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Gender, Forms of Land Ownership and Agriculture Value Chain Participation: Empirical Insights from Smallholder Farmers in Cote d'Ivoire and Nigeria

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abstract

context and background

the type of land tenure system affects the kind of farming activities and agricultural productivity, as it determines land ownership and usage conditions. this ownership and usage have a gender gap against women and this affects agricultural productivity and subsequently the agricultural value chain. therefore, women being disadvantaged in access to agricultural resources including land means low productivity and low participation in the agriculture value chain for them. previous studies on gender differences in agriculture concentrate on the gender gap in agricultural productivity to the neglect of the gender difference in agricultural value chain participation.

goal and objectives:

this study looks at the forms of land ownership and how that affects gender differences in agriculture value chain participation. specifically, the study sought to provide insights into the questions of; (i) what are the forms of land ownership in the studied countries, and how do they affect land access in a gender dimension? (ii) does forms of land ownership relate to contract farming and how does that affect smallholders' agricultural value chain engagement?

methodology:

the study measures farmers' participation in the agriculture value chain (avc) by three variables; whether the farmer has a contract to sell his/her crops/livestock, whether the farmer gets a current market price for his/her crops/livestock, and whether the farmer faces challenge in getting crops/livestock to customers. these three variables were used to compose an index which is an aggregate of avc participation of farmers, where avc participation is a farmer who gets the current market price, faces no challenge, and may have a contract to sell. a binary logistic regression analysis was adopted for the econometric estimation.

results:

the study findings underscored, among other things, that private land ownership form allows more access to land and impact positively on the participation of farmers in the agriculture value chain. however, there are differences in gender dichotomy among the countries. context factors (whether a farmer is located in either a rural or urban area; contract farmer or not; whether a farmer considers farming as a business or not) affect agricultural value chain participation. policy implications are discussed in the study.

keywords

forms of land ownership, agricultural value chain, smallholders cote d'ivoire, nigeria.

1. INTRODUCTION

Many farming communities depend on land resources for their farming activities and livelihood (Mitchell & Myers, 2013). The type of land tenure system in place affects the kind of farming activities and agricultural productivity, as the land tenure system determines the ownership and conditions of the usage of the land (i.e., who can use it and for what duration) (Nasrin & Uddin, 2011). Schulte et al. (2020) noted that the presence of a secured land tenure arrangement was the main factor that determines productivity in cocoa farming in Cote d'Ivoire. Therefore, access to land is seen as a critical factor in smallholders' farm productivity (Osabuohien & Karakara, 2020; Karakara *et al*., 2021). Breisinger *et al.,* (2008), for instance, show that the performance of Ghana's agricultural sector was driven mainly by extensive forces (i.e., land expansion) rather than productivity improvements. This is akin to the experiences in most of the other countries within the sub-region (Akinyemi *et al.,* 2019; Ejemeyovwi *et al.,* 2019). Access to land remains a veritable ingredient of economic development in the region since most of the poor in Africa are smallholder farmers (Iddrisu et al., 2022). Land tenure issues have been an essential component of the development discourse in most African countries. Most Africans hold their land under indigenous customary land tenure systems irrespective of the formal legal position under national law (Karakara *et al.*, 2021). Thus, the form of land ownership determines land access and affects agricultural productivity as well as the agricultural value chain (Osabuohien et al., 2020).

In Africa, there have been continental protocols and conventions on land rights and access, especially the ones that are geared toward women's access. For instance, the African Protocol on Women's Rights, the Convention on Economic and Social Rights, and the Convention on the Elimination of all Forms of Discrimination Against Women emphasized the need for states to ensure that women have access to land, water, livelihoods, and other natural resources are upheld by state parties, and that discriminatory laws and cultural practices should not be the basis of violating women`s rights to land and livelihoods. Despite these protocols, gender differences in agriculture productivity in SSA have been well researched, and highlighted in most of the studies is how women are disadvantaged in landownership and other productive resources for agricultural engagement (Doss *et al*., 2015). Aguilar *et al*. (2015) concluded that a 23.4% agricultural productivity difference between male farmers and female farmers in Ethiopia can be attributed to gender differences in land ownership and management. Thus, gender seems to be a major determinant and plays a key role in the allocation of resources and responsibilities in SSA especially in rural households (Doss *et al*., 2015; Karakara et al., 2023forthcoming).

The forms of land ownership system (i.e., individual, communal, or state ownership) further widen the gender gap in land ownership in Africa. The disparities in land ownership and agriculture productivity take a gender dichotomy in Africa. O'Sullivan et al. (2014) noted that in sub-Saharan African countries, controlling for plot size and geographic factors, the gender difference between male-managed farms and female-managed farms is between 17% and 66% more output per hectare male-managed farms. It has been documented (Osabuohien et al., 2019) that the type of land tenure system or land deals affects female labour outcomes. Thus, the type of land tenure system could be a means for rural transformation and bridging the gap between men and women in terms of economic welfare. In the context of a weak land tenure system (where communal property turns to fall into the hands of few private persons), this could lead to the displacement of smallholders, decreased welfare, and less access to water and food which further widens the gender gap in agriculture.

Access to land is a basic requirement for farming and control over land is synonymous with wealth, status, and power in many areas. However, women being disadvantaged in access to agricultural resources including land means low productivity and low participation in the agriculture value chain.

In Kenya's fruit and vegetable export businesses, for example, women occupy 80% of the positions in packing, labeling, and barcoding produce. Women workers usually receive lower wages than men. Thus, aside from gender differences in agricultural productivity witnessed in SSA as established by literature, this has translated into gender differences in agricultural value chain participation in SSA. An agricultural value chain is defined as the people and activities that bring a basic agricultural product like maize, vegetables, or cotton from obtaining inputs and production in the field to the consumer, through stages such as processing, packaging, and distribution.

In the agriculture value chain, there is the flow of seed to farmers and grain or tubers to the market occurs along chains. Thus, agricultural products move from chain actor to chain actor e.g., from producer to intermediary to consumer (Hellin & Meijer, 2006). Farmers participating in a well-functioning agriculture value chain bring not only higher incomes or prices but also a more stable and predictable income. Value chain analysis has been broadly categorized into horizontal and vertical. Horizontal is where the farmer specializes in crop production and produce quality by upgrading to comfortable engagement in the value chain. This upgrading could allow the farmer to deliver directly to customers further downstream of the channel or through intermediary partners (such as traders, distributors, or processors) (Trienekens, 2011). Value chain could also be vertical coordination, where farmers move away from selling to one-time buyers towards building longer-term contracts with a buyer(s), typically called contract sales. This contract sale or farming, is when a processor, retailer, or exporter signs a contract with grower farmers to purchase their farm produce when they harvest. Contract farming channel choices are heavily constrained by market access limitations such as supporting infrastructures to reach markets, access to demand and price information, and specific demands from these markets such as production according to quality standards (Trienekens, 2011).

Previous studies on gender and agriculture tend to focus on understanding efficiency and productivity differences between males and females (Mukasa & Salami, 2015; Challa & Mahendran 2015; Dasmani et al., 2020). Again, other studies concentrate on gender differentials in productivity to the neglect of the gender difference in Agricultural Value Chain participation. Also, these existing studies have failed to consider the role that land ownership plays in explaining the gender differences in agricultural participation. Thus, to close these gaps in knowledge. This study looks at the forms of land ownership and how that affects gender differences in agricultural value chain participation. Specifically, the study sought to provide insights into the questions of; (i) What are the forms of land ownership in the studied countries, and are there variations across gender? (ii) Does gender influence AVC participation and is the effect mediated by forms of land ownership? This current study uses the individual farmer as the unit of analysis. Also, two countries (Cote d'Ivoire and Nigeria) are compared using nationally representative data on smallholder farmers.

The choice of these countries in the study is informed by the important contribution the agricultural sector makes to both total output and employment in each country. For instance, in 2020, the share of the agricultural sector in total GDP stood at 23.0% and 22.4% in Cote d'Ivoire and Nigeria, respectively. In terms of employment, the agricultural sector employed more than a third and close to three-fifths of the labour force in Nigeria and Cote D'Ivoire, respectively, in 2020. Despite these similarities, the two countries have strictly different land administration systems and farmers in each country encounter different climatic conditions and agricultural policies.

The rest of the paper is captured as follows; the second section presents insights from theoretical and empirical literature, while the third section dwells on data and empirical strategy adopted. The fourth section presents the results and discussion of the study and the last section concludes with policy implications.

2. INSIGHTS FROM THE THEORETICAL AND EMPIRICAL LITERATURE

There are some theoretical studies on land tenure systems and agriculture productivity. One such theory that aligned with the dictates of this study is the evolutionary theory of land rights. Platteau (1996) summarised the evolutionary theory of land rights as, in a market such as the one for agricultural land in sub-Saharan Africa, a transition from communal to private property when there is national and international commercial pressure on land for agricultural activities (usually large-scale land investments). Thus, this nature puts pressure on land and land becomes scarce giving rise to an increase in demand for land certificates that help to achieve tenure security for smallholders and landowners. This will allow landowners to reap rents from allocating lands in the land market. This land market will help to allocate resources efficiently which further helps to achieve efficiency in farming choices and rapid capital accumulation in smallholder agriculture (Platteau 1996). Thus, the evolutionary theory has it that there is a movement from communal to private property and that once land assumes a scarcity value, its demand increases, strengthening the land security for smallholders (Platteau 1996).

Other scholars have empirically studied land tenure and agricultural productivity amidst gender disparity. For instance, Chang, Ai, and Li (2018) investigated the impact of land tenure security on farmers' labour market outcomes in rural China by using the difference-in-difference method on three waves of household income project data. They found that in response to more secure land rights, both men and women increased their probability of wage employment. If a household has more secure land, they can afford to spend more time being engaged in off-farm work. This was recently acknowledged by Kehinde *et al.,* (2021) that households that have a share of farmland (own a farmland) are likely to be food secure in all regards and diversify their work activities.

Akram et al., (2019) used a multivariate Tobit model to study the case of agricultural investment differences under three different land lease agreements and how that affects sustainable agriculture. The authors summarized that landowners involved in agribusiness are more likely to invest in measures to improve soil fertility and increase productivity to achieve sustainability. They found landowner farmers achieve higher yields per hectare than farmers engaged in sharecropping. Also, owner-cultivated lands are averagely larger than land under sharecropping. More owner-cultivated have access to credit than their counterparts and finally land ownership has a positive impact on productivity.

Singbo et al. (2020) analyze the differences in productivity in agriculture between men and women in Mali and assess the factors that affect these differences. The findings indicate that female plot owners' agricultural productivity is 20.18% less than their male counterparts'. Furthermore, although endowment factors account for 44% of the differential in agricultural production, structural disadvantages specific to women account for 56% of it. The structural disadvantages that are specific to women seem to be influenced by socioeconomic factors like the level of education and the plot owners' age, environmental considerations, and agricultural farming practices, i.e., the varying application of inputs (organic or inorganic fertilizer and enhanced seeds), as well as the employment of female employees. Gebre et al., (2019) examine the impact of gender differences in agricultural engagement in Dawuro Zone, southern Ethiopia by adopting the exogenous switching treatment effect model. They found a gender gap in maize productivity between male-headed households and female-headed households. The maize productivity was overall 44.3% higher in male-headed households. However, if female-headed households received the same return on their resources as male-headed households, their productivity would increase by 42.3%.

Okonya and Kroschel (2014) studied the gender dichotomy of sweet potato farmers' access to agricultural information, credit, and extension in Uganda. Issues such as the gender difference in techniques of production, farmers' off-farm incomes, household food security, and farmers' social

capital level were also investigated. They adopted descriptive analysis and found that both male and female-headed households were relatively equal but had very low access to both agricultural information and credit. However, Male-headed households had significantly more members who belonged to a farmer organization (44.6%) compared to female-headed households (30.2%).

Ullah *et al.,* (2019) investigated how tenure agreements affect farmers' decisions to adopt three risk-coping tools to mitigate climate risks in Khyber Pakhtunkhwa Province in Pakistan. The authors found that the adoption of traditional risk-coping tools is relatively higher among landless tenants than the owner or owner-tenant farmers whereas formal risk-coping strategies (like credit reserve) tenant farmers have lower access compared to owner farmers. Land ownership, perception of risks, and attitude towards risk play significant roles in farmers' decisions to adopt off-farm diversification and credit reserves.

The African Group Negotiators Expert Support (AGNES, 2020) studied the gender difference in agricultural engagements in three African countries (Nigeria, Tanzania, and Uganda) and concluded that gender productivity gaps in Nigeria, Tanzania, and Uganda were 18.6%, 27.4%, and 30.6%, respectively. These productivity differentials were due to male-female differential access to resources such as land, inputs, and agricultural extension services as well as competing gender roles in farm activities. The AGNES further estimated that closing the gender gap in the agricultural sector will yield production gains of 2.8%, 8.1%, and 10.3%, in Nigeria, Tanzania, and Uganda respectively.

2.1 A brief note on land tenure and agricultural activities in the studied countries

This section gives a brief overview of the land tenure system in Cote D'Ivoire and Nigeria. It presents the historical antecedents of land tenure and the available country institutional administration of land and land-related issues.

Cote D'Ivoire

Geographical data indicates that the total area of Cote D'Ivoire is 322,000,000 square km. however, the country's arable land is 22% of the country's territory. Agriculture occupies 11.6% of the land with 49.9% of it by permanent pastures, 23.2% by forest, and 24.3% by other forms (Furth, 2001). Cote D'Ivoire, in history, practiced the centralized state-driven approaches to land and forest management in disregard to customary land management, gave birth to legal pluralism (Lamarck, 2019) that led to a difference being observed between law and practice (OFPRA, 2017).

In Cote d'Ivoire, the 1984 land law confirms the rights of the state on all land taken back from French settlers and from traditional owners after independence in 1960. This was to better redistribute land. Later the 1998 Land law accorded the state and state administrative winds the right over lands in the country. This led to conflict between modern state and traditional laws regarding land access (Aka, 2007). In 1963 the land decree indicated that all lands not registered belonged to the state. However, the decree was withdrawn due to customary chiefs' resistance (OFPRA, 2017). This created conditions for migration and expansion of agricultural lands as forests were cleared by migrants. This enabled migrants to own lands. Migration in the 1970s was driven by President Houpouet Boigny's saying that *"the land is owned by whoever puts it to use".* Thus, clearing forests correspondingly means the clearer owns the land (Bymolt *et al.,* 2018) and this strongly encouraged migrants to clear natural forests (Schulfe *et al.,* 2020). However, the Planter-Partager (plant and share) arrangement in the wake of the 1990s and 2000s was in place, which is the system of migrants clearing forests and plants, and upon harvest the migrant and farm owner share the proceeds (Colin & Ruf, 2011).

The Rural Land Law of 1998 was adopted after years of rising tensions around the land that was instrumental in the succession battle after President Houpouet Boigny's death in 1993. However, such tensions that resulted in conflicts between customary landholders and migrants (both nationals and /or foreigners) were mostly (Colin *et al.,* 2007) resolved by the courts. The rural land law recognizes the original customary owners' rights (OFPRA, 2017) to that of migrants' rights. The 1998 law though recognises that customary landowners had rights, but those rights were transitory. This is because the law emphasized that certificates be issued to customary owners, which was not more formalized. The requirement was to allow customary landowners some time to convert their land certificates to titles, after which the customary system would cease (United States Agency for International Development-USAID, 2016). Rural Land registration is done in three different types of formal documentation (titles, certificates, and use contracts) as recognized by the government (Colin *et al.,* 2007).

The Ivorian Government over the years has set up returns, updated policies, and introduced specialized institutions that facilitate the advancement of rural land registration. The Rural Land Law created in 1998 and amended in 2019, recognized rights into account while promoting the formalization of these and other types of rights (Boone et al., 2020; AFOR, 2021). However, article 12 of the 2016 constitution reaffirmed that only Ivoirians can own rural land. This led to the creation of the Rural Land Agency in 2016. Policies promoting land access and agricultural development and in particular investments in smallholder, helped local farmers and migrants alike to capitalize on the ample arable lands in the country's Southern belt.

Nigeria

Different land reforms have taken place in Nigeria since 1960 to facilitate access to agricultural land and make the nation self-sufficient in food production. The Land Use Act 1978 (LUA–1978) also known as the Land Use Decree is basic land administration law in the country. The promulgation of this Act became necessary as then when there was no national land policy and the quest to redistribute land in the country (Ghebru *et al.,* 2014). The Land Use Decree of 1978 empowered local, state, and national government administrators to regulate the occupancy, use, and transfer of land in the name of greater equality and national economic development. The LUA aims to promote agricultural investment that creates opportunities for all citizens to occupy land at ease (Fabiyi, 1984).

The LUA vested all land in each state of the country in the governor of that state (Federal Republic of Nigeria, 1978). The Decree distinguishes between urban and rural land. In urban areas, land is under the control and management of the governor while in rural areas it is the local government that has control and management of lands. Thus, statutory land rights of occupancy were to be granted by the governor, which is referred to as customary law. Local governments could grant the right over land to any person for any purpose (agriculture, residential, or others). Governors could also revoke rights of occupancy for reasons of overriding public interest. The customary law ensures that locals have access to land for agriculture and other purpose. Francis (1979) indicated that the socio-political factors conditioning the terms on which land is held in Ibokun in Oyo State demonstrate that the customary forms of land tenure ensure access to land in the area. However, some scholars (Adegboye, 1966) saw the customary system to be insecure as the customary tenancy is insecure as agreements are mostly verbal and indefinite; and the rent paid is governed more by the land owner's relationship to his tenant than by the fertility and location of the land rented.

One major challenge in Nigeria's land governance is the too much power that has been granted to local governments and governors. These local governors can revoke rights to land occupancy. They can grant customary right of occupancy concerning rural lands (Otubu, 2018). In 2009 the

government inaugurated the Presidential Technical Committee for Land Reforms (PTCLR) to collaborate and provide technical assistance to states and local governments to undertake land registration nationwide, to make recommendations for the establishment of a national depository for Land Title Holdings and Records in all states among other things. Despite some efforts in land administration in Nigeria, it is noted that about 97% of the country's landmass is undocumented (Anyim, 2014). This situation could hamper on correct identification of land owners, especially in rural areas for agriculture purposes. Otubu (2018) summarized that the current system of land administration under the LUA is bereft of any clear and coherent policy direction.

3. DATA AND EMPIRICAL STRATEGY

3.1 Data

The study used micro-level cross-sectional data on smallholder farmers for the two countries –i.e., Cote d'Ivoire and Nigeria. The datasets contain a rich set of information useful for identifying the forms of land ownership each country has and smallholder access to agricultural land including the variables of interest for the study. Both datasets were collected in 2016 with support from the World Bank and each contains around 3,000 households and 5,000 individuals. Notably, the instrument used in collecting the two datasets broadly followed the same structure, especially in defining the key variables used in this paper, thus making them broadly comparable. In each of the countries, three sets of questionnaires were administered to each household. The first questionnaire (household questionnaire) was administered to the head of the household, or the spouse, while the second questionnaire was administered to all adult members in each selected. The third questionnaire (single respondent questionnaire) was administered to only one household member who was selected using the Kish grid.

For the Nigerian data, the sample design was to produce national-level as well as the geo-political zone estimates. To identify smallholder households, a listing of households was carried out in all Enumeration Areas and 15 households were selected in each EA. A total of 3,457 households were selected for the survey, and 3,310 were occupied during data collection with 3,026 households successfully interviewed, yielding a household response rate of 91 percent. Again, for the Multiple Respondents, interviews were completed with 5,128 eligible household members out of 6,643 eligible household members, giving a response rate of 77 percent. This study used the single respondent data for the analysis.

The Cote d'Ivoire data identified 18,321 EAs 15 households were selected in each EA. A total of 223 EAs were selected. A total of 3,415 households were selected for the survey, of which 3,109 were found to be occupied during data collection. Of these, 3,019 were successfully interviewed, yielding a household response rate of 97.1 percent. Interviews were completed with 5,706 eligible household members for the multiple-respondent questionnaire, yielding a response rate of 85.7 percent. Among the 3,019 eligible household members selected for the Single Respondent questionnaire, 2,949 were successfully interviewed yielding a response rate of 97.7 percent.

3.2 Empirical Strategy

The study measures farmers' participation in the Agriculture Value Chain (AVC) by three variables; whether the farmer has a contract to sell his/her crops/livestock, whether the farmer gets a current market price for his/her crops/livestock, and whether the farmer faces challenge in getting crops/livestock to customers. These challenges referred to herein are; distance, transportation, lack of storage facility, product defects, and unreliable middlemen.

The choice of these three measures of AVC is informed by literature (Hellin & Meijer, 2006; Trienekens, 2011). First, farmer's access to contract sale serves as a vertical coordination in the value chain, where they sign a contract with processors, retailer(s), or exporter(s) who expressed interest to buy their crops/livestock. Such vertical coordination provides certainty and future sales assurance to farmers. Second, farmers participating in AVC should be able them get the current market price for their products. Trienekens (2011) indicated that suppliers in a value chain, by vertical and horizontal arrangement, should be able to get a fair share of the price received from customers. Farmers' ability to get current market prices for products could be attributed to them getting market information and thus, there is perfect information in the market (AVC). This information could be in terms of prices, trends, buyers, and suppliers' availability. Hellin and Meijer (2006) concluded that critical factors and trends that shape the value chain environment and operation are enabling factors in the value chain. Third, a farmer could participate in AVC comfortably when he/she faces no challenge in getting crops/livestock to customers. Farmers getting access to the market (through distance reduction), transportation available, good storage facilities available, access to inputs and technology to enable them to produce products without defects, and access to reliable middlemen could increase their benefits from AVC.

Drawing from this, the study measures farmers' AVC participation through; contract sales, getting the current market price, and facing no challenges in the AVC. These three variables were used to compose an aggregate of AVC participation of farmers, which is a binary index, where AVC participation is a farmer who gets the current market price, faces no challenge, and may have a contract to sell. Thus, in a binary outcome, Let P_i represent the probability of a farmer participating in the agricultural value chain (AVC). In contrast, the probability of not participating in AVC is given as 1- P_i. We do not observe P_i because Y is a latent variable. Instead, we observe the outcome Y=1 if the farmer engages in AVC and Y=0 if it does not; this gives us the model in equation (1);

$$AVC_i = \begin{cases} 1 \;\; if \;\; the\; farmer\; engage\; in\; AVC \\ \square \\ 0\; if\; otherwise \end{cases} \qquad (1)$$

Where AVC_i is AVC of participation of farmer i

Thus, following Karakara and Osabuohien (2020) we have a binary outcome dependent variable that we estimated as a logit model as in equation 2.

$$Ln\left[\frac{Pi}{1-Pi}\right] = Li = \beta_0 + \beta' Xi \qquad (2)$$

The aggregate empirical model estimated is thus captured in equation 3.

$$Ln\left[\frac{Pi}{1-Pi}\right] = Li = \beta_0 + \beta^1 X_1 + \beta^2 X_2 + \beta^3 X_3 + \beta^4 X_4 + \beta^5 X_5 + \beta^6 X_6 + \beta^7 X_7 + \beta^8 X_8 + \beta^9 X_9 \qquad (3)$$

The model allows us to estimate the effect of gender on AVC participation and the mediating role of forms of land ownership. The independent variables of the study are the; where X_1 is the education of the farmer; X_2 is the marital status of the farmer; X_3 is age of the farmer; X_4 is the gender of the farmer; X_5 is age square; X_6 is the residence (rural/urban); X_7 is the primary job of respondent; X_8 is the form of respondent landownership; X_9 is whether the farmer considers farming as business.

4. RESULTS AND DISCUSSION

4.1 Descriptive statistics

Table 1 presents the descriptive and distribution of variables in the study. The table shows that in both countries, more than 61% of the farmers are males and more than 84% are rural dwellers. The majority of the farmers in Cote d'Ivoire (62.38%) have no formal education while in Nigeria the majority (51.39%) have secondary-level education. In Cote d'Ivoire, the average age of farmers is 49 years and in Nigeria, it is 36 years. Cote d'Ivoire has relatively older people in farming than Nigeria. Again, the majority of the farmers are married (78.26% in Cote d'Ivoire and 68.43% in Nigeria). Farming is the primary job of most of the farmers (87.07% in Cote d'Ivoire and 80.14% in Nigeria). In each of the countries, the majority of the respondents consider farming as a business (i.e., 62.57% in Cote d'Ivoire and 89.55% in Nigeria). In Cote d'Ivoire, a whopping majority (71.96%) owns lands under individual ownership in the communal trust, while in Nigeria the majority (34.62%) owns lands under individual ownership with a certificate. Thus, in all the countries individual land ownership (either with a certificate or under communal) is the common land ownership form. This might be because in Cote d"Ivoire the Rural Land Law of 1998 recognizes the rights of original customary owners and emphasizes that certificates be issued to customary owners, and the requirement was for customary land owners to convert those certificates to land titles within three years, after which the customary system would no longer have any control. In Nigeria, the Land Use Decree of 1978 aimed to promote agricultural investment and create an enabling environment for citizens to access land with ease (Fabiyi, 1984). In each of the countries, less than 15% of the respondents have contracts to sell their crops/livestock. This means contract farming is less common in the countries. Ruml et al., (2022) found a similar case for Ghana and Adnan et al. (2020) however found that in Bangladesh most farmers have contracts to sell.

Table 1: Descriptive and distribution of variables in the study (number and percentages)

			Cote d'Ivoire		
	Measurement	**Response**	**Percent**	**Obs.**	**Perc**
	The gender of the respondent	Male	73.12	1,137	61.6
		Female	26.88	418	38.3
	The residence where the respondent stays	Rural	84.44	1,313	88.3
		Urban	15.56	242	11.6
	The level of educational attainment	No formal education	62.38	49	7.13
		Primary	34.53	77	29.7
		Secondary	3.09	1,476	51.3
		Tertiary	0	263	11.7
	Number of years the respondent (completed years)		38.99¥	1,555	36.0
s	The marital status of the respondent	Married	78.26	1,217	68.4
		Single/Never married	18.39	286	26.5
		Divorced/Widowed	3.34	52	4.99
	The primary job of the respondent	Farming	87.07	1,354	80.1
		Professional (teacher, Dr., etc.)	2.38	37	4.31
			0.77	12	9.65
		Business/shop owner	9.77	152	5.91
		Labourer/Other			
ness	Whether the respondent considers farming as a business	Yes	62.57	973	89.5
		No	37.43	582	10.4
d	The forms of land owned by farmers	Individual (certificate)	17.36	270	34.6
		Individual (communal)	71.96	1,119	28.3
		Customary	5.02	78	31.2
		State	5.66	88	5.79
n	Whether the respondent has a contract to sell crops or livestock	Yes	14.47	225	14.3
		No	85.58	1,330	85.6

Source: Authors'. Note: ¥ = are mean values

Further in the analysis of the descriptive trends, Figures 1 to 3 capture more information. Figure 1 in the appendix presents a pictorial view of the distribution of farmers who have contracts to sell or consider farming a business and get the current market price for their products. The figure captures this distribution according to gender differences across the countries. It shows that in all the countries, male dominates in each of the categories. In Cote d'Ivoire, a little above 58% of the farmers who have contracts to sell are males as against about 42% who are female. In the same vein, in Nigeria, among the farmers with contracts to sell, about 62% are males while 38% are females. Also, of farmers that consider farming as a business, 66.25% are males and 33.75% are females in Cote d'Ivoire while it is 61.43% against 38.57% for males versus females respectively in Nigeria. On whether the farmers get the current market price for their crops or livestock, the figure shows that more males (61.74% in Cote d'Ivoire and 63.05% in Nigeria) get the current market price for their crops or livestock than female farmers in both countries.

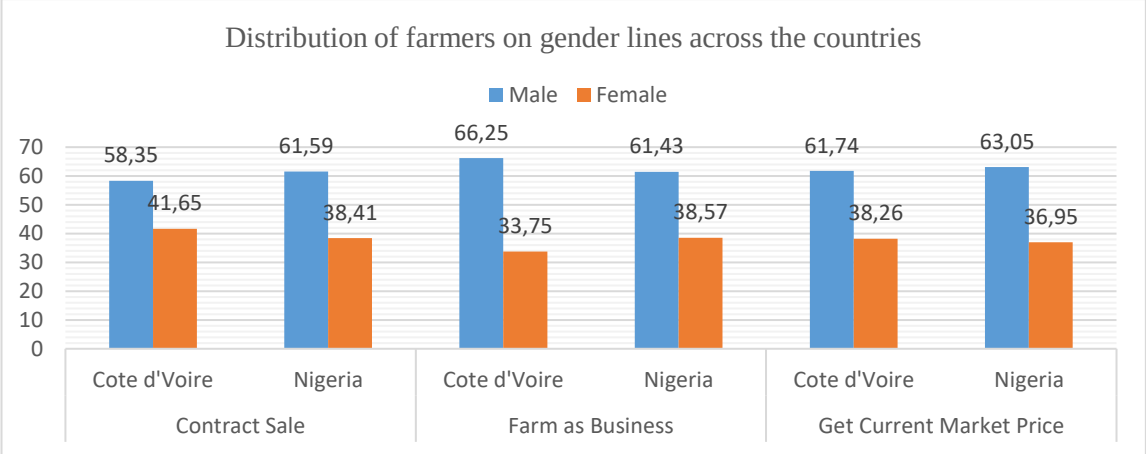

Figure 1: Distribution of farmers with a contract sale, farm as business, and market price by gender
Source: Authors' construction

Furthermore, Figure 2 captures the gender difference in forms of land ownership across the two countries. The figure shows that, across all categories of land ownership, males dominate in ownership in all the countries except state land ownership in Cote d'Ivoire where more females than males own it. The figure shows that 64.63% of farmers who have individually owned land with certificates are males while 35.37% are females in Cote d'Ivoire. Similarly, in Nigeria, this difference is 63.33% as against 36.67% in favour of males. The highest gender disparity is seen in state land ownership in Nigeria where 67.11% are males as against 32.89% females representing almost a 2:1 ratio. Also, the closer gender difference in land ownership is in the case of customary ownership in Nigeria where there are 56.53% males against 43.47% females. Similarly, Karakara et al. (2023forthcoming) found male dominance in land ownership in Ghana.

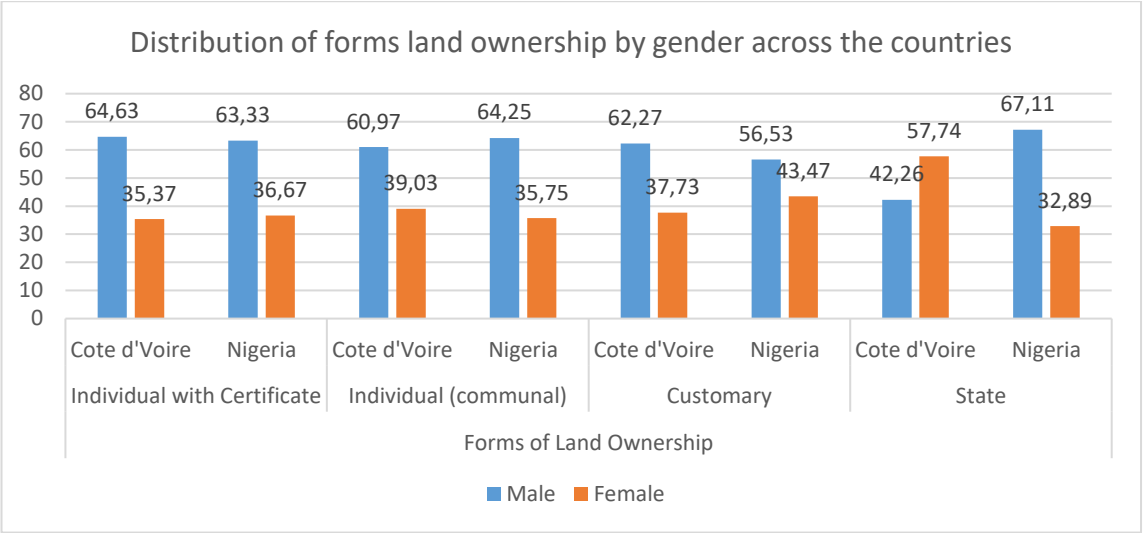

Figure 2: Distribution of forms of land ownership by gender across the countries. **Source:** Author's
Source: Authors' construction

Again, Figure 3 equally shows male dominance in all the countries. The figure highlights the gender distribution of the number of farmers who face challenges in the agriculture value chain. These challenges are specifically on whether farmers face them in their effort to get their crops and or livestock to customers. More males (54.45%) than females (41.55%) in Cote d'Ivoire face distance as a challenge in getting their crops/livestock to customers. While in Nigeria, it is 62.25% male against 37.74% female. Among these challenges, the widest gender gap is seen in the unreliable middlemen challenge in Nigeria, where more men (69.87%) than women (30.22%) are faced with this challenge. This difference is more than a 2:1 ratio for male versus female farmers. Also, the closest gender gap in the case of product defect in Cote d'Ivoire, where males (51.87%) and females (48.13%) who face such challenges are almost close.

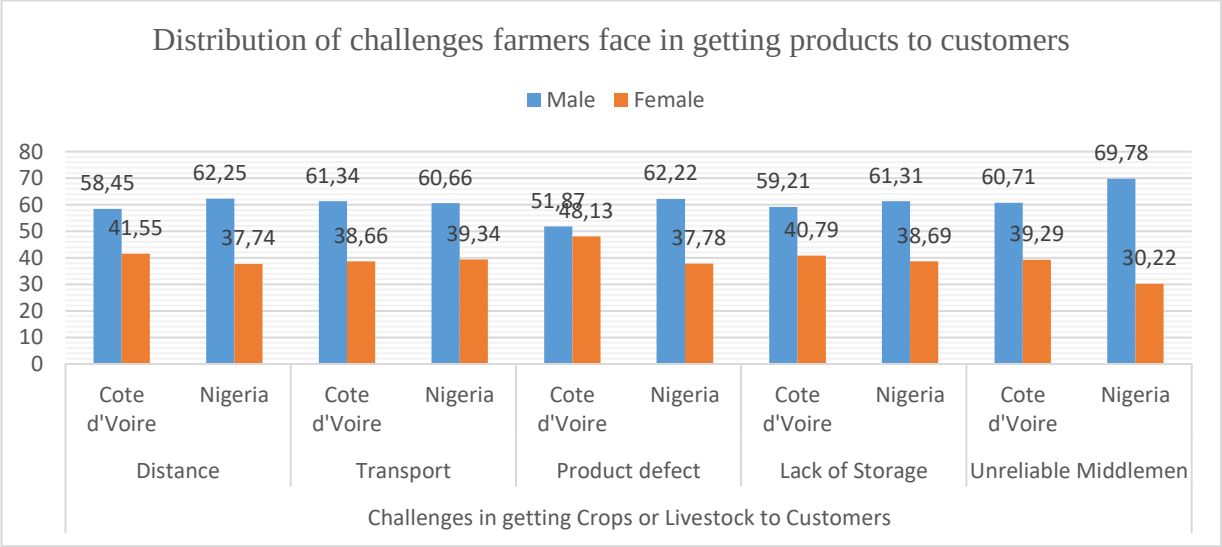

Figure 3: Distribution of challenges farmers face in getting products to customers
Source: Authors' construction

4.2 Regression results

Table 2 captures the econometric results of models I to VI. Models I and IV are baseline models that capture how individual-specific covariates influence farmers' agriculture value chain participation. Models II and V include locality variables as additional covariates to those captured in Models I and IV, thus the role of context (farm located in a rural or urban area and the primary job of the

respondent) in the effect of these individual-level factors is captured. The last set of models III and VI discuss how various forms of land ownership and farming considered as a business affect farmers' AVC participation drive across the countries. Thus, the results are disaggregated by country; for each country, I estimated three separate models. Individual specific characteristics – such as education and age – influence the probability of farmers engaging in AVC; this is true in Cote D'Ivoire and Nigeria.

The table (Table 2) shows that farmers' participation in AVC is influenced by several individual and farm-level factors. For instance, having a tertiary level education increases the probability of participating in AVC by 83% in Nigeria and 30% in Cote d'Ivoire. Educated farmers could understand market trends and price variability and thus could participate in AVC more comfortably than uneducated farmers. Also, educated farmers might have off-farm employment that helps to boost his/her welfare and thereby boost farming activities. Again, female farmers have reduced probabilities of 48% and 21.5% of engaging in AVC in Nigeria and Cote d'Ivoire respectively compared to male farmers. Similar conclusions were made by Gebre et al., (2019) that male farmers have a greater chance of achieving increases in agricultural productivity and sale of their products for better prices compared to females.

Further in Table 2, farmers who have never married or divorced/separated/widowed have reduced probabilities of participating in AVC compared to their counterparts' farmers who are married. This finding is so partly because married farmers could pool with their spouse to enable them to expand productivity and subsequently engage in AVC than unmarried farmers. Again, married farmers may have family labour at home and can easily employ such labour to enhance farm productivity and AVC engagement.

Also, the age of the farmer is found to have a non-linear relation to AVC participation in both countries. Farmers in urban settings have more than 100% increases in the odds of participating in AVC compared to rural farmers in both countries. Urban farmers have a 117% increase in this likelihood of participating in AVC in Nigeria than rural farmers and this difference in Cote d'Ivoire is 101.8%. This finding is so because urban areas have amenities (roads, means of transport, access to finance, access to market, etc.,) that support trade and AVC possibilities than rural areas. Adnan et al. (2020) established that urban farmers in Bangladesh are more into direct sales of their farm produce to customers than rural farmers, who rely on middlemen. Again, respondents whose primary jobs are not farming have reduced probabilities of engaging in AVC than individuals whose primary job is farming. For instance, labourers have 87.6% and 14.7% in Nigeria and Cote d'Ivoire respectively have a reduced likelihood of participating in AVC compared to individuals with farming as their primary job.

Further in Table 2, individual land ownership with a certificate or under communal enhances the chances of farmers participating in AVC compared to the customary land ownership system. Farmers with individual land ownership with certificates have more than 190% and 87% increases in the likelihood of participating in AVC in Nigeria and Cote d'Ivoire respectively. This finding is so because, farmers with formal land certificates can generate non-farm-related income like wages, rent, and loans (Fenske, 2011). Land certificates can be accepted as collateral to in loan acquisition (Ghebru & Holden, 2013). Secure land rights can facilitate farmers' transitions to the non-farm economy and develop efficient land markets to support the process (Hazell, 2020). Again, farmers who consider farming as a business have 43.1% and 78.5% increases in their likelihood of participating in AVC than farmers who don't consider farming as a business respectively in Nigeria and Cote d'Ivoire. Iddrisu et al., (2022) concluded that farmers who consider farming as a business are less likely to experience agricultural risk and therefore attain increased productivity in their study of five African countries (Cote d'Ivoire, Nigeria, Uganda, Mozambique, and Tanzania).

The study uncovers that there is a gender difference in AVC participation in the countries, which is a male favoured trend (at baseline or individual characteristic level). Models I and IV show that female farmers have reduced probabilities of participating in AVC compared to male farmers in all the countries. Thus, at the individual characteristic level gender disparity gap exists in AVC in both countries. However, this gender difference closes when we consider contextual factors like rural/urban settings and the primary job of the respondent. When these variables are considered, the gender gap in AVC participation narrows. Again, even further, when we consider another variable, such as forms of land ownership, it revealed that the gender gap further narrows and becomes insignificant in influencing the likelihood of farmers participating in AVC in both countries.

Table 2: Effect of gender and land ownership on Agricultural Value Chain Participation

Dependent var:		Nigeria			Cote D'Ivoire	
Agricultural Value Chain Participation (Binary)	Baseline model 1 I	Baseline model 2 II	Full model III	Baseline model 1 IV	Baseline model 2 V	Full model VI
Educational attainment (Base: No formal education)						
Primary	0.402***	0.146**	-0.362**	0.145*	-0.190	-0.191*
	(0.041)	(0.036)	(0.011)	(0.125)	(0.330)	(0.031)
Secondary	0.735***	0.702*	0.725**	0.233*	0.046*	0.076
	(0.046)	(0.610)	(0.023)	(0.036)	(0.001)	(1.045)
Tertiary	0.831***	0.369**	0.165*	0.301*	0.212**	0.097
	(0.010)	(0.073)	(0.021)	(0.021)	(0.031)	(0.089)
Marital status (Base: Married)						
Single/Never married	-0.940***	-0.921***	0.806**	-0.4013	-0.388*	-0.353**
	(0.346)	(0.352)	(0.358)	(0.076)	(0.021)	(0.043)
Divorced/Widowed/	-0.792**	-0.834***	-0.785**	-0.421**	-0.428**	-0.495
Separated	(0.355)	(0.355)	(0.371)	(0.081)	(0.053)	(0.775)
Gender (Base: Female)	-0.481**	-0.144***	-0.052	0.215**	-0.223**	-0.150
	(0.220)	(0.221)	(0.226)	(0.035)	(0.015)	(0.035)
Age	-0.088***	-0.094***	-0.107**	-0.115**	-0.119**	-0.114**
	(0.044)	(0.045)	(0.045)	(0.008)	(0.053)	(0.008)
age2	0.001*	0.001**	0.001**	0.001	0.0014	0.001
	(0.0004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Residence (Base: Urban)		1.178***	1.168**		1.018**	1.052**
		(0.521)	(0.528)		(0.010)	(0.025)
Primary Job (Base: Farming)						
Professional (Teacher,		-0.2451	0.056		-0.092	-0.045
Doctor, Nurse, etc.)		(0.617)	(0.626)		(0.002)	(0.067)
Business/Shop owner		-0.5131	-0.380		-0.087	-0.261
		(0.316)	(0.325)		(0.043)	(0.320)
Labourer/Other		-0.876**	-0.824**		-0.147*	0.198
		(0.395)	(0.398)		(0.053)	(0.542)
Land ownership (Base: Customary)						
Individual with			1.918**			0.879*
Certificate			(0.333)			(0.071)
Individual communal			0.450*			0.096*
			(0.023)			(0.404)
State own			-0.095			0.289
			(0.776)			(0.81)

Farm as a business (Yes)			0.431** (0.021)			0.785** (0.315)
Log Likelihood	-395.57	-389.65	-359.46	-195.12	-193.63	-190.06
Prob > chi2	0.0011	0.0002	0.0000	0.0080	0.001	0.0021
Pseudo R-squared	0.0316	0.0461	0.1200	0.010	0.085	0.0268
Observations	2,623	2,623	2,623	1,555	1,555	1,555

Note: *, **, *** represents significance at 10%, 5%, and 1% levels.
Source: Authors' estimation

5 CONCLUSION AND POLICY IMPLICATION

The sets out to examine the gender differentials in agricultural value chain participation and the mediating role of forms of land ownership in Cote d'Ivoire and Nigeria. The study employed nationally representative cross-sectional data on smallholder households for each of the countries. After composing an index to capture the agricultural value chain and employing a binary logistic model as an empirical strategy the study findings are concluded herein. The socioeconomic characteristics of the farmers show that the majority are married and again, farming is the primary job of the majority with a smaller number of them engaging as labourers. Most of the farmers, in all the countries, consider farming as a business.

In Cote d'Ivoire, a whopping majority owns lands under individual ownership in the communal trust, while in Nigeria the majority owns lands under either individual ownership with a certificate or communal trust. Less than 15% of the respondents have contracts to sell their crops/livestock, however, the majority indicated they get the current market price for their crops/livestock. Also, distance to the market seems to be a challenge to less than half of the farmers in each country, while transportation poses a major challenge to the majority of the respondents in both countries. These descriptive has a gender differential in favour of male farmers against female farmers in both countries.

Our logistic regression analysis reveals that women participate significantly less in the agricultural value chain compared to men. This disparity is directly linked to unequal access to and secured lands. To address this challenge, policymakers should prioritize interventions that empower women with secure land access and control. This can include revising inheritance laws to ensure equal property rights for women and tackling discriminatory customary practices, designing microcredit programs and other financial instruments tailored to women's specific landholding forms to enable them to invest in land ownership. It is important to acknowledge the limitations of this study. The cross-sectional data prevents conclusive claims about causality, and the focus on smallholder farmers limits generalizability to other farm types. Additionally, potential limitations in measurements should be considered when interpreting the findings.

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9. KEY TERMS AND DEFINITIONS

Agriculture Value Chain: The Agriculture Value Chain is the flow of farm inputs to farmers and the flow of farm products to the consumer. It encompasses all activities that help in farm productivity and also brings a basic agricultural product like maize, vegetables, or cotton from obtaining inputs and production in the field to the consumer, through stages such as processing, packaging, and distribution.

Forms of Land Ownership: It is closely related to the type of land tenure system.

Smallholder farmers: These are mostly small-scale farmers who are privately owned and mostly lack the basic farm techniques and knowledge.