Useful plant species diversity in homegardens and its contribution to household food security in Hawassa city, Ethiopia

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The study was conducted on homegardens of Hawassa city, Southern Ethiopia with the aim of documenting useful plant species; identifying the internal and external household factors related to useful plant species diversity in and around home gardens and examining its contribution to household food security and income generation. A random sample of 120 homegardens from eight sub-cities of Hawassa city was used to collect useful plant species data. Techniques used were focus group discussion, semi-structured interviews, home garden tour, market survey, free listing, priority ranking, and preference ranking. A total of 258 useful plant species were documented, of which 47.29% were ornamental plants, 29.75% food plants, and 15.89% medicinal plants. Fabaceae was the dominant family represented by 9 genera and 20 species, followed by Euphorbiaceae and Asteraceae with 17 and 16 species each respectively. Homegarden size of the study area ranged from 220 to 1235 m² with a mean size of 571 m². The age of homegarden is ranged from 15 years old to 55 years old with a mean aged of 28. The number of species in the homegarden ranges from 10 to 45 with the mean of 23. The study indicates that home gardens are contributing to food security, income generation and livelihoods in Hawassa city through production of ornamental, food plants, fodder, medicinal, timber and construction. The study recommended that the management of useful plant species in homegardens will be scaled up and further expanded and assisted by agricultural extensions in urban areas in Ethiopia.

Key words: Urban home garden, plant species diversity, household livelihood, food security.

INTRODUCTION

Homegardens are production system of diverse crop plants, which is easily accessible and adjacent to household (Sunwar et al., 2006). It is the site of highest species diversity where several landraces, cultivars and rare/endangered species have been maintained and conserved (Watson and Eyzaguirre, 2002). The compositions of crops grown in home gardens can be grouped based on function as ornamental, fruits, food crops, vegetables, medicinal, spices and fodder, building materials and fuel woods (Kumar and Nair, 2004).
Homegarden systems provide an additional food supply and cash income for the people (Das and Das, 2005). Worldwide, homegardens are a community's most adaptable and accessible land resources and important components in reducing vulnerability and ensuring food security (Buchmann, 2009). The features of homegardens are year round production of food, decreased risks of production failure due to high diversity of species, increased resource productivity over time, expansion of the amount and quality of labour applied in the farm, provision of output flexibility and alternative production (Senanayake et al., 2009).

Homegardens in Ethiopia may broadly be categorized into two types (Zemede, 2001; Tesfaye, 2005). The first category of home gardens is small-sized gardens in which vegetables, spices, oil seeds and fruits are cultivated to supplement cereals and pulses raised in adjoining fields. This type of gardens is characteristic of cereal crop based farming areas of the country and is also found in urban centers. The other type of homegardens, which is characterized by a diverse mixture of crop plants with *enset* (*Ensete ventricosum*) making the basic framework, is found that in the south and southwestern part of the country. Advocates of gardening cite evidence that home gardening can be a sustainable strategy for improving food security and incomes when gardens are well adapted to local agronomic and resource conditions, cultural traditions and preferences (Midmore et al., 1991; IIRR, 1991). Plant diversity is often used as a measure of health of biological system (Naeem, 2002). It is threatened by the agricultural expansion, deforestation, and development activities including rapid urban expansion (Ricketts and Imhoff, 2003). Urbanization is one of the recent important issues in the enormous reduction of plant diversity. Currently the world urban population (3.2 billion) exceeds the number living in rural areas. People create rapid demands for food, settlements, jobs, waste management, and all basic needs for living (Rizvi, 2007). Dense settlements, traffic congestion, air and soil pollution, and waste dumps, reduce the space for plants, especially natural domestic plants (Mckinney, 2002).

Although urbanization is a global phenomenon, its magnitude differs widely among regions (Reid, 1998). In Ethiopia, cities are currently growing rapidly. Hence addressing the global problem of reversing plant diversity in urban areas requires multiple innovative ways. Urban and suburban home gardens play a major role in providing food, breeding sites, shelter for animals and plants also modifying microclimate (Smith et al., 2006).

In the present study most of the useful plant species diversity are almost lost by human impact and hence, there is glaring loss of biodiversity, disruption of indigenous knowledge, practices and culture are becoming evident due to limited integration of traditional practices and modern science in the study area, and the value of traditional home gardening in the conservation and management of useful plant species by indigenous people of Hawassa city is minimal and there is a problem of food insecurity in and around Hawassa city (Reta, 2013). Thus, the purpose of this study was to document, identify the internal and external household factors related to useful plant species diversity in and around home gardens of Hawassa city and examining its contribution to the household food security.

**MATERIALS AND METHODS**

**Study area**

The study was conducted in homegardens of Hawassa city (07° 05' latitude North and 38° 29' longitude east) with an altitude of 1680 m above sea level and covers total area of 157.2 km² and has a mean annual rainfall and temperature of 953.4 mm and 20.3°C, respectively (SNNPRS, 2005). Hawassa is the capital city of Southern Nations, Nationalities and Peoples Regional state and Sidama zone, located 273 km from Addis Ababa, capital of Ethiopia. It is surrounded by Lake Hawassa in the west, Hawassa zuria woreda in the south and east part and Oromiya Region in the north. Based on figures from CSA (2007), Hawassa city has an estimated population of 304,479; 1 is home to about more than 50 ethnic groups. Each ethnic group has their own composition of tribes with distinctive language, custom, traditional beliefs and cultural diversity. It is sub divided in to 8 sub city, namely Tabore, Hayekdar, Menaharia, Misrak, Bahale adarash, Addis Ketema, Mehale Ketema and Awela Tula in which the present study was carried out and 32 kebeles (Figure 1). The land form is plain with reddish volcano soil which is ideal for construction.

**Data collection**

The study of homegarden was carried out in the Hawassa city in 2014. Field work was conducted during the period from February 2014 to September 2015. Each site was visited three times including the reconnaissance survey. Techniques used were homegarden tour, complete plant inventory, focus group discussion, semi-structured interviews, free listing, market survey, priority ranking, and preference ranking. The interview and discussions was conducted in Amharic language and translated into English language during data analysis. Ethno botanical techniques were employed to collect data on knowledge and management of home garden plants used by people in Hawassa city as described in Martin (1995) and Cotton (1996). A total of 120 home gardens were randomly selected from seven sub cities (17 homegardens from each sub city). Forty five homegardens (6 from each sub city) were preferentially selected for detailed study, which represented 37.5% of the garden visited. The distance between each home garden was 300 m apart. During the different visits to the households semi-structured interviews with both household heads were conducted on different aspects: Categories of use of plants in the garden; preferred useful plant species by home gardeners, planting, consumption, income they get, benefits and source habitats of spicy plants; history of the garden, observed change in homed gardens in Ethiopia may broadly be categorized

**Data analysis**

Descriptive statics such frequency and percentage was used for
analysis and summarizing the data. The diversity indices, Shannon-Weaver index (SWI), Evenness index and Simpson's index were employed to determine the species richness, evenness and dominance of the species in the homegardens. Free listing was used by asking participants to list the name of all useful plants found in their homegardens and the uses of each plant. Jaccard's similarity coefficient (JSC) was estimated for comparing homegardens number of species in eight purposively selected study areas in different regions of the country. The formula used was JSC = c/ (c+a+b), where, a = number of species found in the study area but not in other study site, b = number of species absent in the study area, and c = number of species common to the study area (Jaccard, 1912).

RESULTS

Useful plant species diversity

In the surveyed homegardens a total of 258 useful plant species were observed and identified, including 14 (5.43%) vegetable plant species, 23 (8.92%) fruit plant species, 15 (5.81%) spices plant species, 12 (4.65%) root and tubers plant species, 8 (3.1%) cereals, pulses and oil seeds plant species, 3 (1.16%) stimulant plant species, 12 (4.65%) fragrant plant species, 122 (47.29%) ornamental plant species, 39 (15.12%) firewood plant species, 4 (1.55%) animal feed plant species, and 41 (15.89%) medicinal plant species. The average plant species per household was 21 ranging from 10 to 45 throughout the homegardens.

A total of 258 plant species belonging to 186 genera and 76 families were inventoried from home gardens of Hawassa city. Fabaceae was the highest number of species followed by Euphorbiaceae and Asteraceae. The genera represented by the highest number of species were Euphorbia (8 species) followed by Astera 7 species. Out of the 258 useful plant species 244 species were Angiosperms, 10 species were Gymnosperms and 4 species were Pteridophytes.

Multipurpose trees showed the highest and the most frequent occurrence (Appendix I and II). Useful species such as Cordia africana, Moringa stenopetala, Melia azedarach, Croton macrostachys, Calpurnia aurea were showed the highest frequency. The most cultivated useful
food plant species in the homegarden were *Enset ventricosum*, *Carica papaya*, *Persea americana*, *Coffee arabica*, *Musa paradisca*, *Mangifera indica* and *Zea mays*.

Most species (83% of identified) were cultivated, 5% were both cultivated and wild, 12% were wild plants. Most home garden species were perennials (83%), annuals (15%) and biennials (2%). Among 258 species, 64 species (24.8%) were trees, 70 (27.13%) shrubs, 115 (44.57%) herbs, 16 (6.2%) climbers (Figure 2). Herbs were the most numerous species in the homegardens studied followed by shrubs (27.13%), trees 64(24.8%) and climbers 16(6.2%). Among 258 useful plant species recorded, 83(32.17%) was native to Ethiopia, 15(5.81%) was unidentified, 160 (62.02%) was introduced from other parts of the world.

Family wise distribution shows that **Fabaceae** is the most dominant family with 20 species; **Euphorbiaceae** is the second dominant family with 17 species and **Asteraceae** is the third dominant family with 16 species followed by **Solanaceae** (13 species), **Lamiaceae** (10 species), **Rutaceae** (8 species), **Verbenaceae** and **Poaceae** (7 species each), **Apiaceae** (6 species); **Malvaceae**, **Apocynaceae** and **Rosaceae** (5 species each). The twenty most dominant families represent 150(27.9%) of the total number of species recorded. Top 20 useful plant species families in the home garden of Hawassa city are given in Figure 3.

**Food plants**

The food plant constitutes 72(27.91%) species of the total useful plant flora of Hawassa city home garden. Among food plants fruits comprises 23(31.94%), spices 15(20.83%), vegetables 14(19.4%), root and tuber crops 12(16.7%), cereals, pulses and oils 8(11.1%). A high number of food plants belonged to the **Dioscoriaceae**, **Euphorbiaceae** and **Amaranthaceae** families.
Lamiaceae and Rutaceae (8 species each) followed by Apiaceae and Fabaceae (5 species each), Araceae, Euphorbiaceae and Verbenaceae (4 species each), Asteraceae, and Myrtaceae (3 species each). The most widely distributed food crops are Zea mays with a frequency of occurrence (118), E. ventricosum (117), M. paradisiaca (115), M. indica (99), C. papaya (97), P. americana (89), Sccharum officinarum (85) and Brassica rapa (84) respectively (Appendix II). The majority food crops cultivated are used for household consumption. Fruit species commonly found in the study homegardens are Papaya (Carica papaya), Banana (M. paradisiaca), Avocado (P. persea), Guava (Psidium guajava), Mango (M. indica), and Roman (Punica granatum).

Ornamental plants

The ornamental plant use category consisted of 122 species from which 18(14.75%) are native to Ethiopia, 104(85.25%) is exotic. The ornamental plant species are distributed among 73 families with Euphorbiaceae, Lamiaceae (12 species each) and Asteraceae (11 species each) presented the largest number of species corresponding to 30.7% of the total ornamental plants found in the homegardens. Most of the plants surveyed in the homegardens of Hawassa city are exotic and widely disseminated throughout Hawassa city. Ornamental plants are found in more than 87% of home gardens. The most frequently distributed ornamental plants are Melia azedarach, Jacaranda mimosifolia, Cupressus lusitanica, Callistemon citrinus, Hibiscus rosa-sinensis, Senna spectabilis, Duranta repens, Duranta erecta, Bougainvillea glabra, Nerium olander, Terminalia menthals, Araucaria heterophylla, Thevetia peruviana, cuperus lusitaniae and Ficus benjamina.

The homegardens consisted of 122 (47.29%) of ornamental plants. Among these 208 were perennials plant species. Mean number of ornamental plant species in the homegardens was 15 with the range of 10 to 35 for all surveyed households. Euphorbiaceae contained the highest number of ornamental species (12), Asteraceae is the second number of ornamental species with 11 species, Verbenaceae and Malvaceae contained 5 species each, while Asparagaceae, Lamiaceae, Apocynaceae and Bignoniaceae contained 4 species each.

Medicinal plants

A total of 41 plant species with medicinal value were recorded and this accounted for 15.89% of the total plant species documented. Species of family Asteraceae and Solanaceae were the most used for remedies representing nearly 24.39% of all medicinal plants. The majority of medicinal plants are herbs 16 (39.02%) followed by trees 15(36.58%), shrubs 9(21.95%), climbers 1(2.44%). The most frequently utilized plant parts were leaf 22(53.66%), stem 8(19.51%) followed by root 6 (14.63%). Ninety seven percent of medicinal plants documented in the study area are indigenous. Top ten medicinal plants species occurred in more than 50% of the homegardens, namely Acharantesaspera, C. papaya, Artemisia absinthium, Artemisia afra, Ocimum lamiifolium, Withania somnifera, Veronia amygdalina, Ruta chalepensis, Croton macrostachyus and Cucumis ficifolius (Appendix III).

Spices

A total of 16 spices plant species were documented. It is distributed among 8 genera and 9 families. Spices plants consisting of 6.202% of the total useful plant species documented. A high number of spices belonged to Lamiaceae (5 species), Alliaceae (2 species), Solanaceae (2 species), verbenaceae (2), and Rutaceae and Brassicaceae (1 species each). The most commonly used spices were Allium sativum (Onion), Allium cepa, R. chalpensis, Zingiber officinale, Rosmarinus officinalis, Ocimum basilicum, Becium filamentasum and Brassica nigra.

Fragrant, stimulants and fodder plant species

A total of 12 species of fragrants, 3 stimulants and 4 fodder species were documented. The three use categories togeother consisted of 7.36% of the total useful plant species documented. The five most commonly used fragrant plant species in the majority of homegardener were Olea europea, Cymogen citrates, Lippia adoensis, A.absinthium, and A. abyssinica.

Timber (furniture) plants

Timber plant species constitute 29 plant species which accounted 11.4% of all plant species documented. Timber species which occured in more than 50% of the homegarden namely Melia azedarach, Grevillea robusta, Cupressus lusitanica, Cordia africana, Casuarina equisetifolia, Acacia melanoxylon. Among 29 plant species recorded 17 were indigenous plants which were highly treated in the forest namely Prunus africana, Hagenia abyssinica, Juniperus procera, Podocarpus falcatus, O. europea, Celtis africana, and Aningeria adolfindiederici (Appendix IV and V).

The highest Shannon-Wiener Diversity Index (H') of useful plant species was recorded for Tabor sub city (H' = 5.87) followed by Haik dar subcity (H' = 3.80) and the lowest diversity index was recorded at Menhara sub city (H' = 2.77) (Table 1).
Table 1. Shannon-Wiener Diversity Index (H') for seven study sites.

| Study sites       | Species richness | Shannon's index (H') |
|-------------------|------------------|----------------------|
| Haikadar          | 45               | 3.80                 |
| Tabor             | 48               | 3.87                 |
| Misrak            | 35               | 3.55                 |
| Addis Ketema      | 30               | 3.40                 |
| Bahiadrash        | 27               | 3.29                 |
| Mehal Ketema      | 28               | 3.33                 |
| Menhara           | 16               | 2.77                 |

Table 2. Jaccard's similarity coefficient for comparing homegardens number of plant species composition in the homegardens of Hawassa City with other areas of Ethiopia.

| Study site        | Sabata town | Holeta town | Arba Minch Zuria | Sidama zone | Basketo and Kefa | Gedeo zone | Wolyta zone | Selected areas of Amhara |
|-------------------|-------------|-------------|------------------|-------------|------------------|------------|-------------|--------------------------|
| Total number of species | 135         | 112         | 133              | 198         | 224              | 165        | 159         | 85                       |
| Common species    | 120         | 106         | 70               | 120         | 50               | 130        | 58          | 30                       |
| JCS               | 0.465       | 0.421       | 0.272            | 0.44        | 0.12             | 0.443      | 0.22        | 0.096                    |
| Percentage similarity | 46.5       | 42.1        | 27.2             | 44          | 12               | 44.3       | 22          | 9.6                      |
| Source            | Habtamu and Zemede (2011) | Mekonen et al. (2014) | Belachew et al. (2006) | Tesfaye (2005) | Feleke (2011) | Solomon (2011) | Talemos et al. (2013) | Fentahun (2008) |

The highest vaues of Jaccard's Coefficient of Similarity index (JCS) indicate a higher similarity in homegarden species diversity. The JCS result indicates that homegardens of Hawassa city was the highest similarity with homegarden composition of Sabata town (JCS = 0.46), Gedeo zone (JCS = 0.43) and Sidama zone (JCS = 0.44). Home gardens of selected areas of Amhara (JCS = 0.096), Basketo and Kefa (JCS = 0.12) and Wolyta (0.22) showed the weakest similarity coefficient (Table 2).

**Contribution of urban homegarden to household food security**

In Hawassa city, the role of homegarden for cash income generation and house hold consumption was highly increased particularly in Haikidar sub-city, while it is decreased at the center of the city. The ornamental function of home gardens increased particularly in the center of the city, where 50% of the gardeners mentioned decoration as the main function of their gardens in the study survey. About 40% of the respondents report that home garden is a supplementary source of their income and 50% use home garden as a place of enjoyment. Poverty and unemployment is high in Hawassa city, most youth rely on cultivation of ornamental plants to generate income by selling ornamental plants to support their families at road side of the city. About 75% of the homegardeners explained that they conserve useful plant species for foods, 10% for income generation, 25% for pleasure, 25% for medicinal use, 15% for construction and other livelihood needs. The study showed that the majority of homegardeners are under food insecurity especially the poor urban dwellers. Food security assessment survey indicates that 25% of the homergardeners were found food secured throughout the year, 15% of the gardeners are food secured only for six months. The poor homegardeners attained food security through production in their own garden but the reach homegardeners purchase from local market.

The homegardens contributions to household's annual income was 35% of the total income, among which 20% from food plants, 10% from ornamental plants, 0.5% from medicinal plants and 4.5% from others (Figure 4). *Araucaria heterophylla* is the most expensive ornamental plant species sold in the market. One plant of *A. heterophylla* is sold at 500 to 1500 ETB ($24 to 72). *Terminalia mentalis* is the second expensive ornamental plant sold. One plant species of *T. mentalis* is sold as up to 250 to 500 ETB ($12 to 24). Medicinal plants are no direct income to households. Poor urban women are preparing *E. ventricosum* corm kocho for food security (Figure 5).

Only a few homegardeners has sufficient food for a year. The homegardens in the Hawassa city only contributes 10% fresh vegetables. Livestock and poultry farming in the homegardens also another source of
income generation contributes 15%, cow milk (10%), poultry (15%), pig (0.5%) chickens (5%), ducks (0.5%). Sugar cane (S. officinarum), Kocho (E. ventricosum), Muzi (M. paradisiaca) accounted for about 35% of the homegardens income contribution. Income from homegarden increases an average household income from 1177 to 4580 Birr.

Preference ranking of top ten useful food plant species by home gardeners for household income generation shows that M. paradisiaca is the most preferable food crops in the first rank with a score of 120 with maximum yearly income generation of 15000 Ethiopian Birr (ETB), S. officinarum is the second with a score of 117 with yearly income generation of 10000 ETB and E. ventricosum and Zea mays are the third and forth places with income generation of 6000 and 5500 ETB respectively (Table 3).

The categories of use identified are ornamental, medicine, food, firewood, timber, construction, fodder, spices, fragrant and others. A total of 71 species are reported as having one use type, 103 species having two use types and 86 species with three use types. The most numerous species were ornamental 122 species followed by food crops, medicinal plants, fuel wood and constructions (Figure 6).

**Gender role in the homegarden management**

The management of homegardens includes tree planting, watering, weeding and fencing. The homegardeners maintain their homegarden soil fertility by using animal manure and leaf litter. Both men and women are involved in the management of homegardens. Mostly the old aged people are spent most of their time in the management of homegardens in the Hawassa city.
Table 3. Top ten ranking food crops of HG as determined by preference ranking with income generation.

| S/N | Scientific name     | Household use rank | Total score | Yearly income generation(ETB) | Yearly income generation(ETB) |
|-----|---------------------|--------------------|-------------|-------------------------------|-------------------------------|
|     |                     |                    |             | minimum                       | maximum                      |
| 1   | Lactuca sativa      | 9th                | 99          | 500                           | 2500                         | 5th                           |
| 2   | Brassica rapa       | 4th                | 84          | 300                           | 2000                         | 6th                           |
| 3   | Musa x paradisiaca  | 5th                | 120         | 5000                          | 15000                        | 1st                           |
| 4   | Saccharum officinarum | 3rd               | 117         | 1000                          | 10000                        | 2nd                           |
| 5   | Ensete ventricosum  | 2nd                | 114         | 1500                          | 6000                         | 3rd                           |
| 6   | Persea americana    | 6th                | 80          | 250                           | 900                          | 7th                           |
| 7   | Carica papaya       | 10th               | 79          | 200                           | 850                          | 8th                           |
| 8   | Mangifera indica    | 8th                | 69          | 370                           | 600                          | 9th                           |
| 9   | Zea mays            | 1st                | 110         | 2500                          | 5500                         | 4th                           |
| 10  | Dioscorea sagittifolia | 7th              | 55          | 150                           | 450                          | 10th                          |

Figure 6. Categories of uses identified in the homegardens of Hawassa city.

Females managed 47% of useful plant species diversity by planting, watering, weeding and selling while males managed 53% by cultivation of food crops, ornamental, medicinal plants, fencing, digging, designing, searching seeds and other useful plants (Figure 7).

Most youth participated in the cultivation of ornamental plants near road side of the city for income generation (Figure 8).

Constraints of homegardens in Hawassa city

According to the semi structured interview report the main constraints of homegardens of the study area were knowledge gap in plant breeding (66.7%), lack of planting materials and seeds (63.3%), lack of agricultural support system (57.5%), and lack of awareness (55%) respectively (Table 4).

The main source of planting materials in the study homegardener are market (45%), cultivating in their homegardens (20.83%) and from relatives (16.67%). Agricultural office, local and international NGOs are the least source of planting materials (Table 5).

DISCUSSION

A total of 258 species (64 trees, 70 shrubs, 115 herbs and 16 climbers) belonging to 186 genera under 76 family were documented. In Hawassa city, more than 50 ethnic groups are living which have different language, culture, custom, beliefs and religion. Cultural diversity in Hawassa city helps to conserve useful plant species biodiversity in homegardens. Different ethnicity, culture and religion make a unique plant species diversity in the homegardens of Hawassa city (Reta, 2013). Sthapit et al.
Figure 7. The role of Men and Women in the management of Home garden in Hawassa.

Figure 8. One of the youth selling ornamental plants at the road side in Hawassa city.

Table 4. Challenges of homegarden with percentage distribution with frequency (n = 120).

| Challenges                                | Frequency | Percentage | Rank |
|-------------------------------------------|-----------|------------|------|
| Knowledge gap in plant breeding           | 80        | 66.66      | 1    |
| Lack of planting materials & seeds        | 76        | 63.3       | 2    |
| Lack of agricultural support system       | 69        | 57.5       | 3    |
| Lack of awareness                         | 66        | 55         | 4    |
| Water lodging during winter season        | 45        | 37.5       | 5    |
| Lack of water availability                | 35        | 29.17      | 6    |
| Destruction by animals                    | 21        | 17.5       | 7    |
| Disease infestation                       | 20        | 16.66      | 9    |
| Lack of access to land (Size of home garden) | 18       | 15         | 8    |
(2004) showed that the composition of unique plants in homegardens varies with ethnicity, food culture, religion and spirituality. The total numbers of species recorded in the homegardens of Hawassa city are greater than number of species was reported from other parts of Ethiopia. For example, Feleke (2011) reported 224 plant species from homegardens of Basketo and Kafa, Sothern Ethiopia; Mathewos et al. (2013) reported 214 plant species from homegardens of Dworo zone, southern Ethiopia; Tesfaye (2005) reported 198 plant species from homegardens of Sidama, Sothern Ethiopia; Solomon (2011) reported 165 plant species from Gedeo zone. The present study reported 72(27.9%) of food plant species from the total record of 258 useful plants species from homegardens of Hawassa city. Zemed (1997) reported about 126 (75% of the total record) plant species used as food from Ethiopian homegardens. Moreover, Belachew et al. (2003) and Habtamu (2008) reported 48 and 37 edible plant species from homegardens of Arbaminch and Sebeta areas respectively. Solomon (2011) identified about 68 plant species used as food from homegardens areas in Kochere Wereda. Feleke (2011) and Mathewos et al (2013) reported 102 and 77 food plants from homegardens of Basketo and Dworo zone, respectively.

Urban homegardens are sources of food crops, vegetables, cereals, pulses, fruits, spice, milk and livestock etc. Therefore, it is important contributors to household food security of poor urban dwellers and the rich ones also. Urban homegardening is one of the best methods for food production which feed high population, as food security is a major concern in many parts of the world and in many of urban and rural areas of Ethiopia. Urban home garden is a future promising agricultural activity that reduces urban food insecurity. In Ethiopia, cities are not practicing urban agriculture even though there are enough free spaces in and around city gardeners. Mohammed (2002) reported that Ethiopia is the country where existence and significant contribution of urban agriculture was not only disregarded and unrecognized by researchers but also underestimated and given very little attention by urban development studies. Limited homegarden size available for gardeners make them to grow different homegarden species. In the present study the majority of home gardens even though they have large home garden size, they contain low number of species diversity due to lack of knowledge gaps on cultivation, management and conservation of useful plant species.

The total number of species in a single homegarden was found to be a maximum of 45 with more than 85% households having the species numbers up to 10 to 45. The highest number of species was highest in the Haikdar sub-city and Tabor sub-city respectively (45 and 35 species) because there is sufficient irrigation water and large garden size in Hayikdar sub city and large home garden size in Tabor sub-city. The home gardens was the richest as more than 60% of the home gardens had more than 30% species per homegarden and Bahladarash, Mehalketema, Menaheria sub cities are the poorest species diversity where more than 65% homegardens had less than 20 species in home garden. In Ethiopia, there are very few studies on useful plant species diversity and its contribution to food security in urban homegardens. Many studies on home gardening and plant diversity have concentrated on rural areas (Das and Das, 2005). There are very few systematic studies on domestic garden diversity in urban or sub urban areas (Smith et al., 2005). Urban homegardening ensures households food security by providing vegetables, fruits, medicinal plants, fuel wood, ornamental plants, fodders, construction materials, root and tubers. About 25% of the respondents reported that annually they earned a high income of 10,000 and 25,000 ETB from selling various products of useful plant species.

The most useful plant species cultivated in the home gardens of Hawassa city were ornamental plants (47.29%) and food plants (27.91%). Ornamental plant species are the most diversified, abundant and species rich use category. Similar study was report from homegardens of Tihakgameng in which 57% were ornamental plants and 27% were food plants (Molebatsi, 2011). Cilliers (2010) also reported 28% of food plants in Ganyesa home gardens. This shows that most poor peoples in urban areas are largely dependent on cultivation of ornamental plants for aesthetic value, selling to sustain their livelihood and food plants for consumption purposes.

According to Nair (1993), the high number of ornamental plants is associated with the aesthetic role of home gardens in cities, since they are not used for

| Source                  | No. of respondents | Percentage |
|-------------------------|--------------------|------------|
| Market                  | 54                 | 45.0       |
| Relatives               | 20                 | 16.67      |
| Neighbors               | 10                 | 8.33       |
| Cultivate in their homegarden | 25 | 20.83      |
| Agricultural office     | 6                  | 5.0        |
| NGOs                    | 5                  | 4.17       |

Table 5. Source of plant materials in the homegardens of Hawassa city.
subsistence in urban areas except among low income populations (Ninez, 1984). The number of ornamental plants has increased in areas near, as well as in urban areas in response to the process of modernization and the large supply of these plants in cities (Moura and Andrade, 2007).

The major contributor to diversity of urban environments is horticultural floras which are mostly characterized by ornamental plants and vegetables (Gaston et al., 2005, Marco et al., 2008). The most cultivated crops in the homegarden were E. ventricosum, C. papaya, P. americana, C. arabica, M. paradisica, P. guajava and M. indica. Zea mays was the most widely used cereal crops in the homegardens of Hawassa city as it occurred in 85% of sampled households.

Within home garden the number of species per homegarden ranged from 10 to 45 and the mean was 21. Similar research reports on the number of species in home garden of different areas by different researchers for instance, Kabir and Webb (2009) reported 419 species of plants with an average of 34 species per household across 402 homegardens from Bangladesh. Mendez et al. (2001) reported a total of 324 species with nine different uses from Nicaragua with an average of 70 species per homegarden. Tynsong and Tiulari (2010) reported 197 plant species with an average of 89 plant species per homegarden average size of 750 m². Tesfaye et al. (2010) reported 78 cultivated crops within 44 homegardens from Sidama southern Ethiopia with an average as an average number of species per farms. Mekonnen et al. (2014) reported 112 plant species in the homegardens of Hola town with the mean of 22 species per homegarden.

Olajide-Taiwe et al. (2010) reported 36 plant species in homegarden from Ibadan, Oyo state. The total number of species and average number of species per homegarden in the present study was less compared to the previous report. Fabaceae had the highest number of species recorded in the homegardens study.

The dominance of Fabaceae was reported from other homegarden studies in Ethiopia (Tefera, 2010; Mekonnen et al., 2014). This may indicate that homegardener mostly cultivated Fabaceae for food security purposes.

The present study agrees with many previous researches finding on significance of homegarden to household food security. For examples, Olajide-Taiwode et al. (2010) reported 36 plant species from Ibadan, Oyo state showed that homegarding increased family supply. Marooyi (2009) reported 69 plant species from Nhema, Zimbabwe indicated homegarden as important for poor households to overcome adversity and meet basic needs. Tynsong and Tiwari (2010) finding from Meghalaya, India showed that homegarden contributed 7% of the total household income.

Tesfaye (2005) found that richness is positively related with household income, evenness of species is low in homegarden owned by rich household compared to that of poorer households. Kumari (2009) has argued that the higher the household expenses, the higher the food plant density and the lower the total plant diversity. The same author has observed that rich households in urban areas tend to plant more ornamental plants with higher economic values in their home gardens (Kumari, 2009).

Conclusion

The homegardens of the study area is home for many useful plant species diversity. These useful plant species are a great value for household income generation, food security, medicinal, ornamental, and other non food livelihood needs of poor urban dwellers. The present study indicates that high useful plant species diversity documented in the homegarens of Hawassa city was associated with diversity of ethnicity with different language, culture, custom and beliefs. In addition to this, Hawassa city is the fastest growing city in Ethiopia. This also have ement contribution to high useful plant species diversity in the area. The poor urban dwellers are highly interested in homegarden activities to sustain their livelihoods. The number of ornamental plant species diversity in the study area is higher. This shows that urban homegardeners gave more piority for ornamental plant cultivation for aesthetic value. The rich people have not shown much interest in the cultivation of food crops eventhough they have large homegarden size. The rich people gave more piority for conservation and management of ornamental plant species while the poor urban dwellers gave more piority for conservation and management of food crops to sustain their livelihoods. Proper management of homegardens has a great potential for biodiversity conservation, improving food security and provides contribution for ecosystem services in the study area. The present study indicates that there is a knowledge gap in the cultivation, conservation and management of useful plant species in the homegardeners. Therefore, incorporating indigenous knowledge with scientific management and conservation of useful plant species, creating awarness among urban dwellers’, will promote urban agriculture in Ethiopia in general and Hawassa city in particular.

Conflict of Interests

The authors have not declared any conflict of interests.

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### Appendix I. List of ornamental plants, their local name, family, status, duration and frequency of occurrence (n=120).

| No. | Scientific name                  | Family     | Local name | Habit | Fr. | Status | Duration |
|-----|----------------------------------|------------|------------|-------|-----|--------|----------|
| 1   | *Acacia melanoxylon* R.Br.       | Fabaceae   | Omedlla(A)mh | Tree  | 67  | C      | P        |
| 2   | *Acalypha wilkesiana* Mull. Arg. | Euphorbiaceae | Abeba   | Shrub | 23  | C      | P        |
| 3   | *Achillea millefolium* L.        | Asteraceae | Abeba     | Herb  | 12  | C      | P        |
| 4   | *Agave americana* L.             | Agavaceae  |           | Shrub | 14  | C      | P        |
| 5   | *Agave americana* var marginata  | Agavaceae  |           | Shrub | 25  | C      | P        |
| 6   | *Alcea rosea* L.                 | Malvaceae  | Abeba     | Herb  | 45  | C      | P        |
| 7   | *Aloe vera* L.                   | Aloaceae   | Argisaa   | Herb  | 8   | C      | P        |
| 8   | *Aloe* gilbertii Reynolds        | Aloaceae   | Argisaa   | Herb  | 7   | C      | P        |
| 9   | *Alocasia macrorrhizos* (L.)G.Don| Araceae    | Elephant ears | Herb | 29  | C      | p        |
| 10  | *Araucaria heterophylla* (Salisb.)Franco | Araucariaceae | Yeferejitid | Tree | 10  | C      | P        |
| 11  | *Arundinaria alpina* K. Schum.   | Poaceae    | Kerkeha   | shrub | 5   | C      | P        |
| 12  | *Asparagus setaceus* (Kunth) Jessop | Asparagaceae | Seriti | Cl   | 13  | C      | P        |
| 13  | *Asparagus africanus*            | Asparagaceae | Seriti | Cl   | 15  | C      | P        |
| 14  | *Azadirachta indica* A.Juss.     | Meliaceae  | Neem      | Tree  | 6   | C      | P        |
| 15  | *Bougainvillea glabra* Choisy    | Nyctaginaceae | Bugambe   | Shrub | 24  | C      | P        |
| 16  | *Bougainvillea spectabilis* Wild. | Nyctaginaceae | Bugambe   | Shrub | 20  | C      | P        |
| 17  | *Brugmansia x candida* Pers.(Pro.sp) | Solanaceae | Angel's trumpets | Shrub | 18  | C      | P        |
| 18  | *Calathea zebrina* (Sims)Lindl    | Marantaceae |           | Herb  | 36  | C      | P        |
| 19  | *Callistemon citrinus* (Curtis) Seekls | Myrtaceae | Bottle brush | Tree | 47  | C      | P        |
| 20  | *Canna indica* L.                | Cannaceae  | Siet-akuri | Herb  | 35  | C      | P        |
| 21  | *Canna x generalis* L. H. Bailey | Cannaceae  | Enset abebe | Herb | 10  | C      | P        |
| 22  | *Chrysanthemum coronarium* L.     | Asteraeae  | Abeba     | Herb  | 43  | C      | A        |
| 23  | *Casuarina equisetifolia* L.      | Casuarinaceae | Shewshewe | Tree  | 76  | C      | P        |
| 24  | *Casuarina cunninghamiana*        | Casuarinaceae | Shewshewe | Tree  | C   | P      |          |
| 25  | *Catharanthus roseus* (L.)G.Don   | Apocynaceae | Abeba     | Herb  | 37  | C      | A/P      |
| 26  | *Ceiba pentandra* (L.) Gaertn     | Bombacaceae |           | Tree  | 8   | C      | P        |
| 27  | *Centella asiatica* (L.) Urb.    | Apiaceae   |           | Herb  | C   | P      |          |
| 28  | *Clerodendrum myricoides* (Hochst.) Vatke. | Lamiaceae |           | Herb  | 6   | C      | P        |
| 29  | *Codiaeum variegatum* (L.)A.Juss. | Euphorbiaceae | Masincho | Shrub | 22  | C      | P        |
| 30  | *Codiaeum spp.*                  | Euphorbiaceae | Masincho | Shrub | 21  | C      | P        |
| 31  | *Cordia collinum* Fresen.        | Combretaceae |           | Tree  | 5   | W/C    | P        |
| 32  | *Cordyline terminalis*           | Agavaceae  |           | Herb  | 26  | C      | P        |
| 33  | *Cosmos bipinnatus* Cav           | Asteraceae  | Abeba     | Herb  | 7   | C      | P        |
| 34  | *Crassula schimper* Fisch. & Mey. | Crasulaceae | Abeba     | Herb  | 13  | C      | P        |
| 35  | *Croton gratissimus* Burch.      | Euphorbiaceae | Masincho ferenje | Shrub | 21  | C      | P        |
| 36  | *Cupressus lusitanica* Mill.      | Cupressaceae | Homme     | Tree  | 74  | C      | P        |
|   | Scientific Name                                      | Family              | Common Name          | Vegetative Coding | Height | Seedling |     |
|---|-----------------------------------------------------|---------------------|----------------------|-------------------|--------|----------|-----|
|37 | Cyperus bulbosus Vahl                               | Cyperaceae          | Kunti                | Herb              | 11     | C        | P   |
|38 | Cyperus rotundus L.                                 | Cyperaceae          |                      | Herb              | C      | P        |     |
|39 | Dahlia pinnata Cav.                                 | Asteraceae          | Abeba                | Herb              | 10     | C        | P   |
|40 | Datura metel L.                                     | Solanaceae          |                      | Herb              | 5      | C        | A/P |
|41 | Delonix regia (Boj.ex Hook.)Ref.                   | Fabaceae            | Yedirezaf            | Tree              | 38     | C        | P   |
|42 | Dianthus caryophyllus L.                            | Caryophyllaceae     | Abeba                | H                 | 9      | C        | P   |
|43 | Dracaena afrormontana                               | Dracaenaceae        | Abeba                | Tree              | 5      | C        | P   |
|44 | Dracaena steudneri Engl.                            | Dracaenaceae        | Lanticho             | Tree              | 28     | C        | P   |
|45 | Dracaena sanderia                                   | Dracaenaceae        | Happy plant          | Herb              | 47     | C        | P   |
|46 | Duranta erecta L.                                   | Verbenaceae         | Sky flower           | Shrub             | 49     | C        | P   |
|47 | Duranta erecta aureo-variegata                      | Verbenaceae         |                      | Shrub             | 20     | C        | P   |
|48 | Duranta repens L.                                   | Verbenaceae         |                      | Shrub             | 48     | C        | P   |
|49 | Duranta repens Linn.var.variegata                   | Verbenaceae         |                      | Shrub             | 44     | C        | P   |
|50 | Epipremnum aureum L. (L.)Engi.                     | Araceae             |                      | Cl                | 3      | C        | P   |
|51 | Euphorbia antiquorum L.                             | Euphorbiaceae       |                      | Herb              | 6      | C        | P   |
|52 | Euphorbia cotinifolia L.                            | Euphorbiaceae       | Duomo daraaro        | Shrub             | 15     | C        | P   |
|53 | Euphorbia baioensis S.Carter                       | Euphorbiaceae       |                      | Herb              | C      | P        |     |
|54 | Euphorbia griffithii Hook.F.                        | Euphorbiaceae       |                      | Shrub             | 9      | C        | P   |
|55 | Euphorbia myrsinites L.                             | Euphorbiaceae       |                      | Herb              | 13     | C        | P   |
|56 | Euphorbia pulcherrima (R.Grah.)Wild.                | Euphorbiaceae       | daraaro              | Shrub             | 12     | C        | P   |
|57 | Euphorbia mili (Bojex Hook.)Ursch & Leandri        | Euphorbiaceae       | Ye'aklil eshoh      | Shrub             | 8      | C        | P   |
|58 | Ficus benjamina L.                                  | Moraceae            | Ornamental fig       | Shrub             | 5      | C        | P   |
|59 | Ficus elastica Roxb.                                | Moraceae            | Yegoma zaf           | Tree              | 6      | C        | P   |
|60 | Gazania rigens var. rigens (L)Gaertn. var. uniflora (L.f.) Roessler | Asteraceae          | Abeba                | Herb              | 7      | C        | P   |
|61 | Grevillea robusta R.Br.                             | Proteaceae          | Temenjazaf           | Tree              | 39     | C        | P   |
|62 | Hibiscus acetasella Welw. ex Hiern                 | Malvaceae           | Abeba                | Shrub             | 11     | C        | P   |
|63 | Hibiscus rosa-sinensis L.                           | Malvaceae           | Abeba                | Shrub             | 18     | C        | P   |
|64 | Hibiscus sp.                                        | Malvaceae           | Abeba                | Shrub             | 23     | C        | P   |
|65 | Hippeastrum puniceum (Lam.) Kuntze                  | Amaryllidaceae      |                      | Herb              | 10     | C        | P   |
|66 | Hypericum revolutum Vahl                           | Hypericaceae        | Garaanbicho          | Shrub             | 2      | C        | P   |
|67 | Indigofera spicata Forssk. Var.spicata             | Fabaceae            | Abeba                | Herb              | 6      | C        | P   |
|68 | Ipomoea purpurea (L.)Roth.                          | Convolvulaceae      | Abeba                | Cl                | 9      | C        | P   |
|69 | Iresine herbstii Hook.ex Lindi.                     | Amaranthaceae       | Abeba                | Herb              | 39     | C        | P   |
|70 | Jacaranda mimosifolia D.Don.                        | Bignoniaceae        | Jacaranda            | Tree              | 78     | C        | P   |
|71 | Juniperus procera HochstexEngl.                     | Cupresaceae         | Honcho               | Tree              | 12     | C        | P   |
|72 | Kalanchoe lanceolata (Forssk.)Perr.                 | Crassulaceae        | Hanculuulle          | Herb              | 5      | C        | P   |
|73 | Lantana camara L.                                   | Verbenaceae         | Yewofkolo            | Shrub             | 25     | C/W      | P   |
| No. | Species                              | Family            | Type           | Growth Form | Height | Notes     |
|-----|-------------------------------------|-------------------|----------------|-------------|--------|-----------|
| 74  | Matteuccia struthiopteris (L.) Todaro | Dryopteridaceae   | Ferns          | Herb        | 45     | C         |
| 75  | Melia azedar L.                      | Meliaceae         | Neem           | Tree        | 99     | C         |
| 76  | Mirabilis jalapa L.                 | Nyctaginaceae     | Abeba          | Herb        | 39     | C         |
| 77  | Nephrolepis cordifolia (L.) Presl    | Polypodiaceae     | Farnii         | Herb        | 65     | C         |
| 78  | Nerium oleander L.                  | Apocynaceae       | Shrub          | Herb        | 81     | C         |
| 79  | Oenothera biennis L.                | Onagraceae        | Herb           | Herb        | 5      | C         |
| 80  | Olea europaea L. ssp. Cuspidata (Wall.ex G.Don) Cif. | Oleaceae | Ejeru          | Tree        | 37     | C         |
| 81  | Passiflora caerulea L.              | Passifloraceae    | Cl             | Herb        | 7      | C         |
| 82  | Phalaris arundinaceae L.            | Poaceae           | Herb           | Herb        | 12     | C         |
| 83  | Phoenix reclinata Jacq.             | Areceae           | Saticho        | Tree        | 40     | C         |
| 84  | Pavonia urens Cav.                  | Malvaceae         | Abeba          | Herb        | 6      | C         |
| 85  | Pelargonium x hortorum L.H.Bail.    | Geraniaceae       | Abeba          | Herb        | 12     | C         |
| 86  | Pelargonium zonale (L.) L’He’r. ex Aiton | Geraniaceae | Abeba          | H           | 13     | C         |
| 87  | Pinus patula L.                     | Pinaceae          | Patula         | Tree        | 18     | C         |
| 88  | Pinus radiata L.                    | Pinaceae          | Tree           | Tree        | 13     | C         |
| 89  | Plumbago auriculata Lam.            | Plumbaginaceae    | Abeba          | Shrub       | 5      | C         |
| 90  | Plumeria alba L.                    | Apocynaceae       | Plumeria       | Shrub       | 14     | C         |
| 91  | Plumeria rubra L.                   | Apocynaceae       | Imera          | Shrub       | 15     | C         |
| 92  | Pyrostegia venusta (Ker Gawl.) Miers | Bignoniaceae     | Flame vine     | Cl          | 11     | C         |
| 93  | Rosa richardii Hart.                | Rosaceae          | Tsereda        | Shrub       | 49     | C         |
| 94  | Salvia leucahtana Cav.              | Lamiaceae         | Abeba          | Herb        | 10     | C         |
| 95  | Salvia splendens Sellow ex Roem & Schult. | Lamiaceae | Abeba          | Herb        | 7      | C         |
| 96  | Scadoxus multiflorus (Martyn) Raf.  | Amaryllidaceae    | Arfaasa        | Herb        | 2      | C         |
| 97  | Sansevieria trifasciata var. laurentii (DeWild.) | Asparagaceae | Herb          | Herb        | 37     | C         |
| 98  | Sansevieria trifasciata Prain.      | Asparagaceae      | Mother low's tongue | Herb       | 38     | C         |
| 99  | Schefflera arboricola (Hayata) Merr. | Araliaceae       | Umbrella tree  | Shrub       | 10     | C         |
| 100 | Schinus molle L.                    | Anacardiaceae     | Kundebereberb  | Tree        | 12     | C         |
| 101 | Senna siamea (Lam.)H.S.Irwin & Barneby | Caesalpiniaceae | Siamese cassis | Shrub       | 13     | C         |
| 102 | Senna spectabilis (Dc.)Irwin & Barneby | Caesalpiniaceae | Siamese cassis | Shrub       | 18     | C         |
| 103 | Sisyrinchium californicum Ker Gawler Dryander | Iridaceae | Yellow eyed grass | Herb       | 16     | C         |
| 104 | Solenostemon scultellaroides (L.) Cord | Lamiaceae | Yellow eyed grass | Herb       | 49     | C         |
| 105 | Spathodea campanulata P. Beauv. ssp. nilotica. | Bignoniaceae | Tree          | Tree        | 8      | C         |
| 106 | Tagetes erecta L.                   | Asteraceae        | Herb           | Herb        | 13     | C         |
| 107 | Tagetes minuta L.                   | Asteraceae        | Herb           | Herb        | 11     | C         |
| 108 | Tagetes patula L.                   | Asteraceae        | Herb           | Herb        | 9      | C         |
| 109 | Tecoma capensis (Thunb.) Spach      | Bignoniaceae      | Shrub          | Shrub       | 6      | C         |
| 110 | Tecoma stans (L.) Juss ex kunth     | Bignoniaceae      | Shrub          | Shrub       | 8      | C         |
### Appendix I. Contd.

| No. | Scientific name                  | Family          | Local name       | Habit | Fr. | Status | Parts Used | Duration |
|-----|----------------------------------|-----------------|------------------|-------|-----|--------|------------|----------|
| 111 | *Terminalia mentalis* (T. Mantaly)| Combretaceae    | Terminalia       | Tree  | 39  | C      | P          |          |
| 112 | *Thuja orientalis* L.           | Cupresaceae     | Thuja orientalis | Tree  | 11  | C      | P          |          |
| 113 | *Thevetia peruviana* Luckey Nut (Eng.) | Apocynaceae | Thevetia    | Shrub | 16  | C      | P          |          |
| 114 | *Tradescantia pallida* (Rose) D.R. Hunt. | Commelinaceae | Tradescantia  | Herb  | 13  | C      | P          |          |
| 115 | *Tradescantia zebrina* Bosse     | Commelinaceae   | Tradescantia    | Herb cc lent | 19  | C      | A/P        |          |
| 116 | *Tradescantia spathacea* Sw.     | Commelinaceae   | Tradescantia    | Herb  | 13  | C      | P          |          |
| 117 | *Tropaeolum majus* L.           | Tropaeolaceae   | Tropaeolum      | Tree  | 21  | C      | P          |          |
| 118 | *Vinca minor* L.                | Apocynaceae     | Vinca minor     | Herb  | 17  | C      | P          |          |
| 119 | *Vitis vinifera* L.             | Vitaceae        | Vitis vinifera  | Liana | 5   | C      | P          |          |
| 120 | *Washingtonia robusta* (Lindl.) H. Wendl. | Arecaceae | Washingtonia   | Tree  | 21  | C      | P          |          |
| 121 | *Zamioculcas zamiifolia* (Lodd. et al) Engl. | Araceae | Zamioculcas zamiifolia | Shrub | 10  | C      | P          |          |
| 122 | *Zephyranthes candida* (Lindl.) Her. | Amaryllidaceae | Zephyranthes | Herb  | 7   | C      | P          |          |

### Appendix II. List of food plant species documented in Hawassa city homegardens.

| No. | Scientific name                  | Family          | Local name       | Habit | Fr. | Status | Parts Used | Duration |
|-----|----------------------------------|-----------------|------------------|-------|-----|--------|------------|----------|
| 1   | *Allium sativum* L.              | Alliaceae       | Nechishinkurt    | H     | 8   | C      | Bulb       | P        |
| 2   | *Allium cepa* L.                 | Alliaceae       | Keyishnkurt      | H     | 15  | C      | Bulb       | P        |
| 3   | *Amaranthus hybridus* L.         | Amaranthaceae   | Gomen            | H     | 11  | W/C    | Leaves     | A        |
| 4   | *Brassica carinata* A.Br.        | Brassicaceae    | Gomen            | H     | 49  | C      | Leaves     | A        |
| 5   | *Brassica integrifolia* L.       | Brassicaceae    | Yeguragegomen    | H     | 51  | C      | Leaves     | A        |
| 6   | *Brassica oleracea* L.           | Brassicaceae    | Tiklegomen       | H     | 45  | C      | Leaves     | P        |
| 7   | *Brassica oleracea* L.var.capitata | Brassicaceae | Tiklegomen       | H     | 32  | C      | Leaves     | P        |
| 8   | *Beta vulgaris* L.               | Brassicaceae    | Kosta            | H     | 39  | C      | Leaves     | A        |
| 9   | *Lycopersicon esculentum* Mill. | Solanaceae      | Timaatim         | H     | 67  | C      | Fruits     | A        |
| 10  | *Lactuca sativa* L.              | Asteraceae      | Selata           | H     | 78  | C      | Leaves     | A        |
| 11  | *Saccharum officinarum* L.       | Poaceae         | Shonkora         | H     | 81  | C      | Stem       | P        |
| 12  | *Solanum nigrum* L.              | Solanaceae      | Tunayee          | H     | 49  | W/C    | Leaves     | A        |
| 13  | *Solanum melongena* L.           | Solanaceae      | Sarajan/eggplant | H     | 23  | C      | Fruits     | P        |
| 14  | *Moringa stenopetala*            | Moringinaceae   | Shifera/Halako   | T     | 56  | C      | Leaves     | P        |
| 15  | *Solanum tuberosum* L.           | Solanaceae      | Dinichi          | H     | 21  | C      | Leaves     | A        |

### Root Crops

| No. | Scientific name                  | Family          | Local name       | Habit | Fr. | Status | Parts Used | Duration |
|-----|----------------------------------|-----------------|------------------|-------|-----|--------|------------|----------|
| 1   | *Beta vulgaris* L.               | Chenopodiacea   | Keysir           | H     | 78  | C      | Root       | B        |
| 2   | *Colocasia esculenta* (L.) Schott | Araceae        | Godare           | H     | 90  | C      | Root       | A        |
| 3   | *Daucus carota* L.               | Apiaceae        | Karot            | H     | 25  | C      | Root       | B        |
### Appendix II. Contd.

| No. | Common Name | Family | Scientific Name | Genus | Species | Type | Part | Code | Cereal, pulses and oil crops |
|-----|-------------|--------|-----------------|-------|---------|------|------|------|-----------------------------|
| 4   | Dioscorea alata L. | Dioscoreaceae | Dioscorea alata L. | Dioscorea | alata | Root | A   | 59  | C                          |
| 5   | Dioscorea bulbifera L. | Dioscoreaceae | Dioscorea bulbifera L. | Dioscorea | bulbifera | Root | A   | 22  | C                          |
| 6   | Dioscorea sagittifolia Pax. | Dioscoreaceae | Dioscorea sagittifolia Pax. | Dioscorea | sagittifolia | Root | A   | 43  | C                          |
| 7   | Dioscorea praehensilis Benth | Dioscoreaceae | Dioscorea praehensilis Benth | Dioscorea | praehensilis | Root | A   | 42  | C                          |
| 8   | Ensete ventricosum (Welw.) Cheesman | Musaceae | Ensete ventricosum (Welw.) Cheesman | Musa | ventricosum | Root | A   | 117 | C                          |
| 9   | Ipomoea batatas (L.) Lam. | Convolvulaceae | Ipomoea batatas (L.) Lam. | Convolvulaceae | batatas | Root | A   | 54  | C                          |
| 10  | Manihot esculenta Crantz | Euphorbiaceae | Manihot esculenta Crantz | Euphorbiaceae | esculenta | Root | A   | 29  | C                          |
| 11  | Solanum tuberosum L. | Solanaceae | Solanum tuberosum L. | Solanum | tuberosum | Root | A   | 21  | C                          |
| 12  | Xanthosoma sagittifolium (L.) Schott | Araceae | Xanthosoma sagittifolium (L.) Schott | Arum | sagittifolium | Root | A   | 73  | C                          |

### Fruit crops

| No. | Common Name | Family | Scientific Name | Genus | Species | Type | Part | Code | Cereal, pulses and oil crops |
|-----|-------------|--------|-----------------|-------|---------|------|------|------|-----------------------------|
| 1   | Ananas comosus (L.) Merr. | Bromeliaceae | Ananas comosus (L.) Merr. | Ananas | comosus | Herb | C   | 2   | Fruit | P  |
| 2   | Annona squamosa L. | Annonaceae | Annona squamosa L. | Annona | squamosa | Tree | C   | 70  | Fruit | P  |
| 3   | Carica papaya L. | Caricaceae | Carica papaya L. | Carica | papaya | Tree | C   | 97  | Fruit | P  |
| 4   | Casimiroa edulis Laliave | Rutaceae | Casimiroa edulis Laliave | Casimiroa | edulis | Tree | C   | 89  | Fruit | P  |
| 5   | Citrus aurantium | Rutaceae | Citrus aurantium | Citrus | aurantium | Tree | C   | 69  | Fruit | P  |
| 6   | Citrus aurantifolia (Christm. )Swingle | Rutaceae | Citrus aurantifolia (Christm. )Swingle | Citrus | aurantifolia | Tree | C   | 25  | Fruit | P  |
| 7   | Citrus sinensis (L.) Osbeck | Rutaceae | Citrus sinensis (L.) Osbeck | Citrus | sinensis | Tree | C   | 16  | Fruit | P  |
| 8   | Cucumis sativus | Cucurbitaceae | Cucumis sativus | Cucumis | sativus | Tree | C   | 59  | Fruit | A  |
| 9   | Balanites aegyptica | Balanitaceae | Balanites aegyptica | Balanites | aegyptica | Tree | W   | 21  | Fruit | P  |
| 10  | Dovyalis caffra (Hook. f. & Harv.) | Flacourtiaceae | Dovyalis caffra (Hook. f. & Harv.) | Flacourtiaceae | caffra | Tree | W   | 49  | Fruit | P  |
| 11  | Ficus carica | Moraceae | Ficus carica | Ficus | carica | Tree | W   | 18  | Fruit | P  |
| 12  | Mangifera indica L. | Anacardiaceae | Mangifera indica L. | Anacardiaceae | indica | Tree | W   | 98  | Fruit | P  |
| 13  | Malus sylvestris Mill. | Rosaceae | Malus sylvestris Mill. | Rosaceae | sylvestris | Tree | W   | 24  | Fruit | P  |
| 14  | Morus alba L. | Moraceae | Morus alba L. | Moraceae | alba | Tree | W   | 19  | Fruit | P  |
| 15  | Musa x paradisiaca L. | Musaceae | Musa x paradisiaca L. | Musa | x paradisiaca | Tree | W   | 99  | Fruit | P  |
| 16  | Passiflora edulis Sims. | Passifloraceae | Passiflora edulis Sims. | Passifloraceae | edulis | Tree | W   | 11  | Fruit | P  |
| 17  | Persea americana Mill. | Lauraceae | Persea americana Mill. | Lauraceae | americana | Tree | W   | 98  | Fruit | P  |
| 18  | Prunus persica (L.) Batsch. | Rosaceae | Prunus persica (L.) Batsch. | Rosaceae | persica | Tree | W   | 2  | Fruit | P  |
| 19  | Psidium guajava L. | Myrtaceae | Psidium guajava L. | Myrtaceae | guajava | Tree | W   | 97  | Fruit | P  |
| 20  | Syzygium guineense (Willd.) Dc | Myrtaceae | Syzygium guineense (Willd.) Dc | Myrtaceae | guineense | Tree | W   | 30  | Fruit | P  |

### Cereal, pulses and oil crops

| No. | Common Name | Family | Scientific Name | Genus | Species | Type | Part | Code | Cereal, pulses and oil crops |
|-----|-------------|--------|-----------------|-------|---------|------|------|------|-----------------------------|
| 1   | Cajanus cajan (L.) Mill. | Fabaceae | Cajanus cajan (L.) Mill. | Fabaceae | cajan | Shrub | C   | 20  | Seeds | P  |
| 2   | Canavalia africana L. | Fabaceae | Canavalia africana L. | Fabaceae | africana | Shrub | C   | 54  | Seeds | A  |
| 3   | Carthamus tinctorius L. | Asteraceae | Carthamus tinctorius L. | Asteraceae | tinctorius | Shrub | C   | 43  | Seeds | A  |
Appendix II. Contd.

|   | Common Name     | Family       | Type         | Height | C | Seeds   |   |
|---|-----------------|--------------|--------------|--------|---|---------|---|
| 4 | *Jatropha curcas* L. | Euphorbiaceae | Shrub       | 14     | C | Seeds   | P |
| 5 | *Phaseolus vulgaris* L. | Fabaceae   | Climber     | 40     | C | Seeds   | A |
| 6 | *Phaseolus lunatus* L. | Fabaceae   | Climber     | 45     | C | Seeds   | A |
| 7 | *Ricinus communis* L. | Euphorbiaceae | Shrub       | 52     | C/W| Seeds   | P |
| 8 | *Zea mays* L. | Poaceae     | Herb        | 118    |   |         |   |

List of spices

|   | Common Name     | Family       | Type         | Height | C | Seeds   |   |
|---|-----------------|--------------|--------------|--------|---|---------|---|
| 1 | *Allium sativum* L. | Alliaceae | Herb/Bulb  | 16     |   |         | P |
| 2 | *Allium cepa* L. | Alliaceae | Herb/Bulb  | 23     |   |         | P |
| 3 | *Becium filamentasum* (Forssk.) Cliab. | Lamiaceae | Herb/Fruit | 5      |   |         | B |
| 4 | *Brassica nigra* (L.) Koch | Brassicaceae | Herb/Seed  | 5      |   |         | A |
| 5 | *Capsicum annuum* L. | Solanaceae | Herb/Fruit  | 14     |   |         | A |
| 6 | *Capsicum frutescens* L. | Solanaceae | Herb/Fruit  | 12     |   |         | A |
| 7 | *Coriandrum sativum* L. | Apiaceae   | Herb/Fruit  | 52     |   |         | A |
| 8 | *Lippia adoensis* var. kosert Sebsebe | Verbenaceae | Shrub/Leaves | 10     |   |         | P |
| 9 | *Lippia adoensis* | Verbenaceae | Shrub/Leaves | 15     |   |         | P |
| 10 | *Menta spicata* L. | Lamiaceae | Herb/Leaves | 14     |   |         | P |
| 11 | *Ocimum basilicum* L. | Lamiaceae | Herb/Leaves | 37     |   |         | A |
| 12 | *Ocimum basilicum* var. basilicum L. | Lamiaceae | Herb/Leaves | 20     |   |         | A |
| 13 | *Rhamnus prinoides* L'Herit | Rhamnaceae | Shrub/Leaves | 6      |   |         | P |
| 14 | *Rosmarinus officinalis* L. | Lamiaceae | Shrub/Leaves | 68     |   |         | P |
| 15 | *Ruta chalpensis* L. | Rutaceae | Herb/Leaves and seed | 79     |   |         | P |
| 16 | *Zingiber officinale* L. | Zingiberaceae | Herb/Stem  | 2      |   |         | P |

List of stimulant species

|   | Common Name     | Family       | Type         | Height | C | Seeds   |   |
|---|-----------------|--------------|--------------|--------|---|---------|---|
| 1 | *Catha edulis* (vahl.) Forssk. ex Endl. | Celastraceae | Shrub/Leaves | 12     |   |         | P |
| 2 | *Coffee arabica* L. | Rubiaceae | Shrub/Fruits | 97     |   |         | P |
| 3 | *Nicotiana tobacum* L. | Solanaceae | Herb/Leaves | 13     |   |         | A |

List of fragrant plant species

|   | Common Name     | Family       | Type         | Height | C | Seeds   |   |
|---|-----------------|--------------|--------------|--------|---|---------|---|
| 1 | *Artemisia absinthium* L. | Asteraceae | Herb/Leaves | 5      | C |         | P |
| 2 | *Artemisia abyssinica* L. | Asteraceae | Herb/Leaves | 12     | C |         | P |
| 3 | *Cymopogen citrates* (DC.) Stapf. | Poaceae | Herb/Leaves | 29     | C |         | P |
| 4 | *Faeniculum vulgare* | Apiaceae | Herb/Leaves | 11     | C |         | B |
| 5 | *Lippia adoensis* var adoensis Hochst.ex Walp | Verbenaceae | Shrub/Leaves | 33     | C |         | P |
| 6 | *Lippia adoensis* var koseret Sebsebe | Verbenaceae | Shrub/Leaves | 45     | C |         | P |
| 7 | *Myrtus communis* L. | Myrtaceae | Herb/Leaves | 4      | C |         | P |
| 8 | *Ocimum lamiifolium* Hochst.ex Benth. | Lamiaceae | Shrub/Leaves | 89     | C |         | P |
| 9 | *Otostogia integrifolia* Benth. | Lamiaceae | Shrub/Leaves | 6      | C |         | A |
| 10 | *Olea europea* | Oleaceae | Tree/Leaves/stem | 23     | C |         | P |
Appendix II. Contd.

List of fodder species

| No. | Scientific name                      | Family           | Local name | Habit | Parts used | Disease treated |
|-----|--------------------------------------|------------------|------------|-------|------------|-----------------|
| 11  | *Ruta chalepensis* L.                | Rutaceae         | Tena adam  | Herb  | Leaves     | 115 C P         |
| 12  | *Rosmarinus officinalis* L.          | Lamiaceae        | Siga metibesha | Shrub | Leaves     | 68 C P          |

List of medicinal plants documented in the Hawassa city homegardens.

| No. | Scientific name                      | Family           | Local name | Habit | Parts used | Disease treated |
|-----|--------------------------------------|------------------|------------|-------|------------|-----------------|
| 1   | *Achranthes aspera* L.               | Amaranthaceae    | Telnji     | H     | Root       | Pneumonia       |
| 2   | *Allium sativum* L.                  | Alliaceae        | Nechshinkurt | H     | Bulb       | Malaria         |
| 3   | *Aloe vera* (L.) Burm.f.             | Aloaceae         | Ret        | H     | Stem       | Malaria, wound  |
| 4   | *Azadichia indica*                   | Meliaceae        | Neem       | T     | Leaves     | Malaria         |
| 5   | *Artemisia abyssinica* L.            | Asteraceae       | Ariti      | H     | Leaves     | Evil eye, stomach ache |
| 6   | *Artemisia absinthium* L.            | Asteraceae       | Chkun      | H     | Leaves     | Hemorrhoid      |
| 7   | *Artemisia afraisy*                  | Asteraceae       | H          | Leaves | Evileye    |                 |
| 8   | *Carica papaya*                      | Caricaceae       | Papaya     | T     | Leaves     | Malaria         |
| 9   | *Carissa edulis*                     | Apocynaceae      | Agam       | Sh    | Stem       | Eviil eye       |
| 10  | *Cassia occidentalis* (L.) Link.     | Fabaceae         | Hamashaqa  | H     | Leaves     | Body swelling   |
| 11  | *Coffee arabica* L.                  | Rubiaceae        | Bunna      | Sh    | Seeds      | Gastric illness |
| 12  | *Commelina benghalensis* L.          | Commelinaceae    | H          | Stem   | Wound      |                 |
| 13  | *Croton macrostachyus*               | Euphorbiaceae    | Bisana     | T     | Leaves     | Cancer          |
| 14  | *Cucumis ficifolius* A.Rich          | Cucurbitaceae    | Yemed emboy | Cl    | Leaves, fruits | Cold, heart disease |
| 15  | *Datura stramonium* L.               | Solanaceae       | Asangira   | H     | Leaves, seeds | Wound,          |
| 16  | *Dodonaea angustifolia*              | Sapindaceae      | Ittancha   | T     | Stem       | Tooth ace       |
| 17  | *Eucalyptus globulus*                | Myrtaceae        | Nechi barzaf | T     | Leaves     | Common cold     |
| 18  | *Euphorbia tirucalli*                | Euphorbiaceae    | Qincib     | Sh    | Stem fluid | Hemorrhoid      |
| 19  | *Foeniculum vulgare*                 | Apiaceae         | Insilal    | H     | Leaves     | Stomach pain, urine problem |
| 20  | *Hagenia abyssinica*                 | Rosaceae         | Kosso      | T     | Flowers    | Tape worm       |
| 21  | *Juniperus procera*                  | Cupressaceae     | Yeabesha tid | T     | Seeds      | Flue            |
| 22  | *Kalchoe petittiana* A.Rich          | Crassulaceae     | Hancululée | H     | Leaves     | Swelling        |
| 23  | *Melia azedaracha*                   | Meliaceae        | Niimi      | T     | Shoot tip | Malaria, toothache |
| 24  | *Milletia ferruginea* (Hochst.) Bak  | Fabaceae         | Hengedicho | Tree  | Stem bark  | Ecto- parasite  |
| 25  | *Moringa stenopetala* L.             | Moringaceae      | Shifera    | Tree  | Leaves     | Malaria, hypertension |
### Appendix III. Contd.

| No. | Scientific name                  | Local name | Family        | Habit           | Frequency | Duration |
|-----|----------------------------------|------------|---------------|-----------------|-----------|----------|
| 26  | *Nicotiana tabacum* L.           | Solanaceae | Araddo        | Herb Leaves     | Common cold | A        |
| 27  | *Olea europaea* ssp. *cuspidata* | Olaceae    | Ejersu        | Tree Stem       | Tooth ache | P        |
| 28  | *Ocimum lamifolium*              | Lamiaceae  | Damakasse     | Shrub Leaves    | Sun stroke | A        |
| 29  | *Phytolacca dodendcandra* L. Herit | Phytolacceae | Endod        | Shrub Root, leaves | Blahariza | P        |
| 30  | *Podocarpus falcatus* (Thunb.)Mirb | Podocarpaceae | Zigiba    | Tree Stem bark  | Jaundice   | P        |
| 31  | *Prunus africana* (Hook.F.)Kal. | Rosaceae   | Garbicho      | Tree Bark       | Cancer     | P        |
| 32  | *Rhamnus prinoides* L'Herit.     | Rhamnaceae | Xaddo         | Shrub Leaves    | Skin infection | P        |
| 33  | *Rumex nepalensis* Spreng.       | Polygonaceae | Sharbicho   | Herb Leaves/root | Ear problem, body Swelling | A        |
| 34  | *Ruta chalepensis* L.            | Rutaceae   | Sunkurta      | Herb Leaves     | Stomach problem | A        |
| 35  | *Ricinus communis* L.            | Euphorbiaceae | Qomboho   | Tree Root       | Pneumonia  | P        |
| 36  | *Sesbania sesban* (L.) Merr.     | Fabaceae   | Arbeti        | Shrub Root      | Body swelling | P        |
| 37  | *Solanum incanum* L.             | Solanaceae | Borbodho      | Shrub Root      | Intestinal parasites | P        |
| 38  | *Solanum nigrum* L.              | Solanaceae | Xunaye        | Herb Leaves     | Intestinal parasites | A        |
| 39  | *Vernonia amygdalina* Del.       | Asteraceae | Hecho         | Tree Leaves     | Malaria    | P        |
| 40  | *Vernonia auriculiferi* Hiern.   | Asteraceae | Rejicho       | Shrub Leaves    | Wound      | P        |
| 41  | *Withania somnifera* (L.) Dunal. | Solanaceae | Gizawa        | Herb Root       | Pneumonia  | P        |

### Appendix IV. Timber (Furniture) tree species encountered in the study area.

| No. | Scientific name                  | Local name | Family        | Habit         | Frequency | Duration |
|-----|----------------------------------|------------|---------------|---------------|-----------|----------|
| 1   | *Acacia albida*                  | Fabaceae   | Tree          | 12            | P         |
| 2   | *Acacia melanoxylon* R.Br.       | Fabaceae   | Tree          | 67            | P         |
| 3   | *Acacia tortilis* (Forssk.)      | Fabaceae   | Tree          | 14            | P         |
| 4   | *Albizia gummifera* (J.F.Gmel.  | Fabaceae   | Tree          | 5             | P         |
| 5   | *Albizia schimperiana var.* schimperiana | Fabaceae | Tree          | 4             | P         |
| 6   | *Aningeria adolfi-friedericii*   | Sapotaceae | Tree          | 6             | P         |
| 7   | *Arundo donax*                   | Poaceae    | Shrub         | 9             | P         |
| 8   | *Azadirachta indica*             | Meliaceae  | Tree          | 3             | P         |
| 9   | *Casuarina equisetifolia* L.     | Casuarinaceae | Tree         | 87            | P         |
| 10  | *Cellis quinquefolia* L.         | Ulmaceae   | Tree          | 8             | P         |
| 11  | *Cordia africana* Lam.           | Boraginaceae | Tree         | 97            | P         |
| 12  | *Croton macrostachyus* Del.      | Euphorbiaceae | Tree       | 33            | P         |
| 13  | *Cupressus lusitanica* Mill.     | Cupresaceae | Tree          | 98            | P         |
| 14  | *Eucalyptus camaldulensis* Dehn. | Myrtaceae  | Tree          | 29            | P         |
| 15  | *Eucalyptus globulus*            | Myrtaceae  | Tree          | 4             | P         |
| 16  | *Eucalyptus saligna* Smith.      | Myrtaceae  | Tree          | 54            | P         |
### Appendix IV. Contd.

| No. | Scientific name                          | Local name | Family       | Habit | Fr. | Duration |
|-----|------------------------------------------|------------|--------------|-------|-----|----------|
| 17  | *Ficus sur* Forssk.                      | Odakko     | Moraceae     | Tree  | 8   | P        |
| 18  | *Ficus vasta*                            |            | Moraceae     | Tree  | 14  | P        |
| 19  | *Grevillea robusta* R.Br.                | Temenjazaf | Proteaceae   | Tree  | 99  | P        |
| 20  | *Hagenia abyssinica* (Bruce) J.F.Gmel.   | Dadako     | Rosaceae     | Tree  | 6   | P        |
| 21  | *Juniperus procera* Hochst ex Engl.      | Honcho     | Cupresaceae  | Tree  | 13  | P        |
| 22  | *Melia azedarach* L.                     | Neem,      | Meliaceae    | Tree  | 118 | P        |
| 23  | *Olea europaea* L.ssp. Cuspidata (Wall.ex G.Don) Cif. | Egersu   | Oleaceae     | Tree  | 7   | P        |
| 24  | *Pinus patula* L.                        | Patula     | Pinaceae     | Tree  | 16  | P        |
| 25  | *Pinus radiata*                          |            | Pinaceae     | Tree  | 5   | P        |
| 26  | *Podocarpus falcatus* (Thunb.) Mirb.     | Dagucho    | Podocarpaceae| Tree  | 11  | P        |
| 27  | *Prunus africana* (Hook.f.)Kalkm         | Garbo      | Rosaceae     | Tree  | 9   | P        |
| 28  | *Syzygium guineense* (Wild.)DC.          | Duwancho   | Myrtaceae    | Tree  | 3   | P        |
| 29  | *Balanites aegyptiaca* (L.) Del.         | Badana     | Balanitaceae | Tree  | 4   | P        |

### Appendix V. List of plants used as fire wood.

| No. | Scientific name                          | Local name | Family       | Habit | Fr. | Duration |
|-----|------------------------------------------|------------|--------------|-------|-----|----------|
| 1   | *Acacia abyssinica* Hochst Ex Benth      | Wacho      | Fabaceae     | Tree  | 12  | P        |
| 2   | *Acacia albida*                          | Grar       | Fabaceae     | Tree  | 24  | P        |
| 3   | *Acacia etbaica* Schweinf.               | Grar       | Fabaceae     | Tree  | 10  | P        |
| 4   | *Acacia mearnsii* DeWild.                | Yeferjegrar| Fabaceae     | Tree  | 32  | P        |
| 5   | *Acacia nilotica*                        | Cheba      | Fabaceae     | Tree  | 6   | P        |
| 6   | *Acacia seyal* Del.                      | Wachu      | Fabaceae     | Tree  | 15  | P        |
| 7   | *Acacia melanoxylon* R.Br.               | Omedella   | Fabaceae     | Tree  | 55  | P        |
| 8   | *Acacia tortilis* (Forsk.)Hayne          | Dewenigrar | Fabaceae     | Tree  | 20  | P        |
| 9   | *Albizia gummifera* (J.F.Gmel.           | Maxicho    | Fabaceae     | Tree  | 4   | P        |
| 10  | *Albizia schimperiana* var. schimperiana | Gorbe      | Fabaceae     | Tree  | 3   | P        |
| 11  | *Azadirachta indica*                     | Neem       | Meliaceae    | Tree  | 2   | P        |
| 12  | *Senna didymobotrya* (Fresen.) Irwin & Barneby | Harashaqa | Caesalpinioideae | Shrub | 4   | P        |
| 13  | *Casuarina equisetifolia* L.             | Arezalbano  | Casuarinaceae| Tree  | 77  | P        |
| 14  | *Cellis africana* Burm.f                 | Amalaka    | Ulmaceae     | Tree  | 4   | P        |
| 15  | *Combretum collinum* Fresen.             | Wanza      | Combretaceae | Tree  | 5   | P        |
| 16  | *Cordia africana* Lam.                   | Masincho   | Borrinaceae  | Tree  | 114 | P        |
| 17  | *Croton macrostachyus* Del.              | Homme      | Euphorbiaceae| Tree  | 68  | P        |
| 18  | *Cupressus lusitanica* Mill.             | Etancha    | Cupresaceae  | Tree  | 76  | P        |
| 19  | *Dodonaea angustifolia* L.               | Etancha    | Sapindaceae  | Tree  | 7   | P        |
| 20  | *Eucalyptus camaldulensis* Dehn.         | Duumebahirzafe | Myrtaceae | Tree  | 78  | P        |
## Appendix V. Contd.

| No. | Species Name                      | Common Name                  | Family        | Life Form | Height | Code |
|-----|-----------------------------------|------------------------------|---------------|-----------|--------|------|
| 21  | *Eucalyptus globulus*             | Duume bahirzafe              | Myrtaceae     | Tree      | 2      | P    |
| 22  | *Ficus sur* Forssk.               | Odakko                       | Moraceae      | Tree      | 7      | P    |
| 23  | *Grevillea robusta* R.Br.         | Temenjazaf                   | Proteaceae    | Tree      | 89     | P    |
| 24  | *Hagenia abyssinica* (Bruce)J.F.Gmel. | Dadako                  | Rosaceae      | Tree      | 12     | P    |
| 25  | *Jacaranda mimosifolia* D.Don.    | Jacaranda                    | Bignoniaceae  | Tree      | 79     | P    |
| 26  | *Justicia schimperiana* (Hochst ex.Nees) | Cikkicho                  | Acanthaceae   | Shrub     | 23     | P    |
| 27  | *Maytenus arbutilloia* (A.Rich,)Wilczek | Cucco                   | Cleastraceae  | Tree      | 5      | P    |
| 28  | *Melia azedarch* L.               | Neem,                        | Meliaceae     | Tree      | 116    | P    |
| 29  | *Millettia ferruginea* (Hochst.)Bak. | Hengedicho                | Fabaceae      | Tree      | 10     | P    |
| 30  | *Olea europaea* L.ssp. *Cuspidata* (Wall.ex G.Don) Cif. | Ejersu                    | Oleaceae      | Tree      | 19     | P    |
| 31  | *Pinus patula* L.                | Patula                       | Pinaceae      | Tree      | 36     | P    |
| 32  | *Podocarpus falcatus* (Thunb.) Mirb. | Dagucho                   | Podocarpaceae | Tree      | 24     | P    |
| 33  | *Prunus africana* (Hook.f.)Kalkm | Garbicho                    | Rosaceae      | Tree      | 18     | P    |
| 34  | *Schinus molle* L.               | Kunde berbere                | Anacardiaceae | Tree      | 63     | P    |
| 35  | *Sesbania sesban* (L.) Merr.      | Arbeti                       | Fabaceae      | Shrub     | 39     | P    |
| 36  | *Spathodea campanulata* P.Beauv. ssp. nilotica. | Spathoda                 | Bignoniaceae  | Tree      | 45     | P    |
| 37  | *Syzygium guineense* (Wild.,DC. | Duwancho                    | Myrtaceae     | Tree      | 5      | P    |
| 38  | *Vernonia amygdalina* Del.       | Hecho                        | Asteraceae    | Shrub     | 74     | P    |
| 39  | *Balanites aegyptiaca* (L.) Del. | Badano                       | Balanitaceae  | Tree      | 12     | P    |

Cl, climbers; P, Perennial; A, Annual; C, Cultivated; W, Wild; T, Tree; Sh, Shrub; H, Herb.