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Ethnobotanical Study of Indigenous Plants used by the Members of Mantheding Community in Limpopo Province, South Africa

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ABSTRACT

This study is an ethnobotanical survey conducted in the Limpopo Province (South Africa) with the goal of collecting detailed information about the cultural significance of indigenous plants in human culture. Three hundred and forty semi-structured interviews with traditional health practitioners and community members knowledgeable about plant use yielded ethnobotanical data on a variety of indigenous plant uses. The ethnobotanical data collected produced 77 species belonging to 31 families. The diversity of plants produced 45 sources of medicine, 17 sources of stock feed, 13 sources of technological materials, 10 food sources, and six fuel sources. It was found that most plants (15.5%) have dual uses as sources of food and fodder, as well as sources of fruits that are also used for medicinal purposes and timber for the manufacturing of household utensils. The study findings demonstrated how traditional knowledge about indigenous plants may be leveraged to address some of society's most pressing issues, including food insecurity, poor health and wellbeing, poverty, and unemployment. The study reported that the rural community's continued dependence on indigenous plant materials for subsistence is an example of cultural resilience in the pursuit of sustainable development. The research is crucial because it provides information on the plants that remain prominent in Mantheding culture and their many uses in the community's culture.

Keywords: *Ethnobotany; indigenous plants; sustainable development; Limpopo Province*

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INTRODUCTION

Knowledge and use of plants to fulfill household basic needs were developed, used and passed down throughout generations by oral tradition. This type of livelihood pattern was essential to provide food, health care, and objects of material culture by exploiting plant materials with known properties. The use of wild plant species by the members of cultural groups attracted scientific research with the growing interest in the types of plant materials used and their sustainability in the natural environment. Ethnobotanists, anthropologists, geographers and other natural scientists conducted research to explore how different cultures produce food, shelter, medicine, clothing, hunting, and religious ceremonies out of indigenous plant materials.[1] This old custom is entrenched as a community tradition, and still the primary source of livelihood

[1] B. Aseefa, G. Glatzel, & C. Buchmann. Ethnomedicinal uses of Hagenia abyssinica among rural communities of Ethopia." *Journal of Ethnobiology and Ethnomedicine* 6 (2010):20.

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to meet basic household requirements.[2] Indigenous plants have cultural importance for indigenous and local people because they contain traditional ethnobotanical knowledge that is not well recorded and is in danger of degradation and extinction as a result of being passed down orally and vertically from generation to generation.[3] However, ethnobotanists have been instrumental in unraveling and recording these plant-human relationships and in demonstrating local communities' reliance on plants for food, health care, and material culture.[4]

South Africa, with its abundant natural and cultural resources, is one of the world's three most biodiverse nations. It is home to around 24,000 kinds of plants that are utilized for food, fodder, medicine, and spiritual well-being.[5] South Africa's rural population is reliant on indigenous plant exploitation for a variety of uses, including food, housing, fuel, fodder, medicine, and spiritual well-being. The natural biodiversity supplies rural populations with a variety of products and services, including traditional medicine, grazing and browsing, fuel, food, and building materials.[6] Limpopo Province, where this research was done, is endowed with natural resources that are used for human subsistence. The changing livelihood patterns of rural communities as a result of climate change and the influence of Western knowledge systems pose threats to cultural values of local communities resulting in the erosion of knowledge of wild plant species and their cultural significance.[4] A plethora of data about the ethnobotany of many rural communities in Limpopo Province exists, but very little was researched about the ethnobotany of Mantheding. However, an ethnobotanical study was necessary to describe the indigenous plant species exploited to meet household daily needs. The aim of the present study is to identify and document indigenous plant species that are used by the members of Mantheding community in Limpopo Province of South Africa.

METHODOLOGY

Study area

The Mantheding settlement is situated 50 kilometers northeast of Polokwane City in South Africa's Limpopo Province, inside the Dikgale traditional authority. The area is around 25 square kilometers in size and has a population of approximately 2100 people. Mixed bushveld dominates the vegetation. The most prevalent plant type is *Combretum apiculatum*, which is composed of tiny trees that are fairly thick and can form scrub-forest.[7] The community lies in a semi-arid climate with an annual rainfall of around 505 millimeters. It has an average daily temperature of 16.9 °C to 27.8 °C in the summer and 4.3 °C to 19.8 °C in the winter. The natural vegetation is a rather thick savannah of trees and shrubs that are set against a backdrop of tall, varied grass. It occurs on granite and, in turn, merges easily into the sourish mixed bushveld on top of the escarpment. It forms narrow, ill-defined belts. This is a fairly dense savannah of trees and shrubs in tall, mixed grass. The community is a typical rural settlement, with a mix of shacks, traditional mud huts, and contemporary brick buildings as living units. The community consists of a concentrated residential area with delimited dwelling stands separated by a common grazing pasture and a block of marked ploughing fields

[2] C.H. Saslis-Lagoudakis, C. Moray, & L. Bromham. (2014) Evolution of salt tolerance in angiosperms: A phylogenetic approach. In: Rajakaruna, N., Boyd, B. & Harris, T. (Eds.). Plant Ecology and Evolution in Harsh Environments (New York: Hauppage, 2014): 83.

[3] Mohammed Rahmatullah, Nur Kabidul Azam, Zubaida Khatun, Syeda Seraj, Farhana Islam, Md Atiqur Rahman, Sharmin Jahan & Md Shah Aziz "An ethnomedicinal survey among the Marakh sect of the Garo tribe of Mymensingh district, Bangladesh." *International Journal of Pharmacology and Technological Research* 4 (2012):141-149.

[4] Gary J Martin. *Ethnobotany: A Methods Manual*. London: Chapman & Hall, 1995): 98.

[5] M.M.P. Mogale, Ben-Erick Van Wyk & D.C. Raimondo. "The ethnobotany of Central Sekhukhuneland, South Africa. South African Journal of Botany." *South African Journal of Botany* 122 (2019): 102.

[6] Nkoana Ishamael Mongalo & Tshepiso Jan Makhafola. "Ethnobotanical knowledge of the lay people of Blouberg area (Pedi tribe), Limpopo Province, South Africa." *Journal of Ethnobiology and Ethnomedicine* 14 no. 46 (2018). 51. https://doi.org/10.1186/s13002-018-0245-4.

[7] Polokwane Local Municipality Integrated Development Plan (IDP) 2020-2021. Available at: https://www.polokwane.gov.za/City-Documents/Shared Documents/IDP/2020-2021 Final IDP.pdf. Accessed 20 January 2022.

located about 500 meters from the village site in a flatter and less stony location. The economy and sources of income are diversified and grown, but many households continue to rely on the traditional subsistence economy and on a variety of natural resources to meet their basic requirements.[9]

Participants

Semi-structured interviews were conducted with 340 people (163 men and 177 females) who were purposefully chosen from the community. The participants varied in age from 24 to 79 years. By completing a regular university permission form, subjects agreed to participate in the research.

Data Collection

Due to the interdisciplinary nature of ethnobotany, approaches from both anthropology and botany were used to conduct a full research. Anthropological approaches include interacting with individuals in order to elicit knowledge on indigenous plants' cultural importance. An interview schedule was employed to collect data about indigenous plants and their traditional applications. To elicit specific information about the indigenous plants utilized by participants, botanical approaches that include the collection of plant samples, pressing, and analyzing for cultural knowledge about the species were employed. The data were analyzed and presented using a percentage-based descriptive statistical technique. Themes and sub-themes were developed out of the 77 identified plants, 31 plant families, five application categories, and the plant components used.

Trustworthiness

Following the data gathering phase, a community meeting was convened to allow all participants to examine the gathered data. The gathering's purpose was to discover and clarify discrepancies, contradictions, and gaps in order to authenticate the findings.

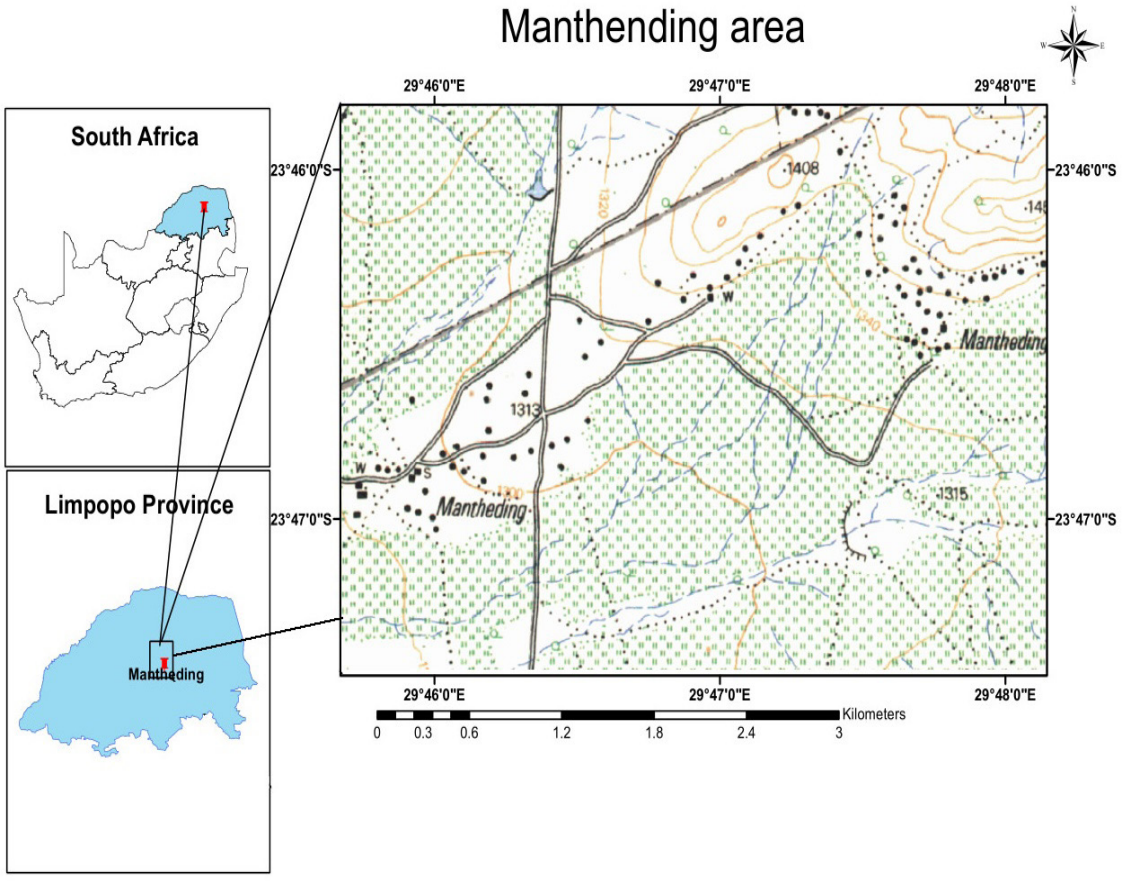


Figure 1. Study Location

RESULTS AND DISCUSSION

Indigenous Plant Uses

A total of 77 ethnobotanical plant species were reported. The scientific names of the species are followed by their vernacular names in both Sepedi and English. Each plant's taxonomy and range are summarized, followed by a description of its applications. The numbers allocated to species are for identification purposes only. Seventy-seven indigenous plants have been identified, and they are classified into 31 families. Euphorbiaceae and Fabaceae are the most numerous plant families, with four species apiece, followed by Asteraceae, Hyacinthaceae, and Liliaceae, each with three species. Forty-five of the 77 plant species gathered are used in medical, 17 are used in livestock feed, 13 are utilized in technology, ten are used as food sources, and six are used as fuel. The majority of plants (15.5%) have numerous functions. For instance, all food sources (Table 1) provide sock feed. *Sclerocary birrea* provides fruits, medication, and wood for making household items; *Ximenia caffra* provides fruit and medicine.

Categories of plant uses can be further reduced to five basic categories of major significance.

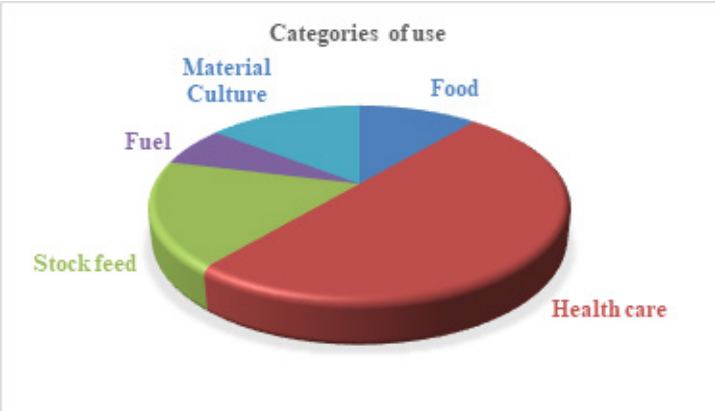


Figure 2: Categories of Plant Uses

Food Sources

Food was the most numerous category of plant species, accounting for ten species. The plant components utilized were fresh fruits and vegetables from five different trees and shrubs, as well as fresh leaves from five different herbs. *Theepe* (*Amaranthus thunergii), letelele (Amaranthus spinosus), morotho (Cleome monophylla), tshehlo (Tribulus terrestris*), and *monyaku* (Vernonia fastigiata) were the most often detected sources of vegetables. These were gathered in the wild, in home-gardens, and in fields where they naturally flourished. *Marula (Sclerocarya birrea), monamane (Ilex mitis), mothokolo (Carissa edulis), motoro (Opuntia ficus-indica),* and *motshidi (Ximenia caffra*) fruits are also obtained in the wild and from home-gardens. These edible indigenous plants are the most prevalent in Limpopo Province.

Sources of Medicine

Table 1: Sources of Medicine

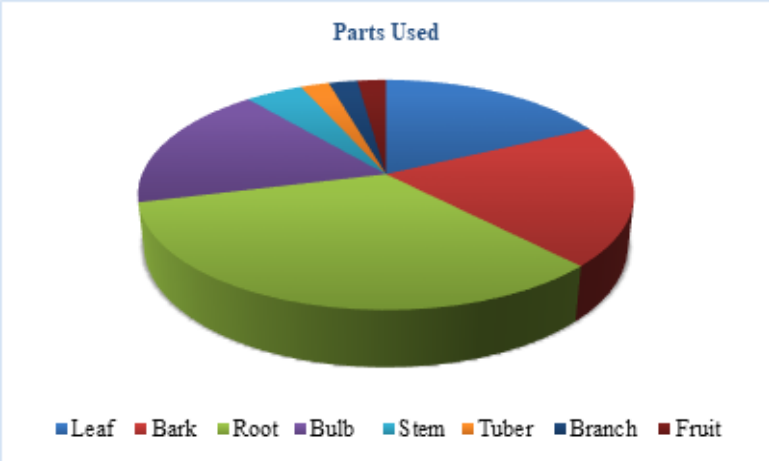
Family Name, Scientific Name & Species No.	Vernacular	Habit	Plant material used	Medicinal value
Amaranthaceae *Amarantus hybridus* (SAR 119)	*Sebjane*	Herb	Root	Decoction is used orally to immunize against illness attack.
Amaryllidaceae *Crinum Macowanii* L. (SAR 206)	*Letotše*	Herb	Bulb	Infusion treats renal issues, coughs, and cleanses the blood.

Haemanthus sp. (SAR 331)	*Leome*	Herb	Bulb	Decoction is used to treat infertility
Anacardiaceae *Sclerocary birrea* (A.Rich) Hochst (SAR 200)	*Morula*	Tree	Bark	Infusion is used to treat stomach aches and hypertension.
Aquifoliaceae *Ilex mitis L*. (SAR 121)	*Monamane*	Shrub	Bark	Chewed bark fragments are used as a purgative for digestive disorders.
Asclepiadaceae *Asclepias fruticose* (SAR 0010)	*Fore*	Herb	Stem	To cure coughs and TB, the dried stem is burned and the resultant ash is consumed with water.
Asparagaceae *Asparagus racemosus* Willd. (38)	*Mphatlalatsa-maru*	Shrub	Root	Infusion speeds up the development of newborns.
Asteraceae *Artemisia afra*. Jacq. ex. Wild (SAR 320)	*Lengana*	Herb	Leaf	Cough, bronchitis, influenza, and constipation are all cured by infusion.
Dicona gerrardii (Harv. ex. Fc Wilson (SAR 126)	*Phala-legolana*	Herb	Root	Coughs, dysentery, and diarrhoea are all treated with decoction.
Gnaphalium helichrysum L. (SAR 75)	*Mohlahlaila*	Shrub	Leaf	Infusion relieves constipation and indigestion problem
Caesalpiniaceae *Senna Halica* Mill. (SAR 35)	*Marotela- tšhoši*	Herb	Stem	Burning dried stems produces a powder that is used to treat chest and reproductive problems.
Canellaceae *Warburgia salutaris* (G. Bertol) (SAR 129)	*Molaka*	Tree	Bark	Coughs, intestinal worms, rheumatism, and arthritis are all cured with infusions.
Capparaceae *Cadaba aphylla* (Thunb) Wild (SAR 423)	*Monna-motsho*	Herb	Root	The root is crushed to create a powder that is used as a powerful antiseptic.
Celastraceae *Gymnosporia senegalensis* (Lam). (SAR 158)	*Sephato*	Shrub	Root	Infusion treats infertility.
Convolvulaceae *Ipomoeia albivenia* sp (SAR 173)	*Lesela-hlolo*	Shrub	Fruit	The fruits of this plant contain cotton wool-like substances that are used to thicken the fat poured into itchy ears.
Dracaenaceae *Sansevieria hyacinthoides* (L.) Druce *(*SAR 71)	*Mokgotle*	Herb	Root	Decoction treats haemorrhoids.
Ebenaceae *Diospyros mespiliformis* Hochst. ex. A. DC. (SAR 0021)	*Mododomma*	Shrub	Bark	Decoction cures ringworms.
Euphorbiaceae *Bridelia micrantha* (Hochst) Baill (SAR 105)	*Motserema*	Shrub	Root	To cure diarrhoea, powdered root is eaten with water.
Euphorbia tiriculli L. *(*SAR 144*)*	*Mohloko*	Shrub	Root	Decoction treats impotency; used prophylactically against snake bites.
Ricinus communis L. (SAR 139)	*Mokhure*	Herb	Leaf	The leaves are used as a poultice to aid in the healing of exterior lesions.

Tragia dioica Sond. (SAR 103)	*Mmabatjane*	Herb	Leaf	Infusion treats xternal sores.
Fabaceae *Elephantorriza elephantina* Burkei Benth. (SAR 159)	***Lešitšana***	Herb	Root	Decoction treats diarrhoea.
Faidherbia albida (Delile) A. Chev *(*SAR 0039)	*Mokgaba*	Tree	Branches	Magically prepared to treat infertility.
Peltophorum africanum Sond. (SAR 186)	*Mosehla*	Tree	Bark	Infusion treats stomach-ache.
Schotia brachypetala Sond. *(*SAR 189)	*Molope*	Tree	Bark	Decoction treats dysentery
Hyacinathaceae *Drimia robusta* Bak. (SAR 167)	*Phaya-bašimane*	Herb	Bulb	Diuretic infusion cleanses the bladder and treats uterine disorders.
Eucomis automnalis (Mill) Chitt. (SAR 172**)**	*Mathuba-difala*	Herb	Bulb	Decoction treats urinary and venereal diseases, as well as fever.
Urginea sorguinea Shinz. (SAR 007)	*Sekanama*	Herb	Bulb	Decoction treats blood diseases.
Hypoxidaceae *Cf Hypoxix L*. (SAR 0079)	*Phela*	Herb	Tubers	Decoction treats coughs.
Neorautanenia mitis (A. Rich) Verdc. (SAR 0038)	*Letlopya*	Herb	Bulb	Infusion treats arthtitis.
Liliaceae *Scilla natalensis* Planch. (SAR 0063)	*Letlopja*	Herb	Bulb	Infusion cleanses boils to accelerate healing.
Trichilia emetica Vahl subsp. (SAR 155)	*Mmaba*	Tree	Bark	Infusion treats stomach-ache, dysentery, and urinary infections.
Mmoraceae *Ficus burkei* (Miq) *(*SAR 184)	*Mohkumu*	Tree	Bark	Infusion treats bloatedness and throat infection.
Myrtaceae *Syzygium cordatum* Hochst. ex. *(*SAR 0050)	*Monthtlo*	Tree	Root	Decoction treats lung infection and cough.
Olaceae *Ximenia caffra* Sond. *(*SAR 0022)	*Motšhidi*	Shrub	Root	Infusion treats impotency.
Pedaliaceae *Harpagophytum procum-bens* (Burch) DC. ex. Meisin *(*SAR 0092)	*Lempate*	Herb	Leaf	Infusion aids in the acceleration of labor and the treatment of digestive issues.
Periplocaceae *Ziziphus mucronata* Willd. *(*SAR 0054)	*Mokgalo*	Shrub	Leaf	A poultice is administered to treat septic skin swellings, and pulsating fontanel.
Lycium sp. (SAR 72)	*Ngangi*	Shrub	Root	Decoction treats head-ache
Rhamnaceae *Berchemia discolor* (Klotzsch) hemsl. (SAR 0034)	*Monoko*	Herb	Root	Decoction prevents susceptibility to infectious diseases such as measles.
Solanaceae *Solanum panduriforme* (Bergense). (SAR 0071)	*Thola*	Herb	Root	Powdered root treats impotency.
Sterculiaceae *Dombeya rotundifolia* (Hochst) planch. (SAR 163)	*Mohlaba-phala*	Tree	Bark	Decoction treats dysentery.

Verbenaceae *Lippia javanica* Burm F. (SAR 181)	*Mosunkwane*	Herb	Leaf	Infusion treats cough, flu and fever
Vitaceae *Rhoicissus tridentata* (L.F) Wild& Dumm (SAR 0061)	*Mopidika*	Herb	Root	Decoction treats bladder and urinary infection.
Zingiberaceae *Siphinochilus aethiopicus* (SAR 0041)	*Serokolo*	Herb	Bulb	The bulb is chewed and smeared on the body for protection against infection by a wide variety of ailments.

A total of 45 indigenous plants belonging to 30 families have been identified as potential sources of medication for curing and preventing susceptibility to existing illnesses in humans. The statistics in Table 2 indicate that medicinal plants grow in the form of herbs, trees, and shrubs. Herbs dominated the species composition (55.5 %), followed by shrubs (24.4 %) and trees (24.4 %) and trees (20%). Asteraceae (3), Hyacinthaceae (3), Euphorbiaceae (4), and Fabaceae (4) were the most often utilized plant families (4). The majority of medicinal plant species are found in the Fabaceae and Euphorbiaceae families[8] but other research indicates that the Asteraceae family has the most genera and species utilized in traditional medicine.[9] According to Figure 2, the root is the most often utilized medicinal plant (38.2 percent), followed by bark (20 %), leaf (17.7 %), bulbs (17.7%), stem (4.4%), and tuber, branch, and fruit (2.2 %) all taken from the nearby wild. The root is the most often collected plant component for medicinal purposes, followed by the bark and bulb.[10]



Figue 2. Plant Materials Used

Table 1. summarizes the percentages of diseases treated. These include digestive difficulties, reproductive health concerns, respiratory and urinary tract illnesses, and headaches. The treatment of disease also takes into account the need to prevent the spread of disease via the administration of root and bulb decoctions and infusions.

[8] K.C. Chinsembu, M. Syakalima & Sebua Semenya. "Ethnomedicinal plants used by traditional healers in the management of HIV/AIDS opportunistic diseases in Lusaka Zambia." *South African Journal of Botany* 122 (2019): 371.

[9] E. Estrada-Castillón, J.A. Villarreal-Quintanilla & J.A. Encina-Domínguez. et al. "Ethnobotanical biocultural diversity by rural communities in the Cuatrociénegas Valley, Coahuila; Mexico." *Journal of Ethnobiology and Ethnomedicine* 17 no.21 (2021). https://doi.org/10.1186/s13002-021-00445-0.

[10] Abadi Birhanu & Shimels Ayalew. "Indigenous knowledge on medicinal plants used in and around Robe Town, Bale Zone, Oromia Region, Southeast Ethiopia." *Journal of Medicinal Plants Research* 12 no. 16 (2018): 200. DOI: 10.5897/JMPR2017.6445.

Sources of Material Culture

Table 2: Sources of Material Culture

Species Names	Vernacular	Habit	Plant used	Material produced
Anacardiaceae *Sclecarya birrea* (A. Rich) Hochst. (SAR 200)	*Morula*	Tree	Stem	Timber used to manufacture milking pails, mortar, pestle, stirrers, spoons and platters, cooking and serving food.
Asparagaceae *Agave American* L. (007)	*Morula*	Aloe	Leaf	Fibre used as twine and rope to bind palisades. The weaving of baskets used to store grain.
Cyperaceae *Scirpus validus* Vahl. (0064)	*Mohlahla*	Grass	Culm	Dry culms are designed to make sleeping mats.
Fabaceae i. *Acacia permixta* Burtt Davy. (005)	*Mosela-phala*	Shrub	Stem	Straight stem used as fence posts.
ii. *Dichrostachys cineria* Wight et Arn. (00142)	*Moretšhe*	Shrub	Stem	Straight stem used as fence posts.
iii. *Faidherbia albida* A Chev. (SAR 0039)	*Mokgaba*	Tree	Stem	Fibre is used to tie roof palisades.
Kirkiaceae *Kirkia wilmsii* Engl. (0041)	*Modumela*	Tree	Stem	Fibre used to tie thatch roof.
Malvaceae *Grevwia flavascens* Juss. (0071)	*Moretlwa*	Shrub	Stem	Used to make roof frames. Stem fibre is used to tie palisades and thatch roofs.
Moraceae *Ficus burkei* (Miq) Miq. 1867. (1200)	*Mokumu*	Tree	Stem	Fibre used to tie thatch roof. Straight branches used to design wooden spoons.
Olacaceae *Ximenia caffra* Sond. (SAR 0022)	*Motšhidi*	Shrub	Fruit	Oil used to tan leather.
Poaceae i. *Aristida congesta* subsp. (00149)	*Lefsielo*	Grass	Culm	Culms used to make household brooms.
ii. *Phragmites australis* (Cav.) Steud. (00621)	*Lehlakanoka*	Grass	Culm	Used as roof thatch.
Rhamnaceae *Berchemia zeyheri* (M.Berchem) C.L.P. Zeyher. (00410)	*Monee*	Shrub	Bark	Dye used to colour storage baskets and sleeping mats.

The study findings indicate that 13 plant species were utilised in the Mantheding community's material culture. These species are classified into ten families, with 23% of species belonging to the Fabaceae and 15% to the Poaceae families, respectively. Shrubs (38%) were the most prevalent plant kind, followed by trees (30%), grass (23%), and one aloe. Stems were the most often obtained plant material from all trees and three shrubs. The species employed are chosen for their utilitarian characteristics such as form, workability, strength, and flexibility. The most often created material creations were household equipment for processing, cooking, and serving food, as well as for building traditional huts and courtyards. These observations corroborate the findings of an ethnobotanical research conducted in Mexico, which identified plants and shrubs as the primary source of materials used to produce ornaments. Additionally, research provides evidence that plant materials are chosen based on one or more morphological, phenological, or phenotypic traits.

Sources of Fodder

Men and herdsmen are well familiar with the feed available to their livestock. Throughout the summer, the stock grazes the *Aristida congesta* (grass), leaves and shoots, as well as all vegetative materials and fruits consumed by community members. This conclusion is backed by the fact that the fruits, stems, and inflorescences ingested by humans are the most significant forage species in the wild.[11]

Sources of Fuel

The community is primarily reliant on natural vegetation as a source of fuel. Deadwood of the species *Dichrostachys cinerea, Euclea schimperi, Grewia flava, Schotia brachypetala*, and *Senegalis sp* is a reliable source of fuel. Firewood is required for cooking, the manufacture of plant-based medicines, and winter heating. Generally, the wood of certain indigenous plant species is periodically preserved dry for use in cooking during family and friend gatherings, as a source of heat, and in the manufacture of plant-based remedies.[11]

FINDINGS

The diversity of indigenous plant species identified in the Mantheding community is a valuable multipurpose resource. Despite the observable negative impacts of harsh climatic conditions on the local vegetation, participants retain a wealth of ethnobotanical knowledge established in conjunction with other traditional knowledge systems. The five categories of plants attest to this depth of knowledge. The majority of these plants are used for medicinal purposes, followed by fodder, material culture, food, and fuel. The study's results indicate that the community retains a wealth of information about useful plants. This cultural heritage should be protected for the benefit of the local communities' sustainable development.

CONCLUSION

The people of Mantheding use indigenous plant materials to meet basic household such as food, health care, and in the manufacturing of household objects of material culture. The plants grow naturally in the surrounding wild and are available for free to all community members who are familiar with their usage. The cultural significance of indigenous plants in the Mantheding community may be realized for sustainable livelihood to acquire the benefits of ethnobotanical knowledge in order to eradicate hunger and poverty and to offer affordable, reliable, and culture-specific health care.

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The researcher wants to express appreciation to respondents for their support and enthusiasm during the study's course.

AUTHOR CONTRIBUTIONS

The text is all mine. I was responsible for design and manufacture.

CONFLICTS OF INTEREST

I declare that I have no competing interests.

[11] S.M. El-Darier & F.M. El-Mogaspi. "Ethnobotany and relative importance of some endemic plant species at El-Jabal El-Akhdar Region (Libya)." *World Journal of Agricultural Science* 5 no. 3 (2009):353.

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