Medicinal plants use and conservation practices in Jimma Zone, South West Ethiopia

Debela Hunde Feyssa, Chemeda Abdeta, Techale Berhan* and Manju Sharma

College of Agriculture & Veterinary Medicine, Jimma University, Ethiopia.

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Traditional medicine has continued to be the most affordable and easily accessible source of treatment in the primary healthcare system of Ethiopia. However, the medicinal plants used for such treatments are becoming increasingly rare and vulnerable to extinction because of improper utilization and conservation practices. Hence, this paper was initiated with the aim to assess the use, management and conservation practices of medicinal plants in some selected districts of Jimma Zone, south west Ethiopia. Ethnobotanical methods such as focus group discussions, key informant interview, semistructured interview and field walks were used to collect ethnobotanical data on use and management practices of medicinal plants in the study area. Data collected were classified into the use of the plants and management practice. Data of the semistructured interview was analyzed using SPSS version 16 software. The result revealed that a total of 69 plant species were identified in the study area, of which 30 are nutraceuticals, 30 are collected at wild habitat and 39 are cultivated. Source of medicinal plants include: cultivation in home gardens, live fences, crop fields and wild collection from the nearby environment. The cultivation practice include home gardens, mixed in field crops, live fences and agroforestry. About 87% of respondents explained that they get medicinal plants easily in the study area and 10% explained that it is difficult. About 76% of respondents explained that medicinal plants are not sold in the market and 23% responded marketability of medicinal plants. About 33% of informants explained that medicinal plants are under threat and 67% explained that they are not threatened. Focus group discussion and key informant interview revealed that people conserve medicinal plant in live fences, home gardens, and they cultivate some species because of their nutraceutical value. They interpreted that there is no specific conservation activities targeted to medicinal planted by extension program. This indicates the necessary strategy and conservation of medicinal plants in the study area. Postharvest handling is not commonly known for many medicinal plants because they are collected and used immediately. Therefore, local people use their knowledge nowadays in this region. The resources require an urgent attention in research and policy which should include training on knowledge of medicinal plant use and management in cultivating, production, postharvest handling, promoting their use and sustainable utilization.

Key words: Conservation, medicinal plants, Jimma, Kersa.

INTRODUCTION

Traditional medicine has continued to be the most affordable and easily accessible source of treatment in the primary healthcare system of developing countries. The need is more pressing for resource poor communities and the local
therapy is the only means of medical treatment for such communities (Haile and Delenasaw, 2007). These medical systems are heavily dependent on various plant species and plant based products (Jansen, 1981). It is estimated that 70–80% of people worldwide rely chiefly on traditional, largely herbal; medicines need to meet their primary healthcare (Farnsworth and Soejarto, 1991; Pei, 2001).

The list of medicinal plants in Ethiopia, which is documented for National Biodiversity Strategy and Action Plan by Tesema et al. (2002) shows that about 887 plant species were reported to be utilized in traditional medicine. Among these, 26 species are endemic and they are becoming increasingly rare and are at the verge of extinction. It is believed that the greater concentrations of these plants are found in the southern and southwestern parts of the country following the concentration of biological and cultural diversity (Yineger, 2005; UNEP, 1995).

In Ethiopia, most of the medicinal plants used by herbalists are collected in the natural vegetation (Asfaw, 1999, 2001). Medicinal plants obtained at wild habitats are found in different natural ecosystems of the forests, grasslands, woodlands, wetlands, in field margins and garden fences, as weeds and in many other microhabitats where they are harvested when the need arises. These are free access resources. Many medicinal plants are also harvested for non-medical purposes such as for timber, implements, firewood and other purposes, and hence they are subjected to multiple depletion. Hence, sustainable utilization measures and conservation of plants should target the habitats of such vulnerable species.

Except in a few medicinal plant species where a few food crops are cultivated with medicinal value, there is no organized cultivation of plants for medicinal purposes in Ethiopia. The reason for this is that the quantities of medicinal plants traded are very small, and there is no organized large scale value addition and processing. However, there is a potential in the future for increased demand for some species, and therefore it is important to identify them and start the necessary research on the conservation and sustainable utilization techniques (Bekele, 2007).

Abera (2003) assessed the locally available medicinal plants in Jimma zone and found that 39 medicinal plants were used for treatment of various diseases. Haile and Delenasaw (2007) carried out also an assessment on traditional medicinal plant knowledge and their use by local healers in Jimma Zone on 27 medicinal plants. They found that the majority of the reported species grow in wild and they are rare. In addition, ethnobotanical study of medicinal plants was carried out by Awas and Demissew in southwestern Ethiopia (2009). However, there is no comprehensive systematic study on the use and conservation practices of medicinal plants in the current study districts. These demanded an urgent attention to conserve such vital resources. Therefore, this study was proposed to assess the use, management and conservation practices of medicinal plants in some selected districts of Jimma Zone, South West Ethiopia.

MATERIALS AND METHODS

Study site

The study was conducted in Jimma Zone (Manna, SekaChekorsa and Kersa districts in Oromia National Regional State, Southwestern Ethiopia where 3 peasant associations were selected from each district.

Geographical location of the study area

Manna, SekaChekorsa and Kersa districts are located in Jimma which is the largest city in southwestern Ethiopia. It is one zone of the Oromia National Regional State. It has a latitude and longitude of 7°40’N 36°50’E.

Population

Total population of the districts is: Kersa 165,331(83579 male and 82,812 female); Mana, 146, 67 (74,512 male and 71,878 female); Seka Chekorsa, 208,096 (104,758 male and 103,338 female).

Vegetation

The study area lies in moist evergreen montane forest of Jimma zone in south western Ethiopia and this specific study was conducted in Agro forestry, cultivated lands MPs. Emphasis was given more on utilization and conservation practices of medicinal plants than on ecosystem and forest type description or characterization.

Ethnic group

In Seka Chekorsa, Mana and Kersa districts the five major ethnic groups are Oromo the Yem, Amhara, Kafficho and Dawuro The majority of the inhabitants are Muslim, Ethiopian Orthodox Christianity, Protestant Christians and Waqefata.

The study area (Jimma Zone) has an agro-ecological setting of highlands (15%), midlands (67%) and lowlands (18%). The zone is one of the major coffee growing areas of Oromia National Regional State well endowed with natural resources contributing significantly to the national economy of the country (Lemessa, 2000).

The study area, Jimma zone is one of the major coffee growing areas of Oromia National Regional State well endowed with natural resources contributing significantly to the national economy of the

*Corresponding author. E-mail: mengistuaddam@yahoo.com.

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Table 1. Source of medicinal plants in the study area.

| Medicinal plant cultivation | Frequency | Percentage |
|-----------------------------|-----------|------------|
| Cultivated                  | 112       | 48.91      |
| Collect at wild habitat     | 85        | 37.12      |
| Buy in market               | 17        | 7.42       |
| From neighbors              | 14        | 6.11       |
| others                      | 1         | 0.44       |
| Total                       | 229       |            |

Table 2. Cultivation status of medicinal plants in the study area.

| Cultivation area             | Frequency | Percentage |
|------------------------------|-----------|------------|
| Home garden                  | 114       | 59.69      |
| Mixed with other crops       | 11        | 5.76       |
| Live fences                  | 42        | 21.99      |
| Agro-forestry                | 24        | 12.57      |
| others                       | 0         | 0.00       |
| Total                        | 191       | 100        |

country. Major crops grown include are: coffee, maize, teff, of medicinal plants was carried out by Awas and sorghum, barley, pulses (beans and peas), root crops (enset, false banana and potato) and fruits (Lemessa, 2000). Climatically, Jimma Zone reliably receives good rains, ranging from 1,200–2,800 mm per annum. In normal years, the rainy season extends from February to October.

Study design

The districts were purposively selected based on their accessibility and because they are believed to be better biodiversity. Twenty informants were selected and interviewed in each district after having discussion with the inhabitants and authorities. Moreover, some discussions were held with concerned offices including agricultural development offices and development agents in each study site. Key informants are selected to get guidance in the field walk exercise.

Data collection

Both qualitative and quantitative approaches were used for this study. Ethnobotanical methods following Martin (1995) and Cotton (1996) were used for collecting data on the use and management practices and applied semistructured questionnaire, key informants’ interview and focal group discussion. Data were collected from December 2012 to April 2014. Ethical clearance was sought from concerned departments of Jimma University and the district agricultural development offices, as well as from the informants who were involved in providing information in the study areas. The help of local administrators, local people and field assistants were taken care of before embarking on data collection.

Indigenous knowledge on local names of plants and their conservation practices was recorded. Plant species were also identified by field walk together with key informants. Related to the possible threats on plant species and traditional conservation, observation was made in the field on the general habitats of the medicinal plants. The medicinal plants were identified in the field spontaneously in situ by the help of taxonomic keys using Flora of Ethiopia and Eritrea such as Hedberg and Edwards (1995) and other volumes and for those which were not identified in situ voucher specimen were collected for further consultation of experts. There was no difficulty faced in identification as most of the plants mentioned have medicinal uses and there are sufficient information in the Flora books.

Data analysis

Questionnaires was coded, entered into excel sheet and analyzed using SPSS software version 16. The qualitative data was narrated and summarized into tables, figures and graphs for explanation following Martin (1995) and Cotton (1996).

RESULTS

Medicinal plants in the study area

The present study identified 67 plant species, of which 36 are used for medicinal purpose and 31 both for food and medicine, that is, nutraceuticals.

Source of medicinal plants in the study area

In the study area, 48.91, 37.12 and 7.42% of the respondents explained that medicinal plants are obtained in cultivation, wild and purchased form market respectively (Table 1).

Cultivation of medicinal plants

As a result, 48.91% of the respondents explained that people cultivate medical plants whereas, 37% collect at wild habitat and less than 20% in market and from their neighbours by social relations (Table 1). This indicated that medicinal plants need more attention in production, and accessibility to the community by minimizing unstructured production approach.

The analysis shows that 48.9% of the respondents cultivate medicinal plants for their day to day use. Among the commonly used method of cultivations, the followings can be mentioned: home gardens (59.69%), mixing with other crops (5.76%), maintaining in live fences (21.99%) and in agro-forestry (12.57%) (Table 2). These medicinal plants are not maintained or cultivated for medicinal use only; rather they have food value and other multiple uses for families. This is an issue for more research which need to promote nutraceutical plants for conservation and family use, marketing and extraction of crude drugs to contribute to health care system and conservation of biodiversity.

About 37 of the medicinal plants are cultivated and 30 species are collected at wild habitats (Appendix 1). This indicates the existence of diversity of medicinal plants both in farm and natural habitats in Jimma Zone.
Conservation efforts of medicinal plants

The result of this study showed that 55% of the respondents explained no effort for conservation of medicinal plants. Whereas, 44% of them highlighted general conservation effort on natural resources which also include medicinal plants as a part of the conservation system. However, all respondents agreed that there is no particular attention given to medicinal plants conservation. The authors also observed the inadequate efforts made by the governmental and nongovernmental organization in conserving medicinal plants. The area has rich diversity of medicinal plant species; however, it is increasingly becoming degraded and lost at their natural habitat so that attentions must be given before time passes.

Postharvest management and conservation methods

The community has a living experience and knowledge on managing of medicinal plants for long term and short term benefits (Table 5). The applied conservation methods vary from species to species (Table 5). Some of postharvest managements include storing dried seeds for short and long times, dried leaves are stored for short time, crushed and pounded leaves kept in canned containers and sucks, and dried fruits in sucks and other containers for long time (Table 5). Even though the community has sufficient indigenous knowledge on conservation, postharvest storage and use, this unwritten knowledge should be supported with scientific studies and researches for the future as per the personal observations of the authors. In spite of variety of seasonal and temporary postharvest management of the medicinal plant parts, most users prefer the fresh material collected requiring more research in finding solutions for better postharvest management or identifying the alternative indigenous postharvest practices which will help the sustainable utilization of medicinal plants in the study area and elsewhere.

The commonly used conservation methods of medicinal plants include the following: seasonally cultivation, planting in home garden and live fence, planting as live fence and farm borders, seasonal cropping as field crop and home garden, planted in home and field top, as well as semi wild and grown as perennial field drop (Table 5). The key informants explained that these methods have helped to get medicinal plants year round.

DISCUSSION

Source of medicinal plants in the study area

The result revealed that people of the study are get medicinal plants from their agricultural land followed by wild collection. Similar studies have been reported from

| Table 3. Availability of wild medicinal plants in the study area. |
|---------------------------------------------------------------|
| Availability of wild medicinal plants | Frequency | Percentage |
|--------------------------------------|-----------|------------|
| Easy to get                           | 128       | 87.07      |
| Difficult to get                      | 15        | 10.20      |
| Very difficult to get                 | 1         | 0.68       |
| No information                       | 3         | 2.04       |
| Total                                | 147       |            |

| Table 4. Threats to medicinal plants in the study area. |
|--------------------------------------------------------|
| Threat to medicinal plants | Frequency | Percentage |
|---------------------------|-----------|------------|
| Yes                       | 52        | 33.33      |
| No                        | 104       | 66.67      |
| Total                     | 156       | 100        |

Wild medicinal plants’ availability

The result of the current study revealed that medicinal plants are easily available in forests, grasslands and woodlands. It was witnessed by 87% of the respondents. Whereas, <20% of the respondents explained that it is difficult to get medicinal plants even in wild state (Table 3). These responses focus on a debate in the light of the increasing agricultural land, selective harvesting of medicinal plants in the study area and elsewhere.

Marketability of medicinal plants

Among respondents, 76% explained that medicinal plants are used locally for traditional treatments and not sold in the market. However, 23% explained that some medicinal plants are sold in the local markets seasonally depending on their availability in local harvest (Table 4). Concerning marketability of medicinal plants, 23.77% of the respondents explained that medicinal plants are marketed while 76.22% of them explained their not marketed state.

Threat to medicinal plants

Respondents were asked whether there are threats to medicinal plants in the study area or not. Hence, 66.67% of them explained that there is no threat to medicinal plants and 33% of them mentioned a critical threat due to deforestation, urbanization, agricultural land expansion and lack of awareness among the community and inadequate extension which support targeted to sustainable harvesting of plants (Table 4).
Table 5. List of medicinal plants used in the area along their conservation and postharvest management practices.

| S/N | Local name  | Scientific name                        | Family       | Postharvest management                                           | Conservation method                  | Habit | Production type |
|-----|-------------|----------------------------------------|--------------|-----------------------------------------------------------------|--------------------------------------|-------|-----------------|
| 1   | Korarimaa   | Aframomum korarima Pereira             | Zingiberaceae| Dried fruits stored in sucks and other containers for long       | Seasonal planting                     | H     | Cult            |
| 2   | Qulubi adi  | Allium sativum L.                      | Liliaceae    | Crushed, pounded and kept in covered container, mostly used in fresh form | Planted as field and home garden crop | H     | Cult            |
| 3   | Ariti       | Artemisia afra Jacq. ex Wild.          | Compositae   | Dried leaves stored                                              | Grown in home garden                 | H     | Cult            |
| 4   | Neenii      | Azadirachta indica A. Juss             | Meliaceae    | Fresh leaves and sticks used                                     | Planted as live fence                | T     |                 |
| 5   | Xosinyi     | Calamintha paradoxa (Vatke) Ryding     | Labiatae     | Dried leaves stored in sucks and also fresh leaves used as collected | Farm boarders in some homes, mostly collected at wild habitat | H     | Cult            |
| 6   | Ceeka       | Calpurnia aurea (Alt.) Benth.          | Fabaceae     | Fresh leaves used                                                | Collected at wild habitat            | S     | wild            |
| 7   | Gora        | Capparis cartilaginea Decne.           | Capparaceae  | Fresh collected                                                   | Collected at wild habitat            | S     | wild            |
| 8   | Arangama    | Capparis tomentosa Lam.                | Capparaceae  | Not stored                                                       | Planted as live fence                | S     | wild            |
| 9   | Miximixaa   | Capsicum minimum L.                   | Solanaceae   | Dried fruits stored for long                                     | Grown as field crop and home garden  | H     | Cult            |
| 10  | Papayaa     | Carica papaya L.                      | Caricaceae   | Fresh fruits used                                                | Planted in home garden and field top | T     | T               |
| 11  | Hagmasa     | Carisa spinarum L.                    | Apocynaceae  | Fresh fruits used                                                | Collected at wild habitat            | S     | wild            |
| 12  | Azmudi adi  | Carum capticum L.                     | Umbelliferae | Dried fruits stored for long                                     | Grown as field crop and home garden  | H     | Cult            |
| 13  | Shumburaa   | Cicer arietina L.                     | Leguminosae  | Dried seeds stored                                               | Grown as field planting/cropping as field crop | H     | Cult            |
| 14  | Burtukana   | Citrus sinensis (L.) Osbeck           | Rutaceae     | Fresh fruits used                                                | Grown as field crop and in some cases in home garden | S     | Cult            |
| 15  | Buna        | Coffea arabica L.                     | Rubiaceae    | Dried beans collected and stored for long                        | Grown as perennial field drop        | S     | Cult            |
| 16  | Wadesa      | Cordia abyssinica R.Br                | Boraginaceae | Fresh leaves and fruits are used                                  | Collected at wild habitat            | T     |                 |
| 17  | Dimbilala   | Coriandrum sativum L.                | Apiaceae     | Seed stored                                                      | Seasonally cultivated                | H     |                 |
| 18  | Makanisa    | Croton maroastachyus Hochst. ex Ferret et Gallinier| Euphorbiaceae| Fresh from forest or farm borders                               | Collected at wild habitat            | T     | wild            |
| 19  | Dabaqula    | Cucurbita pepo L.                    | Cucurbitaceae| Fresh fruit used and seasonally stored                            | Grown as home garden plant           | C     |                 |
| 20  | Irdii       | Curcuma (L.) domestica Valeton        | Zingiberaceae| Bulb kept for long                                               | Grown as field crop and few as home garden | H     | Cult            |
| 21  | Astanagiri  | Datura stramonium L.                 | Solanaceae   | Fresh leaves and dried seeds used                                | Collected at farm borders            | H     | wild            |
| 22  | Karootii    | Daucus carota subsp. sativus (Hoffm.) Schübl. & G. Martens | Apiaceae | Tap root collected and used in fresh form/state                  | Grown as field crop and home garden  | H     | Cult            |
| 23  | Akuku       | Dovyalis abyssinica (A. Rich.) Warb.  | Flacourtiaceae| Fresh part collected from the wild                               | Collected at wild habitat            | T     | wild            |
| 24  | Barzafi adi | Eucalyptus gamadulensis Labill.       | Myrtaeae     | No data                                                         | Live fences                         | T     |                 |
| 25  | Ulaga       | Ehretia cymosa Thon                   | Boraginaceae | Fresh leaves used                                                | Collected at wild habitat            | T     | wild            |
| 26  | Coqorsa     | Eleusine jaegeri Pilg.                | Poaceae      | Fresh leaves                                                     | Collected at wild habitat            | H     | wild            |
| 27  | Moqmoqo     | Embelia schimperi Vatake              | Myrsinaceae  | Fresh buds collected and used                                     | Grown as live fence                  | S     | wild            |
| No. | District | Common Name | Scientific Name | Family | Habitat Type | Planting Details |
|-----|----------|-------------|-----------------|--------|--------------|-----------------|
| 28  | Hadamii  | Euphorbia abyssinica | *Euphorbia abyssinica* J.F.Gmel. | Euphorbiaceae | Fresh exudates collected and used | Live fence |
| 29  | Ano      | Euphorbia tirucalli | *Euphorbia tirucalli* L | Euphorbiaceae | Fresh exudates | Live fences |
| 30  | Insilal  | Foeniculum vulgare | *Foeniculum vulgare* Mill | Umbelliferae | Dried seeds stored | Seasonal cropping |
| 31  | Koso     | Hagenia abyssinica | *Hagenia abyssinica* J. F. Gmel. | Rosaceae | Dried flower is stored and fresh and dry flowers used | Collected at wild habitat |
| 32  | Gatira   | Juniperus procera | *Juniperus procera* Hochst. Ex Endl | Cupressaceae | Fresh leaves collected and used immediately | Planted as live fences |
| 33  | Dhumuga  | Justia schimperi | *Justia schimperi* Jaub. & Spach | Acanthaceae | Fresh leaves used | Planted as live fence |
| 34  | Kusaye   | Lantana trifolia | *Lantana trifolia* L | Verbenaceae | Dried leaves stored in sucks | Live fences and farm borders |
| 35  | Ras kimir (Amh) | Leonotis | *Leonotis* spp. | Labiatae | No data | Seasonal cropping as field crop and home garden |
| 36  | Shimfi (Fexo) | Lepidium sativum | *Lepidium sativum* L. | Cruciferae/Brassicaceae | Seed stored for long | Planting in home garden and live fence |
| 37  | Talba    | Linum usitatissimum | *Linum usitatissimum* L. | Linaceae | Dried seeds stored for long | Grown as field crop |
| 38  | Abbayi   | Maesa lanceolata | *Maesa lanceolata* Forsk. | Myrsinaceae | Fresh seeds used | Collected at wild habitat |
| 39  | Kombolcha (atat) | Maytenus ovata (Wall. ex Wight & Arn) | *Maytenus ovata* (Wall. ex Wight & Arn) | Celastraceae | Fresh parts collected from wild when needed | Collected from wild habitat |
| 40  | Qoda     | Myrtus communis | *Myrtus communis* (L) Myrtle | Myrtaceae | Fresh collected | Collected at wild habitat |
| 41  | Qoda     | Myrtus communis | *Myrtus communis* L | Myrtaceae | Fresh leaves used | Collect at wild habitat |
| 42  | Timbo    | Nicotiana tabacum | *Nicotiana tabacum* L. | Solanaceae | Dried leaves stored in sucks or used in fresh form | Seasonal cropping as field crop and home garden |
| 43  | Abasuda guracha | Nigella sativa | *Nigella sativa* L. | Ranunculaceae | Dried seeds and leaves stored | Seasonal cropping as field crop |
| 44  | Damakasse | Ocimum lamifolium | *Ocimum lamifolium* Wild | Lamiaceae | Fresh leaves collected and used | Planted in home garden |
| 45  | Basobila | Ocimum sanctum | *Ocimum sanctum* L. | Lamiaceae | Fresh leaves collected and used | Rarerly in home garden and mostly collected at wild habitat |
| 46  | Ancabi   | Ocimum suave | *Ocimum suave* Wild. | Lamiaceae | From wild forest, borders and grasslands | Collected at wild habitat |
| 47  | Nole     | Olinia usambarensis | *Olinia usambarensis* Gilg ex Engl. | Penaeaceae | Fresh fruits and leaves collected | Collected at wild habitat |
| 48  | Hincini  | Pavonia patenis (L.f.) Redouté | *Pavonia patenis* (L.f.) Redouté | Malvaceae | No data | Collected at wild habitat |
| 49  | Avocadoo | Persea americana | *Persea americana* Mill | Lauraceae | Fresh fruits used | Planted in home garden and field top |
| 50  | Handodee | Phytolacca dodocandara | *Phytolacca dodocandara* L. Hert | Phytolaccaceae | Dried seeds stored in sucks | Planted as live fence and mostly collected at wild habitat |
| 51  | Surumaa  | Pilea spp. | *Pilea spp.* | Urticaceae | Dried leaves stored and mostly fresh leaves used | Grown in home garden |
Table 5. Contd

| No. | Local Name | Scientific Name | Family | Part Used | Cultivation Method | Cult Status |
|-----|------------|-----------------|--------|-----------|--------------------|-------------|
| 53  | Zayituna   | *Psidium guajava* L. | Myrtaceae | Fresh fruits used | Planted in home garden and field crop in a semi wild habitat | S Cult |
| 54  | Geesho     | *Rhamnus prinoides* L. | Rhamnaceae | Leaves dried & stored for shirt time | Planting in home garden and live fence | S Cult |
| 55  | Qobo       | *Ricinus communis* L. | Euphorbiaceae | Dried seeds stored | Grown as a field crop | S Cult |
| 56  | Tult(Amh)  | *Rumex repalensis* | Polygonaceae | Fresh roots and leaves used | Collected at wild habitat | H wild |
| 57  | Cilatama   | *Ruta graveolens* L. | Rutaceae | Fresh leaves collected and used immediately | Planting in home garden | H Cult |
| 58  | Alaltu     | *Salix subserrata* Willd. | Salicaceae | Fresh young stems and leaves | Collected at wild habitat | T wild |
| 59  | Chifrigi   | *Sida ovate* Forssk. | Malvaceae | Fresh stem and root used | Collected at wild habitat | S wild |
| 60  | Hiddi      | *Solanum incanum* L. | Solanaceae | Fresh leaves used | Collected at wild habitat | S wild |
| 61  | Hiddi holota | *Solanum spp.* | Solanaceae | Fresh leaves and fruits are used | Collected at wild habitat | S wild |
| 62  | Dinicha    | *Solanum tuberosum* L. | Solanaceae | Freshly and used | Grown as field crop | S Cult |
| 63  | Baddessa   | *Syzygium guineense* (Wild.) DC. | Myrtaceae | Fresh fruits used | Collected at wild habitat | T wild |
| 64  | Abishi     | *Trigonella foenumgraecum* L. | Fabaceae | Seed stored for long | Seasonal crop in home garden and mixed with crops | H Cult |
| 65  | Dheebicha  | *Vernonia amygdalina* Delile | Compositae | Fresh leaves collected and used | Planted as live fences and in some cases in home garden | S Cult |
| 66  | Reejji     | *Vernonia auriculifera* Hiern | Asteraceae | No data | Collected wild habitat | S wild |
| 67  | Jinjibila  | *Zingiber officinale* L. | Rosaceae | Collected and used | Perennial crop in home gardens and as field species | H Cult |

Cult= Cultivated, wild = collected at wild habitat, nutraceutical = medicinal and food value, medicinal = reported for medicinal use, T = tree, S = shrub, H = herb, most local names are in Afaan Oromo (Oromo language), Amh = Amharic language.

different parts of the country. Yirga (2010) reported 16 medicinal plant species utilized in Mekele town, Tigray National Regional State by the local people. The same author explained that most of plants are collected from wild habitat. The author also indicated that people have knowledge of indentifying the plant species which is believed to have medicinal value. Luizza et al. (2013) reported in their finding, women’s local ecological knowledge is noted by many scholars to be unique and important for local conservation and development planning. This includes conservation in homegardens contributing to agrobiodiversity, thereby to food security of the family. Farnsworth and Soejarto (1991) stated that the conservation of biodiversity has uses. Kokwaro (1993) attested the sustainable utilization of Africa’s medicinal plants which are wealth of people.

Luizza et al. (2013) stated that “with rapid population growth in the highlands and rural people’s dependence on natural resources across Ethiopia, cataloguing and preserving local ethnobotanical knowledge is critical for future community based conservation efforts”. This indicated that the diversity of nutraceutical plants need to be sustainably utilized and conserved for continuity of biodiversity in the study area at Jimma and elsewhere.

**Wild medicinal plants availability**

The farm ecosystem and natural vegetation are major sources of the medicinal plants in the present study districts of Jimma Zone. The same author stated that “contrary to previous thinking, it is becoming clear that women know more about these plants, because throughout history, women’s daily work has required more of this
knowledge”. Seventy one plant species were reported for use in the treatment of various diseases in the study area. These plant species belong to 41 families in the Ngai and Otwal Sub Counties in Oyam district, Northern Uganda (Howard, 2003; Kamatenesi-Mugisha et al., 2011). The use of medicinal plants in primary healthcare is still a common practice in Ngai and Otwal Sub Counties. This is a practice similar to that of the present study area, Jimma, Ethiopia. Kamatenesi-Mugisha and Oryem-Origa (2005) described, as a way to recognize the values and roles of traditional medical knowledge in health care provision, further research into the efficacy and safety of herbal remedies were emphasized in Uganda and beyond. As the research reports indicated availability of medicinal plants across contents and the present study area, it is essential to make efforts for the year round availability of these valuable resources. Hamilton and Alan (2004) stated that “billions of people in the world rely on herbal medicine, while millions gain income in their wild harvest or cultivation, or are involved in their trading or processing. Medicinal plants are symbolically significant in many cultures, often being seen as sources of power.” Thus, indicate that local people are motivated by the use of nutraceutical species and conserve them in home gardens, live fences and nearby forests in Jimma Zone.

In the present study area, medicinal plants are collected from the wild. Kamatenesi-Mugisha et al. (2011) has concluded that “it should be noted that a high percentage of these plant species are harvested from the wild, but with no consideration for domestication hence threatening their existence. The plant species are being overexploited, and the rapid environmental degradation coupled with insurgency has put mounting pressure on the environment. This may lead to the disappearance of many species of medicinal plants of economic value.”

Marketability of medicinal plants

From direct observation by researchers, there is no formal market scheme for medicinal plants in the present study area. It is an area which needs further investigation. According to Shahidullah and Emdad Haque (2010), the value chain for medicinal plants is produced by village-based marginal farmers and homestead growers whose livelihoods are significantly supported by the commercial scale production of several plant species. They suggested an improved value chain system through economic coordination that links production with the enhancement of the producers’ livelihoods in Natore district of northwest Bangladesh.

In the study area, Jimma Zone, there is no clear and closer relationship between producers and processors through necessary integration in the value chain which can result in a diversified benefits to the producers and processors of medicinal plants in terms of price, quality and overall control of the supply chain. The authors believed that un-marketability and low return value of medicinal plants could be the reason for low production and area coverage of medicinal plants, so that marketing of medicinal plants should be promoted so as to encourage farmers who cultivate medicinal plants in the study area.

Conservation aspects

People in the study are conserving medicinal plants in Agroforestry, farm fields and live fences not to lose the valuable resources for its livelihood. The result indicated that 44.77% (30) medicinal plants in the study are collected from the wild. Wild collection has detrimental consequences unless the wild gene pool is sustainably handled. Mujawar (2012) reported that out of 235 species in 184 genera and 65 families, the herbaceous floristic composition is dominant and it shows that 120 species are recorded from this area. He also explained that floristic vegetation is affected by local activities and their natural regeneration prevented due to heavy cuttings, grazing, stone and soil mining activities. There is urgent need for whole area under conservation and protection as well to alert the peoples about the plant biodiversity. The recommendation of this author can be adapted to the present study area as there is increasing population pressure on natural vegetation, accompanied agricultural expansion and other development activities.

Conclusions

As sum, the study area involves diversified medicinal plants which have a potential role to contribute to healthcare system of the country. Currently, these medicinal and nutraceutical plants are serving for the majority of people as a source of medicine and food which narrow the gap in the shortage of medication and nutrition. The results show also the use, management and conservation of medicinal plants in agricultural fields, home gardens and live fences. These data have a positive contribution to the availability of medicinal plant in the study area and contributed generally to the conservation of biodiversity, and to the agricultural biodiversity, too. It also contributes to continued existence of the ingenious knowledge as a part and parcel of the use and management of medicinal plants.

There is no focused research in the region, conservation activity and postharvest management technology which can complement the indigenous postharvest management method which local people are using currently. People have their own value system in the production and utilization of medicinal plants.

However, there is no system which makes all stakeholders closely linked and benefit from the system.
From the present study, it is possible to state that medicinal plants are part and parcel of the livelihood of people in the study area. The fact that local people are owners of the knowledge of medicinal plants use and management needs integrating the traditional knowledge to conventional approach of medicinal plants production.

Local people’s resources utilization needs attention in research and policy. This needs to include training, on knowledge of medicinal plant use and management including cultivating, production, postharvest handling, promoting their use and sustainable utilization. Appropriate market value chain need to be assessed and prompted for equitable utilization of the benefit arising from plants and also encourage the indigenous knowledge in this regard.

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