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Gender role in home-garden agroforestry management in Chuko district, Southern Ethiopia

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ABSTRACT

Gender role in agroforestry management is given little recognition partly due to cultural and traditional bias against men and women. This study was conducted to investigate the gender role of women and men in home garden agroforestry management. A total of 334 sample households from the two Kebeles were randomly selected for data collection. The two major home garden agroforestry systems practiced in the study area were agrosilvopastoral (88.5%) and agrosilvicultural (9%). Men and women have a different role in managing home garden agroforestry in the study area. Crops produced for cash (coffee and khat) were managed by men, whereas, crops produced for food (Ensete and vegetables) were managed and controlled by women. On average, 98.7% and 91% of all management activities of inset and vegetables were carried out by women, whereas, about 92% of all management activities of coffee and khat were carried out by men. Based on the overall analysis of the role of gender in home-garden agroforestry management, participation of women was higher than men in manuring, weeding, harvesting, taking animal care and marketing of home-garden products, while land preparation, planting activities and selling of products were done by men. Even though women play important role in the home garden agroforestry management activities, it's seemingly low in control of cash when compared to the men in the study area. Therefore, based on the finding, the study recommended that, the unfair distribution of labor division to control cash crop by men only by giving little quota for women should be clearly given due attention to enable home-garden agroforestry system remain sustainable.

Keywords: Agrosilvicultural, Agrosilvopastoral, Home-garden, Agroforestry, Gender role.

INTRODUCTION

Home garden is traditional agroforestry systems with multiple functions practiced by farmers around homesteads as a means of supporting livelihoods to stabilize their sustenance (Das T and Das AK, 2005). It is among agroforestry practices maintained by rural farmers, achieving an important role primarily for household consumption. In most tropical countries, home garden agroforestry is commonly practiced and play a vital role in supporting households' livelihood by providing supplementary products to meet the basic needs (FAO, 2004).

The management of home garden agroforestry needs the participation of all members of the household at various levels to improve farmers' livelihoods and quality of life (Mohan S, 2004). Traditional management of home gardens include production of seedling or planting, weeding, manuring, hoeing, pruning, fencing and in some cases irrigation were applied (Gautam T et al., 2004). The contribution of home garden agroforestry to household income generation per year was high next to agriculture (Billes, 2013). It improves the families' nutritional status, health, food security and provides important contributions to meet potential economic conditions. Selling of livestockproducts, tree products, cash crops:

Coffee (coffee arabica), khat (khat edulis) and spices, food crops (maize, teff, and bean) and fruits (mango, avocado, banana and papaya) are the main sources of income derived from home- garden products (Atiso H, 2017). Regarding the role of gender, both men and women play a substantial role in management of HG (Homegarden) agroforestry. Men tend to prefer crop characteristics that increase market value such as yield, appearance and market demand, while women prefer varieties that are more nutritious, better tasting and easier to fix. In addition to that, women are often responsible for managing trees, especially at the early stages of establishment (Kiptot E et al., 2014). The economy of Ethiopian people is dominated by agrarian and women are the key players of the agrarian economy in rural communities of the country. According to Meaza (2010), rural women are the main stay of the farm labor and make significant contribution to ensure food security. Women generate around 50% of income of the sector by actively participating in production (FAO, 2007). Despite their vital contributions, a little recognition is given for the gender role of women in home-garden agroforestry. As the other areas of the country, the study area has the same problem as less attention is given to the gender role of men and women in home-garden agroforestry management activities. In spite of the above mentioned facts about the active contributions of men and women, the division of labor in homegarden agroforestry management practices such as pit preparation, planting, pruning weeding, manuring, pest control, harvesting, marketing and money control remained as the study gap. This study therefore, intended to fill the existing gap and specifically to investigate the major homegarden agroforestry practices and the role of women and men in the management of home-garden agroforestry in the study area.

MATERIALS AND METHODS

Description of study area

The study site is located in Sidama Region, about 337 km south west of Addis Ababa and about 62 km south-west of the regional capital, Hawassa. Its geographical location extends from 6046'N to 7001'N latitude and 38004'E to 38024'E, Longitude (Aleta chuko Woreda Finance and economic development annual report, 2010). Agro ecology of the Woreda cover 70% of Woyna-Dega and 30% of Kola. The altitude of the study area ranges from 1400 to 2300 m above sea level. The Woreda annual rainfall ranges between 1100 to 1800 mm and average minimum and maximum temperature is 10°C and 26°C, respectively (Aleta chuko Woreda Finance and economic development annual report, 2010). On the area, tree species and shrubs like Cordia africana, Podocarpus falcatus, Millettia ferruginea, Bersama abyssinica, Eucalyptus camaldulensis, Eucalyptus globulus, Ensete, Coffee, khat, corn, sweet potato and haricot bean are dominant pronounced with clay loam and sandy loam soils. The farming system was a combination of horticulture and animal husbandry. Rainfall is bimodal in nature occurring in two growing seasons, namely the ''belg'' growing season (extending from March to May) and the meher (kiremt) growing season (extending from June to August). The total population of Woreda was 180,142. Out of this, total number of male was 50.2% (90,523) and the female population is 89,619 or 49.8%. (AC WFEDO, 2010) (Figure 1).

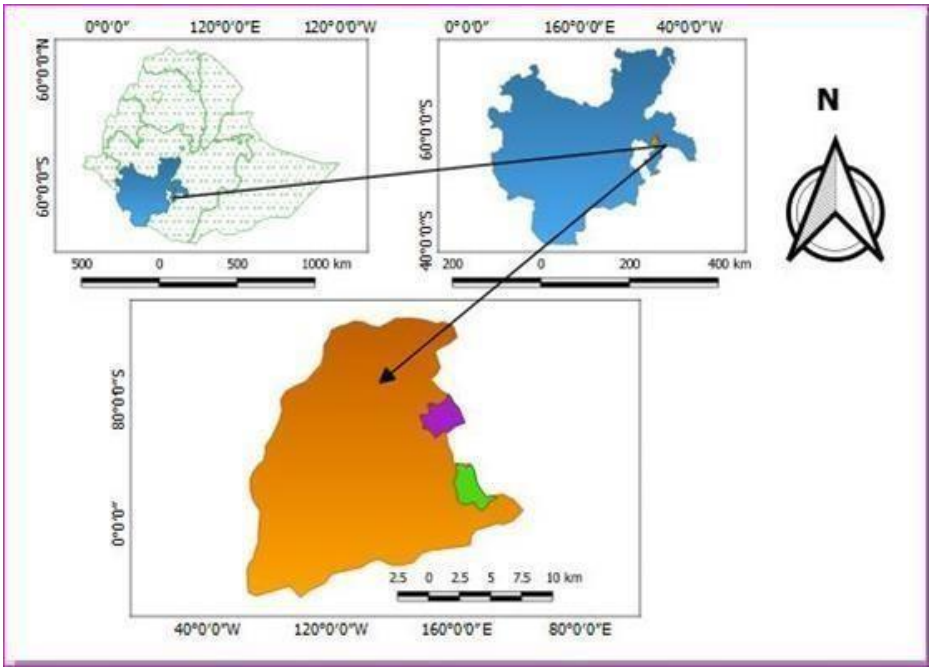

Figure 1. Map of the study area. **Note:** Study kebele ( ) Gure; ( ) Helo; ( ) Chuko Woreda; ( ) SNNPR; ( ) Ethio Regions.

Sampling technique and sample size determination

The study Woreda was selected purposively from the Sidama regional state due to extensive presence of home garden agroforestry practices (Table 1).

Table 1. Sample size of respondent's selected from each Kebeles.

S.No.	Name of Kebeles	Total number of HHs (House-holds)	Sampled HHs (House-holds)
1	Gure	838	137
2	Halo	1211	197
Total		2,049	334

Out of 26 Kebeles found in the Woreda, two Kebeles namely (Gure and Halo) were purposively selected based on the relative dominant coverage of home garden agroforestry practices compared to the others. From the total households of 2,049 in the two selected Kebeles, 334 households were selected using proportional to population size. The sample size was determined by using the formula proposed (Yamane T, 1967).

$$n = N/(1+N)^2 \cdots\cdots\cdots \text{Equation (1)}$$

Where, n is the sample size, N is the population size (total HHs (House holds) in sampled Kebeles) and, e=5% is the level of precision.
The total population of Gure and Halo kebele is 838 and 1211 respectively.

$$n = \frac{2049}{1+2049\ (0.05)^2} = 334 \ldots\ldots\ldots\ldots\ldots\ldots \text{Equation (2)}$$

Where, no is sample taken from each Kebele, N1 is number of HH (House holds) from each Kebele; N is total population and n is sample size. It's illustrated above in Table 1.

Data sources and collection techniques

Both primary and secondary data sources were used to achieve the designed objectives. Primary data were collected directly from sample households through a household survey, focus group discussion, and key informants interview. Secondary data were collected from the Woreda office of agriculture and natural resource, Kebele administration offices, and other published materials, including books, journals, and unpublished materials (Mateows N, 2005).

A total of 269 male and 65 female respondents were selected through simple random sampling (SRS) using the household lists of each kebele administration. The existing list of each kebele were used for randomizing the selected households for collecting data for investigating gender role in home-garden agroforestry management and its contribution to household livelihood (Degrande A et al., 2007). Questionnaires were administered on representative sampled households to obtain primarily the detailed information that focus on home-garden agroforestry management and their contribution.

A total of 10 key informants, five from each kebele were purposively selected based on their age and considered as knowledge, about the gender role and homegarden agroforestry management. People like village elders, and local leaders are well-informed about a certain topic of valuable bases of information. In addition to that, two focus group discussions were held in each kebele with eight participants in each group, a total of four focus group discussants (two groups with 16 women and two groups with 16 men).
Focus group discussion (FGD) helps to generate data at a community level and involves a small group of respondents to discuss on matters forwarded by the facilitators who are skilled moderators focusing on key issues of the research topic (Mwanje JI, 2001).

Data analysis

The qualitative data were collected through interview and field observations were summarized in the form of descriptive statistics such as frequency and percentage. Data collected by quantitative methods were analyzed and summarized by using SPSS version 20.0. Then data were presented in table, graph, chart, and percentage.

RESULTS AND DISCUSSION

Home-garden agroforestry systems practiced in the study area
The result of the household survey showed that there are two types of home-garden (HG) agroforestry systems found in the study area (Table 2).

Table 2. Types of HG (home garden) agroforestry system elaborated by gender in the study area.

HG (home garden) agroforestry system	Men		Women	
	Frequency	Percentage	Frequency	Percentage
Agrosilvopastoral	251	75.3	44	13.2
Agrosilvicultural	9	2.7	21	6.3

These include HGs (home gardens) of trees mixed with herbaceous crops (agro silvicultural HGs) and the HGs of trees/shrubs mixed with herbaceous crops and animals (agro silvopastoral HGs). The results indicated that 88.5% of respondents are practicing HGs (home gardens) where trees are mixed with herbaceous crops and animals (agrosilvopastoral HGs). Moreover, 9% of HHs (households) practicing HGs (home gardens) where trees are mixed with herbaceous crops (agrosilvicultural HGs). The illustration is given in Table 2. The result is in line with (Wiersum KF, 2006); home gardens in the tropics can be classified as agrosilvopastoral systems consisting of herbaceous crops, woody perennials and animals, while some home-gardens represent agrosilvicultural systems. As focus group discussants, HGs (home gardens) of trees mixed with herbaceous crops and animals provide multiple productions assured primarily for household consumption and income generation with its diverse products. This is consistent with (Kumar BM and Nair PR, 2004) reported that the diverse products from the homegarden, available year-round, not only contribute to food security during the "lean" seasons, but also ensure food diversity. Similarly, results in line with (Bassullu C and Tolunay A, 2010), reported that traditional HGs (Home gardens) involving animal components with growing various trees/shrubs and agricultural products have high output compared to those without it.

Gender division of labour for HG (home garden) agroforestry management

In the study area the household survey indicates that major components are food crops; ensete (Ensete ventricosum), cash crops; coffee (Coffea arabica), vegetable, fruit tree, woody species and livestock keeping. These are cultivated and managed by both men and women headed households in their home gardens (Zemede A and Ayele N 1995). The result revealed that 52.6% of the respondents confirmed that women achieved a major role than men in their HG (home garden) agroforestry management activities whereas, 31.4% of respondents agreed that men play a greater role than women in HG (home garden) agroforestry management activities. According to focus group discussants, Women bear the major responsibility in managing the HG (home garden) Agroforestry like weeding, manuring, harvesting, processing and marketing. These were the activities in which women took direct involvement together with all kinds of household activities. However, cash crop production is fully controlled by men. However, in case, difficult tasks like: land preparation, planting, insect pest and disease management, and harvesting of products are covered by men. The study is consistent with (Gabiso G et al. 2015) where women often play a prominent role in all activities, contributing 51% of the labor in HG (home garden) agroforestry but, they control only 25% of HG (home garden) products of cash crops and wood products. Similarly, result in line World Bank, (2008) who reported that women play a substantial role in agricultural productivity carrying out an estimated 40% to 60% of all agricultural labor force.

Management activities for different home garden agroforestry

The survey result showed that women are always engaged in management activities like manuring (100%), harvesting, (100%), processing (100%) and marketing (95.4%) of ensete products. Ensete has been considered as women crop in the study area; however, the plantation part of ensete production is carried out by men. Other farm duties, such as weeding and hand hoeing are done by both men and women (Kebebew M, 2018).

Further information from FGDs showed that, women are more involved in managing of ensete than men. They play essential roles in all stages of ensete production, whereas; planting and hoeing of ensete are the duty of men. During the planting stage, women's support men by (suckers) transporting to the fields which are planting materials. They also take part in the difficult and very important tasks in ensete production and growth like; weeding, manuring, ensete harvesting and processing; on which men would never try. This is because; it's culturally taboo for men to participate in harvesting and processing of ensete and its products. The study is in line with (Gebrehiwot M, 2013) women contributed more in ensete production than other cash crops. In the study areas cabbage, potato

and green pepper are the most commonly grown vegetables in their HGs (home gardens). Present survey results revealed that (63.6%) weeding, (100%) manuring, (100%) harvesting and (100%) marketing of the vegetables are the role performed by women; whereas almost (72.5%) of respondents replied that planting of vegetables was done by both men and women (Table 3). Moreover, information from FGDs showed that, the vegetable production is very close to the house, which increase the women's' opportunity to entirely care, control and manage the products attractively. Thus, in study areas, harvesting and marketing of such vegetables like cabbage and pepper is thoroughly carried out by women because of its accessibility to transport and to have the desirable market price. The result is in line with (Kumari et al., 2015) who reported that women have played a supportive role in vegetable production more prominent in transplanting of vegetables, hoeing and weeding, scarring of birds and rodents, vegetable harvesting and processing. On the other side, Avocado, Banana, Mango and Papaya are widely growing home garden fruits in the study area. The result showed that 74% of planting, 68% of hand hoeing, 50% of weeding were reported as a role of men in the management of fruit trees. The majority, 78% of respondents reported that harvesting was mainly carried out by men. However, most respondents, 70.7% of confirmed that selling of the fruit at the market is carried out by women (Table 3). Information obtained from respondents shows that, culturally, women are not mandated to be involved in planting and hoeing of fruit trees unless she is widowed. Even widowed women engage in this activity if they have no male children. Women have the power to control the benefits obtained from selling of fruits like Banana and Papaya. However, traders could directly go to the farms and purchase fruits like Avocados and Mango on the trees from the men. Thus, harvesting of these fruits was directly related with the men. They began to take over responsibility for marketing by looking for traders; and took over controlling the income. In previous studies, similar findings were reported by in Kembata Tembaro zone. Field observations indicate both men and women headed HHs (House holds) produced in the field as a sole crop or mixed with ensete at a home garden. From the total sample households, 92% of the pit preparation, 87.7% of planting, 73.1% of harvesting and 70.6% of marketing of products is performed by men households. On the other hand, 52.1% of manuring and 50% of the weeding activities were done by both men and women. Only 16% of marketing and 14.7% of the harvesting of coffee were done by women (Table 3). the result revealed that, men control the majority of cash income from the sales of coffee, whereas women have a chance of harvesting the coffee: especially in the first phase which is concentration to peak red color. Despite its contribution to improved living conditions of households, women can only sell small amount of coffee to merchants or shops. The study agrees with (Gebrehiwot M et al., 2013), men controlled the income and trade of coffee products, while women were responsible for small-scale trading in the local market (Table 3).

Table 3. The role of gender on all management activities of Home gardens (n=334 women=65, men=269).

Management activities	Gender role on Enset management			Gender role on vegetable management			Gender role on Fruit crop management			Gender role on Coffee management		
	Men (%)	Women (%)	Both (%)	Men (%)	Women (%)	Both (%)	Men (%)	Women (%)	Both (%)	Men (%)	Women (%)	Both (%)
Pit preparation	-	-	-	-	-	-	-	-	-	92	0	8
Planting	79	12.6	8.4	13.5	14	72.5	74	0.00	26	87.7	0.00	12.3
hoeing	47	14	39	-	-	-	68	8	24	-	-	-
Weeding	46.3	18.4	35.3	20.04	62.6	17.36	50	9.5	40.5	35.3	14.7	50
Manuring	-	100	-	-	100.00	-	38.3	13.2	48.5	32.6	15.3	52.1
Harvesting	-	100	-	0.00	100.00	0.00	78	4	18	73	14.7	12.3
Processing	-	100	-				-	-	-	-	-	-
Marketing	-	95.4	4.6	0.00	100.00	0.00	6	70.7	23.3	70.6	16	13.4

Gender role in livestock management

According to the survey result, the majority of respondents, (91%) practiced keeping livestock like cows, ox, goat, sheep, poultry and donkeys and only (9%) of respondent HHs (Households)

were not practicing keeping livestock in the study area (Kumari AR 2015). Regarding livestock management, the majority of respondents, on average (92.5%) of HHs (Households) reported that women play a key role in taking off fodder, cleaning of animal shed, selling of milk and milk products and selling poultry. Most of the respondents (86.8%) confirmed that selling of the livestock was performed by men (Yusuf S, 2008). The other roles and management activities performed by men are clearly illustrated on Table 4 below. Further, information obtained from focus group discussants indicated that, women have been found more conscious than men. It is considered as a taboo in culture for men to shed cleaning and farmyard manure collection. The finding is consistent who reported that the role of rural women taking various livestock management activities such as animal dung collection, shed cleaning and purchasing livestock products is also done by themselves (Table 4).

Table 4. Gender on role livestock management (n=33 women=65, men=269).

Activity	Men (%)	Women (%)	Both (%)
Grazing of animal	48.2	12.7	39.1
Taking off fodder	13.5	70.2	16.3
Watering of animal	43.3	12.6	44.1
Cleaning of animal shed	-	100	-
Selling of milk and milk products	-	100	-
Selling of poultry	-	100	-
Selling of livestock	86.8	13.2	-

Gender role in woody species management

In the study site, both men and women headed HHs (House holds) plant or retain the woody species in their HGs (home gardens). The majority (71.3%) of respondents were reported that, there were growing perennial trees and (28.7%) of replied that shrubs and herbs were grown. The finding agreed with reports of (Mulugeta G, 2018) who informed that woody species was greatly spread in HG (home gardens) than shrub and herbs. According to (Nzilano BL, 2013) retaining or planting of woody species is shown by the need to reduce the size of open gaps in the farmstead (Table 5).

Table 5. The role of gender in tasks woody species management (n=334 women=65, men=269).

Activity	Men (%)	Women (%)	Both (%)
Pruning	92.5	-	7.5
Thinning	43.3	12	44.7
Manuring	38.8	17.2	44
Fencing and protection	79.5	-	20.5

The tree/shrub species that were found in the study area are *Cordial african* (wadicho), *Croton macrostatus* (masincho), *Gravellia robusta* (gravilla), Podocarpus (dagucho), Eucalyptus (barzafe), Erythniabrucei (welako), Millettia ferruginea (hengedicho), Juniperus procera (honcho), *Persea americana* (Avocado) and shrub species such as elephant grass, Susbanea sesban, desho, vetivers and leucaena. *Grevillea robusta* (Gravilla) and *Cordia africana* are the most common timber species; whereas; *Persea americana* (Avocado) and *Mangifera indica* (Mango) are the common fruit trees in the study area (Yirefu T et al., 2019). Woody species management activities practiced by respondents in the study area are pruning, thinning, manuring and fencing or protection from animal interaction.

The majority (92.5%) of respondents replied that pruning of large tree branches is performed by men. Result revealed that, men are responsible for pruning trees, as the canopy of the large tree branches block the light coming from the sun to the ensete and other home garden crops. This finding is in line with the study of (Haddis A et al., 2014) who reported that pruning of the shed tree was done by reduction of the shed for HG (home garden) crops. In addition to that, thinning and fencing of HG (home garden) woody species were also the difficult management activities which are more dominantly carried out by men. The results are summarized in Table 5 above. On the other side, manure application as organic materials like green manure, plant residues and animal dung is the important

management activities to facilitate the growth of different woody species in their HGs (home gardens). From the total sample households, 44% of respondents affirmed that, manure application on woody species carried out by both men and women (Jackson WJ and Ingles AW 1998).

Main sources of food and income for rural households

According to the present survey result, various sources of food and income generation of the respondents in the study area are presented in Figure 2.

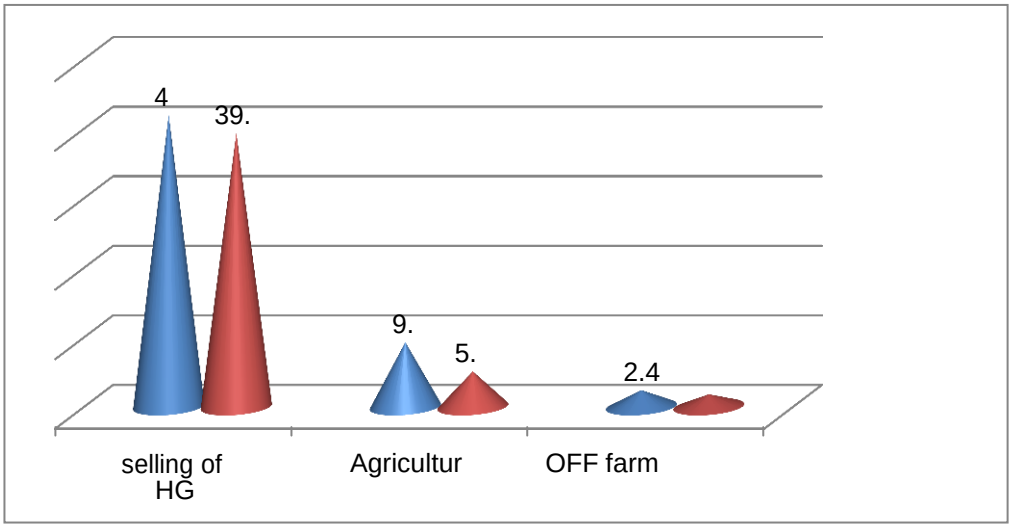

Figure 2. Sources of food and income generation. **Note:** ( ) Men; ( ) Women.

These include agriculture, HG (home garden) products and off farm activities. Off-farm activities provide minor business primary sources of earnings for smallholder farmers (Gebrehiwot M 2018). According to the result, selling of home garden agroforestry products is the major source of both male headed households and female headed households in both Kebeles. On the other hand, with regard to petty trade, women are dominant traders of vegetables, food crops, livestock products and fruits. The result is similar with the finding of (Gebrehiwot M et al., 2018). The result further revealed that, homegarden agroforestry products are closely related to the women. This is because women want to buy small commodities such as food, salt, food oil and other for household consumptions. This is again agreed with the finding of (Audu SI, 2009), that mainly women are dominated in the marketing of homegarden products, because there are more women in the food market as a result of those who come to buy farm produce for their consumption (Kebebew M, 2018).

Contribution of home-garden agroforestry to households' livelihood

Result showed that, both men and women headed HHs (House holds) grow different crops in their HGs (home gardens) primarily for household consumption and income generation. HGs (home gardens) are best for providing food, cash income, firewood, construction materials and medicine uses. Figure 3 below showed that the two major roles HG (home garden) agroforestry contributed to households' livelihood are providing food and generation of cash income. This study was in line with (Mendez VE et al., 2001) reported that the HG (home garden) agroforestry helps to attach livelihood income by linking marketable cultivated crops and conserving species diversity. HGs (home gardens) are primarily used for subsistence purposes of the HHs (house holds) and are increasingly being used to generate cash income (Figure 3).

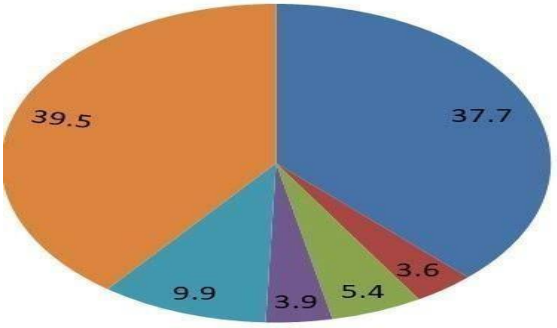

Figure 3. Contribution of HG agroforestry for HH (House hold) livelihoods. **Note:** ( ) cash income; ( ) construction material; ( ) fodder; ( ) fire wood; ( ) medicinal use; ( ) serving as food.

CONCLUSION

Homegardens are traditional land–use systems with multiple functions practiced by rural farmers around homesteads. The findings from this study showed that (97.5%) of the HHs (House holds) were practicing the HG (home garden) agroforestry technologies. The two dominant home-garden agroforestry practices on the area are agrosilvopastoral HGs (home gardens) and agrosilvicultural HGs (home gardens). 88.5% of HGs (home gardens) trees were mixed with herbaceous crops and animals for production diversification and income expansion. The study findings have explicitly shown that men and women have different roles in managing and controlling HG (home gardens) agroforestry products in the study area. The results reveal that the contribution of women is much higher in enset (food crop) production. They make decisions regarding clone selection, harvesting time and regarding the income from the sale of enset products while men dominate in planting of the enset. Management activities like weeding, hoeing and disease control are done by both men and women. In cash crop (coffee production), men are the dominant decision makers in the management and control of the income. Regarding livestock management, women have been found more aware than that of men. The women have a lion share and strong control and use of livestock products like milk, butter, eggs, and poultry for home consumption. Men are main managers of woody species, whereas women are usually responsible for fire wood collection. In general, participation of women was higher than men in manuring, harvesting, taking animal care and marketing of HG (home garden) products. While Land preparation, planting activities, weeding and harvesting of products done by men. The overall homegarden agroforestry management activities done by women, men and both men and women were (52.6%), (31.4%) and (16%) respectively. HG (home garden) agroforestry are the good source for the provision of food, cash income, firewood, construction materials, fodder and medicinal uses by household members. Generally, our results revealed that women have the greater role in the management of home garden agroforestry products. However, there is a little involvement in decision-making and benefit sharing of cash crops. In the study area, there is a cultural taboo that hinders women from touching base to resources benefits. Therefore, there should be a research on the cultural taboos that hinder women's access to resources and decision making. The dominant role of women in this agroforestry practices while only having least proportion of controlling money should be understood by different stakeholders and be given impetus to enable this agroforestry production system to remain sustainable.

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