Survey on knowledge, attitude and practices that communities have on medicinal plants in Debre Birhan and surrounding areas

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This is to certify that the thesis prepared by Zebene Abebe, entitled: Survey on knowledge, attitude and practices that communities have on medicinal plants in Debre Birhan and Surrounding areas: Submitted in partial fulfilment of the requirements for the Degree of Master of Msc (Master of Science in Biology) complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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ABSTRACT

Survey on knowledge, attitude and practices that communities have on medicinal plants in Debre Birhan and surrounding areas

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The study is a survey on knowledge, attitude and practice (KAP) on medicinal plants of people in Debre Birhan town and surrounding area, north Shewa zone, Amhara region, in Ethiopia. A total of 198 informants (male 78 and female 120) (age≥18) were selected by simple random sampling employed to collect information on medicinal plant use from three kebeles (3, 6 and 9). The kebeles selected by systematic random sampling from Debre Birhan town and one kebele (Debele) from the surrounding area selected purposely. Semi-structured interviews and questionnaires were employed to collect data. Quantitative approaches were used to determine informant consensus factor (ICF) and fidelity level (FL) values. A total of 64 plant species in 62 genera and 40 families were recorded to have medicinal values for 45 different human health problems. For each plant species local name (Amharic) and scientific name documented. Plant parts used, method of preparation and application and routes of administration were also documented. Majority of medicinal plant species in the study area were obtained from market (23.44 %).Herbs were found to be the most widely used (46.88%) followed by shrub species (34.38%).The most frequently used plant part were leaves (36.9%) followed by roots. The most widely used root of administration is oral followed by dermal. The knowledge, attitude and practice on large number of medicinal plants by people of Debre Birhan and surrounding area shows that indigenous people of the study area still depend on traditional medicine of plant origin. Few people fear to use medicinal plants. Because they think that the dosage of traditional medicine is unknown and few traditional healers mix the medicine with religious and evil spirit.

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Abbreviations

BWWAO Bassona Worana Wereda Administration Office

CSA Central Statistical Agency

DBTTC Debre Birhan Teachers training college

FL Fidelity Level

GICHO Government information communication head office

ICF informant consensus factor

IK Indigenous knowledge

IUCN International union for conservation of nature.

STDS Sexually transmitted diseases.

WHO World health organization

1. Introduction

Ethnobotany is a broad term referring to the study of people's classification, management and use of plants. It is defined as local people's interaction with plants: how they classify, manage and use plants available around them (Martin, 1995). Ethno botany encompasses all studies relating to the mutual relationships between plants and people (Cotton, 1996). Among the relationships of humans with plants, dependence of people on plants for their medicinal value is one. Thus, people depend on plants not only for food, but also for preparation of remedies. Ethnobotanical studies are use full in documenting, analyzing and communicating knowledge and interaction between plant biodiversity and human society, how plant diversity in nature is used and influenced by human activities Martin, 1995; Cotton, 1996; Balick and Cox, 1997)

Traditional medicine still remains the main resources for a large majority (80%) of the people in Ethiopia for treating health problems. Traditional medicinal consultancy including the consumption of the medicinal plants has a much lower cost than modern attention (Bashar, 1990; Tesema Tanto *etal*., 2003). The current account of medicinal plants of Ethiopia, as documented for national biodiversity strategy and action plan by (Tesema Tanto *etal*, 2002), shows that about 887 plant species are reported to be utilized in the traditional medicine. Among these, about 26 species are endemic and they are becoming increasingly rare and rare at the verge of extinction. Moreover, both the traditional medicinal plants and the indigenous knowledge about them are equally threatened as the ethno botanical information is not documented and remains in the memory of elderly practitioners.

Deforestation, overexploitation, overgrazing, habitat loss and degradation, agricultural land expansion and acculturation continuously threat Ethiopian traditional medicinal plants and linked knowledge (Dawit Abebe, 1998). Hence, it is important to document the knowledge, attitude, and practices that communities have on medicinal plants in Debre Birhan and surrounding areas.

1.1 .Objectives

1.1.1 General objective

To document the knowledge, attitude and practices that communities have on medicinal plants in Debre Birhan and surrounding areas

1.1.2 Specific objectives

To identify the knowledge of the community about medicinal plants

To find out the diseases that the communities use medicinal plants for treatment or curing

To identify plant part (parts) used, method of preparation and ways of administration

To know the attitude of the communities towards the use of medicinal plants

1.2.3 Statement of the problem

The knowledge on traditional medicinal plants of Ethiopia which was developed for millennia is now subjected to loss since it has mainly been stored in the memories of elderly peoples and handed down mostly by word of mouth for successive generations.so it is important to document the knowledge, attitude and practices that communities.

2. Literature review

Ethiopia is an important regional center of biological diversity .The wide range in altitude and climate, the isolation of the highlands of Ethiopia, and the fact that there are so many different biomes present in the country, are some of the reasons for its high biodiversity. There are between 6500 and 6700 plant species in the country .These represents the fifth most diverse flora in Africa (MOE 2010). About 10-12% of these plant species are endemic to Ethiopia (MOE, 2010).

In Ethiopia, about 800 species of plants are used in the traditional health care system to treat nearly 300 physical and mental disorders, and remains to be the main resource of treatment for large majority (80%) of the people. Medicinal plants occur throughout the country's diverse highland and lowland areas (Edwards, 2001).

Ethiopians have used traditional medicines for many centuries, the use of which has become an integral part of the different cultures in Ethiopia. The indigenous people different localities in the country have developed their own specific knowledge of plant resource uses, management and conservation (Pankhurst, 1965).

The World Health Organization (WHO) estimates that about 80% of the world' people relay chiefly on traditional medicine, mostly of plant origin to meet their primary health care needs (Duke, 1992; Farnsworth *etal.*, 1985). According to Mekonnen Bishaw (1990) and Tesema Tanto *etal.*, (2003) about 80% of human population and over 90% livestock in Ethiopia rely on traditional medicine. The livestock or ethnoveterinary medicine provides traditional medicines which are locally available and usually cheaper than standard treatments. Not only in Ethiopia but also globally and in all developing countries and especially in tropical Africa, using traditional medicinal plants is common and form the back bone of traditional therapy since the majority of the people depend on this traditional medicinal plants for their health care, and this global importance and utilization of medicinal plants has considerably increased in the last two 13 decades. And

thus, today, medicinal plants play a great role also world wide of the health services.In most scenarios, the traditional knowledge in Ethiopia is passed verbally from generation to generation and valuable information can be lost whenever a traditional medical practitioner passes without conveying his traditional medicinal plants knowledge. In addition, the loss of valuable medicinal plants due to population pressure, agricultural expansion and deforestation is widely reported by different workers (Dawit Abebe, 2001).As a result, the need to perform ethnobotanical researches and to document the medicinal plants and the associated indigenous knowledge must be an urgent task.

2.1. Traditional medicinal plants

The world health organization (WHO) (2001) defined traditional medicine as the total combination of knowledge and practices that can be formally explained or used in prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, whether verbally or in writing (Desta et al., 1996; cited in Fassil kibebew, 2001).

According to Fassil Kibebew (2001), about 75-90 % of the rural population in the world (excluding western countries) relies on traditional medicines as their only health care system. This is not only because of poverty where people cannot afford to buy expensive modern drugs, but traditional systems are also more culturally acceptable and meet the psychological needs in a way modern medicine does not.

According to WHO (2001), consultation of medicinal practitioners is very helpful for the development and incorporation of useful approaches in planning and budgeting system for health care provision of most developing nations and indigenous communities. In Africa, traditional medicine plays a central role in health care needs of rural people and urban poor. Here, it is said that, this situation would remain so long as modern medicine continues to be unable to meet the health care of the people of the continent effectively (Jansen, 1981). Their value and role of this health care system will not diminish in the future, because they are both culturally viable and expected to remain affordable, while the modern health care service is both limited and expensive (WHO, 1998).

Indigenous traditional medicinal practices were carried out essentially based on private practice, i.e. private agreement between consenting parties, and the knowledge of traditional practice in most cases has descended through oral folk lore (Asfaw Debela *etal*., 1999).The secrete of information retained by traditional healers is relatively less susceptible to distortion but less accessible to the public (Dawit Abebe,1986). However, the knowledge is dynamic as the practitioners make every effort to widen their scope by reciprocal exchange of limited information with each other (Dawit Abebe, 1986; Abbink, 1993).

2.2. Indigenous knowledge and medicinal plants

Indigenous knowledge (IK) refers to the accumulated knowledge, rules, standards, skills, and mental sets, which are possessed by local people in a particular area (Quanash, 1998). It is the result of many generations' long years' experiences, careful observations and trial and error experiments (Martin, 1995). Traditional people around the world possess unique knowledge of plant resources on which they depend for food and medicine (Martin, 1995). Over centuries, indigenous people of different localities have developed their own specific knowledge on plant resource use, management and conservation (Cotton, 1996)

IK is now considered to be cultural knowledge in its broadest sense, including all of the social, political, economic and spiritual aspects of a local way of life. Sustainable development researchers, however, have found the following categories of indigenous knowledge to be of particular interest: resource management knowledge and the tools, techniques, practices and rules related to pastoralism, agriculture, agroforestry, water management and the gathering of wild food; classification systems for plants, animals, soils, water and weather; empirical knowledge about flora, fauna and inanimate resources and their practical uses; and the worldview or way the local group perceives its relationship to the natural world (Emery, 1996). Indigenous knowledge is important for an essential first step for development projects, allows better innovation and adaptation of technologies, adds to scientific knowledge, increases understanding between researchers and local people, increases the local capacity to experiment and innovate and empowers

local people (Warburton and Martin, 1999). And also relevance to conservation and sustainable development because of locally appropriate, diversified production systems, respect for nature, flexible and social responsibility (Dewalt, 1994). According to Stephan and Justin (2003), indigenous knowledge is the local knowledge that is unique to a given culture or society and the base for agriculture, health care, food preparation, education, environmental conservation and a host of other activities. It is a systematic body of 8 knowledge built up by a group of people through generation of living in close contact with nature and it is cumulative and dynamic. The complex knowledge, beliefs and practices, generally known as indigenous knowledge develops and changes with time and space. One important feature of indigenous knowledge system is its adaptive skills for local people acquired informally though interaction with the natural environments (Zemede Asfaw and Tigist Wondimu, 2007). Indigenous knowledge systems also refer to sets of concepts, beliefs and perceptions comprising the stock of knowledge as well as the process by which it is acquired, stored and transmitted. One of the widely used indigenous knowledge system in many countries is the knowledge and application of traditional medicine. Such knowledge known as ethnomedicinal knowledge involves traditional diagnosis, collection of raw materials, preparation of remedies and its prescriptions to the patients (Farnsworth, 1994). The immediate and intimate dependence of indigenous people on local resources resulted in the accumulation of indigenous knowledge, which helps the people to adapt to and survive in the environments in which they lived (Martin, 1995). Indigenous knowledge on remedies in many countries including Ethiopia passed from one generation to the other generation verbally with great secrecy (Jansen, 1981). Such secrete and crude transfer makes indigenous knowledge or ethnomedicinal knowledge vulnerable to distortion and in most cases, some of the lore is lost at each point of transfer (Amare Getahun, 1976), hence there is a need for systematic documentation and record of such useful knowledge through ethnobotanical research, record and use of indigenous knowledge, raise awareness in the community about the value of indigenous knowledge

2.3. Threats and conservation of traditional medicinal plants

2.3.1Threats to medicinal plants

people use many wild species of plants for food, medicines, clothing, shelter, fuel, fiber, income generation and the fulfilling of cultural and spiritual needs throughout the world (Zemede Asfaw, 2001) Recent evidence from Ethiopia as well as other countries indicates that the existence of these indigenous resources are threatened. The most serious proximate threats generally are habitat loss, habitat degradation and over harvesting (Hamilton, 1997). According to Maundu *et al.,* (2004), the main threats of the medicinal plants (unsustainable use of medicinal plants) in Africa are a high population growth rate, competing land uses of natural vegetation to other forms of land use such as agriculture ,environmental degradation, loss of local knowledge ,increasing commercialization of traditional medicine, increasing demand in the local and world market, lack of appropriate policies and legislation or failure to enforce, poverty and high unemployment rate, low prices of medicinal plants, invasive species, undue pressure on specific preferred species and slow plant growth. Environmental degradation, deforestation, agricultural expansion, over exploitation and population growth are the principal threats to medicinal plants in Ethiopia (Ensermu Kelbessa *et al*., 1992; Mirutse Giday, 2001; Zemede Asfaw, 2001; Kebu Balemie *et al*., 2004). Generally, there are two sources of threats to medicinal plants, i.e. manmade and natural causes. Rapid increase in population, the need for fuel, urbanization, timber production, over harvesting, destructive harvesting, invasive alien species, honey collection degradation, agriculture expansion and habitat distraction are caused threat to medicinal plants. Likewise, natural causes include recurrent drought, bushfire, disease and pest outbreaks (Ensermu kelbessa *et al.,* 1992). 20 According to Jansen (1981), in Ethiopia, even though the traditional medicinal partitions are the best source of information about the knowledge of medicinal plants, it was found very difficult to obtain their traditional medicinal information as they considered their indigenous knowledge as a professional secrete, only to be passed orally to their elder son at oldest age. According to Amare Getahun (1976), practitioners do not want to tell the use of medicinal plants because they believe the healing power of the plant losses its curative and healing virtues; therefore it

should be secrete (that is, the name of the plant and its reputed use should not be disclosed). In addition to the knowledge on traditional medicine are commonly passed from generation to generation orally, valuable information can be lost whenever a medicinal plant is lost or when a traditional medical practitioner dies without passing his/her indigenous knowledge to others (Cunningham, 1993; Cunningham, 1996; Cunningham 2001; Getachew Birhan and Shiferaw Dessie, 2002). There for, doing Ethnobotanical research, creating awareness to the communities is important.

2.3.2. Conservation of traditional medicinal plants

According to Getachew Berhan and Shiferaw Dessie (2002) the knowledge of medicinal plants is commonly secretly passed orally from generation to generation. In this process valuable information can be lost whenever a medicinal plant is lost or when a traditional medical practitioner dies without passing his/her indigenous knowledge to others. Hence, documentation of indigenous knowledge and making herbaria for future use is also recommended to conservation of the declining medicinal plants (Muthus wamy and Solomon, 2009). And also to create awareness on the contribution of traditional medical practice towards fulfilling the primary healthcare needs should be created among the youth (Mirutse Giday *et al*., 2009). It was pointed out that young generation has no interest to know about medicinal plants and efforts should be made to incorporate traditional medicine in school curricula so that younger people appreciate its usefulness (Mirutse Giday *et al*., 2009). As stated Zemede Asfaw (2001) in Ethiopia, traditional medicine as elsewhere in other developing countries is faced with a problem of sustainability and continuity mainly due to loss of taxa of medicinal plants, loss of habitats of medicinal and other categories of plants and cultures. Conserving the diverse cultures with indigenous medicinal and other knowledge that exists with the traditional communities has also contributed greatly in giving value to the biodiversity and maintains the resource for generation (Medhin Zewdu, 2002). Thus for the conservation of plant biodiversity, both in-situ and ex-situ conservation methods can be applied (Frankel *et al.,* 1995). The growing recognition of the importance of medicinal plants in meeting local and global health care needs provides an important opportunities for conservationists, traditional medicine practitioners, local communities and others to work

together to develop mutually supporting solutions to problems associated with forest loss and biodiversity erosion. Now a day's sustained and co-ordinate efforts are needed to transform currently unsustainable practices of medicinal plants mining from wild sources to more ecologically sustainable, socially 22 acceptable and economically equitable production and utilization systems (Parrotta, 2002). Generally, there are some conservation measures that have been under taken around the world aimed at protecting threatened medicinal plant species from further destruction (Cunningham, 1993). This includes in-situ conservation (on their natural habitats like natural reserves and parks e.g. home gardens) and ex-situ (field gene bank, seed bank and botanical garden) conservation. In order to conserve useful plants (including medicinal plants) which are threatened due to natural or manmade factors in Ethiopia, in-situ and ex-situ conservation strategies should be complimentarily implemented (Abebe Demissie, 2001).

3. Materials and methods

3.1. Description of the study area

3.1.1. Location

The study was conducted in DebreBirhan town and its surrounding area North Shewa zone of Amhara region, in Ethiopia. DebreBirhan town is located in north Shewa zone of Amhara region about 120 kilo meters North East of Addis Ababa. The town has a latitude and longitude of $9^{o}\,41^{'}$ N and $39^{o}\,32^{'}$ E coordinates and an elevation of 2840 meters. The total area of the town is $14.71Km^{2}$ and the density of the population is $11000/km^{2.}$ Totally this town comprises 9 kebeles (DBGICHO). The study kebeles number are those written by yellow color for the purpose of identification.

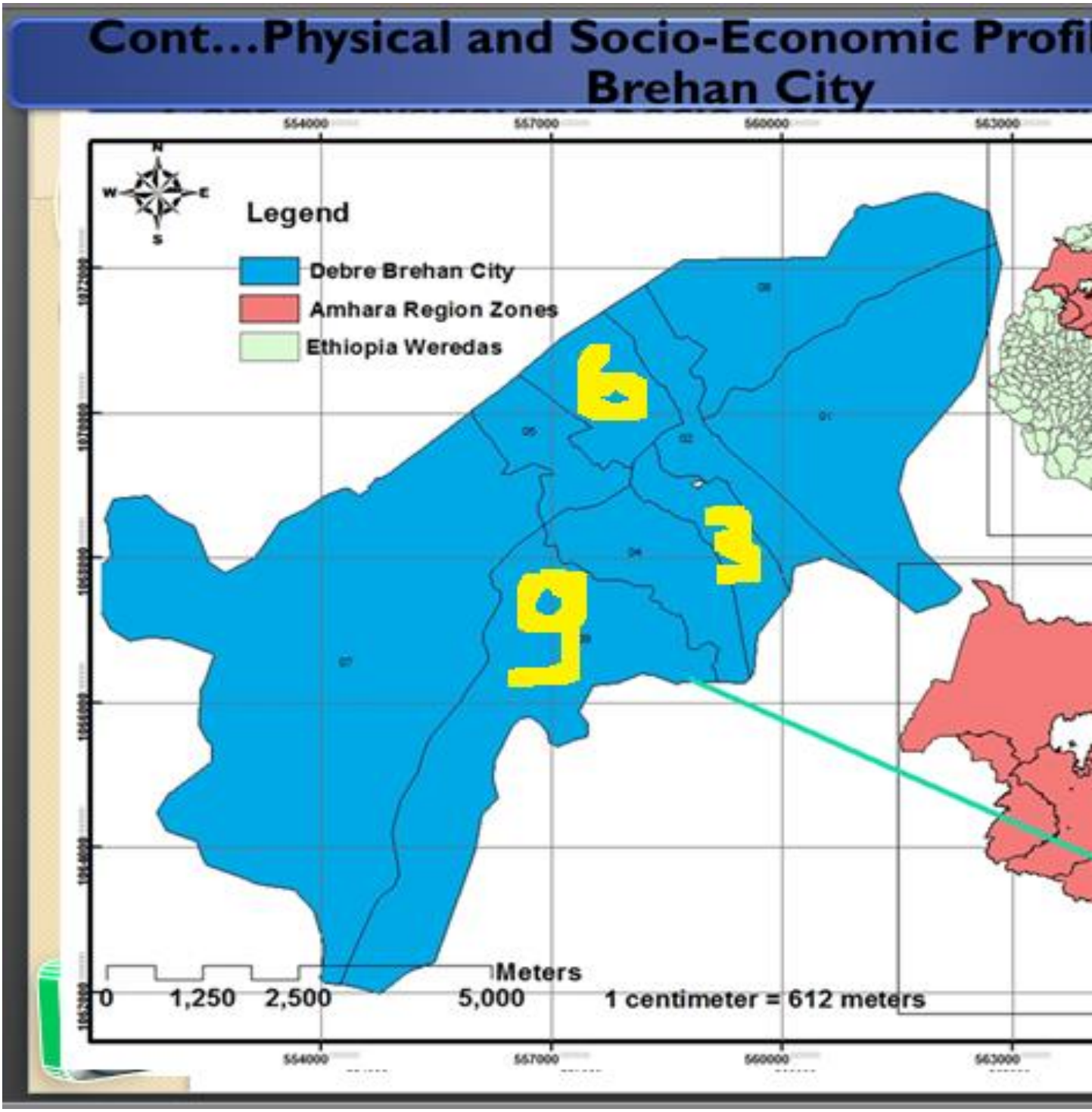

Figure 1. Map of DebreBirhantown(Source)DBGICHO

3.1.2 Location of Debele kebele

Debele keble situated in Bassona Worana Wereda North Shewa Zone Amhara region 20 km East of Debre Birhan (BWWAO,2012).The altitudinal varation of Bassona Worana Wereda range from1500-3400m above sea level and it covers atotal surface area of 139,900 hectar (BWWAO,2012) . The wereda lie between the coordination of 9^{o} 36' N 39^{o} 30'E

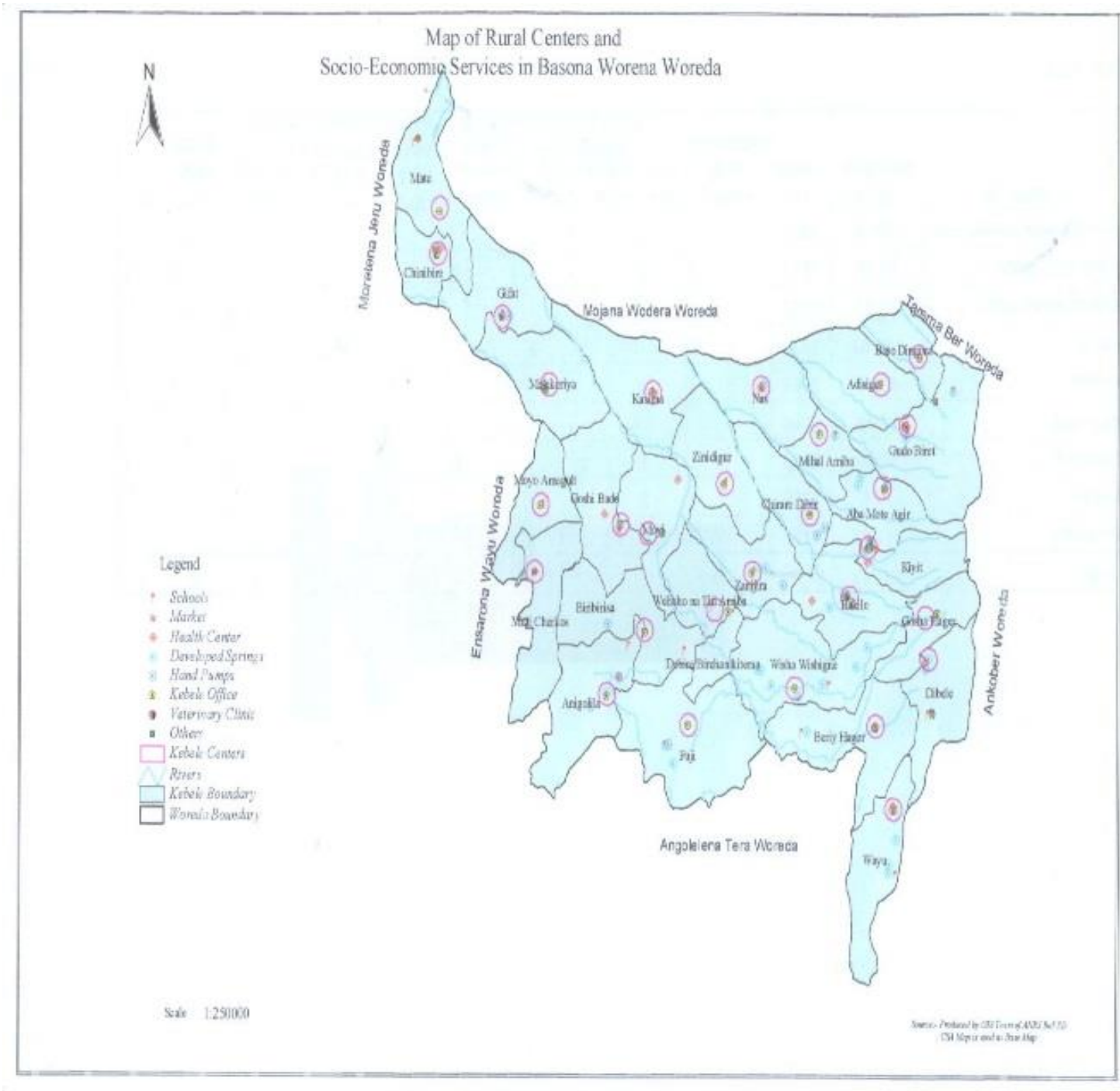

Figure 2 Map of Bassona Worana Woreda

3.1.3 Demographics

According to DebreBirhan town Government Information Communication Head office this town has a total population of 97,845 of whom 44,244 are men and 53,601 women. The majority of the inhabitants practiced orthodox Christianity with 94.12% reporting that as their religion, while 3.32% of the population said they were Muslim and 2.15% were Protestants (CSA, 2007)

The five largest ethnic groups reported in the town were the Amhara (90.12%), the Oromo (3.94%), the Tigrayan (1.81%), the Gurage (1.6%), and the Argobba (1.2%); all other ethnic groups made up 1.33% of the population. Amharic was spoken as a first language by 93.81%, Oromiffa was spoken by 3.04%, and 1.5% spoke Tigrigna; the remaining 1.65% spoke all other primary languages reported (CSA, 2007)

3.1.3. Climate

DebreBirhan city is one of the coolest city which is found at sub-tropical zone of Ethiopia. The average annual temperature of the city during day and night hour is 17.8 °C and 8.83 °C respectively with precipitation 66.17mm

3.1.4. Local economy

The DebreBirhan wool factory, the first wool factory in Ethiopia, is found in the town .there is also the new consortium of the industries, which include beverage, paper, plastic, metal, leather goods, pharmaceutical and bottle manufactures as well as automotive assembly plant. The town is also a famed center of rug mating.

3.2 Methods

Data was collected from three kebeles out of total nine kebeles. The three kebleles (3, 6 and 9) were selected by systematic random sampling method .In addition to these three kebeles one kebele (Debele) around DebreBirhan also selected, in order to compare the knowledge of medicinal plants in urban and rural areas.

Totally, 198 (male 78 and female120), age (≥18).110 (male 44 and female 66) ordinary residents and 2(male) key informants participated from Debre Birhan and 86(male 32 and female 54) general informants participated from around Debre Birhan (Debele kebele). The key informants selected based on the information gathered from the local people while other informants were randomly selected. The data were collected between, January, 2017-May, 2017. Data collection methods were through semi structured questionnaires, interviews. Key informants were interviewed individually to mention medicinal plants, their location, local name, disease treated, parts used ,methods of preparation, rout of administration, dosage, side effects .For nontraditional healers questionnaires were distributed to fill the questions . The questionnaires filled by informants collected. The questionnaires are prepared in English language, translated to Amharic language for the respondents.

3.3 Data analysis

3.3.1 Descriptive statistic

Descriptive statistical methods such as percentage and frequency were employed to analyze and summarize the data on medicinal plants, associated knowledge, management methods, use and conservation. The most useful information gathered on medicinal plants reported by local people include medicinal value, application, methods of preparation, route of application, disease treated, dosage, part and habit used was analyzed through descriptive statistical analysis according to Martin (1995), Alexiades (1996) and Cotton (1996).

3.3.2. Informant consensus factor

Informant consensus factor (ICF) was calculated for categories of ailments to identify the agreements of the informants on the reported cures using the formula used by (Tilahun Teklehaymanot and Mirutse Giday, 2007).ICF was calculated as follows: number of use citations for each ailment (nur) minus the number of species used (nt) for that ailment, divided by the number of use citations for each ailment minus one. ICF = nur - nt | nur -1

3.3.3. Fidelity level

The fidelity level (FL), the percentage of informants claiming the use of a certain plant for the same major purpose, was calculated for the most frequently reported diseases or ailments using the following equation. (Friedman etal, 1986)FL (%) =Np/N×100Where Np is the number of informants that claim a use of a plant species to treat a particular disease, and N is the number of informants that use the plants as a medicine to treat any given disease.

3.3.4. Preference ranking

Ranking is used to compare the most effective medicinal plant used by the community to treat a particular disease. Nine most important medicinal plants used in treating diarrhea. Each informant was provided with nine medicinal plants reported to cure this illness. They asked to assign the highest value (9) for the most preferred plant against diarrhea and the lowest value (1) for the least preferred plant and in accordance of their order for the remaining one .The value of each species was summed up and the rank for each species determined based on the total score. This helps to indicate the rank order of the most effective medicinal plants used by the community to treat diarrhea

4. Results and Discussion

4.1. Medicinal plants of the study area

In this study 64 plant species in 62 genera and 40 families were recorded to have medicinal values for 45 different human health problems. The presence of knowledge and practices on large number of medicinal plants by people of Debre Birhan and surrounding shows that indigenous people of the area still depend on traditional medicine of plant origin. This result supported by research done previously by Edwards (2001) that states, in Ethiopia, about 800 species of plants are used in the traditional health care system to treat nearly 300 physical and mental disorders, and remains to be the main resource of treatment for large majority (80%) of the people. Medicinal plants occur throughout the country's diverse highland and lowland areas.

Table-1 List of medicinal plants used for human ailment

No.	**Scientific name**	**Family**	**Local name**	**Growth form**	**Disease treated**	**Part used**	**CPU**	**MPA**	**RA**
1	*Ocimum lamiifolium Hochst.ex*	Lamiaceae	Dama Kesse	H	Headache Eye Ear	L L L	F	crush, homogenize with cold water & drink grind & paint the powder grind & paint the powder	O De Au
2	*Hagenah abyssinica*	Rosaceae	Koso	T	Taeniasis	F	F/D	crush, homogenize with cold water & drink	O

3	***Lepidium sativumL.***	**Brassicaceae**	**Feto**	**H**	**Asthma** **Diarrhea** **Hemorrhoids** **Headache**	**Se** **Se** **Se** **Se**	**F/ D**	**either drinking or eating concoction** **crush, homogenize with cold water & drink** **heat the part & tie** **crushed & sniff**	**O** **O** **O** **De**
4	*Foeniculum vulgareMill*	Apiaceae	Insilal	H	Unable to urinate Kidney Cough	L F L	F	either drinking or eating concoction eat the part either drinking or eating concoction	O O O

5	*Zingiber officinale Roscoe*	Zingiberaceae	Zingibil	H	Common cold Constipation Coughing Diarrhea Asthma	Rh Rh Rh Rh Rh	F/ D	boil & drink the decoction boil & drink the decoction boil & drink the decoction crush, homogenize with cold water & drink boil & drink the decoction	O O O O O
6	*Leonotis ocymifolia (Burm.f)*	Lamiaceae	Raskimir	S	Mich Ascariasis	L L	F	crush, heat or burn or boil the part &inhale its smoke or steam crush, homogenize with cold water & drink	De O
7	*Rhamnus prinoides*	Rhamnaceae	Gesho	S	Skin disease	F	F	grind & paste or tie	De

	L.Herit								
8	*Ruta chalepensisL.*	Rutaceae	Tena adam	S	Common cold Eye disease Poison Cough	F/L L L L	F	boil & drink the decoction crush, heat or boil the part &inhale its smoke or stem crush, homogenize with cold water & drink either drinking or eating the concoction	O Na O O
9	*Laggeratomentosa*.	Asteraceae	Keskeso	S	Hemorrhoids	R	F	grind & paint the powder	An
10	*Linumusitatissimum L.*	Linaceae	Telba	H	Retained placenta Stomachache Abdominal pain	Se Se Se	D	crush, homogenize with cold water & drink crush, homogenize with cold water & drink crush, homogenize with cold water & drink	O O O

11	*Inula confertiflora A.Rich*	Asteraceae	Woynagift	S	Tooth	R	F	hold with tooth	O
12	*Urtic simensis Steudel*	Urticaceae	Sama	H	Stomach ulcer Gonorrhea	L L	F D	eat the part crush, homogenize with cold water & drink	O O
13	*Thymus schimperiRonniger*	Lamiaceae	Tosigne	H	Hypertension Abdominal pain Cough Liver Ear defect	L L L L L	F	boil & drink the decoction either drinking or eating the concoction boil the part & drink boil the part & drink grind & paint the powder	O O O O AU
14	*Clematis hirsuta.*	Ranuculaceae	AzoHarege	C	Diarrhea	L	F	crush, homogenize with cold water &	O

	Perrr. And Guill				Taeniasis Constipation mumps Ring worm Herpes zoster	R R L L L	F/ D F/ D F	drink crush, homogenize with cold water & drink crush, homogenize with cold water & drink extract the juice , oil, or latex and paint extract the juice , oil, or latex and paint extract the juice , oil, or latex and paint	O O AU De De
15	*Kalanchoe petitiana*	Euphorbiaceae	Indahula	H	Hemorrhoids Cancer Headache Toothache	L R L R	F	grind &paint the powder either drinking or eating concoction insert the part in to nose hold with teeth	An O Na O
16	*Phytolacca dodecandra.*	Phytolaccaceae	Indod	S	Gonorrhea Syphilis	R R	D	boil & drink the decoction boil & drink the decoction	O O
17	*Silene macrosolen*	Caryophylaceae	Wegert	H	Abdominal pain	L	F	either drinking or eating the concoction	O

18	*Verbascum sinaiticum*	Scrophulariaceae	Yeahya joro	H	Diarrhea Constipation	L R	F F/D	boil and drink the decoction crush, homogenize with cold water & drink	O O
19	*Vernoniaamygdal*	Asteraceae	Girawa	T	Heart defect	L	F	either drinking or eating the concoction	O
20	*Artemisia abyssinica*	Asteraceae	Chqugne	H	Headache Nose bad smell Stomach ache	L L L		either drinking or eating the concoction Insert the part in to nose either drinking or eating the concoction	Na Na O
21	***Bersama Abyssinica***	Melianthaceae	Azamir	S	Cancer Syphilis	R SB	F	grind &paint the powder either drinking or eating concoction	De O

					Ascariasis Hypertension	L L/R		eat the part boil & drink the decoction	O O
22	***Embelia schimperiVatke***	Mysinaceae	Inkoko	T	Diarrhea **Taeniasis** **Constipation** **Ascariasis**	F F F F	F/ D	crush, homogenize with cold water & drink crush, homogenize with cold water & drink crush, homogenize with cold water & drink crush, homogenize with cold water & drink	 O O O O
23	***Calpurnia aurea (Ait.) Benth.***	Fabaceae	Digita	S	Diarrhea Constipation	R R	F	boil & drink the decoction boil & drink the decoction	O O

					Scabies Toothache Sore Epiglottitis Giardiasis	L R R R R		grind & paint the powder hold with teeth extract the juice, oil latex and paint boil & drink the decoction boil & drink the decoction	De O De O O
24	*Citrus aurantifolia .*	Rutaceae	Lomi	S	Cough Fever Common cold Headache	L Wp Wp Wp	F	either drinking or eating the concoction either drinking or eating the concoction either drinking or eating the concoction	O O O O

25	*Allium sativumL*	Alliaceae	Nech shinkurt	H	Herpes zoster Ring worm Asthma Common cold Pneumonia Coughing	Bu BU BU BU BU BU	F F/ D	extract the juice ,oil, latex and paint extract the juice ,oil, latex and paint either drinking or eating the concoction either drinking or eating the concoction either drinking or eating the concoction either drinking or eating the concoction	De De O O O O
26	*Juniperus procera*	Cuprussaceae	YeabeshaTsid	T	Epiglottitis Tooth	F F	F/ D	either drinking or eating the concoction either drinking or eating the concoction	O O
27	*Discopodium penninervium* .	Solanaceae	Ameraro	S	Evil sprit	F	F	eat the part	O

28	*Cucumis ficifolius*	Cucurbitaceae	Yemidr imbuay	H	Evil sprit Rabies	L F	F/ D F	crush, heat or burn or boil the part &inhale its smoke or stem boil & drink the decoction	De O
29	***Croton macrostachyus***	Erphorbiaceae	Bisana	T	Sore Rushes on skin Cough Ascariasis Syphilis Bleeding	L L F F F L	F	grind & paint the powder extract the juice or oil or latex & paint either drinking or eating the concoction either drinking or eating the concoction grind & paint the powder	De De O O O Na
30	***Justicia schimperiana***	Acanthaceae	Sensel	S	Liver Tonsillitis	L L	F	boil & drink the decoction boil & drink the decoction	O O

31	*Hoslundia opposite*	Lamiaceae	Yemch medhanit	S	Mich	L/St	F/D	crush, heat or burn or boil the part & or in hale its smoke or stem	Na
32	***Acmella caulirhizea***	Asteraceae	Yemider berberie	H	Toothache	WP	F	hold with teeth	O
33	*Aloe percassa Tod*	Aloaceae	Eret	H	Hemorrhoids Eye Diabetes Heart defect Constipation Kidney Abdominal pain Toothache Ear defect	La La La La La La La La La	F	extract the juice or oil or latex & paint either drinking or eating the concoction either drinking or eating the concoction either drinking or eating the concoction either drinking or eating the concoction either drinking or eating the concoction either drinking or eating the concoction	An O O O O O

								either drinking or eating the concoction either drinking or eating the concoction	O O
34	*Salvia nilotica*	Lamiaceae	Hulegeb	H	Hemorrhoid Heart defect Wound	L R L	F	boil the part & paint the decoction either drinking or eating the concoction grind & paint the powder	De O De
35	*Euphorbia ampiphylla Pax*	Euphorbiaceae	Qulqual	S	External parasitic Wound	La La	F	extract the juice or oil or latex & paint extract the juice or oil or latex & paint	De De
36	*Glinus lotoides*	Aizoaceae	Metere	S	Tape worm	Se	D	crush, homogenize with cold water & drink	O
37	*Maesa lanceolata.*	Myrsinaceae	Kelewa	T	Skin Disease	Se	D	grind & paint the powder	De

38	*.Coffea Arabica L.*	Rubiaceae	Buna	S	Wound	Se	D	Grind & paint the powder	De
39	*Diplolophuium africanum*	Apiaceae	Feres zeng	H	Ascariasis Headache	L L	F	grind & paint the powder crush & sniff	O Na
40	*Asparagus africanus*	Asparagaceae	Serity	H	Cancer Diabetes Toothache	R/S R/F R/St	F F	either drinking or eating the concoction eat the part hold with teeth	O O O
41	*Allium cepaL.*	Alliaceae	Keyeshinkurt	H	Asthma	BU	F	eat the part	O

					Kidney Hypertension Common cold	BU BU BU		boil & drink the decoction eat the part eat the part	O O O
42	*Rumex nervosus*	Polygonaceae	Enbacho	S	Antibleeding Eye defect	L L	D	grind & paint the powder grind & paint the powder	De De
43	*Solanecio gigas*	Asteraceae	Yshekoko gomen	H	Skin disease	L	D	grind & paste or tie	De
44	*Solanum anguivi Lam.*	Solanaceae	Dekak emboay	S	Skin disease	Se	D	grind & paste or tie	De
45	*Trigonella foenumgraecumL.*	Fabaceae	Abish	H	Abdominal pain	Se	D	crush, homogenize with cold water & drink	O
46	*Nigella sativa*	.Ranunculaceae	Tikur Azmud	H	Asthma Allergic	Se Se	F/ D	either drinking or eating the decoction either drinking or eating the decoction	O O
47	*Zehneria scabra*	Cucurbitaceae	Hareg ressa	C	Wound	L	D	grind & paint the powder	De

48	*Rhus retinorrhoea*	Anacardiaceae	Tilum	T	Diabetes	L	F	boil & drink the decoction	O
49	*Sesamum angustifolium*	Pedaliaceae	Selit	H	Ear defect	Se	D	extract the juice or oil or latex & paint	AU
50	*Rumex nepalensis*	Polygonaceae	Tult	H	Diarrhea Eye defect Abdominal pain	R R R	F/ D	crush,homogenize with cold water& drink grind & paste or tie either drinking or eating the decoction	O De O

51	*Verbena officinalis*	Verbenaceae	Atuch	S	Sore Tooth Diarrhea Liver Epiglottis Ear defect	L L L L L L	F	boil the part& paint the decoction hold with teeth either drinking or eating the concoction either drinking or eating the concoction boil the part & paint the decoction grind & paint the powder	O O O O O AU

52	*Cymbopogon citrats (DC ex Nees)*	Fabaceae	Tejesar	H	Stomach ache	WP	F	boil & drink the decoction	O
53	*Eucalyptus globulus*	Myrtaceae	Nechbeharizaf	T	Influenza Common cold	L L	F	crush ,heat or burn or boil the part &inhale its smoke or stem crush ,heat or burn or boil the part &inhale its smoke or stem	Na Na
54	***Achyranthes asperaL***	Amaranthaceae	Telenj	H	Liver Unable to urinate	R R	F	crush,homogenize with cold water& drink crush,homogenize with cold water &	O

					Hypertension Hemorrhoid Wound	R R R		drink crushed & sniff grind & paste or tie grind & paste or tie	O Na De De
55	***Aloe pulcherrima***	Aloaceae	Sete-eret	H	Miscarriage	R	F	crush, homogenize with cold water & drink	O
56	*Dodonaea angustifolia*	Sapindaceae	Ktkitta	S	Wound Cough	L L	D F	grind & paint the powder boil & do stem bath	De De
57	*Ficus palmataForssk.*	Moraceae	Beles	S	Skin rush	L	F	extract the juice or oil or latex & paint	De

58	*Guizotia abyssinica*	Asteraceae	Nug	H	Cough Asthma Common cold	Se Se Se	D	boil & drink the decoction boil & drink the decoction boil & drink the decoction	O O O
59	*Ricinus Communis*	Euphorbiaceae	Gulo	S	Eye disease	L	F	heat the part & tie	De
60	*Moringa oleifera*	Moringaceae	Moringa		Hypertension	L	F	boil & drink the decoction	O
61	*Carthamus tinctures*	Asteraceae	Suf	H	Heart	R	F	boil & drink the decoction	O
62	*Schefflera abyssinica*	Araliaceae	Getem	T	Syphilis	SB	F	hold with teeth	O
63	*Acolanthera*	Apocynaceae	Mernz	T	Skin rush	R/L			De

	schimperi								
64	*Ajugainteg pifolia*	Lamiaceae	Armagusa	H	Diarrhea Diabetes Evil sprit Evil eye Asthma Hypertension	R/F R/F R R F F	F	either drinking or eating the concoction either drinking or eating the concoction crush heat or burn or boil the part &inhale its smoke or stem crush heat or burn or boil the part &inhale its smoke or stem either drinking or eating the concoction either drinking or eating the concoction	O O De De O O

In terms of species composition, the reported 64 plant species grouped in to 40 families. Out of these families, family Asteraceae (8 species), Lamiaceae (6 species), they consisted. The remaining families contained three,two or one species each. Other studies conducted in different parts of the country (Zemede Asfaw, 1999; Mirutse Giday and Ameni, 2003; Tesema Tanto et al., 2003; Mesfin Tadesse et al., 2005) also revealed the highest contribution of these families to the Ethiopian medicinal flora.

Table-2 Medicinal plant species in each family

No	Family	No of genera	No of plant species	Percentage
1	*Acanthaceae*	1	1	2.5
2	*Aizoaceae*	1	1	2.5
3	*Alliaceae*	1	2	2.5
4	*Aloaceae*	2	2	5
5	*Amaranthaceae*	1	1	2.5
6	*Anacardiaceae*	2	2	5
7	*Apiaceae*	2	2	5
8	*Apocynaceae*	1	1	2.5
9	*Araliaceae*	1	1	2.5
10	*Asparagaceae*	1	1	2.5
11	*Asteraceae*	8	8	20
12	*Brassicaceae*	1	1	2.5
13	*Caryophylaceae*	1	1	2.5
14	*Cucurbitaceae*	2	2	5
15	*Cuprussaceae*	1	1	2.5
16	*Erphorbiaceae*	1	1	2.5
17	*Euphorbiaceae*	3	3	7.5
18	*Fabaceae*	3	3	7.5

19	*Lamiaceae*	6	6	15
20	*Linaceae*	1	1	2.5
21	*Melianthaceae*	1	1	2.5
22	*Moraceae*	1	1	2.5
23	*Moringaceae*	1	1	2.5
24	*Myrsinaceae*	1	1	2.5
25	*Myrtaceae*	1	1	2.5
26	*Mysinaceae*	1	1	2.5
27	*Pedaliaceae*	1	1	2.5
28	*Phytolaccaceae*	1	1	2.5
29	*Polygonaceae*	2	2	5
30	*Ranuculaceae*	1	1	2.5
31	*Rhamnaceae*	1	1	2.5
32	*Rosaceae*	1	1	2.5
33	*Rubiaceae*	1	1	2.5
34	*Rutaceae*	2	2	5
35	*Sapindaceae*	1	1	2.5
36	*Scrophulariaceae*	1	1	2.5
37	*Solanaceae*	2	2	3.125
38	*Urticaceae*	1	1	2.5
39	*Verbenaceae*	1	1	2.5
40	*Zingiberaceae*	1	1	2.5
Total		62	64	100

The majority of medicinal plant species in the study area were obtained from market followed by fences and forest, home gardens, DBTTC campus and road side ((Table-3)

Table-3 Location of medicinal plant species obtained in the study area

Location of medicinal plant species obtained	No of medicinal plants	Percentage
Forest	13	20.31
Road side	2	3.12
Fence	13	20.31
Home garden	12	18.75
Market	15	23.44
DBTTC campus	9	14.06
Total	64	100

4.1.1 Knowledge of medicinal plants reported by male and female informants

4.1.1.1 Knowledge of medicinal plants reported by male and female informants in Debele

The male mean age18-39 is 4.4,the male mean age ≥40 is 8.4,the female mean age 18-39 is 4.1 and the female mean age ≥40 is 8.36.From the table the total mean of male's is 5.03 and the total mean of female's is 5.In each age category female report equal number of medicinal plant to male. This does not fit to any of previously work done to other part of Ethiopia. Age has great significance effect in the knowledge of traditional medicine (Table-4).Some aged female and male report more number of medicinal plants than young informants.

Table-4 Knowledge of medicinal plants reported by male and female in formants in Debele

Number of medicinal plants reported	**Age 18-39**		**Age≥ 40**	
	Male	Female	Male	Female
1	6	3	-	-
2	2	7	-	-
3	2	12	-	-
4	4	6	-	-
5	4	----	-	-
≥6	9	15	5	11

4.1.1.2 The number of medicinal plants reported by male and female respondents in DebreBirhan

The male mean age 18-39 is 4.6 and the male mean age ≥40 is 6.87 and the female mean age 18-39 is 4.76 and the female mean age ≥40 is 5.6. The total male mean 5.39 and the total female mean 4.89.Here, age has significant effect in the knowledge of medicinal plants, but, the gender effect is less (Table-5).The finding fit with previous findings that age has great effect in the knowledge of traditional medicine use. The knowledge of medicinal plants use is nearly disappearing among the young generation, because, may be most of the knowledgeable persons did not properly pass on their knowledge to the next generation (Tilahun Teklehaymanot, 2009).In case of gender the result show almost male and female respondents report equal number of medicinal plants. This contrast to other studies.

Table-5 Knowledge of medicinal plants reported by male and female respondents in DebreBirhan.

Number of medicinal plants reported	Age 18-39		Age ≥40	
	Male	**Female**	**Male**	**Female**
1	2	14	-	-
2	4	16	2	-
3	4	-	4	2
4	6	4	2	4
5	8	-	-	-
≥6	6	22	8	6

The knowledge of medicinal plants comparisons between urban and rural areas, the rural area informants report 35 (54.68) .This indicates the rural informants know more medicinal plants than urban informants the study result shows.

In this study some plants were reported to have medicinal value more frequently than others .For exampl*e Ocimum lamiifolium Hochst.ex* (Damakesa) cited by 117(59.09%) of informants as a sources of medicine for head ache, eye, ear. *Allium sativumL* (Nechshinkurt) cited by 80(40.40%) of informants as a source of remedy for cough ,common cold, ring worm, asthma, herpes zoster, pneumonia. *Ruta chalepensisL* (tena Adam) cited by 56(28.28%) informants as a source of medicine for eye, poison, common cold, cough. *Zingiber officinale Roscoe* (zingible) used by 51(25.75%) informants to treat common cold, constipation, coughing, diarrhea and asthma. *Eucalyptus globulus* (nechbeharzaf) used by 47(23.73%) informants to treat influenza and common cold (Table-6).

Table-6. Some of the medicinal plants cited most by informants

Scientific name of medicinal plant	Common name of medicinal plant	No of informants	Percentage
Ocimum lamiifolium Hochst.ex	Dama kesse	117	59.09
Allium sativumL	Nechshinkurt	80	40.40
Ruta chalepensisL	Tena adam	56	28.28
Zingiber officinale Roscoe	Zingibil	51	25.75
Eucalyptus globulus	Nech beharzaf	47	23.73
Lepidium sativumL	Feto	45	22.72
Inula confertiflora A.Rich	Woynagift	41	20.70
Urtic simensis Steudel	Sama	36	18.18

4.2. Plant growth forms, part (s) used, methods of preparation and rout of administration.

4.2.1. Plant growth forms

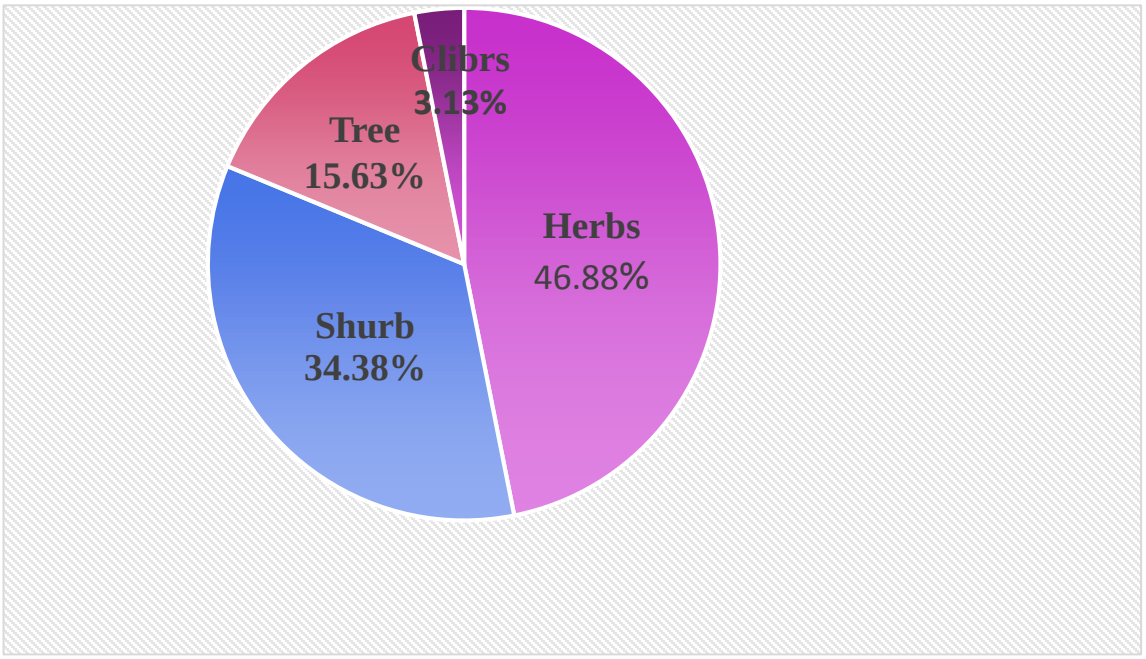

Figure -3 plant growth forms

Out of the total 64 medicinal plants reported from the study area 30(46.88%) were herb species followed by 22 (34.38 %) shrub species ,10(15.63 %) tree species and 2(3.125%) climbers. Studies conducted in other parts of Ethiopia (Zemede Asfaw, 1999; Mirutse Giday et al., 2003; and Tesema Tanto et al., 2003) also indicated the large proportion of use of herbs as sources of medicine.

4.2.2. Plantpart(s) used for medicine

People of the study area used different plant parts for the preparation of traditional medicine .Result of this study showed that leaf is the most plant part used in traditional medicine preparation followed by root and seed plant parts. Plant parts such as bulb, fruit, rhizome, latex, stem, flower, whole part, stem bark, root/stem, root/fruit, leaf/ stem, and leaf/fruit was reported to prepare remedy for human health problem.(Table-7). Previous reports in Ethiopia have shown that leaves were the most commonly used and followed by roots to treat various health problems (Dawit Abebe, 1991 and Mirutse Giday, 1999).

Table-7 Plant parts used for traditional medicine preparation in the study area

Plant parts	Total responses	% of Total
Leaf	73	36.9
Root	37	18.7
Seed	24	12.12
Fruit	15	7.6
Latex	14	7.1
Bulb	12	6.1
Rhizome	6	3.03
Whole part	5	2.52
Root/Fruit	4	2.02
Stem Bark	2	1.01
Root/Stem	2	1.01
Stem	1	0.5
Leaf/Root	1	0.5
Leaf/Stem	1	0.5
Leaf/Fruit	1	0.5
Total	198	100

4.2.3. Methods of preparation and application

Way of the preparation of traditional medicine, the locale people employ various methods of preparation of traditional medicines for different types of diseases. The preparation based on the type of disease treated and the actual site of the disease .The principal method of traditional medicine preparation reported was the concoction. Preparation may involve using a single plant or mixture of different parts of the same plant or a mixture of different plant parts. In the study the local people also use other substances as additives in their preparations. For example, honey, milk, yoghurt, butter etc are some of the additives that the study area people reported to be used to improve the flavor, taste and effectiveness of the medicine (Table-8). Similar result was also reported elsewhere (Mirutse Giday, 1999). Dawit Abebe (1986) has also identified the additive substances in herbal remedy preparations with their possible benefits.

Table-8 Method preparation and application of traditional medicine reported by people of DebreBirhan and its surrounding area

No	Method of preparation	Total respondents	% of total respondent
1	Boil & drink decoction	40	20.20
2	Grind & apply the powder	20	10.10
3	Grind &paste/tie	7	3.54
4	Extract juice/oil/latex &paint	15	7.58
5	Crush homogenize it with cold water &drink	7	3.54
6	Hold with teeth	7	3.54

7	Crush,heat/burn/boil the part& inhale it's smoke/steam	9	4.55
8	Crush &Sniff	4	2.02
9	Eat the part	10	5.05
10	Boil &do steam bath	1	0.51
11	Either drink or eat concoction	65	32.85
12	Boil the part &paint the decoction	4	2.02
13	Boil the part &drink	3	1.5
14	Heat the part &tie	3	1.5
15	Insert in to organ	3	1.5

4.2.4. Dosage and route of administration.

The dosage of medicine to be administered is given by estimation of the age, sex and physical state of the patient. So there is no precision on the dosage of the remedy. Similar study showed that all administrations are not standardized. Healers determine the dosages based on age, physical appearance and strength of the disease. Children are given small doses of medicine than considered in case of adult patient. Small amount such as drops, hand palms, coffee cups are applied as small dosage. For larger dosages, they use water glasses or other local materials that are used for drinking (Getaneh Seyoum and Girma Zerihun, 2014).

As regards to the route of administration, methods are applied internally or externally. Internal application include through oral, nasal, anal, eye, ear. External application includes dermal treatment. Over all oral administration was reported as a dominant route of administration followed by dermal application. (Table-9) Similar studies show that most remedies taken orally, followed by external application (Mirutse Giday, 2001).

Table-9. Route of administration

Route of administration	Total informant	% of total informant
Oral	135	68.2
Dermal	43	21.71
Anal	4	2.02
Auditory	5	2.52
Nasal	11	5.55

4.2.5. Informant consensus factor (ICF)

In this study all cited human diseases were grouped in to 8 categories. (Table-10) Respiratory diseases had high ICF followed by parasitic and abdominal, organ, skin, blood related, and spiritual diseases. Amongst these ,the categories with the highest ICF values respiratory diseases (0.94 %), which were followed by abdominal and parasitic disease(0.86 %each), skin diseases (0.84%),organ diseases(0.82%), blood related and STDS (0.78%each), and spiritual (0.6%.)According to Tilahun Teklehaymanot and Mirutse Giday (2007), medicinal plants that are presumed to be effective in treating a certain disease have higher ICF values. This indicates the respondents agree on the use of that plant taxa to treat a specific disease. A high ICF value (value close to 1) indicates that the informants rely most on the same taxa to manage specific disease conditions, while a low value (close to 0) indicates that the informants disagree on the taxa to be used in the treatment of a given ailment

Table -10 Informant consensus factor ICF

NO	Disease category	Species	% of all species	Use citations	% of all use citations	ICF
1	Skin diseases, hemorrhoids, herpes zoster, allergic, cancer and wound.	23	35.93	142	14.31	0.84
2	Respiratory diseases, epiglottitis, headache, mumps, and mich	25	39.06	451	45.46	0.94
3	Abdominal diseases, fever, miscarriage, poison, constipation, and rabies's	20	31.25	142	14.31	0.84
4	Parasites	10	15.62	68	6.85	0.86
5	Blood related	14	21.87	61	6.5	0.78
6	STDS	5	7.81	20	2.01	0.78
7	Organ diseases	19	29.68	102	10.28	0.82
8	Spiritual problems	3	4.68	6	0.60	0.6

4.2.6. Fidelity level index (FLI)

Fidelity level (FL) values were calculated for some commonly used medicinal plants against some commonly reported diseases. *Ocimum lemiifolium Hochst.ex* (against headache),Inula confertiflora A.Rich (against tooth), *Eucalyptus globulus* (against common cold), *Hagenia abyssinica* (against Tape worm),*Zingiber officinale* (against common cold), *Urtic simensis Steudel (*against stomachache*), Leonotis ocymifolia* (against Mich), *Hoslundia opposite* (against Mich) (Table-11).The medicinal plants that are widely used by the local to treat one or more ailments will have higher FL values than those that are less popular (Tilahun Teklehaymanot and Mrutse Gidyie, 2007).

Table-11 Fidelity index of some medicinal plants

Scientific name of medicinal plant	Example of ailment treated	NP	N	FL	FL%
Ocimum lemiifolium Hochst.ex	Headache	112	117	0.95	95
Inula confertiflora A.Rich	Toothache	41	41	100	1oo
Eucalyptus globulus	Common cold	40	47	0.85	85
Hagenia abyssinica	Tape worm	36	36	100	100
Zingiber officinale Roscoe	Common cold	36	51	0.70	70
Urtica simensis Steudel	Stomachache	30	36	0.83	83
Leonotis ocymifolia	Mich	29	31	0.93	93
Hoslundia opposite	Mich	20	20	100	100

4.2.7. Preference ranking--

When there are different species reported for the same ailment people show preference of one over the other. Preference ranking of nine medicinal plants that were reported for treating diarrhea was conducted after selecting ten informants. The informants were asked to compare the reported medicinal plants based on their efficacy and to give the highest number (9) for the medicinal plant which they thought most effective in treating diarrhea and the lowest number (1) for the less effective plant in treating diarrhea. Lepidium sativumL ranked first indicating that it is the most effective in treating diarrhea followed by Verbascum sinaiticum and the least effective was Zingiber officinale Roscoe (Table-12)

Table-12 Preference ranking of medicinal plants used for treating diarrhea informants labeled R_1-R_{10}

List of medicinal plans	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Total	Rank
Lepidium sativumL.	3	7	8	7	7	8	6	3	9	9	67	1
Zingiber officinale Roscoe	6	4	9	3	7	8	5	3	1	1	47	9
Clematis hirsuta.	1	8	1	2	3	6	7	8	9	9	54	6
Verbascum sinaiticum	9	9	7	7	5	5	3	2	7	8	62	2
Embelia schimperiVatke	3	1	9	8	8	4	4	7	9	6	59	5
Calpurnia aur ea (Ait.) Benth.	8	7	6	3	1	4	5	5	6	4	49	7
Rumexnepalensis	1	4	5	6	7	9	7	8	3	2	48	8
Verbena officinalis	7	3	9	5	7	5	5	5	6	8	60	4
Ajugainteg pifolia	4	9	9	7	5	6	3	2	8	8	61	3

4.3 .Threat to medicinal plants and indigenous knowledge

People need plants in their lively hood for different aspect. hey use plants for fire wood, charcoal production, house and fence construction, and urbanization were some of the factors that threats medicinal plants.

4.3.1 Direct matrix ranking

In the study area, many medicinal plants were used for different purpose other than their medicinal value. The major uses include medicine, edible, firewood, charcoal, construction and furniture and forage. For this ten key informants were requested to give value, 5 to the most used plant for that particular purpose and 0 to the least. Accordingly, *Eucalyptus globulus* was found to be the most multi-purposed plant scoring 85, followed by Hagenia abyssinica 79. Direct matrix ranking for the multipurpose of five medicinal plants. The value given to each plants is the sum of the scores given by the informants. From the table the study area of medicinal plants threats greatly by using for forage 73 followed by medicinal value 68.

Table- 13 Multipurpose and factor that threats medicinal plants of the study area

Name of Species	**Use of Categories**					**Total**	**Rank**
	Medicine	**Fire Wood**	**Charcoal**	**Construction and Furniture**	**Forage**		
Eucalyptus globulus	10	25	20	25	5	85	1
Hagenia abssinica	15	20	11	18	15	79	2
Inula confertiflora	12	15	0	5	18	50	3
Ziniber officinale	20	0	0	0	20	40	4
Urtica Simensis	11	0	0	0	15	26	5
Total	68	60	31	48	73		
Rank	2	3	5	4	1		

Indigenous knowledge on use of medicinal plants is secrete and transferred from one generation to the next orally. According to the traditional healers this word of mouth transfer classified in to two.

For those literate (learn about religious) and for those illiterate (did not have religious knowledge). For those members of their family and literate all procedures in the process of medication told, but for illiterate even if their family only rough process told about medication. So, the process of knowledge transfer was much secreted. They think that if they too illiterate one, they cannot perform medication process accordingly and the efficiency of the medicine disappear. Some traditional healer have written documents with Ge`ez language. However, they do not want to show or talk about the material because of fear of thief and illiterate persons. Because of these reasons the knowledge of traditional medicine dose not transfers to the young generation. This supported by similar studies, the knowledge on traditional medicinal plants of Ethiopia which was developed for millennia is now subjected to loss since it has mainly been stored in the memories of elderly peoples and handed down mostly by word of mouth for successive generations (Mirutse Giday et al., 2013).

5. Conclusion and recommendation

5.1 Conclusion

Debre Birhan and its surrounding area is rich in medicinal plant diversity. Sixty four medicinal plants were reported used to treat or cure human ailments .Totally 45 ailments of humans are treated by traditional medicinal plants. Herbs constitute (46.44%) of traditional remedies followed by shrub (34.38%), trees (15.62%), and clumber (1.56%).

Leaves were also found to be the most frequently used plant part followed by roots for preparation of human remedies. Traditional medicine preparation mostly involved a mixture of many plants. Route of administration was mainly oral (68.12%) followed by dermal (21.87%).

Few people think that dosage is unknown and some traditional healers related the medicine with evil spirit so they fear to use traditional medicine. On the other hand, 39.06% of the identified plant species location was live fences and home gardens. Most residences have at least 2 medicinal plants in their live fences or home gardens. This shows people concern towards medicinal plants conservation. The main threats for medicinal plants in the area are a rises of charcoal production, fire wood, construction and urbanization. Threats to indigenous knowledge in general come from secrecy, oral based knowledge transfer, reluctance by some to gain knowledge, and lack of awareness.

5.2. Recommendations

Creating awareness to the young generation about traditional medicinal plants importance, practices, and conservation.

Aware traditional healers to transfer their knowledge and practices in written document with full practical processes.

Encouraging religious institutes to scale up their practice of growing indigenous plants in their compound.

Encouraging and advising the community to advance their growth and conserving of traditional medicinal plants in their private area.

Giving more attention to research in the area of traditional medicinal plants

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Appendices

1. Semi-structured questionnaires to be employed in the research area

Date _____ village (Kebele) _____

Sex: Male _____,Female_____, Age _____Occupation _____

Level of education: Degree----------Diploma_____; High School: _____ Elementary _____; Illiterate _____

NO	Locale name	Growth form	Disease treated	Part used	Condition of part used	Method of application	Route of administration

2. Some representative pictures of the medicinal plant species

Name*OcimumurticifoliumRoth (*damakese)

Location home garden

Date 02/05/2017

Name *Allium sativumL* (nechshinkurt)

Location market

Date 17/04/2017

Date 17/04/2017

Name*RutachalepensisL (*tenaadam)

Location home garden

Date 02/05/2017

Name Zingiber*officinale**Roscoe* (zingible)

Location market

Date 06/05/2017

Name *Eucalyptus globulus* (nechbeharzaf)

Location home garden

Date 02/05/2

Name *LepidiumsativumL(*feto)

Location market

Date 03/05/2017

Name *Inulaconfertiflora* (woyenagift

Location home garden

Date02/05/2017

Name*Hageniaabyssinica*(koso)

Location TTC campus

Date 02/05/2017

Name *Leonotisocymifolia(*eraskimer)

Location forest

Date 05/05/2017

Name *Aloe debrana (*erat)

Location fence

Date 02/05/2017

Name*Artemisiaabyssinica*(chiqugne)

Location home garden

Date: 02/05/2017

NameKalanchoepetitiana (Indahula)

Location TTC Camp

Date: 02/5/2017

Name *UrticadioicaL. (*Sama)

Location road side

Date 02/05/2017

Name *Laggeratomentosa (*keskeso)

Location road side

Date 05/05/2017

Name*FoeniculumvulgareMiller(*inselal)

Location home garden

Date 20/02/2017