

Agriculture and gender roles in the semi-arid region of Ghana

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Abstract

In the Upper East Region (UER) of Ghana, women play an important role in economic growth and poverty reduction through their active engagement in agricultural activities. However, little is known about the extent of their productive roles in agriculture in the region. This study sought to investigate the gender-specific agricultural roles of men and women in the region where the major livelihood is subsistence rain-fed agriculture. A household survey was conducted from August to December 2014 using a pre-tested questionnaire where 150 males and 150 female headed households (HH) were randomly sampled from 14 communities within the Bolgatanga Municipality and Bongo district of UER. The simple Fisher's exact test using STATA 13 statistical software was used to determine the correlation between gender and agreement or disagreement in productive roles. Results show that women are involved at all levels of farming activities particularly in physically demanding activities such as planting crops, weeding, fertilizer application, tree and crop harvesting among others. Women are not engaged in financial administration except for selling of crops. Men on the other hand, are responsible for land preparation, feeding of livestock, seedling production among others. Planting of crops and harvesting of fruit trees are performed jointly by men and women. About 86 % of men and 94 % of women perceived planting of crops to be a productive task that should be performed jointly, whereas 65 % men and 65 % women expressed the same view on harvesting of fruits. There is a need to empower women through policy formulation and enforcement to allow them equal access to productive resources such as land.

Introduction

Agriculture is the engine of growth and poverty reduction for many developing countries where it is the main source of livelihood for the rural poor households. However, the agricultural sector in most of these countries is unable to achieve its full potential in terms of productivity partly because women who represent a key resource in agriculture sector through their roles as labourers, entrepreneurs and farmers have unequal access to productive resources compared to men (SOFO Team and Doss, 2011). Women's contribution to agricultural and rural economies in developing countries is enormous (World Bank 2017, SOFA Team and Cheryl Doss 2011). They play different roles that vary within and between regions where there is rapid economic and social transformation of the agricultural sector.

In many parts of Sub-Saharan Africa, a conventional gender differences exists in agricultural production and marketing activities, which are mostly based on crops and/or roles (Doss 2001; McPeak & Doss, 2006). Men mostly dominate the cash crop production and export sector of agriculture mainly because they are considered the major cash earners for households or families. On the other hand, subsistence agricultural production is typically under the dominance of women's sphere (Njuki et al., 2011). This disparity in roles among men and women is multifaceted and may depend on specific physiological, institutional, socio-cultural and political economy settings. According to Ibnouf (2011) and Sorensen (1996), gender roles in agricultural production and marketing activities are dynamic and can change not only as a response to commercialization

and innovation but also in the circumstance where gender is absent due to natural attrition or disability. It is also observed that access to, ownership, and control of agricultural resources form critical components in the measurement of wellbeing of rural farm households. A farmers' ability to engage additional farm labour, adopt improved farm technologies and make investment depends on their access to and control of productive resources (SOFO Team and Doss, 2011). Inequalities in access to productive resources tend to constrain women's capacity to ensure high agricultural productivity and household food security, thus, causing poverty perpetuation and a wider welfare gap between male and female-headed households (FAO, 2012; FAO, 2013). According to Milcah (2014), gender inequity exists in access to valuable agricultural production resources such as land; variable agricultural inputs (including seeds, labour, chemicals, etc.); credit; production technologies; extension services, training and other production services that would enhance production efficiency and productivity levels. For instance, access to land is highly limited among women farmers when it becomes highly commercialized, causing women to lose out completely. Generally, access to land for agricultural production in developing nations like Ghana is considered extremely low and insecure for women compared to men. According to Doss et al. (2015), women in the sub-Saharan African countries have less land and of lower quality compared to their male counterparts. Study by Djurfeldt et al. (2013), points out that the male and female tend to have unequal access to modern agricultural technologies and inputs and is a major cause for low agricultural productivity among female farmers in most

African countries

.Kabeer (2012) argues that institutional, social, cultural and economic barriers tend to limit women's access, ownership and control of valuable productive resources. The situation is worsened by biased legal and regulatory structures that restrict opportunities for women to fully participate in economic and social engagements. Considering the proportion of Ghanaian rural population that depend on agriculture for livelihood, access and control of productive resources needed for agriculture production is key in improving the sector's performance (World Bank 2017). In the Upper east region (UER) of Ghana, women play an important role in economic growth and poverty reduction through their active engagement in agricultural activities. However, little is documented about the extent of their productive roles in agricultural livelihood opportunities in the region. The aim of this study is to investigate the gender-specific agricultural roles of men and women in a predominantly patrilineal society whose major source of livelihood is subsistence rain-fed agriculture.

Customary gender-differentiated roles in agricultural related activities

In general, productive tasks in rural households are classified under three main categories: 1) productive work that either produces goods or services for household consumption or for sale in the market for cash or in kind; 2) reproductive tasks such as child bearing and rearing, feeding the family, and caring for the sick; and 3) social/community activities performed not only for family welfare, but also for public well-being and community-related responsibilities (Peter 2006; Villamor et al., 2015). Table 1 presents the list of activities/

TABLE 1
Activities according to the three classes of gender roles

1. Productive role	2. Reproductive role	3. Community role
Clearing land	Collecting firewood	Community meetings
Planting crops	Fetching water	Church meetings
Planting trees	Preparing meals	School buildings, bridges, etc.
Feeding livestock	Taking care of children	Cleaning public spaces
Weeding	Washing clothes	Afforestation
Fertilizer application	Cleaning house	Community beautification
Applying pesticides/herbicides	Children's expenses	Adopting conservation measures
Watering/irrigation	Household budgeting	
Producing seedlings	House construction/maintenance	
Pruning trees		
Harvesting crops		
Harvesting fruit trees		
Hauling crops		
Selling crops		
Farm finances		
Purchasing farm inputs		
Maintaining farm records		

Adopted and modified from Villamor et al., (2015)

tasks according to the three categories.

Women are compelled to combine their reproductive and productive roles such as cooking, fetching water, collection of fuel wood, childcare, sale of cooked food and cooking with their regular farming activities (IFAD 2016; Duncan 2004). In effect, women tend to be more burdened than men whose workloads are mostly restricted to productive roles.

The contribution of women in the (UER) and Ghana to agricultural production for the household and the rural economies cannot be overemphasized. Over the years, women's roles have evolved due to the changes in demand as well as in the rural economies in which they are situated. Traditionally, different roles are ascribed to men and women in the rural agrarian economy of Ghana. However, with changing economic demands, the multiplicity of women's roles, which include childbirth and taking care of the children and

the husband while at the same time processing the spouse's farm produce for the market, makes them overburdened and impoverished (Grieco 1997). In addition, activities such as fetching water and firewood collection are still the sole responsibility of women making it difficult for them to attain their productive potentials. Despite this, women, especially in female-headed households, are now assuming greater responsibilities in terms of providing for their children's educational and material needs especially when their husbands migrate to urban centers in search of greener pastures. The female-headed households in rural Ghana constitute about 20 % of all households with 11 % of the female-headed households located in the UER in Ghana (FAO 2012).

Methodology

Study area

The research was carried out in the Ve

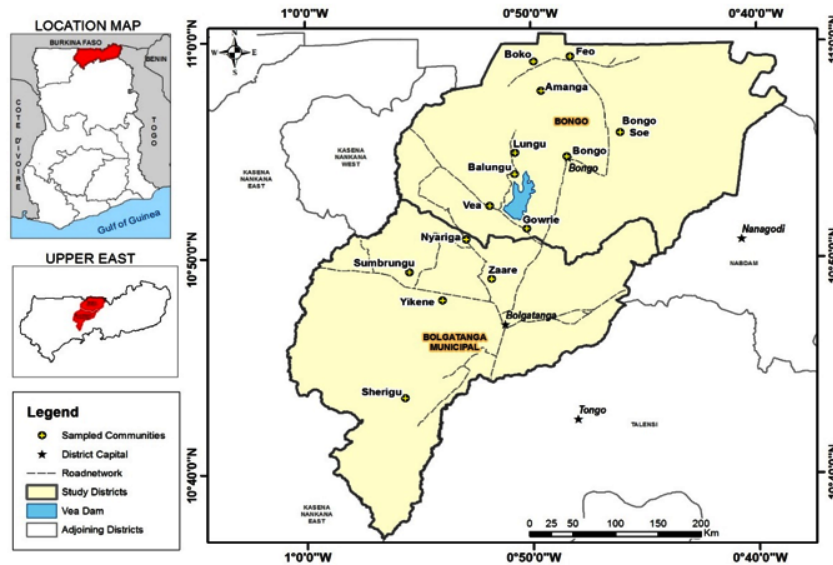


Figure 1: Map of the study area

catchment located within Bolgatanga municipality as well as the Bongo district of the UER of Ghana (Fig. 1). The Veolia Catchment which has a total land area of about 301 km² is bordered to the north by Burkina Faso and to the east by Togo. A larger portion of the region is situated within the semiarid West African savannah belt except for a small stretch of land in the north-eastern part of the catchment that belongs to the Sudan savannah (Adu, 1972). The UER falls within the White Volta basin with an estimated land area of about 8,842 km² which represents 3.7% of the entire land mass of Ghana. The region is made up of nine administrative districts namely: Kassena-Nankana East, Kassena Nankana West, Bawku Municipality, Talensi-Nabdum, Bawku West, Bongo, Garu Tempene, Bolgatanga municipality and Builsa Districts (GSS, 2012).

According to GSS 2012 report, the population of UER is estimated to be 1,046,545 (506,405 males and 540,140 females), representing 4.2 % of Ghana's population with a density of 118 km⁻² and an annual growth rate of 1.2 %. The population density per square kilometer of the region exceeds the country's average

population of 103.4 km⁻² (GSS, 2012). The region is about 79 % rural based with an average household size of 5.8 people. The main economic activities in the region are agriculture, forestry and hunting. Agriculture is the predominant economic activity employing about 80% of the economically active population (GSS 2010). There are two main irrigation projects in the region for dry season farming. These are the Tono and Veolia irrigation projects with catchment areas of 850 and 2,490 hectares respectively. Small scale agro processing (rice and groundnut) and handicraft are the income generating activities for the active population. Veolia catchment is located within the Sudan-Savannah climate zone which has high temperatures and a monomodal rainfall distribution. The rainy season has a duration of 5 months (May – September) where most farming activities take place whereas the dry season lasting for 7 months (October – April) (Martin 2005; Schindler 2009). Over the last 30 years (1985–2014), the hottest dry period was experienced between March and April and the coolest rainy season in August (Figure 2). The mean annual rainfall over the 30-year period obtained from Ghana

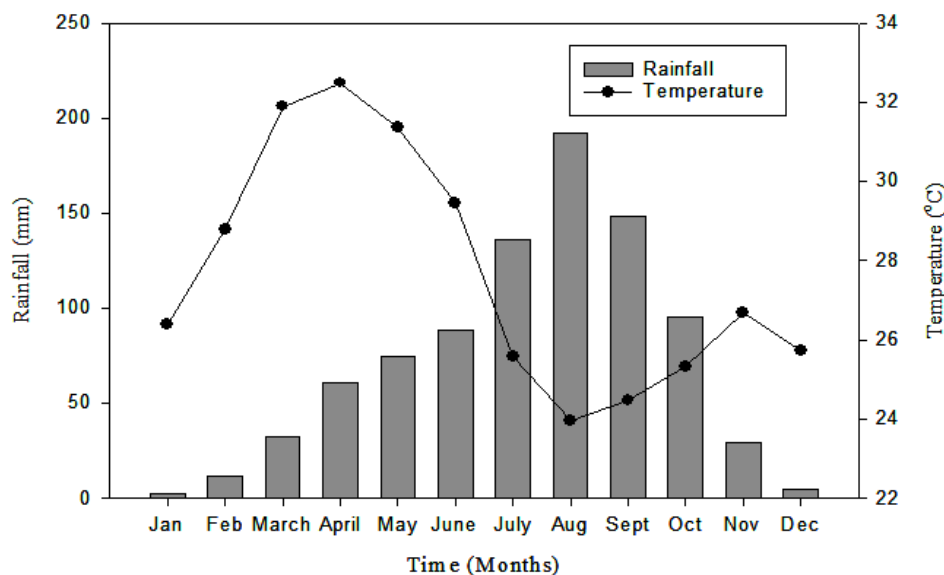


Figure 2: Annual mean temperature and rainfall pattern in Upper East Ghana over a 30-year period (1985 – 2014). Source: Ghana Meteorological Agency

Meteorological Agency was 1031 (± 144.63) mm and 29.0 (± 0.34) °C for temperature.

Traditional agricultural systems

Agro-pastoralism is the main practice in the UER of Ghana (Eguavoen 2013; Yembilah and Grant 2014). Subsistence rain fed agriculture is the main source of livelihood in the area with exception of the communities that are located close to the Veia dam that practice dry-season (irrigation) farming. Traditional cereals are the basis for the agricultural system in the farmers' environment (Villamor & Badmos, 2016). Cultivation is usually normally carried out around the compound on continuous basis with soil enrichment through the application of crop residues, animal manure and compost (González-Estrada et al., 2008). Millet is the key traditional cereal crop in the study area and has two common varieties namely early millet (*Pennisetum spicatum*) and late millet (*Pennisetum glaucum*). Sorghum (*Sorghum bicolor*) is the second most important cereal that is commonly cultivated by many farmers due to its ability to withstand drought coupled with the fact that it can survive in areas that

are too dry for other cereals such as maize crop. Maize (*Zea mizea*) is also an integral component of the traditional agricultural systems in the region. It is mostly intercropped with leguminous crops such as cowpea and groundnut as sources of proteins and to improve soil fertility through nitrogen fixation by the legumes.

Groundnut (*Arachis hypogea*), either mixed or as monoculture, is grown within the compound or at some distances away from the homestead (Villamor & Badmos, 2016). Groundnut is the major leguminous crop cultivated together with other crops and this is important in meeting the protein and financial requirements of the farmers apart from serving as fodder for livestock (Marfo 1992; Slingerland 2000; Ntare et al., 2007). Cowpea (*Vigna unguiculata* L.) and Bambara beans (*Vigna subterranean*) are other common legumes cultivated in the area with the latter being used to define farm boundaries (Marfo 1992). The nature of the cropping systems in the UER is characterized by low output and decreasing productivity, labor constraints, low use of inputs such as improved hybrids

and fertilizers, poor communication and transportation systems, and poor extension services (Ntare et al., 2007; Kpongor 2007). Livestock and poultry production also constitute an important component of the livelihood structure to supplement both income and nutritional needs of the households. The most common livestock and poultry in the area include goats, sheep, cattle, guinea fowls, ducks, chickens, donkeys and pigs. Cattle ownership is considered in the region as a measure of wealth and social status (Yilma 2005) and is mostly used to pay bridal dowries (Villamor & Badmos, 2016).

Data collection

A total of 300 households in Bolgatanga municipality and Bongo district were randomly selected using the purposive random selection method. A semi-structured questionnaire was used out of which 150 (50 %) of the respondents were male-headed and 150 (50 %) female headed households. The survey was conducted between August and December 2014 to determine gender-specific roles in farming and associated marketing activities. The respondents were asked about various productive, reproductive and community roles pertaining to the study area using the Harvard analytical framework which is also known as the 'gender roles framework' (Razavi and Miller 1995). The question of 'who does what' for all reproductive, productive and community roles (tasks) is addressed by this framework.

Data analysis

The simple Fisher's exact test using STATA 13 statistical software was employed to analyze the survey data to determine the correlation between gender and agreement or

disagreement in productive roles (Fisher 1922; Agresti 1992). Significant activities explain a clear 'distinct' opinion between genders. The following hypotheses was tested:

(H1) *Men and women have similar opinions with regard to productive roles*

Results

Who performs the specific productive roles in the main agricultural systems?

Figure 3 presents the distributional percentage of tasks performed by men and women in the region as reported by the respondents. The results suggest that women are involved in all levels of farming activities and more particularly in physically demanding activities with respect to planting crops, weeding the farm area, fertilizer application, irrigation or watering, tree and crop harvesting as well as hauling of farm produce. The only engagement women have in the financial administration of the household is selling of crops in the market. Men on the other hand are responsible for manual activities in terms of land preparation, feeding of livestock, seedling production and pruning of trees. They are the main actors in the financial administration regarding purchasing of farm inputs, farm financing and maintenance of farm records.

Do men and women play the same productive roles in male and female headed households?

There is a remarkable consistency in the perceived division of labor between male and female-headed households (table 2), as shown by the Fisher exact test results (i.e., the higher the p -value, the greater the degree of agreement) except for specific roles. The productive roles for which there was a clear difference between the household types in the men and women

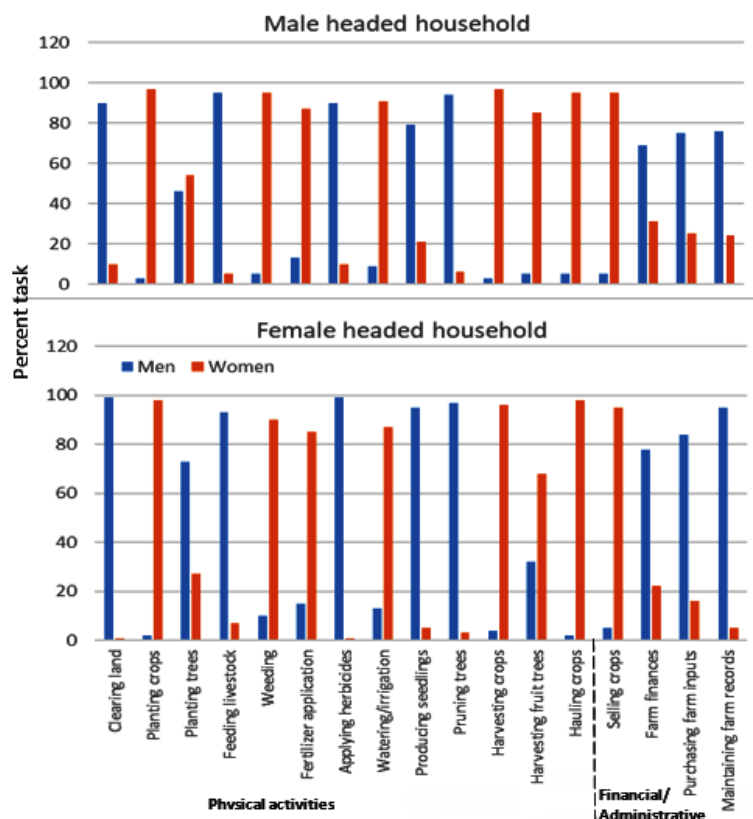


Figure 3: Distribution of gender-specific productive roles in the UER, Ghana, (N = 300)

TABLE 2
 Perspectives of male and female-headed households regarding ' who performs specific roles' in the UER, Ghana, (N=300)

Roles	Activity	Male headed household (%)		Female headed household (%)		Fischer exact test (p)
		“men”	“Women”	“men”	“Women”	
Productive	Clearing land	90	10	99	1	0.002**
	Planting crops	3	97	2	98	0.718
	Planting trees	46	54	73	27	0.014*
	Feeding livestock	95	5	93	7	0.441
	Weeding	5	95	10	90	0.152
	Fertilizer application	13	87	15	85	0.717
	Applying pesticides/herbicides	90	10	99	1	0.001**
	Watering/irrigation	9	91	13	87	0.549
	Producing seedlings	79	21	95	5	0.000**
	Pruning trees	94	6	97	3	0.251
	Harvesting crops	3	97	4	96	0.722
	Harvesting fruit trees	15	85	32	68	0.076
	Hauling crops	5	95	2	98	0.169
	Selling crops	5	95	5	95	1.000
	Farm finances	69	31	78	22	0.195
	Purchasing farm inputs	75	25	84	16	0.131
	Maintaining farm records	76	24	95	5	0.000**
Reproductive	Collecting firewood	2	98	5	95	0.334
	Fetching water	0	100	2	98	0.114

TABLE 2 cont.
 Perspectives of male and female-headed households regarding ' who performs specific roles' in the UER, Ghana, (N=300)

Roles	Activity	Male headed household (%)		Female headed household (%)		Fischer exact test (P)
		"men"	"Women"	"men"	"Women"	
	Preparing meals	1	99	2	98	0.612
	Taking care of children	4	96	6	94	0.368
	Washing cloths	2	98	3	97	0.712
	Cleaning house	2	98	6	94	0.204
	Children's expenses	10	90	20	80	0.102
	Household budgeting	15	85	19	81	0.560
	House construction/maintenance	64	36	79	21	0.050*
Community	Community meetings	66	34	92	8	0.000**
	Church meetings	46	54	68	32	0.019**
	School building, bridges etc.	63	37	91	9	0.000**
	Cleaning public spaces	47	53	70	30	0.007**
	Afforestation	52	48	92	8	0.000**
	Community beautification	46	54	71	29	0.002**
	Adopting conservation measures	67	33	56	44	0.115

Note: Numbers in bold text represent significant results: *, ** Significant at 0.05 and 0.01, respectively

roles are clearing of land, planting of trees, pesticide or herbicide application, seedling production, and maintenance of farm records. Regarding the reproductive chores, there is high agreement between male and female-headed households with women carrying out majority of this burden, irrespective of who heads the household. In contrast, there is a strong shift towards women engagement in social and community roles when a woman is the head of the household except when it comes to adaptation of conservation measures.

Is collaboration between men and women similar in male and female headed households?

The opinion of male and female household heads about sharing in farming and household tasks is represented in table 3. In general, there was a great congruence in the perception of cooperation in performing productive tasks between the different household head (HH). The results show that planting of crops and harvesting of fruit trees are performed

jointly by men and women. About 86 % of the men and 94 % of the women perceived planting of crops to be a productive task that was performed jointly, whereas an equal percentage of both gender household heads (65 % men, 65 % women) expressed the same view on harvesting of fruit. There is a strong agreement in the perception of men and women that productive roles such as watering, weeding and selling of crops are undertaken individually as shown in the Fisher's exact test. Among the male household heads, 88 %, 92 %, 90 %, indicated that watering, weeding, and selling of crops respectively are to be performed individually by women.

In contrast, out of the 9 reproductive roles identified, 3 activities (i.e., washing of clothes, children's expenses and household budgeting) revealed that men and women have strongly diverging opinions on working together. Among the men respondents, 85 % regarded washing of clothes as work that should be performed individually and particularly by

TABLE 3

Perspectives of men and women head of households about collaboration in household activities (joint roles) in the upper east region, Ghana, (N = 300)

Roles	Activity	Male headed households (%)		Female headed household (%)		Fischer exact test (P)
		“Joint”	“Individual”	“Joint”	“Individual”	
Productive	Clearing land	20	80	12	88	0.107
	Planting crops	86	14	94	6	0.121
	Planting trees	20	80	12	88	0.107
	Feeding livestock	10	90	11	89	0.851
	Weeding	8	92	8	92	1.000
	Fertilizer application	10	90	12	88	0.704
	Applying pesticides/herbicides	7	93	12	88	0.115
	Watering/irrigation	12	88	12	88	1.000
	Producing seedlings	0	100	1	99	0.246
	Pruning trees	2	98	5	95	0.335
	Harvesting crops	16	84	15	85	0.748
	Harvesting fruit trees	65	35	65	35	1.000
	Hauling crops	17	83	16	84	0.875
	Selling crops	10	90	10	90	1.000
	Farm finances	37	63	32	68	0.394
	Purchasing farm inputs	33	67	22	78	0.037*
	Maintaining farm records	33	67	22	78	0.046*
Reproductive	Collecting firewood	14	86	14	86	1.000
	Fetching water	13	87	6	94	0.042*
	Preparing meals	12	88	8	92	0.253
	Taking care of children	26	74	24	76	0.687
	Washing cloths	15	85	6	94	0.011**
	Cleaning house	16	84	10	90	0.168
	Children’s expenses	54	46	37	63	0.005**
	Household budgeting	43	57	28	72	0.011*
Community	House construction/maintenance	55	45	43	57	0.037*
	Community meetings	56	44	42	58	0.015**
	Church meetings	64	36	51	49	0.033*
	School building, bridges etc.	55	45	49	51	0.354
	Cleaning public spaces	54	46	51	49	0.729
	Afforestation	57	43	35	65	0.000**
	Community beautification	54	46	41	59	0.028*
Adopting conservation measures	26	74	37	63	0.047*	

Note: Numbers in bold text represent significant results. *, ** Significant at 0.05 and 0.01, respectively.

women whereas among women respondents, 63 % regarded children expenses and 72 % regarded household budgeting as task that should be shouldered individually by men. A similar trend can be seen in the community task where women perceive afforestation (65 %) and community beautification (59 %) to be a sole responsibility and task to be performed

by men.

Discussion

Gender-specific productive roles in the main agricultural production and marketing systems

Results from the study shows that the manual activities such as planting crops, weeding

farms, planting trees, and fertilizer application which were traditionally male dominated activities are now being performed by women which indicates a shift in their productive roles. Globally, gender roles are recognized as important factors in rural agricultural production and marketing where male and female farmers play significant roles in agricultural production. According to Damisa et al. (2007), women contribute about 60 to 90% of the total farm work in Nigeria. Furthermore, Koyenikan & Ikharea (2014) reported that women constitute about 70% of the total workforce involved in agricultural production, processing and marketing activities across the whole of sub-Sahara Africa. This is in line with the findings of Koyenikan & Ikharea, (2014) who reported that productive roles of Nigerian women include physically demanding activities such as planting crops, weeding farms, harvesting crops, marketing of food produce among others with little or no involvement in the financial administration of farming and marketing activities. This observation could be due to increase desire of women to be independent of men in order to improve their household food security and resilience to poverty.

In spite of the increasing visible roles of women in agricultural production, they have limited control over physical and financial resources thereby increasing their vulnerability to food security and limiting their effort in reducing poverty. This also indicates that the core reproductive roles of women have not changed despite their increase involvement in farming activities (Table 2).

Do men and women play the same productive roles in male and female headed households?
Traditional patterns of work distribution within

both male and female headed households in many developing nations including Ghana indicate that women are primarily responsible for addressing the fundamental needs of members in their households. Specifically, women produce food for domestic consumption and local markets, whereas men mainly work in agricultural wage labor and cash crop production (i.e., commercial agriculture). Largely, women are responsible for food selection and preparation, and for the care and feeding of the children, and therefore play a vital role in defining the coping mechanisms of poor households to ensure food security and to reduce risk. According to Lambrecht et al. (2017), women typically expend a higher portion of their income than men on providing food, health and education to members in the household especially children. In addition, women spend a lot of time and hard work in obtaining water and domestic fuel for their households. For example, in Ghana women spend more than twice as much time as men and boys in fetching water and gathering firewood.

The hypothesis (H1) that 'Men and women have similar opinions about productive roles in the upper east region is rejected. The disagreement in some productive roles (i.e. clearing of land, planting of trees, pesticide or herbicide application, seedling production, and maintenance of farm records) of men and women between male and female-headed households (Table 1) is due to additional responsibilities or tasks performed by women which were originally men dominated. Thus, women are taking up more labour-intensive roles which were traditionally meant for men hence over burdening them. This result is contrary to the findings of Villamor et al., (2015) who reported that in lowland areas

in Sumatra, Indonesia, women are primarily responsible for less labour intensive farming activities in monoculture rubber production while men engage in more labour intensive farming activities. The shift in the productive roles of women could be due to increase desire to improve household food security in order to reduce their vulnerability to poverty. Given the significance and diversity of their roles, women are essential bearers of knowledge related to the sustainable use of natural resources, including strategies for adapting to climate change and agro biodiversity conservation (Mensah, 2019; Mensah et. al., 2018).

Conclusion

The role of gender in agricultural production and marketing is very crucial in expanding income, reducing poverty and inequality among rural dwellers in Ghana and for that matter Upper East Region. Women play key roles in every scope of agricultural activity. Specifically, operations that demand more physical effort and drudgery, such as weeding, planting and watering/irrigation, are left to women, who undertake these roles in addition to their primary role as house managers and homemakers. Women are multi-tasking than their male counterparts in the household. Thus, for an economically viable and ecologically sustainable agriculture, the role of women in the course of modernization of agricultural production practices is crucial.

Nonetheless, in spite of their significant and varied roles, women in agriculture and rural areas have inadequate access to productive resources than their male counterparts. Gender inequity exists in many assets, inputs and services such as access to and control

over land, financial services, productive technologies and inputs, and extension or marketing services.

Policy implications

Given the increasingly critical role women play beside their reproductive tasks in the region, there is an urgent need for their empowerment through policy considerations to enable their access to vital resources, such as physical assets. Land access and ownership by women should be prioritized and appropriate policies enacted to ensure access and control by women. The district assembly could promote the formation of women farmer groups who could eventually be provided with land and other external inputs such as fertilizer and improved seeds to increase their productivity. Individual women who cannot access credit facilities should be provided with subsidized inputs in order to promote their livelihood.

The article 22 of Ghana's 1992 constitution mandates parliament to pass legislation in order to protect the right of married women upon dissolution of their marital status.

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