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The role of homegardens for *in situ* conservation of plant biodiversity in Holeta Town, Oromia National Regional State, Ethiopia

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This study was conducted to assess the role of homegardens for *in situ* conservation of plant biodiversity in Holeta Town. In the garden data collection 75 homegardens were randomly selected. Ethnobotanical data were collected using homegarden observation, semi-structured interviews and market survey. Data were analyzed using preference ranking, direct matrix ranking, and descriptive statistics. A total of 112 plant species belonging to 93 genera and 43 families were identified which were classified to 14 functional groups. Out of which, 49 species (43%) were herbs, 32 species (29 %) were trees, 28 species (25 %) were shrubs, and (3%) species were climbers. Further analysis of the results showed that 70 species were cultivated, 35 were wild while 7 species were Ethiopia domesticated. Of the cultivated species, 41.07% were food crops and 58.93% were non-food crops. Family Fabaceae consisted of the highest number of species (11 species), whereas *Ensete ventricosum* was the most frequently occurring species (93.75%) in the homegardens of the area. Garden was managed by males (47.93%) and females (38.41%). Of the total plant species, 13% were medicinal plants, out of which 33.33% were nutraceutical plants. Direct matrix analysis showed that *Juniperus procera* was the most important versatile species followed by *Cordia africana.* These results indicate that homegardens studied play a crucial role in food security of the households and conservation *in situ* of these plant resources. However, insufficient agricultural support, small- sized gardens and the shifting of polycultural farming to few income generating food crops affect the diversity of species.

Key words: plant biodiversity, homegarden, hotspot, *In situ* conservation, indigenous knowledge.

INTRODUCTION

Biodiversity is crucial for survival, health and well-being of humans. It is giving greater resilience to ecosystems and organisms (Qualset et al., 1995). Complex, diversified and highly traditional rooted part of plant biodiversity conservation and utilization is found in homegardens (Kumar and Nair, 2006; Zemede, 2004).

Homegardens are variously named in English language as agroforestry homegardens, backyard gardens, farmyard, roof top garden, homestead farms, gardens (Kumar and Nair, 2004). In Ethiopia, a very common Amharic vernacular name equivalent for the term homegarden is "*Yeguaro-ersha*", in Oromo vernacular language is *"eddo*" means a land at a backyard of a house (Zemede, 2001).

Homegarden is commonly defined as land use systems involving deliberate management of multipurpose trees and shrubs in intimate association with annual and perennial agricultural crops and invariably, livestock within the compounds of individual houses, the whole tree-crop-animal unit being intensively managed by family labour (Christanty, 1990; Kumar and Nair, 2004). Such systems

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are essentially man-made and reflect the wisdom of the traditional culture and ecological knowledge that have evolved over the years (Kumar and Nair, 2004; Abebe et al., 2010).

The high diversity of species in home gardens plays wide socioeconomic and ecological roles. because it is related with the production of food and other products such as firewood, fodders, spices, medicinal plants and ornamentals (Christanty, 1985), prevention of environmental deterioration commonly associated with monocultural production systems, income generating sites (Hoogerbuugge and Fresco, 1993) and *in situ* conservation of agrobiodiversty (FAO 2001; Watson and Eyzaguirre, 2002). Generally, homegardens serve as refuges to a number of plant species, particularly those not widely grown in the larger agroecosystems. Moreover, they are the place of enormous indigenous knowledge (Eyzaguirre and Linares, 2004).

Ethiopia is one of the eight world's centers of origin and diversity of agricultural products. The tremendous variety and complexity of genetic resources results from *in situ* conservation of plants traditionally grown in homegardens (Zemede, 2001; Kumar and Nair, 2004). However, homegardens are currently under threat of genetic erosion such as, the displacement of great variety of landraces by few high-yielding varieties, loss of traditional knowledge of cropping patterns and management practices, socioeconomic factors and drought (Kumar and Nair, 2004; Zemede, 2004).

In Ethiopia, inventory and documentation of home gardens are very few. It has been concentrated in south and southwestern parts of Ethiopia (Zemede and Zerihun, 1997; Tesfaye, 2005; Talemos Seta, 2007; Abebe et al., 2010). Thus, the study was initiated to increase the knowledge of homegardens of northwestern Ethiopia, specifically in west part of Ethiopia, Holeta Town region. We provided analysis regarding plant species, management practices of local people and their contribution for agrobiodiversity conservation in this region.

MATERIALS AND METHODS

Description of the study area

Holeta Town is situated at a distance of 31 km West of Addis Ababa and located at 9°02' N latitude and 38°29' E longitude. The Town has an area of 5550 ha. Holeta Town is found in Oromia National Regional State (ONRS) of Ethiopia. Holeta Town is found at an average altitude of 2449 m a.s.l.

Selection of study sites and informants

During a reconnaissance survey (September, 2010) of the study area, overall information was obtained. Consequently, four study sites were identified and selected based on the presence of traditional homegarden practices and various ethnic communities (languages). They are described as Welayita community site (W.C.S), Gurage community site (G.C.S), Oromo community site (O.C.S) and Mixed community site (M.C.S).

A total of 400 houses (100 for each site) were randomly selected to determine the frequency of homegardens and to identify their local positions (front-yard, back-yard, side-yard or others). To undergo data collection and analysis, 75 homegardens were selected randomly from houses that practice homegardening. A total of 12 knowledgeable key informants were systematically selected from different sites with the assistance of community elders and local developmental agents for ethnobotanical data collection.

Data collection

Ethnobotanical data were collected by using semi structured interviews, field observation, market survey and ranking and scoring methods (Martin, 1995; Cotton, 1996). Interviews and discussions were conducted in Amharic (the local language) using a checklist of topics.

Direct matrix ranking was calculated for five multipurpose tree species in order to assess their relative importance to local people and to generate a matrix that represents the views of the entire community. Based on their relative uses, selected twelve key informants were asked to assign use values for each plant (using the following category 5 = best, 4 = very good, 3 = good, 2 = less used, 1 = least used and 0 = not used). In the end, the results of twelve respondents were summed up to generate a matrix that represents the views of the entire community (Martin, 1995; Cotton, 1996). Preference ranking was calculated for six food crops to determine the relative importance to local people. This technique was employed to rank some selected homegarden species according to their significances. Based on their personal preference of efficacy, selected informants were asked to assign use values for each plant (Highest score (10), while the one with the least effectiveness given the lowest score (1). The numbers are summed for all respondents, giving an overall ranking for the items by the selected group of respondents (Martin, 1995; Cotton, 1996).

Floristic composition data and plant identification

Floristic composition data collection was conducted on 75 sample plots of 10 m × 10 m (100 m^2) were delimited in 75 representative homegardens giving a total of 7500 m^2 or 0.75 ha. Then, counts of each species (presence or absence) were conducted on each plot. Specimens of plants found to be the homegardens were collected and local names and habits of each plant were recorded with the help of key informants and development agents. Botanical names were established by comparing specimens with those at the National Herbarium, Science Faculty of Addis Ababa University using available floras.

Data analysis

Ethnobotanical data were analyzed and summarized using descriptive statistical methods (percentages) and floristic composition data were analyzed for species diversity using appropriate equations of the following parameters: Frequency, Frequency classes A-E, Density, Shannon and Wiener index (H'), evenness and species richness, and Sorensen's Index of similarity (Kent and Coker, 1992; Shannon and Wiener, 1949; Whittaker, 1972)

RESULTS AND DISCUSION

Structure of homegardens in Holeta Town

The survey of 400 houses in Holeta Town indicated that 342 (85.50%) households were practicing homegardening.

The positions of homegardens are varying in type. The same case was reported by Zemede (2002), and Talemos Seta (2007).The size and diversity of species in the study area have positive correlations. With increase in holding size, more variations in species composition were encountered. Similarly, Tesfaye (2005) reported the same result in the study of diversity in homegarden agroforestry system of southern Ethiopia.

Homegardens in the study area are composed of trees, shrubs, herbs, climbing plants and food crops in different strata. They consist of trees approximately 10 to 15 m on the upper strata (*Eucalyptus camaldulensis, Erythrina brucei, Cupressus lusitanica*). Fruit crops *(Prunus persica)* and *Ensete ventricosum* encompassed the middle strata. Herbaceous plants up to 1 m from the ground strata *(Brassica carinata, Cymbopogon citrates*, *Beta vulgaris, Brassica carinata, Brassica oleracea, Daucus carota, Lycopersicon esculentum* and *Ocimum basilicum).* However, the horizontal structure of the species declines as one goes from homegarden to the out fields. This was also reported by Tesfaye (2005) in coffee-enset-based Sidama homegardens and Talemos (2007) enset-based homegardens in Welayita.

Plant diversity and composition of the homegardens of Holeta Town

A total of 112 plant species were identified and documented from the study area (Appendix I). These plant species were classified into 93 genera and 43 families. The commonly represented families were Fabaceae which contains 11 species, followed by Rutaceae and Poaceae in the second rank, which contain 8 species each, and Solanaceae in the third with 7 plant species.

The richest homegarden contained 47 species; whereas, the poorest garden contained 4 species and the mean was 22 species per homegarden. Among the recorded species, only 34 species (26.79%) were found in all study sites and 5 species in only two homegardens. From 112 plants species identified, 6.25% were indigenous plants such as *E. ventricosum*, *Juniperus procera* (Appendix I); 35 species were wild plants which grow, and 70 species were cultivated crops.

The growth form of the species were 49 (43%) herb species, 32 (29%) tree species, 28 (25%) shrub species, and 3% were climber plants. *E. camaldulensis*, *C. lusitanica*, and *Prunus persica* were the top tree species. *Rhamnus prinoides*, *Catha edulis*, and *Dovyalis caffra* were the most prominent shrub species in the study area.

The homegarden flora is composed of both food and non-food plants, accounting for 41.07% and 58.93% of the total of species respectively. Among the food crops, 19 species (17%) were fruit species, 15 species (13%) were vegetables and 6% pulses & cereals and ranked 1 to 3 in that order. On the other hand, from non-food components of the garden grown species, medicinal plants were 13% and construction & building plants were 12% and miscellaneous consisting of 5% ranked 1 to 3, respectively.

From the total number of species recorded in the study area, *E. ventricosum* (93.75%) was the most frequent species, followed by *E. camaldulensis* (90.63%).The species distributed in the frequency classes indicated 6.22% of high frequency values species occurred in higher frequency classes A and B. These classes include *E. ventricosum, E. camaldulensis*, *Justicia shimperiana, C. edulis, Solanum tuberosum* and *R. prinoides*. The remaining species were distributed in frequency classes C, D and E in ascending order containing 13.39%, 20.54% and 59.85% in that order a total of 93.78%, that indicated that more than half of species showed low frequencies. These results indicated that homegardens play a vital role in *in situ* conservation of agrobiodiversity (Lamprecht, 1989).

The value of Shannon-Wiener diversity index of sites ranges from 3.016 to 3.28 (Table 1). Naturally the Shannon's index value varies from 1.5 to 3.5 and rarely exceeds 4.5 (Kent and Coker, 1992).

Sorenson similarity index of the study area ranged from 0.206 - 0.346 or below 0.5 (Table 2), indicating the existence of low similarities/high species diversity among the recognized sites (Table 3). It may be related to the existence of diversified ethnic society in the study area, dissimilar habits for growing plants and preference of food crops as illustrated in (Table 4).

Factors that affect homegarden plant diversity

According to the results of semi-structured interviews, the diversity and productivity of homegardens in the study area were mainly affected by lack of agricultural support/ extension service (81.25%). Disease and pests are the main biological factors of the Welayita and Gurage community sites, which damaged market and non-market crops like *B. oleracea, Prunus persica,* and *S. tuberosum*.

Food plants in Holeta Town homegardens for nutrition and food security

Out of 112 plant species identified in the study area, 43 species distributed among 36 genera and 17 families were documented as food plants which accounted for 41.07% of the total. Among these, 45.50% were fruits, 30.23% vegetables, 13.95% pulses & cereals, 10.32% tubers and roots and 4% were spices. The fruits are the most usable parts (39.96%) and roots were least usable parts (4.35%) of the food plants. The diversity of food crops of the study area had significant role to increase nutritional and income status of the local people. Consequently, *P. persica* the most preferred and *Allium sativum* was the least preferred food crop (Table 4).

Table 1. Species numbers, Shannon Wiener diversity index and species evenness foreach study site.

Study site	Number of species (richness)	Shannon's index (H')	(H'/H'max)
Welayita C. D. S	81	3.260	0.74
Oromo C. D. S	57	3.016	0.76
Gurage C. D. S	65	3.283	0.79
Mixed C. S	87	3.161	0.72

Table 2. Sorenson similarity index of the homegardens of the study area.

Clustered HGs	Oromo C. D. S	Welayita C. D. S	Gurage C. D. S	Mixed C. S
Oromo C.D.S	1.00			
Welayita C.D.S	0.346	1.00		
Gurage C.D.S	0.212	0.217	1.00	
Mixed C. S	0.206	0.226	0.214	1.00

Table 3. Frequency of factors that affect diversity of homegardens.

Factor	Study site and frequency of factor					
	Welayita	Oromo	Gurage	Mixed	Total	percentage
Lack of agricultural support	7	3	8	8	26	81.25
Disease and pests	8	3	8	5	24	75.00
Garden size	5	1	7	6	19	59.38
Lack of water availability	2	8	-	7	17	53.13
Other			3	2	5	15.63
Market access	1	2	-	1	4	12.50

Table 4. Simple preferences ranking for widely used food crops in homegardens: 10- for most valuable, 1- for least valuable.

Scientific name	Key informant													
	1	2	3	4	5	6	7	8	9	10	11	12	Total score	Rank
Prunus persica	10	7	8	5	10	9	5	6	7	10	1	3	81	1
Malus sylvestris	1	6	10	2	4	5	10	10	5	8	9	9	79	2
Solanum tuberosum	7	10	1	4	8	6	9	5	8	6	9	5	78	3
Ensete ventricosum	2	9	8	8	9	8	4	3	9	8	4	3	75	4
Lycopersicon esculentum	6	2	7	10	6	10	3	4	8	5	2	6	69	5
Allium sativum	4	1	6	6	7	4	1	2	2	9	8	5	55	6

Important homegarden tree species with multiple uses

Homegarden owners and other people in Holeta Town have the tradition of using various tree species found in their homegardens for different purposes. The results of 12 key informants using direct matrix ranking in the four study sites showed that tree species have versatile uses (Table 5). The tree species were chosen according to the informant's consensus. Thus, *Juniperus procera* showed a total score of 239 (79.67%) and ranked first, *Cordia africana* and *Olea europaea* with a total of 227 (75.33%) and 219 (73%) second and third positions, respectively.

Homegarden plant species of HoletaTown with medicinal values

The traditions of planting nutraceutical plants and wild plant species in homegardens for medicinal purposes have a vital role to *in situ* conservation of agrobiodiversity. From a total of plant species (112) identified in the present study, 13% were used as traditional medicinal plants and distributed among 15 genera in 9 families (Appendix II). Among these, 33.33% were nutraceutical plants (Table 6) and 60% were wild plants. The findings obtained were similar to that of Belachew et al. (2003) that reported 133 plant species grown in the 'Gamo'

Table 5. Results of direct matrix ranking of five homegarden tree species and its six major uses. According to the 12 key informants.

Scientific name	Attributes and score								
	Construction and crafts	Fuel wood	Medicine	Live fence	Soil fertility	Shade	Total score	Rank	%
Cordia africana	47	34	-	44	57	45	227	2	75.33
Juniperus procera	55	32	-	54	54	44	239	1	79.67
Eucalyptus globulus	40	56	55	32	10	23	216	4	71.33
Olea europaea	44	28	23	31	44	49	219	3	73
Acacia Sesbania	43	55	-	33	42	22	195	5	65

Table 6. Medicinal and food (nutraceutical) plant species found in the study area.

Specie name	Part used as medicine	Health problems	Method of preparation and use
Allium sativum	Bulb	Headache, abdominal crump and flue	The bulb is eaten alone or with *Zingiber officinale*
Ensete ventricosum	Corm, leaf	Broken limbs	The underground corm is boiled and is eaten to recover from injured limbs
Punica granatum	Leaf	Expel tape worm	Decoction of the leaf is reported to be used as a tape worm remedy
Lepidium sativum	Seed	Constipation, evil eye diarrhea, skin rash	The seeds are ground, mixed with lemon & water & are taken orally to cure constipation & diarrhea / rubbed on the skin to treat skin rash

south Ethiopia homegardens of which 18 were medicinal plants.

Indigenous knowledge and homegarden management practices in Holeta Town

For maintenance, the diversity of homegarden species in Holeta Town depends on various indigenous management activities. Belachew et al. (2003) and Talemos (2007) confirmed the same results.

Homegarden owners of Welaiyta and Gurage communities sites developed indigenous knowledge about the preparation, classification and cultivating of *E. ventricosum. E. ventricosum* is a versatile crop that is used for food, fodder, medicinal and other uses (Table 7). In regions surrounding the study site, Zemede and Zerihun (1997) reported similar perception with regard to the functions of this valuable crop.

One of the best aspects of indigenous knowledge in the study area is work division in managing homegardens. Females managed (38.41%) vegetables, spices, and medicinal plants by planting, weeding, watering and selling (Christianity, 1990). Males participated (47.93%) cultivating cash crop plants and digging, designing, finding seed and seedling. Zemede (2002) remarked that the male family head is often accountable for designing homegarden structure, identifying suitable places for positioning the major crops, monitoring and strongly impacting the structure and direction of homegarden development. Our results confirmed homegardens are useful for the maintenance of good health in developing countries as also reported by UNICEF (1982). This indigenous know-

Table 7. Eight landraces of *Ensete ventricosum* recorded in Gurage community site.

Local variety name	Use
Kancho (G)	Food, Fodder, Fiber
Key enset (G)	Medicinal, Food, Fiber, Fodder
Guariye (G)	Medicinal, Food, Fiber, Fodder
K'ebbena (G)	Medicinal, Food, Fiber, Fodder
Deriye (G)	Food, Fiber, Fodder
Ankefe (G)	Food, Fiber, Fodder
Demret (G)	Medicinal, Food, Fiber, Fodder
Safar (G)	Medicinal, Food, Fiber, Fodder

G: Gurage language.

ledge is also important in the development of modern medicines as reported by Dawit et al. (2003) and Fisseha (2007).

CONCLUSION

The results of this study indicated that homegardens in Holeta Town had high species diversity and a rich floristic composition that is worthy of *in situ* conservation of plant biodiversity, trial sites of new variety of income source vegetables and other species. In addition, homegardens provide significant contributions for the gardener and the society as source of supplementary food, medicinal functions, and income. However, insufficient agricultural support, small sized garden and disease and pests affect the diversity of species. If these challenges receive attention by concerned institutions and researchers, the hotspot will maintain its existing biodiversity and traditional management systems on a sustainable basis in the future.

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REFERENCES

TesfayeAbebe, K.F Wiersum, F. Bonger F (2010). Spatial and temporal variation in crop diversity in agroforestry homegardens of southern Ethiopia

Belachew W, Zemede A, Sebsebe D (2003). Ethnobotanical Study of Useful Plants in Daniio Gade (Homegardens) In Southern Ethiopia. Ethiop. J. Biol. Sci., 2(2): 119-141.

Christanty L (1985). Homegardens in Tropical Asia: A special reference to Indonesia. Proceedings of the First International Workshop on Tropical Homegarden, 2-December, 1985, Bandung, Indonesia, pp.39-42.

Christanty L (1990). Homegardens in tropical Asia with special references to Indonesia .In: *tropical homegardens*, Pp .9-20 (Ladue, k. and Brazil, M. eds.). The United Nations University press, Tokyo, Japan.

Cotton CM (1996). Ethnobotany: Principle and Applications. John Wiley Sons Ltd Chichester, England.

Dawit A, Asfaw D, Kelbessa U (2003). Medicinal Plants and Other Useful Plants of Ethiopia. Ethiopian Health and Nutrition Research Institute, p.312.

Eyzaguirre P, Linares O eds (2004). Homegardens and agro biodiversity. Smithsonian Press. Washington, D.C. p. 254.

FAO (2001). Assessment of the World Food Security Situation. Committee on Food Security, Twenty-seventh Session, documents no CFS: 2001/2. FAO. Rome, Italy.

Fisseha M (2007). An Ethnobotanical study of Medicinal Plants in Wonago woreda , SNNPR, Ethiopia. M. Sc. Thesis, Addis Ababa University, p.72.

Hoogerbrugge I, Fresco LO (1993). Homegarden system: Agricultural characteristics and challenges. Intl. Inst. Environ. Devepment Gaxekeeper Series p.39.

Kent M, Coker P (1992). Vegetation Description and Analysis: A practical approach. Belhaven Press, London. p. 263.

Kumar BM, Nair PKR (2004). The enigma of tropical homegardens. Agroforestry Systems, Kluwer Academic Publisher.61:135-152.

Kumar BM, Nair PKR (2006). Tropical Homegardens: A time-tested Example of Sustainable Agroforestry. Environmental Experts S. L., p. 377.

Lamprecht H (1989). Siliculture in the tropics. Tropical forest ecosystems and their tree species possibilities and methods are the long-term utilization. T_2-verlagsgeslls chaft, RoBdort, Germany, p. 296.

Martin GJ (1995). Ethnobotany: A method Manual. Chapman and Hall, London. pp. 265-270.

Qualset CO, McGuire PE, Warburton ML (1995). Agrobiodiversity key to Agricultural productivity. Genetic Resource conservation program University of California, Davis, pp.35-41.

Shannon CE, Wiener W (1949). The mathematical theory of Communication. Unversity of Illions Press. Urbana III.

Talemos Seta (2007). Diversity in Ensete-Based Homegardens and Its Significance to Household Supply in Welayita (Southern Ethiopia): An Ethnobotanic Approach. M. Sc. Thesis, Addis Ababa University, p. 105.

Tesfaye Abebe (2005). Diversity in Homegarden Agroforestry Systems of Southern Ethiopia. Ph. D dissertation, Wageningen University, Netherlands.

UNICEF (1982). Homoegarden Handbook Biodiversity guide for Ethiopia. Word Conservation Monitering Center, Cambridge, Euphytica 96:1-2.

Watson JW, Eyzaguirre PB eds (2002). Homegardens and *in situ* conservation of plant genetic resources in farming systems. Proceedings of the Second International Home gardens Workshop, 17-19 July 2001, Witzenhausen, Federal Republic of Germany. Intl. Plant Genet. Resour Inst. (IPGRI), Rome, Italy pp.105-124.

Whittaker RH (1972). Evolution and measurement of species diversity. Taxon. 21:213-251.

Zemede Asfaw (2001). The role of homegardens in the production and conservation of medicinal plants. In: Conservation and Sustainable use of Medicinal plants in Ethiopia, (Medhin Zewdu and Abebe Demissie, eds.). Proceedings of the National Workshop on Biodiversity Conservation and Sustainable Use of Medicinal Plants in Ethiopia. 28 April - 1 May 1998. Institute of Biodiversity Conservation and Research, Addis Ababa, Ethiopia. pp. 76-91

Zemede Asfaw (2002). Homegardens in Ethiopia: Some observations and generalizations. In: Homegardens and *In situ* Conservation of Plant Genetic Resources in Farming Systems, (Watson J. W. and Eyzaguirre, P.B., eds.). Proceedings of the Second International Homegardens Workshop, July, 2001, Witzenhausen, Germany. Intl. Plant Genet. Resour. Inst. Rome, Italy. pp.125-139

Zemede Asfaw (2004). Homegarden and Agrobiodiversity. In: The enset based homegardens of Ethiopia, (Eyzaguirre and Linares eds.). Smithsonian Institution, Washington. pp. 123-147.

Zemede Asfaw, Zerihun Woldu (1997). Crop association of homegardens in Walayta and Gurage in Southern Ethiopia. SINET: Ethiop. J. Sci. 20(1):73-90.

Appendix I: List of plants found in Holeta homegardens.

Scientific name of plants	Local name (Amharic)	Family name	Habit	Collection number
Acacia abyssinica Hochst.ex Benth	Grar (A)	Fabaceae	tree	M035
Acacia melanoxylon R.Br	Omedla (A)	Fabaceae	tree	M064
Acacia Sesbania (vahl) Benth	Chaca (A)	Fabaceae	tree	M114
Ajuga integrifolia Buch-Ham ex-D.Don	Armagusa (A)	Lamiaceae	herb	M98
Allium cepa L.	Key shinkurt (A)	Alliaceae	herb	M033
Allium porrum L.	Baro shinkurt (A)	Alliaceae	herb	M023
Allium sativum L.	Netch shinkurt (A)	Alliaceae	herb	M040
Allophylus abyssinicus (Hochest) Radlkofer	Embuse (A)	Sapnidaceae	tree	M059
Anethum graveolens L.	Iensilal (A)	Apiaceae	herb	M053
Apium graveolens L.	Yeshorba kitel (A)	Apiaceae	herb	M014
Artemisia absinthium L.	Arrity (A)	Asteraceae	herb	M101
Arundo donax L.	Shenbeko (A)	Poaceae	herb	M083
Asparagus africanus L am	Serity (A)	Asparagaceae	climber	M021
Asplenium aethiopicum (Burm.f.)Bech	Fern (E)	Aspleniaceae	herb	M02
Beta vulgaris L.	Keyisir (A)	Chenopodiaceae	herb	M074
Beta vulgaris L.	Kosta (A)	Chenopodiaceae	herb	M056
Brassica carinata A.Br.	Yeguragie gomen (A)	Brassicaceae	herb	M088
Brassica integrifolia L.	Tikel gomen (A)	Brassicaceae	herb	M109
Brassica oleracea L. var. capitata	Yewer gomen (A)	Brassicaceae	herb	M093
Brassica oleracea L.	Gomen (A)	Brassicaceae	herb	M030
Buddleja davidii Franch.	Amfar (A)	Loganiaceae	shrub	
Callistemon citrinus (Curtis) Skeels	Bottle brush (E)	Myrtaceae	tree	M081
Canavalia africana L.	Adenguara (A)	Fabaceae	herb	M09
Citrus paradisi L.	Gripe fruit (A)	Rutaceae	shrub	M028
Canna indica L.	Setakuri (A)	Cannaceae	herb	M094
Capsicum annuum L.	Yeferenge karia (A)	Solanaceae	herb	M041
Carica papaya L.	Papay (A)	Caricaceae	herb	M115
Capsicum frutescens L.	Yabish karia (A)	Solanaceae	herb	M071
Carissa spinarum L.	Agam (A)	Apocynaceae	shrub	M025
Casimiroa edulis La Llave	Casimer (A)	Rutaceae	tree	M022
*Catha edulis (*Vahl.) Forssk.ex Endl	Chat (A) (E)	Celastraceae	shrub	M038
Citrus aurantium L.	Komtate (A)	Rutaceae	shrub	M090
Citrus aurantifolia (Christm.) Swingle	Lomi (A)	Rutaceae	shrub	M018
Citrus medica L.	Tirengo (A)	Rutaceae	shrub	M05
Citrus sinesis L. Osb	Birtukan (A)	Rutaceae	shrub	M010
Coccinia abyssinica (Lam) Cogn	Anchote (O)	Cucurbitaceae	herb	M103
Coffea arabica L.	Buna (A)	Rubiaceae	shrub	M034
Cordia africana Lam.	Wanza (A)	Boraginaceae	tree	M089
Croton macrostachyus Del.	Bisana (A)	Euphorbiaceae	tree	M024
Cucumis sativus L.	Kiar (A)	Cucurbitaceae	herb	M061
Cucurbita pepo L.	Duba (A)	Cucurbitaceae	herb	M043
Cupressus lusitanica Mill.	Yefireng tid (A)	Cupressaceae	tree	M090
Cymbopogon citralus (DC) Stapf	Tej-sar (A)	Poaceae	herb	M070
Daucus carota L.	Karot (A)	Apiaceae	herb	M112
Dovyalis caffra (Hook.f.Harv.)Hook.f.	Kosim (A)	Flacourtiaceae	shrub	M079
Ensete ventricosum (Welw) Cheesman	Enset (A)	Musaceae	herb	M087
Eragrostis tef (Zucc.)	Tef (A)	Poaceae	herb	M046
Erythrina brucei Schweinf	Korich (A)	Fabaceae	tree	M036
Eucalyptus camaldulensis Dehnh	Netch bahrzaf (A)	Myrtaceae	tree	M096
Eucalyptus globulus Labill	Key bahrzaf (A)	Myrtaceae	tree	M092

Appendix I. Contd.

Ficus elastica Roxb.	Yegoma zaf (A)	Moraceae	tree	M03
Ficus sur Forsk.	Sholla (A)	Moraceae	tree	M073
*Hagenia abyssinica (*Bruce) J. F. Gmel.	Koso (A)	Rosaceae	tree	M019
Hordeum vulgare L.	Gebs (A)	Poaceae	herb	M052
Juniperus procera Hochst,ex.Endl	Yabesha tid (A)	Cupresaceae	tree	M072
Justicia shimperiana L.	Sensel (A)	Acanthceae	shrub	M078
Lactuca sativa L.	Selata (A)	Asteraceae	herb	M060
Lepidium sativum L.	Fetto (A)	Brassicaceae	herb	M026
Ligustrum vulgare L.	Yeferenge mifakia (A)	Oleaceae	tree	M067
Lippia adoensis var adoensis	Kessie (A)	Verbenaceae	shrub	M051
Lippia adoensis var koseret Sebsebe	Koseret (A)	Verbenaceae	shrub	M068
Lycopersicon esculentum Mill	Timatim (A)	Solanaceae	herb	M084
Malus sylvestris Miller	Pom (apple) (A), (E)	Rosaceae	shrub	M065
Mentha spicata L.	Nana(A)	Lamiaceae	herb	M080
Millettia ferruginea (Hochst.) Bak	Birbira (A)	Fabaceae	tree	M099
Morus alba L.	Yeferenge injury (A)	Rosaceae	tree	M048
Musa X *paradisiaca* L.	Muse (A)	Musaceae	herb	M044
Myrtus communis L.	Ades (A)	Myrtaceae	shrub	M045
Nicotiana tobacum L.	Timbaho (A)	Solanaceae	herb	M016
Ocimum basilicum L.	Besobila (A)	Lamiaceae	herb	M031
Ocimum lamiifolium Hochst ex Benth	Demakese (A)	Lamiaceae	shrub	M017
Olea europaea L. sub sp cuspidata Wall ex G.Don.)Cif	Wyera (A)	Oleaceae	tree	M057
Osyris quadripartita Dec.	Kert (A)	Santslaceae	shrub	M076
Otostegia integrifolia Benth	Tinjuit (A)	Lamiaceae	shrub	M013
Pennisetum puprureum Schumach	Elphant grass (E)	Poaceae	herb	M100
Pentas schimperiana (A.Rich.)	Weynagifte (A)	Rubiaceae	herb	M066
Persea americana Mill	Abokado (A)	Lauraceae	tree	M058
Phoenix reclinata Jacq	Zenbaba (A)	Areaceae	tree	M020
Phaseolus vulgaris L.	Fossolia (A)	Fabaceae	herb	M011
Physalis peruviana L.	Yefirang awet (A)	Solanaceae	herb	M055
Phytolacca dodecandra L' Herit	Endod (A)	Phytolaccaceae	shrub/climber	M111
Pinus patulla Schiede ex Schltdl.&Cham	Arzelibanos (A)	Pinaceae	tree	M029
Pisum sativum L.	Ater (A)	Fabaceae	herb	M07
Plectranthus edulis L.	Yewelayta dinic (A)	Lamiaceae	herb	M010
Podocarpus falcatus (Thunbr.)R.B.ex.Mirb	Zigba (A)	Podocarpaceae	tree	M062
Prunus africana L.	Tikur enchet (A)	Rosaceae	tree	M063
Prunus x domestica L.	Prim (E)	Rosaceae	tree	M042
Prunus persica (L.) Batsch	KOk (A)	Rosaceae	tree	M027
Psidium guajava L.	Zitun I (A)	Myrtaceae	tree	M050
Punica granatum L.	Roman (A)	Punicaceae	shrub	M049
Rhamnus prinoides L' Herit.	Gasho (A)	Rhamanceae	shrub	M039
Ricinus communis L.	Golo (A)	Euphorbiaceae	shrub	M107
Rosa hybrida Hort.	Tigerda (A)	Rosaceae	shrub	M095
Rosmarinus officinalis L.	Sigametibesha (A)	Lamiaceae	shrub	M037
Ruta chalepensis L.	Tenadam (A)	Rutaceae	shrub	M032
Saccharum officinarum L.	Shenkorageda (A)	Poaceae	herb	M012
Salix subserrata Willd	Aleltu (A)	Salicaceae	tree	M113
Schinus molle L.	Kundoberberie (A)	Ancardiaceae	tree	M04
Sesbania sesban L. Merr	Sesbania (A)	Fabaceae	shrub	M104
Solanum nigrum L.	Yabish awit (A)	Solanaceae	herb	M001
Solanum tuberosum L.	Dinch (A)	Solanaceae	herb	M039
Sorghum bicolor L.	Tinquish (A)	Poaceae	herb	M054

Appendix I. Contd.

Trigonella foenum graecum	Abise (A)	Fabaceae	herb	M08
Verbena officinlis L.	Atuse (A)	Verbenaceae	shrub	M069
Vernonia amygdalina Del.	Grawa (A)	Asteraceae	tree	M108
Vica faba L.	Bakela (A)	Fabaceae	herb	M06
Vitis vinifera L.	Weyn (A)	Vitaceae	climber	M077
Washingtonia filifera L.	Zenbaba (A)	Areaceae	tree	M015
Zantedeschia aethiopica (L.) K.P.J Sprengel	Tirumbaabeba (A)	Areaceae	herb	M028
Zea mays L.	Bekolo (A)	Poaceae	herb	M047

** O: Oromo name, E: English name and A: Amharic name.

Appendix II: Species of medicinal plants widely used in the homegardens of Holeta Town.

Species name	Local name (Amharic)	Part used	Habit
Allium sativum	Nich senkurit	Bulb	herb
Artemisia absinthium	Ariti	Leaf	herb
Ajuga integrifolia	Armagusa	leaf	herb
Croton macrostachyus	Bisana	Leaf sap	tree
Cymbopogon citrates	Tej-sar	Root	herb
Verbena officinalis	Atuch	Leaf	shrub
Ensete ventricosum	Key enset	Corm, Leaf	herb
Eucalyptus globules	Nech bharzaf	Leaf	tree
Anethum graveolens	Insilal	Leaf	shrub
Hagenia abyssinica	Kosso	Flower	tree
Mentha spicata	Nana	Leaf	herb
Punica granatum	Roman	Leaf	shrub
Ruta chalepensis	Tena- adam	Leaf	shrub
Vernonia amygdalina	Grawa	Leaf	tree
Pentas schimperiana	Weynagift	leaf	herb
Lepidium sativum	Fetto	seed	herb