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ARTICLE

Understanding the Nexus between Climate Change, the Shift in Land Use toward Cashew Production and Rural Food Security in Ghana; the Experiences of Farmers in the Transition Zone of Ghana

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ABSTRACT

This study summarises the findings from a study investigating rural small-holding farmers' experiences on the shift from food crop to cashew in the forest/savanna transitional agro-ecological zone of Ghana and its impact on rural food security. Using a mix method approach, the study sampled the views of 400 farmers from 9 farming communities in the Wenchi Municipality of Ghana via questionnaire and semi-structured interview and collated statistical data on crop production to trace the nexus between climate change, agrarian land-use decisions and food security. The study found evidence of increasing shift from food crop to cashew production. This was evidenced by increasing cashew cultivation and cashew output and decreasing total land acreage for food crops and increasing food insecurity of farmers. The findings revealed that about 71% of farmers had expanded their cashew farms and another 41.0% have turned their food crops' lands to cashew production. Besides cashew production, (57.0%) has overtaken the traditional food crop -maize (25.5%) production in terms of output. Instructively, the study found that the main motivation for the shift from food crop to cashew production is not only to maximise income in bulk, but also climate change adaptability issues. The study found that the cashew crop is resilient in adapting to the changing climate and less prone to pests' invasion compared to maize in the study District. The study found that food security among rural folks had been seriously compromised by the conversion of farmlands from food crop to cashew farming. Although, the study found that female farmers have higher consciousness to food security yet less motivated to shift from food crop to cashew crop production compared to men. Worryingly, females are the hardest hit group because of their low ownership of or access to farmlands and low voices of women in farmland use decision making in a men-dominant rural extended family setting of the study District. The study concludes that climate change adaptability concern has introduced a new set of risks including crop failure due to changing rainfall pattern and increasing incidence of pest invasions forcing the rural folks to compromise innovative indigenous farming focus and practices that have helped them to navigate extreme food poverty. This study, therefore, argues for improved food crop seeds tailored to the specific climatic context and innovative farming practices that beef-up small-holding farmers' capacity to navigate climate change to continually produce food crop to ensure rural food security and sustainability.

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1. Background

Agriculture is the main 'life support' for broad-based economic growth, poverty alleviation and food security in Sub-Saharan Africa (SSA), having economic and social impacts. Undeniably, incomes accrued from agriculture in the sub-region (SSA) are much more effective in reducing poverty than Gross Domestic Product (GDP) growth in other sectors [1].

Agriculture remains the heartbeat of the economy of most of the third world countries employing more than half of the populace and contributing immensely in GDP. In Ghana, agriculture employs half of the labour force [2]. About 70% of farmers in Ghana engaged in crop production [3]. Livestock, cocoa, fish and forest products dominate Ghana's agricultural sector while non-traditional exports such as mango, pineapple, cashew nuts are progressively becoming very viable to the economy of Ghana [4].

Agriculture in Ghana is rural, dominated by small-holder farmers [5]. About 52% of the Ghanaian rural workforce are into small-scale agriculture, accounting for about 80% of the agriculture produce and 20% of the GDP [5,6]. However, smallholding farmers are less productive and are among the poorest in Ghana, accounting for about 80% of the poverty incidence. This is because agriculture productivity is low as it is rain-dependent, small-scaled and less mechanised. More worriedly, in recent times, agricultures in Ghana has come under the rampaging effects of climate change evident in intensified long dry seasons, erratic rainfall patterns, excessive evaporation and the drying of freshwater bodies, increasing incidence of pests' invasion, particularly on cereal crops. The effects of these have resulted in the increasing incidence of crop failures, low productivity, increasing food insecurity, which is putting about 46% of Ghanaians [whose livelihood is dependent on small-holding agriculture] at risk. Even more so is the fact that only 300 km^2 of the 41000km^2 arable under cultivation is irrigated in Ghana, thus making agriculture highly exposed to climate variability [7,5]. The combined effect of these is that in the study Municipality, farmers attempt to navigate the impact of climate change on the increasing incidence of food crop failure arising from erratic rainfall pattern, increasing dryness and pest invasion, farmers are rapidly shifting land use from food crop to cash crop, particular cashew nut production.

As a tropical crop, cashew (Anacardium occidentale L.) is presently grown around the equator, globally. Even though cashew was introduced in West Africa in the middle of the 16th century [8], the acceptance of cashew as cash crop began in the 1950s and has only become an intensively grown cash crop since 1990s. Currently, West Africa is among areas dominated in producing cashew accounting for 45% of the worldwide production in 2015 [9]. In Ghana, cashew as a non-traditional export crop began to receive attention in the late 80s. The export of Raw Cashew Nuts (RCNs) increased appreciably from 15 metric tonnes to 61,590 metric tonnes between 1990 and 2008, the annual production was estimated to be 26,452 metric tonnes [4]. Cashew is grown in three agro-ecological zones in Ghana, namely in the Interior Savanna (Guinea Sudan Savanna), Forest-Savanna Transitional and, the Coastal Zone [4]. However, among these three zones, the middle belt (Forest-Savanna Zone) is best suitable for cashew production in Ghana [4,10]. It is estimated that Ghana has about 3 million hectares (ha) of arable land suitable for the cultivation of cashew farm, however these arable lands in the three aforementioned ecological zones, especially the Savanna-Forest Transition Zone is the main food basket of Ghana, hence the more expansion of cashew farms is tantamount to decreasing farmland for food crop production [4]. This study, therefore, seek the answer to the following questions:

(1) To what extents are farmers shifting land use from food crop to cashew production in the Transition Zone of Ghana?

(2) What factors and motivation underpinned farmers' shift of land use from food crop to cashew production?

(3) What is the effect of the shift of land use from food crop to cashew production on rural food security?

The research, therefore, seeks an understanding of the seemingly growing shift of land use from food crop to cashew production in the Forest/Savanna Transitional Agro-ecological Zone of Ghana and its implication for rural food security and sustainability. The study tracked the nexus among climate change, farmers adaptability to climate change and rural food security to inform a more detailed study on innovative practices that can fortify rural livelihoods and food security.

2. Methodology

2.1 The Study Sites

The study was conducted in the Wenchi Municipality in the Bono Region (formerly Brong Ahafo Region) of Ghana. The district was randomly selected from a list of districts[1] that fall within the Transitional Zone of Ghana. The region is the major cashew production area and is located in the Forest/Savanna Transition agro-ecological Zone

[1] *Ghana has a-3 tier governance structures of national, regional and district levels. There are 16 regions and 254 districts. The Ministry of Education classifies districts into educationally deprived and non-deprived base on access and quality outcomes indicators. Seventy-five (75) district were classified as educationally deprived in 2015, these are also the rural-dominated district*

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with a population of 89,739 [11]. The study Municipality occupies 7,619.7 square kilometres with 180 communities of which 70% of the local communities (villages and towns) are rural [12]. In Ghana, communities with a population of less than five thousand (5000) people are defined as rural areas [6]. The Municipality rurality is characterised by small-holding farming. The imprint of the agrarian land used in the Municipality is evident in her settlement pattern characterised by several smaller rural communities scattered across the district [13]. The study area lies between latitude 7°27N and 8°30N and longitudes 1°30W and 2°36W. The economy of the Municipality is driven by agriculture and its related activities. The sector accounts for 65.2% (33,817) of the active labour force compared with 57.0% at the nationwide level [2]. The study area has a bimodal rainfall pattern with peaks in June/July as well as September/October with a marked dry season from November-March. Average annual rainfall and temperature are 800-1200mm and 26^{0}C respectively [14].

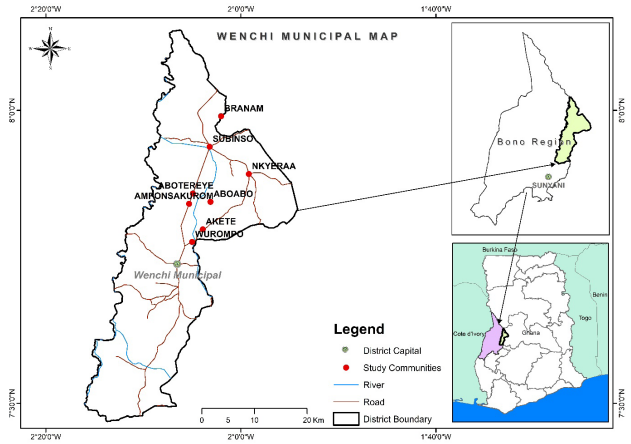

Figure 1. Map of Wenchi Municipality showing the study area

2.2 Participants and Data Collection and Methods

The study uses mix-method research by triangulating qualitative and quantitative methods and primary and secondary sources of data. Quantitatively, the study used surveyed method to sample the views of small-holding farmers. The study combined cluster cross-sectional and simple random sampling methods to select 400 small-holding farmers across nine (9) communities, including *Abotareye (55), Aboabo (30), Subenso No 1 (70), Subenso No 2 (40), Akefe (15), Nkyeraa (45), Brenam (55), Wurampo (20), and Amponsakrom (70)* to participate in this study via the administration of close-ended questionnaires. The questionnaire elicited a rage of farmers responses on climate (temperature and rainfall), farming activities, farmers' association, income accrued from cashew, demographic information and so on. The component of the respondents comprises both male and female farmers. Additionally, statistical secondary data on farm acreage, crop outputs and pesticides use were also collated from the Agricultural Department Office of the study Municipality. The quantitative data (questionnaires and secondary statistical data) were quantitatively analysed with SPSS and the results displayed in table and charts.

Also, in-depth semi-structured interviews were conducted with 6 key farmer-informants, probing farmers' motivation and experiences regarding cashew and food crop production, and food security. The discussions were audio-recorded with the permission from participants and, the data were later transcribed and thematically analysed to embellish the statistical result from the analysed responses from the questionnaires and the secondary data from the Municipal Department of Agricultural. Analytical summaries of the interview were developed to assist in the identification of the overarching themes for the study. In all, seven field workers were engaged.

3. Results and Discussion

Socio-economic characteristics of cashew farmers sampled are shown in Table 1. Majority of the cashew farmers were males (87.2%) whereas very few were females (12.8%). Greater number of the respondents were between the ages of 36-59 years (54.0%) while few of them were above the age of 60 years (10.8%). About 35.3% of the sampled cashew farmers were below the age of 35 years. About a third of the population of Wenchi comprises settlers [migrant farmers] form the five northern regions of Ghana making the Municipality multi-ethnic [2]. The indigenes who happened to be the Bono's were 41.5%. On education, it was revealed that the greater part of the respondents had not received formal education (29.8%). From Table 1, 26.5% were junior/middle school leavers whereas 18.3% of the farmers had received second cycle education. About 28% of the farmers were either primary or tertiary school graduates (see Table 1). However, about gender disparity, male farmers were better educated than their female counterparts. The results of the present study corroborate a study by [15] that education level of male farmers supersedes female farmers in the Nkoranza South Municipality. Approximately 43% of the female respondents had not received formal education as against 27.8% of male farmers. Moreover, with junior high/middle school, the percentage of male farmers (26.4%) and female (27.5%) were almost at par. Better still, the percentage of senior high graduates among male respondents (19.2%) was higher than the female respondents (11.8%). On tertiary education, the male farmers (14.0%) were

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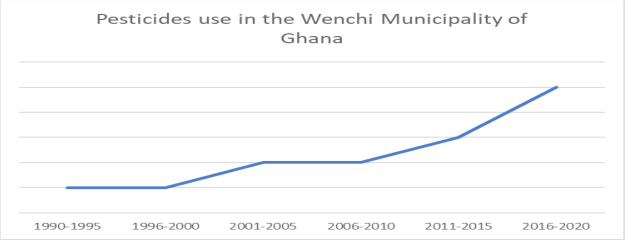
better educated than their female cashew farmers (3.9%). A study by [16] revealed that the education attainment of a farmer has a major consequence on the farmer's productivity. It was observed that a higher percentage of the respondents had a family size around 1-5 (46.0%). The result of the study showed that the average household size is around 6-10 (42.5%) with about 2.3% of households having more than 10 members. The results also show that about 66 % of the farmers owned farmland with the rest patterning with or working for landlord/ladies on *adonkye (farm and let's share)*. More men than women own farmland in the Municipality. Farmers' background point to low educational attainment which was found to be the factor for the low productivity as found by [17] and [13].

Table 1. Socio-characteristics of farmers (participants)

Characteristics	Frequency	Percentage
Gender		
Male	349	87.2
Female	51	12.8
Total	400	100
Age		
≤ 35	141	35.3
36-59	216	54.0
≥60	43	10.8
Total	400	100
Tribe		
Bono	166	41.5
Mo	25	6.3
Settler from the north	198	49.5
Others	10	2.5
Total	400	100
Education		
No formal education	119	29.8
Primary	51	12.8
Junior High Sch./Middle School	106	26.5
Senior High Sch./O'level	73	18.3
Tertiary	51	12.8
Total	400	100
Literacy		
Cannot read and write	188	47.0
Can read only	19	4.8
Can write only	3	0.3
Can read and write	192	48.0
Total	400	100
Household size		
1-5	184	46.0
6-10	170	42.5
> 11	9	2.3
Total	400	100
Farmer identification		
Landlord/lady	264	66.0
Partner farmer	52	13.0
Resident farmer	83	20.8
N/A	1	0.3
Total	400	100
Acquisition of land		
Family land	107	26.6
Personal land	162	40.5
Rented land	94	23.5
Purchased	37	9.3
Total	400	100
Part of cashew sold		
Nut	400	100
Fruit	0	0

3.1 Characteristics of Cashew Farming in Wenchi Municipality

One dominant farming activity was the usage of weedicides/herbicides (88.0%) to clear weeds instead of the normal cutlass weeding. Pruning (89.5) too was pervasive unlike fungicides/spraying (16.5%) and ploughing (23.5%). The study found that (informant interview) using herbicides to '*burn*' weeds was much economical than employing a labourer to use a cutlass. Others too did not have much problem with weeding because such farmers normally used the land to cultivate food crop (93.3%) to check weeds unless it was the off-farm season. Historical records on pesticides application at the Municipal Agricultural Office as captured in Figure 1 indicates an increasing used in pesticides, especially, among farmers who cultivate maize due to the increasing incidence of pest invasion in recent times.



Regarding farming methods, the results revealed that the majority (93.3%) of the framers intercropped cashew with other crops, but at the infant stages of the cashew crop. However, the opportunity for intercropping reduces as the cashew crop matures. The result resonates with a study by [11] that most of the cashew farmers practice intercropping but when the cashew trees start forming canopies over time, it makes mixed cropping difficult to practice. Very few respondents practised monoculture (6.8%). Two paramount reasons were assigned to this intercropping farming system (informants). One was to en-

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sure continual food supply to the household and the other one too to control weeds. The study also showed that the farm size of most of the respondents (67.0%) was 2 hectares whereas farmers with farmlands greater than 2 hectares were 33.0%. The study agrees with a study by [18] that cashew in Ghana is grown as a smallholder crop and the commercial plantations sector is very small. According to the paper, the majority of cashew farms are owned by smallholders, with farms ranging in size from a minimum 0.8ha (2 acres) to 3.0 ha (5 acres). The average price for a new land per hectare was around GHS120.00 (US$21) as of 2019-2020 farming season. The average cost of production in the study area was approximately GHS 2,205 per hectare (i.e. GHS 900 per acre). On acquisition of cashew farmlands, about half (49.8%) of the respondents farmed on their lands while 26.8% had their cashew on family lands. Others too (23.5%) farmed on rented lands in the Municipality.

The data from the Department of Agriculture in the Municipality clearly showed that between the year 2013 and 2017, there had been appreciable percentage increase in area under cultivation (36%), production (285%) and production per yield (183%). The average percentage increase for the five years under review was 7.2%, 57% and 37% respectively. This exponential increase in production from 2013 to 2017 was driven by the profit (53.4%) accrued from cashew business and probably vulnerability of food crops to climate change (10.8%).

Table 2. Estimated production figures for cashew from 2013-2017 in Wenchi Municipality

DEPARTMENT OF AGRICULTURE, WENCH MUNICIPALITY					
CURRENT ESTIMATED PRODUCTION FIGURES FOR CASHEW					
Crop	Cashew				
Year	2013	2014	2015	2016	2017
Area under cultivation (ha)	7,980.00	8,424.20	8,867.60	9,852.80	10,838.80
Production (yield /ha)	0.6 mt/ha	0.8 mt/ ha	0.89 mt/ ha	1.6 mt/ha	1.7 mt/ha
Production	4788.48 mt	8739.4 mt	7094.1 mt	15764.5 mt	18425.96 mt

Source: Department of Agriculture, Wenchi Municipality.

3.2 The Economic Contribution of Cashew to the Livelihood of Farmers

The study revealed that the topmost source of income to the greater proportion of the respondents in the study area was cashew (56.75%). Formerly, maize [14] was the major occupation that provided economic reward to the farmers in the Municipality. Maize currently ranked second (25.50%) followed by yam (11.5%) according to the respondents. On gender bases, 58.8% of female cashew farmers placed cashew first whereas maize was graded second (21.6%) which was not all that different from their male counterparts about cashew (56.4%) and maize (26.1%). This agrees with another study by [1] in Guinea Bissau that cashew is the most important source of monetary income, in addition to being the core of both economic performance and poverty reduction. Other beneficiaries of cashew production were mostly women who handpicked the nuts and the local buyers. On average, female labourers could take away GHS 20 (US$3.47) a day for their labour. The local buyers were also in two categories; those who used their own capital and those who received funding from oversea expatriates to purchase the nuts. Cashew was source of livelihood to these "middlemen" (informants). However, only nuts of the fruit were sold (100%), while the apple was thrown away (0%).

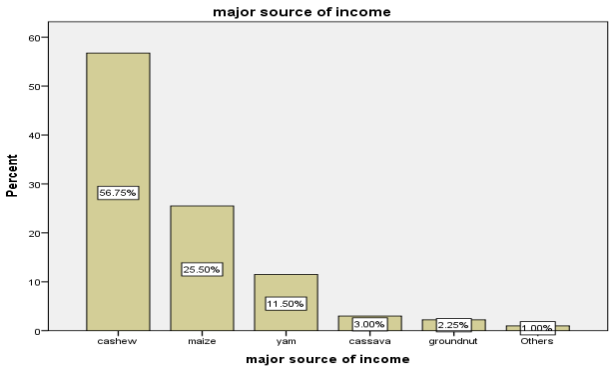

Figure 2. the major source of income to respondents

The study also revealed that majority of the respondents enjoyed much income from cashew in a given farming season. A greater proportion of respondents received a substantial amount of money between GHS 3,000.00 and GHS 4,000.00 (US$520- 693) (24%) within a farming season while others could accrue over GHS 5,000.00 (US$ 869) (23.3%). According to key informants, a cashew farmer could harvest an amount of GHS 7,350.00 per hectare (i.e. GHS 3,000 per acre) in a farming season if sales were favourable and the trees were mature (above 7 yrs.). It was also recognised that there was a discrepancy concerning the money both genders received. Among male cashew farmers who obtained GHS 5,000.00 during a farming season, was higher (27.5%) than their female counterparts (3.9%). Concerning GHS 3,000-4,000 threshold, among the male farmers, 22.9% were captured as against 23.5% of females. Also, at the lower range (GHS 100-900), the study showed 20.9% of male cashew farmers as against 39.2% female farmers. This revealed that the chunk of the female farmers did not receive much money as compared to the male farmers. The study again showed that the average cashew farmland for female farmers was 1 ha (3 acres) whereas that of the males was 2 ha

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(5 acres). There was a statistically significant relationship between gender and farm size $p< 0.05$ (0.003) and income received by cashew farmers and farm size $p< 0.05$ (0.000). Hence, male farmers were found to have better economic muscles than female cashew farmers when it came to cashew benefits.

3.3 The Shift of Farmland Use from Food Crop to Cashew Production and Its Implication for Food Security

3.3.1 Factors

The major factor endangering food security in the study areas was found to be the conversion of lands meant for food crop to cash crop (cashew) cultivation. About 71% of the respondents opined that they had expanded their cashew lands, another 41.0% had turned their food crops' lands to cashew farms, and 10.5% of the cashew farmers purchased their farmland from food crop farmers. The study found a correlation between the expanded farmland for, and output in cashew production and a corresponding declined in farmlands for, and output in maize [the dominant food crop] production in the Municipality. In other words, as farmland for cashew production and output in cashew production increases, food insecurity in the municipality also increases.

The study established the factor for the adverse impact of the increasing cashew production on food insecurity in the area. In-depth information elicited from farmers revealed that emerged the adverse correlation between the increasing cashew production and dwindling food security in the study area has to do with the fact that cashew production has compromised the traditional intercropping farming practice in the areas which allow framers to grow a variety of food crops on the same land to ensure the availability of a variety of food for rural households' upkeep throughout the year. The use of intercropping has been a major innovative indigenous farming practice that has helped the rural agricultural dependent folks to navigate extreme poverty, especially, the lack of money by saving their monies that would have gone into buying certain foods items. Through intercropping, farmers were able to cultivate and store a variety of food items, especially maize and beans and gari (processed cassava) for families used throughout the year. However, due to the shift to cashew production, active intercropping has become impossible when the cashew trees are about three to four years. The thick canopied cashew farms deny farmers the opportunity to continually intercrop cashew trees with food crop like cassava, maize, yam, groundnut with the cashew trees. The diminishing opportunity for intercropping was found to be contributing to food insecurity and exacerbating poverty in the study Municipality, especially among women, who are mostly the food crop farmers as the food crop farmlands are taken over by cashew trees, grown mostly by the men. This is because cashew dominated farmers are spending more money to buy food items, including locally produced ones which they could otherwise have produced, thereby dwindling any income they might have made from cashew. It, therefore, emerged that before the graze for cash production in the areas, although the rural farmers where poor in terms of purchasing power and access to social amenities, they were not poor when it comes to their resourcefulness in producing food locally to feed their families. However, the study found that climate change adaptability concern was found to have introduced a new set of risks including crop failure due to changing rainfall pattern and increasing incidence of pest invasions forcing the rural folks to shift from maize to cashew production.

The study found that farmers motivation for shifting from food crop to cashew production in the study area is not precipitated on a high income or stable market prices for cashews per se, but more of climate change adaptability concerns. According to participants, prices of cashew nuts have been unstable, oscillating between GHS 7.00 (US$1.20) per kilo and GHS 2 (US$ 0.35) for the past four years. One farmer expressed his disappointment that; "*The buyers could start purchasing the nuts at GHS 7.00 but within a twinkling of an eye, the price would fall as low as GHS2.00*". In probing the motivation for the shift from maize to cashew production, the study found that the shift is occasioned by climate change adaptability concerns rather than better market prices for the cashew nuts. According to the farmers, the cashew crop is resilient than maize (the main food crop in the area) in adapting to the changing climate in the area. Additionally, the cashew crop is less prone to pest invasions compared to maize in the area. Besides, historical data on pests' invasion, particularly on maize, and a corresponding increase in pesticides use among farmers in the study Municipality, suggesting an increasing cost of production to the farmers and declining output. Linked to the issue of the effect of climate change on farmland use decision and food security is the changing rainfall pattern. The changing rainfall pattern is adversely impacting the rainfed smallholding farming in the area. [19] observed that food crops in Ghana are increasingly becoming vulnerable to erratic rainfall than cashew. The most susceptible crops to the changing climate according to the study were maize (52.3%), yam (15.0%), groundnut (13.5%), vegetables (10.0%) and cashew (2.3%).

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3.3.2 Effects

The study found that food security among the rural folks had been seriously compromised due to the conversion of farmland from food crop to cashew farming. The study revealed that about 49.0% of the cashew farmers experienced a shortage of food supply in the lean farming season. Such farmers relied on food on the market (mostly imported from other areas). The high prices of such food item relative to cashew farmers' income level erode any gains in income they might have accumulated from the shift from food crop to cashew production. In the long run, the cashew farmers become even worse off than food crop farmers [as food crop farmers usually store most of their farm produced for a family used so that they can overcome escalated price during the lean season]. The growing incident of food poverty of the cashew farmers articulated aptly by one farmer as;

"The majority of us too buy even locally produce food during the lean season because we don't have enough maize and beans to store and cassava and plantain farmers to rely on in the dry season."

According to participants, lives of some of the cashew farmers become miserable as they resorted to demanding *"soft loans"* from the buyers so that they could repay it with their nuts when the season got started. The high interest charged on such loans further worsens farmers' plight.

Additionally, the study found that female farmers have higher consciousness to food security and thus less propensity to shift from food crop to cashew crop production compared to men. The less motivation for the female farmers to shift from food crop to cashew crop does not suggest a low appetite for taking risks, instead, it is because females were found to have higher consciousness to family food security. The higher female consciousness to food security was found to have a link to the traditional role of the Ghanaian women in the extended family setting. In Ghanaian traditional setting, women are not just a caregiver, but they have a responsibility to feed the family with or without the support of the men or household heads. Hence, in the Akan ethnic group in Ghana, the title for women is *Maame* (mother) which translate as *my stomach is full*. This is further supported by our general field observation that the male farmers tend to have more apatite from cash crop production including cashew, cocoa and oil palm because its income comes in bulk in a given season of the year compare to food crop whose income comes in bits and pieces, throughout the year. However, cash crop farmers became venerable and poor in the off-season of those annual crops. Although the study found that female farmers have higher consciousness to food security and thus less propensity to shift from food crop to cashew crop production compared to men, they are the most severely hit group regarding the increasing shift of land use from food crop to cashew production. This is because women have little say on land use decision making at home and have less ownership of the farmlands compared to the men.

In total the general impact of the Shift of farmland from food crop to cashew production on food security as summarised in Figure 3 indicates that about 49% of respondents [farmers] are experiencing food insecurity.

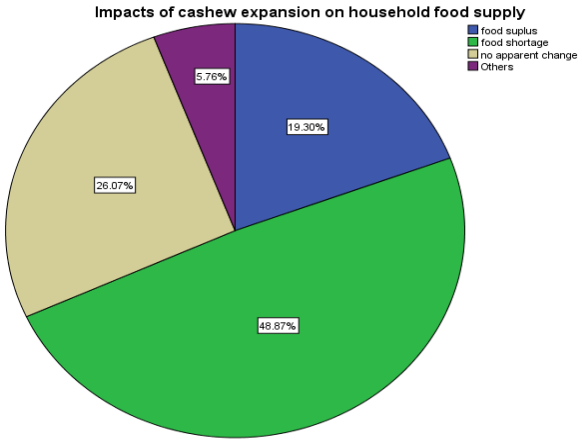

Figure 3. Impacts of expansion of cashew lands

Additionally, Table 2 also summarises the general problems confronting small-holding farming food and cash crop farming in the study area.

Table 2. Problem of cashew farming

Item	Frequency	Per cent	Cumulative Percent
unavailability of land	65	16.3	16.3
Unstable price	136	34.0	50.3
High temperature	8	2.0	52.3
Lack of capital	101	25.3	77.5
rainfall	43	10.8	88.3
Thieves	38	9.5	97.8
labourers	9	2.3	100.0
Total	400	100.0	

The study also found that the growing rural food insecurity caused by climate change adaptability concern of a shift from food crop to cash crop production in the study Municipality is contributing to the surge in rural-urban and north-south migration pattern in Ghana. This finding affirms [17] that increasing rural-urban migration in Ghana is linked to dwindling rural agricultural productivity, which the authors also linked it to the effect of climate

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change. The high rural-urban migration in Ghana the authors argued has, in turn, created a development challenge called "double jeopardy of rurality" in Ghana. A situation where rural areas are experiencing slow socio-economic development due to loss of human capital to urban Ghana and are also indirectly paying for the cost of overcrowding in the cities caused by the rural-urban migration, evidenced by skewed resources allocation in favour of urban areas to combat urban sanitation and housing deficit.

4. Conclusion

The study sought to analyse the impact of cashew farming on food security of the people of Wenchi Municipality. The findings of the study attest to and reflect the unequal benefits and challenges posed by the cashew farming between individuals and genders. The data from the Municipal Assembly confirms the exponential increase in production and expansion of cashew lands and dwindling food crop output. Even though cashew farmers accrued more income than food crops farmers at a go, food crop farmers were found to have better food security throughout the year and are comparatively better off than the cashew farmers whose income get eroded by increasing food prices in the lean season. Although the study found that female farmers have higher consciousness to food security and thus less motivated to shift from food crop to cash (cashew) crop production compared to men, the females are the most severely hit group bearing the brunt of the shift of land use from food crop to cashew production because they carry more responsibility of feeding the family, hence have little say on land use decision making at home and have less ownership and thus access to farmlands compared to the men. The study concludes that climate change adaptability concern was found to have introduced a new set of risks including food crop failure due to changing rainfall pattern and increasing incidence of pest invasions forcing the rural folks to shift from maize to cashew production. Further investigation on how to mitigate the impact of climate change on rural food security is very crucial especially regarding improved food crop seeds tailored to the specific climatic context and innovative farming practices that will help small-holding farmers to navigate climate change effect on food crop production to ensure rural food security and sustainability. This crucial as rural food insecurity caused by climate change is causing a surge in rural-urban and north-south migration in Ghana and, global South and North migration.

Competing Interest

Authors have declared that no competing interests exist.

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References

[1] Monteiro F. Catarino L., Batista D. Indjai B., Duarte M. C. and Romeiras M. M.. Cashew as a High Agricultural Commodity in West Africa: Insights towards Sustainable Production in Guinea-Bissau, 2017. www.mdpi.com/journal/sustainability (accessed 22nd January 2020)

[2] Ghana Statistical Service, National Analytical Report 2010 Population and Housing Census Ghana Statistical Service, 2012.

[3] Ghana Statistical Service (2015) Composite Budget of the Wenchi Municipal Assembly for 2015 Ghana Statistical Service, 2016.

[4] African Cashew Initiative. A Value Chain Analysis of the Cashew Sector in Ghana; Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ) International Foundations, 2010.

[5] FAO. Gender inequalities in rural employment in Ghana. An overview. Food and Agricultural Organization, 2012. Retrieved from: http://www.fao.org/docrep/016/ap090e/ap090e00.pdf (assessed on 18.12.08)

[6] Ghana Living Standard Survey- GLSS8, 2018. http://www.statsghana.gov.gh/nada/index.php (assessed on 30th March, 2020)

[7] World Bank. The World Bank Annual Report 2013. Washington, DC. © World Bank, 2013. https://openknowledge.worldbank.org/handle/10986/16091 License: CC BY 3.0 IGO.

[8] Salam, M.A. Peter, K.V. Cashew-A Monograph; Studium Press (India) Pvt. Ltd.: New Delhi, India, 2010.

[9] Rabany, C., Rullier, N., Ricau, P.. The African Cashew Sector in 2015, 2015. Available online:

  DOI: https://doi.org/10.30564/jasr.v3i2.2010

http://www.rongead.org/IMG/pdf/african_cashew_market_review_rongead_ica_2015 (accessed on 14th March 2020).

[10] Dedzoe C.D., Senayah J.K., Assiamah R.D. Suitable agro-ecologies for cashew (Anacardium Occidentale L.) production in Ghana. West Afr J Appl Eco., 2001, l 2: 103-115.

[11] Wongnaa C. A.1, Awunyo-Vitor.D. Profitability analysis of cashew production in Wenchi municipality in Ghana, 2013.

[12] Ghana Statistical Service (GSS). Statistics for Development and Progress: Gros Domestic Product 2014, 2016. Retrieved on 12th January 2016 from: www.statsghana.gov.gh

[13] Anlimachie, M.A, Avoada, C.Socio-Economic Impact of Closing the Rural-Urban Gap in Pre-tertiary Education in Ghana, (in-print), International Journal of Educational Development, 2020.

[14] Adjei-Nsiah S., Kermah M.. Climate Change and Shift in Cropping System: From Cocoa to Maize Based Cropping System in Wenchi Area of Ghana. British Journal of Environment & Climate Change, 2012, 2(2): 137-152, Sciencedomain international. www.sciencedomain.org

[15] Adjei V., Kyerematen R.. Impacts of Changing Climate on Maize Production in the Transitional Zone of Ghana. American Journal of Climate Change, 2018, 7: 463-476. https://doi.org/10.4236/ajcc.2018.73028

[16] Khan, H., Ali, F.. Measurement of Productive Efficiency of Tomato Growers in Peshawar, Pakistan. Agric. Econ. CZECH, 2013, 59(8): 381-388. ISSN: 0139-570 X.

[17] Amoako-Mensah, T., Anlimachie, A. M., Adu, B. S., Elorm, E. A.. Out-migration and the Double Jeopardy of rurality in Ghana. An integrated approach to rural development. European journal of geography, 2019, 10: 50-67.

[18] Osei-Akoto, S., Topper, C.P., Swatson, E.. Status of cashew production in Ghana and agronomic options for increasing production by smallholder farmers. Paper presented at Ghana Institute of Horticulture Annual Conference, 2005.

[19] Adjei V., Kwantwi L. B.. Maize and Cashew Farming in the Face of Climate Change Variability in the Transitional Zone of Ghana: A Case Study of Nkoranza South Municipality American Journal of Environmental Sciences, 2019.

 DOI: https://doi.org/10.30564/jasr.v3i2.2010