Journal of Medicinal Plants Studies
Year: **2014**, Volume: **2**, Issue: **2**
First page: (**94**) Last page: (**108**)
ISSN: **2320-3862**
Online Available at **www.plantsjournal.com**

Received: 01-01-2014
Accepted: 09-02-2014

Journal of Medicinal Plants Studies

Traditional medicinal plants utilization, management and threats in Hadiya Zone, Ethiopia

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The traditional medicinal plants of Hadiya were studied ethno botanically. The study aimed to document indigenous knowledge on use and management as well as to investigate the threats to traditional medicinal resources. The data were collected from traditional healers and knowledgeable Hadiya people using semi-structured interview, field observations, survey, use diversity matrix and priority ranking. A total of 31 medicinal species, belonging to 22 genera and 14 families of angiosperms were observed. The two most frequently used plant parts were leaves and roots accounting for about 44.7% and 26.3% respectively. Crushing and homogenizing in water was found a widely used method of preparation remedies. The common route of administration was oral, accounting for about 71.7%. Use diversity analysis showed that *Nigella sativum* scored high (26.6%), followed by *Justicia schimperiana* (22.5%) and *Calpurnia aurea* (16.7%) indicating high utility value of these species for the local community. Agricultural expansion was ranked as the principal threat (23.1%) to medicinal plants followed by firewood (17.7%). The concerned bodies should have to make action to conserve the endangered medicinal plant resources.

Keyword: Medicinal Plant, Management, Threats.

1. Introduction

During the last decade, the use of traditional medicine (TM) has expanded globally and has gained popularity. It has not only continued to be used for primary health care of the poor in developing countries, but has been used in countries where conventional medicine is predominant in the national health care system (Ayehu *et al*., 1993). It has been confirmed by WHO that herbal medicines serve the health needs about 80% of the world's population, especially for millions of people in the vast rural areas of developing countries. Natural products from microorganisms has been the primary source of antibiotics, but with the increasing acceptance of herbal medicine as an alternative from of health care the screening of medicinal plants for active compounds has become very important because of these may serve as promising sources of novel antibiotic prototypes (Asres, 1986).

It has been shown that in vitro screening methods could provide the needed preliminary observations necessary to select crude plant extracts with potentially useful properties for further chemical and pharmacological investigations (Duru, *et al*., 2006). In Ethiopia, traditional remedies represent not only part of the struggle of the people to fulfill their essential drug needs but also they are integral components of the cultural beliefs and attitudes (Duru *et al*., 2006).

Among natives of countries, knowledge of medicine has been passed by of mouth from one generation to priests, with doctors or medicine man. This is no less true in Ethiopia where

written records in this fields are almost absent even though the country has had a written language for over two thousand years. The method is crude and highly conductive to distortion in an area where much accuracy is needed. Some of the understanding is lost at each point of transfer or otherwise modified and there by becomes mistaken and dangerous to use. But despite these virtues, only few studies have been conducted in the assessment and chemical constituents of these medicinal plants specifically in the identification of the structure of bioactive constituents of traditional medicinal plants in the country wise and no studies are conducted in Hadiya zone. Thus with regard to this there is much to be explored. Therefore the study will help people in the area to upgrade the indigenous knowledge of these plants as well as to make the traditional knowledge of the plant scientific & also corroborate the therapeutic potential of the plant.

2. Methodology

2.1 Experimental Sign

2.1.1 Description of the Study Area

The study Zone, Hadiya is one of the thirteen Zones and nine Special Woredas of the SNNPR of the Ethiopia. It is situated in the western margin of the Great Ethiopian Rift Valley and at the fringe of the Gurage mountains in the northern part of the region. Its absolute location is roughly between $7^{0}45^{'}$N and $38^{0}28^{'}$E. Its capital, Hossana, is 232 km away from Addis Ababa, the capital of the Ethiopia and it is also168kms and 200kms away from the capital of the SNNPR, Hawassa through Alaba- Danboya-Anegacha and Durame- Shenshicho, respectively. Hadiya zone is bordered in the south by Kembata–Tembaro Zone and Alaba Special Woreda, on the west by the Omo River which separates it from Oromia Region and the Yem Special Woreda, in the north by Gurage and Silite Zones, and in the east by the Oromia Region.

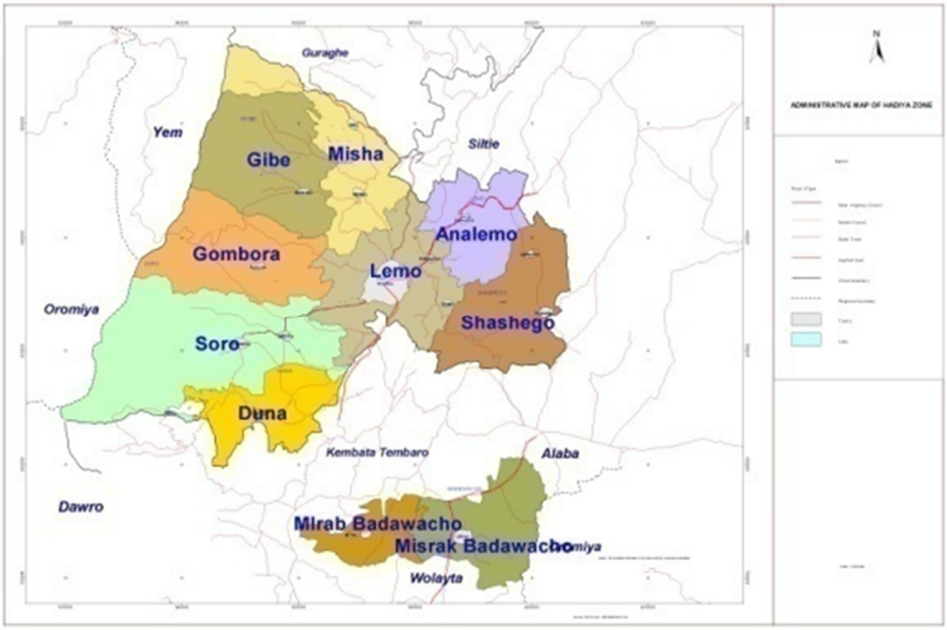

Fig 1. Administrative Map of Hadiya Zone.

2.1.2 Climate

According to the data collected from National Metrological Service Agency Hossana branch *n*early two-thirds (64.7%) of the Zone lies in the Woina Dega agro-climatic zone whereas 23.7% and 11.6% of the total land area of the zone lies in the Dega and Kolla agro-climatic nature respectively. In general, the zone has a

predominantly undulating topography and a pleasant climate which makes it highly suitable for human habitation as well as agricultural production.

Hadiya zone receives seasonal rainfall amount ranging between 469.98 and 156.66 mm annually in summer, season from June to August locally named as "Hagayye". The generalized mean-maximum annual temperature is 22.54 ^{0}C and mean-minimum temperature is 10.35 ^{0}C. In general, the climate in the zone is mild tropical highland type. It is suitable for the production of both tropical and temperate crops. This may be the reason why Hadiya zone is one of the leading wheat producing zones and nicknamed "The Little Canada".

2.1.3 Agro-Ecology

According to the Hadiya Zone Agricultural Department Report, agriculture is one of the dominant and primary economic activities in Hadiya zone. From the total land cover, 69% is cultivated and used for growing different crops, 7% is grazing land, 6% bush and woodland, 8.78% used for nonagricultural activities, 2% cultivable and 7.22% not cultivable land. It consisted planting crops and keeping of animals.

2.2 Methods

2.2.1 Selection of Survey Sites and Informants

Four Woredas of the Hadiya zone (Soro, Gombora, Gibe and Shashogo) were selected based on the semi-pastoral peasants' settlement and climatic nature. The selection of Kebeles was based on information from the Zonal and Woredas agricultural rural development department in addition to the criteria set by the researchers. The criteria considered for selecting the study Kebeles was based on a better natural resource cover or vegetation association together with the topographic characters and visual recognition of peasants' settlements.

A total of 12 Kebeles from each Woredas 3 Kebeles were selected for the survey purpose. A total of 120 respondents, 10 respondents from each Kebeles traditional healers and knowledgeable elders were selected purposeful for the interview. The selection of respondents was based on their better knowledge on the area in the past and now, practical knowledge of medicinal plants and willingness guided by local administrators, individuals from the local community as indicated in Martin (1995).

2.2.2 Ethno botanical Data Collection

All of the data required to answer and validate the research questions were collected from primary sources. To generate the required data from the primary sources, a designed questionnaires and key informants interview of traditional healers and knowledgeable elders were used to collect pertaining data about utilization, dosage, management (wild/ cultivated), marketability, threats of traditional medicinal plants as well as indigenous knowledge.

The data collecting questionnaires and key informants interview were administered in the local language (Hadiyisa), field observation and focus group discussion were done as described in Martin (1995) and Cotton (1996). Several topics was asked, useful plants growing in their natural locality including vernacular names, parts used and methods of preparation, conservation status including scarcity and cause of scarcity management way of multipurpose tree species and traditional farming practice, threats to these genetic resources and related data was collected.

2.2.3 Focus Group Discussion and Key Informant Interviews

Apart from the formal questionnaire both focus group discussions and key informant interviews were also carried out, to complement the survey method. For the focus group discussions, about two farmers per Kebele from which, one traditional healer and one knowledgeable elder were invited for a joint interview session. Several topics were brought for discussion, including thoughts, perceptions, utilization, attitudes and practices of traditional medicinal plants. This method assumes that there exists variation in opinion, experiences and knowledge among informants.

2.2.4 Field Observation: Data collection was done through guided field walk, which involves a

combination of observation and interview methods. This implies that some of the interviews were made while walking through the vegetation, recording the habitat, habit and appearance of the plants and voucher specimen collection.

2.2.5 Data Identification and Analysis

Specimens collected from various habitats, dried and prepared using standard herbarium specimens techniques, was taken to National Herbarium of Addis Ababa University and identified and preserved there. The data collected through structured questionnaires and key informant interview were presented using tables, graphs and percentages as described in Martin (1995). Information consistency on the threats of medicinal plants gathered from key informants was analyzed.

3. Results and Discussions

3.1 Medicinal Plants Used To Treat Human and Livestock Health Problems

In this study, 31 medicinal plant species belonging to 22 genera and 14 families were considered. The results in Table 1, of those 19 species (61.3%) were used for human health purposes, 7species (22.6%) for both human and livestock and 5species (16.1%) for livestock only. Among the families, Fabaceae and Euphorbiacea had the highest number, that is 8 species each; followed by the Asclepiadaceae represented by 6 species, Cappardaceae, Solanaceae and Tiliaceae each represented by 3 species. The medicinal plants were collected from various habitats including riverbanks, hill slopes, roadsides, farm borders and church compounds. Most of the medicinal plant species investigated in this study is also medicinally useful in other parts of Ethiopia and elsewhere in Africa (Mesfin Taddese and Sebsebe Demissew (1992), Bayafers Tamene (2000) and Kebu Balemie et al (2004). The main feature of medicinal plant species and the medicinal plant used by Hadiya 'peoples' are given in Appendix 1. The results shown in Table 1, the medicinal plant tradition appears to be greater in the treatment of infectious human diseases such as dysentery, malaria and in relation to livestock health, they stronger in treating health problems of cattle and horses rather than goats and sheep.

Table 1: Proportion of plants for human and livestock medicine in the Hadiya.

Target Organism	No of Species	Percent of total
Human only	19	61.3
Livestock only	5	16.1
Human and livestock	7	22.6

The result in Table 2 indicates, the most commonly used growth forms of medicinal plants prescribed for human and livestock health problems were herbs and shrubs accounting for about 38.7% and 32.3% respectively. The parts used were as variable as diseases treated. But 44.7% of leaves and 26.3% of roots were the most widely used parts. Katambo (1999) has also reported 65% of herbal prescription from leaves in a study carried out in Tanzania. The same author explained widespread utility of root parts as being detrimental to the survival of plant species, especially plants with high demand and low populations. On the other hand, whole plant or above ground parts, latex and fruit were the plant parts reported as being used least

Table 2: Growth forms of medicinal plants and parts used by the Hadiya people.

Growth forms or parts used	No of Species	Percent of total
Growth forms		
Trees	7	22.6
Shrubs	10	32.3
Herbs	12	38.7
Others	2	6.4
Parts		
Roots	8	26.3
Leaves	14	44.7
Seeds	3	10.5
Barks	4	13.2
Fruits	2	5.3

The results of the study in Table 3 revealed that some of the medicinal plants were popular and widely used in the study area. For example, Allium ursinum, Lippaia abyssinica, *Nicotiana tabacum* and *Rumex nervosus* were reported as medicinally useful by most of the respondent. The results in Table 4, also indicated that most of the medicinal plants were used to treat more than one health problem *Nigella sativum*, *Justicia schimperiana*, and *Calpurnia aurea* for example were reported to treat Malaria, Headache, and Skin diseases health problems respectively.

Table 3: widely used medicinal plant species by the Hadiya people.

Medicinal Plants	Frequency of report	Percent
Nigella sativum	32	26.6
Justicia schimperiana	27	22.5
Calpurnia aurea	20	16.7
Phytolacca dodecandra	17	14.2
Ricinus communis	15	12.5
Allium ursinum	9	7.5
Total	120	100

3.2 Preparation Methods and Routes of Administration of Medicinal Plants

Information from most informants indicated that the plant parts used condition for medicinal

preparation depended on the availability of the species. For example, for commonly available plants, they used fresh specimens to prepare remedies for their patients. But, for rare and seasonally available plant species, they stored and used dried specimens.

Table 4: Medicinal plant species widely used to treat different health problem by the Hadiya people.

Medicinal Plants	No of health problems	Percent of total
Nigella sativum	5	22.8
Justicia schimperiana	4	18.2
Calpurnia aurea	4	18.2
Phytolacca dodecandra	3	13.6
Ricinus communis	3	13.6
Allium ursinum	3	13.6
Total	22	100

The medicinal plant parts are processed in various forms (decoction, concoction, homogenizing in water, chewing, crushing, steam bath, smoke inhalation) and administered through various routes (oral, dermal, nasal and other body parts). However, simple crushing and pounding a particular plant part (s) and homogenizing it in water are the commonly used form of herbal preparation for both human and livestock health problems. In case of human use, the remedy is often decanted before use.

Most of the surveyed medicinal plant preparations involved the use of a single plant species or a single plant part (s) and different plants or plant parts were rarely used together in concoction. Dawit Abebe (1986) also commented that the use of multiple plants and plant parts for a single health problem was rare. Other ingredients often used in preparation for certain health problems including animal products. Coffee with milk is often used to arrest continued vomiting or diarrhea after the administration of remedies for serious diseases like glandular swelling, malaria, gonorrhea and respiratory problems.

The informants' responses indicated that there were variations in quantity of remedies, unit of measurement of remedies, duration and time of use of preparations prescribed by healers for the same kind of health problems. Secrecy of medicinal knowledge among healers and amateur practitioners was reflected in variations in dosage employed for a particular condition. Amare Getahun (1976) and Dawit Abebe (1986) have also discussed lack of precision and standardization as one drawback for the recognition of the traditional health care system.

Table 5: Forms of herbal preparations and methods of application for human health problems.

Forms of preparations	Total	Percent	Ways of administration	Total	Percent
Decoction	6	13	Oral	33	71.7
Concoction	4	8.7	Dermal	8	17.3
Steam bath	1	2.2	Nasal	2	4.4
Smoke	3	6.5	Nasal & Oral	1	2.2
Chewing	5	10.9	Chewing	2	4.4
Homogenizing in water	15	32.6			
Crushing	12	26.1			
Total	46	100		46	100

3.3 Categories of Health Problems and Treatment Methods

During this survey, 46 different health problems confronting human and livestock health were encountered. This health problems /conditions/ are generally categorized as infections, general complications, diet-related, antidotes, cancer-related, allergies, helminthes, evil spirit, wounds and sores and others. The local naming of some of these health problems is often related to specific body parts, for example, like headache, stomachache, eye disease or to the causative agents, for example, scorpion bites and snake bite. In some cases, the local naming is lump different health problems together. For example, evil spirit is called as jinni.

3.4 Medicinal Plant Use Diversity

Some of the surveyed medicinal plant species were found to be multipurpose, useful to local people in many different ways, including charcoal, firewood, construction materials, forage, medicine, food and household equipment. Use diversity ranking for 6 multipurpose medicinal plants, commonly reported by key informants was conducted to see the relative importance of the species to the local people. In this exercise, each key informant was asked to assign value to each attribute based on the relative benefits he derived from each plant. The total score of average score given to each attribute was obtained by adding the values given to each attribute (Table 6).

From the total scores, *Prunus africanus* followed by *Milletia ferruginea* and *Hagenia abyssinica* were ranked top indicating these plants were more preferred for various uses and had high use diversity in local community. *Prunus africanus* and *Croton macrostachyus* were especially used for firewood, charcoal making, as live fence and shade plants rather for medicinal purposes. The use diversity results also indicated that medicinal use was of second importance, next to firewood, for the above-mentioned species. From field observations, commercial sale of *Prunus africanus*, *Catha edulis* and other woody species for firewood or charcoal was common in the study area. If the present rate of harvesting of this species continues, the species may be gradually eliminated from the area. Widespread sale firewood and charcoal also reported in Zerihun Woldu and Mesfin Taddese (1990) and Ensermu Kelbessa *et al*., (1992) as one of the causes of environmental problem in forest clearance.

Table 6: Average score for direct matrix ranking of 6 medicinal plant species with other additional uses based on use criteria (5= best, 4= very good, 3= good, 2= less used, 1= least used, 0= no value).

Use diversity	Medicinal plants with other additional uses						
	Prunus africanus	***Milletia ferruginea***	***Hagenia abyssinica***	***Croton macrostachyus***	***Myrsine africana***	***Justicia schimperiana***	**Total**
Firewood	5	5	5	5	5	4	29
Charcoal	5	5	5	5	5	1	26
Medicine	4	3	5	4	3	5	24
Live fence	5	5	4	4	3	5	26
Forage	4	3	1	2	2	3	15
Shade	5	5	4	3	4	3	24
Fruit edible	0	0	0	0	0	0	0
Total	28	26	24	23	22	21	
Rank	1	2	3	4	5	6	

3.5 Traditional Management of Medicinal Plants

Resources managed through traditional laws are often more sustainable than imposed systems for controlling over-harvesting or other destructive activities (Furze et al., 1996). The Hadiya people have such customs and beliefs traditionally which includes regulation of plant resources. The indigenous knowledge associated with such cultural practices has been used for judicial utilization of the plant resources for generations, even though the people inhabit a fragile environment.

The traditional land management system is closely linked the indigenous knowledge passed from generation to generation. The strategies used were herd diversification and crop rotation. Such strategies enable the elders to feed their stock on different browse and grass species and provide rest to grazing lands so that they have good ground cover for dry season as well as wet season pasture. Cutting of trees, especially for charcoal, is also culturally prohibited. For livestock forage, trees or shrubs are lopped or leaves, seeds and pods are shaken down using sticks, rather than cutting down the trees. Such indigenous practices favor biodiversity conservation. Simonsen (1996) also reported a similar observation among afar pastoralists. This might show use of common management knowledge among farmers and pastoral communities where resource uses overlap.

3.6 Beliefs

Keeping some secrecy about the curative effect of plants among traditional healers was seen /observed/. Medicinal plants are given high respect by local people. There is a strong belief among the people that herbal medicines lose their healing power or die if other people know them. Informants also claimed that there was fear among local people to harvest medicinal plants for themselves or others even if the medicinal plants, he/she will be affected by jinni, the evil

spirit. It is believed that this could happen to, at least, one of his/her family members or his/her livestock in some form. Moreover, harvesting of medicinal plants requires some pre-condition to be fulfilled. For instance, collectors/healers are expected to put money, or rings under the mother plant before harvesting for medicinal purposes. Anybody who fails to do so is also, believed to be affected by jinni. After fulfilling the preconditions, a harvester collects a portion of a plant part without damaging the mother plant. These methods used for harvesting have a valuable contribution to limit the general misuse of medicinal plants. The result of this study is in line with those of odera (1997), Katambo (1999), and Debela Hunde (2001).

3.7 Threats to Medicinal Plants

Various human induced and natural factors threaten the survival of many medicinal plant species. However, the degree of threats varies from place to place and species to species. The order of importance of the threat factors (agricultural expansion, harvest for firewood and charcoal, home use and trade, Overgrazing) in the study area is summarized in Table 7.

Table 7: priority ranking for factors perceived as threats to medicinal plants based on their level of destructive effects

Threats	Scored by Respondents						Total	Percent	Rank
	R_1	R_2	R_3	R_4	R_5	R_6	Score	(%)	
Firewood	3	4	4	5	4	3	23	17.7	2
Charcoal	4	3	3	4	5	2	21	16.2	3
Drought	1	2	1	2	2	1	9	6.9	7
Overgrazing	3	2	2	3	3	2	15	11.5	5
Agriculture	5	5	5	5	5	5	30	23.1	1
Home use	3	3	3	4	3	2	18	13.8	4
Trade	2	3	2	3	2	2	14	10.8	6

In Table 7, priority ranking of threat factors indicates that agricultural expansion, 23.1% of the total score) was most hazardous to medicinal plants and their habitats. Most informants perceived that marketing and drought are the least destructive factor for medicinal plants, nearly 10.8% and 6.9% of the total score respectively. Dawit Abebe and Istifanos Hagos (1991) marshal (1997), and katambo (1999) also reported that local level consumption as a whole was not regarded as a threat to the survival of medicinal plant species unless demand was higher than sustainable harvest. In this study, informants put forward various reasons that make over-grazing the most important threat including shrinking of unpolished land by expansion of agriculture, shortage of forage due to drought and increasing livestock population. Over-grazing has especially affected those medicinal species that have forage value. Agricultural expansion for small-scale farming due to high dense population in the area have increased and cleared the natural vegetation. These factors combined with the natural vulnerability of the area may lead to further reduction in medicinal plants. Pressure from over-grazing, agricultural expansion, widespread cutting for fuel wood combined with seasonal drought were reported in Zerihun Woldu and

Mesfin Taddese (1990) and Ensermu kelbessa *et al*. (1992) as main factor for environmental degradation in different parts of Ethiopia.

4. Conclusions and Recommendations

The Hadiya people have good medicinal plant use and management knowledge, which could make a valuable contribution to promoting conservation activities in the area. Ethnomedicinal plant use knowledge was found best developed among a few traditional healers. The prominently used parts are roots and leaves. Widespread utility of roots for medicinal purposes coupled with over harvesting for other purposes, such as commercial charcoal making, fire wood, construction, and others may lead to loss of the plants from the local area. Moreover, pressures from overgrazing and agricultural expansion together with recurrent drought worsen the threats to the medicinal species. From observation, many species medicinal plants are depleting due to combined effect of the above factors. Strengthening the traditional management systems of range plants and creating awareness on sustainable use of declining plant resources, especially among the local youth, could slow down the existing threats. Finally, for the validity and safety use of reported medicinal plants, photochemical analysis should be conducted. In this case, there should also be negotiation to safeguard the intellectual property rights of the healers.

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Appendix 1: Medicinal Plant species, Local names, Health problems treated, Parts used and Ways of applications for humans, live stocks or for both in selected areas of Hadiya Zone.

S. No	Scientific Name of Medicinal Plant	Vernacular Name	Health Problems Treated	Parts Used	Way of Administration
1.	Aloe abyssinica	Ireta	Skin fungi	Leaves	Dermal
2.	Lippaia abyssinica	Damakase	Common cold	Leaves	Nasal
3.	*Acacia mellifera*	Kontir grar	Sexual incompetence of male	Root	Oral
4.	*Milletia ferruginea*	Hanigeda	Pesticides	Seed	External
5.	*Croton macrostachyus*	Masana	Skin disease	Leaves	Dermal
6.	*Datura Stramonium*	Haro-kecheba	*Rabbis*	Leaves	Oral
7.	*Lepidium sativum*	*Shuunfa*	*Head ache, cold*	*Seed*	*Nasal & Oral*
8.	*Catha edulis*	Chat	disease	Seed	Oral
9.	*Phytolacca dodecandra*	Hanja	Abortion Anthrax Itchy	*Root* *Root* *Root*	*Oral* *Oral* *Dermal*
10.	*Ricinus communis*	Kob'o	Dysentery Cold Itchy	Root Root Root	Oral Oral

					Oral
11.	*Hagenia abyssinica*	Suto	Tape worm	Flower	Oral
12.	*Eucalyptus globulus*	Kedal-barzafa	Skin diseases	Leaf	Dermal
13.	*Myrsine africana*	Keme'il-haqa	Cattle skin diseases	Seed	Oral Oral
14.	*Linum usitatissimum*	*Talba*	*Dandruff*	*Seed*	*Oral*
15.	*Solanum indicum*	Achongera	Ear pain Gonorrhea	Fruit Flower	Dermal Oral
16.	*Ruta chalepensis*	*kentelama*	*Stomach ache*	*Leaves*	*Oral*
17.	*Vernonia amygdalina*	*Heba*	*Cattle Nematodes*	*Leaves*	*Oral*
18.	*Zingiber officinale*	*Jinjibela*	*Stomach ache*	*Corm*	*Oral*
19.	Allium ursinum	Tuma	Lung cancer, Wound, Dandruff	Corm	Oral
20.	*Justicia schimperiana*	Tumuniga	Gonorrhea Malaria Rabies Headache	Leaf Leaf Leaf Leaf	Oral Oral Oral Oral
21.	*Brassica nigra var botrytis*	Yabesha gomen	*Constipation*	Leaves	Oral
22.	*Nicotiana tabacum*	*Tenba'a*	*Cattle Nematodes*	*Leaves*	*Oral*
23.	*Nigella sativum*	Hemach enja	Wound Cold Cough Headache Malaria Skin disease Sour throat	Bark Bark Root Bark Root Root Bark	Dermal Oral Oral Dermal Nasal Dermal Oral
24.	Prunus africanus	Arara	Toothache	Bark	Chewing

25.	Rumex nervosus	Bahet-heka	Gastritis	Leaves	Oral
26.	*Euphorbia abyssinica*	*Adamma*	*Glandular swelling*	*Petiole*	Oral
27.	Erythrina brucei	Worea	*Glandular swelling*	Leaves	Oral
28.	Aframomum angustifolium	Wokasha	Stomachache	Seed	Chewing
29.	*Calpurnia aurea*	Sena	Eye disease Snake bite Vomiting Stomach ache	Leaf Leaf Root Bark	Dermal Oral Oral Oral
30.	Arundinaria aplina	Leema	Tapeworm	Corm	Oral
31.	Maesa lanceolata	Kowada	Ascaris	Fruits	Oral

Appendix 2

Questions for assessment of traditional medicinal plants management, utilization and threats, in Hadiya zone, Ethiopia

1. What are the medicinal plants you use at your locality? How do they grow, and/or how are they grown?

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2. How are these plants collected- with what instrument? In what stage of life cycle? Which part of the plant do you use?

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3. Do you sell or handover or trade raw plants? If not, in what form? What are the processing mechanisms? What is the benefit of primary processing?

4. Please rank the top ten local names of medicinal plants as per their demand by the people and mention health problems treated.

Species Name	Parts used
1.	
2.	
3.	

5. Please rank ten of your most medicinal used medicinal plants?
   a.
   b.
   c.
6. What type of support do you feel should be given to the Traditional Medicine practitioners for their professional capacity building and socio-economic status upgrade?

   _____

7. What are the causes of the extinction of species from your neighborhoods? Do you have any suggestions to resist these?

   _____

8. Who supplies you with medicinal plants and from what sources?

   _____

9. What are widely used medicinal plant species your neighbors?
   a.
   b.

10. Is medicinal plant collection/production the primary means of you're earning? If yes, to what extent does it help livelihood?
    a. adequately supports
    b. moderately supports
    c. not sufficient

    If not, what other sources of income do you have?

11. Mention the type of plants for human and livestock medicine in the neighbors?

Plants used as livestock medicine	**Plants used as human medicine**
a.	
b.	
c.	

12. What are the highly venerable plant species? What are the less abundant plants now? Which plants are already extinct? Why?

13. What Forms of herbal preparations and methods of application for human health problems people used?

14. Mention Medicinal plants with other additional uses in addition to medicinal purposes