutton, Glenrosa, Oakleaf and Shortlands soil types; sandy to loam soils are dominant	Soils are derived from granitic-gneissic rocks, giving rise to sandy soils, with low water-holding capacity, low fertility, low pH and deficiencies in nitrogen, phosphorus and sulphur
Main crops	Main crops include maize (*Zea mays* L.), Pearl millet (*Pennisetum glaucum* (L.) R. Br.) and grain sorghum (*Sorghum bicolor* (L.) Moench), Cowpea (*Vigna unguiculata* (L.) Walp.), Bambara groundnuts (Vigna subterranean (L.) Verdc.) and mung bean [*Vigna radiata* (L.) Wilezek]	Main crops include maize (*Zea mays* L.), sorghum (*Sorghum bicolor* (L.) Moench), millet (*Pennisetum glaucum* (L.) R. Br.), pumpkins (*Cucurbita maxima* Duchesne ex Lam.), covo (*Brassica carinata* A. Braun), rape (*Brassica rapa* L.), cabbage (*Brassica oleracea* L.) and beans (*Phaseolus vulgaris* L.)

*Source: Vincent & Thomas, 1961; Wild & Barbosa, 1968; Nyamapfene, 1991; McGregor, 1994; LSOER, 2005; M'Marete, 2003; Paumgarten et al., 2005; Mucina & Rutherford, 2006; Maroyi, 2011, 2013; Rasethe et al., 2013.

ried out between January 2012 and January 2013. Sixty randomly selected participants were interviewed between January and June 2012 in Ga-Sekgopo and Monywaneng, Limpopo Province, South Africa. Similarly, eighty three randomly selected participants were interviewed in Chikato, Donga, Gamwa, Gundura, Hanke, Tongogara and Zvamatenga villages, Midlands Province, Zimbabwe between December 2012 and January 2013. Prior informed consent was sought from each participant before interviewing them, and we adhered to the ethical standards of the International Society of Ethnobiology (International Society of Ethnobiology, 2006). Participatory rural appraisal (PRA) methods were used (Chambers, 1994) to systematically collect data on plant utilization [plant species and part(s) used, use(s), preparation and harvesting frequency] and local name of the plant species in question.

Plants mentioned by the participants during the interviews were collected. Plants were initially identified by participants with their vernacular names. Voucher specimens of plants collected in South Africa were verified and deposited for future reference at the Larry Leach Herbarium (UNIN) of the University of Limpopo, while those collected in Zimbabwe were verified and deposited for future reference at the National Herbarium and Botanic Garden, Harare (SRGH).

Data management and analysis. The data collected were entered in Microsoft Excel 2007 program and were later analyzed for descriptive statistical patterns. During analysis, data on plant use patterns were summarized into major themes by content analysis (Chambers, 1994). Descriptive statistics, such as percentages and frequencies were used to analyze the data obtained from the questionnaires. Bar graphs were generated using Microsoft Excel 2007 program.

RESULTS AND DISCUSSION

Demographic data of the participants. Table 2 shows the demographic characteristics of the participants. Of the one hundred and forty three participants, 56.6% were female and 43.4% were male. Their ages ranged from 18 to 87 years, with 52 years as the median. The majority of participants were married (62.2%), 16.8% widowed, 9.1% never married, 7.7% divorced and 4.2% separated (Table 2). The majority of households (70.7%) comprised between three and six family members, while 10.5% had one or two household members and 18.9% had more than seven family members (Table 2). The majority (50.3%) of the participants were educated up to secondary level, while 31.5% had attained primary education, 4.9% had attained tertiary education and 6.5% had no formal education. More than half of the participants (57.3%) were unemployed, surviving on less than R2000 a month (Table 2). A very small proportion of the participants had a constant income as either self-employed (24.5%) or employed by government or private companies (18.2%) (Table 2).

Table 2. Demographic and descriptive data of the participants, N=143.
Tabla 2. Datos demográficos y descriptivos de los participantes, N=143.

Socio-economic variables		Number	%
Gender	Female	81	56.6
	Male	62	43.4
Age (years)	<20	5	3.5
	20-39	32	22.4
	40-59	68	47.6
	60-79	34	23.8
	>80	4	2.8
Marital status	Separated	6	4.2
	Never married	13	9.1
	Widowed	24	16.8
	Married	89	62.2
	Divorced	11	7.7
Household size	1-2	15	10.5
	3-4	53	37.1
	5-6	48	33.6
	>7	27	18.9
Highest level of education	No education	19	13.3
	Primary	45	31.5
	Secondary	72	50.3
	Tertiary	7	4.9
Occupation	Unemployed	82	57.3
	Employed	26	18.2
	Self-employed	35	24.5
Combined monthly income	Less than R1000*	46	32.2
	R1001-2000	73	51.0
	R2001-3000	13	9.1
	R3001-4000	9	6.3
	R4001-5000	2	1.4

*1 Rand = USD 0.115.

Plant richness. A total of 98 plant species were used by the people of the Limpopo Province, South Africa and the Midlands Province, Zimbabwe. **H**igher species numbers [70 species, (71.4% of the total)] were recorded in Zimbabwe compared to South Africa [47 species, (48.0% of the total)] (Table 3). Higher plant family numbers and genera were also recorded in Zimbabwe than South Africa (Table 3). The majority of the utilized plant species in the Limpopo Province, South Africa (91.5%) were indigenous species, when compared with 87.1% indigenous species recorded in the Midlands Province, Zimbabwe (Table

3). *Opuntia ficus-indica* (L.) Mill. (edible fruits/hedge), *Melia azedarach* L. (firewood/fodder/ornamental) and *Solanum lycopersicum* L. (edible fruits/medicine) were among utilized exotics recorded in both South Africa and Zimbabwe. With the exception of *Eucalyptus grandis* W.Hill ex Maiden used in South Africa for firewood, six additional exotic species were recorded in Zimbabwe only. Among these were common food plants such as *Amaranthus hybridus* L. (pigweed), *Chenopodium album* L. (wild spinach), *Cucumis anguria* L. (bur cucumber), *Lantana camara* L. (cherry pie), *Physalis angulata* L. (cutleaf groundcherry), and *Solanum nigrum* L. (black nightshade). Four of these exotics (*E. grandis*, *L. camara*, *M. azedarach* and *O. ficus-indica*) are declared weeds and invaders in South Africa, listed under the Conservation of Agricultural Resources Act (1983) No. 43 of 1983. Maroyi (2012) classified *A. hybridus*, *C. anguria* and *P. angulata* as naturalized in Zimbabwe, while *C. album*, *L. camara*, *M. azedarach* and *O. ficus-indica* were classified as invasives. These species pose an immediate and significant threat by virtue of their aggressive qualities and having the capacity to invade natural habitats and overwhelm some of the indigenous species (South Africa, 1983). Therefore, these species including other naturalized exotics, and those exotics still confined to cultivation have the potential to spread into the natural environment. If this happens, they might become problematic in the future as alien plant species invasions are causing major conservation problems in many regions of the world (Vitousek et al., 1997; Vilà et al., 1999).

A large number of utilized plant species in South Africa and Zimbabwe (55, 56.1%) are from 10 families (Fig. 2). The most dominant families were: Fabaceae *sensu lato* (16 species), Anacardiaceae (7 species), Combretaceae (6 species), Ebenaceae and Phyllanthaceae (5 species each), Tiliaceae (4 species), Amaranthaceae, Loganiaceae, Solaniaceae and Verbenaceae (3 species each). Species belonging to Amaranthaceae and Loganiaceae families were utilized in Zimbabwe only. The genera with the highest number of utilized species were *Combretum* with five species, *Grewia* with four species, *Euclea, Rhus* and *Strychnos* with three species each, and *Acacia*, *Aloe, Amaranthus, Bauhinias, Bridelia, Carissa, Cleome, Diospyros, Ficus, Gymnosporia, Lannea, Solanum* and *Ximenia* with two species each. Amaranthaceae, Anacardiaceae, Combretaceae, Ebenaceae, Fabaceae *sensu lato*, Loganiaceae, Phyllanthaceae, Solaniaceae, Tiliaceae and Verbenaceae have the highest diversity of species used probably because these are large families in both South Africa and Zimbabwe, characterized by at least 20 species each (Mapaura & Timberlake, 2004; Germishuizen et al., 2006). In the study area, the family Amaranthaceae was represented by two genera, *Amaranthus* and *Chenopodium* used as leafy vegetables in Zimbabwe. *Amaranthus hybridus*, *Amaranthus thunbergii* Moq. and *C. album* are well known agricultural weeds consumed as leafy vegetables in Zimbabwe (Maroyi, 2013). The three members of Loganiaceae family recorded in this study (*Strychnos cocculoides* Baker, *S. madagascariensis* Poir. and *S. spinosa* Lam.) are among common wild edible fruits gathered, preserved, stored and consumed some weeks or months after gathering in Zimbabwe (Maroyi, 2011). Additional uses of *Strychnos* species in Zimbabwe included firewood, medicine and timber.

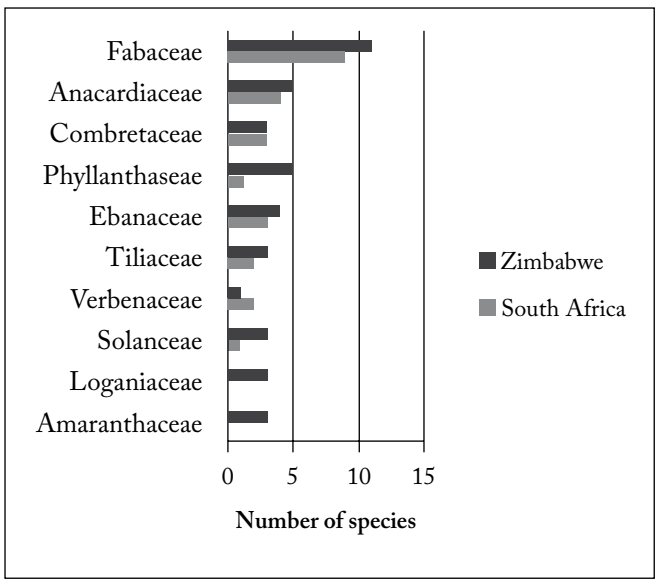

Fig. 2. Families with the highest number of utilized plants in the Limpopo Province, South Africa and the Midlands Province, Zimbabwe.
Fig. 2. Familias con mayor número de plantas utilizadas en la provincia de Limpopo, Sudáfrica y la provincia de Midlands, Zimbabwe.

Table 3. Summary of plant species recorded in the Limpopo Province, South Africa and the Midlands Province, Zimbabwe.
Tabla 3. Resumen de las especies de plantas registradas en la provincia de Limpopo, Sudáfrica y la provincia de Midlands, Zimbabwe.

		South Africa	Zimbabwe
Taxonomic rank	Family	28 (65.1%) *	28 (81.4%)
	Genera	41 (52.6%)	55 (78.2%)
	Species	47 (48.0%)	70 (71.4%)
Origin	Exotic	4 (8.5%)	9 (12.9%)
	Indigenous	44 (91.5%)	61 (87.1%)

* Percentage of total.

Table 4. Proportion of the utilized species contributing to each of the plant use categories.
Tabla 4. Porcentaje de las especies que contribuyen a cada una de las categorías de uso de las plantas.

Plant use category	South Africa (%)	Zimbabwe (%)
Edible fruits	17.3	43.9
Edible seed kernel	0	1.0
Fruit juice/beer	0	1.0
Inner bark chewed	0	1.0
Vegetable	0	8.2
Total % food plants	17.3	55.1
Ethnoveterinary medicine	0	3.1
Medicine	14.3	33.7
Total % medicinal plants	14.3	36.8
Firewood	18.4	35.7
Timber	1.0	31.6
Crafting	6.1	0
Dye	0	4.1
Toothbrush	0	4.1
Hedge	0	3.1
Ornamental	0	2.0
Thatching	0	2.0
Wooden fence	0	2.0
Broom	0	1.0
Fibre	0	1.0
Fodder	0	1.0
Rope	0	1.0

Plant use categories. Four major plant use categories identified in this study included firewood, food plants, medicine and timber (Table 4). A major plant use category in Zimbabwe were food plants, contributing 55.1%, followed by medicinal plants (36.8%), firewood (35.7%) and timber (31.6%). In contrast, firewood was the major plant-use category in the Limpopo Province, South Africa, contributing 18.4%, followed by food plants (17.3%), medicinal (14.3%) and timber (1.0%). Additional use categories recorded in Zimbabwe only included use of plants or plant parts as broom, dye, fibre, fodder, hedge, ornamental, rope, thatching, toothbrush and wooden fence. Use of plants or plant parts for making crafts was recorded in South Africa only (Table 4). A study conducted by Kepe (2003) in the Eastern Cape Province showed that craftwork is a significant component of the livelihood strategies of rural people in South Africa. Previous research in Zimbabwe by Maroyi (2011) found that rural communities in Zimbabwe make use of wild plants to supplement their diet, which is based on rainfed cultivation of staples such as cassava, maize, millet, sorghum and wheat. Similarly, research conducted in northern Nigeria by Harris & Mohammed (2003) found that wild foods are usually collected and used during times of food shortage, and can be of critical importance in livelihood and survival strategies for rural households and communities. Previous studies in South Africa (Van Wyk et al., 2009) and Zimbabwe (Gelfand et al., 1985) revealed a strong culture of herbal medicine usage for primary healthcare in both countries.

This study revealed use of plants as firewood as one of the major uses of plants in both South Africa and Zimbabwe (Table 4). Interviews with the participants revealed that the majority of the local people use firewood to cook their food, heat and light up their houses. Plant species used exclusively for firewood in the Limpopo Province, South Africa, mentioned by at least 10% of the participants included *Acacia karroo* Hayne (22%), *A. rehmanniana* Schinz (15%), *Berchemia discolor* (Klotzsch) Hemsl. (35%), *Combretum kraussii* Hochst. (35%), *Dichrostachys cinerea* (L.) Wight & Arn. (22%), *Dombeya rotundifolia* (Hochst.) Planch. (10%), *M. azedarach* (10%), *Peltophorum africanum* Sond. (10%) and *Philenoptera violacea* (Klotzsch) Schrire (13%). No plant species were used as firewood only in the Midlands Province, Zimbabwe. *Dichrostachys cinerea*, *P. africanum* and *P. violacea* were listed among the preferred species used for firewood in two previous studies by Madubansi & Shackleton (2007) and Makhado et al. (2012) carried out in the Limpopo Province, South Africa. According to these authors, these species are preferred because they have relatively dense wood that burns well with little smoke. Research by Makhado et al. (2012) also showed that high reliance on fuel wood in rural areas is due to the fact that it is the cheapest and most accessible source of energy to the majority of rural poor people.

Burkea africana Hook. (81%) and *Dalbergia melanoxylon* Guill. & Perr. (71%) were used exclusively as sources of timber in the Midlands Province in Zimbabwe. Twenty nine species (29.6% of the total species) were also used as timber in Zimbabwe. Interviews with participants in Zimbabwe revealed that timber is used in hut or house wall construction, roof beams, granaries, drying racks and livestock or crop enclosures. The participants also revealed that large quantities of timber were needed to roof storage huts, living huts and houses built of bricks. For example, previous research in Zimbabwe by Grundy et al. (1993) recorded 150 poles per structure for wooden huts, grain bins and cattle pens. Participants in the Limpopo Province, South Africa did not mention timber as a major plant use category in this study. However, rural inhabitants in South Africa are known to use poles for construction of traditional huts, maize granaries, fences, animal kraals and utensils such as mortars, pestles and wooden spoons (Liengme 1983). The same author documented use of wood to construct traditional structures in rural areas of South Africa.

Table 5. Useful plants recorded in both the Limpopo Province (South Africa) and the Midlands Province (Zimbabwe). Species marked with asterisk (*) are exotic to both South Africa and Zimbabwe.
Tabla 5. Plantas útiles registradas tanto en la provincia de Limpopo (Sudáfrica) y la provincia de Midlands (Zimbabwe). Las especies marcadas con un asterisco (*) son exóticas para Sudáfrica y Zimbabwe.

	Zimbabwe		South Africa	
Family, scientific name	**Frequency (%)**	**Use(s)**	**Frequency (%)**	**Use(s)**
Anacardiaceae				
Lannea discolor (Sond.) Engl.	16	Edible fruits, dye, firewood, hedge, medicine, timber	5	Edible fruits
Sclerocarya birrea (A.Rich.) Hochst	35	Edible fruits, firewood, medicine, timber	75	Edible fruits, firewood, medicine
Apocynaceae				
Carissa edulis (Forssk.) Vahl	21	Edible fruits, medicine	12	Edible fruits, firewood
Asparagaceae				
Asparagus suaveolens Burch.	13	Medicine	8	Medicine
Cactaceae				
**Opuntia ficus-indica* (L.) Mill.	12	Edible fruits, hedge	5	Edible fruits
Ebenaceae				
Diospyros lycioides Desf.	8	Edible fruits, firewood, timber, toothbrush	7	Edible fruits
Euclea crispa Gürke	13	Broom, edible fruits, firewood, timber, toothbrush	3	Crafting
Fabaceae *sensu lato*				
Acacia karroo Hayne	52	Wooden fence, firewood	22	Firewood
Burkea africana Hook.	81	Timber	22	Firewood, medicine
Dichrostachys cinerea (L.) Wight & Arn.	42	Wooden fence	22	Firewood
Peltophorum africanum Sond.	39	Firewood, medicine, timber	10	Firewood
Flacourtiaceae				
Flacourtia indica (Burm.f.) Merr.	25	Edible fruits, firewood	2	Edible fruits
Meliaceae				
**Melia azedarach* L.	12	Fodder, ornamental	10	Firewood
Moraceae				
Ficus ingens (Miq.) Miq.	18	Edible fruits, firewood, medicine, timber	8	Edible fruits
Phyllanthaceae				
Flueggea virosa (Roxb. ex Willd.) Voigt	8	Edible fruits, medicine, timber	8	Crafting, edible fruits
Rhamnaceae				
Berchemia discolor (Klotzsch) Hemsl.	80	Edible fruits, firewood, medicine, timber	35	Firewood
Ziziphus mucronata Willd.	21	Edible fruits, firewood, medicine, timber	12	Edible fruits, firewood
Rubiaceae				
Vangueria infausta Burch.	60	Edible fruits	17	Edible fruits

Solanaceae				
**Solanum lycopersicum* L.	18	Edible fruits, medicine	2	Medicine
Tiliaceae				
Grewia bicolor Juss.	6	Edible fruits, firewood, medicine, timber	15	Edible fruits
Xanthorrhoeaceae				
Aloe greatheadii Schönland	29	Ethnoveterinary medicine	22	Medicine

Plant species utilized in both South Africa and Zimbabwe. A total of 21 species were utilized in both South Africa and Zimbabwe (Table 5). Plant use categories were characterized by a higher number of species in Zimbabwe than South Africa (Table 5). For example, 13 species were utilized as edible fruits in Zimbabwe against 11 species in South Africa. Ten species were utilized as firewood in Zimbabwe against nine species in South Africa. Similarly, ten species were utilized as medicinal plants in Zimbabwe against five species in South Africa. Most of the plant species had wider applications and more than one use category in Zimbabwe than in South Africa (Table 5). Among the plant species used by at least 10% of the participants in Zimbabwe (Table 5), only *Asparagus suaveolens* Burch., *Burkea africana* Hook., *Dichrostachys cinerea* (L.) Wight & Arn. and *Vangueria infausta* Burch. had a single use application each. In South Africa, only four species [*B. africana*, *Carissa edulis* (Forssk.) Vahl, *Sclerocarya birrea* (A. Rich.) Hochst and *Ziziphus mucronata* Willd.] had more than one use applications with the rest characterized by a single use application (Table 5). With the exception of *S. birrea*, the frequency of plant usage was higher in Zimbabwe than South Africa (Table 5). In South Africa, the most frequently used species were *S. birrea* which was cited by 75% of the participants, followed by *Berchemia discolor* (Klotzsch) Hemsl. (35%); *Acacia karroo* Hayne, *Aloe greatheadii* Schönland, *B. africana* and *D. cinerea* (all cited by 22% of the participants). The most frequently used species in Zimbabwe were *B. africana* which was cited by 81% of the participants, followed by *B. discolor* (80%), *V. infausta* (60%), *A. karroo* (52%) and *D. cinerea* (42%) (Table 5).

The higher number of utilized plant species, and associated high number of plant use categories, in Zimbabwe could be attributed to a close relationship between the local people, and their natural and agricultural environment. This contributes to get a rich knowledge base on plants, plant use and related practices. Our results showed that rural households in Zimbabwe were more reliant on plant resources than their counterparts in South Africa. The economic decline in Zimbabwe, constant droughts, declining health providing system, HIV/AIDS, and rapidly increasing livelihood problems are the main reasons for the extensive exploitation of plant resources in the Midlands Province. Villagers, therefore, are forced to harvest various plant products which are used to supplement household nutritional requirements, herbal medicines, meet energy demand and provide the primary source of poles used for construction of traditional structures. The vast differences observed in South Africa and Zimbabwe are mainly due to socio-economical differences, characterized by deep infrastructural and economic differences. Another significant difference is the HDI according to international measures of both the social and economic development (South Africa Human Development Report, 2003; Zimbabwe Human Development Report, 2003). South Africa is considerably much better than Zimbabwe. Provision of social pension and disability grants, and food packages distributed by the South African government through the Department of Social Development decrease the amount of pressure on plant resources in the Limpopo Province, South Africa. As a form of social protection, social grants are vital components of rural livelihoods; they not only ameliorate poverty and provide a safety net but also potentially promote social transformation in rural areas (Kepe, 2003).

CONCLUSIONS

The present study explored and reviewed the contribution that plant resources make to rural welfare. Existing use patterns were examined including types of goods derived from both South Africa and Zimbabwe, including species used in both countries and how they are utilized. We believe that our work makes an important contribution to the body of empirical ethnobotanical research by demonstrating that the improved formal health sector, provision of social services and energy do not necessarily displace the utilization of plant resources as food, firewood and medicines. This comparative analysis strengthens the firm belief that utilization of plant resources is an important shared heritage, preserved over the centuries, which must be used to provide a further new and useful body of ethnobotanical knowledge.

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