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Gender Dilemma of Small-Scale Farmers in Improving Household Income through an Agro Enterprise Development: A Case of Tea Growing Farm Households in Uganda

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Abstract

The agricultural sector is the most dominant in Uganda's economy. It's a main avenue the government uses to improve household food, nutrition and income security. Tea is one of the main cash crops and export commodities after coffee and fish. Tea was promoted both in traditional and emerging districts as a commodity, which smallholder farmers could use to improve household income. The study was carried out to assess: 1) farmers' capacity building in tea production; 2) tea leaf yields in wet and dry seasons on farm; 3) farmers' strategies in marketing tea leaves; and 4) factors that led to changes in green tea yields over time. It was revealed that there was high disproportion capacity building of male and female headed households. This was highly due to gender issues and concerns, which could not favor female headed households. There was low productivity of tea bushes due to limited use of improved agricultural innovations related to soil fertility improvement and conservation. Low productivity of tea bushes was a disincentive to household poverty alleviation and undermined government's efforts of alleviating household poverty.

Subject Areas

Agricultural Science

Keywords

Gender, Soil Conservation, Soil Fertility, Tea Production, Poverty Alleviation

1. Introduction

Agricultural growth in sub Saharan Africa is considered as the primary source of poverty reduction, and its development is key to supporting farmers to raise household incomes (FAO and OCEDO, 2018) [1] [2]. Uganda, in general has favorable climate with ample rainfall to support agricultural production [3]. Among the Government's investment focus areas to boost the country's economic development, agriculture sector has been prioritized. This is because the sector is a significant economic activity for over 64% of the households, and contributes 25% to the country's GDP, followed by industry (20%) and service sector (47%) [4].

Tea (*Camellia sinensis*) is a major Uganda's export earning commodity after coffee and fish, and is grown by both plantation companies and smallholder farmers. The tea industry employs more than 80,000 small farm households and supports over 150,000 skilled and unskilled workers [5]. Approximately, one million people derive their livelihood from tea production. Uganda is endowed with favourable soils, altitude and climate that could be harnessed to support and expand tea production. The country has year-round harvesting due to its geographical position located right across the equator, characterized by plenty of sunshine and abundant rainfall that support tea production [5].

Uganda's tea industry had been decimated by political upheaval in the 1970s where tea bushes became trees and factories turned into empty shells. By 1981, Uganda was producing just 5% of the tea it produced in 1974. After 1990s, Uganda's tea industry revitalised from near ruin to being a stronger sector currently plays a vital role in country's economy [6]. Development partners including foreign investors have augmented government efforts to rehabilitate the tea industry. By 2018, Uganda was producing 50 million kg of tea annually, making it the second largest producer in Africa after Kenya [5]. Its production is bound to increase owing to its increasing global demand, making it one of the major components of the world beverage market [7].

Through the Malabo Declaration in 2003, the African Union Comprehensive Africa Agriculture Development Programme (CAADP) was developed, and one of its aims was to improve household incomes in Africa's largely agriculture based economies [8]. Uganda like all other African countries agreed to allocate at least 10% of its entire national budgets to agriculture as response to the stagnation of the sector. Tea was among the cash crops earmarked to stir the country's economic development and reduce poverty among small-scale farmers [9]. Hence, efforts to increase tea production intensified from 2010 through development strategy to expand tea production, processing and marketing within the old and new tea-growing areas of the country. This was done by provision of free tea seedlings with associated inputs and advisory services. To effectively promote tea production, the government handed the task of providing tea seedlings to the National Agricultural Advisory Services (NAADS). Procurement and distribution of tea seedlings to farmers were done covering 17 tea-growing districts of

Uganda. In 2013, Operation Wealth Creation (OWC) under NAADS was created to achieve a number of objectives that also supported tea production. These included: 1) mobilization of masses to engage in commercial agricultural activities including tea production; 2) distribution of production inputs equitably and timely to boost agricultural production and productivity; 3) upgrade rural technological infrastructure to allow smallholder farmers to transform themselves into small-scale industrialists; and 4) stimulation of local and community enterprise development across the country. Using this strategy, from 2015 to date, the government through OWC has distributed over 500 million tea seedlings to smallholder farmers. Currently, area under tea production is estimated to be over 41,152 hectares of which 54% and 46% are under tea estates and smallholder farmers, respectively. Increase in area under tea cultivation has led to production of over 66,000 MT of made tea and increased export volume [5].

To assess farmers' perceptions and challenges related to tea agro enterprise as one of the government's interventions towards poverty alleviation, a household survey was conducted in three major tea growing districts in south-western Uganda. The objectives of the study were centered on assessing: 1) farmers' capacity building in tea production; 2) tea leaf yields in wet and dry seasons on farm; 3) farmers' strategies in marketing tea leaves; and 4) factors that led to changes in green tea yields over time.

2. Materials and Methods

2.1. Study Area

The study was conducted in three districts of Rubirizi, Mitooma and Buhweju which are considered among the major tea producing districts in south-western Uganda (**Figure 1**). The three districts were created by Act of Parliament and became functional on 1 July 2010 after being curved out of Bushenyi district. The Census conducted in 2014, revealed that more than two thirds (69%) of households derived their livelihoods from subsistence farming as the main source of earning. In terms of employment, the majority of the working population (65%) were subsistence farmers [10]. Buhweju is an old or traditional tea-growing district while Mitooma and Rubirizi are the emerging ones in tea production with currently established tea processing plants.

2.2. Research Process

The study employed both qualitative and quantitative methods to collect primary data. Secondary information was gathered from government published economic surveys, statistical abstracts, and previously published journal articles and working papers. Primary data was collected from a total of 76 households that constituted 64 and 12 male and female headed households, respectively. The studied sample was purposively selected from households involved in tea production from Buhweju, Bushenyi and Mitooma, representing major tea growing districts in the Southwestern Agro-ecological Zone of Uganda. The sample size

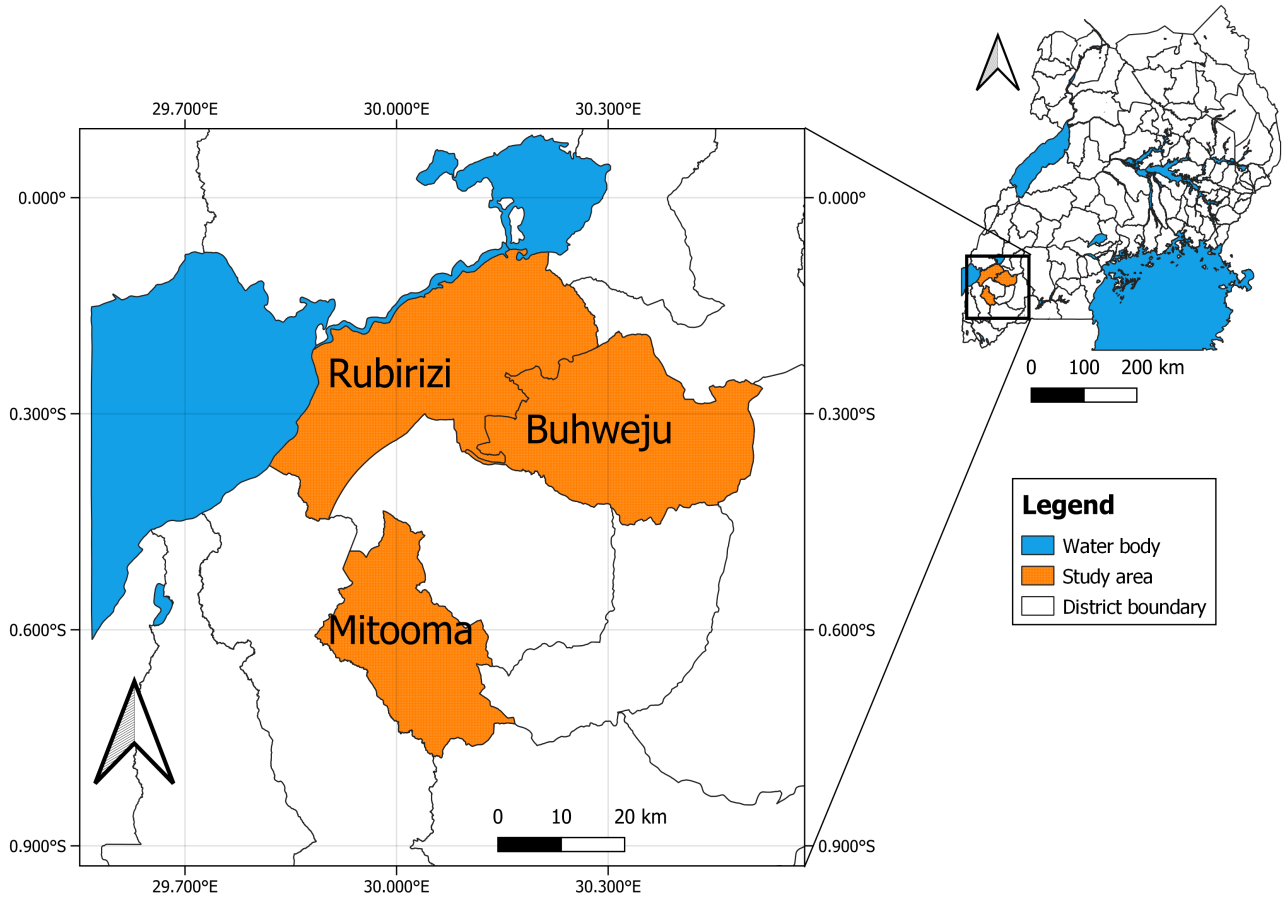

Figure 1. Study area located in south-western Uganda.

was deliberately kept small to enable in-depth investigation of the subject. Both household interviews and focus group discussions were conducted to seek whether farm households were benefiting from the government interventions for rural poverty alleviation through promoting tea production and productivity. This was done by assessing: 1) farmers' participation in agricultural training and use of soil fertility improving and conservation innovations; 2) available market channels farmers use to sell their tea leaves; 3) farmers' perceptions on changes in tea leaf yields, household incomes and labor demand on food security crops over the last decade. The collected data was entered in Excel spreadsheet for cleaning and management and later descriptive analyses were done using R statistical computer package.

3. Results

3.1. Farmers' Exposure to Knowledge and Innnovations Related to Tea Production

Though tea was identified as a priority crop that could be used as governmet's intervetion to reduce household poverty, it was established that majority of the female and male-headed farm households had not attended any training related to tea production and its associated technologies (**Figure 2**). It was further

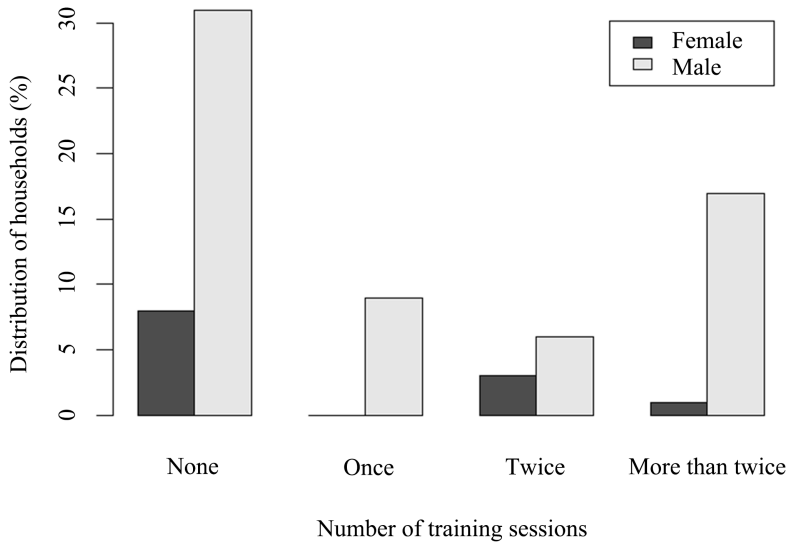

Figure 2. Distribution of households that participated in the different number of training workshops.

revealed that male-headed households were more exposed to sensitization and training compared to their female-headed household counterparts.

3.2. Farmers' Use of Mineral Fertilizers and Soil Conservation Innovations

Mineral fertilizers that farmers often used in tea production were Diammonium Phosphate (DAP) and NPK. These were given to them as subsidies from the central government through the existing extension system, and tea processing factories that provided inputs at subsidized price, credit system and deducting payments for the green leaf deliveries. There were less female-headed households applying mineral fertilizers at any given rate compared to the male-headed households (**Figure 3**). Fertilizer use in tea production was most common with the male-headed households compared to their female-headed household counterparts. Majority of the male-headed households often applied 100 kg·ha^{-1} of mineral fertilizers. Nonetheless, there was a sharp decline of male-headed households that applied mineral fertilizers above 100 kg·ha^{-1} compared to their female-headed household counterparts.

The majority of female-headed households applied only 50 kg·ha^{-1} of mineral fertilizers, and the number gradually declined with the increased mineral fertilizer application rates.

While there were subsidies on mineral fertilizers, there were still high proportions of both male and female-headed households that had no access to the mineral fertilizers (**Figure 4**). There was higher proportion of male-headed households accessing mineral fertilizers compared to the female-headed households. Similarly, majority of the male and female-headed households expressed their dissatisfaction with the rates of mineral fertilizers applied in tea-grown fields (**Figure 5**).

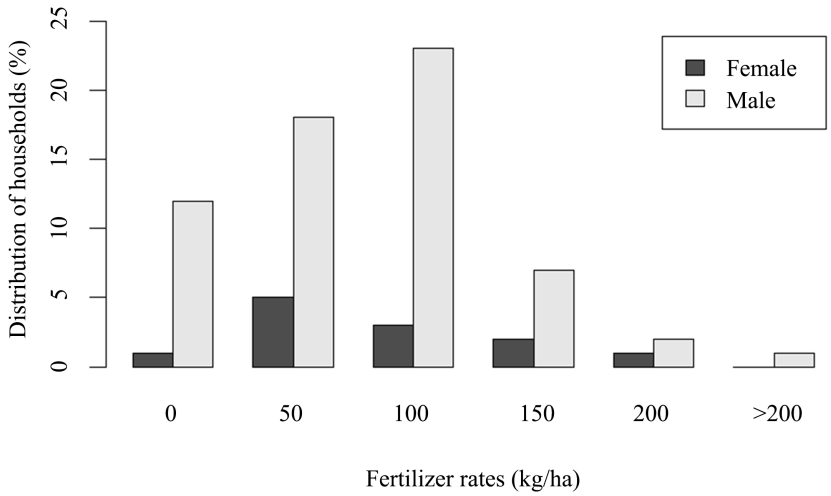

Figure 3. Distribution of farm households with different mineral fertilizer application rates.

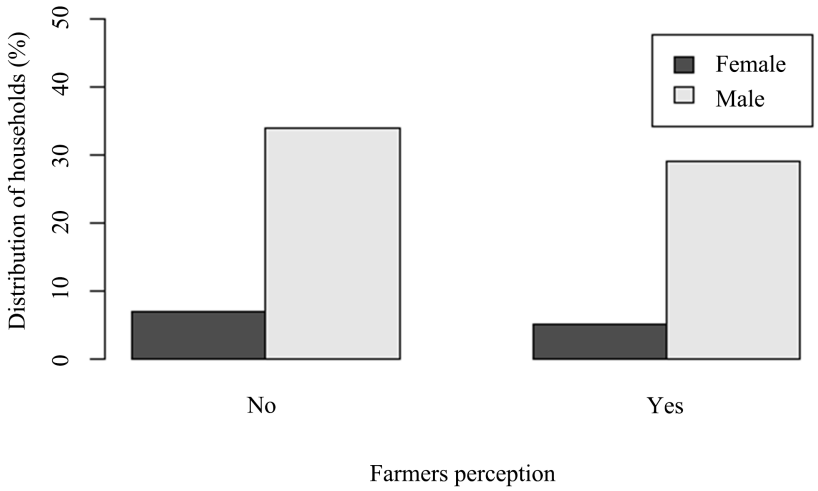

Figure 4. Distribution of households with and without access to fertilizer subsidies.

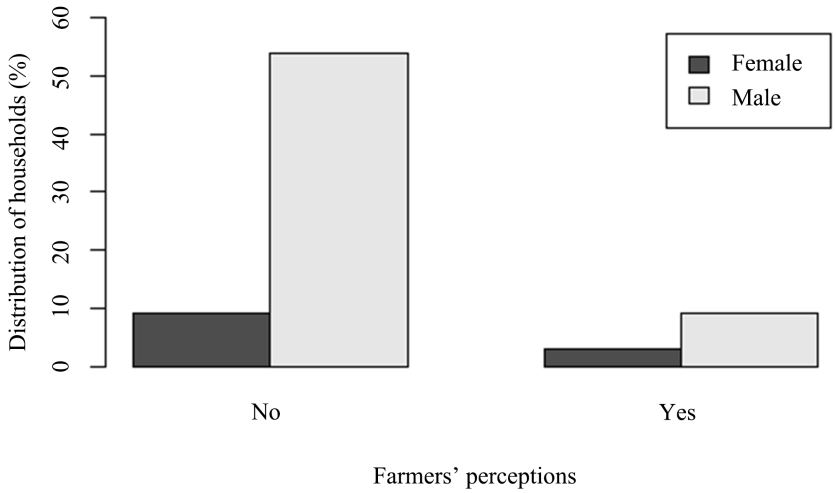

Figure 5. Levels of farmers' satisfaction on the rates of mineral fertilizer applied.

Tea-grown fields were more vulnerable to erosion more especially at establishment stage and when planted on hill-slopes. From the study, it was found that at any given number of soil conservation measures established in tea-grown fields, majority of them were associated with the male-headed households (Figure 6). However, majority of farmers had only one soil conservation measure especially trenches established in tea-grown fields that were more pronounced with the male headed-households.

3.3. Farmers' Perceptions on Green Tea Yields in Wet and Dry Seasons

Generally, male-headed households produced higher green tea yields compared to their female-headed household counterparts, regardless of the season (Figure 7 and Figure 8). In the wet seasons, majority of the male-headed households often harvested more than 1000 kg·ha^{-1} of green tea leaves. On the other hand, most of the female-headed household often harvested green tea leaves ranging from 501 - 1000 kg·ha^{-1}.

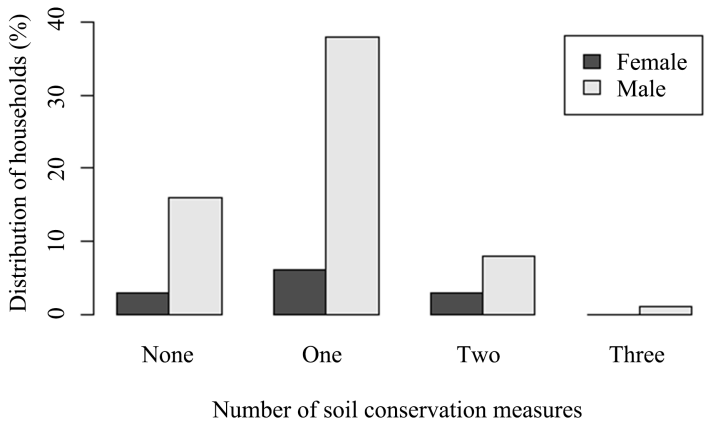

Figure 6. Distribution of tea-growing households with different numbers of soil conservation measures.

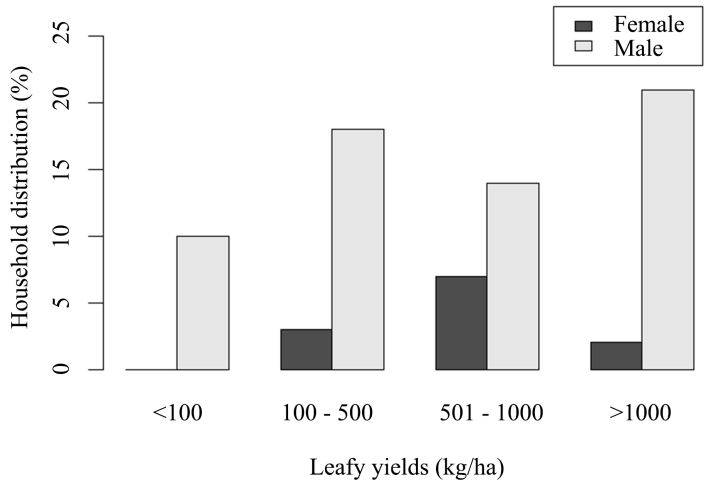

Figure 7. Distribution of farm households with different green tea yields in wet seasons.

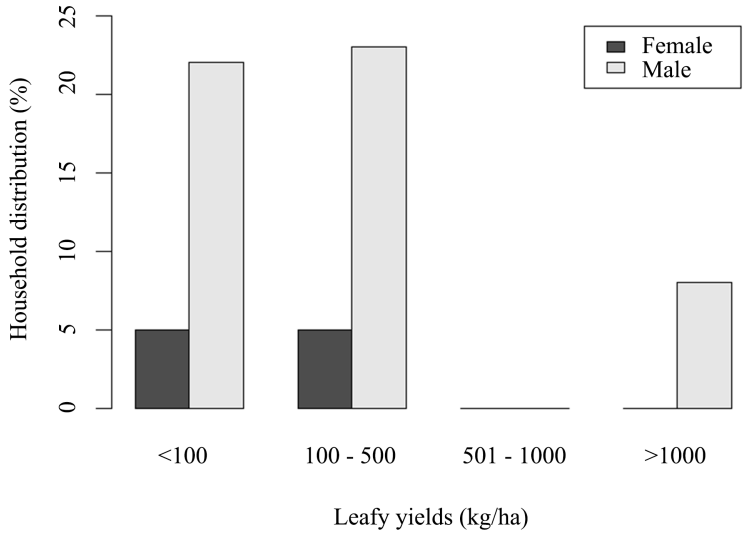

Figure 8. Distribution of farm households with different green tea yields in dry seasons.

In the dry seasons, green tea yields dropped whereby majority of the female and male-headed households often harvested not more than 500 kg·ha^{-1}. In the dry seasons, there was often sharp decline in green tea yields more especially in fields located on hillslopes compared to those located in the valley bottoms.

3.4. Farmers' Perception of Tea Production on Household Income

Higher proportions of farm households perceived that their income had increased in the last 10 years due to introduction and expansion of tea production both in the traditional and new districts. Nonetheless, proportion of the male-headed households that perceived an increase in household income was higher than that of the female-headed households. Similarly, proportions of the male-headed households that had perceived either a decreased, increased or static in household income was higher than that of the female-headed households (**Figure 9**).

3.5. Farmer-Market Linkages to Tea Processors

The majority of tea-growing farm households had direct linkage of selling green tea leaves to tea processing plants (**Figure 10**). Other farmers brought green tea leaves to collection centers for bulking and utilized single transport to the processing plants. However, some farmers with pressing domestic needs often sold green tea leaves through middlemen at lower prices compared to factory prices. Nonetheless, at every marketing channel, the proportion of female-headed households selling green tea leaves was often lower than their male-headed household counterparts.

3.6. Farmers' Perception on Effect of Introduction of Tea Production on Labor Demands for Food Security Crops

Majority of the female and male-headed households perceived that labor demand

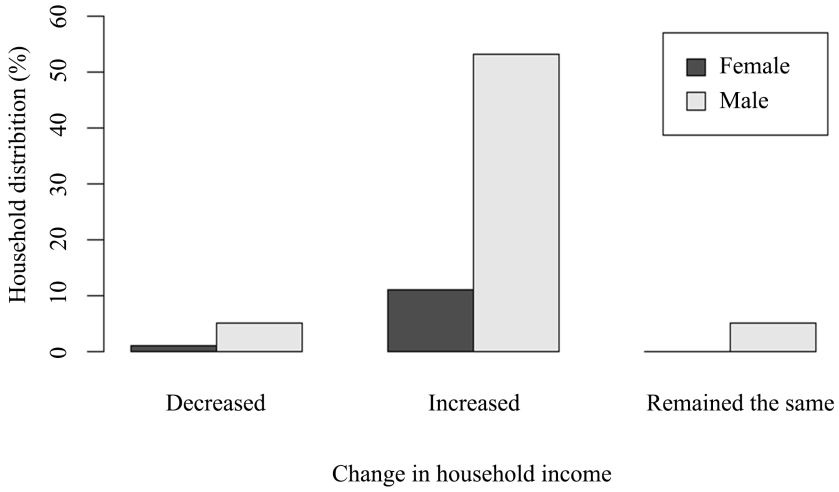

Figure 9. Farmers perception of impact of tea production on household income.

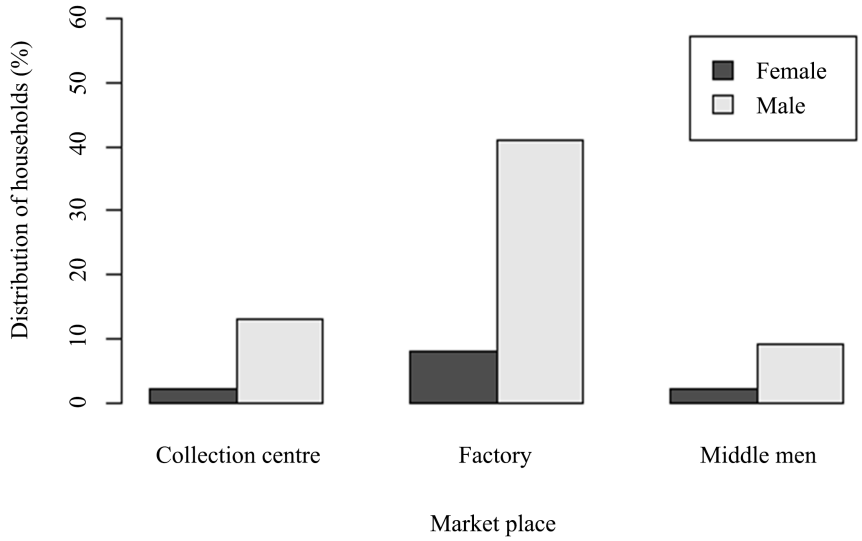

Figure 10. Distribution of farm households under different marketing place.

for other agro-enterprises more especially those related to household food security increased as a result of introduction and expansion of tea production even in non-traditional tea-growing areas (**Figure 11**). Major food crops grown by smallholder included banana, sweet potato, sorghum, vegetables, millet, legumes, and maize. On the other hand, other than tea production smallholder farmers were engaged in production of coffee, cotton, and tobacco as cash crops. Casual laborers were not readily available within the community as they migrated near established tea estates to get salaried jobs. The available casual laborers in the community proved more expensive due to their high demand from the different household farms. The demand of the hired labor intensified in the rain season, which raised costs of production. The intensity of labor demand and associated costs increases up to weeding time, coinciding with increased leaf plucking frequencies in tea estates belonging to factories.

Figure 11. Farmers' perception on change of labor demand on other crops.

4. Discussion

4.1. Enhancement of Farmers' Knowledge in Relation to Tea Production

Extension staff from tea processors and the local government through NAADS sensitized and trained smallholder farmers in improved agricultural practices that would result into increased sustainability of tea production. Enhancing farmers' knowledge and awareness tended to improve tea production through opening up more land for cultivation (9). Further, sensitization of tea-growing households about improved tea clones provided opportunities to farmers to plant high yielding tea bushes for improved productivity (9). Farmers obtained skills in improved land and water management innovations such as use of agro-forestry trees and trenches that were established at the periphery or within tea-grown fields. Nonetheless, these structures were few making them less efficient in controlling soil erosion and surface runoff. Low number of soil and moisture conservation structures in tea-grown fields was associated with high costs of labour and specialised tools such as spades and pickaxes. Tea-growing households were further trained in record keeping, linked to sources of credit and given weather information. Although farmers were aware of the use of micro-finance institutions, majority of farmers could not access credit due to high interest rates and lack of collaterals. Micro financial institutions had less desire to give out loans to agriculture venture due to associated risk such as crop failure resulting from drought as well as pests and diseases. Few female headed households were able to access credit compared to men because of limited sensitization done, and lack of assets to present in form of collateral.

Sensitizing and training farmers on importance of green tea production as one of the avenues for improved household incomes was one of the major objectives of NAADS (MOFPED 2017) [11]. Nonetheless, majority of the male and female-headed households did not receive any training, and this had implications on the rate of adoption of Good Agricultural Practices (GAPs), and thereby indirectly affecting tea productivity and profitability. Limited training in GAPs for

green tea production led to low yields. This was majorly attributed to limited government funding given to agricultural sector and yet it is the main backbone to Uganda's economy [12]. Low government funding to agriculture more especially to green tea production undermines Malabo declaration against household food, nutrition and income insecurity sub-Saharan Africa (NEPAD 2014) [8]. High proportions of the male-headed households not receiving any sensitization and training in green tea production was a result of men being more mobile compared to women farmers. Men in most cases moved away from the communities in search of off-farm jobs as viable alternative to farming. Establishment of tea factories in communities provided employment opportunity to the local population and therefore men were not often on their individual household farms. Tea being a cash crop was considered a man's crop, and therefore it was a man's responsibility to raise household income. Hence, more male-headed households got involved in tea production, and this made them receive more sensitization and training compared to their female-headed household counterparts. This indicated that more male-headed households were more aware of the GAPs that could lead to higher green tea yields. Because of low proportions of female-headed households getting sensitized and trained in GAPs, there was always disproportions of tea productivity in fields belonging to men and women farmers. This was mainly a result of the differences in levels of use of soil fertility improving and conservation innovations. None of the households was trained on use of improved agricultural practices such as irrigation and simple mechanisation that could boost tea production and productivity. This was because such innovations required higher capital investments, which smallholder famers could not afford. Tea production still depended on rainfall and hand hoe was still the main tool for its production. This led to low and stagnant tea productivity on farm. Low green tea yields were always associated with low farm incomes that in turn led to persistent household poverty.

This study revealed that although the government identified and promoted green tea production as an avenue to alleviate rural poverty, it benefited male-headed households compared to their female-headed household counterparts. This indicated lack of mass benefits of tea production as some sections of the population more especially the women were often left out.

4.2. Utilization of Soil Fertility Improving and Conservation Innovations in Tea-Grown Fields

Under normal conditions, the tea plant takes all the nutrients it needs from the soil, apart from very small quantities of nitrogen and other elements that may be absorbed by the leaves from air and rainwater. Continuous cropping rapidly exhausts the soil of its mineral supply, thus reducing plant growth and hence profitable yields [13]. Also a possible imbalance in the relative supply of nutrients by the soil may disrupt the growth rate of the tea plant. The main nutrient elements removed from a tea plantation via harvested tea are majorly nitrogen, phosphorus and potassium. The most important component is incurred by the inevitable

removal of the young shoots. To avoid depletion of soil nutrients or imbalances of their uptake, there should be deliberate applications of soil nutrients in form of mineral fertilizers or organic inputs. Nonetheless, majority of the female and male-headed households applied only 50 and 100 kg·ha^{-1} of mineral fertilizers, respectively. Further, majority of the male and female-headed households did not have access to fertilizer subsidies. This resulted into soil nutrient mining leading to wide spread land degradation in form of soil nutrient exhaustion. In the long term this would lead to continuous decline of green leaf harvests, in turn leading to wide-scale poverty at community level as farmers take up tea agro enterprise. Reduced green leaf yields will undermine the "Malabo Declaration" against household poverty as well as household food and nutrition insecurity (NEPAD, 2014) [8]. The aforementioned challenges were majorly attributed to low allocation of funds in the national budget to agriculture sector resulting into poor implementation of agricultural related policies (MoFPED, 2019) [14]. Hence, the amounts of mineral fertilizers applied could not sustain tea production and productivity. Continued lack of progress in use of adequate quantities of mineral fertilizers stagnated tea productivity and derailed government's efforts against poverty alleviation among smallholder farmers.

4.3. Green Tea Yields on Farm and Household Incomes

Highest proportions of households harvested more than 1000 kg·ha^{-1} of green tea leaves in a wet season while in the dry season majority harvested 100 - 500 kg·ha^{-1} of green tea leaves. This was attributed majorly to soil moisture differences between the two seasons. Soil moisture stimulates leaf development and growth, which leads to high yields [7]. On the other hand, plants produce low number of leaves in dry seasons as a response to soil moisture stress. Limited number of efficient technologies used on the farm could not sustain high tea productivity more especially in the dry seasons that are associated with moisture stress. Since, Uganda has two reliable rain seasons in most cases, farmers would experience relatively good harvests of green tea under GAPs. Nonetheless, higher green leaf yields led to improved incomes for households engaged in its production compared to those that solely relied on highly risky annual crop production ventures. Farm households engaged in tea production had smoothened income all-year-round. Nonetheless, household incomes were high during the rain seasons when the leaf harvests were at their peak, which is associated with high leaf plucking frequencies.

Household incomes derived from tea production were higher in male-headed households compared to their female-headed household counterparts. This was attributed to the limited resources such as land and use of other inputs more especially mineral fertilizers in the female-headed households. Due to limited resources such as land, female-headed household often placed less land under tea production as more land was often used for food production. Such households could not afford improved innovations that led to increased tea leaf yields (UBOS, 2020) [15]. As consequence, female-headed households had less access

to in inputs such as tea seedlings and mineral fertilizers that were given to farmers as subsidies. Female-headed households were resource constrained and therefore, could not hire labour for tea production. All these challenges faced by female-headed households had negative consequences on green tea yields and profits among such households.

Tea productivity on farm was still low productivity and could not drive broad entrepreneurial activities through diversification into new products, the growth of rural service sectors, the birth of new agro-processing industries, and the exploration of new export markets. Low productivity of tea in the region productivity could not catalyse development of infrastructure such as small-scale processing plants to add value to farmers' produce. This resulted into long distances with the associated transport costs farmers incurred while taking their produce to the factories. This challenge that faced farmers led to middlemen buying green leaf from farmers at low prices. Further lack of other processing plants for agricultural produce left farmers with limited choices, which left them in poverty.

4.4. Farmers' Choice of Green Tea Market Linkages

Marketing system for green tea leaves harvested from farmers' fields was underdeveloped and inefficient. Farmers involved in tea production were not well organized in groups such as cooperatives. Majority of farm households sold green tea harvests directly to factories as individuals. This was because, such households had been registered and supplied with mineral fertilizers and tea seedlings on credit and therefore, they directly sold green tea leaves to the factories to settle the debts. Further, factory owners or processors often organized and picked green tea leaves directly from farms or received leaves from farmers at relatively higher price compared to what they would receive from middle men. Nonetheless, poor rural infrastructure such as bad roads that often increased transportation costs led farmers to selling the harvests through middlemen. Farmers lacked storage facilities and therefore they could not store the harvested green tea leaves. Middlemen had concentration centres where farmers could bring their own harvested green tea leaves for cash payments. Some farmers sold green tea leaves to the middlemen because the factory owners or processor could not make instant payments, which made them wait for weeks. Therefore, where farmers had pressing needs, middlemen could be approached as off-takers of green tea leaves.

While linking farmers to market increases services aimed to improve transparency of the agricultural marketplace, tea farmers still had challenges because of one tea factory in place that decided upon the prices and other market conditions. Having one tea processing factory among tea growers, led to low grade tea produced due to deterioration of harvested tea leaves at the collection centres, and also leaves could be harvested when they have overgrown. Tea processors could not utilize all the green tea produced by farmers due to their limited capacity. This led to introduction of quotas indicating when farmers in a given lo-

cation could supply green tea leaves to the processing factory. Reducing plucking frequency made farmers harvest mature leaves mixing them with tender leaves in order to reduce losses on their side.

4.5. Influence of Tea Estate Establishments on Food Security Crops

Agriculture sector provides livelihoods of the majority of Ugandan population. It is the major source of household food, income, employment and raw material for the industrial sector (Adeleke *et al.* 2010) [16]. Health and well-being of the general population, children's growth, development, and cognitive ability as well as the productivity of the workforce are all negatively impacted by food insecurity [17]. In the study, land under tea production was expanding at the expense of food security crops. This led to records of high malnutrition, high morbidity rates, and in most cases low farm productivity and incomes [18]. As shift was done from traditional crops such as potatoes, banana, cassava, legumes and cereals that supported household food security to tea as a cash crop. While there was general increase in household income due to expanse of land under tea, most households experienced food insecurity [17]. This was attributed to decline land allocation for food crops and labour shift to tea plantations. Hand hoe was still the main tool for agricultural production, which made farm operations slow and expensive. The sharp rise of labour costs in the community resulted into low food crop production, and turn food items being imported from other neighbouring communities. This indicated that farmers not engage in tea production and relied solely on food crops were more vulnerable to household food insecurity. Tea farmers often harvested green tea leaves all-year-round, which indicated that their annual household income was smoothened. Such households therefore could access externally produced foods during the times of scarcity compared to their counterparts that relied on food crops produced on their own farms.

4.6. Use of Soil Fertility Improving and Conservation Technologies in Tea Production

The key long-standing challenge of the smallholder farmers is low tea productivity stemming from low soil fertility that has been in turn influenced by lack of access to profitable markets, credit, and suitable technologies that boost tea production and productivity [16]. For investment, smallholder farmers depend on savings from their low incomes, which limits opportunities for expansion of tea-grown fields. Because of the lack of collateral or credit history, most farmers are bypassed not only by commercial and national development banks, but also by formal micro-credit institutions. In addition to their own resources, farmers rely mostly on incomes of friends and relatives, remittances, and informal money lenders to invest in tea production. Therefore, tea-growing households used no or limited amounts of mineral fertilizers that were often subsidized by the government or given to them by processor as credit. Fertilizer subsidies given by the government through OWC did not satisfy tea production due to the small

amounts given to farmers. Limited or no purchase of mineral fertilizers by farmers themselves was attributed to high fertilizer prices, limited availability within the community, lack of credit, and low prices given to green tea leaves. These challenges were disincentive to farmers in using mineral fertilizers for sustainable tea production. This implied that tea sub sector still faced significant challenges that could hamper government's efforts to promote economic growth and poverty reduction at household level. The challenge of low green tea leaf yields was largely attributed to limited uptake of improved tea seedlings with the associated technologies. Most farmers planted volunteer tea seedlings or poor quality seedlings from community nurseries and did not apply mineral fertilizers.

5. Conclusion

Farmers' capacity building in tea production is majorly inclined to men due to their high participation in tea, which is considered a cash crop for household. Low productivity of tea bushes due is attributed to limited use of improved agricultural innovations related to soil fertility improving and conservation, and exacerbated by poor road infrastructure and networks. Low productivity of tea bushes is a disincentive to household poverty alleviation and undermines government's efforts of alleviating household poverty. Furthermore, tea-growing households are not well organized, which makes difficult to come up with collective action for any challenge and opportunity

6. Recommendations

Nonetheless, there is need to bring more farmers on board to gain the highly needed skills more especially in soil fertility management and conservation. This could be done when farmers are well organized in cooperatives or associations. There is need to increase funding through microfinance sector in the tea sub sector so that farmers could access soil fertility improving inputs such as mineral fertilizers within the community. There should be deliberate efforts by the government to develop rural roads for farmers accessing tea processing factories. There is also need to invest in coolers at the collection centers to avoid green tea leaf deterioration before processing is done.

Conflicts of Interest

The authors declare no conflicts of interest.

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