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Original Article

Empowering Rural Women through Agroforestry Practices; The Case of The Mount Oku Forest Region, Cameroon

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Agroforestry is gaining grounds among women who have traditionally played important role in agricultural production. Benefits derived from agroforestry has addressed the multiple challenges linked to inadequate arable land, low productivity, socio-cultural barriers among others. This study assessed agroforestry practices of women in Male Headed Households (MHH) and Female Headed Households (FHH), in the Mount Oku Region of Cameroon. Institutional analysis and developmental framework were used to study the conditions for effective agroforestry management strategies. The study: identified farms and crops /trees planted by women in MHHs and FHHs; examined the enabling conditions that favoured agroforestry practices; assessed the benefits before and after agroforestry project as they influence livelihood strategies. Based on the existence of frontline and secondary villages, three Forest Management Institution (FMI) were randomly selected from the tribes that make up the Kilum/Ijum Forest Project. Selected Participatory Rural Appraisal tools were employed to obtain relevant data. Farms in MHH were from 2 ha and above with more trees for commercial purpose and long-term benefits (timber); while FHH were 2 ha but inclined to indigenous, fast growing trees for subsistence use (firewood, soil fertility improvement, fodder, fruits). The enabling conditions included: access to extension services, improved technology, market information, access to credit facilities and institutional settings; the benefits were: improved agricultural production, increased school attendance and combating child labour, increased employment and end of daily wages, diverse livelihood options, increased household income, sustainable fuelwood production, improve soil fertility, reduced weed incidence. The test of hypotheses revealed that there exist a significant difference in the benefit before and after agroforestry project as they influence livelihood strategies ($Z = -35.00$, $p = 0.000$). The study recommended the government, integrates agroforestry in agricultural development programs.

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INTRODUCTION

Agroforestry is gaining grounds among women who have traditionally played important role in agricultural production, and it is major strategy for forest conservation where primary users of forest resources have accelerated degradation. Agroforestry contributes to human wellbeing by providing additional income, increasing food security through a higher diversity of agricultural products (fruits, nuts, medicinal plants, and edible oils among others), providing firewood, and construction materials (Islam *et al.*, 2017). Agroforestry improves ecological integrity and the sustainability of ecosystem services through, habitat rehabilitation, tree canopy protecting the soil from erosion, creation of microclimate favourable for the association of crops and livestock; consequently, agroforestry has become a trade-off between forest conservation and the degradation of forest resources.

As noted by Foncha and Asongwe (2019); this has reduced deforestation, watershed degradation and stabilized the soil; and an alternate approach to land use which generates steady income for subsistence farmers, enhancing the capacity of local communities to manage their resources efficiently. According to Joshi, (2019), agroforestry provides a buffer against expected impacts of climate change by increasing the diversity and resilience of agricultural landscapes. The International Council for Research in Agroforestry/ World Agroforestry (ICRAF, 2014), defined agroforestry as 'a land-use system in which woody perennials (trees, shrubs woody and non-woody) are deliberately used on the same land management unit as agricultural crops, with animals either in some form of spatial arrangement or temporary sequence.

Sinja *et al.* (2014) documented that agroforestry involves the integration of trees and crops or animals and requires access and rights to land planting materials, knowledge, capital, and labour. Many of the trees planted are multipurpose providing a range of benefits. Agroforestry thus has the potentials to offer great benefits to women across most developing countries, who for decades had challenges in land tenure, the exploitation of forest resources which was limited to non-Timber Forest products (NTFP), consequently, their rights to equality and equity showed that a lot has to be done. According to Kiptot and Franzel (2011), the minimal input needed, particularly with regards to cash and the substantial benefits in terms of food, fuelwood, fodder and other products and environmental services, especially in times of shocks, stress and uncertainty has attracted women to agroforestry.

In a related work, Quisumbing and Pandofelli (2010) noted agroforestry practices for replenishing soil fertility attracted women farmers because it involved low input but high returns. In a study by Gladwin *et al.* (2001); Kalaba *et al.* (2009); World Bank (2019), women have been responsible for managing trees, and as with other agricultural enterprises they do most of the work especially during the initial stages of the establishment (planting, weeding and watering). Despite the many benefits derived from agroforestry, most women in Africa are disadvantaged due to cultural and socio-economic factors. Traditionally, women's rights to tree products were usually limited to products that were considered to have little or no commercial value like indigenous fruits, vegetable and mulch, while men reserve high value products like timber for themselves. In some cases, the participation of

women in agroforestry was hampered by limited access to resources such as: land, capital, labour, extension services, lack of appropriate technology and taboos that prohibits women from planting or using certain trees (Gray & Kevane, 2008; Kokuteta & Raja, 2012; World Bank, 2019). Consequently, not much is understood about the role of gender in the adoption of agroforestry practices. Although women are participating in agroforestry by increasingly exercising their rights to land and tree resources, paradoxically, women from Men Headed Households (MHH) are playing a limited roles in agroforestry than women from Female Headed Households (FHH) due to socio-cultural constraints.

The Mt Oku forest is an important biodiversity hot spot in Cameroon with a high level of endemism. Within the last decades, the eco-site has rapidly degraded and is amongst the earliest to have benefited from forest decentralization and devolution policies in the country. This was facilitated by the 1994 Forestry law and the 1998 Manual of Application (MINEF, 1994; 1998). Because of the importance of the Mount Oku Forest, in the local economy and culture; successful conservation program led to the creation of the Kilum/Ijim Forest Project (KIFP) in 1997 with the involvement of the local people and address their needs (Asanga, 2014). Using Participatory Rural Appraisal approach and based on the Forest Management Plan (FMP) information (on activities of forest users, forest resources, history of use, availability of forest resources and traditional rules governing resource use) it facilitated the drawing up and implementation of Simple Management Plan (SMP). This led to the institution of agroforestry program, as a conservation strategy to divert the people's interest from the unsustainable agricultural practice and unregulated exploitation of resources from the forest especially for the poor and marginalized with little or no access to land and land tenure rights. This study is focused an assessment of agroforestry practices of women in Male Headed Households (MHH) and Female Headed Households (FHH), in the Mount Oku Region of Cameroon. The study: 1.) identified

farms and types of crops/trees planted by women in MHHs and FHHs; 2.) examined the enabling conditions that favoured agroforestry practices 3.) assessed the benefits before and after agroforestry project as they influence livelihood strategies.

MATERIALS AND METHODS

Description of the Study Area

Mount Oku forest in the Northwest Region of Cameroon is located between longitude 10°20'E and 10°35'E and latitude 6°07'N and 6°17'N (figure 1). The forest area is made up of the Kilum Mountain range and the Ijim Ridge forests. The Mountain is 3011 m above sea level, it covers 20,000 ha (Asanga, 2014). The mountain is part of the Western Highlands of Cameroon, commonly referred to as the Bamenda Highland. The summit of the mountain is very cold and clouded, with mean maximum temperature ranging between 16.5 – 19°C and mean minimum temperature between 19 – 10.5°C, while the rainfall varies from 2850 to 3050 mm yearly. The area experiences two seasons (rainy and dry). The rainy season runs from May to September and the dry season between October and April (Neba, 2021). From the prevalence of mist and cloud, the humidity is high (about 90 percent) and the incidence of sunshine low (Asanga, 2014, 2015). Geologically, Mount Oku is formed on volcanic rocks (Tertiary basalt and Trachyte lava), though some uplifting of older granite and gneiss basement rocks has also occurred (Neba, 2021). The soils therefore vary greatly. They are strongly influenced by the parent materials, altitude, topography and human activities.

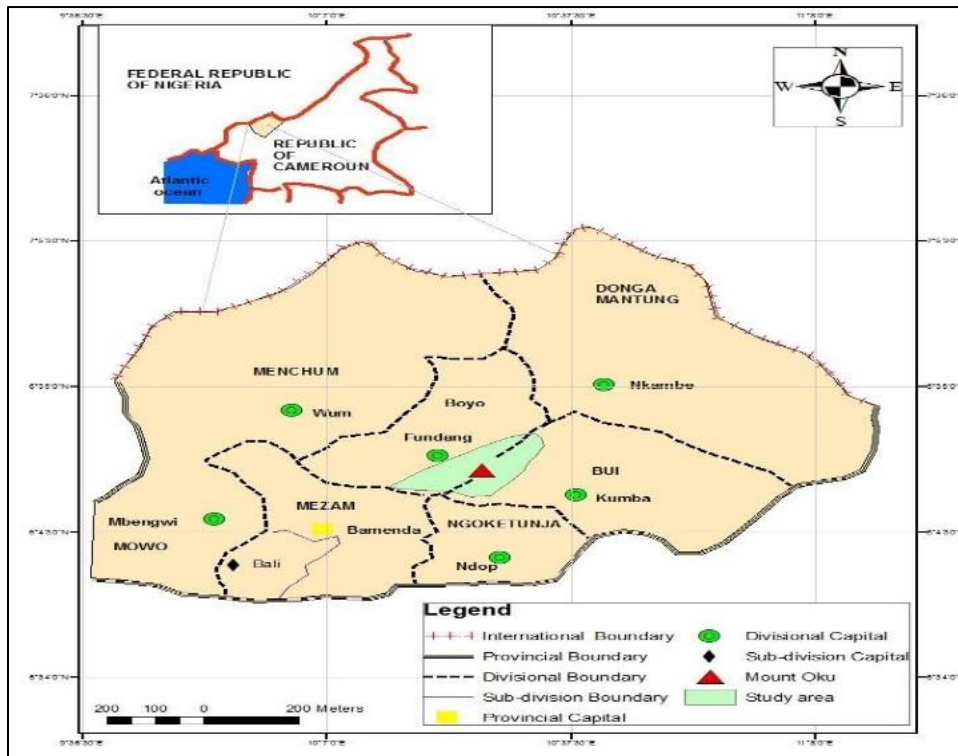
Sampling Techniques

The study started with a reconnaissance survey to get background information of the study area from January 2019 to October 2021. During this survey three fondoms (Nso, Oku, and Kom) were identified that make up the KIFP. This was followed with transect walk, with the aid of two field assistance that were familiar with the study area; the different stakeholders were identified (Forest Management Institutions (FMI), Forest Users Groups (FUG), specifically farmers and

Extension Workers). Using purposive sampling, 50 women were selected from the three fondoms (25 from Male Headed Household - MHHs and 25 from Female Headed Households - FHHs) making

a total of 150 women and were farmers who practiced conventional agriculture before the program and were practicing agroforestry after the institution of the program.

Figure 1: Map of the study area



The Participatory Rural Appraisal tools (PRA) were used in collecting data; the instruments used included: focus group discussion and Semi Structured Interview (SSI), to identify the farms and types of crops/trees planted by women in MHHs and FHHs and examine the enabling conditions that favoured agroforestry practices. Recognizing women’s unpaid works in terms of economic and societal values, and to assess the benefits before and after agroforestry project as they influence livelihood strategies, household survey for MHH and FHH were undertaken to assess the gender inequality in household work and suitable strategies as alternative to supplement unpaid work to improve on livelihood sustainability after the institution of the agroforestry program. This was complemented with the use of Venn diagrams and seasonal calendars. These farmers were only women from MHHs and were either from monogamous or polygamous families and FHHs were single (who have never married), divorced, widows.

Data Analyses

Apart from the institutional analyses and development framework, data was also subjected to descriptive, using SPSS package version 17.5.

RESULTS AND DISCUSSIONS

Identified Farm Sizes and Crops /Trees Planted by Women in MHHs and FHHs.

Table 1 shows farm sizes in the MHHs and FHHs. Farm sizes ranged between 1 ha to 5 ha and above in all FMI studied. The 43 persons (FHHs) had 1 ha of land, while in the MHHs 16 persons had land of 1 ha, a difference of 27 persons. The land size of 2 ha had 31 persons in the MHHs while 18 persons in the FHHs, difference of 13 persons. The number of person in MHHs that had 3 ha of land was 17 while in the FHHs it was 10 persons, difference of 7. The land sizes that range from 4 to 5 ha, had 11 persons while the FHHs had 4 persons, a difference of 7.

Table 1: Farm sizes of MHHs and FHHs.

Study Area	MHH 1 ha	FHH 1 ha	MHH 2 ha	FHH 2 ha	MHH 3ha	FHH 3 ha	MHH 4-5 ha	FHH 4-5 ha	Total in ha
Oku	5	15	10	6	7	3	3	1	50
Nso	6	16	12	4	4	3	3	2	50
Kom	5	12	9	8	6	4	5	1	50
Total	16	43	31	18	17	10	11	4	150

More FHHs had land size of 1 ha than the MHHs, however, the number of FHH reduces with increase in land sizes, and there was a general reduction in the number of MHHs in the land size from 4 and 5 ha. Most of the women in the FHH are single parents, widows or divorcees, with little access to land either because of no money to buy land or cultural challenges; where women do not have right to inheritance (right to inheritance is reserved for the male children). The increase in the number of MHHs with land sizes of two hectares are usually attributed to inheritance rights

and household sizes - the polygamous attitude of the men who usually benefit/ find favour with the father in-law who give them pieces of land considering it farming land to their daughters. However, some men do buy land for farming which is their main occupation. The large family size (polygamous) also make them acquire land with labour provided by the family with no wage or salary. There number of MHHs drops with land sizes of between 4 – 5ha, as the land mostly productive are usually owned by elites and politicians.

Table 2: Types of Crops/Trees Planted in MHHs and FHHs

Types of crops/Trees	Oku		Nso		Kom		Total
	MHHs	FHHs	MHHs	FHHs	MHHs	FHHs	
Indigenous Timber	4	0	2	1	4	0	11
Eucalyptus	3	1	5	3	4	2	18
Indigenous Fruit Trees	4	6	2	6	4	7	29
Leguminous Crops	2	3	0	3	1	2	11
Fodder shrubs	0	2	1	0	0	0	3
Mixed Cropping/Staple food crops	5	6	5	5	4	6	31
Vegetables	5	5	5	5	4	6	30
Exotic Trees/ bee loving plants	0	2	2	2	2	2	10
Trees at boundaries	2	0	3	0	2	0	7
Total	25	25	25	25	25	25	150

Table 2 shows the types of crops and trees planted in the MHHs and FHHs. In the FMIs studied, 11 persons had indigenous timber in the farms, only 1 from FHHs in Nso while the rest were from MHHs. Eucalyptus was found in both the MHHs and the FHHs with the FHHs having a relatively lower number in all the FMIs. More indigenous fruit trees were planted in the FHHs than MHHs, of the 29 persons that planted Indigenous trees in their farms 19 were women while men were 10. Leguminous crops were mostly found in the farms of FHHs, 3 in MHHs while FHHs were 8. Fodder shrubs were the least planted in both the MHHs and FHHs in all the FMIs, 3 out of 150 house hold studied. Mixed cropping /staple food crops were

cultivated in both the MHHs and FHHs in all the FMIs and scored 31 the highest crops among all the crops planted. Like mixed crops, vegetables were also cultivated in all the Households and scored 30 ranking second. Except for the MHHs in the Oku FMI, all the households in the two FMIs planted exotic trees (bee loving plants). Trees at boundaries were found only in the farms of MHHs in all the FMIs and none in the FHHs.

Men and women have different objectives for planting trees and crops, thus the MHHs and FHHs manage trees for multiple purposes in a way that they benefit. The MHHs tend to plant trees for commercial purposes (timber for poles, constructions) as it yield more income, while the

branches serves as fuelwood for domestic use. In all the FMIs studied high valued trees were found in the farms of MHHs, these trees are having some traditional/ cultural significance which most women do not have access due to status quo, for example, *Rauvolfia vositoria*, and *Croton macrostachys* for carving; *Neobotonia velina*, for musical instruments. Eucalyptus were mostly found in plantations which were difficult for women to afford either because of low inheritance opportunities or no money to buy and manage plant (Mugunga et al. 2017). On the other hand women were inclined to plant trees for subsistence use, such as firewood, soil fertility improvement, fodder and fruits; these trees are mostly fast growing trees. Most FHHs domesticated indigenous fruit trees of commercial and economic importance such as mangoes, oranges, avocado among others. These subsidized the household income, improves dietary intake, and contributes to food security (Foncha & Asongwe, 2019).

Some of the indigenous trees have multiple functions as, their roots, leaves, and barks of some trees are mostly used for the treatment of minor illnesses (headache, fever, rashes abdominal pains). Flowers produce nectar for bee farming; branches used for farm tools; some are of good quality that produces charcoal for domestic use which reduces time spent in collecting firewood. They also sell some for extra household income. Most FHHs plant fast growing leguminous crops in rotation, which act as green manure as it incorporates leafy biomass from plants and animals. There was also the planting of nitrogen fixing trees and plants. The planting of fodder shrubs was only in the Oku FMI, it was mostly hedges in farms for goats to browse. Animals feed on plant residue (post-harvest) and the shots of new plant; on the other hand the dung of these animals on the farms help to enrich the soil (Foncha & Asongwe, 2019).

In all the households, women were involved in mixed cropping (staple food crop) and vegetable, which contributed immensely to household nutrition consumption, and their incomes as the

farms produced were sold to neighbouring urban centres at relatively high cost. Although indigenous trees were found in the farms of MHHs, the women had access only to food crops. Some of the vegetables and food crops served as cover crops helped in the retention of soil moisture and conservation (e.g. pumpkin, sweet potatoes), leguminous crops enhanced soil fertility (e.g. soya beans). A remarkable innovation was the non- use of fire (bush fire) which was a common tradition practice in which it sterilized and provide an injection of rich ash which was however short-lived. Except for Oku which is more of semi- urban area, bee loving plants were planted in all the farms, besides the nectar it provides during flowering season, these plants which are mostly trees provide fire wood for cooking at home (domestic energy). Some of the fruit trees also act as bee loving plants during flowering season.

The most common specie of exotic trees in all the household is the cypress which act as insect/pest repellent thus replacing insecticide/pesticide, reducing their negative impacts on the environment especially on the bees and butterflies (other social insects). Trees at the boundaries were found mostly in the farms of MHHs, acting as wind break, timber for construction, firewood for commercial purposes, which were tended by mostly the men in the household. The women deliberately did not plant trees at the boundary because of the specie which are mostly used- *the eucalyptus*, a water thirsty plant which does not tolerate undergrowth, also because of the small size of the farms which had no provision for tree boundaries. The species of trees planted at the boundaries did not have much canopy to improve on soil fertility. At the same time the fruit trees protected plants from wind since they planted mostly food crops, (Foncha & Asongwe, 2019). Generally, there was an improvement in ecological integrity and sustainability of the ecosystem services at the same time increased food security and nutrition in FHHs, with high crop diversity throughout the year.

Enabling Conditions

Table 3 shows the enabling conditions that enhanced agroforestry practices in the study area - M* represents MHH while, F* represents FHH. Although there was a general increase in the number of households involved in agroforestry after the institutions of the project, there was a remarkable increase in the FHHs than in the MHHs, in all the FMIs studied. In the Oku FMI, 15 MHHs were involved in agroforestry before the project and 25 after the project, thus an increase of 10 MHHs, while with the FHHs, 6 were involved before and after 25 were involved, thus an increase of 19 households. In the Nso FMI, 13 were involved before and after project 25 MHHs were involved, thus an increase of 12; while 11 FHHs were involved and after project institution, there was an increase of 14 households. In Kom, 9 and 25 were involved before and after the project institution respectively, thus an increase of 16 in the MHHs, while in the FHHs 7 were involved before and 25 after making an increase of 18. In order to enhance the participation of women in the program, several interventions enabled the improvement of agroforestry systems. Extension services required by farmers were difficult to access before the program with more men having relatively more access than women. With the government of Cameroon's strategy to improve on food and nutrition security to meet up the demands of the growing population and changes in dietary needs, more women are receiving more extension visits because women are more involved in food crop and subsistence crop production. This was done through deliberate gender sensitive intervention, training - formation of women's groups (IFPRI and World Bank, 2010; Kalovoto et al. 2020).

However, the FHHs had access to extension services than the MHHs firstly because of socio-cultural challenge based on strong tradition that prohibits male extension officers from interacting with women farmers (especially married women); women in MHHs had much household chores than those in FHHs, thus do not have enough time to participate in extension activities. More of the farms in MHHs were focus more on cash crops

and more involved in indigenous timber, eucalyptus as it was mainly for commercial reasons. Access to credit facilities was linked to assets which most FHHs did not have. Credit viability needed collateral whose regulations were unfriendly. These women were thus faced with difficulties in having money to buy farm inputs. However, three strategies enabled them to access credit, creating and joining informal saving club locally known as 'njangi' routine bi – weekly contributions with the money give to a member; 'acawoh' daily savings and very low interest rates to have access to credit. There was the rise of social capital which strengthened the capacity of FHHs and linking them to financial institutions, the creation of cooperatives (food crop producer's cooperatives) which they put their resources together in other to get input at a reduced rate (Kiptot et al., 2006; Kiptot & Franzel, 2001). The government on their part intervened to encourage the creation of rural financial micro-credit institutions whose regulations were friendly to most rural women and was complemented with literacy program to build their skills in record sales/book keeping. The FHHs were involved in the marketing food crops with a lower margin, coupled with their low educational level they were confined to small retail trade unlike their counterparts in the MHHs backed by their husbands' dominated the wholesale trade. Thus the FHHs did not benefit equitably from the growing national and international markets. Although still at lower end of marketing (mostly food crop production), the program imparted processing and business skills which empowered the FHHs financially. The women were involved in the processing of indigenous fruits to non-alcoholic beverages, dried fruits and additives, food crops like corn (maize) were used by local brewery to produce alcoholic drinks (Shah, corn beer) sold in restaurants, clubs and at social functions. Kolanuts were used in dyeing of fabrics in neighbouring Nigeria, thus served as export crops with large profit margin. These got the women into agricultural supply and value chain thus, benefited from the growing local, national, and international markets.

Access to information of farmers in FHHs and MHHs was a major factor that enhanced agroforestry in the studied FMIs. The information where either on crop cultivation or market trends. Before the program, FHHs had little access to information which increased their vulnerability to brokers and middlemen, who took advantage to their ignorance by offering lower prices as they had no means of bargaining better prices. Information on crop cultivation were from visits of agricultural extension officers - where to get seeds and planting materials, selection of tree species how to grow trees; the FHHs had more access to the MHHs due to socio – cultural barriers. Mobile phones, availability of internet connection offered a great potential to the FHHs to market information systems, it was also easier to disseminate information among their partners. Technical training and skill building were encouraged by engaging local women through community participation in community- radio station using their local languages. This strengthened their bargaining power as they were able to make decisions on what and when to produce; when, where and whom to sell. This, greatly improved smallholders' access and returns (Gerhardt & Nemandwe, 2006).

The community / local radio station broadcasting in dialect, was a powerful medium passing information and increasingly used to advertise market products (Kathingiri *et al.*, 2018). The women who were able to access extension officers were endowed with Indigenous knowledge of crop and tree cultivation, their lack of basic education limited their ability to use technical information. The program initiated a participatory training workshops on the domestication of valuable trees species that benefited the women folk (most of which was collected from the forest). This workshops were mostly attended by FHHs while women in the MHHs were more involved in home chores, the few women in MHHs who attended the workshop were those whose husbands have migrated for off farm livelihood option (personal communication Ma Nformi, 2019). Appropriate techniques for improving post-harvest quality on tree products were put in

place by the Ministry of Agriculture and Rural Development (MINADER, 2019), this includes, regulating harvest time to maximize post-harvest, improving artificial ripening of products in incubation regime, extending the shelf life of products without refrigerators. Improved cultivars, development of post-harvest storage methods appropriate agricultural and processing equipment was also put in place. These interventions uplift the women mostly from FHHs from the lower end of value chain to being part of agricultural supply and value chain.

Table 3: Enabling Conditions:

Enabling factors	Oku				Nso				Kom			
	B/4M*	After M*	B/4 F*	After F*	B/4 M*	After M*	B/4 F*	After F*	B/4 M*	After M*	B/4 F*	After F*
Access to Extension services	1	4	0	8	2	6	2	7	0	6	1	8
Access to Credit	8	8	2	7	6	9	2	5	5	9	3	6
Access to market	3	5	4	6	3	5	5	7	2	6	3	7
Access to Information	2	4	0	2	2	1	0	4	2	2	0	2
Access to technology	1	4	0	2	0	4	2	2	0	2	0	2
Total	15	25	06	25	13	25	11	25	09	25	07	25

Table 4: Benefits before and after agroforestry project as they influence livelihood strategies.

Benefits	Before OKU After				Before NSO After				Before KOM After			
	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH	MHH	FHH
Increased production	16	25	09	25	13	20	11	25	14	20	07	25
Small-scale livestock	10	15	02	10	09	11	08	13	15	22	05	11
Sustainable fuelwood production	11	11	05	21	15	17	05	25	19	19	07	25
Diverse livelihood options	15	20	08	25	18	18	10	22	12	19	06	23
Increased employment/end of daily wages	10	15	10	23	11	15	08	23	13	19	06	20
Increased Household Income	20	21	7	25	16	19	08	25	14	19	05	25
Farmers organization	08	15	01	25	15	21	05	25	11	18	02	25
School attendance/end of child labour	25	25	05	20	25	25	10	25	20	25	05	25

Benefits Before and After Agroforestry Project as they Influence Livelihood Strategies

Table 4 show the benefits before and after the institution of agroforestry program in the MHH and the FHH in the three fondoms that constitute the KIFP. Eight parameters were used to measure agroforestry benefits. There was a general increase in agricultural benefits in all the households, but the FHHs experienced a more increased. In Oku, MHHs increased from 16 to 25, the FHHs increased from 9 to 25; in Nso MHHs increased from 13 to 25, while the FHHs from 11 to 25; and in Kom the MHHs increased from 14 to 20 while the FHHs increased from 7 to 25. Although they had smaller farm sizes, much of what they planted was food crops while the MHHs planted more tree and cash crops, (agricultural production was limited to food crops, fruits). There was increased in food and tree crop production through improved soil fertility with the use of green manure, recycling of post-harvest waste (organic manure). The planting of multiple purpose trees provided environmental services beneficial to agriculture, for example: increased soil nutrients from decomposed leaves, tree roots stabilize the soil, maintenance of ground surface litter, The trees act as wind break shade soil and prevent evaporation wind-break destruction, retaining soil moisture (Sharma et al., 2019).

Trees pruning, lopping, thinning, slash of weeds with leaves were used for mulching and composting especially by those without animals. Planting of cover crop plants like sweet potatoes, pumpkins, and melon not only provided food but help protect the soil from degrading as it reduced the velocity of wind at ground level (evaporation, soil erosion). Leguminous plants added phosphorus and nitrate which added nutrients in the soil. The variety of crops planted and harvested all year round providing sufficient food variety throughout the year, these increased food security and nutrition through high diversity of agricultural products (rhizomatous crops, vegetable, fruits, nuts, edible oils, fungi, termites) (Waldron et al., 2017) The diversity of plant species (greater crop diversity) reduces the incidence of pest and disease. -Integrated land use

management system under agro forestry practices was enhanced by agriculture extension workers which meets food and production needs.

Small-scale livestock rearing, this comprised (poultry farming, rabbits, goats, sheep and piggery). There was an increase in the small – scale livestock rearing in both the MHHs and FHHs in all the chiefdoms. In Oku the MHHs increased by 5, and the FHHs by 8; in Nso the MHHs increased by 2 while the FHHs increased by 5; and in Kom the MHHs increased by 7 while the FHHs increased by 6. Most of livestock were mostly indigenous species (local breed), besides the services from the veterinary officers, local and available food were from forage harvested from farms, post – harvest waste, hedges planted as farm boundaries. They planted hedges (herbaceous) legumes, as high-quality fodder widely adopted by small-scale farmers; planting of shrubs grown along boundaries or cover crop plants like sweet potatoes which serves as food for rabbits (e.g. the availability of legume seeds was obtained through farmers’ organizations). Tree pruning, lopping thinning was also used as foliage. On the other hand animal waste was used as farm manure which reduced the use and buying of inorganic fertilizer.

Sustainable fuelwood production before and after the agroforestry program, the MHHs in Oku and Kom had a constant of 11 and 19 respectively while Nso had an increase of 2. In Oku the FHHs had an increase of 16, Nso had an increase of 20 and Kom had an increase of 18. There was a general increase in the FHHs in all studied area with all the women sampled in Nso and Kom having an increase in fuelwood production. Although The MHHs planted more of tree and cash crops which generates fuel wood, there was no increase in the numbers planted after the institution of agroforestry, unlike in the FHHs were they planted fast growing indigenous trees for ecological reasons, fodder trees, fruit trees other multipurpose trees provided fuelwood especially when they are dry or pruned, it was strictly not for but for domestic use and not for sale.

In Oku livelihoods diversification including off farms' activities in the MHHs increased from 15 to 20, while in the FHHs from 8 to 25. In Nso, there was no change in the MHHs while in the FHHs it increased from 10 to 22; in Kom there was an increase from 12 to 19 in the MHHs and from 6 to 23 in the FHHs. Livelihood diversification included: local brewery from farm products like "shah, corn beer" from corn; fruit juice from local indigenous fruits like oranges, pineapples; honey drink from bee farming. There was all year-round flow of cash from agroforestry products.

Increase in livelihood option led to increase non-farm activities and consequently increased employment in all the study area and among the households, but the FHHs has a tremendous increase. In Oku the MHHs there was an increase of 5, while the FHHs had an increase of 13; in Nso the MHHs had an increase of 4 while the FHHs increased by 15; in kom The MHHs increased by 6 while the FHHs increased by 14. Agroforestry notably provided jobs/employment for unskilled labourers, even for those not in the field of agriculture. Small families, especially those from FHH with little or no "safety-net" were able to generate income, spend in their communities and stimulate rural economies, which in turn contributed to peace and security. Off farm activities included, bee-farming, the creation of honey cooperatives which accelerated market outlets (bookkeepers, sales agents, secretaries); restaurants most of the food and drink sold were from the increased in quantity and quality farm produced; potters (head potters), (transportation of people and goods, from farms to houses and markets), bike riders (transportation of goods and people to markets, nearby settlement and urban centres; Financial institutions, formal like micro financial institutions and informal like daily contributions and savings from small traders locally called "Acawo".

Income level Livelihood diversification and high employment level contributed to increased incomes of farmers/ house hold (proceeds from high agricultural diversification, increased employment). In Oku the MHHs increased by 1

while the FHHs increased by 18; in Nso the MHHs increased by 3 while the FHHs increased by 13 and in Kom the MHHs increased by 5 and the FFs increased by 20. Besides providing food, it provided household incomes after sales which enabled them to get other food items they did not produce. Additional income contributed to the wellbeing and improvement in family welfare – and could afford basic household needs like television sets, connect potable water and electricity, mobile phones among others (Pandit et al., 2014). Access to medical facilities – primary health care increased because of affordability, reduction in the use of traditional medicines.

School attendance was a major problem faced by the children of FHH; where they drop out of school temporary during harvesting season join their mother to do jobs in order to raise money to pay their school fees. However with the institution of agroforestry and high participation of women in FHH, there was general increase in school attendance and reduction in child labour. In all the chiefdoms and households all the 25 homes sampled, all the children went to school except for Oku, which increased from 5 to 20, – payments of children's school fees who initially dropped out of school during harvesting season for employment in order to generate money for school fees reduced. During holiday periods these children are usually engaged in other activities: head potters, hawking (boiled groundnut, ground nut paste, boiled corn, sugarcane, avocado, cassava products -garri, boboloh, etc. all of which are farm produce) in order to raise money for school needs.

Farmers Organization in Oku the number of farmers in MHHs increased from 8 to 15, in the FHHs it increased from 1 to 25; in Nso the MHHs increased from 15 to 21, in the FHH there was an increase from 5 to 25; in Kom MHHs increased from 11 to 18, and FHHs increased from 2 to 25. Farmers' organization mitigated the challenges that come with working in isolation. There was increased access to financial services like loans which enabled small-scale producers to invest in businesses that increased their productivity. Coming together and forming an organization became easier for them to access farming inputs

(better quality seeds, plant material, fertilizer and pesticides, collective water management – irrigation/ reservoir for water harvesting) and to aggregate produce to reach larger markets, avoiding the longtime middlemen exploitation (bulk sales). They benefited services and subsidies from the government designed for rural women considered vulnerable and marginalized (training in soil conservation, organic farming, water conservation and management programs) from agricultural extension workers. Their organization assisted them in reducing cost and improve bargaining power, these improved food security and nutrition, moved them out of poverty (Kiptot et al. 2014).

CONCLUSION

The women were attracted to agroforestry because of the minimal input needed, this made agroforestry having the potentials to offer great benefits to women across Africa, especially those of FHH. Land ownership was a challenge to the FHH, making them to limit their production to food crop production, while MHH because of access to land planted more trees which was mainly for commercial purposes. However, after the introduction of agroforestry there was the integration of trees and crop production which in most FHH was for ecological and subsistence use. The participation of FHH in agroforestry practice was higher than the MHH as they had access to extension workers who not only train them on new agricultural technology but provided information on market situation this improved on their access to credit facilities. The FHH benefited more than the MHH from agroforestry, with increased agricultural productivity, availability of fuelwood for domestic use, diverse livelihood options and employment opportunity, consequently increased in household income and improved family welfare, formation of farmers' organization which facilitated buying of agricultural input in bulk.

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