

ORIGINAL RESEARCH ARTICLE

Ownership and governance of tree resources on cocoa farms: A case study in Brong-Ahafo and Western Regions of Ghana

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ABSTRACT

Cocoa is important for the economy and rural development of Ghana. However, small-scale cocoa production is the leading agricultural product driver of deforestation in Ghana. Uncertain tree tenure disincentivizes farmers to retain and nurture trees on their farms. There is therefore the call for structures that promote tree retention and management within cocoa farming. We examined tenure barriers and governance for tree resources on cocoa farms. Data was collected from 200 cocoa farmers from two regions using multistage sampling technique. Information was gathered on tree ownership and fate of tree resources on cocoa farms, tree felling permit acquisition and associated challenges and illegal logging and compensation payments on cocoa farms. Results suggest 62.2% of farmers own trees on their farms. However, these farmers may or may not have ownership rights over the trees depending on the ownership of their farmlands. More than half of the farmers indicated they require felling permits to harvest trees on their farms, indicative of the awareness of established tree harvesting procedures. Seventy percent of the farmers have never experienced illegal logging on their farms. There is however the need to educate the remaining 30% on their rights and build their compensation negotiation powers for destructions to their cocoa crops. This study has highlighted ownership and governance issues with cocoa farming and it is important for the sustainability of on-farm tree resources and Ghana's forest at large.

Keywords: Cocoa; Tree Ownership; Natural Resource Governance; Tenure; Tree Harvesting Permits

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1. Introduction

Cocoa is the most important agricultural commodity in Ghana, and it is important for the economy and rural employment^[1]. According to Adarkwah *et al.*^[2], cocoa is particularly important to the people of Ghana at the national, regional and local levels because aside its importance for the economy and job creation, it provides improved livelihoods and social welfare, an expanded tax base, higher family and corporate income and foreign exchange earnings. Despite the above, cocoa produced by smallholder farmers is the leading agricultural product driver of deforestation in Ghana^[2]. Ghana's cocoa production is faced with economic, environmental and sustainability challenges^[1]. Ghana is currently grappling with the need to increase cocoa production to increase output and export earnings which have over the years been at the expense of natural forests^[3]. Ghana is also grappling with the need to maintain her forest remnants to avoid biodiversity loss and environmental degradation, reduce greenhouse emissions and also to participate in international campaigns to reduce deforestation and forest degradation.

Meeting the above objectives require a new cocoa production system that tackles tenure and other constraints in order to manage the agricultural resource base and promote new investments in trees and agroforestry systems^[2]. This new approach should control forest cutting, build back shade trees and secondary growth forests or fallow cocoa land and also increase cocoa productivity. The impression is that building back shaded cocoa systems can help the nation attain her greenhouse emission reduction and crop production targets, improve the livelihood and resiliency of cocoa farmers and increase the sustainability of global cocoa value chain^[4]. This may be attained if barriers with tenure, finance and knowledge to replant unproductive farms with agroforestry systems are overcome. This paper seeks to contribute to overcoming tenure barriers by exploring the governance structure of tree resources on cocoa farms.

Tenure is as a result of one's relationship to natural resources such as forests and trees, and the relationships between individuals in which rights and obligations with respect to the control and use of natural resources are defined^[5]. According to the World Bank document on Ghana's Forest Investment Programme (FIP), the government is working to improve the complex tree tenure system to provide positive incentives to maintain trees on farms. Strategies on afforestation and the promotion of agroforestry indirectly offset land lost through deforestation. This study as part of a larger study has its goal to comprehensively integrate trees into agricultural farming systems to increase yields, resilience and carbon stocks. The larger study, the Ghana FIP forms part of the Strategic Climate Fund within the Climate Investment Funds. The Ghana FIP has its overall goal to reduce greenhouse gas emissions from deforestation and forest degradation while reducing poverty and conserving biodiversity^[1]. Specifically, the objectives of this study were to (1) assess tree ownership on cocoa farms, (2) assess acquisition of permit for tree products harvesting on cocoa farms and challenges encountered and (3) assess the occurrence of illegal logging on cocoa farms.

2. Methodology

2.1 Study areas

The study was conducted in two regions (Brong-Ahafo and Western Regions) and four cocoa districts of Ghana. Brong-Ahafo region is now sub-divided into three regions—Bono, Bono East and Ahafo regions (see **Figure 1**).

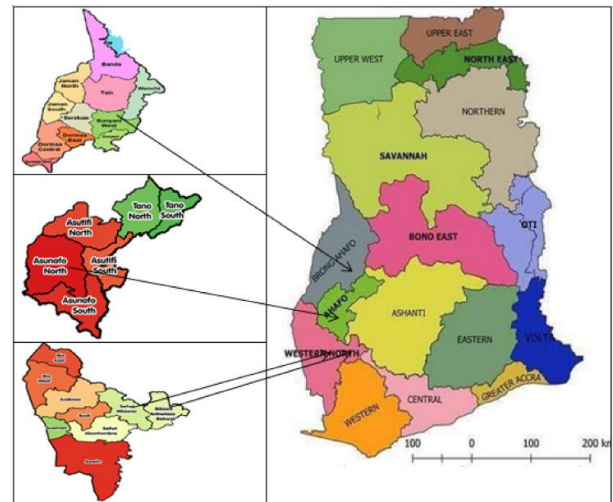


Figure 1. Map of Ghana showing the study area. Source: Ghana Statistical Service^[6,7].

The cocoa districts involved were Asunafo North and Sunyani West Districts of the Brong-Ahafo Region and Bibiani Anhwiaso Bekwai and Sefwi Wiawso Districts of the Western Region. Brong-Ahafo Region has a tropical climate, with high temperatures averaging 23.9 °C (75 °F) and a double maxima rainfall pattern. Rainfall ranges from an average of 1,000 mm in the northern parts to 140 mm in the southern parts^[6]. The region has two main vegetation types, the moist semi-deciduous forest, mostly in the southern and southeastern parts, and the guinea savannah woodland, which is predominant in the northern and northeastern parts of the region. The moist semi-deciduous forest zone is conducive for the production of cash crops, such as cocoa and cashew. The main food crops are maize, cassava, plantain, yam, cocoyam, rice and tomatoes. Yam production is very high in the guinea savannah zone^[6]. The Western Region lies in the equatorial climatic zone that is characterized by moderate temperatures, ranging from 22 °C at nightfall to 34 °C during the day. The Region is the

wettest part of Ghana, with a double maxima rainfall pattern averaging 1,600 mm per annum. It is the largest producer of cocoa, rubber, coconut, and oil palm. Major food crops produced in the region are maize, cassava, plantain, yam, cocoyam and rice^[7].

2.2 Sampling and sample size

A multistage sampling technique was employed for this study. The first stage was the selection of the regions and the cocoa districts. These were purposively selected based on project involvement and cocoa production. The second stage involved the selection of communities and this was done purposively based on cocoa production and involvement in the FIP project. The third stage involved the selection of sampling units which was done randomly. The list of cocoa farmers from each community was collected from the district directorates of agriculture and random numbers were used to select the sampling units. Two districts from each region were selected. In each district, ten communities were selected and in each community five farmers were randomly selected. Fifty farmers from each district were randomly selected and a total sample of 200 farmers from the four districts was chosen for the study.

2.3 Data collection and analysis

Cross sectional data were collected for the larger study. Data collected were mainly on farmer and farm characteristics, institutional settings, incomes, production of food and cash crops and household livelihood outcomes (estimates of food consumption and coping strategies). For the purpose of this paper the data considered were about ownership of trees on cocoa farms, harvesting permits for tree products, challenges involved in permit acquisition, illegal logging incidences and payment of compensation for felled trees on cocoa farms. Although 200 farmers were selected for the study, 195 samples were analyzed due to incomplete information on five of the sample population. The collected data was organized, prepared and

coded for analysis. Using IBM SPSS (Version 20), the data was descriptively analyzed and presented pictorially with tables and pie charts.

3. Results and discussion

3.1 Characteristics of respondents

One hundred and thirty-six farmers (69.7%) out of the 195 respondents were males while the remaining 59 (30.3%) were females. This confirms Barrientos and Asenso-Okyerere^[8] who noted that there is gender inequality in cocoa livelihoods. Two percent of the respondents were below 29 years old, 33% within the age range of 20–29 years, 21.8% within the age range of 30–39 years, 23.4% within the age range of 50–59 years while 19.8% were 60 years or above (**Figure 2**). This was as expected as it is already documented that most Ghanaian cocoa farmers are elderly^[9]. Nineteen and half percent of the respondents had no education, 51.3% had junior high school/middle school education while 2.6% had tertiary education (**Table 1**). Thus, from **Table 1**, only 3.6% of the cocoa farmers had post-secondary education. This confirms a household survey report in 2013 that recorded post-secondary education in cocoa growing districts in Ghana to be very low with negligible university education. The low level of education can translate into lack of knowledge of modern agroforestry and farm renovation and rehabilitation best practices. The lack of knowledge together with other inter-connecting factors such as old and low-yielding cocoa trees, removal of shade trees, elderly farmers and lack of access to finance have led to the declining cocoa production^[8].

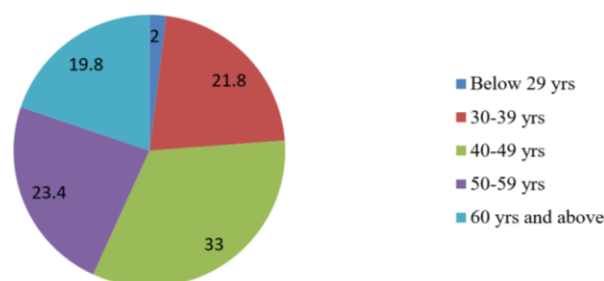


Figure 2. Age range of respondents.

Table 1. Level of education of respondents.

Level of education		Frequency	Percentage
None	No education	38	19.5
Pre-secondary	Primary	29	14.9
Secondary	Junior High School/Middle School	100	51.3
	Senior High School/Secondary School	21	10.8
Post-secondary	Vocational	2	1.0
	Tertiary	5	2.6

3.2 Tree ownership and fate of tree resources on cocoa farms

In Ghana, there are two categories of trees—naturally occurring trees and planted trees^[10]. A tree is naturally occurring if like other natural resources such as minerals, it occurs naturally and not planted or produced on a landowners' farm, fallow lands or in forests. Planted trees on the other hand are trees raised or planted and owned by an individual or a group^[11]. By virtue of the Concessions Act of 1962, timber rights in Ghana are vested in the President. However timber rights only concern naturally occurring trees and do not extend to planted trees^[12]. This may imply that a tree planter has ownership rights over the tree. More than 50% of the respondents (62.6%) (**Table 2**) reported that they own the trees on their cocoa farms. It must however be noted that depending on the ownership of the land on which trees are planted, the tree planter may or may not have full ownership, control, management and use rights over the trees. In the case where the landowner is the tree planter, he/she has full ownership, control and use rights over the trees. Where the tree planter is not the landowner, initial agreements between the landowners and planters determine the ownership, control, management and use rights over the planted trees^[11]. This then suggests that depending on the landownership of the cocoa farms, the 62.2% of the cocoa farmers who own trees may or may not have full ownership rights over the trees.

Figure 3 suggests that almost 80% of the respondents indicated they would help naturally occurring trees to grow (48.2%) or let them grow (30.3%). However as noted in the previous paragraph farmers have little or no control over the

Table 2. Tree ownership on cocoa farms.

Tree owner	Percentage of ownership
Farmer	62.6
Landowner	17.4
Government/Forestry Commission	19.5
Others	0.5
Total	100

management of natural timber trees in cocoa landscapes. The management and control over when to harvest trees and benefits sharing of revenues are not placed with the cocoa farmers. The government of Ghana through the Forestry Commission manages and controls all naturally occurring trees in the country^[11]. This coupled with the fear of destruction of cocoa trees by logging companies serve as disincentive to nurture or plant trees on farms and fallow lands^[4]. However, recently in Ghana, in 2012 and 2016, the Tree Tenure and Benefit Sharing Policy and the Tree Tenure and Benefit Sharing Framework respectively, have been formulated to incentivize farmers and landowners to plant economic tree species and engage in sustainable forest management practices^[10]. The recent policy reforms state that a farmer has the right to negotiate benefit sharing arrangements over trees planted or nurtured with landowners, a farmer has the right to dispose of and gain financial benefits from trees planted or nurtured and a farmer can prove title to trees through a decentralized title registration that will enable the demarcation and registration of land and trees.

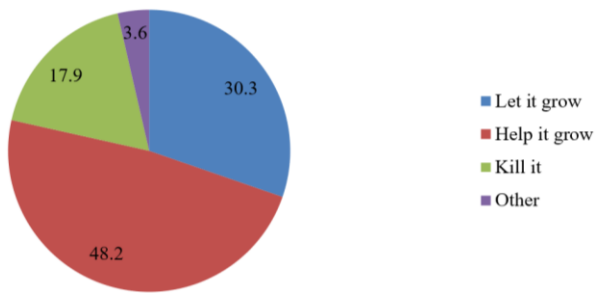


Figure 3. The fate of naturally occurring trees on cocoa farms.

On the issue of tree felling on cocoa farms, 67.7% of the respondents indicated that they would not cut down trees on their cocoa farms while the remaining 32.3% reported that they would cut down trees from their farms. This suggests that majority of the cocoa farmers perceive an advantage in retaining and maintaining trees on their farms. This may also be indicative of the roles trees have played and continue to play in cocoa landscapes. Trees are important for the growth of cocoa as cocoa trees grow best in thinned forests or under planted shade^[2]. Shade provided by trees protect young cocoa plants from physiological stress from direct exposure to sun together with protection from competing weeds^[2]. Aside the trees providing shade for sustainable cocoa systems, the trees can be sources of products such as timber, fruits, fuelwood and fodder. The importance of trees in cocoa landscape were realized early in the country as forests were put under reservation to create conducive climatic and soil conditions for the growth of cocoa^[13].

According to Acheampong *et al.*^[14], some farmers destroy trees on their cocoa farms due to a number of reasons. Some cut down trees for fear of timber concessionaires destroying their crops in the process of tree felling, some are unaware of the importance of trees to their planted cocoa while others cut down trees for timber and timber products. In Ghana, concessions are allocated to timber companies in exchange for royalties. Concession allocations can create conflicts between farmers, landowners and timber companies^[14]. This is because sometimes during tree felling activities farmers' crops are destroyed. Some farmers therefore kill young and older timber trees to stop concession holders from coming into their farms. Out of the 195 respondents, 17.9% indicated they would kill

the trees on their cocoa farms because the trees disturb their planted cocoa. Also, when the farmers were asked if they cut trees from their cocoa farms, 32.3% answered in the affirmative with some reasons presented in Box 1. The respondents who kill or cut down trees on their farms are important targets for knowledge transfer on good agroforestry practices and capacity building on the importance of trees in cocoa landscapes.

Box 1. Why cocoa farmers cut down trees from their farms.

- "Compete with cocoa and other crops"
- "For timber products"
- "To allow air and sunlight on the cocoa plants"
- "The trees are not useful in the cocoa farms"
- "Due to technical advice"
- "The trees are hosts to disease and pests"

3.3 Tree felling permit acquisition and associated challenges

There are three main types of felling permits in Ghana; the Timber Utilization Contract (TUC), the Salvage Permit (SP) and the Timber Utilization Permit (TUP) (Box 2). The right to harvest naturally occurring timber is enshrined in sections 1 and 4 of the Timber Resources Management Act (1998, Act 547): Except in the case of land with private forest plantations or lands with timber grown or owned by an individual or group, no person shall harvest timber unless that person holds timber rights in the form of a Timber Utilization Contract (TUC)^[11]. When the respondents were asked whether they need permit to harvest tree and tree products in their cocoa farms, 62.6% answered yes. More than half of the respondents reporting that they require permits may be indicative of an evolution towards tree felling and tree product felling permits acquisition. It also suggests that majority of the cocoa farmers are aware of established tree harvesting procedures. However, considering results of this study, majority of the cocoa farmers may not require felling or harvesting permits in the form of TUCs since they own the trees on their cocoa farms.

Box 2. Types of felling permits.

- Timber Utilization Contract (TUC) is a written contract signed by the Minister and ratified by the Parliament granting a timber harvesting right acquired upon competitive bidding.
- Salvage Permit (SP) is an administrative permit signed by the Forestry Commission to salvage trees from an area undergoing development. To be considered legal, the permit needs to be accompanied by the application and an inspection report from Forest Service Division.
- Timber Utilization Permit (TUP) is a small-scale permit to harvest a defined number of trees for social or community purposes signed by the Forestry Commission. Timber from these permits cannot be sold or exported.

Source: Akapame and Weyns^[11].

The respondents were asked about how they can acquire felling permits, and 95.4% indicated they can acquire permits from the Forestry Commission while 3.1% indicated they can acquire permits from the Ghana Cocoa Board (**Table 3**). This is impressive and suggestive of the awareness level of the cocoa farmers to tree harvesting procedures. On the challenges encountered during felling permit acquisition, majority of the cocoa farmers stated bureaucratic procedures (**Table 4**). They indicated delay in processing procedures, difficulties in accessing offices and time spent during the acquisition process add up to make the procedure bureaucratic and cumbersome. This confirms a statement in the Ghana Forest Plantation Strategy (2015–2040) that the existing bureaucracy in the Ghana Forestry Commission slows down decision making. Also, bureaucratic procedures like complex paperwork can deter many smallholder farmers from engaging in programs^[15]. Notwithstanding this, as reported above, 62.6% of the cocoa farmers own the trees on their farms and may therefore not go through the process of permit acquisition.

Table 3. Institutions where felling permits can be acquired.

Institution	Percentage response
Traditional elders	0.5
Ghana Cocoa Board	3.1
Forestry Commission	95.4
Landowner	0.5
None	0.5
Total	100

Table 4. Challenges with the acquisition of felling permits.

Response	Percentage response
Can't tell	2.1
Have not applied for it before	6.7
Bureaucratic procedures	80.0
I do not see why I should apply for permit since it is in my farm	0.5
Expensive	3.6
No challenge	7.2
Total	100

3.4 Incidences of illegal logging and payment of compensation on cocoa farms

According to an FAO report in 2017, farmers and forest fringe communities do not always understand their rights and this has led to illegal logging activities for a long time in Ghana's off-reserve forests^[16]. As noted above, naturally occurring trees are vested in the President, therefore farmers do not have control over those that occur on their farms. This uncertain tree tenure is a disincentive to nurture naturally occurring trees and also leads to illegal logging in agricultural landscapes including cocoa farms^[17]. Notwithstanding this, 69.7% of the farmers indicated that they have never experienced illegal logging on their farms while 3.6% indicated they have experienced illegal logging more than five times on their farms (**Figure 4**). While these figures are encouraging it must be noted that logging could destroy farmers' crops, compact soil and pollute water sources. Therefore, established logging procedures must always be adhered to in order to prevent any destruction.

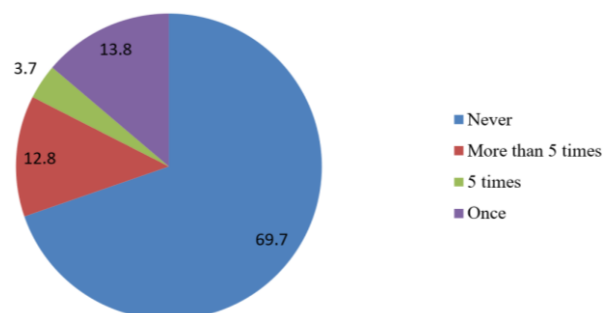


Figure 4. Illegal logging experiences on cocoa farms.

On the issue of compensation paid by concessionaires to cocoa farmers for crops destroyed,

9.7% of the respondents reported they have received compensation before while the remaining 90.3% reported they have never received compensation before. Of those who have received compensation before, **Table 5** presents the amounts received and the number of times payments were received. It is clear from **Table 5** that the cocoa farmers need training on how to negotiate with loggers on the amount of compensation for their damaged crops. Many farmers are not aware of their rights, they accept any amount as compensation for their damaged crops (which is mostly made through verbal agreements) and loggers use this to their advantage^[16]. This result in many farmers not happy with compensations paid to them. For instance, the FAO report stated that 90% of farmers in their project were unhappy with the compensation paid to them by loggers.

Table 5. Amount of compensation and number of times compensation were received by farmers.

Amount received (Ghana Cedis)	Number of times amount received
150	2
20	1
5	2
40	3
500	4
50	1
15	1
5	1
600	1
20	2

4. Conclusion

This study which surveyed 200 cocoa farmers evaluated tree ownership on cocoa farms, the processes and challenges involved in felling permit acquisition and the incidences of illegal logging on cocoa farms. The results suggested that 62.6% of the cocoa farmers own the trees on their farms. However, these farmers may or may not have full ownership rights over the trees depending on their land holding arrangements. More than half of the respondents (62.6%) reported they would require permits to fell or harvest tree products. This is indicative that majority of the cocoa framers are

aware of established tree felling procedures. Bureaucratic procedures emerged as the major challenge to tree felling permit acquisition. It is therefore suggested that acquisition of felling permits should be made less cumbersome by cutting down on paperwork and time needed for processing. Sixty nine percent of the cocoa farmers reported that they have never experienced illegal logging on their farms before. Although this is encouraging, the cocoa farmers need to be educated on negotiating for compensation for the destruction of their crops during logging activities.

Author contributions

Conceptualization, PPA and AAD; methodology, PPA, PAY and SY; software, EAO; validation, PPA, AAD and EAA; formal analysis, AAD and EAO; investigation, PPA and PAY; resources, EAA; data curation, PPA and AAD; writing—original draft preparation, AAD; writing—review and editing, AAD, PPA, PAY and SY; visualization, AAD and EAO; supervision, PPA; project administration, SY; funding acquisition, EAA. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.

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