ASIAN JOURNAL OF FORESTRY
Volume 6, Number 2, December 2022 E-ISSN: 2580-2844
Pages: 83-89 DOI: 10.13057/asianjfor/r060204

Identification and characterization of traditional agroforestry practices and their socioeconomic roles in Dendi District, Central Ethiopia

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Manuscript received: 14 July 2022. Revision accepted: 4 September 2022.

Abstract. *Humnessa T, Gebretsadik W, Negasa A. 2022. Identification and characterization of traditional agroforestry practices and their socioeconomic roles in Dendi District, Central Ethiopia. Asian J For 6: 83-89.* This study was conducted in the Dendi District of Central Ethiopia in three *kebele* (smallest administration units in Ethiopia) to identify and characterize the existing traditional agroforestry practices and their contribution to household livelihood. Informal surveys were conducted through key informant interviews and physical observations, while formal surveys were conducted using structured questionnaires. Home gardens, scattered trees on cropland, scattered woody species on grazing land, live fencing, and rarely woodlots were traditional agroforestry practices identified in the area. Home gardens were the prevailing traditional agroforestry practices in the study area. Fifty-seven (57) perennial woody species and twenty-two (22) annual crops (including vegetables and crops) in the home garden, twelve (12) species of scattered trees on cropland, twenty-eight (28) woody species on grazing land, twenty-four (24) woody species on the live fence, and two (2) woody species on woodlots were planted and managed in the study area for several purposes. Except for woodlots, most woody species in traditional agroforestry were grouped under the Fabaceae family. Furthermore, most associated annual crops in home garden agroforestry were categorized under the Solanaceae family. Different tree management practices, such as branch pruning, coppicing, pollarding, and thinning, were undertaken by agroforestry practitioners to reduce negative interaction among components and maximize the overall products of the system.

Keywords: Dendi, home garden, scattered trees, woodlot, woody species

INTRODUCTION

Today's world, including Ethiopia, faces many challenges related to declining vegetation cover, land degradation, unsustainable farming practices, rising hunger, and poverty. Agroforestry has a high potential to provide both sustainable products and environmental services (Sharma et al. 2007; Nyaruai et al. 2018). It is a farming system in which trees or shrubs are grown in association with crops, pastures, or livestock. The positive interaction between trees and other components increases land users' social, economic, and environmental benefits (Leakey 1996). In Ethiopia, traditional agroforestry, a household strategy of land use system to provide food, fuel-wood, timber and fodder, protection, and other values as a model for sustainable forestry and agricultural practices, has been practiced for a long period. Traditional agroforestry practice may include home gardens, defined as an agroforestry system in which woody plant species and crops/vegetables are closely integrated around farmers' homesteads and managed mainly by family labor to stabilize their food security (Nair 1993; Kebebew et al. 2018). Multipurpose woody species on croplands, which is considerately incorporating woody plant species in annual croplands for various purposes such as fulfilling farmers' need for timber products. Also on conserving native woody species and conserving biological diversity (Giday et al. 2019). Furthermore, it is useful for improving the production of annual food crops and non-food goods (Gebrewahid and Abrehe 2019). Trees in live fences are multipurpose woody species planted around a house, cropland, and garden for protection. Trees in multipurpose woodlots are small patches of land planted with trees on individual farms or communal lands for various purposes. Moreover, scattered trees on grazing lands are referred to as the management and conservation of scattered trees and other woody species on grazing lands.

Agroforestry, where trees are integrated with crops and livestock, is a promising land management system that can address many challenges farmers encounter (Lundgren and Raintree 1982). For example, Agroforestry has the potential to mitigate climate change and adapt resource-poor smallholder farms to extreme and variable weather. Furthermore, it could increase tree-related essential ecosystem services while increasing farm productivity without reliance on large amounts of external inputs such as inorganic fertilizers and chemicals for pest management (Agroforestry Network 2018).

The first principle of agroforestry is that plants work and grow best in cooperation. This notion is against the conventional agricultural view. In the conventional agricultural view, plants brought together on a parcel of land compete for a limited environmental resource, resulting in yield loss. On the contrary, agroforestry examined how plants cooperate rather than how they compete. Each plant is considered to have a unique role in the ecosystem, and agroforestry tries to put plants in a mutually beneficial relationship: companion planting. Companion plants may provide yield at one time or render their ecosystem service (Shade, insect pollination, etc.) at

other times. Agroforestry is an early farming system characterized by managing complex natural systems rather than destroying local ecosystems to grow crops (Dara Casey, 2022)

Even though traditional agroforestry systems have contributed immensely to households' food security improvement and environmental protection in Ethiopia, less attention is given to improving the system. Furthermore, it is important to identify and characterize the existing traditional agroforestry practices in the area and the species compositions to modify farmers' knowledge of different traditional agroforestry practices. In agroforestry research, practices are often applied after diagnosis and design, participatory research, or characterization studies, depending on an area's social, economic, and environmental problems (Leakey 1996). Thus, we conducted the current study with the overall objective of identifying and characterizing the existing traditional agroforestry practices and their contribution to household livelihood, which will be used as baseline data for further development and research activities.

MATERIALS AND METHODS

Description of the study area

Dendi is one of the 19 districts/ *woredas* (administration units higher than *kebele*s) of the West Shoa zone of the Oromia regional state, Ethiopia, within 8°7'19"-9°15'1"N and 37°9'15"-38°3'41"E with an altitudinal range from 2,000-3,200 meter above sea level. The district's capital town, Ginchi, is located 75 km West of Addis Ababa. The district has a total area of 109,555 ha. The district is bordered in the South by Bacho and Dawo Districts, in the East by Ejere District, in the West by the Ambo district, and in the North Jeldu district (Figure 1).

Survey procedures

The specific study sites and prioritization of agroforestry practices were identified through discussions with different district stakeholders in the study area (administrations, development agents, and relevant experts). Based on these discussions, the purposive sampling method, a robust non-random sampling method to pick out intensive agroforestry practitioners and knowledgeable key informants in the community, was employed to get basic information from the selected *kebele*s (smallest administration units in Ethiopia).

Purposive sampling is a more robust technique than random sampling because random community members may not be known as expert informants (Tongco 2007). Thus, three *kebele*s (Bajiro, Boda Boseqa, and Gare Arera) were selected for this study for key informant interviews. Ten households were selected from each *kebele*s as a sample and assigned to be interviewed. The primary information was collected through formally structured questionnaires, key informant interviews, and physical observation. In addition, secondary information was collected from the district agricultural office, *kebele*s Farmers' Training Centre (FTC), and other relevant stakeholders.

Finally, all selected kebeles groups comprised ten key informants representing elders, youth group, male-headed and female-headed. The selection was based on their long residence in the study area, good knowledge of traditional agroforestry practices, and ability to express the functioning and historical development of traditional agroforestry practices in the area. The nomenclature of plant specimens collected from the home garden follows Bekele-Tesemma and Tengnäs (2007). Collected data were subjected to SPSS 20 statistical software and Microsoft Excel 2010 for analysis.

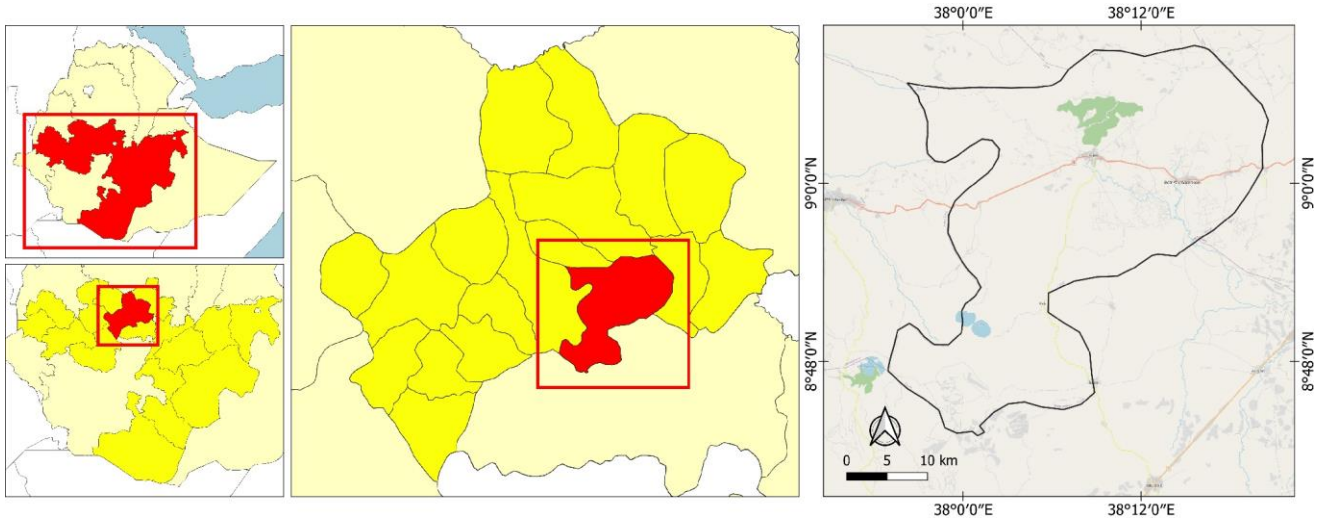

Figure 1. Map of the study area in Dendi District, Oromia State, Ethiopia

RESULTS AND DISCUSSION

Trends of vegetation cover

Most respondents from the interviewed household heads at Bajiro (90%) and Boda Boseqa (80%) replied that the vegetation cover of the area is decreasing from time to time. In comparison, at Gare Arera, the majority of respondents (above 70%) replied that it is increasing; the reason for increasing of vegetation coverage at Gare Arera *kebele* is mainly attributed to the participatory forest management activity of the Chillimo natural forest, where the respondents were located (Figure 2).

Landholding and classification of land use

Survey results showed that relatively larger land holdings that ranged from 1.00 ha to 3.75 ha were observed at Boda Boseqa *kebele*s. Gare Arera had the least land holding size comparatively, averaging about 1.23 ha. The dominant land uses identified in the study area include cropland, grazing land, and home garden agroforestry. Traditional agroforestry was frequently observed in land use at all interviewed households. At Bajiro and Boda Boseqa, significantly larger areas are allocated for cropland, while at Gare Arera, the coverage for home garden agroforestry practices was significantly higher than other land uses (Figure 3).

Traditional home garden agroforestry

The survey results showed that home gardens commonly practiced traditional agroforestry activities in the study area. Multipurpose woody plant species were incorporated and managed with various associated crops, vegetables, and spices in the backyard of households. As a result, fifty-seven woody species representing thirty-seven families were recorded in traditional home garden agroforestry practices (Table 1). Of thirty-four woody species managed in the home garden, 74% were native, while the rest, 26%, were exotic species. At the family level, Fabaceae was the most dominant family, represented by nine woody species, followed by Rosaceae, a family of five woody species. Similarly, twenty-two species of various associated crops and vegetables representing fifteen families were recorded in the traditional home garden agroforestry practices (Table 2).

For associated crops and vegetables, Solanaceae was the most dominant family, represented by four woody species, and Poaceae, represented by three woody species. The major woody species recorded were *Vernonia amygdalina* Delile, *Croton macrostachyus* Hochst, *Buddleja polystachya* Fresen, *Catha edulis* (Vahl) Endl., *Dombeya torrida* J.F.Gmel., *Cordia africana* Lam., and *Olea africana* Mill. The associated crops and more frequently recorded species were *Ensete ventricosum* Welw, *Allium cepa* L., *Allium sativum* L., *Solanum tuberosum* L., and *Brassica carinata* A., commonly practiced as understory crops and vegetables. These findings are similar to those reported by Yusuf and Solomon (2019) on home garden agroforestry (Figure 4).

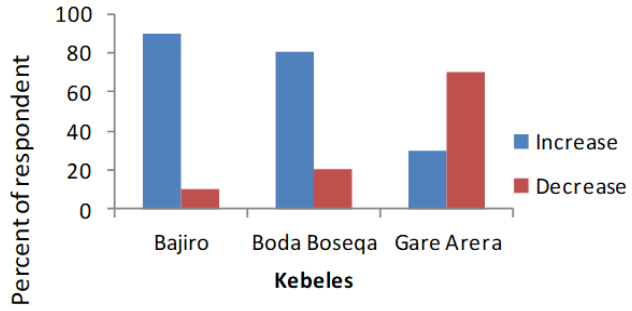

Figure 2. Comparison of responses on trends of vegetation covers across sampled *kebeles*

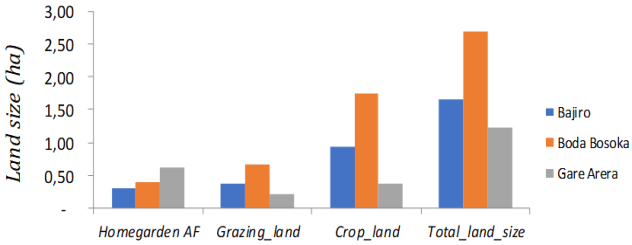

Figure 3. Landholding size and characterization of land use

Figure 4. Home garden agroforestry of the study area

Table1. Woody species managed in home gardens

Species	Family	Freq.	% of Freq.
Acacia abyssinica Hochst.	Fabaceae	12.00	2.39
Acacia decurrens Willd.	Fabaceae	1.00	0.20
Acacia saligna Labill.	Fabaceae	14.00	2.79
Albizia gummifera J.F.Gmel.	Fabaceae	8.00	1.59
Aleurites moluccanus Willd.	Euphorbiaceae	16.00	3.19
Arundinaria alpina K.Schum.	Poaceae	1.00	0.20
Balanites aegyptiacus L.	Balanitaceae	1.00	0.20
Buddleja polystachya Fresen.	Scrophulariaceae	27.00	5.38
Calpurnia aurea Benth.	Fabaceae	1.00	0.20
Carissa edulis Forssk.	Apocynaceae	2.00	0.40
Casuarina equisetifolia L.	Casuarinaceae	2.00	0.40
Catha edulis (Vahl) Endl.	Celastraceae	24.00	4.78
Celtis africana Burm.f.	Cannabaceae	1.00	0.20
Chamaecytisus palmensis H. Christ	Fabaceae	21.00	4.18
Citrus aurantium L	Rutaceae	14.00	2.79
Citrus sinensis L.	Rutaceae	1.00	0.20
Coffee arabica L.	Rubiaceae	15.00	2.99
Cordia africana Lam.	Boraginaceae	19.00	3.78
Croton macrostachyus Hochst.	Euphorbiaceae	26.00	5.18
Cupressus lusitanica Mill.	Cupressaceae	5.00	1.00
Dombeya torrida J.F.Gmel.	Sterculiaceae	20.00	3.98
Dovyalis abyssinica A.Rich.	Flacourtiaceae	6.00	1.20
Ekebergia capensis Sparrm.	Meliacieae	6.00	1.20
Erythrina brucei Schweinf.	Fabaceae	13.00	2.59
Eucalyptus globulus Labill.	Myrtaceae	8.00	1.59
Euclea schimperi Hiern	Ebenaceae	1.00	0.20
Ficus sur Forssk.	Moraceae	2.00	0.40
Grevillea robusta A. Cunn.	Proteaceae	4.00	0.80
Hagenia abyssinica J.F.Gmel.	Rosaceae	1.00	0.20
Hypericum revolutum Vahl	Hypericaceae	17.00	3.39
Juniperus procera Hochst.	Cupressaceae	4.00	0.80
Justicia schimperi Hochst.	Acanthaceae	1.00	0.20
Lippia javanica Burm.f.	Verbenaceae	18.00	3.59
Maesa lanceolate Forssk.	Myrsinaceae	9.00	1.79
Magnifera indica L	Anacardiaceae	2.00	0.40
Malus domestica Borkh	Rosaceae	23.00	4.58
Maytenus arbutifolia Hochst.	Celastraceae	3.00	0.60
Millettia ferruginea Hochst.	Fabaceae	7.00	1.39
Myrica salicifolia Hochst.	Myricaceae	1.00	0.20
Myrsine africana L	Primulaceae	1.00	0.20
Olea africana Mill.	Oleaceae	18.00	3.59
Osyris compressa (P.J.Bergius).	Santalaceae	1.00	0.20
Persea americana Mill.	Lauraceae	7.00	1.39
Phytolacca dodecandra Hoffm.	Phytolaccaceae	1.00	0.20
Pittosporum viridiflorum Sims.	Pittosporaceae	3.00	0.60
Podocarpus falcatus (Thunb)	Podocarpaceae	4.00	0.80
Prunus africana (Hook.f.)	Rosaceae	11.00	2.19
Prunus domestica L	Rosaceae	9.00	1.79
Psidium guajava L	Myrtaceae	1.00	0.20
Rhamnus prinoides L'Hér.	Rhamnaceae	20.00	3.98
Rhamnus staddo R.Br.	Rhamnaceae	3.00	0.60
Rhus vulgaris Meikle	Anacardiaceae	2.00	0.40
Rosa abyssinica R.Br.	Rosaceae	11.00	2.19
Salix subserrata Willd.	Salicaceae	3.00	0.60
Sesbania sesban (L.)	Fabaceae	16.00	3.19
Vernonia amygdalina Delile	Asteraceae	33.00	6.57
Vernonia auriculiolia Hiern	Asteraceae	1.00	0.20

Table 2. Crops and vegetables in the traditional home gardens

Scientific name	Family	Freq.	Percent (%)
Vicia faba L.	Fabaceae	10	3.08
Allium cepa L.	Amaryllidaceae	8	2.46
Ocimum basilicum L.	Lamiaceae	16	4.92
Zea mays L.	Poaceae	10	3.08
Ruta chalepensis L.	Rutaceae	18	5.54
Cucurbita pepo L.	Cucurbitaceae	14	4.31
Solanum tuberosum L.	Solanaceae	26	8.00
Beta vulgaris L.	Amaranthaceae	18	5.54
Daucus carota L.	Apiaceae	4	1.23
Cymbopogon citratus (DC.)	Poaceae	10	3.08
Musa acuminate Colla.	Musaceae	6	1.85
Capsicum annuum L.	Solanaceae	1	0.31
Allium sativum L.	Alliaceae	27	8.31
Allium cepa L.	Alliaceae	29	8.92
Brassica carinata A.	Cabombaceae	26	8.00
Brassica oleracea L.	Brassicaceae	22	6.77
Lactuca sativa L.	Asteraceae	11	3.38
Rosmarinus officinalis L.	Lamiaceae	5	1.54
Saccharum officinarum L.	Poaceae	13	4.00
Nicotiana tabacum L.	Solanaceae	1	0.31
Lycopersicon esculentum Mill.	Solanaceae	20	6.15
Ensete ventricosum Welw.	Musaceae	30	9.23

Scattered multipurpose woody species on cropland

Trees planted in this traditional agroforestry practice were woody species preferred by farmers and rarely naturally grown trees and shrubs maintained in scattered densities. Survey results showed the presence of 12 woody species of trees and shrubs representing ten families at the study site (Table 3). Of twelve woody plant species planted and managed on croplands, 82% were native. At the family level, *Fabaceae* was the most dominant family, represented by three woody species, while one species represented the rest families. The *B. polystachya*, *C. macrostachyas*, *V. amygdalina*, *Dovyalis abyssinica* A.Rich., and *Acacia abyssinica* Hochst. were the most frequently observed multipurpose woody species on cropland in the study area.

In contrast, *Juniperus procera* Hochst., *Podocarpus falcatus* (Thunb), and *Erythrina brucei* Schweinf. were rarely observed. Results indicated that most households prefer indigenous tree species to manage on their cropland for soil fertility improvement, timber production, shade for their livestock, and rarely to hang traditional beehives. This finding is in line with other studies elsewhere in Ethiopia on scattered tree species on farmlands (Alebachew 2012; Yusuf and Solomon 2019).

Scattered woody species on grazing lands

We commonly practiced deliberate protection and management of naturally grown trees on grazing land and planting selected multipurpose woody species in all study areas. However, we rarely practiced planting different multipurpose woody species in the area. Survey results showed that 28 woody species representing 20 families were planted and managed on grazing land (Table 4). Of twenty-eight woody species managed and planted on grazing lands, 82% were native, while the rest 18 woody

species were exotic. At the family level, the most dominant family was *Fabaceae*, represented by four woody species. In addition, two woody species represented five families, Casuarinaceae, Cupressaceae, Euphorbiaceae, Primulaceae, and Rosaceae. Furthermore, only one species represented the remaining 14 families. Of identified woody species, *J. procera*, *P. falcatus*, *A. abyssinica*, *Eucalyptus globulus* Labill., and *C. macrostachyas* were the most frequent woody species managed on grazing land in the study areas. At the same time, *Euclea schimperi* Hiern, *Carissa edulis* Forssk. and *Salix subserrata* Willd. were the least occurring species in the area.

Woody species used for live fence/boundary planting:

The study indicated that different woody species were planted as live fences around a house, cropland, and between the boundaries of farmlands. Mainly the purposes of the live fence/boundary planting are protection and shelter against animals and wind, shade, and rarely some leguminous shrubs between the boundaries of croplands are planted for fodder, soil fertility, and soil and water conservation. Besides its deliberate benefits, woody species planted for fencing can provide fuel-wood, food, and fodder and serve as beautification. Twenty-four woody species representing 16 families were planted for living fences in the study area (Table 5). At the family level, the most dominant family was Fabaceae, represented by three woody species. In comparison, the remaining 15 families were represented by one species. The *D. abyssinica*, *Calpurnia aurea* Benth., *E. globulus*, *Rosa abyssinica* R.Br. ex. Lindl, and *Cupressus lusitanica* Mill. were priority species by farmers for live fence planting.

Multipurpose woodlots

In the study area, plantations (in-situ conservation) of woody species in the form of woodlots to achieve several objectives (timber, fodder, soil protection, and soil reclamation) were practiced. A survey indicated that *E. globulus* (86%) was a commonly planted species for woodlots, while naturally grown *J. procera* (14%) was managed as woodlots for various purposes.

Table 1. Woody species managed on farmland

Scientific name	Family name	Freq.	% of freq.
Acacia saligna Labill.	Fabaceae	1	1.02
Buddleja polystachya Fresen.	Scrophulariaceae	18	18.37
Croton macrostachyus Hochst.	Euphorbiaceae	16	16.33
Podocarpus falcatus (Thunb)	Podocarpaceae	2	2.04
Dombeya torrida J.F.Gmel.	Sterculiaceae	13	13.27
Vernonia amygdalina Delile	Asteraceae	15	15.31
Olea africana Mill.	Oleaceae	10	10.20
Juniperus procera Hochst	Cupresaceae	2	2.04
Acacia abyssinica Hochst.	Mimosaceae	12	12.24
Sesbania sesban (L.)	Fabaceae	3	3.06
Ekebergia capensis Sparrm.	Casuarinaceae	4	4.08
Erythrina brucei Schweinf.	Fabaceae	2	2.04

Table 4. Woody species, managed and planted on grazing lands

Scientific name	Family name	Freq.	% of freq.
Malus domestica Borkh	Primulaceae	2	1.35
Acacia decurrens Willd	Fabaceae	4	2.70
Acacia saligna Labill.	Fabaceae	2	1.35
Euphorbia abyssinica J.F.Gmel.	Euphorbiaceae	4	2.70
Carissa edulis Forssk.	Apocynaceae	1	0.68
Salix subserrata Willd.	Salicaceae	1	0.68
Eucalyptus globulus Labill.	Myrtaceae	12	8.11
Croton macrostachyus Hochst.	Euphorbiaceae	8	5.41
Podocarpus falcatus (Thunb)	Podocarpaceae	16	10.81
Vernonia amygdalina Delile	Asteraceae	4	2.70
Olea africana Mill.	Oleaceae	7	4.73
Juniperus procera Hochst.	Cupressaceae	23	15.54
Cupressus lusitanica Mill.	Cupressaceae	3	2.03
Grevillea robusta A. Cunn	Proteaceae	4	2.70
Ficus sur Forssk.	Moraceae	2	1.35
Hagenia abyssinica J.F.Gmel.	Casuarinaceae	3	2.03
Prunus africana (Hook.f.)	Rosaceae	3	2.03
Rosa abyssinica R.Br. ex. Lindl.	Rosaceae	4	2.70
Maytenus arbutifolia Hochst.	Celastraceae	2	1.35
Acacia abyssinica Hochst.	Mimosaceae	14	9.46
Euclea schimperi Hiern	Ebenaceae	1	0.68
Myrsine africana L	Primulaceae	4	2.70
Rhamnus staddo R.Br.	Rhamnaceae	2	1.35
Ekebergia capensis Sparrm.	Casuarinaceae	4	2.70
Pittosporum viridiflorum Sims.	Pittosporaceae	3	2.03
Millettia ferruginea Hochst.	Fabaceae	7	4.73
Osyris compressa Decn	Santalaceae	2	1.35
Erythrina brucei Schweinf.	Fabaceae	6	4.05

Table 2. Woody species for live fence/boundary planting

Scientific name	Family name	Freq.	% of freq.
Acacia decurrens Willd	Fabaceae	9	4.71
Buddleja polystachya Fresen.	Scrophulariaceae	2	1.05
Eucalyptus globulus Labill.	Myrtaceae	18	9.42
Croton macrostachyus Hochst.	Euphorbiaceae	4	2.09
Podocarpus falcatus (Thunb)	Podocarpaceae	2	1.05
Calpurnia aurea Benth	Fabaceae	22	11.52
Vernonia auriculiolia Hiern	Asteraceae	11	5.76
Dombeya torrida J.F.Gmel.	Sterculiaceae	6	3.14
Vernonia amygdalina Delile	Asteraceae	8	4.19
Olea africana Mill.	Oleaceae	2	1.05
Juniperus procera Hochst.	Cupressaceae	8	4.19
Cupressus lusitanica Mill.	Cupressaceae	14	7.33
Rubus steudneri Schweinf.	Rosaceae	2	1.05
Grevillea robusta A. Cunn	Proteaceae	10	5.24
Rosa abyssinica R.Br.	Rosaceae	15	7.85
Maytenus arbutifolia Hochst.	Celastraceae	1	0.52
Dovyalis abyssinica A.Rich.	Salicaceae	22	11.52
Rhamnus staddo R.Br.	Rhamnaceae	1	0.52
Sesbania sesban (L.)	Fabaceae	9	4.71
Casuarina equisetifolia L.	Casuarinaceae	14	7.33
Ekebergia capensis Sparrm.	Casuarinaceae	2	1.05
Chamaecytisus palmensis H. Christ	Fabaceae	5	2.62
Osyris compressa (P.J.Bergius).	Santalaceae	1	0.52
Erythrina brucei Schweinf.	Fabaceae	3	1.57

Purposes of planting woody species on traditional Agroforestry practices

The survey results indicated that in the study area, different woody species are planted in traditional Agroforestry practices (home gardens, farm lands, grazing lands, live fence/boundary planting, and woodlots) for various purposes. We found from respondents' replies that the woody species are mostly planted and managed for construction, fuel wood and charcoal, income generation, shade and shelter, soil fertility, and medicinal values (Figure 5). Of woody species planted and managed for traditional agroforestry practices, the respondents planted most for fuel-wood, shade, construction, soil fertility, and income generation. This finding is consistent with the study by Gebretsadik et al. (2018) and Tefera et al. (2019).

Management practices for woody species in traditional agroforestry practices

This study rendered different management practices to woody species on traditional agroforestry practices in the areas, including pollarding (55%) and branch pruning applied to (45%) of the scattered trees on croplands. Branch pruning (51%), coppicing (7%), pollarding (30%), and thinning (30%) of the woody species on grazing land were implemented. Therefore, (61%) of branch pruning, (3%) of pollarding, and (36%) of thinning were applied for live fence/boundary planting. Similarly, branch pruning (24%) and coppicing (76%) were implemented for woodlots, while branch pruning (49%), thinning (6%), and pollarding (46%) were implemented in the home garden.

The objective of applying the mentioned management practices is to reduce negative interactions between components and maximize the system's overall products/values per land management unit. For example, branch pruning and pollarding in cropland, home gardens, and rangeland facilitate light interception to the understory. That would reduce competition for light among those multipurpose woody species and associated crops. Additionally, timber and fuel wood products were obtained during these management practices.

Contribution of traditional agroforestry practices to household livelihood

Results from the survey indicated that traditional agroforestry practice provides many benefits for local communities to improve their livelihood. The respondents said that their major benefits from a home garden were economic, ecological, and social. They mainly generated incomes from products of traditional home garden agroforestry practices (fruits, associated vegetables, and crops, and other practices also generated income from selling timber and other related products). Additionally, there are fruits, understory vegetables, and crops cultivated in home garden agroforestry were used for household consumption (Figure 6).

In the study area, livestock production is one of the income-generation activities practiced by most households. In addition to grazing lands, livestock feeds were mainly obtained from by-products of different vegetables and crops cultivated in home gardens. Additionally, leaves and flowers of different woody species planted for live fence/boundary planting and on farmland and grazing land were highly used as a source of forage for livestock. For instance, in Boda *kebeles*, the respondents said that, during a dry season, they feed their livestock with the leaves and other parts of 'enset' (*E. ventricosum*) used to overcome the shortage of animal feed caused by drought. Besides its benefits as a source of fodder, woody species planted in different agroforestry practices can also serve as shade for livestock. This study finding is in line with the study conducted by Amenu (2017).

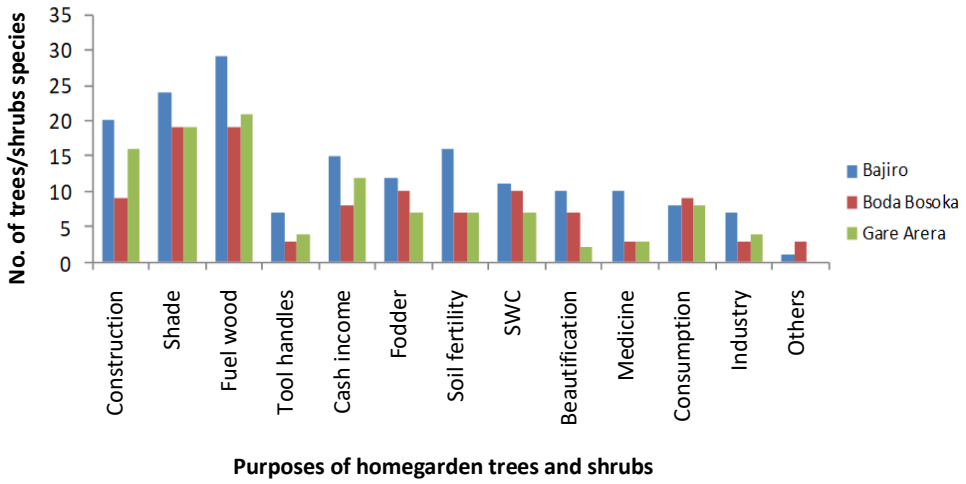

Figure 5. Purposes of planting trees and shrubs around the homestead

Figure 6. Various products obtained from traditional home garden agroforestry

In conclusion, most of the vegetation observed in the area were woody species managed in different traditional agroforestry practices. Such as home gardens, selected multipurpose tree species on croplands, woody species on grazing land, woodlots, and live fencing. Different multipurpose woody species were managed and conserved in all identified land use types for household consumption, timber production, income generation, fodder, soil fertility improvement, and protection. The plantation of *E. globulus* and infrequent natural regenerations of *J. procera* were managed as monoculture woodland by a few farmers in the study areas. Different management practices were observed, including branch pruning, coppicing, pollarding, and thinning of woody species of traditional agroforestry practices to reduce negative interactions among components and maximize overall function. Diversified agroforestry products from different traditional agroforestry practices provided countless benefits for local communities in improving their livelihood. A future study is suggested to promote the most preferred woody species from identified agroforestry practices in the area.

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