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Medicinal plants having a dual role in treating both human and livestock diseases in Suro Barguda District, West Guji Zone, Southern Ethiopia

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This study aimed to identify and analyze medicinal plants used by the Guji Semi-Pastoralist People in Suro Barguda District, West Guji Zone, and Southern Ethiopia. 124 informants with knowledge of traditional herbs were interviewed, and ethnobotanical data was collected. 22 medicinal plant species were identified, with Euphorbiaceae, Rubiaceae, Rutaceae, Apiaceae, and Solanaceae being the most common. Oral application was the most popular method, and herbal medicines were often made using freshly harvested plant parts. The high-use value indices of multipurpose plant species identified in the research area provide indicators of high use pressure and keys to developing and executing complementing *in situ* and *ex situ* conservation interventions to maintain these highly used plant species.

Keywords: Ailments, Dual roles, Indigenous knowledge, Plants

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Native people around the world are well-versed in using plants for food, medicine, and other uses[1]. Traditional plant-based remedies have been used to treat a wide range of human and animal ailments since ancient times, and they are still very helpful in meeting the healthcare needs of the vast majority of people on the planet[2]. Ancient indigenous knowledge and trial-and-error experiments have made plants essential for pharmaceuticals and human and animal survival. Traditional healers preserve ancient knowledge about conventional plant applications, despite the accessibility of modern healthcare facilities[3,4]. Medicinal plants are a significant component of African civilization since African societies have historically utilized them to treat a variety of ailments[5]. Traditional medicine is the most accessible, affordable and crucial for treating diseases, affecting 80% of rural communities[6]. Coordinated efforts are needed to capture this valuable knowledge for better use and conservation. However, due to deforestation, environmental degradation, overexploitation, agricultural land expansion, and limited documentation, this rich knowledge is being threatened along with medicinal plant species. Ethiopia's diverse ecological, edaphic, and climatic conditions contribute to its rich biological diversity and potential therapeutic plants. 95% of Ethiopia's traditional medical therapies are plant-based, and because contemporary medical systems, medications, and cultural acceptance are so poor, most people may continue to use traditional medicine[7] and which implies that recording and preserving indigenous knowledge is crucial for future well-being[4].

Traditional medicinal plant knowledge in Ethiopia is being passed down orally from one generation to the next, leading to a decline in its effectiveness in healthcare. This knowledge is particularly important in rural areas where many plants are available and their descendants inheriting these medicinal manuscripts. The local population lacks access to contemporary medications for both humans and animals because the research area is rural and remote. Therefore, using the following hypothesis, this study was started in Ethiopia's Suro Barguda District to look into the use of medicinal plants to treat human and livestock illnesses: “There should be medicinal plants that can treat both human and livestock ailments.” It seeks to determine which plant species treat certain ailments, how to prepare and use them, and which plant species should be prioritized for conservation. The study also looks into what influences various socioeconomic groups' acquisition of indigenous knowledge.

Method and Materials

The research area

Suro Barguda District, West Guji Zone, Oromia Regional State, Southern Ethiopia, is where the current study was carried out. The zone's center, Bule Hora town, is 30 km away, and Addis Ababa, Ethiopia's capital, is 497 km to the south. The district is known for its rocky and rough terrain and is located between latitudes 5°30'0" and 5°50'0" N and longitudes 37°50'0" and 38°20'0" E. The range of altitude is between 900 and 2350 meters above sea level. The lowlands in this district lie between 900 and 1500 meters above sea level, and the middle altitude zone is between 1500 and 2500 meters. The primary basis for this agroecological classification is altitudinal changes, which significantly affect rainfall and temperature. Thus, the two agroecological zones have different climatic trends. Ethiopia's southern bimodal rainfall regime is where the study area is situated[8].

Population trends and medical services

Speaking the Oromo language and predominantly adhering to the old religion system known as "Waaqeffannaa," the Guji Oromo ethnic groups mainly depend on subsistence farming and pastoralists. Access to modern health treatments is limited, with only 55% of the population receiving modern care. The district has two government health facilities and eight health posts, but due to a lack of peace and security, residents rely on conventional medication for various diseases. The most prevalent health issues are internal parasites, typhoid, pneumonia, gastroenteritis, and cancer symptoms. Modern health services struggle to provide comprehensive preventive and healing healthcare, but due to logistical challenges, erratic medicine supplies, and high costs, it is not as effective. Rural communities and their livestock often lack access to modern clinics, leading to traditional treatments being the main alternative for treating illnesses in districts with limited modern healthcare facilities[9].

Site and informant selection

From May 6 to May 21, 2022, a reconnaissance survey was carried out to choose data collection locations and discover more about the agro-ecology, vegetation, and traditional knowledge of the area. Based on their accessibility to the administrative center (Suro town) and the availability or lack of modern medical services, ten kebeles-the smallest administrative units were selected as study sites in order to gather general data about the local community's pharmaceutical system and livestock. The informant size was set to guarantee the required representative size of families from all semi pastoralist kebeles in order to collect both quantitative and qualitative data for medicinal plant research. The sample size from a population was determined using Cochran's sample size formula, which was introduced by Barett *et al.*[10] According to the author, the sample size ought to be for p-value of 0.05 and a 95% confidence level:

$$n = N/1+N(e)^2$$

Where n is the research sample size and N is the total number of households across all 10 kebeles. e = maximum variability or 5% (0.05) margin of error; 1 = probability that the event will take place. 180 households in all were taken from ten kebeles for semi-pastoralists in the district. The informant sample size therefore equals: $= 180/1+180(0.05)^2 = 180/1.45 = 124$

Eighteen key informants: healers, elders, and practitioners were chosen for the study from each kebele based on their knowledge and suggestions. These key informants were specially chosen (using non- probability sampling) after reaching out to the elders, development specialists, and local leaders in each kebele. They were people who had long employed medicinal plants to heal livestock and human illnesses. The remaining 106 participants were randomly selected general informants, including those who occasionally take conventional medications. All informants ranged in age from 15 to 68, and there were 40 females and 84 males among them. Each informant gave their consent for the study's results to be published, and ethnobotanical data was collected for ethical reasons.

Data collection

The study collected information on the medicinal plants that informants utilized for humans and animals between July 1 and August 30, 2022, and November 15 and December 30, 2022. Data was gathered through semi-structured interviews, market surveys, field walks, conversations, and field observation. The interviews focused on the informants' use, management, preferred species, habitat knowledge, financial gain, and sage cultivation. Both quantitative and qualitative data were collected using a semi-

structured interview questionnaire. The field walks included discussions regarding the condition of the vegetation and if traditional medicinal plants are accepted in the community. The features of the responders, the history of those plants, the history of individuals who have used medicinal herbs, and other pertinent facts (based on the questionnaire) were all noted in detail on the spot. There were no restrictions on the informants' ability to communicate their knowledge of medicinal plants during the conversation. The researchers identified the species of medicinal plant by using the taxonomic descriptions and explanations available in the pertinent volumes of the Flora of Ethiopia and Eritrea. After being brought to the Bule Hora University Herbarium, the medicinal plant species were allowed to dry and freeze. The findings were improved by visual examination using certified herbarium specimens. The study's findings were presented as tables, graphs, and percentages once the labeled plant specimens were eventually placed in the previously mentioned herbaria.

Data analysis

The ethnobotanical data was arranged using a Microsoft Excel spreadsheet. The number and proportion of medicinal plant species, genera, and families used, along with their usage trends and the percentages of components collected, were also determined using descriptive statistics. Medicinal herbs were identified using ethnobotanical data analysis methodologies, such as the rank ordering (preferred ranking) method and the informant consensus factor method. Additionally, the study determined how well five frequently mentioned plants worked to treat particular illnesses. In a more sophisticated approach called direct matrix ranking, participants ranked medicinal plants according to their assessments. Ten key informants were used in the study to rank the hazards to medicinal plants in the study area. Strategies for conservation were proposed after the biggest threats were determined. Each group's citation count was split by the number of species used to calculate the informant consensus factor (ICF).

$$ICF = n_{ur} - n_{t} / n_{ur} - 1$$

When assessing a species' importance for a certain objective, its fidelity level (FL) is essential. The fidelity of therapeutic herbs is often great. FL = Np/N was utilized to determine the level of faithfulness. The percentage of fidelity level as per Alexiades[11] was calculated using FL% = (Np/N) 100. N is the total number of informants who indicated the plant's ability to treat any given ailment, whereas Np is the number of informants who particularly mentioned the significance of a species' ability to treat a particular disease. Using the use value (UV) technique, the relative significance of each species described in the research region was evaluated locally, which was created by Heinrich *et al.*[12] This approach aids informants in comprehending the importance of every species.

$$UV_{is} = \Sigma U_{is}/n_{is}$$

Where n_{is} is the number of events for species **s** with informant i, UV_{is} is the use value of a species **s** for informant i, and U_{is} is the number of uses indicated in each event by informant i.

Results

A variety of medicinal plants that are used by both humans and animals

In this study, 22 species of medicinal plants were identified in a district to heal cattle and human ailments. Euphorbiaceae, Rubiaceae, Rutaceae, Apiaceae, and Solanaceae were the most prevalent plant families. The majority of plants were shrubs, with a higher proportion of trees, herbs, and epiphytes (Supplementary Table S1).

Diseases that these therapeutic herbs treat

Supplementary Table S1 lists 33 human and 27 veterinary disease types treated with medicinal plant species. Six distinct disease types in animals and seven distinct disease types in people are included in the category of gastrointestinal diseases. Diarrhoea, toothaches, and coughing are the most common illnesses in the district.

Formulation and use of medications for both people and animals

Most drugs for humans and animals are made from a single medicinal plant species (78.3%), with 21.7% derived from mixtures of two or more plant species.

Plant components that are utilized to prepare medicines

Leaves were the most commonly used plant parts for remedy preparations followed by roots.

Doses, routes of administration, and methods of medication preparation

As mentioned by the respondents doses were determined based on the condition of the suffered

person or livestock and route of remedy application depend upon the type of disease and the affected body part of the animal.

Preferences for both human and animal therapeutic plants

The efficacy of a certain medicinal plant in curing a particular ailment determines its choice.

The state of multifunctional medicinal plant conservation

Some medicinal plants are highly affected due to their multipurpose usage and special considerations.

The efficacy of herbal remedies for both humans and animals

Some diseases can be treated with a multitude of medicinal plant species which give good options for traditional healers.

Comparative ability of different plants to cure

Some medicinal plants were seen highly effective in treating diseases properly.

Additives and solvents used in the manufacture of conventional herbal medicines

Different substances can be used as additional ingredients in the preparation of traditional medicines in addition to water.

Values for selected medicinal plant species in terms of medicine

Certain plant species can be used to treat different kinds of diseases both in humans and livestock.

Use categories of medicinal plants with dual roles in treating both humans and livestock

It is clear that every plant is important in giving environmental services for the presence of normal ecosystem.

Distribution of traditional medical plant knowledge among various social categories in the study area's community

The study tried to identify if there were any disparities in the organization of indigenous knowledge among different socioeconomic groups by carrying out the statistical significance test for the average number of therapeutic plants among various informant groups.

Conversation

What appears to be the diversity of plant species acting in both a human and a livestock therapeutic capacity?

Since ancient times, traditional plant based medicines have been used to treat a variety of human and animal illnesses. They continue to be invaluable in helping to address the healthcare needs of the great majority of people worldwide[13-15]. The numerous vegetation types found in Ethiopia's agroecological zones support a variety of medicinal plants. The study region includes Bush Land, Acacia-Commiphora Woodland, and the Dry Evergreen Afro-Montane Forest and Grassland Complex[16]. More medicinal plants are found in the vegetation of the mountains and woodlands. Ethiopia's considerable use of traditional medicine is influenced by its rich plant diversity and distinctive civilizations. It is regarded as one of Africa's most significant sources of biodiversity, encompassing both plants and animals[17]. More than 6000 plant species can be found there, with 12-15% of them being endemic[18,19]. Ethiopia is also recognized for having a plurality of languages, cultures, and beliefs, all of which have contributed to the nation's variety in traditional knowledge and customs[20]. 90% of livestock and 70% of people in Ethiopia use traditional medicine, which is primarily reliant on medicinal plants for basic healthcare[21]. Cultural traditions, the community's faith in the therapeutic benefits of traditional medicine, and its relatively low cost are the main drivers of Ethiopians' need for medicinal herbs.

As part of the current investigation, it was discovered that both human and livestock ailments were treated in the district using medicinal plant species, the majority of which were shrubs (Supplementary Table S1) and the conclusions of Giday *et al*.[22] are in agreement with one another. As a result, we accept the proposed hypothesis, "There should be medicinal plants that can treat both human and livestock ailments" in the district.

Identified medicinal plants are used to treat which conditions?

Plants have long been used in many traditional communities to heal a variety of human and animal ailments. Ethiopia has a long history of using traditional medicine to treat both human and animal health problems[23]. Plant-based healthcare for people and livestock continues to be the main alternative treatment for a variety of illnesses in Ethiopia[24] because of the scarcity of pharmaceutical items, the prohibitive distances between health care facilities, the high cost of conventional drugs for smallholder farmers and pastoralists, the resurgence of some diseases, and the growth of helminthes and/or drug-resistant microorganisms. This analysis uncovered 33 human disease categories and 27 veterinary disease types, for which informants claimed to have utilized one or more types of medicinal plants to cure them (Supplementary

Table S1). To treat conditions like rabies, hepatitis, eczema, snakebite, evil eye, and bad spirit, patients therefore only go to traditional health practitioners rather than contemporary clinics. This demonstrated the abundance of indigenous medical knowledge in the field of study. It also implies that, like in many other countries, controlling human and livestock health in Ethiopia still depends on plant diversity and the application of plant-based medicines[25].

There are six different disease types in livestock and seven different disease types in humans in the category of gastro-intestinal illnesses. Five different illness types in humans are caused by urogenital problems, whereas four different disease types in animals are caused by tissue cancer and cold diseases. The most often reported illnesses in the area were coughing in cattle, tooth diseases, and diarrhoea in humans. This observation agrees with the conclusions of Giday *et al*.[22]. The major symptoms presented by the ill animals are what healers focus on when prescribing a course of treatment for their patients or livestock owners. This kind of diagnosis has also been recorded in other investigations, such as Tilahun and Mirutse[26]. It was believed that chewing medicinal portions, applying pounded treatments to the damaged tooth, and/or ingesting homogenized herbal preparations were the main therapeutic methods for treating diarrhoea and coughing.

What plant components or species are typically employed in treatment?

It has been established that the majority of treatments for people and animals consist of medicinal components from a single species of medicinal plant. This observation is consistent with the findings of Mesfin *et al*.[23] Formulas from two or more different species were used to construct the rest. Of all the plants found, the greatest proportion of species claimed to treat respiratory issues, followed by toothaches and diarrhea/stomach aches. *Croton macrostachyus* Del. (13 different ailments), *Aloe calidophila* Reynolds, *Calpurnia aurea* (Alti) Benth., and *Teclea salicifolia* Engl. (each utilized for five different ailments), according to Eshete and Molla[13], had the highest number of numerous therapy uses (Supplementary Table S1).

According to reports, the creation of the various treatments included almost every component of the plant, including the roots, leaves, stems, bark, new shoots, latex, and so on. However, the leaves and roots were the parts that were most frequently utilized to heal ailments in people and animals (Fig. 1). This might be because they consistently produce novel metabolites. Similar studies revealed that the leaves and roots of plants were more frequently utilized to make medicines[22]. Leaves are preferred over other plant components because they are more readily available and simpler to prepare. Additionally, the storage of secondary metabolites is higher in the leaf, which is advantageous to the medicinal plant's biological properties[22]. Over the course of evolution, plants have developed defense mechanisms against herbivores, a variety of a biotic stressors, and illnesses caused by bacteria, viruses, fungus, nematodes, mites, and insects[26]. Numerous possible risks are present in plants by nature. As a result, plants produce a wide range of chemicals referred to as "secondary metabolites" that are not necessary for their development and growth These compounds may have a defensive effect because the leaves are more vulnerable to intruders[27]. Accordingly, using leaves as the primary ingredient in a treatment could be seen as an indication of scientific significance. Notably, the zoo-pharmacognostic technique (observing animal self-medication behavior), in which animals eat predominantly the leaves of particular plants[27], has historically led to the identification of some aliphatic medicines. This supports the notion that leaves are preferred as a source of traditional remedies. Furthermore, previous study has indicated that harvesting aerial portions, such as leaves, causes less harm to medicinal plants than removing roots and barks[13]. Furthermore, plucking roots and bark increases a plant's susceptibility because they recover more slowly than leaves[13]. The primary risks to medicinal plants in this study region are deforestation and agricultural land development, which necessitate special attention.

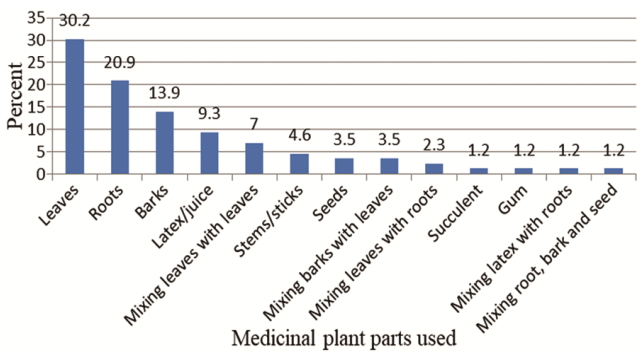

Fig. 1 — Plant parts that are used to make medicines for people and animals

How are medicines manufactured and administered?

Depending on the type and degree of complexity of the ailments, several drug production techniques were seen to be used in the district for both humans and livestock. According to this study, mixture and filtrate are the two most popular types or methods of preparation, with concoction being the most popular. A liquid that has had insoluble contaminants eliminated is called a filtrate. The remedies are taken orally or by inhaling the vapor created by boiling (fumigation), and are made with water (cold or warm), local beverages, local salt ("Magado salt"), or milk as a carrier. Following Gololo *et al.*[28] observations, these outcomes are consistent with those of preparations that were cooked, cooled, and homogenized (Fig. 2). The most frequently cited route was oral administration, which was followed by cutaneous. Healing practitioners frequently combine two or more medicinal plants to create concoctions, which may be a reflection of their conviction that certain plant components work together synergistically to treat certain illnesses. This result is consistent with earlier reports of Ashebir *et al.*[29] but it contrasts from prior study in which crushing and squeezing Amare *et al.*[30] and homogenizing and crushing Bekalo *et al.*[3] were the primary use types. These gaps are most likely caused by cultural and conceptual variations between socio-cultural groups. A physical examination and data from the patient or owner of the ill animal were used to calculate preparation doses for both humans and cattle. Some traditional healers claimed to treat ailments with a handful or small dish of unprocessed pieces, while

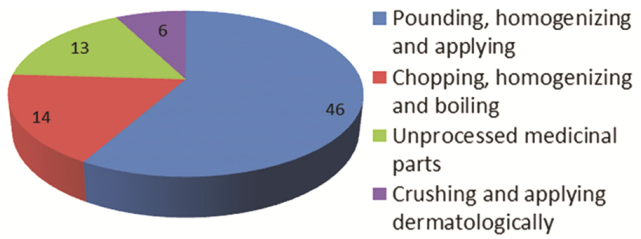

Fig. 2 — Ways of remedy preparation

others claimed to determine doses for therapeutic concoctions using finger tips, coffee cups, water glasses, and bottles. In any case, herbal remedies used to cure human and animal illnesses in the region were not standardized doses, according to traditional healers. This result is in line with author study[31]. Hepatitis, which is one of the most prevalent diseases in both humans and cattle in the study area, is treated more favorably by traditional herbalists than by modern medicine, according to traditional herbalists. In order to compare five medicinal plants, a preference rating exercise was conducted with ten traditional herbalists who had experience treating hepatitis patients. The findings are shown in (Table 1). The best traditional remedy for curing hepatitis was shown to be *Vangueria apiculata* K. Schum, followed by *Croton macrostachyus* Del. The least frequently picked medicinal plant among the top species was *Aloe calidophila* Reynolds.

Calpurnia aurea (Alti) Benth. was ranked first (most endangered) among five species of multipurpose medicinal plants in a direct matrix ranking, followed by *Balanites aegyptiaca* (L.) Del. According to the findings, these multipurpose medicinal plant species are currently utilized less for therapeutic purposes and more for firewood and charcoal (Table 2). Despite their high concentration in the past, these factories are today confronting continuity and sustainability issues. Due to a lack of accurate documentation of indigenous knowledge about medicinal plants and an increase in modern education, the younger generation has come to undervalue local indigenous knowledge about medicinal plants (potential acculturation), which is the cause of the current loss of medicinal plants. The issue of medicinal plant conservation in Ethiopia necessitates research and documentation before fast ecological and cultural transformations damage physical entities and the accompanying knowledge base. This result agrees with[32].

The selection of medicinal plants by traditional herbalists is based on their parents' past knowledge

Table 1 — The favored medicinal herbs for treating hepatitis in both humans and animals

The favored medicinal herbs for treating hepatitis in both humans and animals	Informants assigned the designations A through J										Total score	Rank
	A	B	C	D	E	F	G	H	I	J		
Aloe calidophila Reynolds	3	5	4	2	3	1	4	2	5	1	30	5th
Calpurnia aurea (Alti) Benth.	5	3	4	4	4	3	5	3	4	4	39	4th
Croton macrostachyus Del.	4	5	4	4	5	4	5	3	4	3	41	2nd
Teclea salicifolia Engl.	5	4	3	3	4	5	4	3	5	4	40	3rd
Vangueria apiculata K. Schum	3	4	4	5	5	5	4	4	5	4	43	1st

or on lateral interactions with other herbalists in the community that are focused on mutual benefit. Healers also believed that historical anecdotes were taken into consideration while choosing the most effective medicinal plants and steering clear of those with harmful side effects. The studies found that while some plants were used by every single traditional herbalist who took part, others were only known by a very small portion of herbalists. Traditional medicines used to treat gastrointestinal diseases had the highest ICF (0.83) and the lowest ICF (0.70%) for sensorial diseases in the computation of informants' consensus factor (ICF) values for the six primary disease categories that were common to humans and livestock in the district (Table 3). This result aligns with the findings of[33].

A species' fidelity level (FL) measures how important it is for its therapeutic potential, and species with a high FL are thought to be more effective for the associated disorders. Thus, historically valued medicinal plants with high FL can be the subject of additional phytochemical study. Therefore, for urogenital illnesses, *Croton macrostachyus* Del. had the best fidelity level value, while for tissue cancer and cold disease categories, *Solanum dennekense* Dammer had the highest fidelity level value. *Aloe calidophila* Reynolds achieved the highest documented fidelity level value in the dermatological therapeutic category, while *Teclea borenensis* M.Gilbert also had relatively strong healing capacity for gastrointestinal and internal parasitic illnesses (Table 4). *Croton macrostachyus* Del. and *Calpurnia aurea* (Alti) Benth. were found to have the greatest medicinal use values (UVmed), respectively (Table 5). When dilution is necessary, water is used as a "solvent" in virtually all ethnopharmaceutical formulations of conventional medicines. Of all ethnoformulations, different ingredients are found in 23.4% of them. According to informants, some additives are commonly used to improve the appropriateness of a range of oral medications, either by reducing their bitterness and unpleasant flavour or by increasing their efficacy[34]. Butter and "Magado

Table 2 — The direct matrix rankings of five species of medicinal plants and their further applications as determined by ten key informants.

Species of medicinal plants	Make use of diversity						Total	Rank
	Ch	Co	Fr &Tl	Fw	Md	We		
Balanites aegyptiaca (L.) Del.	4	2	3	4	2	3	18	2nd
*Calpurnia aurea (*Alti) Benth.	4	4	4	5	2	0	19	1st
Croton macrostachyus Del.	2	3	2	4	3	0	14	3rd
Zanthoxylum chalybeum Engl.	2	2	1	2	2	2	11	5th
Ziziphus abyssinica Hochst ex A. Rich.	2	2	2	2	2	2	12	4th
Total	14	13	12	17	11	7	74	
Rank	2nd	3rd	4th	1st	5th	6th		

Where, We stands for wild edible, Ch for charcoal, Co for construction, Fr & Tl for furniture and tools, Fw for firewood, and Md for medicinal

Table 3 — The ICF values of traditional medicines that are used to treat both human and animal illnesses.

Category of disease	Number of species	Percentage of every species	Use citation	% of use citations	ICF
Gastrointestinal diseases	12	54.5	66	27.7	0.83
Urogenital diseases	9	40.9	46	19.3	0.82
Dermatological diseases	6	27.3	28	11.8	0.81
Tissue cancer and the cold	9	40.9	42	17.7	0.80
Hepatitis, the nervous system, and a snake bite	11	50.0	45	18.9	0.77
Sensorial diseases	4	18.2	11	4.6	0.70

Table 4 — The fidelity level values of medicinal plants in relation to popular categories of human and livestock illnesses.

A medicinal herb	Category of remediation	Np	N	FL (%)
Solanum dennekense Dammer	The cold and tissue cancer	14	15	93
Croton macrostachyus Del.	Urogenital disorders	24	26	92
Aloe calidophila Reynolds	Disorders of the skin	18	20	90
Teclea borenensis M. Gilbert	Gastrointestinal disorders	21	24	87
Vangueria apiculata K. Schum	Snakebite, the neurological system, and hepatitis	11	13	85
*Calpurnia aurea (*Alti) Benth.	Diseases of the senses	12	18	67

Note that FL stands for Fidelity Level, Np for the number of informants who separately mentioned a species' significance in treating a specific ailment, and N for the overall number of informants who mentioned the plant for any given condition.

salt" (locally produced salt) were the two products with the most additions (Fig. 3).

Are there any multipurpose medical plant species that should be prioritized for conservation?

Every one of the 22 species of medicinal plants found in the district was mentioned for one or more non-medical purposes, including helping to make building materials, protecting the environment, providing fuel (charcoal and firewood), acting as poison, and being used as fodder and life fences (Fig. 4). Key informants predict that as the population grows, more medicinal plants will be used for a variety of reasons related to the community's everyday activities, such as firewood, buildings, and equipment. The study area's indigenous population is aware of their surroundings, harvesting practices, and harvest season. They also think that plants have

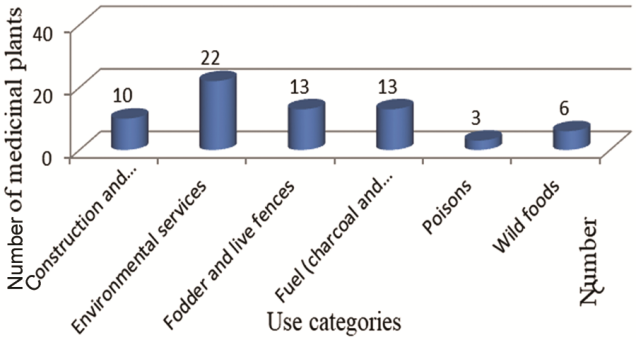

Fig. 3 — Additives used in traditional herbal remedy preparation

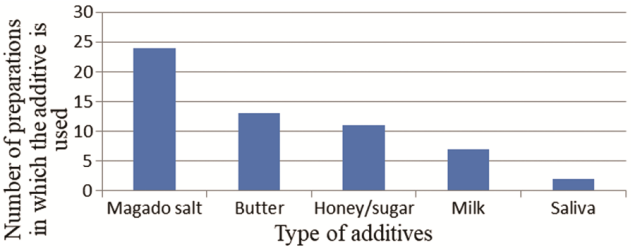

Fig. 4 — Medicinal plants according to their different use categories

medicinal properties. Only one medicinal plant (*Foeniculum vulgare* Miller) had been identified in the research site's backyard garden. This indicates that there were little attempts to grow therapeutic plants in their backyard gardens because of the ease with which wild medicinal plants could be cultivated in the past and the challenges associated with domesticating some of them. Elders and practitioners, on the other hand, recognize the value of conserving medicinal plants and believe that home gardens are appropriate sites for both medicinal plant conservation and the improvement of indigenous knowledge transfer to the next generation. According to the Simachew[35] assessment, the biggest risks to Ethiopia's medicinal plants are environmental degradation, agricultural growth, the loss of forests and woods, overharvesting, wildfires, the exploitation of marginal lands, overgrazing, and urbanization. Changes in cultures, customs, and ways of life make the problem worse. Benefits from the production of firewood and charcoal drove the high rate of exploitation of Calpurnia aurea (Alti) Benth. and Balanites aegyptiaca (L.) Del. Simone *et al*.[36] simply assert that the population's main source of support, mature seed-producing trees, will pass away and not be replaced, and that the resource basis upon which cultural values are built will finally vanish as a result of overharvesting. The preservation of indigenous medicinal plant diversity is crucial for environmental management, sustainability, education, and conservation. Due to the large number of medical plant species, medicinal plant conservation can be seen as a miniature version of plant conservation as a whole. Through instruction or teaching, people should be encouraged to grow native medicinal plants in their backyard gardens. Additionally, future studies on indigenous medicinal plant knowledge as well as phytochemical and pharmacological investigations can be built on the reported medicinal plants. To

Table 5 — Most commonly used remedial plants' medicinal use values (UV med).

Species of medicinal plants	The number of informants who mentioned the species	Total number of citations	Number of illnesses cured with	UV med.
Croton macrostachyus Del.	118	1086	13	9.2
Calpurnia aurea (Alti) Benth.	110	935	6	8.5
Zanthoxylum chalybeum Engl.	92	754	6	8.2
Teclea salicifolia Engl.	84	655	6	7.8
Teclea borenensis M. Gilbert	88	651	6	7.4
Aloe calidophila Reynolds	74	481	6	6.5
Solanum dennekense Dammer	96	596	5	6.2

Note that UV med stands for medicinal use value

Table 6 — The average quantity of medicinal plants across different informant groups, as determined by the statistical significance test.

Things to think about	Groups of informants	N	Average ± SD	t-value**	p–value
Sex	Participants who were men	85	6.62±2.65	1.97	p≤0.97
	Participants who were female	39	6.05±2.18		
Age	Youths (less than 40 years old)	90	5.16±2.07	-12.87	p≤0.001*
	Elderly people (over 40)	34	7.96±2.19		
Being literate	Participants who lack literacy	92	7.22±2.31	12.92	p≤0.001*
	Participants with literacy	32	4.28±1.82		
Closeness to the medical facility	Close to the medical facility	7	6.00±2.37	-0.94	p≤0.36
	A long way from the medical facility	117	6.5±2.57		
Category of Informants	Important informants	18	10.76±1.09	25.75	p≤0.001*
	Informants selected at random	106	5.85±2.04		

*Difference that is statistically significant ($p<0.05$); degree of freedom (df) = 223, **t (0.05) (two-tailed), and N = total number of responders

ensure the survival of indigenous medicinal plant species, it is essential to increase knowledge among traditional healers and the general public.

What factors influence indigenous knowledge acquisition in different social groups?

Indigenous knowledge, according to its definition, is "a body of knowledge built up by a group of people through generations of living in close contact with nature"[37]. Such knowledge is developed locally and is especially suited to the needs and circumstances of the local populace. Additionally, it is creative and imaginative, constantly fusing external influences with internal innovations to tackle fresh problems. Indigenous wisdom is frequently mistaken for being "outdated," "backwards," "static," or "unchanging." Males reported more therapeutic plants than females in the study area, but the difference was not statistically significant ($p> 0.05$) when the average number of medicinal plants identified by each group was compared. There was no discernible difference in the number of therapeutic plants mentioned by informants who lived near health centers as opposed to those who lived farther away. Nonetheless, a statistically significant ($p<0.05$) difference was observed in the number of medicinal plants reported by older community members (elders) (> 40 years old) versus younger to middle-aged individuals (40 years old), key informants versus randomly selected informants, and illiterate versus literate informants. Elders (> 40 years old), illiterates, and important informants reported more medicinal plants than young, literate, and randomly selected informants (Table 6). This might be brought on by disparities in experience, lifestyle standards, the chance to put knowledge into practice, a desire to pick others' brains, the incapacity to use new services, or financial difficulties[38]. In recent years, both industrialized and developing nations have paid more attention to traditional medicine and its importance to public health. Numerous benefits of traditional medicine include its variety, accessibility, length of continuity, affordability, low degree of technological input, lack of negative side effects, and growing economic significance. Therefore, it is important to implement activities that support elders' and healers' desire to improve their skills, learn from one another, and create strong networks, such as professional development and conferencing for healers and elders through access to universities, healthcare facilities, and traditional medicine stakeholders.

Conclusion

The study's findings indicate that a significant number of medicinal plant species heal health problems in both humans and livestock and that the majority of these plants' leaves are more frequently used to make a variety of traditional medicines. By observing sick people and animals, asking patients and livestock owners about their symptoms, and then preparing the right medication for administration based on their cultural knowledge of those symptoms, the corresponding illnesses, and the therapeutic medicinal species known to indigenous people, traditional healers are able to identify diseased people and animals. If interested parties provide these individuals with specialized training on how to diagnose specific illnesses based on their symptoms-particularly those that are easily transmissible and considered zoonotic illnesses-and how to calculate medication dosages, this could be more effective. Due to industrialization and the current generation's ignorance, oral transmission of traditional information and its exclusive flow through the male line of the family for secrecy may

soon exhaust it. Interesting bioactive components were found in the chosen medicinal plants after they were examined for high ICF, FL, and medicinal use values.

Supplementary Data

Supplementary data associated with this article is available in the electronic form at https://nopr.niscpr.res.in/jinfo/ijtk/IJTK_24(6)(2025)543-554_SupplData.pdf

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Recommendation

The author forwarded the following suggestions in light of the research's findings:

- Due consideration should be given to conservation priorities for the identified medicinal plant species that serve dual roles in treating livestock and human illnesses.
- Ethnobotanists should intensify their research to record and reveal such valuable resources (the identification and application of medicinal plants) in light of the younger generation's lack of familiarity with traditional medicinal knowledge passed down from elders.
- Special bioactive molecules for diseases that are hard to treat with modern medications could be extracted using the knowledge of traditional healers. So, phytochemical screening is advisable for those medicinal plants that have good healing potential for a certain disease.
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Conflict of Interest

The author declares that he has no competing interests.

Author Contribution

The author gathered and analyzed the data, evaluated it thoroughly, and wrote the manuscript. The final version of the manuscript has been read and approved by the author.

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Prior Informed Consent

All parties involved in this study, including the author, the Suro Barguda District local community (informants), and users of traditional medicines, voluntarily consented to engage in the field studies, utilize the data pertaining to their knowledge, and publish the findings. Furthermore, approval for publishing is not required because the manuscript does not contain any pictures or videos of specific participants.

Ethics Approval

The site and informant selection portion mentions ethical approval and agreement to participate.

Data Availability

The manuscript contains all of the datasets used to support the paper's results, and the data may be made available by the author upon reasonable request.

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