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Full Length Research Paper

Utilization and conservation of medicinal plants and their associated Indigenous Knowledge (IK) in Dawuro Zone: An ethnobotanical approach

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This research work was aimed at documenting the traditional management and conservation of indigenous knowledge associated with the use of plant diversity for treatment of human and livestock diseases and medicinal plants found in Dawuro Zone, Southern Ethiopia. A total of 216 medicinal plants distributed in 69 families were documented through semi-structured interview conducted on 91 traditional healers in this study. The data were analyzed using excel spread sheet and data matrix procedure for preference ranking. Asteraceae was the most frequently used plant family which accounted to 44.93%, followed by Fabaceae and Lamiaceae which were 39.13% and 26.06%, respectively. Most of the traditional healers of the area collect their medicinal plants, about 169 species (78.24%) from the wild and predominantly use herbs 91(42.13%) and leaves account for 89 (41.20%) for medicinal purpose. There was poor utilization and conservation of medicinal plants in the study area. Indigenous knowledge on medicinal plants was gradually disappearing due to secrecy, unwillingness of the young generation to gain the knowledge, and other activities. Initiating pharmacological and biological activity testing of most popularly used traditional medicinal plants, establishing botanical gardens and protected areas with community-based conservation and encouraging the use of home gardens for cultivation of multipurpose plants were needed.

Key words: Conservation, Dawuro, ethnobotany, indigenous knowledge, medicinal plants, traditional healer.

INTRODUCTION

Ethnobotany is the study of how people of a particular culture and religion make use of indigenous plants. From the beginning of humanity, indigenous people have developed their own local specific knowledge on plant use, management and conservation (Cotton, 1996). Indigenous knowledge has developed as a result of human interaction with their environment. In this view, ethno botanical studies are useful in documenting, analyzing and communicating knowledge and interaction between biodiversity and human society, how diversity in nature is used and influenced by human activities (Martin, 1995; Cotton, 1996; Balick and Cox, 1996).

The study of ethno botany plays a vital role because of the direct contact that can be established with the authentic information on the uses of plants both wild and cultivated. These plants are used for purposes of food, fodder, medicine, clothing, shelter, agricultural implements, hunting, narcotics, poison, gums, dyes, fuel, fiber, income generation and the fulfilling of cultural and spiritual needs throughout the world (Zemede, 2001; Pareek and Trivedi, 2011; Mathewos *et al*., 2013a; Mathewos *et al*., 2013b).

Ethiopia is characterized by a wide range of ecological, edaphic, and climatic condition that accounts for the wide diversity of its biological resources both in terms of flora and fauna (Jansen, 1981). It is well known that traditional medicines are widely used especially in the low income rural parts of the country. Medicinal plants play a vital role in providing health care to human beings since the dawn of civilization. The demand for medicinal plants is increasing in both developing and developed countries and the bulk of their material trade is still from wild harvested plants and safe, effective and inexpensive indigenous remedies are gaining popularity among the people especially in the developing countries, where modern health service is limited (Pareek and Trivedi, 2011).

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WHO (2003) defined traditional medicine as health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercises applied to treat, diagnose and prevent illnesses or maintain well being.

Tribal communities living in biodiversity rich areas possess a wealth of knowledge on the local utilization and conservation of food and medicinal plants. Today, there is a realization to preserve the enormous wisdom, traditional knowledge and also the cultures associated with them. Not only the flora and fauna have been protected but also the knowledge data base often treasured in the memories of traditional healers. The knowledge of medicinal plants has been accumulated in the course of many centuries based on different medicinal systems (Venkataswamy *et al*., 2010).

People are dependent upon their surrounding environment for all of their needs. They use many wild species of plants for traditional medicine as elsewhere in Africa is faced with problems of continuity and sustainability (Ensermu *et al.,* 1992). The primary cause of this problem is loss of taxa of medicinal plants, loss of habitats of medicinal plants and loss of indigenous knowledge. Some studies have shown that most of the medicinal plants utilized by Ethiopian people are harvested from wild habitats (Mirutse, 1999; Zemede, 1999; Mathewos *et al*., 2013a). And hence, this aggravates the rate of loss of taxa with related indigenous knowledge and loss widely occurring medicinal plant species. According to Zemede (2001), medicinal plants are considered to be at conservation risk due to over use and destructive harvesting (Roots and bark collection). The sustainable management of traditional medicinal plant resources is important not only because of their value as a potential source of new drugs, but due to reliance on traditional medicine for health (Cunningham, 1993).

There is a wide gap in our knowledge about ethnobotanical data and information from various parts of Ethiopia although we have rich and diverse ethnolingustic groups throughout the country. Complete collection, identification and documentation of ethnobotanical works have not yet been made in the study area. This study therefore, is aimed at documentation of indigenous knowledge on use and conservation of medicinal plants by the people of Dawuro and assessment of the existing threats to medicinal plants in it.

MATERIALS AND METHODS

Study Area

The research area, Dawuro zone, is located at $6^059'$–$7^0 34'$ N of latitude and $36^0 68'$–$37^0 52'$ E of longitude and at altitudinal range between 550–2820 meter above sea level in Southern Nations, Nationalities and Peoples Region (SNNPR). It is one of the 14 Zones in the region and bounded with Hadiya Zone in the North, Kembata & Tembaro Zone in the Northeast, Wolayta Zone in the East, Gamo Gofa Zone in the South, and Konta special Woreda in the West within SNNPR and Jimma Zone in Oromya Region. It is also found in between Omo River from North to South and Gojeb River from Northwest to North. Tarcha is the main town about 507 kms Southwest of Addis Ababa across Shashemene and 449km across Hosana but 505km across Jimma, 282 Kms away from Hawassa, town of SNNPR and 140 km from Jimma. It has an area of 466,082 ha. It has about 586,005 people according to the projected CSA final report of 2007. Out of the five Woredas of the Zone, the study area covered four Woredas, Essera, Tocha, Loma and Gena Bosa (except Mareka woreda which is bounded by the four woredas, at the center of zone) and one administrative town Tarcha (Figure 1).

The major economic activity of the people in the study area is mixed agriculture (rearing of animals and growing of crops). The main food crops grown in the area are enset, maize, taro, sweet potato, sorghum, millet, teff, pulses and yam. Enset is the staple food in Dawuro, particularly in mid and high altitude areas, while maize is the most important crop in the lowlands. In rural areas the number of cattle owned and enset cultivated by a household usually determines the wealth status of the household. Plants, animals, land forms, rivers, gorges and mountains have cultural significance for the people of the study area. People living there have long years experience of interaction with each other and the natural resources of their surroundings.

Dawuro is a naturally gifted land with diverse topography, diverse climate, and varied ecology. It is home to a wide range of fauna and flora diversity in wildlife and botanical resources. The Chebera-Churichura national park, which is found in between Dawuro zone and Konta Special Woreda includes the Esera and Tocha woredas of the study area, is a natural habitat for many wild animals in the area. The study area in the Dega receives rainfall almost throughout the year, for 9 months and heavy rain comes between June and September. The mean annual rainfall is 1705.4mm at Gasa Chere Station while 1424.9mm at Tercha station. The maximum and minimum mean annual temperature is (22.3^0C and $12.4\ ^0$C) and (29.3^0C and 16.8^0C) in Gasa Chere and Tercha stations respectively (Mathewos *et al*., 2013a). Based on the 18 recently classified agroecological zones, the area consists of sub-humid types of agroecological zones containing deciduous woodland with elevation 550-2820m having *Boswellia papyrifera*, *Combretum mole, Terminalia browni, Acacia senegal, Balanites aegyptica, Lannea fruticosa* and others along the Omo and Gojeb river valleys.

People in the study area are the Dawuro people and have unique cultural practices and social structure.

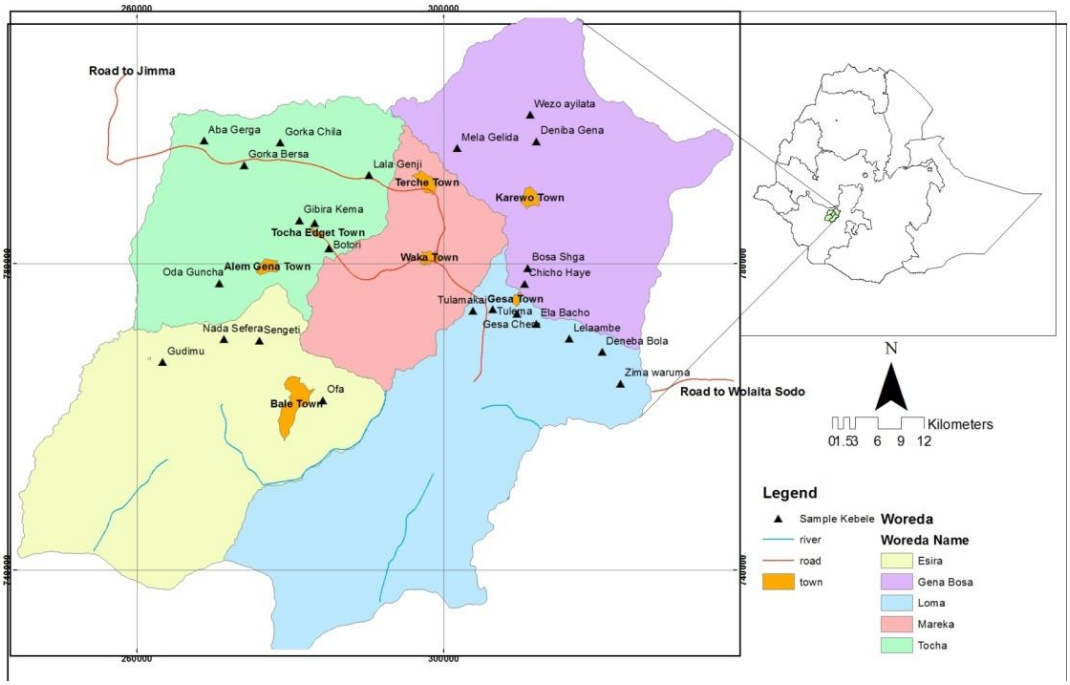

Figure 1. Location of the study area in Dawuro Zone and the sampling sites.

The word “Dawuro” means an impregnable, powerful and heroic people. Dawuro belongs to the family of the Omotic peoples in the Southern Ethiopia. The language, which is locally called “Dawroothuwa or Dawuro k’aalaa”, uses a Latin script and it is classified as a dialect of the central Omotic languages along with Gofa, Gamo, Wolaita, Konta, and others (Anon, 2005a; Mathewos *et al*., 2013a).

Preliminary survey of the study area was conducted in April, 2012 specifically from April 4 - 9, 2012. During this survey, information about the physical features of the study area was collected. From 5 districts, 4 districts namely, Essera, Tocha, Gena Bosa and Loma were selected by the help of zonal administrative office and agricultural department of Dawuro zone. From these, a total of 22 kebeles were selected purposefully for ethnobotanical data collection based on availability of traditional healers and different agro-climatic zone (*Dega*, *Woina Dega* and *Kola*) of the region identified with the assistance of Woreda and local authorities, elders and knowledgeable persons to gather diversified information on the management, use and conservation of medicinal plants.

Ethnobotanical data were collected using purposive sampling. This sampling technique was preferred because the study focuses on specific issues that it was gathered from the most knowledgeable representatives of the society. The full names and residential addresses of traditional healers residing in the 22 kebeles of the four districts selected were exhaustively identified and registered with the help of local administrators, local people, and field assistants.

Individuals who were selected to know and practice at least four/five medicinal plant species were considered as traditional healers in this study. A total of 91 respondents from the entire study sites which were identified as healers were interviewed. Semi-structured interviews were then employed and observations made to collect ethnomedicinal data with the help of local people and field assistants. Data on, human and livestock diseases treated, local names of plants used, degree of management (wild/cultivated), status, parts used, methods of preparation, routes of administration, noticeable adverse effects of remedies, indigenous knowledge transfer, other uses of the ethnomedicinal plant species, existing threats to these species and traditional conservation practices were gathered during the interviews (Appendix 1). The informed Plant specimens were collected then pressed, dried and identified through the flora of Ethiopia and Eritrea in the National Herbarium of Addis Ababa University.

Facilities in MS Excel spread sheet were utilized to make simple calculations, determine proportions. Ethnobotanical data were entered in to Excel spreadsheet and summarized using descriptive statistics. The spreadsheet data filter facility was employed to determine frequencies of citations so as to identify the most common ailments in the study area popularly used medicinal plant species and multipurpose plant species, to determine proportions of different variables like growth

forms, source of collection, degree of scarcity, plant part used, methods of preparation and threatening factors.

RESULT AND DISCUSSION

Indigenous Knowledge of Traditional Healers in the Study Area.

Traditional healers of Dawuro have developed traditional medicinal practices either collecting or cultivating common medicinal plants and use them effectively before they go to clinics or health centers. Healers that exercise traditional medicine (knowledge) were within the age range of 18-91 years. The traditional healers in the area developed indigenous knowledge to treat different types of diseases using different types of plant species at early ages (26-35 years) which are different from other areas, for example it is 23-77 years in Chifra District, Afar Region (Tesfaye *et al*., 2006) and 51-70 years in Konso (Tizazu, 2005). This is probably because of the availability of plants in the study area, the encouragement/demand of local people, the stress of diseases, efficacy in some treatment that cannot be healed using modern medicament, the absence of health centers around them at the time though there were recently established health posts and upgrading clinics of veterinary that were yet not well equipped with facilities and infrastructure for transportation unless the dry season roads.

There is transfer of knowledge at young age as some interviewers informed. Their willing to transfer their knowledge at earlier time of life was very low because of modernization and less consideration of indigenous knowledge. It is not determined by only the age but also by once skill, knowledge, and other factors. Similar report indicated that, it is once knowledge that determines the use of plants as medicinal value that others might use for treatment or for other purpose (Mathewos *et al*., 2013a). In most case, the tradition of conveying traditional medicinal knowledge to the next generation is at old ages to keep secret. In this process of transferring at the old age, most of indigenous knowledge and practices die out with the old knowledgeable individual. At this age, he/she loses memory. She/he cannot walk to distant places to show or train important medicinal plants. In other word, there is less ability of children to understand/ memorize things. Therefore, there was knowledge and skill gap during transferring indigenous knowledge.

Educational level is considered as a factor to determine the inheritance of indigenous knowledge and conservation and sustainable use of medicinal plants. About 50 (54.95%) of them were not educated while 41 (45.05%) were literate similar to the one reported from Chifra District, Afar Region, with about 74.65% (Tesfaye *et al*., 2006).

Though there is a difference in know-how among healers due to the interest of individuals, age, education status, availability of plants and occurrence of diseases, the traditional healers of the study area have accumulated traditional medicinal knowledge for long period of time (for generations) due to their interaction with plants of their environment.

The traditional healers in the study area were knowledgeable of diseases and medicinal plants used to treat them. Medicinal plants practiced in the area are more for treatment of human than cattle and other domestic animals. About 71.76% (155) of the medicinal plants were used to treat humans while 15.28% (33) are used to treat cattle disease only but about 12.96% (28) used for both human and cattle. They practiced in more of human and livestock problems compared to a report to Kerreyu people in Fentalle, Eastern Shewa wth 46 human and 12 livestock (Kebu *et al*., 2004) and Afar people in Chifra District, Afar Region, Northestern Ethiopia 48 human, 9 livestock and 13 both human and livestock (Tesfaye *et al*., 2006). They exercised in such a healing activity due to the absence of health centers in nearby town, the accessibility of medicinal plants in their surroundings, efficacy in some treatment that cannot be healed using modern medicament.

Most traditional healers practice using the same plant species for treating different diseases of human and the domestic animals. About 10 (4.63%) of them were used to treat three types, 30 (13.89%) of them for treating two types of diseases and 176 (81.48%) of them are used to treat only one type of either human or animals diseases.

Allium sativum, Artemisia afra, Brachiaria brizontha, Buddleja polystachya, Clerodendrum myricoides, Justicia ladanoides, Lannea fruticosa, Piper capense, Syzygium guineense, and *Tagetes minuta* are popular medicinal plants each used to treat three types of diseases of either human, human and animal, and/or anima1. These and other plants were kept in the house or in the pocket for immediate usage of accidental illness (Mathewos *et al*., 2013a). For this purpose, they were cultivated or allowed to grow in home gardens.

Indigenous Knowledge Associated to Conservation of Medicinal Plants

Home Garden Management

Home gardens are rich in species diversity than that of away from home due to hipping and spreading of household wastes that served as manure for their growth. Women regularly manure home garden plants with house wastes including cow-dung (Mathewos *et al*., 2013b). A similar pattern is reported in Kefa (Zemede, 2004). This traditional practice is used to conserve a lot of plant species with their associated knowledge. Farmers deliberately preserve some native tree, shrub and herb species for a variety of purposes especially for immediate access. The more the multiple uses a plant has for local people, the more conservation of that plant resource

through cultivation and protection in and around home gardens and farm areas.

The indigenous knowledge of using plants to protect other plant species from disease, pests and other harming conditions has conservative value of these species. for example, *Pycnostachys abyssinica* which is planted among *Ensete ventricosum* to destroy bacterial wilt spread; another options rotate the ensete field with other crops such as taro and barley and also plant bacterial resistant variety of ensete like 'Mazya'- lcoal name. Another indigenous knowledge in the community is planting ensete and some other species when moon appears for propagation because they believe that species planted during moon were not decay. A similar finding was reported in Dawuro (Data, 1997; Mathewos *et al*., 2013b).

The Inter-cropping of Plants

The presence of on farm agroforstry and home garden diversity with knowledge about their use are important for the conservation of plant diversity and environmental suitability. The intermixing of multipurpose plants in home gardens and in the farm field benefits the indigenous people. Such activity conserves plants of medicinal value with indigenous practices. It was observed that, men were practiced on the use of trees and shrubs that were collected from the wild and planted in the home gardens. On the other hand, women are more knowledgeable than men regarding on the usage, cultivation and management of herbaceous species (root and tuber, vegetable crops, spices, condiments and medicinal plants grown) in the home garden as similar report from Loma and Gena Bosa districts (Mathewos *et al*., 2013b).

Tree and Shrubs Management Practices of Indigenous Knowledge

In the study area home garden and on farm tree and shrub management agroforestry practices was remarkable. The respondents informed that the tree species are managed by coppicing from the beginning of December up to the end of April or shortly before the rainy season. It was noted that coppice sprouts which is equivalent to straight stem is important consideration in management of coppicing. The harvest from coppicing can be used to produce firewood and charcoal and other tree products.It was also noted that respondents in the present study site managed tree species by thinning. Respondents informed that the growth of seedling in the study areas is by watering. The other tree–management practice further mentioned was pruning, also noted for the protection from splash erosion which would have destroyed the crop. In general the types of management employed vary from one agro-ecological zone to the other. It was mentioned that the cutting of trees on June, July and August were caused decay. It was preferred to cut trees near the ground at a height of 5-30 cm mainly to protect the sprouts from splitting by wind and to obtain more sprouts. It was noted that coppicing avoids the need to replant trees after harvesting. Generally, thinning, pruning, controlling lopping, watering and coppicing are the most important farmers' indigenous (known) home garden and on farm tree management practices in study area.

Culture of Diversifying Income Generating and Food Security Plant Species

The present interest of community trend of planting various species on their home garden and on farm lands is for income generation and understanding the advantages of improving their livelihood status. On the other hand the culture of the community obligating individuals planting various species and managing them on their home garden and on farm area has important contribution for biodiversity. The individual who cannot properly mange species diversity at home garden and on farm land is neglected/deprived from social works. The community stops cooperation with him on any social activities. As result the nature of home gardens and on farm areas diversity in study site is rich. A similar finding was reported in Kefa (Zemede, 2004) and in some area of Dawuro (Mathewos *et al*., 2013b).

Traditional Cultural Ceremony Celebrating Places

There is indigenous knowledge of the community preserving plant diversity around church, local tomb and spiritual ceremonial places forests. After the death of community member, planting selective indigenous tree, shrub and herb species on his/ her grave/ tomb is the common traditional practice. They believe that the type of spice planted refers dead person's strength on his/her life time and protecting the grave/tomb from replacement of others. They respect protected forests and big trees as the older man and cultural leaders. In addition to this, they believe that "God" destroys them and whole community if they cut big tress (kasha) from culturally protected area. As result of culturally respecting of local protected areas in the study area, there was sustainability of species diversity and hence, conservation of that type plant species as well as others grow under or near the canopy of these plants. Similar report from Chifra District (Tesfaye *et al*., 2006), in Ejaji area (Chelya Woreda) in West Shoa (Endale, 2007) and Gimbi area, in western Wellega (Etana, 2007), and for indigenous knowledge of Loma and Gena Bosa districts community of Dawuro (Mathewos *et al.*, 2013a).

Ocha Kasha is another ceremony at which women in the neighborhood and relatives come together to the home of a newborn child. They wash the mother three to

Table 1. Growth forms of medicinal plants used in the preparation of remedies.

S.No.	Growth forms	Number	%	Rank
1	Herbs	91	42.13	1st
2	Shrubs	58	26.85	2nd
3	Trees	40	18.52	3rd
4	Climbers	26	12.04	4th
5	Creepers	1	0.46	5th
Total		**216**	**100**	

four days after child is born. According to their tradition, for this purpose, the spices and other aromatic herbs used for the washing should be cultivated around the house, in the home garden. Therefore, this traditional practice encourages the growth of spices, medicinal plants and other multipurpose species (Mathewos *et al*., 2013a; Mathewos *et al*., 2013b).

Selective Harvesting

Medicinal plants in the study area were collected in the morning not at midday in order to protect themselves from evil spirits that may be hiding the plant and for effectiveness as reported from Der es Salaam and on the main island of Ukerewe, Tanzania (Gesseler *et al*., 1995 cited in Tesfaye *et al*., 2006), from Chifra District (Tesfaye *et al*., 2006) and Loma and Gena districts of Dawuro (Mathewos *et al*., 2013a). Most of the time, medicinal plant collection and provision is also done in Sunday, Wednesday and Friday. It was also reported from Ejaji area (Chelya Woreda) in West Shoa (Endale, 2007), Gimbi area, in western Wellega (Etana, 2007) and in Loma and Gena Bosa districts of Dawuro (Mathewos *et al*., 2013a). The above mentioned activities have conservative characters because of participating only selected part of community and days and time. There was also following moon appearance, half, full and setting for cutting some plants for different purposes, for example liker pole, pole tip and other house construction, handles of axes, yolk, etc trees preparation.

Medicinal Plants of the Study Area

Diversity of Medicinal Plants in the Study Area

A total of 216 medicinal plant species distributed in 69 families were collected and identified. *Asteraceae* is the most frequently used family containing 31 species and accounts 44.93%. *Fabaceae* and *Lamiaceae* follow it by covering 39.13% and 26.06% families having 27 and 18 species, respectively. The scientific name, families, growth form and other information from the data gathered in the different sources was summarized in the appendix. Significant numbers of medicinal plants were documented in this ethnobotanical study when compared to similar studies in different parts of the country, Ethiopia. There was a similar report on *Asteraceae* from Wonago (Fisseha, 2007) and Wolaita (Talemos *et al*., 2013) and from Loma and Gena Bosa (Mathewos *et al*., 2013a). It disagrees with a report (*Fabaceae)* from Ejaji (Endale, 2007) and Gimbi (Etana, 2007). It may be due to collections and traditional healers interviewed were from highland and midland.

Out of 216 species, 169 (78.24%) species were wild while36 (16.67%) and 11(5.09%) species were cultivated and cultivated wild relatives and semi-wild, respectively. Most of the traditional healers of the area collect their medicinal plants from the wild. Similar studies elsewhere, for example, Gambella and Benishangul Gumuz Reginal States (Zemede, 1999), Ejaji 78.7% (Endale, 2007), Loma and Gena Bosa area 57.9% (Mathewos *et al*., 2013a), Konta 74.6% (Tesfaye, 2009), Kafficho 74% (Tesfaye and Sebsebe, 2007), Wonago 69.1% (Fisseha, 2007), Konso 55.7 % (Tizazu, 2005) and Zay People (Mirutse, 1999) showed a similar trend. The significant number of medicinal plants documented may be due to either the large area covered (four Woredas), or diversity of indigenous knowledge to use different plants to treat different types of diseases. In other word, traditional practices, various cultural and seasonal restrictions of collecting medicinal plants have contributed to the management and conservation of diversified and rich medicinal plants compared to others.

Growth Forms and Parts of Medicinal Plant Species used in the Study Area

Traditional healers in the study were predominantly use herbs 91(42.13%) followed by trees 40 (18.52%), shrubs 58 (26.85%), climbers 26(12.04%) and creeper 1 (0.46%) (Table 1). People in the study area collect more herbs, than trees and shrubs for medicinal purpose that is similar to the report for the Kafficho people in Kafa (Tesfaye and Sebsebe, 2007), Loma and Gena Bosa area (Mathewos *et al*., 2013a) and a country report (Anon, 2005b). This result differed from the report for the people of Bosat, Welenchiti area who are said to use more of shrubs than herbs (Debela *et al.,* 2004). This can be explained by the fact that Bosat is a degraded

dryland area where the shrub elements take prominence over the herbs.

Leaves account for 89 (41.20%), roots 61 (28.24%), leaf and root parts 13 (6.02%), barks 13 (6.02%), and fruits 11 (5.09%) each to treat different types of diseases in that order. The other parts are used to a lesser percentage (shoots 7 (3.24%), stems 7 (3.24%), all parts 3 (1.39), seeds 2 (0.93%), fruit and leaf 1 (0.46%), leaf, root and bark 1 (0.46%), leaf and stem 1 (0.46%), sap 1 (0.46%), and shoot and flower 1 (0.46%)]. Traditional healers in the study area collect more of leaves than other parts of medicinal plants similar to a report of the Kafficho people in Kafa (Tesfaye and Sebsebe, 2007) a report to Bosat, Welenchiti area (Debela *et al.,* 2004), Loma and Gena Bosa area (Mathewos *et al*., 2013a) and Konso (Tizazu, 2005) while it disagrees with the national report that indicates the use of more of roots than leaves (Anon, 2005b).

People who are using more of shrubs focus on root parts while those use on herbs do focus on leaves of that plant. The most widely used life form of medicinal plants in the study area is herb followed by shrub due to their ease of availability. This has contribution to reduce the threat rate of medicinal plants. The use of leaves than roots, barks, stems and whole plant minimize the threat to the destruction of medicinal plants. This is because; if it is harvested in sustainable manner, it gives opportunity for long life of the plant than others. However, the root part utilization is significant and threats the plant species in the study area.

Most of the medicinal plants are prepared alone and mixed with water, 190 (87.96%) while 26 (12.04%) are used in mixture, prepared in combination with others. In this kind of indigenous knowledge, the chemicals in the mixture may dilute the toxity of some dangerous plants that become suited to be used with others in the mixture. Most of the remedies in the study area depend on fresh plant material preparation, elsewhere, there is a report of Boosat area (Debela *et al.,* 2004), Fentalle (Kebu *et al*., 2004), Ejaji area (Endale, 2007), Konta (Tesfaye, 2009) and Loma and Gena Bosa area (Mathewos *et al.*, 2013a). Most of the time the fresh preparation is more threatened than dry preparation due to use and through mechanism of plant material that is not conservative. However, local people argue that fresh materials are effective in treatment as the contents are not lost before use compared to the dried one similar to Ejaji area (Endale, 2007) and Loma and Gena Bosa area (Mathewos *et al*., 2013a).

Most of medicinal plants prescription was orally administered 135 (62.5%). About 51 (23.61%) were applied on the skin/surface, 11 (5.09%) were through oral and dermal, 10 (4.63%) were nasally applied, 7 (3.24%) were through oral and nasal, and only 1 (0.46%) was administrated through dermal and nasal. Most people in the study area take their preparations in liquid form. This is because; it was easier to take and fear to taste some chemicals during chewing or masticating. However most of their prescription was orally administered 135 (62.5%) similar to Fentalle (Kebu *et al*., 2004) and Chifra (Tesfaye *et al*., 2006) and Loma and Gena Bosa area (Mathewos *et al*., 2013a).

The Most Popular Medicinal Plants of the Study Area

The traditional medicinal plants especially, in the family's *Asteraceae*, *Fabaceae* and *Lamiaceae* played the most important role in curing illness of human and domestic animals for centuries. The most frequently and easily accessable known traditional medicinal plants are found in family *Asteraceae*. The others *Allium sativum, Moringa stenopetala, Milettia ferruginea, Gnidia involucrate* and *Indigofora spicata* were popularly used in the area. These and other plants were kept in the house or in the pocket for immediate usage of accidental illness. For this purpose, they were cultivated or allowed to grow in home gardens which agree with research result of some areas of Dawuro (Mathewos *et al.*, 2013a).

Depleting Factors of Medicinal Plants of the Study Area

There are different threats to medicinal plant availability and indigenous knowledge in the study area. Indigenous knowledge on medicinal plants is gradually disappearing due to secrecy, unwillingness of young generation to gain the knowledge, influence of modern education and awareness factors beside other natural conditions and anthropogenic activities. Medicinal plants are being scarcer due to different factors such as agricultural expansion, over harvesting, overgrazing, uncontrolled bushfires, drought, disease and pests, introduction of modernization and encouraging the new varieties, and cultural shifts are also threatened factors (Mathewos *et al*., 2013a).

The death of old people with particular knowledge on cultural requirement and regarding medicinal uses of some plants that are more knowledgeable than younger individuals is one of the major threat to both medicinal plants and indigenous knowledge. Because, there is no documented IK of the use of traditional medicines. The acquisition and transfer is done verbally as top secret in the presence of only the healer and his inheritor with strong oath training. A similar study elsewhere in Kenya (Kokwaro, 1979), Manyara, Tanzania (Efrem *et al*., 2004), Fentalle (Kebu *et al*., 2004), Konso (Tizazu, 2005), Gimbi (Etana, 2007) and Loma and Gena Bosa area (Mathewos *et al.*, 2013a) in Ethiopia confirmed such a culture threatened to medicinal plants and IK on them. They treat their patients by disclosing medicinal plants name or never show it thinking that the medicine becomes powerless in curing patient if she/he knows

(even if she/he knows the patient is prohibited to call or show that plant until she/he gets safe).

The destructive practices in harvesting (collecting the whole plant and using one or some parts and threw the rest) are the major threat to medicinal plants in specific and to plant diversity (taxa) in general. This may be due to most of them about 54.95% them are none educated and 95.6% of them were lived in remote area for long time. Uprooting and using roots for treatment results in threat of plant itself than relying on other parts. The heavy or continued exploitation risks the regeneration of the natural source population besides overr-harvesting and the destruction and conversion of their habitats to other purposes. This was reported as one of medicinal plants threats (Frankel, 1995). The loss of plants causes the loss of traditional knowledge in turn.

All informants agree that the decrease in plant resources of medicinal value from nearby forests. Because of this, they travel long distances even from one district to the other.

The elders who cannot travel such a distant inform the threat in transferring their knowledge to the younger generation, as the medicinal plants are no longer available, even they themselves do not serve with/practice their knowledge. As plant resources decrease/loss, indigenous knowledge and practices die out (Mathewos *et al.*, 2013a).

CONCLUSION AND RECOMMENDATIONS

There were immense medicinal plant resources which were used for treatment of both human and livestock diseases in the study area for generation. Traditional practices, various cultural and seasonal restrictions of collecting medicinal plants have contributed to the management and conservation of diversified and rich medicinal plants compared to others. Currently, these resources and indigenous knowledge on medicinal plants was gradually disappearing due to secrecy, unwillingness of young generation to gain the knowledge, influence of modern education and awareness factors beside other natural conditions and anthropogenic activities like agricultural expansion, timber production, over harvesting for construction materials and other purposes and over grazing. The destructive practices in harvesting (collecting the whole plant and using one or some parts and throwing the rest) were the major threats to medicinal plants in specific and to plant diversity (taxa) in general. Most of medicinal plants that were recorded and effectively used by the community are harvested from wild. For this purpose, they travel long distances even from one Woreda to the other. Apart from this, all informants agree that the decrease in plant resources of medicinal value from nearby forests. In other word, they are cultivated or allowed to grow in the home garden if and only if they have multipurpose (medicinal, spices, etc) otherwise uprooted by considering as weed. Therefore, training on conservation and sustainable usage, domesticating and cultivating endangered multipurpose plants in specific and of plants in general should be given for traditional healers as well as for community. Distributing important information in the form of leaflets, broachers, posters and other ways like media accessible in the area.

The following were some suggestions and recommendations for the effective utilization of the medicinal plant species and the associated indigenous knowledge of the Dawuro people of the study area: Initiating pharmacological and biological activity testing of most popularly used traditional medicinal plants in the area; establishing botanical gardens and protected areas with community-based conservation; encouraging the use of home gardens for cultivation of multipurpose plants; area closure to allow regeneration of seed and establish community parks in each kebele for the sake of conservation, too; assess the indigenous multipurpose trees and shrubs and associated indigenous knowledge then after apply ex-situ conservation (establish botanical garden, afforestation, field gene bank, etc.) before their loss.

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Appendix- Medicinal Plants of the Study Area

Scientific name	Family	Local name	Growth form	Source	Part used	scarcity	Preparation and application	Route of Administration	Disease treated	treatment for	Voucher no.
Abrus precatoritus	Fabaceae	Badaluwa	Climber	wild	Seed	rare	crushed and concocted with *Maesa lanceolata* and taken	Oral	Hephatitiss/ liver problem	human	Dawro149
Acalypha villicaulis	Euphorbiaceae	Wak'ak'uwa	Herb	wild	Root	rare	crushed and mixed with water taken	Oral	Hepatitis/Liver problem; Babesios	animal and human	Dawro171
Agarista salicifolia	Ericaceae	C'ank'uwa	Tree	wild	shoot	rare	crushed/decocted mixed with water	Oral	Babesios	animal	Dawro251
Ageratum conyzoides	Asteraceae		Shrub	wild	Leaf	rare	crushed and applied through nose	dermal	eye disease	human	Dawro173
Ajuga integrifolia var.alba	Lamiaceae	c'amiashiya	Herb	wild	Leaf	plenty	powder mixed and a cup of it is taken	Oral	colic pain	human	Dawro139
Albiza schinperiana	Fabaceae	C'aattaa	Tree	wild	Root	less plenty	crushed and taken	Oral	snake bite	human	Dawro205
Allium sativum	Alliaceae	Tumuwa	Herb	Cultivate	leaf;stem	plenty	eat the the parts with other food	Oral	stomach ache, malaria and others	human	Dawro26
Alysicarpus ferrugineus	Fabaceae	Warechiya	climber	wild	Root	less plenty	crushed/cococted with sura and taken	Oral	snake bite	human	Dawro339
Annona senegalensis	Annonaceae	Monok'uwa	Tree	wild	Stem	rare	decocted and taken 2 jug	Oral	abdomenal pain	animal	Dawro100
Artemisia absinthium	Asteraceae	Naatiruwa	Herb	Cultivate	all parts	rare	crushed and mixed /concotedwith butter and taken	Oral	removal of placenta during birth/for retained placenta	human	Dawro35
Artemisia afra	Asteraceae	Agupiya	Herb	Cultivated	Root	less plenty	crushed and concocted with Rue and wormwood	Oral	for different aliement	animal	Dawro39

Arundinaria alpine	Poaceae	Woosha	Shrub	semi wild	Leaf	less plenty	crushed the leaf after dried and mixed with water taken orally	Oral	diahrrea	animal	Dawro294
Asparagus flagellaris	Asparagaceae	Sereetiya	Climber	wild	Root	plenty	chrushed and decocted mixed with butter taken	Oral	for blocked urination	animal	Dawro45
Astragalu membransceus	Fabaceae	K'eeri-wusiwusiya	shrub	wild	Stem	less plenty	small pieces of it hunged on the neck	dermal	Black leg	human	Dawro198
Azadirachta indica	Meliaceae	Nimitriya	Tree	Cultivated	Leaf	less plenty	powdered, pressed and applied	nasal	Black leg	animal	Dawro291
Basilicum polystachyon	Lamiaceae		Herb	wild	Leaf	less plenty	crushed and applied on the skin	dermal	alergic reaction	human	Dawro343
Becium obovatum	Lamiaceae	Gendiya	climber	wild	Root	less plenty	crushed and mixed with water taken orally and the remaining rubbed on the skin	Dermal and Oral	Tina capitis	human	Dawro220
Bersama abyssinica	Melianthaceae	Walasoniya	Tree	wild	Leaf	rare	flesh part rubbed on it	dermal	tumour	human	Dawro170
Biophytum umbraculum	Oxalidaceae	Dango/shidho	Herb	wild	Root	less plenty	crushed/powdered mxed with water taken a cup of it	Oral	Anaphlitic shock; epilepsy	human	Dawro299
Bothricline sp.	Asteraceae	Shankishasha	Shrub	wild	Leaf	plenty	crushed and mixed /concoted with butter taken	Oral	Pain	human	Dawro268
Brachiaria brizontha	poaceae	Shaalishattuwa	Herb	wild	Root	plenty	crushed and taken orally for children and chewing the root by adults	Oral	stomach ache and Anaphlitic shock; epilepsy	human	Dawro129 and Dawro346
Brassica nigra	Brassicaceae	Sanafic'iya	Herb	Cultivate	Fruit	plenty	crushed concocted with *Piper capense, Lepidium sativum* and yoghort	Oral	abdomenal pain	animal and human	Dawro62
Bridelia scleroneura	euphorbiaceae	Zuzia	Tree	wild	Bark	less plenty	crushed mixed with water and taken mainly the pregnant women	Oral	colic pain	human	Dawro153
Brucea antidysenterica	Simaraubaceae	Shushaliya	Tree	wild	Bark	rare	crushed and mixed with water and taken as	Oral	abdomenal ache	human	Dawro15
Brucea antidysentrica J.F.mill	Solanaceae	Shureshuupiya	Tree	wild	Root	rare	crushed and taken	Oral	parasitic disease in children	human	Dawro107

Buddleja polystachya	Luganiaceae	Kanfara	Tree	wild	leaf,root ,bark	rare	dried the part and crushed and taken as a drink, smelling	Oral and nasal	Epilepsiy; malaria; stomach ache	human	Dawro1
Capsicum frutescens	Solonaceae	Mis'imis'uwa	Herb	Cultivate	Stem	plenty	crushed and taken orally	Oral	Lymph adenitis	human	Dawro298
Carex steudneri	Cyperaceae	-	Herb	wild	Fruit	rare	decocted taken	Oral	snake bite	human	Dawro245
Carica papaya	Caricaceae	Paapa	Shrub	Cultivate	Root	less plenty	crushed/decocted taken for three days	Oral	Malaria	human	Dawro286
Catha edulis	Celastraceae	Jimaa	shrub	cultivated and wild	Leaf	plenty	heated/decocted taken	Oral	liver problem	human	Dawro283
Chamaecrista mimosoides	Fabaceae	Shosha entarsa/Bazomata/Deeshahalakuwa	Shrub	wild	root, leaf and stem	plenty	washed/crushed and rubbed on the skin otherwise taken orally	Dermal and Oral	snake bite	human	Dawro332;Dawro 201
Cissampelos mucronata	menispermaceae	Bula Tura	Climber	wild	Root	plenty	crushed/decocted and taken orally	Oral	colic pain	human	Dawro320
Cissus sp.	Vitaceae	Tussa	Climber	wild	Leaf	rare	rubbed on the infected part of the skin	dermal	fire burning	human	Dawro273
Citrus aurantifolia	Rutaceae	Lomiya	Tree	Cultivate	Fruit	plenty	the fleshy part applied on the wound	dermal	Wound	human	Dawro103
Clausena anisata	Fabaceae	Zama	Tree	wild	root; bark	less plenty	crushed and mixed with water	Oral	gall bladder	animal	Dawro120
Clematis hirsute	Ranunculaceae	Soguwa tura	Climber	wild	Leaf	plenty	powder and pressed/decocted and rubbed on the bite part	dermal	snake bite	human	Dawro160
Clerodendrum cordifolium	Lamiaceae	Boye maata	Climber	Cultivate	Root	less plenty	crushed and applied orally	Oral	Anaphlatic shock	animal	Dawro157
Clerodendrum myricoides	Lamiaceae	Alga	Shrub	wild	Leaf	less plenty	crushed 2/3 leaves and decocted half of acup applied orally ;crushed and tied on the infected part	Dermal and Oral	Chill and internal pain; Sever abdominal cramp	animal and human	Dawro77 and 229
Clerodendrum myricoides	Lamiaceae	Kareta mata	Tree	wild	Leaf	rare	crushed/decocted and taken	Oral	evil eye	human	Dawro210

Cluita lanceolata	Euphorbiaceae	Shosha D'aliya	Shrub	wild	Leaf; root	less plenty	crushed/decocted and taken ;concocted with *Entada abyssinica* taken	Oral	Anaphlatic shock; snake bite	animal and human	Dawro166 and Dawro 233
Coccinia abyssinica	Cucurbitaceae	Usik'iya/ushu shiya	climber	Cultivate	Root	less plenty	crushed and mixed with the bark of korch and water taken	Oral	gonorrhea; liver problem	human	Dawro102
Combretum collinium	Combretaceae	Digisuwa	Tree	wild	Leaf; root	less plenty	crushed the leaf and root part applied both dermal and oral	Dermal and Oral	Black leg	animal	Dawro165
Commelina africana	Commelinaceae	Gulbatiya	Herb	wild	Leaf	less plenty	crushed, mixed with water and taken	oral	vomiting in children	human	Dawro106
Commelinia latifolia	Commelinaceae	Dal'isha/Gassaa	Herb	Cultivate	Leaf	plenty	chewed the part and applied to the infected skin with insect for three days	dermal	insect bite	human	Dawro20
Conyza pyrrhopappa	Asteraceae	D'oniya	Herb	wild	Leaf	less plenty	crushed decocted taken a glass of it	Oral	diaharrea	human	Dawro197
Conyza sp.	Asteraceae		Shrub	wild	Leaf	less plenty	crushed and taken	Oral	Reumatism	human	Dawro347
Crassocephalum macropappum	Asteraceae	Botsa k'odhuwa	Climber	Wild	Leaf	less plenty	crushed and taken	Oral	Anthrax	animal	Dawro335
Crepis achyrophoroides	Asteraceae	Mas'uwa-sawa	Herb	Wild	Leaf	less plenty	crushed/decocted and taken	Oral	Black leg	animal	Dawro193
Crepis rueppellii	Asteraceae	Maas'uwa	Herb	Wild	all parts	plenty	decoction	dermal	evil eye	human	Dawro48
Crepis xylorrchiza	Asteraceae	Shid'a-maas'oliya	Herb	Wild	Root	less plenty	crushed and taken	Oral	Anthrax/aba senga	animal	Dawro246
Crotalaria rosenii	Fabaceae	Kishikisho	Shrub	Wild	Root	less plenty	cut the root in to seven pieces and then crushed/decocted and mixed with milk taken	Oral	colic pain	human	Dawro235
Croton macrostachyus	Euphorbiaceae	Anka	Tree	Wild	Leaf	plenty	crushed the leaf and applied on the infected skin	dermal	Wound	human	Dawro24
Cucumis ficifolium	Cucurbitaceae	Sukulo d'antha	Herb	Wild	Root	less plenty	crushed and taken orally and also rubbed the skin	Dermal and Oral	snake bite	human	Dawro232
Cuscuta reflexa	convilvulaceae	Has'emamito	climber	Wild	Leaf	rare	crushed/decocted	Oral	internal parasites/worms	animal	Dawro87

Cyathula cylindrical	Amaranthaceae	Gumpula/Dorsa- k'arc'ocha	Herb	Wild	Leaf	plenty	crushed mixed with water and taken	Oral	for swelling of abdomen	animal	Dawro56
Cynodon spp	poaceae	sura	runner	Wild	shoot	less plenty	placed the leaf on the injured area	dermal	fire burning	human	Dawro341
Cynoglossum sp.	Boraginaceae	Shosha Taliya;S'ilkiya	Herb	Wild	Leaf; root	less plenty	crushed and mixed with water taken orally, put the root on the pocket;crushed/decocted taken	Oral	snake bite;Anthrax	Animal and human	Dawro253 and Dwro 349
Cyperus articulate	Cypraceae	Bidaaraa	Herb	Wild	Root	less plenty	crushed and concocted with Rue and wormwood	Oral	stomach ache	human	Dawro38
Cyperus iria	Cyperceae	Bidara-mala	Herb	Wild	Root	less plenty	heated the root part and taken	Oral	facilitate digestion	human	Dawro207
Cyphostemma niveum	Vitaceae	Shortiya Tura	Climber	wild	Leaf	less plenty	crushed and taken through oral, tied on the neck	Dermal and Oral	swelling on the neck/ Lymph adenitis; snake bite	animal and human	Dawro261 and Dawro322
Cyphostemmo nivenum	Vitaceae	Banbari-Bachuwa	Shrub	Wild	Root	rare	crushed and taken	Oral	Trypanosomiasis	animal	Dawro348
Datura stramonium	Solanaceae	Laflafuwa	Herb	Wild	Leaf	plenty	crushed with water and applied to skin	dermal	Ringworm and Skin disease	animal	Dawro18
Dergea sp.	Asclepiadaceae	Ek'a d'aliya	Climber	Wild	Root	less plenty	washed/crushed/decocted and taken	Oral	abdomenal pain	human	Dawro203
Dichondra repens	Convolvulaceae	Ec'c'ere haytsa	Herb	Wild	Leaf; root	less plenty	crushed and concocted with *Tragia cinerea* and *Sida schimperiana*	Oral	snake bite	human	Dawro223
Dicliptera laxata	Acanthaceae	Toguwa	Herb	Cultivated	shoot	less plenty	crushed the part and applied on skin	dermal	eye disease/alergic reaction	human	Dawro32
Dicrocephula integrifolia	Asteraceae	Sa`a'-okata malaa	Herb	Wild	Leaf	less plenty	crushed/decocted and applied through nose and rubbed on the surface of head	dermal and nasal	Anaphlitic shock; epilepsy	human	Dawro228
Discopodium penninarvum	Solonaceae	C'oyd'a/A'inaa	Shrub	Wild	Leaf	less plenty	crushed and mixed with water	Oral	Black leg	animal	Dawro194

Dombeya torrid	Sterculiaceae	Boshuwa/loluwa	Tree	Wild	Leaf	less plenty	crushed/decocted taken	Oral	abdominal pain	animal	Dawro292
Echinops amplexcaulis	Asteraceae	Wora bursa/kashiya (zo'uwa gad'awa)	Shrub	Wild	Root	plenty	crushed/decocted and taken	Oral	for building	animal	Dawro211
Echinops kebricho	Asteraceae	Bursa	Shrub	Wild	Root	plenty	smoked	dermal	head ache, never reach snake around the area of smoking	human	Dawro9
Ehretia cymosa	Boraginaceae	Etriwanjiya	Tree	Wild	Leaf	less plenty	crushed and tied on the infected part	dermal	Sever abdominal cramp	animal	Dawro78
Embelia schimperi	Myrsinaceae	K'uank'uula	Shrub	Wild	Fruit	rare	crushed mixed with water and taken orally befote breakfast	Oral	tape worm	human	Dawro250
Ensete ventricosum	Musaceae	Utsa	Shrub	Cultivated	Root	plenty	the root tied on neck	dermal	tumour	human	Dawro72
Entada abyssinica	Fabaceae	Gelec'ec'a	Shrub	Wild	Leaf	less plenty	crushed and applied on the infected parts	dermal	wound	animal and human	Dawro88
Erythrina abysinica	Fabaceae	Borttuwa-Gad'awa	Tree	cultivated and wild	Bark	rare	crushed/decocted and taken	Oral	evil eye	animal and human	Dawro155
Erythrina brucci	Fabaceae	Bortuwa-Geziyawa	Tree	cultivated and wild	Bark	plenty	crushed or poudered fresh mixed with water and taken	Oral	ascaris, stomach ache	human	Dawro3
Eucalyptus globules	Myrtaceae	Botha-Barzafiya	Tree	cultivated	Leaf	plenty	smoking	Nasal	common cold	human	Dawro282
Euphorbia hirta	Euphorbiaceae	Shato-maataa	Herb	wild	Root	less plenty	crushed and rubbed out to it	dermal	Ringworm and Skin disease	human	Dawro176
Euphorbia inidica	Euphorbiaceae	Shato dhaliya	climber	wild	Sap	less plenty	cut and then apply the sap	dermal	Skin disease	human	Dawro324
Euphorbia tirucalli	Euphorbeaceae	Maxuwa-darawa/S'aduwa	shrub	Wild	shoot	rare	decocted and taken	Oral	swelling of stomach	animal	Dawro27
Ficus thonningii	Moraceae	Shaynhiya	Tree	wild	Bark	less plenty	crushed and decocted taken	Oral	dysentry	human	Dawro323

Ficus vasta	Moraceae	Esaa//etta	Tree	Wild	Bark	rare	crushed, decocted and mixed/concoted with *Rumex nepalenis,Erytherina bruci* and *Solanum incanum* taken	Oral	stomach disorder	human	Dawro154
Foeniculum vulgarie	Apiaceae	Shileria	Shrub	Wild	Leaf	rare	crushed and mixed with water and taken	Oral	Chill	human	Dawro16
Galinirea coffeoides	Rubiaceae	Deesha loomiya	Shrub	Wild	Leaf; root	rare	crushed and mixed with milk applied through oral	Oral	epilepsy	human	Dawro307
Galinsoga paruifolra	Asteraceae	Ematiya/bizdiya	Tree	Wild	Leaf; root	less plenty	crushed the root and leaf together taken orally with in three days interval until heall	Oral	Hepatitis/Liver problem	human	Dawro222
Gallium aparinoides	Rubiaceae	Kangad'a	Herb	Wild	shoot	rare	rubbing on the infected part	dermal	Skin disease;Imptigo	human	Dawro259
Gardenia ternifolia	Rubiaceae	Genbbela	Tree	Wild	Leaf	less plenty	crushed/decocted and mixed with butter	Oral	colic pain	human	Dawro296
Geranium sp.	Geranaceae	Badinecho	Herb	Wild	Leaf	less plenty	rubbed on the infected part of the tooth	dermal	Gum infection	human	Dawro272
Gerbera piloselloides	Asteraceae	Sa-sheka	Herb	Wild	Leaf	rare	crushed/decocted and add little water taken orally once	Oral	Sever abdominal cramp	human	Dawro315
Girardinca bullosa	Urticaceae	Kona	Herb	wild	Root	rare	crushed and taken	Oral	conspitation	human	Dawro280
Glycine wightii var.longicauda	Fabaceae	Tooguwa tura	Climber	Wild	Root	less plenty	crushed /decocted and can be concoted /mixed with milk taken	Oral	evil eye	animal and human	Dawro231
Gnidia glauca	Thymelaeaceae	Migra	Shrub	Wild	Root	less plenty	crushed and leave it for overnight mixed with water and taken orally	Oral	Hepatitis/Liver problem	human	Dawro183
Gnidia stenophylla	Thymelaceae	K'uriya	Shrub	cultivated	Root	less plenty	crushed/decocted and taken orally and then taken milk	Oral	abdominal pain	human	Dawro351
Grewia bicolour Juss	Tiliaceae	Gumariya/S'awayiya	Tree	wild	Bark	plenty	cruched and added with water and taken	Oral	swelling of stomach	human	Dawro28
Guizotia scabra	Asteraceae	Tufaa	Herb	semi wild	Stem	plenty	crushed/decocted and applied on the skin	dermal	skin disease	human	Dawro147

Habenstretia angolensis	Scrophuriaceae	Kayis'eriya	Shrub	wild	Stem	less plenty	the small pieces of it tied on the neck	dermal	tumour	human	Dawro244
Hagnia abyssinica	Rosaceae	Soyid'uwa	Tree	wild	Fruit	rare	crushed and mixed with water taken	Oral	tape worm	human	Dawro101
Helichrysum gerberifolium	Asteraceae		Herb	wild	shoot	plenty	crushed and taken	Oral	mengits	human	Dawro168
Helichrysum sp.	Asteraceae	Samba lolo/Yesamba mich	Herb	wild	Leaf	less plenty	crushed and mixed with water taken through eye, nose, oral and rubbed on the skin	Oral, nasal, deremal	evil eye, pneumonia	human	Dawro242
Hypericum peplidifolium	Guttiferaceae	Mali Mas'ino	Herb	cultivated	Leaf	rare	crushed/decocted and applied on the skin	dermal	Itching and Scabies	human	Dawro128
Hypericum revolutum	Guttiferaceae	K'irik'uwa	Shrub	wild	Leaf	plenty	crushed/ decocted taken	Oral	Anaphlatic shock	human	Dawro156
Hypoestes forskaolii	Acanthaceae	Ginginuwa malatiyawa	Herb	wild	Root	rare	powdered applied	Oral	snake bite	human	Dawro178
Indigofera arrecta	fabaceae	wusiwusiya	Shrub	wild	Root	plenty	chewed the root part	Oral	abdominal ache; Anthrax	animal and human	Dawro54
Indigofera spicata	Fabaceae	Sheka/K'uriya /Dangarsa d'oniya	Herb	wild	Root	less plenty	crushed/decocted and mixed with water taken orally	Oral	snake bite;abdomenal pain	animal and human	Dawro328 and dawro98
Juniperus procera	Cuperssaceae	S'iida	Tree	semi wild	Leaf	rare	crushed and applied on the infected parts	dermal	Wound	animal	Dawro311
Justicia ladanoides	Acantaceae	Mulu muk'uwa	Herb	wild	Leaf; root	rare	crushed,washed ,rubbed on the skin and also taken through nose;powdered, and liquid filtered butter of a spoon given orally;crushed mixed with butter and rubbed on the part	Dermal and Oral	colic pain;Hepatitis/Liver problem;tumour	animal and human	Dawro169 (175/187/196)
Laggera pterodonta	Asteraceae	Sesa/Geleshotanbuwa	Shrub	wild	Leaf	rare	crushed and applied orally	Oral	evil eye	human	Dawro59
Lannea fruticosa	Anacardiaceae	Dechi-marac'iya	Tree	wild	Root	rare	crushed and rubbing on the infected part	dermal	wound; Abdominal pain/(Karishuwa)	animal and human	Dawro99
Lantana tritolia	Verbenscae	Shanki-shasha	Herb	wild	Leaf	rare	crushed and decocted taken	Oral	malaria	human	Dawro97
Lantana viburnoides	Verbenaceae	Shanki-shasha malaa	Herb	wild	Leaf	less plenty	crushed and applied through eye and nose	nasal	Alergic reaction of eye	human	Dawro192

Launea mtgbacea Jeffrcy	Asteraceae		Herb	wild	Root	less plenty	crushed and mixed with water taken	Oral	abdominal pain	human	Dawro234
Lepidium sativum	Brassicaceae	Sibika	Herb	cultivated	Fruit	plenty	crushed and mixed /concotedwith butter and taken	Oral	abdominal pain and Intestinal problem/ cramp (karshuwa)	animal	Dawro137
Leucas abbyssinica	Lamiaceae	Kirikisa	Herb	wild	Leaf	less plenty	crushed and mixed with water taken one cup for adult and half cup for children	Oral	diaharrea	human	Dawro218
Leucas martinicensis	Lamiaceae	Gumpula	Herb	semi wild	Root	less plenty	powder then the local areki is taken as mouth	Oral	Anthrax	animal	Dawro146
Lippia adoensis var.koseret	Verbenaceae	Kosorotiya	Shrub	semi wild	Leaf	less plenty	concoction with milk	Oral	Aptizer	human	Dawro68
Lobelia giberroa	Lobeliaceae	Ododiya	Shrub	wild	Leaf	rare	crushed/cococted with tobaco and eucalyptus and taken	Oral	Trypanosomiasis	animal	Dawro125
Lotus sp.	Fabaceae	Badanecha	climber	wild	Leaf; root	less plenty	crushed and rubbed on the surface of gum	dermal	Gum infection	human	Dawro338
Maerua oblongifolia	Capparidaceae	Sangana	Shrub	Wild	Root	less plenty	crushed and taken orally, smoked	oral and nasal	colic pain	human	Dawro209
Maesa lanceolata	Myrrecenaceae	Gegec'uwa	Tree	Wild	Bark	plenty	crushed or poudered fresh mixed with water and taken	Oral	ascaris, stomach ache	human	Dawro5
Maytenus sega	Celastraceae	Putawuwa	Tree	Wild	leaf; root	less plenty	crushed the root and leaf/decocted taken	Oral	evil eye	animal and human	Dawro163
Milettia ferruginea	Fabaceae	Zagiya	Tree	Wild	Root	less plenty	crushed/decocted and applied	Oral	Trypanosomiasis	animal	Dawro119
Momordica foetide	Cucuribitaceae	K'eca	Climber	Wild	Root	less plenty	crushed and taken orally with water	oral and nasal	Rabies	animal and human	Dawro304
Moringa stenopetala	Moringaceae	Halakuwa	Tree	Cultivated	leaf	less plenty	heated the leaf and then eaten until treatened	Oral	Malaria	human	Dawro287
Mukia maderaspatana	Cucurbitaceae	Shosha mata	Climber	Wild	Leaf	less plenty	crushed and mixed wit water	Oral	snake bite	human	Dawro336
Musa x peradisacal	Musaceae	Muuziya	Shrub	Cultivated	all parts	less plenty	crushed/decocted applied on the injured part	dermal	blood clotting	human	Dawro305
Nephrolepis	Oleandrac	Bisa-	Herb	Wild	Leaf	less	crushed and mixed	Oral	snake bite	human	Dawro213

undulata	eae	gadhawa				plenty	with water taken				
Nicandra physaloides	Solanaceae	Puqaqiya (laflafuwa mala)	Herb	Wild	Leaf	plenty	crushed and taken cup of it	oral	Hepatitis/Liver problem	human	Dawro290
Nicotiana tabacum	Solanaceae	Tambuwa	Herb	Cultivated	Leaf	less plenty	crushed/decocted and applied	nasal	Leech	animal and human	Dawro92
Ocimum americanum	Lamiaceae	Dunkiya-bunawa/Sa'atusa	Shrub	Wild	Root	less plenty	crushed and pressed mixed with the root of *Richrdia tingetana* /decocted taken orally;crushed and mixed with water and a cup of it is taken	Oral	Anaphlatic shock	human	Dawro161(326)
Ocimum basilicum	Lamiaceae	Dunkiya	Herb	Cultivated	Leaf	rare	crushed, pounded and given	Oral	stomach ache	human	Dawro12
Ocimum lamifolium	Lamiaceae	Damakesiya	Herb	Wild	Leaf	plenty	crushed and mixed /concoted with coffee and taken	Dermal and Oral	Alergic reaction	human	Dawro14
Ocimum utricifolium	Lamraceae	Guluuwa/Desha-dunkiya	Shrub	Wild	Root	less plenty	crushed and mixed with water taken orally	Oral	colic pain	human	Dawro195
Oncocalyx sp.	Loranthaceae	China Mita	Shrub	Wild	Bark	rare	crushed mixed with butter and rubbed on the skin	dermal	skin disease	human	Dawro185
Oxalis latifolia	Oxalidaceae	mac'igara	Climber	Wild	Leaf	plenty	powder taken	Oral	colic pain	human	Dawro144
Oxalis radicosa	Oxalidaceae	Shumachiya	Herb	Wild	Leaf	plenty	heated/crushed and mixed with water taken	Oral	Aptizer	human	Dawro217
Paspalum scrobiculatum	Poaceae	Gors'a-mala	Herb	Cultivated	Leaf	less plenty	rubbing on the infected part	dermal	snake bite	human	Dawro74
Penisetum clandestinum	Poaceae	Gors'aa	Herb	Wild	Leaf	rare	crushed and mixed with water	Oral	snake bite	animal and human	Dawro136
Pentas lanceolata	Rubiaceae	Gergeda mitsa/Dawridama mala	Shrub	Wild	leaf; root; bark	rare	crushed/decocted and taken;crushed taken orally, and the root cut in to three pieces and tied on neck	nasal	Breathing problem/Tinita/;tumour	human	Dawro227 (256)
Pentas schimperiana	Rubiaceae	Dawuri Daamaa/Dalbantsa	Shrub	Wild	Leaf	rare	crushed and mixed with water and butter taken	Oral	broken	animal and human	Dawro138
Persea americana	Lauraceae	Abokatuwa	Tree	Cultivated	Bark	less plenty	crushed/decocted taken	Oral	colic pain	animal and human	Dawro295

Phaulopsis imbricata	Acanthaceae	Umba	Herb	Wild	Root	rare	powdered and mixed with water and applied	nasal	Black leg	animal	Dawro177
Phoenix reclinta	Ariaceae	Zamba	Tree	Wild	Leaf	rare	chopped,powdered and droped into eye	dermal	eye disease	human	Dawro288
Phragmanthera machosolen	Loranthaceae	Mitsa shapuwa	Climber	Wild	Bark	rare	the plant part tied on the nack	dermal	Lymph adenitis/swelling of gland	human	Dawro21
Phyllanthus maderaspatensis	Euphorbiaceae	Dal uwa	Herb	Wild	Root	rare	crushed and mixed with water applied	oral and nasal	for milk shortage	animal	Dawro188
Phyllanthus reticulatus	Euphorbiaceae	Wusiwisiya mala	Shrub	Wild	leaf; root	less plenty	crushed both parts taken	Oral	Hepatitis/Liver problem	human	Dawro249
Phytolacca dodecandra	Phytolaccaceae	Hanc'ic'iya	Shrub	Wild	leaf,root ,bark	plenty	crushed or poudered fresh mixed with water and taken	Oral	Stomach ache, malaria	human	Dawro2
Pilea rivularis	utricaceae	Hayitsa matta	Herb	semi wild	Leaf	plenty	crushed, pressed and the solid is applied in to ear	dermal	ear disease	human	Dawro145
Pileatera phyla	Uritaceae		Herb	Wild	Leaf	less plenty	crushed and smelled it	dermal	head ache, sweating	human	Dawro240
Piper capense	Piperaceae	Tunja	Shrub	Cultivated	Fruit	rare	crushed and cococted with Rue and *Echnops kebericho* and taken	Oral	chill, stomach ache, head ache	human	Dawro6
Plantago lanceolata	Plantaginaceae	Borada mala	Herb	Wild	Leaf	rare	crushed and rubbed on the skin	dermal	Wound	human	Dawro238
Plantago palmate	Plantaginaceae	Borodaa	Herb	Cultivated	Root	rare	the root tied on neck	dermal		human	Dawro132
Plectranthus caninus	Lamiaceae	Mudha	Herb	Wild	Leaf	plenty	crushed and decocted	Dermal and Oral	Alergic reaction and wound	human	Dawro34
Plectranthus ornatus	Lamiaceae	Dissa	Herb	Wild	Leaf; root	rare	the leaf part simply smell but the root parts chewed	oral and nasal	Alergic reaction	human	Dawro309
Plumbago zeylanica	Plumaginaceae		Herb	Wild	Root	less plenty	crushed/decocted and taken t	nasal	snake bite	human	Dawro190
Polygala persicarifolia	Polygonaceae	Gic'inda	Herb	Wild	Root	less plenty	powdered and applied	nasal	head ache	human	Dawro180
Pteris catoptera	Pteridaceae	Bisa	Herb	Wild	Root	less plenty	crushed and mixed with water taken	Oral	abdominal pain	human	Dawro148

Pycnostachys abyssinica	Lamiaceae	Olomuwa	Shrub	Wild	Leaf	less plenty	crushed the leaf and applied on the foot	dermal	athelet foot cracking/maac'uwa	human	Dawro306
Pycnostachys abyssinica	Lamiaceae	Olomuwa	Shrub	Wild	Leaf	rare	the leaf placed on the eye	dermal	eye disease	Animal and human	Dawro58
Rhamnus prinoides	Rhamnecea e	Geeshuwa	Shrub	Cultivated	Leaf	plenty	crushed, mixed with water and heated	dermal	Itching and Scabies	human	Dawro122
Rhoicissus revoilii	Vitaceae	Gegeluwa	Climber	Wild	Stem	less plenty	flesh of it tied on the neck	dermal	Lymph adenitis	human	Dawro159
Rhynchosia minima	Fabaceae	Galimentsuwa	Herb	cultivated and wild	Leaf	rare	crushed and rubbing on the infected part	dermal	thorn toxic	human	Dawro124
Rhynchosia orthobotrya	Fabaceae		Shrub	Wild	Leaf	plenty	crushed/decocted and mixed with little water	Oral	Alergic reaction and Anaphlatic shock	human	Dawro152
Richrdia tingetana	Asteraceae	Mas'oliya	Herb	Wild	leaf	less plenty	crushed and taken orally	Oral	gonnorrea and Haemorriadge (kintarot)	human	Dawro255
Rumex abyssinicus	Polygonac eae	C'olieya	Herb	Cultivated	Root	plenty	decocted and half of a cup it taken	Oral	ascariasis	human	Dawro57
Rumex nepalensis	Polyganac eae	Zans'ala	Herb	Wild	Root	plenty	crushed and tied on the infected part	dermal	Insect bite (Sa'aba) disease	human	Dawro80
Ruta chalopensis	Rutaceae	S'alotiya	Shrub	Cultivated	fruit, leaf	plenty	chewed orally or mixed with water	Oral	stomach ache, chill	human	Dawro8
Salvia nilotica	Lamiaceae	Sa'a Okata	Herb	Wild	Leaf	plenty	crushed and mixed with water and taken	Oral	Alergic reaction	human	Dawro17
Satureja abyssinica	Lamiaceae	Wuta malaa	Herb	Wild	Leaf	less plenty	crushed and applied orally and dermal;by simply smelling the leaf	Dermal and Oral	abdominal pain; Epilepsy	Animal and human	Dawro118(241)
Satureja punctata	Lamiaceae		Herb	Wild	Leaf	less plenty	powdered and pressed a cup of it taken	Oral	snake bite	human	Dawro182
Satyrium aethiopicum	Orchidacea e	Ec'ere Hayitsa	Herb	Wild	Root	less plenty	crushed and mixed /decocted with lemon taken orally	Oral	Anthrax	animal	Dawro266
Scadoxus nutans	Maryllidace ae	Wara Mana	Herb	Wild	Leaf	rare	crushed and cococted with *Tragia cinerea* and taken	Oral	snake bite	human	Dawro95
Schrebera alata	Oleaceae	K'ara	Tree	Wild	Leaf	less plenty	crushed and mixed with water taken	Oral	Wound	human	Dawro212

Sclerocarya birrea	Anacardiaceae	Woshilachiya/ Tunk'aluwa	Tree	Wild	Stem	less plenty	five pieces of it hunged on the neck	derma l	Lymph adenitis	human	Dawro297
Senna peteriana	Fabaceae	Shosha enxarsa	Shrub	Wild	Leaf	rare	crushed/decocted and add little water taken once	Oral	snake bite	human	Dawro313
Sida rhombifolia	Malvaceae	Danduretsa	Herb	Wild	Root	less plenty	crushed and applied	nasal	dandreta	animal and human	Dawro301
Sida schimperiana	Malraceae	Kindichuwa	Shrub	Cultivated	Leaf	plenty	crushed the leaf and taken , smelling the leaf	Derm al and Oral	evel eye	human	Dawro73
Solanecio gigas	Asteraceae	Dook'a	Shrub	Cultivated	Leaf	less plenty	crushed mixed with water and taken orally	Oral	abdomenal pain	animal	Dawro134
Solanum capsicoides	Solanacea e	Karetsa buluwa/Meete tiya buluwa	Herb	Wild	shoot and flower	plenty	crushed and decocted taken orally for children	Oral	common cold, Abdominal cramp	human	Dawro47
Solanum incanum	Solanacea e	Wora buluwa	Shrub	Wild	Fruit	less plenty	crushed /decocted and taken orally	Oral	snake bite	animal and human	Dawro310
Solanum incanum L	Solanacea e	Buluwa/Wora buluwa	Shrub	Wild	Leaf	plenty	crushed, heated mixed with butter	Oral	Gastritis, Alergic reaction	human	Dawro63
Solanum sp.	Solanacea e	Puk'ek'iya	Shrub	Wild	Root	rare	washed/crushed mixed with water and taken orally 3 cup before breakfast for three days	Oral	Hepatitis/Liver problem	human	Dawro189
Solanum sp.	solanaceae		Shrub	Cultivated	Leaf	rare	cut in to small pieces and hung	derma l	Lymph adenitis	human	Dawro355
Sparmannia ricinocarpa	Tiliaceae	K'eri-cayshiya/K'arc'ocha/Baribacho	Herb	Wild	Leaf	less plenty	applieg in to nose/drunk	oral and nasal	snake bite	human	Dawro181
Spilanthus mauritiana	Asteraceae	Aydamiya	Herb	Wild	flower	plenty	chewed orally	Oral	flutulence, for fatening	human	Dawro13
Sporobolus pyramidalis	Poaceae	Gic'igiliya/Gic'ariya	Herb	Wild	Leaf	rare	powdered and mixed with the leaf of *Conyza pyrrhopappa* taken a glass of it	Oral	diaharrea	human	Dawro174
Sporobulus sp.	Poaceae	Sura mala	Herb	Wild	leaf and stem	less plenty	crushed and applied on the skin	derma l	fire flamation	human	Dawro331
Stephenia abyssinica	Menispermaceae	Bazo tura/Ado tura	Climber	Wild	Root	rare	crushed, decocted and mixed with fresh	Oral	stomach ache in	human	Dawro19

							milk taken		children		
Syzygium guineense	Myrtaceae	Ocha	Tree	Wild	Bark	rare	crushed or poudered fresh mixed with water decocted and taken	Oral	ascaris, stomach ache; abdominal pain	human	Dawro4 (285)
Tagetes minuta	Asteraceae	Derek'a	Herb	Wild	leaf; root	Less plenty	crushed/decocted and mixed with yoghort; crushed and given orally	Oral	chill; Sudden attack of digestive guts; Reumatism	human	Dawro206 (334;352)
Tamarindus indica	Fabaceae	Koriya	Tree	Wild	Fruit	rare	crushed and mixed with water taken	Oral	diarrhea	human	Dawro325
Tephrosia villosa	Fabaceae		Herb	Wild	Root	rare	cruched and added with water and taken	Oral	Anaphlatic shock	animal and human	Dawro172
Terminalia schimperiana	Combretaceae	Ambiya	Tree	Wild	Bark	plenty	crushed and decocted and taken	Oral	chill and stomach ache	human	Dawro43
Thalictrum rhynchocarpum	Ranunculaceae		Herb	Wild	Root	less plenty	crushed and mixed with milk applied	Oral	ascariasis	human	Dawro257
Tragia cinerea	Euphorbiaceae	Kinklishuwa	Climber	Wild	Root	less plenty	flesh of it tied on the neck	dermal	Lymph adenitis	human	Dawro158
Tragia doryoges	Euphorbiaceae	Kinklishuwa	Herb	Wild	Leaf; root	less plenty	crushed the root and leaf together concocted with the leaf and root of *Croton macrostachyus* mixed with water taken orally	Oral	snake bite	human	Dawro237
Trichodeswa zeylanicum	Boraginaceae	Kontsotsuwa/ K'uro aguntsa/Kach anchiliya	Herb	Wild	Leaf	less plenty	crushed, mixed with *Phaytolaca dedecandra* and applied	dermal	eye disease	human	Dawro116
Trifolium decorum	Fabaceae	Azimiya	Herb	Cultivated	Leaf	plenty	crushed/decocted and applied on the skin	dermal	Itching	human	Dawro130
Trigonella foenumgraecum	Fabaceae	Shuk'uwa	Herb	Wild	Leaf	less plenty	crushed/ground and applied in to the eye	dermal	eye disease	human	Dawro289
Triticum polonicum	Poceae	K'anbara	Herb	Cultivated	Seed	plenty	pound then ground and mixed with water then heat	Oral	building of body	animal and human	Dawro64

Tropaeolum majus	Tropacolaceae	Faranjiya-Sibika	Climber	Cultivated	Fruit	rare	crushed and cococted with Rue/*Ruta chalepensi* and taken as orally	Oral	stomach ache	human	Dawro10
Vepris danellii	Rutaceae	C'awula	Tree	Wild	Fruit	rare	crushed and mixed with water and taken	Oral	stomach ache, chill	human	Dawro7
Verbena officinalis	Verbenaceae	Higisha D'aliya	Herb	Wild	Root	rare	crushed and taken orally	Oral	evel eye	human	Dawro350
Vernonia amygdalina	Astraceae	Garaa	Tree	Wild	shoot (young)	rare	crushed the root and concocted with the root of papaya	Oral	malaria for human and swelling of abdomen for animals	animal and human	Dawro23
Vernonia karaguensis	Asteraceae	Saguwa	Shrub	Wild	Leaf	less plenty	crushed, dried and rubbed on the skin	Oral	Anthrax	animal	Dawro262
Vernonia lasiopus	Asteraceae	Waramayiya	Shrub	Wild	Root	less plenty	crushed/decocted taken orally	Oral	dysentry	animal	Dawro321
Vernonia sp.	asteraceae	Yesheshuwa	Herb	Wild	Root	less plenty	powdered and press then mixed /concoted with the root of *Abrus precatorius* and milk	Oral	Hepatitis/Liver problem	human	Dawro162
Vernonia sp.	Asteraceae	Kariya	Shrub	cultivated	Leaf	rare	chewed cococted with *Syzygium guineense* taken through mouth	Oral	Aphlatic shock	human	Dawro358
Vernonia theophrastifolia	Asteraceae	Buuzuuwa	Shrub	wild	Leaf	rare	crushed/concocted with tselotiya taken orally	Oral	evil eye	human	Dawro308
Vernonia urticifolia	Asteraceae	Zamuwa	Shrub	semi wild	Leaf	rare	take the tip of the leaf and crushed/mixed with water and taken	Oral	abdomenal pain	human	Dawro131
Vicia sp.	Fabaceae	Kishikishi mala	Shrub	wild	Leaf	less plenty	crushed and applied on the skin	dermal	saba bite	human	Dawro329
Vigna vexillata	Fabaceae	Tsoka	Climber	wild	Leaf	rare	powdered and taken orally	Oral	Black leg	animal	Dawro342
Zehneria scabra	Cucuribitaceae	Ecca	Climber	Wild	Root	less plenty	crushed and applied througn mouth and nose	oral and nasal	Gonnorreh ea	human	Dawro303
Zernia pratensis	Fabaceae	X	Herb	Wild	Leaf	less plenty	crushed and rubbed on the biteen area of the skin at least 3 times within 3days interval	dermal	snake ite	human	Dawro230

Zingiber officinale	Zingiberaceae	Yenjeluwa	Herb	Cultivated	Root	plenty	crushed and concoted/mixed with coffee for human and only with water for animals	Oral	swelling of abdomen for human ; Trypanosomiasis for animals	Animal and human	Dawro22
Zornia glochidiato	Fabaceae	Korie	Herb	Wild	Root	less plenty	crushed and concocted /mixed with *Plumbago zeylanica* taken through nose	nasal	snake bite	human	Dawro191
Zornia partensis	Fabaceae		Shrub	Wild	Root	less plenty	crushed and taken orally	Oral	abdominal pain	animal and human	Dawro164