



Land

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6.1 Land tenure

Land is a critical productive asset for farmers, but it also plays an important role in social prestige and is regarded as the basis for wealth and political power. It has been documented that farmers' attitudes and investment decisions in cocoa production are directly linked to the issue of land tenure arrangements and security,^{1,2} and that there is an important relationship between land tenure and sustainable livelihoods.³ The way in which land tenure arrangements have developed in Ghana and Côte d'Ivoire is rooted in the history of each country.

A brief history of land tenure in Ghana and Côte d'Ivoire

In Ghana, both customary and statutory law play a role in the country's land tenure system. Most land is essentially private, and managed by customary authorities (approximately 80% of all land), whereas state ownership ('public lands') is limited to about 20%.⁴ Given the pluralistic legal environment within which land is managed, both formal and informal routes exist to accessing land. There have been numerous attempts to reform Ghana's land tenure system, however land ownership and management remains highly contested.⁵

In pre-colonial Ghana, land was held by communities under local rules and practices (customary law). Land titling was vested in traditional authorities and tenure practices varied from place to place. Customary law was usually unwritten, and based on local practices and norms that were flexible and negotiable. Three kinds of customary land law rights were recognised: allodial title, customary freehold and leasehold.⁶

Allodial title: This is the highest form of customary interest in land, and is vested in Stools/Skin or clans or families. These entities are seen as custodians who hold land in trust for community members (made up of living members, the dead, and those to come). Only indigenes can hold allodial title to land.

Customary freehold: This type of land right is created when an allodial holder allocates land to a subgroup or individual. Customary freehold rights are conditionally perpetual, and holders may

¹ Asamoah, M. and Owusu-Ansah, F. (CRIG) Report on land tenure & Cocoa production in Ghana. A USAID, CRIF and WCF Collaborative Survey, February 2017. <http://www.worldcocoaoundation.org/usaaid-report-on-land-tenure-cocoa-production-in-ghana-a-crigwcf-collaborative-survey>

² USAID, WCF. (2015). Assessment of Land Tenure-Related Constraints to Cocoa Productivity in Ghana. Available at https://www.land-links.org/wp-content/uploads/2016/09/USAID_Land_Tenure_Ghana_Cocoa_Report.pdf

³ Bugri, J.T. (2012) Final Report: Improving Land Sector Governance in Ghana Implementation of the Land Governance Assessment Framework. Department of Land Economy College of Architecture and Planning Kwame Nkrumah University of Science and Technology, Kumasi. Available at http://siteresources.worldbank.org/INTLGA/Resources/Ghana_Final_Report.pdf

⁴ Narh, P., Lambini, C., Sabbi, M., Pham, v d., Nguyen, T.T. (2015). Land Sector Reforms in Ghana, Kenya and Vietnam: A Comparative Analysis of Their Effectiveness. Land 2016, 5(2), 8; Available at <https://doi.org/10.3390/land5020008>

⁵ Ibid

⁶ Djokoto, G. and Opoku, K. (2010). Land tenure in Ghana: making a case for incorporation of customary law in land administration and areas of intervention by the growing forest partnership. Commissioned by International Union for the Conservation of Nature and Growing Forest Partnership. Available at https://www.growingforestpartnerships.org/sites/gfp.iiedlist.org/files/docs/ghana/ghana_land_tenure-gfp_project.pdf

sell, lease or mortgage their rights. However, customary freehold holders must recognise the superior ownership of the Stool and must perform any customary services to the Stool when necessary. Only indigenes can hold customary freehold title.

Leasehold: Allodial title holders may enter into a formal leasehold agreement for up to 99 years with other Ghanaians or up to 50 years with foreigners. Leaseholds are generally entered into by settlers.

With colonisation, statutory law was introduced in Ghana. Unlike customary law, this was set down (codified) by a body of legislature. Under statutory law, land rights are allocated and confirmed through the issue of titles or other forms of ownership registration.⁷ The government aimed to exert state control and management over lands in the country and fundamentally reform the land sector. It was not until 1979 that the Constitution re-vested land administration in local authorities.

There are currently 166 laws pertaining to land in Ghana, although their implementation is often limited in rural areas. The most important land laws pertaining to customary tenure are the Land Title Registration Law of 1986 that identified which land can be legally registered, including customary freehold registration although, in practice, very little rural land has been registered; The 1992 Constitution of the Republic of Ghana, which recognised all forms of landholding including customary rights; The Office of the Administrator of Stool Lands Act of 1994, which provided the framework for the management of Stool and Skin lands; and The Lands Commission Act of 2008, which merged several major land sector agencies into one umbrella body known as the Lands Commission.⁸

It has been argued that all these state interferences created a general 'indiscipline' in Ghana's land market and weakened traditional and customary institutions and authorities. Problems mentioned in different studies include land encroachment, multiple land sales, and unapproved maps, which leads to conflict and disputes between traditional authorities and governments.^{9,10} These problems are said to be exacerbated due to population pressures and growing commercial activities.

In Côte d'Ivoire, land was traditionally appropriated collectively and controlled on a village or lineage basis; this was called common or communal property. This meant that villagers, on condition that the piece of forest they were clearing was not already appropriated, did not have to ask permission to start cultivating the land. Only 'outsiders' had to ask permission from the chief and offer him a symbolic gift. It was possible to pass the land on to one's children but it was not possible to sell the land. With the introduction of tree crops, such as a cocoa and coffee, private property rights emerged, mainly because of the long lifespan of these trees compared to food crops. Therefore, planting trees legitimised permanent land control. Another factor was that trees were considered one's property and could be sold (while land officially could not be sold). With

⁷ USAID, WCF and CRIG (2015) Assessment of land tenure-related constraints to cocoa productivity in Ghana. Available at https://www.land-links.org/wp-content/uploads/2016/09/USAID_Land_Tenure_Ghana_Cocoa_Report.pdf

⁸ Ibid

⁹ Djokoto and Opoku refer to the State Lands Act, 1962 (Act 125), the Administration of Lands Act of 1962 (Act 123) and the Concessions Act, 1962 (Act 124). Djokoto, G. and Opoku, K. (2010) Land tenure in Ghana: making a case for incorporation of customary law in land administration and areas of intervention by the growing forest partnership. Commissioned by International Union for the Conservation of Nature and Growing Forest Partnership. Available at https://www.growingforestpartnerships.org/sites/gfp.iedlist.org/files/docs/ghana/ghana_land_tenure-gfp_project.pdf.

¹⁰ Narh, P., Lambini, C., Sabbi, M., Pham, v d., Nguyen, TT. (2015). Land Sector Reforms in Ghana, Kenya and Vietnam: A Comparative Analysis of Their Effectiveness. Land 2016, 5(2), 8; Available at <https://doi.org/10.3390/land5020008>

these shifts, the perception of land scarcity also appeared. Planting trees became a strategy to secure future land, and made the plantation itself sometimes more of a by-product. The demand for land was further increased by the 'sometimes massive arrival of immigrants'.¹¹

State attempts to redefine the structure of property rights in Côte d'Ivoire were unsuccessful. A 1935 decree gave the State the control of all land unexploited for more than ten years. On 20 March 1963, a Law was introduced that laid down the principle that the State was the owner of all non-registered land. But this law was never truly enforced.¹² In 1998, the Rural Land Law was adopted, which reserved rural land ownership for Ivorian citizens.^{13, 14} However, this law has remained problematic and difficult to implement. In January 2017, a new rural land policy was adopted by the Government of Côte d'Ivoire. This law confirms the objectives of the 1998 Rural Land Law, and also the government's intention to identify and formalise the boundaries between rural villages, and to clarify the land property rights of rural landholders. For this purpose the Rural Land Tenure Agency (AFOR) was established.¹⁵ The current land tenure system in Côte d'Ivoire is still regarded as complicated, costly, and outdated.¹⁶

6.2 Land scarcity

In Ghana and Côte d'Ivoire, focus group participants often discussed how agricultural land is becoming scarcer. As researchers, this is not uncommon to hear throughout sub-Saharan Africa, and mainly relates to rapid population growth in recent decades rather than the establishment of large plantations (although this can also be an issue in some contexts).

In Ghana, Amanor (2001) has discussed access to land for cocoa through the generations.¹⁷ The first generation of cocoa farmers of the 1920s–1940s could establish ownership over large tracts of forest land which became individual property through clearance. The next generation met growing land shortage and had limited

¹¹ Colin, J. (1998) The Emergence of Private Property in Land and the Dynamics of Agricultural Production: A Case Study from the Ivory Coast. In Hunt, R. and Gilman, A. (eds) *Property in Economic Context*. Page 317–49. University Press of America. New York/Oxford. http://horizon.documentation.ird.fr/exl-doc/pleins_textes/pleins_textes_7/b_fdi_55-56/010023171.pdf

¹² Ibid

¹³ According to Jean-Pierre Chauveau (2000), the Law provided for an initial ten-year phase (subsequent to its promulgation, i.e. until January 2009) during which any person holding land tenure rights involving appropriation of land (excluding derived rights holders) must have his rights officially recognised with a view to obtaining a land tenure certificate (individual or collective). After this deadline, land unclaimed in this way would be registered in the name of the State and the person farming it will be deemed a tenant. Land tenure certificates held by Ivorians entitle the holders to have their land registered on an individual basis after a period of three years, and result in the issue of a permanent private ownership title. Chauveau, J. (2000). The land tenure question in Côte d'Ivoire: A lesson in history. This text is an edited English translation of an article which originally appeared in French in special edition on Côte d'Ivoire of *Politique Africaine* 2000 (no 78) under the title "Question foncière et construction nationale en Côte d'Ivoire. Les enjeux silencieux d'un coup d'Etat". Available at http://hubrural.org/IMG/pdf/iied_dry_ip95english.pdf.

¹⁴ Ibid.

¹⁵ USAID, country profile Côte d'Ivoire. Available at <https://www.land-links.org/country-profile/cote-divoire/>

¹⁶ Press release World Bank 28 March 2018. Available at <http://www.worldbank.org/en/news/press-release/2018/03/28/world-bank-supports-rural-land-tenure-security-in-cote-divoire>.

¹⁷ Amanor, K. S. (2001). Land, Labour and the Family in Southern Ghana. A Critique of Land Policy under Neo-Liberalisation. Research Report No 116. Nordiska Afrikainstitutet. Available at <https://www.files.ethz.ch/isn/95533/116.pdf>

potential to clear new forest land. This generation had smaller lands and also limited access to land they could claim to have been created by their own labour, individual property that they had added to abusa property. They became more dependent upon abusa land and gifts from their fathers and matrilineal kin. The third generation has hardly any scope to clear its own land from forest land, and is competing with the second generation to use existing farm land.¹⁸

Likewise, in Côte d'Ivoire, frontier expansion in the 1920s and the booming cocoa economy translated into rapid population growth.¹⁹ Immigration from neighbouring countries and the Northern part of the country contributed to the demand for land. Initially, as in Ghana, settlers cut down prime rainforest for cocoa and, once land became scarce in a certain region, simply moved to another region where new land could still be found.^{20,21} Therefore, in the mid-twentieth century cocoa farms were rarely replanted with farmers preferring to move and cut down virgin forest because of better soil fertility. Over time this naturally exacerbated the pressure on land, which led to more land fragmentation and forest loss.

Land scarcity is therefore not a new phenomenon in Ghana and Côte d'Ivoire. What has changed is the scale and intensity of the issue as the population has continued to grow in both countries. In Ghana presently, there is additional pressure on land from illegal gold mining and commercial agriculture investment. In the future, changing climatic conditions may force farmers to abandon areas where the climate is no longer suitable for cocoa production. Untapped forest areas located in the south-western regions of both countries (Western Region in Ghana and Bas-Sassandra in Côte d'Ivoire) may have a more favourable climate for future cocoa production.^{22, 23} Decreasing land availability increases the cost of land, restricts households' ability to expand their land under cultivation and, if land is not well managed, can lead to depletion of soil fertility.

As researchers, we would like to add that the mean size of cocoa households' land is not usually contextualised in cocoa literature in relation to other countries. Without intending to diminish the important issue of land pressure in Ghana and Côte d'Ivoire, we typically encounter smallholders with much smaller land sizes throughout East Africa, regardless of their main crop.²⁴

¹⁸ Ibid

¹⁹ Ibid

²⁰ Knudsen, M. H. & Agergaard, J. (2015). Ghana's cocoa frontier in transition: the role of migration and livelihood diversification. *Geografiska Annaler: Series B, Human Geography*, 97(4), 325- 342. Available at <https://www.tandfonline.com/doi/abs/10.1111/geob.12084>

²¹ Ruf, F., Schroth, G., Doffangui, K. (2015). Climate change, cocoa migrations and deforestation in West Africa: What does the past tell us about the future?. *Sustainability Science*, 10(1), 101- 111. Available at http://publications.cirad.fr/une_notice.php?dk=575355

²² Kroeger, A., Bakhtary, H., Haupt, F., Streck, C. (2017). Eliminating Deforestation from the Cocoa Supply Chain. World Bank, Washington, DC. World Bank. Available at <https://openknowledge.worldbank.org/handle/10986/26549>

²³ Schroth, G., Läderach, P., Martinez-Valle, A.I., Bunn, C. (2017). From site-level to regional adaptation planning for tropical commodities: cocoa in West Africa. *Mitigation and Adaptation Strategies for Global Change*, 22(6), 903-927. Available at <https://link.springer.com/article/10.1007/s11027-016-9707-y>

²⁴ For example, in recent years we have carried out several assignments in Ethiopia, Kenya, Tanzania, and Uganda. In all of these studies we find that smallholders have, on average, roughly half the land as the smallholders in this study.

In Ghana, focus group participants confirmed that natural population growth, migration and (illegal) mining activities in the Ashanti Region and Central Region, has led to increasing land scarcity.

"There is not enough land. The population is increasing and we use most of the land for buildings. We also lose land to gold mining." (FGD, Ashanti Region, Ghana)

Ghanaian participants explained how the choice to grow cocoa contributes to pressure on land availability. Once planted, cocoa typically remains on the land for 30 years or more, as it offers long-term land tenure security and income. Participants explained that land owners are rarely interested in selling land if there is cocoa planted on it because income from cocoa is believed to be more profitable than selling the land. Participants also explained that a lack of land has inevitably led to some households intensifying production on the same piece of land. Previously they would rotate (non-cocoa) crops and leave land fallow at times so as not to exhaust the soil of nutrients, however now land is frequently under continuous cultivation. Farmers expect yields to decline in the future, unless fertiliser use is increased. This emphasizes to us the importance of programmes that educate on erosion control and soil fertility management.

"There used to be virgin forest many years back and we had fallow land. Now we have a lack of land and it has forced us to use same plots of land all the time, which depletes the soil. We cannot let the soil rest because we need the revenue." (FGD, Ashanti Region, Ghana)

In Côte d'Ivoire, focus group participants in some parts in the North of the Ivorian cocoa belt explained that access to land is further constrained by desertification or the expanding savannah land. The lack of rain in the northern limits combined with deforestation is seen as the primary driver of desertification there. More generally, participants frequently explained that population increases in communities has led to more houses being built. This simultaneously reduces land availability and increases demand for agricultural land. Population increases were also said to be exacerbated by migrants from the North of Côte d'Ivoire or from Burkina Faso and Mali illegally claiming pieces of land.

"We do not have enough land because the increasing population makes land scarce. There is no more forest land to expand into. All lands are in use and cannot be divided amongst the children as it will be too fragmented. The land we have is used continuously and is exhausted." (FGD, Béliér, Côte d'Ivoire)

6.3 All land data

Estimating and measuring land size

Most studies report farmer estimations of land size, whilst a few have been able to record land sizes using GPS. The question inevitably arises, ‘can farmers accurately estimate their land sizes?’ This is an important question because estimations of land size are used to calculate other values such as yield and revenue per hectare.

We don’t dispute that some farmers don’t know their land sizes. However, we think a better question is, ‘Can farmers who believe they know their land size accurately report the correct size?’. A related question is ‘How accurately can enumerators measure land sizes with GPS enabled devices?’

Reporting land size in a unit the respondent is familiar with

In our study, all respondents were first asked in which unit they would like to report their land size. In Ghana, farmers frequently responded in acres, but many also used a unit known locally as ‘poles’. In Ghana, 27% of cocoa farmers and 43% of non-cocoa farmers reported their land size in poles. Unfortunately, a ‘pole’ varies in size across communities in Ghana. Poles are calculated using the width of an average man’s arm span multiplied by a certain number squared.²⁵ Whilst the reporting of land in poles seems inconvenient, it does imply that land has been measured, and is probably less prone to rounding errors. We have come across very few studies looking at cocoa in Ghana which allowed land to be reported in poles. We suggest that land size estimates are more accurate when respondents can opt for the unit they are most comfortable reporting in. In this report, land sizes given to us in poles and acres have been converted to hectares to be consistent with most cocoa research in West Africa. In Côte d’Ivoire, respondents usually gave their land size in hectares.

Do farmers think they know their land sizes?

The next step was to ask respondents, “Do you know how many [land unit] of land your household used to cultivate all your crops last year?” This binary yes/no question was designed to prevent respondents from guessing their land sizes in subsequent questions. Table 6.2 shows that substantially fewer female respondents reported knowing their household’s land size than male respondents. In Ghana, 81% of female respondents and 94% of male respondents said they know their land size. In Côte d’Ivoire, 71% of female respondents and 94% of male respondents said they know their land size. If respondents answered that they weren’t sure of their land size (or if our

²⁵ Typically, one pole was reported as being between 30x30 and 45x45 arm widths, and this data was also captured for each respondent. This means that one pole ranges between $30\text{ m}^2 \cdot 1.75\text{ m} = 1,575\text{ m}^2$ and $45\text{ m}^2 \cdot 1.75 = 3,544\text{ m}^2$ across communities.

enumerators saw that they were struggling to make estimates) then no further questions were asked on land size. We only wanted land size estimates from those who were quite confident that they knew their land size to avoid obvious reporting bias. In hindsight, we would have liked to add a question on whether a respondent had ever had their land measured. We do not think that it is good methodological practice to ask respondents to make an estimate of land size (or production output or other such continuous variables) without first checking on the respondent's confidence to do so.

GPS mapping accuracy

In general, we support the use of GPS mapping to improve the accuracy of data wherever possible. That said, we would like to highlight that GPS data can also be prone to error for a number of reasons and comparisons between farmer recall data and GPS data rarely consider the possibility that GPS data has contributed to a mismatch between measured and estimated data.

First, GPS measurement is very time consuming to collect, and most studies can only GPS record a sub-set from the total sample. This sub-sample is often quite small, may not be random, and can be chosen for its convenience to the centre of the community. This is important to consider if the objective of the GPS sampling is to adjust the size of estimated plots by the error of those measured.

Studies that GPS measure land typically do not first select out farmers who are not confident that they know the size of their land (we have never seen this mentioned in other researcher's methodologies). In our view, these farmers shouldn't be in the GPS measurement sample because we already know that some farmers don't know their land sizes. We only really want to compare those who believe they know their land size with GPS measured data.

The most commonly described approach is to first ask a farmer their land size, record this, and then to go and measure it with a GPS enabled device. Whilst this sounds simple enough, there are several points at which recording errors can be made.

We suggest that farmers should be asked to make the estimate twice, once before measuring and once after measuring (both estimates should be the same). This is because we have often found that farmers and enumerators are not always talking about the same piece of land. Farmers have multiple plots of land and they can be also referring to nearby or adjoining land parcels which are not GPS measured. We suggest that the farmer should walk with the enumerator to make absolutely sure they are talking about the exact same plot of land that has been estimated.

Second, GPS data is often recorded using a mobile phone or tablet. This is usually because the survey is loaded on the same device. We know from experience that even the latest models of these devices are not highly accurate. In our study we also collected GPS data points on the location of each survey, and we can see the accuracy of each reading in meters squared. We frequently observe an accuracy of 16m, often 32m, and sometimes 64m per reading. An error of 32m x 32m is nearly a quarter of an acre, and 64m x 64m is roughly an acre. Part of the problem

is that often GPS enabled devices are not also setup with 3G or 4G sim cards to support signal triangulation. In remote areas there may be few mobile towers and very weak (or no) signal. The location GPS readings we took in our study were under clear sky.

GPS accuracy in a cocoa plot is an even greater issue. The perimeter of cocoa plots are often under dense foliage, which affects GPS accuracy. This issue is compounded when an enumerator has to collect multiple data points to measure an area. Most plots are not a rectangle and are multisided, implying multiple opportunities for measurement inaccuracy. It is vital that enumerators are properly trained, but it is almost impossible to check if they consistently make accurate measurements.

Unfortunately, the boundaries of many plots also have geographical features that might dissuade an enumerator from walking a perimeter properly (such as a boggy area). An enumerator may sometimes take shortcuts either by not fully walking the edges of a farm, or in recording all of the data points for an irregularly shaped plot of land. Such a case would give the appearance that a farmer had over-estimated the land size in relation to the measurement. We also suggest that the larger the land area to be measured, the greater the likelihood that an enumerator will take a shortcut. Land is unlikely to be over-measured because an enumerator does not walk further than necessary.

Analysis of a recent study using GPS measurements

We were interested in one recent study conducted by Wageningen University for IDH²⁶ which collected GPS coordinates for a small sample of 99 farms in Côte d'Ivoire. The study states that "GPS measurements indicated that 26% of farmers had miscalculated their farm size, with on average a 7% over-estimation of field size".²⁷ We are not surprised as this is a similar proportion of respondents in our study who said they didn't know their land size. The study helpfully published their GPS measurements alongside farmer estimates in their Annex 9.

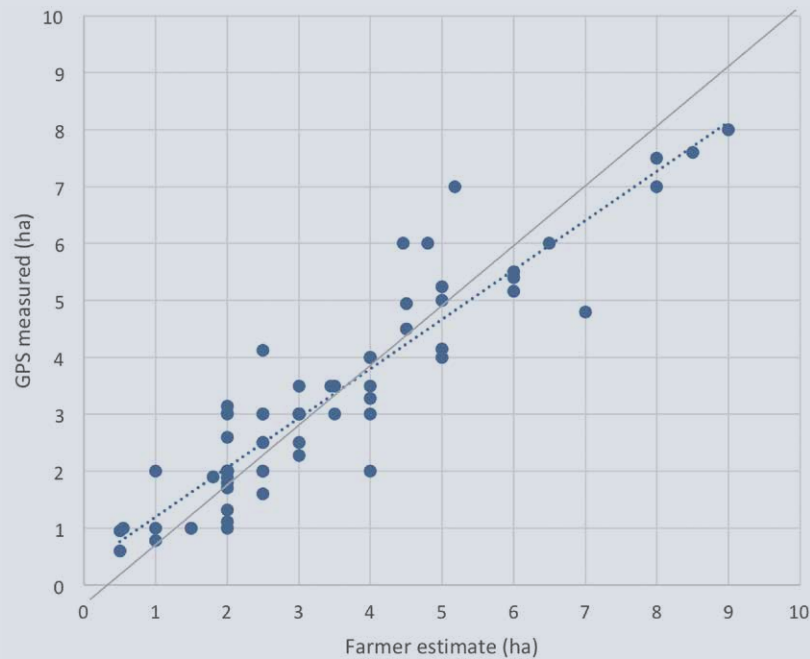
We used this data to plot estimated and measured land sizes (Figure 6.1). The first thing we noticed was that there were about 10 extreme outliers, representing about 10% of the sample of measured plots. We suspect that these outliers were either farmers who didn't know (and hence wouldn't be asked to estimate their land size in our study), or measurement was done incorrectly (see earlier discussion).

The trend line of the remaining data plots indicates that there is a reasonably good fit between farmer estimations and GPS measurements in most cases. We note that at higher land sizes it appears that farmers have over-estimated their land holdings. However, we must remember that data measurement inaccuracies will be compounded with larger land sizes and this could also be a enumerator error. At smaller land sizes under 1 hectare it appears that farmers may have rounded up to the nearest hectare. It is also possible that GPS inaccuracy has had a greater effect at smaller land sizes.

²⁶ Ingram, V., Waarts, Y., Ge, L., van Vugt, S., Wegner, L., Puister-Jansen, L., Ruf, F., Tanoh, R. (2014). The IDH Cocoa Productivity and Quality Programme (CPQP) in Côte d'Ivoire. Impact assessment framework and baseline. Available at <http://edepot.wur.nl/311372>

²⁷ Ibid, p.61

Figure 6.1 Farmer estimations of land size vs measured land (Ingram et.al 2014)²⁸



Concluding remarks on measurement

In our study, we have used farmer estimations of land size. We took a number of reasonable measures to ensure our farmer reported data was as accurate as possible, as described above. We also cleaned and omitted extreme outlier values falling outside four standards deviations from the mean (less than 1% of the total number of observations).

Based on a light analysis of the Wageningen data set of measured and estimated data, we have not felt persuaded that we should adjust our land data in either direction. While we would have liked to GPS measure a good sample cocoa farms, this simply wasn't possible for reasons of logistics and available resources.

While we certainly make no claim that all respondents accurately reported their land sizes, we feel reasonably confident about accuracy of the mean values we have reported for the overall sample, due to our large sample size. We have less confidence in the mean values of regional data (for instance) because as the sample size falls the risk of sampling bias increases, as does the possible effect of outlier values caused by a few inaccurate farmer estimations.

We think that land size estimations in Ghana may be slightly more accurate than those in Côte d'Ivoire. Ghanaian respondents reported in smaller land units (acres or poles), meaning that rounding errors will have a less pronounced effect than for Ivorian respondents reporting in hectares.

We also found that farmers are not able to estimate the number of cocoa trees they cultivate. Less than 2% of all respondents said they know the number of cocoa trees they have.

²⁸ Ibid

Table 6.1 Land unit that respondents used to report land size, percent of respondents, by country

	Ghana Cocoa HH	Ghana Non-Cocoa HH	pvalue	sig	Côte d'Ivoire Cocoa HH	Côte d'Ivoire Non-Cocoa HH	pvalue	sig
acre(s)	73%	57%	0.00	***	0%	0%	0.00	***
ha(s)	0%	0%			100%	94%		
pole(s)	27%	43%			0%	0%		
carré(s) 0.25 ha	0%	0%			0%	6%		
N	1,318	242			910	575		
land_unit_preference								

Table 6.2 Percent of respondents who know the size of household land used to cultivate all crops last year, by country

	Ghana Female respondent	Ghana Male respondent	pvalue	sig	Côte d'Ivoire Female respondent	Côte d'Ivoire Male respondent	pvalue	sig
mean	81%	94%	0.00	***	71%	94%	0.00	***
std.error	2%	1%			2%	1%		
N	538	1,022			498	987		
all_land_known_yn								

6.3.1 All land - use and ownership

In our household survey, only respondents who said they knew the size of their household's land were asked further questions their household's land (Table 6.2).

Many households in both Ghana and Côte d'Ivoire cultivate more than one plot of land. On average, Ghanaian households cultivated 2.58 plots of land compared with the 3.3 plots of land that Ivorian households reported. This is consistent the generally larger land sizes found in Côte d'Ivoire (Table 6.3).

Land tenure arrangements, Abunu and Abusa

There are two main types of land tenure arrangements, abunu and abusa. These are mainly used in relation to cocoa, but not exclusively.

The abunu system is the most frequently encountered system in our study.²⁹ There can be local variations, but in general a land owner offers an uncultivated part of his/her land (often bush or forested land) to a farmer (or labourer), who then works for several years to clear the land and establish cocoa trees on the new plot. After the new cocoa plantation is established (often a period of around six years), the land will be divided in two equal parts with (customary) ownership rights secured for each. From this time on, the cocoa plots will be independently managed. For the original owner, the main advantage of the abunu system is that he or she can expand his/her land under cocoa without using their own labour or incurring financial cost. For the farmers or labourer that enters the arrangement, the main advantage of the abunu system is that he or she can acquire a portion of land without buying it for a substantial amount of money.³⁰ It is important to emphasize that the main feature of the abunu system is the sharing of land, not the harvested crop. It should also not be assumed that abunu is a discreet category of farmer. Many farmers are already landowners and engage in abunu as a way to enlarge the amount of land they already own.

In Ghana, abunu contracts emerged in the 1940s and 1950s, while in Côte d'Ivoire they emerged in the 1980s before blossoming in the 2000s. In Côte d'Ivoire, the abunu contract is sometimes referred to as 'Partager-Travailler' (Work-and-Share) or 'Planter-Partager' (Plant-and-Share). According to Ruf (2010) these arrangements have become more popular with the increasing scarcity of land.³¹ While abunu is often referred to as a 'contract' between parties, this does not necessarily mean that the terms of the arrangement are written down and signed. Often abunu contracts are agreed verbally before a witness and may not be extensive in detail. In some cases there may be misunderstandings or disputes during the course of the contract period which may need to be renegotiated.³² Nevertheless, the relative frequency of abunu contracts in Ghana suggests to us that abunu is a reasonably well functioning system.

Another sharecropping arrangement is known as abusa. In its most direct translation from the Twi language, abusa simply means 'one-third', but during the course of this century it has come specifically to denote a crop-sharing arrangement whereby the supplier of labour and other inputs (the abusa man) receives from his partnership with a farm owner a third of the cocoa produced.³³ This was formally an important system. According to Hill (1956), as much as three-quarters of Ghanaian cocoa used to be produced under such arrangements in the middle of the twentieth century.³⁴ However, both in Ghana and in Côte d'Ivoire, we find very few households who continue to undertake abusa contracts in our sample.

²⁹ Abunu is also called Yemayenkye, which literally means 'do and let us share'. Takane, T. (2000). Incentives embedded in institutions: the case of share contracts in Ghanaian cocoa production. *The Developing Economies*, 38(3), 374-397. Available at <http://www.cocoaconnect.org/publication/incentives-embedded-institutions-case-share-contracts-ghanaian-cocoa-production>

³⁰ Some payment is still often made at the start of an abunu contract

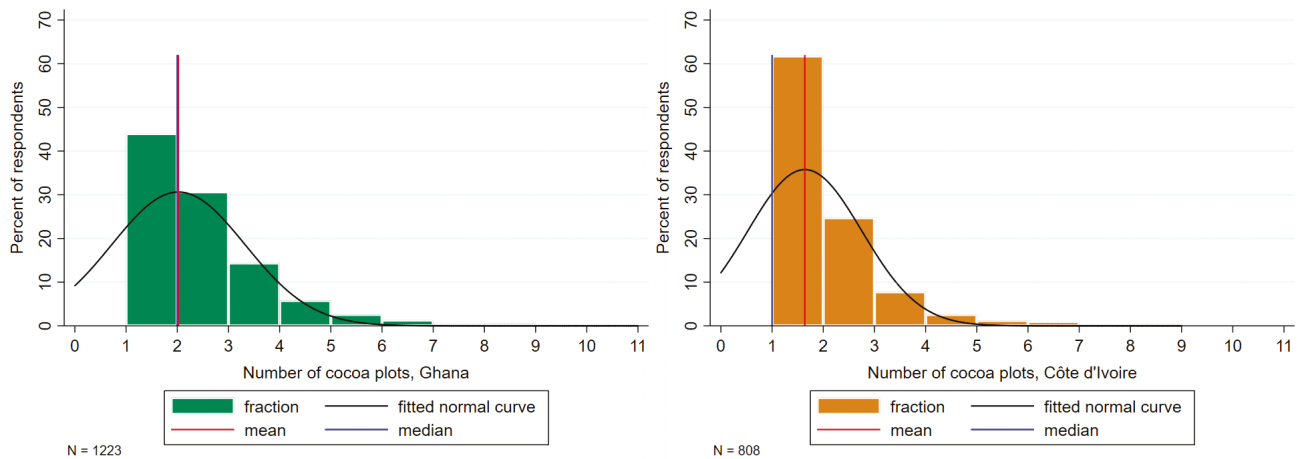
³¹ Ruf, F. (2010) You Weed and We'll share: Land Dividing Contracts and Cocoa Booms in Ghana, Côte d'Ivoire and Indonesia. Available at https://www.researchgate.net/publication/293482558_You_Weed_and_We'll_share_Land_Dividing_Contracts_and_Cocoa_Booms_in_Ghana_Cote_d'Ivoire_and_Indonesia

³² For example, if the terms of the arrangement are not fulfilled (e.g. the cocoa trees die or the abunu farmer/labourer abandons the farm mid-contract) then the land will be returned to the original owner.

³³ Robertson, A.F. (1987). *The Dynamics of Productive Relationships: African Share Contracts in comparative perspective*. The University of California. Cambridge University Press. Available at <https://books.google.nl/books?id=Bf08AAAAIAAJ>

³⁴ Hill, P. (1956). *The Gold Coast Farmer. A preliminary Survey*. Oxford University Press. Available at <https://catalog.princeton.edu/catalog/1219343>

Figure 6.2 Distribution of land parcels (separate plots) in Ghana and Côte d'Ivoire



Significant differences in the number of land parcels cultivated were also found between cocoa and non-cocoa households in both countries. Ghanaian cocoa households reported cultivating crops on 2.69 plots of land compared with 1.88 plots for non-cocoa households (highly significant). In Côte d'Ivoire, the cocoa households cultivated 3.52 plots of land, compared with 2.91 plots of land for non-cocoa households (highly significant) (Table 6.4). These findings are consistent with higher land sizes cultivated by cocoa households compared with non-cocoa households.

Table 6.3 Mean number of land parcels (separate plots), by country

	Ghana	Côte d'Ivoire	pvalue	sig
mean	2.58	3.30	0.00	***
std.error	0.05	0.05		
N	1,395	1,279		
all_land_numlandparcels				

Note: The question asked was "How many separate parcels of land did your household cultivate crops on last year?"

Table 6.4 Land, mean number of land parcels (separate plots), by cocoa vs non-cocoa household

	Ghana Cocoa HH	Ghana Non-HH	pvalue	sig	Côte d'Ivoire HH	Côte d'Ivoire Non-Cocoa HH	pvalue	sig
mean	2.69	1.88	0.00	***	3.52	2.91	0.00	***
std.error	0.05	0.08			0.06	0.08		
N	1,191	204			808	471		
all_land_numlandparcels								

Table 6.5 summarises our findings on average land sizes. These figures are averages and include respondents who did not ‘own’, ‘lease’, ‘have land under abunu or abusa’, or ‘do not have fallow land’.³⁵

On average we find that Ivorian households cultivate their crops on significantly larger farms than Ghanaian farmers. In Ghana, the mean land size on which all crops were cultivated was 4.77 ha, compared with 5.36 ha in Côte d’Ivoire (*highly significant*) (Table 6.5).

Most households in Ghana reported owning³⁶ at least some land (86%) and virtually all those in Côte d’Ivoire reported doing so (98%) (Table 6.5). This may mean that respondents are in possession of formal land title, that land was once given for ownership through chieftaincy or tribal agreements, or that land is considered to be owned under ancestral title. Ivorian respondents reported owning considerably more land than Ghanaian respondents on average. In Ghana, respondents reported owning an average of 4.06 ha, compared with 7.95 ha in Côte d’Ivoire (*highly significant*). (Of only those who owned some land, the average was 4.74ha in Ghana and 7.95ha in Côte d’Ivoire)

It is important to note that ‘land owned’ can be greater than total land cultivated because households may choose to keep some land fallow during crop rotation, may use fallow land as grazing land for animals, or leave land as bush because they do not have sufficient household labour available to cultivate more land. In Côte d’Ivoire, the average amount of fallow land is 2.74 ha. This considerably higher than in the average fallow land in Ghana, which is only 0.76 ha (*highly significant*).

Our interpretation is that, while pressure on land may be increasing (as reported in focus group discussions and literature), these are still relatively large farm sizes by smallholder standards in Africa. It is certainly debatable whether a household can efficiently manage this amount of land without considerable hired labour. Also, the presence of substantial amounts of fallow land in Côte d’Ivoire in particular (which may be bush), suggests that we are not close to a crisis point in terms of land availability.

In Ghana, only 6% of respondents reported that their household leases some land. A more common way to cultivate additional land is via the abunu system. In Ghana, 31% of all respondents engage in at least some abunu farming, which implies that a substantial number of households both own land and practice abunu farming at the same time. Across the Ghana sample, respondents reported that their household

³⁵ This implies that if the respondent household does not have a particular type of land they will be assigned ‘0’. This will affect the average for each type. We have chosen to also report the average of those with each land type in the text only so that tables will not be confused.

³⁶ In this study we use respondent interpretations of ‘owned’. It may be that it is either customary or statutory ownership, but either way respondents consider it to be theirs.

practices abunu farming on an average of 1 hectare (Table 6.5). However, among only those doing abunu farming, the average is 3.29 hectares. A relatively small number of respondents reported doing abusa farming (5%).

In Côte d'Ivoire, 10% of respondents reported that their household leases some land. However, from previous studies we expected a much higher proportion of respondents reporting abunu (2%) or abusa (2%) farming.^{37,38} We cannot easily explain the low abunu and abusa numbers in Côte d'Ivoire. They may reflect the natural shift from abunu to full ownership (since 98% of respondents reported owning some land). Abunu is, after all, a temporary arrangement. However, we suspect that the low percentage is also the result of the way in which the question was asked. While our enumerators in Côte d'Ivoire were trained on what was meant by abunu and abusa farming, we suspect this was still not understood by some respondents.

Table 6.5 Mean land cultivated, owned, leased, sharecropped, fallow, (ha), by country

	Ghana	Côte d'Ivoire	pvalue	sig
Land used to cultivate all crops (ha)	4.77	5.36	0.00	***
All land own (ha)	4.06	7.95	0.00	***
All land leased (ha)	0.11	0.16	0.07	*
All land abunu (ha)	1.00	0.07	0.00	***
All abusa (ha)	0.14	0.06	0.00	***
All fallow land or land left for grazing (ha)	0.76	2.74	0.00	***

Note: Land owned, leased, abunu, abusa may not add up to land cultivated due to rounding and cleaning of extreme outliers. Also fallow land is, by definition, not cultivated land.

Table 6.6 Land, proportion of households owning, leasing, abunu, abusa (percent) by country

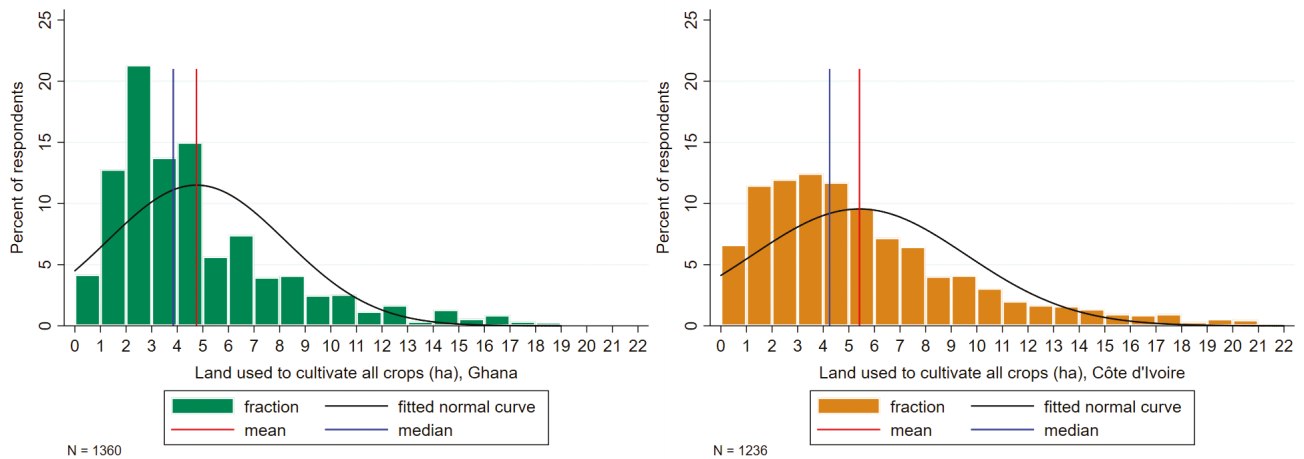
Type	Ghana	Côte d'Ivoire	pvalue	sig
Owned land	86%	98%	0.00	***
Leased land	6%	10%	0.00	***
Abunu	31%	2%	0.00	***
Abusa	5%	2%	0.00	***
N	1360	1102		

Note: p-value from a one-way ANOVA test

³⁷ Ruf, F. (2010) You Weed and We'll share. Land Dividing Contracts and Cocoa Booms in Ghana, Côte d'Ivoire and Indonesia. Available at https://www.researchgate.net/publication/293482558_You_Weed_and_We'll_share_Land_Dividing_Contracts_and_Cocoa_Booms_in_Ghana_Cote_d'Ivoire_and_Indonesia

³⁸ Waarts, Y., Ingram, V., Linderhof, V., Puister-Jansen, L., van Rijn, F., Aryeetey, R. (2015). Impact of UTZ certification on cocoa producers in Ghana, 2011 to 2014. Available at <http://edepot.wur.nl/366868>

Figure 6.3 Distribution of land cultivated in Ghana and Côte d'Ivoire (ha)



In Ghana, the size of land cultivated was found to differ between regions. However, these were not as pronounced as may be expected, and we must be careful with interpretation as the sample size falls considerably in some regions. The region with the smallest average land size cultivated was the Central region (4.06 ha) and the region with the highest average land size was Brong Ahafo (5.28 ha) (*highly significant*) (Table 6.7).

In Côte d'Ivoire, significant differences were also found between administrative districts, although the sample size per district is too low to draw firm conclusions. The district autonome de Yamoussoukro has the smallest mean land size cultivated (2.41 ha); Lagunes (7.85 ha) and Comou (7.76) had relatively the largest mean land size to cultivate all crops (*highly significant*) (Table 6.8).

Table 6.7 Mean land cultivated, owned, leased, abunu, abusa, fallow, by Ghana region (ha)

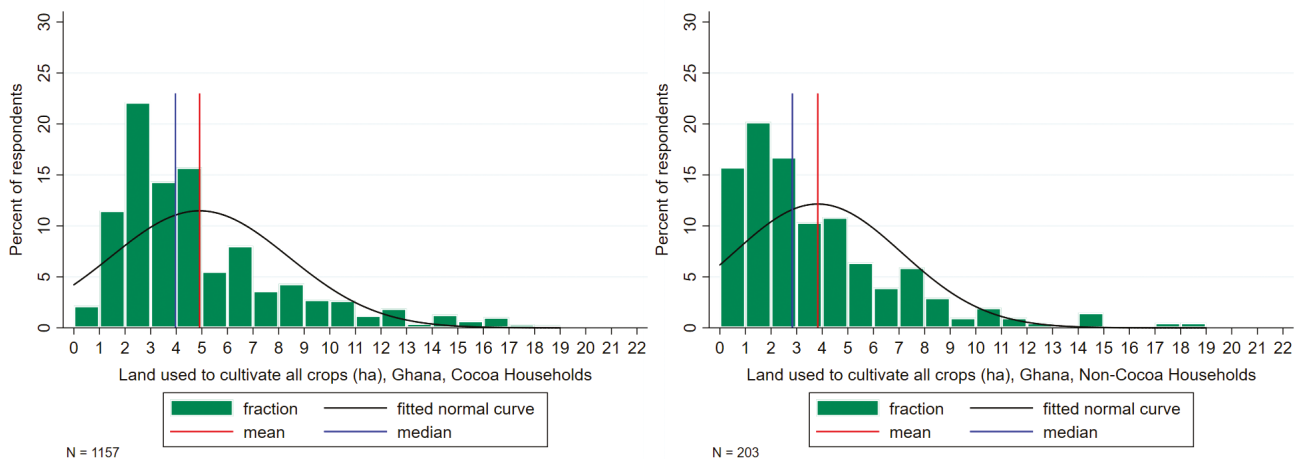
	Ashanti	Brong Ahafo	Central	Eastern	Western	pvalue	sig
Land used to cultivate all crops (ha)	4.32	5.28	4.06	4.39	5.03	0.00	***
All land own (ha)	3.86	4.70	3.47	3.54	4.20	0.02	**
All land leased (ha)	0.10	0.26	0.08	0.07	0.09	0.01	***
All land abunu (ha)	0.71	0.95	0.82	1.26	1.09	0.04	**
All abusa (ha)	0.10	0.35	0.03	0.05	0.13	0.00	***
All fallow land or land left for grazing (ha)	0.82	1.11	0.62	0.49	0.73	0.00	***
N	280	221	68	230	589		

Table 6.8 Mean land cultivated, owned, leased, abunu, abusa, fallow, by Côte d'Ivoire district (ha)

	Bas-Sassandra	Comoe	Yamoussoukro	Goh-Djiboua	Lacs	Lagunes	Montagnes	Sassandra-Marahoue	Zanzan	pvalue	sig
Land used to cultivate all crops (ha)	6.23	7.76	2.41	6.29	4.07	7.85	5.58	4.73	6.23	0.00	***
All land own (ha)	7.15	7.40	6.40	7.77	8.39	10.56	7.46	6.22	9.47	0.00	***
All land leased (ha)	0.18	0.16	0.01	0.22	0.13	0.09	0.26	0.25	0.04	0.08	*
All land abunu (ha)	0.09	0.46	0.00	0.14	0.03	0.03	0.02	0.01	0.04	0.00	***
All abusa (ha)	0.26	0.19	0.00	0.04	0.02	0.03	0.00	0.05	0.01	0.00	***
All fallow land or land left for grazing (ha)	1.82	1.04	4.57	1.54	4.55	3.28	2.15	1.93	3.48	0.00	***
N	138	73	78	114	295	95	114	219	104	138	

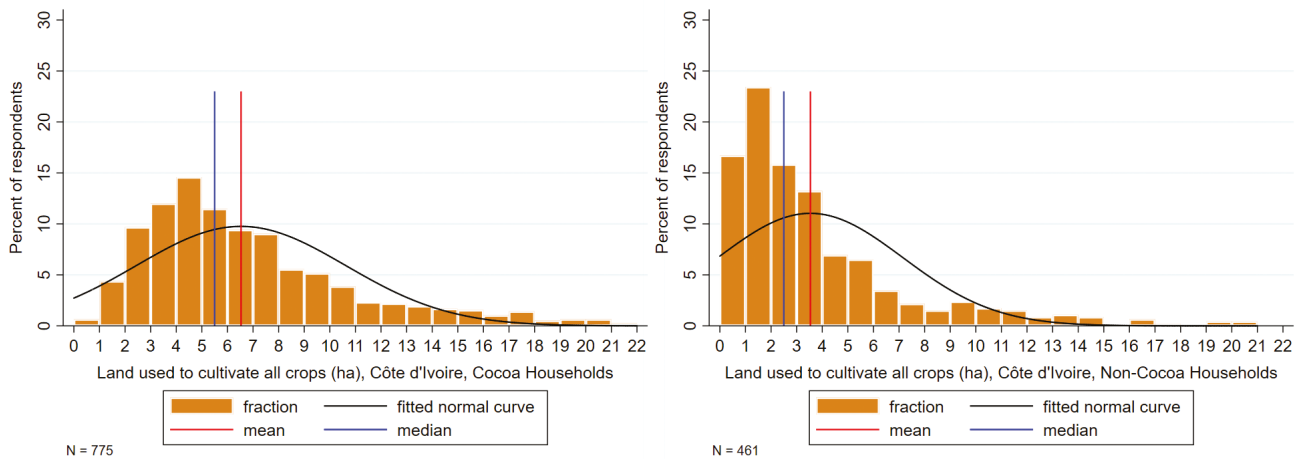
In Ghana, cocoa households reported cultivating more land (for all their crops) than non-cocoa households. The mean land size cultivated by cocoa households was 4.93 ha, considerably larger than the 3.90 ha reported by non-cocoa households (*highly significant*) (Table 6.9).

Figure 6.4 All land cultivated by cocoa and non-cocoa households, Ghana (ha)



The pattern is much the same in Côte d'Ivoire. The mean land size on which cocoa households cultivated all their crops was 6.48 ha, compared with only 3.50 ha for non-cocoa households (*highly significant*) (Table 6.9).

Figure 6.5 All land cultivated by cocoa and non-cocoa households, Côte d'Ivoire (ha)



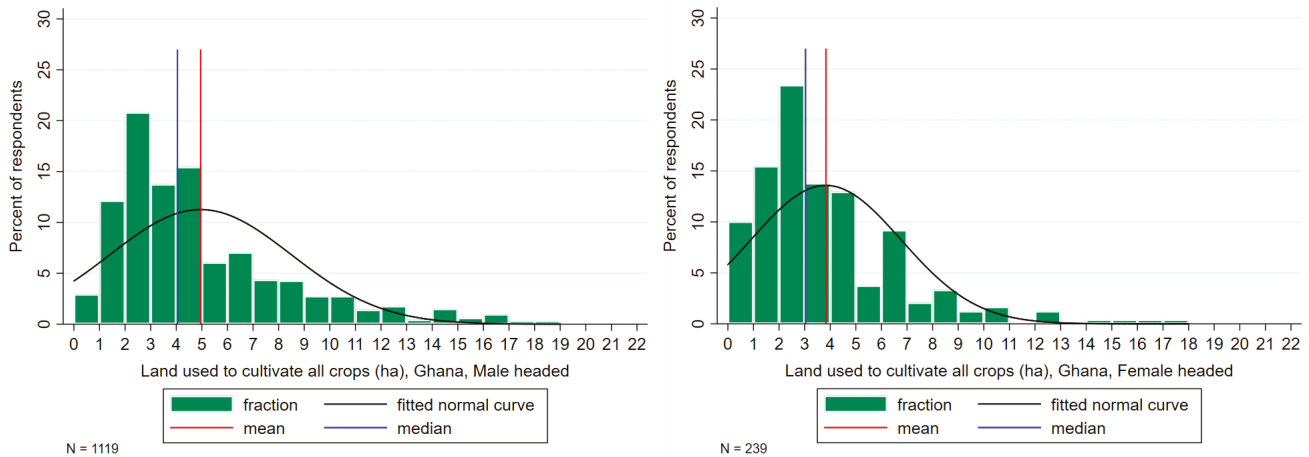
Correlations between the amount of land cultivated and whether or not the household produces cocoa need to be carefully interpreted as correlation does not imply causation. For example, it is not clear whether a larger landholding allows a household to invest in cocoa production, or whether good income from cocoa allows a household to invest in more land (perhaps through the abunu arrangement). We think that it is likely there is a two-way relationship.

Table 6.9 Land, mean land cultivated, owned, leased, abunu, abusa, fallow, (ha) by cocoa vs non-cocoa households

	Ghana Cocoa HH	Ghana Non-Cocoa HH	pvalue	sig	Côte d'Ivoire Cocoa HH	Côte d'Ivoire Non-Cocoa HH	pvalue	sig
Land used to cultivate all crops (ha)	4.93	3.90	0.00	***	6.48	3.50	0.00	***
All land own (ha)	4.21	3.20	0.00	***	8.32	6.78	0.00	***
All land leased (ha)	0.08	0.33	0.00	***	0.19	0.11	0.07	*
All land abunu (ha)	1.06	0.71	0.02	**	0.07	0.06	0.86	
All abusa (ha)	0.11	0.31	0.00	***	0.09	0.01	0.01	***
All fallow land or land left for grazing (ha)	0.74	0.88	0.22		2.45	3.36	0.00	***

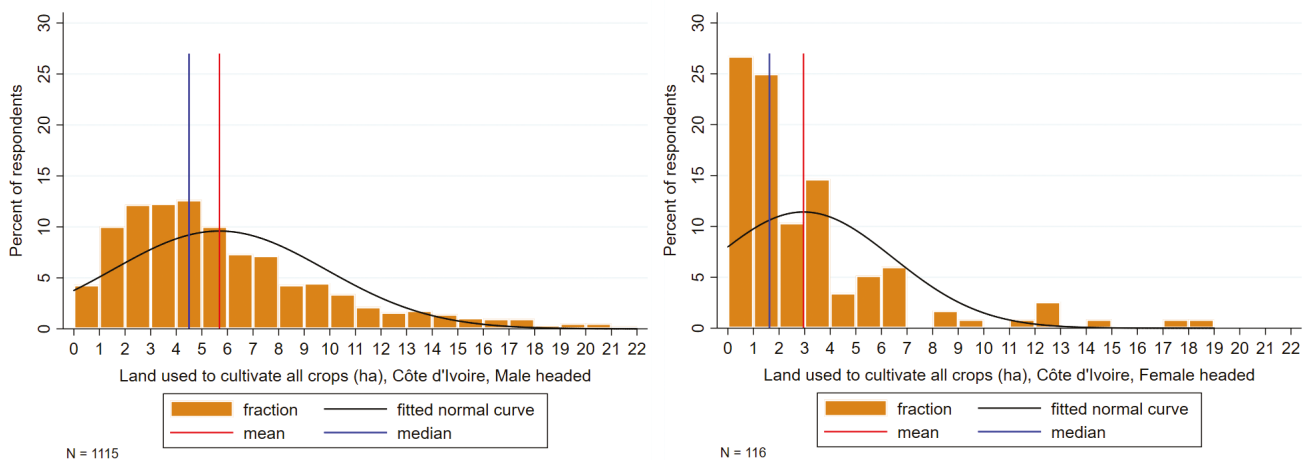
Differences in land cultivation and ownership were also found between male and female-headed households. In Ghana, a slightly higher proportion of female headed households (91%) reported owning land than male headed households (85%) (*significant*). However, female-headed households own a little less land on average (3.49 ha), compared with male-headed households (4.28 ha) (*highly significant*). Also we find that there is a slightly smaller proportion of female headed households who do abunu farming (24%) compared with male headed households (32%). This is consistent with focus group discussion data in which it was sometimes explained that land owners (whether men or women) prefer men to take abunu contracts on their land because they are physically stronger, and therefore more likely to be successful.

Figure 6.6 All land cultivated by male headed and female headed households, Ghana (ha)



In Côte d'Ivoire, differences were found to be much more pronounced. While nearly all households reported owning at least some land, female-headed households own, on average, 4.54 ha of land, compared with 8.16 ha for male-headed households (*highly significant*)³⁹.

Figure 6.7 All land cultivated by male headed and female headed households, Côte d'Ivoire (ha)



This data needs to be interpreted carefully. We must emphasize that female household heads (who are typically single, divorced or widowed) are not the same as females living in male headed households (and who are typically married). These findings should not be interpreted more broadly in terms of 'female land ownership'. The findings do suggest that narratives that women typically don't own land are not accurate⁴⁰

³⁹ We note that our sample size of 'female-headed households in Côte d'Ivoire who report that they know their land size' is quite small.

⁴⁰ This narrative is often expressed alongside reasons why women participate less frequently in training, have lower membership in farmer groups, or access credit less frequently. For example, see Zoen, S. (2015). The truth about women and chocolate – soft promises or solid change? Oxfam. Available at <https://policy-practice.oxfam.org.uk/blog/2015/03/cocoa>

(particularly for female headed households), while at the same time highlighting that there are differences in the amount of land owned by male and female-headed households, particularly in Côte d'Ivoire. We are not sure if the relatively moderate difference in Ghana is a sign that legislative changes are having an effect, or if there has been a cultural shift.

Table 6.10 Land, mean land cultivated, owned, leased, abunu, abusa, fallow, (ha) by sex of household head

	Ghana Female head	Ghana Male head	pvalue	sig	Côte d'Ivoire Female head	Côte d'Ivoire Male head	pvalue	sig
Land used to cultivate all crops (ha)	3.83	4.98	0.00	***	2.96	5.63	0.00	***
All land own (ha)	3.49	4.19	0.01	***	4.54	8.16	0.00	***
All land leased (ha)	0.13	0.11	0.74		0.05	0.17	0.07	*
All land abunu (ha)	0.61	1.09	0.00	***	0.00	0.07	0.29	
All abusa (ha)	0.04	0.16	0.05	**	0.00	0.06	0.18	
All fallow land or land left for grazing (ha)	0.60	0.80	0.07	*	2.17	2.80	0.07	*
N	241	1145			117	1160		

Land ownership patterns also differ between migrant households (those born outside the region where they now live) and non-migrant households. In Ghana we find no significant difference in the amount of land each group cultivates for all crops. However, a higher proportion of non-migrant (autochthonous) households (91%) reported owning land than migrant households (71%) (*highly significant*). As a result, autochthonous households own more land on average (Table 6.11). Migrant households compensate for lower land ownership rates by undertaking abunu arrangements more frequently (45%) than autochthonous households (26%) (*highly significant*).

In Côte d'Ivoire, both migrant and non-migrant groups own considerably more land than Ghanaian households. Ivorian migrants own about 1 ha less land than non-migrants (*significant*). Migrant households appear to compensate for the difference in ha owned by cultivating a higher proportion of their own land and leaving a smaller proportion fallow. Migrants in Côte d'Ivoire actually report cultivating all their crops on more land than non-migrants (*highly significant*) (Table 6.11).⁴¹

⁴¹ In Côte d'Ivoire, the same definition of migrant was used, however 'une région' in Côte d'Ivoire is a lower administrative unit than that in Ghana.

Table 6.11 Land, mean land cultivated, owned, leased, abunu, abusa, fallow, (ha) by migrant vs non-migrant household

	Ghana Migrant	Ghana Non-Migrant	pvalue	sig	Côte d'Ivoire Migrant	Côte d'Ivoire Non-Migrant	pvalue	sig
Land used to cultivate all crops (ha)	4.79	4.77	0.91		6.82	5.13	0.00	***
All land own (ha)	3.30	4.43	0.00	***	7.07	8.11	0.03	**
All land leased (ha)	0.13	0.11	0.52		0.45	0.11	0.00	***
All land abunu (ha)	1.64	0.78	0.00	***	0.13	0.06	0.17	
All abusa (ha)	0.22	0.11	0.02	**	0.23	0.03	0.00	***
All fallow land or land left for grazing (ha)	0.68	0.79	0.22		1.23	3.02	0.00	***
N	361	1,033			183	1,099		

6.3.2 All land – regression analysis

A regression analysis was conducted on determinants of all land, in order to add a layer of robustness to the descriptive data presented above.

For Ghana, Table 6.12 confirms all of the earlier findings. Households in Brong Ahafo and the Western Region own and cultivate more land than other regions. On average, female headed households cultivate approximately 1 hectare less land than male headed households and also own around half a hectare less land than male headed households. Cocoa households cultivate and own more land than non-cocoa households, and migrant households have more land under abunu arrangements than autochthonous households. Leaders also have more land than non-leaders. We suggest that this is because leaders tend to be relatively important and successful community members in the first instance, although leadership positions may also provide privileged access to land in some instances. Households with older heads in the 56-65 and 66+ categories have more land than households with younger heads. This stands to reason because they have had a lifetime to acquire more land, and they likely acquired a good portion of land prior before relative scarcity became an issue.

Table 6.12: Regression, determinants of land cultivated, owned and under abunu, Ghana (ha)

	Land used to cultivate all crops (ha)	All land own (ha)	Abunu land (ha), if abunu
Head: Sex: female	-0.97 (0.25)***	-0.58 (0.28)**	-0.65 (0.34)*
Region: Central	-0.43 (0.47)	-0.33 (0.52)	-0.35 (0.55)
Region: Brong Ahafo	1.20 (0.31)***	1.45 (0.35)***	0.96 (0.42)**
Region: Western	0.84 (0.26)***	0.94 (0.29)***	0.61 (0.35)*
Region: Eastern	-0.13 (0.31)	-0.56 (0.34)	0.54 (0.37)
Age Group (head): 26-35	0.46 (0.71)	0.13 (0.79)	-0.31 (0.82)
Age Group (head): 36-45	0.98 (0.68)	0.94 (0.76)	-0.42 (0.80)
Age Group (head): 46-55	1.06 (0.68)	1.17 (0.76)	-1.00 (0.80)
Age Group (head): 56-65	1.89 (0.69)***	2.37 (0.77)***	-0.31 (0.82)
Age Group (head): >66	1.67 (0.70)**	2.34 (0.78)***	-0.46 (0.85)
Cocoa Household: yes	0.98 (0.27)***	0.89 (0.30)***	0.57 (0.37)
Migrant: yes	-0.22 (0.22)	-1.38 (0.25)***	0.55 (0.26)**
Number of household members living in the compound	0.11 (0.04)***	0.09 (0.04)**	0.02 (0.05)
Leader: yes	0.42 (0.21)**	0.79 (0.23)***	0.48 (0.26)*
Constant	1.66 (0.73)**	1.06 (0.81)	2.47 (0.90)***
N	1,349	1,347	413
R ²	0.07	0.10	0.08

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ Robust se in parenthesis

For Côte d'Ivoire, Table 6.13 also confirms the earlier analysis. Female headed households cultivate 1.7 ha less than male headed households, and own around 2.5 ha less. Cocoa households also cultivate around 1.5 ha more and own around 2 ha more than non-cocoa households. Migrants are also confirmed to cultivate more land than autochthonous households but own less (because they appear to cultivate more fallow land). As in Ghana, households with older heads in the 56-65 and 66+ categories have more land than households with younger heads.

Table 6.13 Regression, determinants of land cultivated and owned, Côte d'Ivoire (ha)

	Land used to cultivate all crops (ha)	All land own (ha)
Head: Sex: female	-1.70 (0.38)***	-2.55 (0.58)***
Region: Lacs	1.08 (0.48)**	1.57 (0.79)**
Region: Montagnes	1.67 (0.57)***	0.60 (0.92)
Region: Bas-Sassandra	1.85 (0.58)***	0.07 (0.92)
Region: Goh-Djiboua	2.00 (0.59)***	0.27 (0.92)
Region: Zanzan	3.57 (0.56)***	2.68 (0.88)***
Region: Sassandra-Marahoue	0.82 (0.53)	-0.94 (0.85)
Region: Comoe	3.17 (0.63)***	-0.43 (0.97)
Region: Lagunes	3.81 (0.59)***	3.10 (0.94)***
Age Group (head): 26-35	0.32 (0.69)	1.07 (1.08)
Age Group (head): 36-45	0.42 (0.68)	0.69 (1.06)
Age Group (head): 46-55	0.66 (0.68)	1.28 (1.06)
Age Group (head): 56-65	1.20 (0.70)*	2.66 (1.09)**
Age Group (head): >66	1.22 (0.74)*	2.31 (1.14)**
Cocoa Household: yes	2.16 (0.26)***	1.44 (0.41)***
Migrant: yes	1.04 (0.32)***	-1.21 (0.48)**
Number of household members living in the compound	0.24 (0.03)***	0.33 (0.05)***
Leader: yes	0.15 (0.23)	0.20 (0.35)
Constant	-0.04 (0.79)	2.89 (1.25)**
N	1,126	1,019
R ²	0.28	0.17

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ Robust se in parenthesis

6.4 Cocoa land data

6.4.1 Cocoa land

Land under cocoa in Ghana is estimated to have increased from around 1 million ha in 1995 to 1.6 million ha in 2010,⁴² and has recently been estimated at 1.8 million ha.⁴³ In Côte d'Ivoire, total land covered by cocoa plantations is estimated to have increased from 1.6 million ha to 2.5 million ha between 1990 and 2011.^{44,45}

Estimations of the average land size of smallholder cocoa farms vary somewhat across studies, depending on factors such as regional differences and sample variance.

Table 6.14 Land sizes reported in other studies, Ghana

Farm size	Region	Source	Notes
4,6 ha 2,2 ha	Western Eastern	Ruf (2011) ⁴⁶	-
3,0 ha	Unknown	Aneani et al (2011) ⁴⁷	-
2 types: 1,4-2,7 ha (smallholder), 5,5 ha or more (larger farms)	Unknown	Barrientos & Akyere (2012) ⁴⁸	Larger farms mostly in Western Region
2 ha	Unknown	Victor et al. (2010) ⁴⁹	-
7.14 acres	Mean for Ashanti, Eastern, Western	Waarts et al. (2013) ⁵⁰	Certified farmers Highest acreage in Ashanti Smallest acreage in Eastern
5 acres	Mean for all regions	Hainmueller et al (2011) ⁵¹	Difference between reported (3.6 a) and measured (5.1 a) farm sizes
4 acres 4 acres 3 acres 2,5 acres 3 acres	Ashanti Bhrong-Ahafo Central Eastern Western	Hainmueller et al (2011)	Median sizes reported
4.7 ha	Mean for Ghana	Calkins & Ngo (2005) ⁵²	Older source, larger farms in Western compared to Ashanti

⁴² Wessel, M., & Quist-Wessel, P. F. (2015). Cocoa production in West Africa, a review and analysis of recent developments. *NJAS-Wageningen Journal of Life Sciences*, 74, 1-7. Available at <https://doi.org/10.1016/j.njas.2015.09.001>

⁴³ Kroeger, A., Bakhtary, H., Haupt, F., Streck, C. (2017). Eliminating Deforestation from the Cocoa Supply Chain. World Bank, Washington, DC. World Bank. Available at <https://openknowledge.worldbank.org/handle/10986/26549>

⁴⁴ Ibid

⁴⁵ Wessel, M., & Quist-Wessel, P. F. (2015). Cocoa production in West Africa, a review and analysis of recent developments. *NJAS-Wageningen Journal of Life Sciences*, 74, 1-7. Available at <https://doi.org/10.1016/j.njas.2015.09.001>

⁴⁶ Ruf, F.O. (2011). The myth of complex cocoa agroforests: the case of Ghana. *Human Ecology*, 39(3), 373. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3109247/>

⁴⁷ Aneani, F., Anchirinah, V. M., Owusu-Ansah, F., Asamoah, M. (2011). An analysis of the extent and determinants of crop diversification by cocoa (Theobroma cacao) farmers in Ghana. *African Journal of Agricultural Research*, 6(18), 4277-4287. Available at <https://academicjournals.org/journal/AJAR/article-full-text-pdf/D36327231736>

⁴⁸ Barrientos, S.W & Asenso Akyere, K. (2012). Mapping sustainable production in Ghanaian cocoa, Report to Cadbury. Institute of Development Studies & University of Ghana. Available at <https://www.cocoalife.org/progress/mapping-sustainable-production-in-ghanaian-cocoa>

⁴⁹ Victor, A.S., Gockowski, J., Agyeman, N. F., Dziwornu, A.K. (2010). Economic cost-benefit analysis of certified sustainable cocoa production in Ghana. In Proc. of the 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference (pp. 19-23). Available at <https://ageconsearch.umn.edu/bitstream/97085/2/33.%20Cost%20benefit%20of%20cocoa%20in%20Ghana.pdf>

⁵⁰ Waarts, Y., Ge, L., Ton, G., van der Meen, J. (2013). A touch of cocoa: Baseline study of six UTZ- Solidaridad cocoa projects in Ghana. LEI report 2013-2014. LEI Wageningen UR. Available at <http://edepot.wur.nl/305316>

⁵¹ Hainmueller, J., Hiscox, M., Tampe, M. (2011). Sustainable development for cocoa farmers in Ghana. MIT and Harvard University. <https://www.theigc.org/wp-content/uploads/2015/02/Hainmueller-Et-Al-2011-Working-Paper.pdf>

⁵² Calkins, P., & Ngo, A. (2005). The Impacts of Farmer Cooperatives on the Standard of Living Of Cocoa Producing Villages in Côte d'Ivoire and Ghana. Canada: Societe de Cooperation pour le Developpement International. Available at <http://socodevi.org/contenu/prospecteur/uploads/Cocoa-Cooperatives-and-Well-being-20051130.pdf>

Farm size	Region	Source	Notes
7.1 acres (2.9 ha)	Mean for Ghana	Waarts et al. (2013)	Certified farmers Highest acreage in Ashanti
2.3 ha	Mean for Ghana	Wiggins & Leturque (2011) ⁵³	-
7.8 acres (3.2 ha)	Western Region	Anang (2016) ⁵⁴	-
3.0 ha (mean), 0.4 ha (min), 36 ha (max)	Whole of Ghana	Aneani et al (2011)	Research conducted over different cocoa growing regions
10.5 acres (4.2 ha)	Ashanti region	Schouten (2016) ⁵⁵	Three communities in Ashanti
5.5 acres (2.2 ha)	Mean for Ghana	Hiscox & Goldstein (2014) ⁵⁶	
7.5 acres (3 ha)	Mean for Ghana	Tulane university (2015) ⁵⁷	Farm size decreased from 9.6 acres in 2009 to 7.5 in 2014
Q1: 1.65 ha Q2: 3.14 ha Q3: 5.24 ha Q4: 10.12 ha	Mean for Ghana	Kolavalli et al. (2016) ⁵⁸	Makes distinction between 4 quartiles of landholdings based on size
4.98 acres (2 ha) 10.6 acres (4.3 ha) 4.78 acres (1.9 ha) 8.73 acres (3.5 ha)	Eastern Western Volta Mean for all three	Baah et al. (2012) ⁵⁹	-
2-4 ha	Average for West Africa	Barry Callebaut (2014) ⁶⁰	-
66% of farm sizes 0-8 ha, 18,9% of farm sizes 20 ha+	Whole of Ghana	Addae (2014) ⁶¹	-
12.4 acres (5 ha) 10.9 acres (4.4 ha)	Uncertified farmers Certified farmers	Nelson et al. (2013) ⁶²	-
2.47 ha	Mean for Ghana	Oomes et al. (2016) ⁶³	-
4.3 ha	Mean for Ghana	Donovan et al. (2016) ⁶⁴	Total farm sizes of which 30% is fully for cocoa
2.14 ha 1.94 ha	Ashanti Western	Vigneri and Serra (2016) ⁶⁵	Average calculated based on 4 districts in Ashanti, 2 in Western
2-5 ha	Mean for Ghana	Lambert et al. (2014) ⁶⁶	Rather broad mean size

⁵³ Wiggins, S & Leturque, H. (2011). Ghana's sustained agricultural growth: Putting underused resources to work. London: ODI Publications. Available at <https://www.odi.org/sites/odi.org.uk/files/resource-documents/11558.pdf>

⁵⁴ Anang, B.T. (2016). Determinants of Farmers' Satisfaction with the Price of Cocoa in Ghana. Available at https://www.researchgate.net/profile/Benjamin_Tetteh_Anang/publication/283575616_Determinants_of_Farmers%27_Satisfaction_with_the_Price_of_Cocoa_in_Ghana/links/5806088b08aeb85ac85f1104/Determinants-of-Farmers-Satisfaction-with-the-Price-of-Cocoa-in-Ghana.pdf

⁵⁵ Schouten, E. (2016). Household food security of Ghanaian cocoa producers: the impact of UTZ-certification (Master's thesis). Available at <https://dspace.library.uu.nl/handle/1874/339348>

⁵⁶ Hiscox, M., & Goldstein, R. (2014). Gender Inequality in the Ghanaian Cocoa Sector. Harvard University. Available at <https://www.cocoalife.org/~media/CocoaLife/News%20Articles%20PDF/Ghana%20Gender%20Assessment%20by%20Harvard%20University.pdf>

⁵⁷ Tulane University (2015). Survey Research on child labor in West African cocoa producing regions, 2013/14. School of Public Health and Tropical Medicine, Tulane University, July 30 2015. Available at https://makechocolatefair.org/sites/makechocolatefair.org/files/newsimages/tulane_university_-_survey_research_on_child_labor_in_the_cocoa_sector_-_30_july_2015.pdf

⁵⁸ Kolavalli, S., Vigneri, M., Gockowski, J. (2016). The Cocoa Coast: the board managed cocoa sector in Ghana. Ghana strategy support program, International Food Policy Research Institute (IFPRI). Available at <http://www.ifpri.org/publication/cocoa-coast-board-managed-cocoa-sector-ghana-synopsis>

⁵⁹ Baah, F., Anchirah, V., Badger, E., Badu-Yeboah, A. (2012). Examining the cocoa farmer-purchasing clerk relationship in Ghana. Global Journal of Science Frontier Research, 12(11-D). Available at <https://journalofscience.org/index.php/GJSFR/article/download/552/475/>

⁶⁰ Barry Callebaut (2014). Cocoa sustainability report 2012/2014. Available at https://www.barry-callebaut.com/system/files/download/barry_callebaut_cocoa_sustainability_report_2014_web.pdf

⁶¹ Addae, S. (2014). The Cocoa Certification Program and Its Effect on Sustainable Cocoa Production in Ghana: A Case Study in Upper Denkyira West District (Doctoral dissertation, Kwame Nkrumah University Of Science And Technology, Kumasi). Available at <http://ir.knust.edu.gh/xmlui/handle/123456789/6966>

⁶² Nelson, V., Opoku, K., Martin, A., Bugri, J., Posthumus, H. (2013). Assessing the poverty impact of sustainability standards: Fairtrade in Ghanaian cocoa. London: DfID UK. Available at <https://fairtradebook.files.wordpress.com/2013/12/apiss-fairtradeinghanaiancocoa.pdf>

⁶³ Oomes, N., Tieben, B., Laven, A., Ammerlaan, T., Appelman, R., Biesenbeek, C., Buunk, E. (2016). Market concentration and price formation in the global cocoa value chain. SEO Amsterdam Economics. Available at <http://www.seo.nl/pagina/article/market-concentration-and-price-formation-in-the-global-cocoa-value-chain/>

⁶⁴ Donovan, J., Stoian, D., Foundjem, D., Degrande, A. (2016). Fairtrade Cocoa in Ghana: Taking Stock and Looking Ahead. Available at <https://www.biodiversityinternational.org/e-library/publications/detail/fairtrade-cocoa-in-ghana-taking-stock-and-looking-ahead/>

⁶⁵ Vigneri, M. and Serra, R. (2016). Researching the Impact of Increased Cocoa Yields on the Labour Market and Child Labour Risk in Ghana and Côte d'Ivoire. ICI Labour market research study. Available at: http://www.cocoainitiative.org/wp-content/uploads/2016/12/market_research_full_web.pdf

⁶⁶ Lambert, A., Gearhart, J., McGill, A., Wrinkle, H. (2014). The Fairness Gap: Farmer incomes and root cause solutions to ending child labor in the cocoa industry. International Labour Rights Forum, Washington D.C. Available at https://laborrights.org/sites/default/files/publications/Fairness%20gap_low_res.pdf

Table 6.15 Land sizes reported in other studies, Côte d'Ivoire

Farm size	Region/other	Source	Notes
5 ha 2-10 ha	Local farmers National/migrant farmers	Smith-Dumont et al. (2014) ⁶⁷	-
2.8 ha 6.2 ha 9.5 ha 6.2 ha	Tiassalé Adzopé Abengourou Mean for Côte d'Ivoire	Calkins & Ngo (2005)	Older source. Mean for Côte d'Ivoire has been calculated based on these three regions
5.34 ha (estimated) 3.7 ha (measured)	Mean for Côte d'Ivoire	Ingram et al. (2014) ⁶⁸	Farmers significantly overestimate farm sizes
3-4 ha	Mean for Côte d'Ivoire	Wessel & Quint-Wessel (2015) ⁶⁹	"No reliable statistics"
5.69 ha 5.84 ha	Uncertified farmers Certified farmers	Plate-Form pour le Commerce Equitable (2016) ⁷⁰	-
5.6 ha 6.4 ha	Uncertified farmers Certified farmers	Lemeilleur et al (2015) ⁷¹	-
6,3 ha	Mean for Côte d'Ivoire	Assiri et al. (2009) ⁷²	80% of the farmers have a farm smaller than 10 ha (also see tables on next page)
11.7 acres 8.8 acres	In 2009 In 2014	Tulane University (2015)	Average acreage used for cocoa by households
5,65 ha 4,96 ha 4,25 ha	For Baoulé For Bakwé For Burkinabé	Tano (2012) ⁷³	The study is about differences between ethnicities
5,8 ha	Mean for specific region in Côte d'Ivoire	Varlet & Kouamé (2013) ⁷⁴	Research about cocoa lands bordering the Taï national park near Liberia
6,76 ha 7,19 ha 5,29 ha 2,08 ha 5,77 ha	Indénie-Juabin Nawa Loh Jibua Haut-Sassandra Mean for all four	Vigneri and Serra (2016)	-
7,2 ha 6,31 ha	Study A (mean for Côte d'Ivoire) Study B (mean for Côte d'Ivoire)	Maytak (2014) ⁷⁵	Synthesis of 2 other reports
2-5 ha	Mean for Côte d'Ivoire	Lambert et al. (2014)	Very broad classification
4.31 ha >12ha >23ha 4.87ha <3.34ha	Average cocoa plot size 5% of plots are >12ha 1% of plots are >23ha Average all plots combined 50% of plots are <3.34ha	Balineau et al. (2017) ⁷⁶	Farmers have one or more cocoa plots. The first three statistics are the size per plot. The last two are the size of all plots combined.

⁶⁷ Smith-Dumont, E., Gnahoua, G. M., Ohouo, L., Sinclair, F. L., Vaast, P. (2014). Farmers in Côte d'Ivoire value integrating tree diversity in cocoa for the provision of ecosystem services. *Agroforestry systems*, 88(6), 1047-1066. Available at <https://www.mendeley.com/papers/farmers-c%C3%B4te-divoire-value-integrating-tree-diversity-cocoa-provision-ecosystem-services/>

⁶⁸ Ingram, V., Waarts, Y., Ge, L., van Vugt, S., Wegner, L., Puister-Jansen, L., Ruf, F., Tanoh, R. (2014). Impact of UTZ certification of cocoa in Ivory Coast: Assessment framework and baseline. Wageningen, LEI Wageningen UR (University & Research centre), LEI Report 2014-010. Available at https://utz.org/wp-content/uploads/2016/03/Impact-of-UTZ-certification-of-cocoa-in-Ivory-Coast_2014.pdf

⁶⁹ Wessel, M., & Quist-Wessel, P. F. (2015). Cocoa production in West Africa, a review and analysis of recent developments. *NJAS-Wageningen Journal of Life Sciences*, 74, 1-7. Available at https://www.researchgate.net/publication/282316360_Cocoa_production_in_West_Africa_a_review_and_analysis_of_recent_developments

⁷⁰ Plate-Forme pour le Commerce Equitable (2016). La Face Cachée du Chocolat: Une comparaison des coûts sociaux et environnementaux des filières conventionnelles, durables et équitables du cacao. Available at https://lebasic.com/wp-content/uploads/2016/05/Etude-Cacao_Synthese.pdf

⁷¹ Lemeilleur, S., N'Dao, Y., Ruf, F. (2015). The productivist rationality behind a sustainable certification process: evidence from the Rainforest Alliance in the Ivorian cocoa sector. *International Journal of Sustainable Development*, 18(4), 310-328. Available at http://publications.cirad.fr/une_notice.php?dk=576452

⁷² Assiri, A. A., Yoro, G.R., Deheuvels, O., Kébé, B.I., Keli, Z.J., Adiko, A., Assa, A. (2009). Les caractéristiques agronomiques des vergers de cacaoyer (# Theobroma cacao# L.) en Côte d'Ivoire. *Journal of animal and plant sciences*, 2(1), 55-66. Available at http://publications.cirad.fr/une_notice.php?dk=555828

⁷³ Tano, M.A. (2012). Crise cacaoyère et stratégies des producteurs de la sous-préfecture de Meadji au sud-ouest ivoirien (Doctoral dissertation, Université Toulouse le Mirail-Toulouse II). Available at <https://tel.archives-ouvertes.fr/tel-00713662/document>

⁷⁴ Varlet, F. & Kouamé, G. (2013). Étude de la production de cacao en zone riveraine du parc national de Taï. *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and Ministère de l'Agriculture de la Côte d'Ivoire*.

⁷⁵ Maytak, L. (2014). Report on Farm Level Sustainability of Cocoa in Côte d'Ivoire: A Synthesis of Five Studies. International Finance Corporation, New York. Available at https://www.uni-goettingen.de/de/document/download/133209052e4238ff6de0f471ff51abb.pdf/GlobalFood_DP103.pdf

⁷⁶ Balineau, G., Bernath, S., Pahuatini, V. (2017). Cocoa farmers' agricultural practices and livelihoods in Côte d'Ivoire. Insights from cocoa farmers and community baseline surveys conducted by Barry Callebaut between 2013 and 2015. Technical Reports, No. 24. AFD, Paris. Available at <http://www.afd.fr/en/cocoa-farmers-agricultural-practices-and-livelihoods-cote-divoire>

In our sample, Ghanaian households reported cultivating cocoa on an average of 3.65 hectares (Table 6.16), with the majority cultivating between 2 and 5 hectares (Figure 6.1). 82% of respondents said that their household ‘owns’ the cocoa land. On average, Ghanaian cocoa households own 2.74 ha of cocoa land. (The average among those who own at least some land is 3.35 ha). Furthermore, 28% of respondents reported that their household is engaged in abunu farming. This means that a considerable proportion of households that own cocoa land are also trying to acquire more land through the abunu system. On average, Ghanaian cocoa households have 0.78 hectares of cocoa under abunu arrangements. (The average among those doing only abunu 2.82 ha).

In Côte d’Ivoire, cocoa is cultivated on slightly bigger farms (4.17 ha) than in Ghana, with most households reporting cocoa farms of between 2 and 5 ha (Figure 6.2).

Table 6.16 Cocoa land under cocoa, owned, leased, abunu, abusa (ha), by country

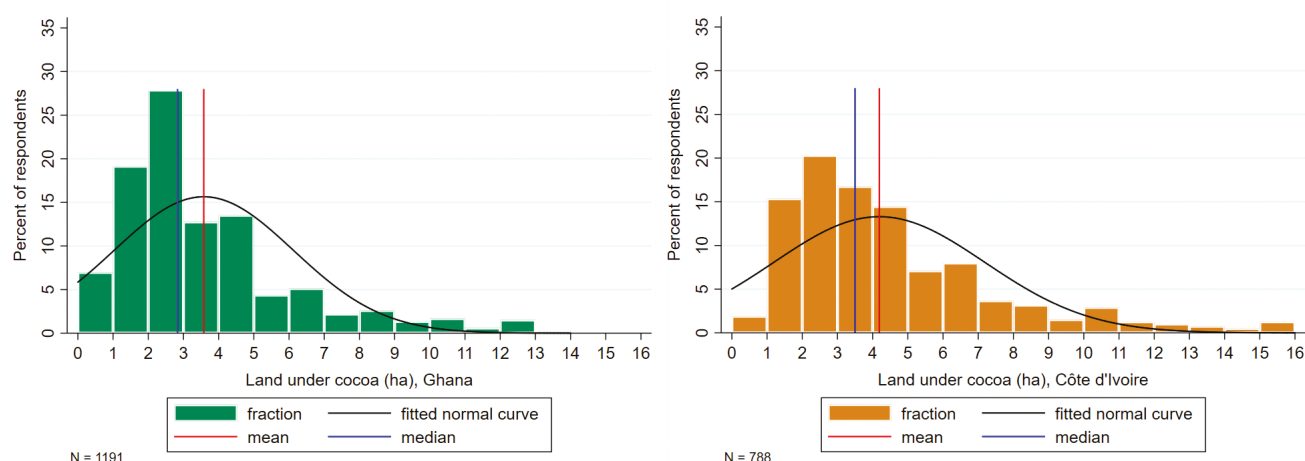
	Ghana	Côte d’Ivoire	pvalue	sig
Land under cocoa (ha)	3.65	4.17	0.00	***
Land under cocoa, with trees older than 5 years (ha)	2.80	3.48	0.00	***
Cocoa land owned (ha)	2.74	3.89	0.00	***
Cocoa land leased (ha)	0.02	0.01	0.42	
Cocoa land abunu (ha)	0.78	0.01	0.00	***
Cocoa land abusa (ha)	0.09	0.08	0.76	
N	1,199	787		

Note: N is given for the category ‘land under cocoa (ha)’. The N for some categories may slightly differ by a few respondents.

Table 6.17 Land, proportion of cocoa households owning, leasing, abunu, abusa, by country

	Ghana	Côte d’Ivoire	pvalue	sig
Cocoa land owned	82%	99%	0.00	***
Cocoa land leased	1%	1%	0.38	
Cocoa land abunu	28%	0%	0.00	***
Cocoa land abusa	3%	2%	0.85	
N	1146	753		

Figure 6.8 Distribution of land under cocoa, Ghana and Côte d'Ivoire



Cocoa land was also disaggregated by sex of the household head. In Ghana, we find that male-headed households cultivate more cocoa land (3.77 ha) than female-headed households (3.02 ha) (*highly significant*) (Table 6.18). However, In terms of the average amount of land owned, we find no statistical differences between male and female headed households. (However, of those only who own cocoa land, female headed households own 2.82 ha compared with 3.47 ha for male headed households, *highly significant*). One reason for the difference in cocoa land cultivated is the proportion of female (19%) and male (29%) headed households who do abunu farming (*highly significant*).

In Côte d'Ivoire, we find no statistical differences between male and female headed households because the sample size of female headed households is too small. This is due to a combination of factors – There are proportionally fewer female headed households in our Ivoirian sample than in our Ghanaian sample, fewer female-headed households opt to produce cocoa in Côte d'Ivoire, and also because a higher proportion of female respondents reported that they didn't know their land size.

Table 6.18 Cocoa land under cocoa, owned, leased, abunu, abusa (ha), by sex of household head

	Ghana female head	Ghana male head	pvalue	sig	Côte d'Ivoire female head	Côte d'Ivoire male head	pvalue	sig
Land under cocoa (ha)	3.02	3.77	0.00	***	3.45	4.21	0.14	
Land under cocoa, with trees older than 5 years (ha)	2.27	2.90	0.00	***	2.88	3.51	0.19	
Cocoa land owned (ha)	2.53	2.79	0.23		3.27	3.92	0.17	
Cocoa land leased (ha)	0.02	0.02	0.99		0.00	0.01	0.71	
Cocoa land abunu (ha)	0.38	0.86	0.00	***	0.00	0.01	0.72	
Cocoa land abusu (ha)	0.08	0.09	0.82		0.00	0.08	0.44	
N	200	1,005			35	738		

Note: N is given for the category 'land under cocoa (ha)'. The N for some categories may slightly differ by a few respondents.

6.4.2 Cocoa land – regression analysis

A regression analysis was conducted on determinants of cocoa land, adding a further layer of robustness to the descriptive data presented above.

For Ghana, Table 6.19 supports the above findings. Households in the Western Region cultivate more cocoa and own more land under cocoa than other regions. Female headed households cultivate a little less cocoa land than male headed households, but there is no statistically significant difference in the amount of land that they own under cocoa. Female headed household do have less cocoa land under abunu arrangements. There is no statistical difference between migrant and autochthonous households regarding the amount of cocoa land cultivated. However, migrants own a little less land and make up this difference through abunu arrangements. Other variables have either a weak effect or are not significant.

Table 6.19 Cocoa land, regression analysis of cocoa land cultivated, owned, under abunu, Ghana (ha)

	Land under cocoa (ha)	Cocoa land own (ha)	Abunu land (ha), if abunu
Head: Sex: female	-0.60 (0.21)***	-0.23 (0.21)	-0.92 (0.34)***
Region: Central	-0.37 (0.38)	0.00 (0.38)	-0.70 (0.49)
Region: Brong Ahafo	0.42 (0.26)	0.44 (0.27)*	0.80 (0.42)*
Region: Western	0.61 (0.22)***	0.81 (0.22)***	0.07 (0.32)
Region: Eastern	-0.22 (0.24)	-0.57 (0.24)**	0.34 (0.32)
Age Group (head): 26-35	0.05 (0.65)	0.18 (0.64)	-0.53 (0.70)
Age Group (head): 36-45	0.45 (0.62)	0.59 (0.61)	-0.48 (0.67)
Age Group (head): 46-55	0.31 (0.62)	0.96 (0.61)	-1.13 (0.68)*
Age Group (head): 56-65	0.88 (0.62)	1.63 (0.61)***	-0.60 (0.69)
Age Group (head): 66-older	0.62 (0.63)	1.57 (0.62)**	-0.56 (0.74)
Migrant: yes	0.11 (0.18)	-0.82 (0.18)***	0.57 (0.24)**
Number of household members living in the compound	0.08 (0.03)**	0.05 (0.03)	0.00 (0.04)
Household is member of a farmer group: yes	0.47 (0.25)*	0.27 (0.26)	-0.59 (0.33)*
Leader: yes	0.26 (0.17)	0.29 (0.17)*	0.09 (0.24)
Constant	2.40 (0.65)***	1.27 (0.63)**	3.26 (0.71)***
N	1,189	1,136	315
R ²	0.05	0.08	0.11

For Côte d'Ivoire, Table 6.20 presents few significant determinants. As with all land, the analysis suggests that female headed households produce cocoa on less land than male headed households. However, this finding is not particularly robust due to the very small sample size of female headed households who grow cocoa in Côte d'Ivoire (as discussed earlier). Migrants cultivate a little over half a hectare more cocoa than autochthonous households. We also see a positive relationship between the number of members in the household and the amount of cocoa land cultivated, but we suggest that this finding is not of importance because the effect size is so weak.

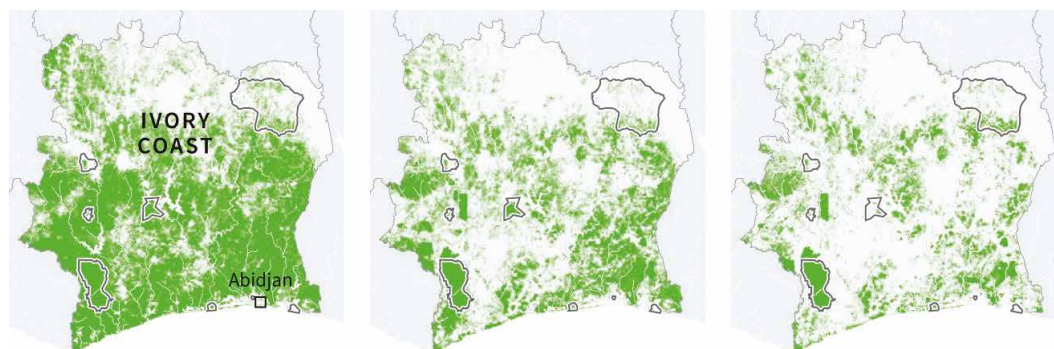
Table 6.20 Cocoa land, regression analysis of cocoa land cultivated, owned, Côte d'Ivoire (ha)

	Land under cocoa (ha)	Cocoa land own (ha)
Head: Sex: female	-1.31 (0.54)**	-1.10 (0.50)**
Region: Lacs	0.76 (1.18)	0.63 (1.07)
Region: Montagnes	1.11 (1.20)	0.92 (1.09)
Region: Bas-Sassandra	1.41 (1.19)	0.95 (1.08)
Region: Goh-Djiboua	0.82 (1.19)	0.79 (1.09)
Region: Zanzan	1.46 (1.30)	1.25 (1.19)
Region: Sassandra-Marahoue	0.32 (1.17)	0.35 (1.06)
Region: Comoe	1.83 (1.21)	1.32 (1.10)
Region: Lagunes	3.27 (1.19)***	2.93 (1.09)***
Age Group (head): 26-35	0.20 (0.79)	0.25 (0.73)
Age Group (head): 36-45	0.55 (0.78)	0.74 (0.72)
Age Group (head): 46-55	0.60 (0.79)	0.99 (0.72)
Age Group (head): 56-65	0.71 (0.79)	0.96 (0.73)
Age Group (head): 66-older	0.92 (0.83)	1.11 (0.76)
Migrant: yes	0.62 (0.29)**	0.50 (0.27)*
Number of household members living in the compound	0.13 (0.03)***	0.11 (0.03)***
Household is member of a farmer group: yes	0.26 (0.26)	0.35 (0.24)
Leader: yes	-0.04 (0.23)	-0.06 (0.21)
Constant	1.43 (1.39)	1.32 (1.27)
N	725	697
R ²	0.14	0.13

6.4.3 Cocoa land expansion

Cocoa production is a contributor to deforestation in Ghana and Côte d'Ivoire.⁷⁷ Recent study shows that many protected areas have been cleared mainly for cocoa growing operations, and there is a risk both countries will lose all of their forest in coming decades if no action is taken.⁷⁸

Map 6.1 Forest cover in Côte d'Ivoire, 1990–2015⁷⁹



Note: Map shows any surface 1 hectare or more with a tree canopy density of at least 30 percent.

Cutting fertile forest and bush land is still the most common way for farmers to increase their cocoa production. Studies have offered a number of reasons for this, such weak laws and enforcement, weak legal systems, and government policies promoting cocoa production.⁸⁰ Other studies have suggested that smallholder farmers open up new land due to their inability to increase productivity on existing land due to factors such as aging cocoa trees, insufficient use of inputs (mainly fertiliser), declining soil fertility, and the high incidence of pests and diseases.⁸¹

In our household survey, respondents were asked if their household's land under cocoa had changed in the past five years. A fairly high proportion of respondents in Ghana (46%) and in Côte d'Ivoire (35%) reported that their household had increased the amount of land under cocoa (*highly significant*). Very few respondents reported decreasing their land under cocoa in either Ghana (5%) or Côte d'Ivoire (7%) (Table 6.21).

This is concerning because most respondents in Ghana (84%) and Côte d'Ivoire (66%) who increased their land under cocoa did so not by converting land under other

⁷⁷ Fountain, A.C. and Hütz-Adams, F. (2015) Cocoa Barometer 2015-USA Edition. Available at http://www.cocoabarometer.org/International_files/Cocoa%20Barometer%202015%20USA.pdf

⁷⁸ Higonnet, E., Bellantonio, M., Hurowitz, G. (2017) Chocolate Dark's Secret. How the cocoa industry destroys national parks. Mighty. Available at http://www.mightyearth.org/wp-content/uploads/2017/09/chocolates_dark_secret_english_web.pdf

⁷⁹ Cabrera, G. Ivory Coast's Deforestation. MapHubs Forest. Available at <https://www.reuters.com/article/us-cocoa-sustainability-forests/explainer-plans-to-end-cocoa-deforestation-face-multiple-hurdles-idUSKBN1HQ1V3>

⁸⁰ Kroeger, A., Bakhtary, H., Haupt, F., Streck, C. (2017). Eliminating Deforestation from the Cocoa Supply Chain. World Bank, Washington, DC. World Bank. Available at <https://openknowledge.worldbank.org/handle/10986/26549>

⁸¹ Wessel, M., & Quist-Wessel, P. F. (2015). Cocoa production in West Africa, a review and analysis of recent developments. NJAS-Wageningen Journal of Life Sciences, 74, 1-7. Available at https://www.researchgate.net/publication/282316360_Cocoa_production_in_West_Africa_a_review_and_analysis_of_recent_developments

crops, but by clearing bush or a natural area (Table 6.22). This could be considered rational economic behaviour. Forestland typically has good soil fertility, and the household doesn't lose income (or the value of food crops) from conversion. Planting cocoa may also allow the household to strengthen their tenure claims over the land in a context of increasing land scarcity. Deforestation will be extremely difficult, if not impossible, to reverse. It would also be a concern if the lagged effect of high rates of planting drives future supply faster than demand. A structural surplus on the world market would inevitably depress prices. We discuss this further in the chapter on marketing and prices.

Table 6.21 Cocoa, percent of households who increased or decreased land under cocoa compared with 5 years ago, by country

	Ghana	Côte d'Ivoire	pvalue	sig
Increased land under cocoa	46%	35%	0.00	***
Decreased land under cocoa	5%	7%		
No change	49%	52%		
Not done for 5 years (new farmer)	0%	5%		
N	1,298	880		
cocoa_land_incdecnc_5ago				

Table 6.22 Cocoa, how did the household increase the amount of land under cocoa, by country

	Ghana	Côte d'Ivoire	pvalue	sig
Cleared bush/natural area	84%	66%	0.00	***
Converted crop or pasture land	10%	15%		
Purchased land	2%	2%		
Inherited	2%	12%		
Other	1%	2%		
Abunu/abusa	0%	3%		
N	591	312		
cocoa_land_inc_how_5ago				

Note: Table is of those who responded that their household had increased land under cocoa

6.4.4 Cocoa tree ages

In the household survey, respondents were asked about their household's experience growing cocoa. In Ghana, we find that most households have been producing cocoa for less than 25 years (often given as the end of peak cocoa productivity). In Côte d'Ivoire, cocoa farmers have a fairly similar experience profile as those in Ghana (Table 6.23).

Table 6.23 Cocoa experience, number of years the household has been growing cocoa, by country

	Ghana	Côte d'Ivoire	pvalue	sig
1-5 years	6%	5%	0.00	***
6-10 years	21%	20%		
11-15 years	22%	16%		
16-20 years	16%	15%		
20-24 years	10%	9%		
More than 25 years	25%	35%		
N	1,318	909		
cocoa_years				

Note: p-value from a Chi-squared test

Cocoa trees start to become productive after three to five years depending on whether the variety is a hybrid and whether or not fertilizer is used. Trees are fully matured within about eight years and can maintain good yields until they are approximately 25 years old. Thereafter productivity begins to drop off, however trees can remain somewhat productive for 40 years.⁸²

In our household survey, the mean age of cocoa trees was found to be 14 years in Ghana and 16 years in Côte d'Ivoire (Table 6.24). We note that this is a younger average age than some other studies. For example, Kolavalli et al. (2016)⁸³ report an average age of 20.29 years in Ghana. Three recent studies in Côte d'Ivoire report the average age of trees at between 22 and 25 years.^{84,85,86} We have a hypothesis for this difference. In our study, we asked “How many years old are *most* of your cocoa trees?” and then averaged observations across the sample. This is not quite the same as asking “On average how old are your trees?”, which is what commonly gets asked in most studies. The problem with the latter is that the enumerator (or respondent) typically gives an average age of different *plots* of cocoa trees (or patches thereof) rather than an average of all the *trees*. For example, if a farmer had two plots of cocoa trees and one was a small plot of 30 year old trees and the other was a large plot of 10 year old trees, the enumerator typically records 20 years as the average, even though the average of all the trees in both the plots would be nearer to 10 years.

⁸² Assiri, A. A., Yoro, G.R., Deheuvels, O., Kébé, B.I., Keli, Z.J., Adiko, A., Assa, A. (2009). Les caractéristiques agronomiques des vergers de cacaoyer (# Theobroma cacao# L.) en Côte d'Ivoire. Journal of animal and plant sciences, 2(1), 55-66. Available at http://publications.cirad.fr/une_notice.php?dk=555828

⁸³ Kolavalli, S., Vigneri, M., Gockowski, J. (2016). The Cocoa Coast: the board managed cocoa sector in Ghana. Ghana strategy support program, International Food Policy Research Institute (IFPRI). Available at <http://www.ifpri.org/publication/cocoa-coast-board-managed-cocoa-sector-ghana-synopsis>

⁸⁴ Tano, M.A. (2012). Crise cacaoyère et stratégies des producteurs de la sous-préfecture de Meadji au sud-ouest ivoirien (Doctoral dissertation, Université Toulouse le Mirail-Toulouse II). Available at <https://tel.archives-ouvertes.fr/tel-00713662/document>

⁸⁵ Vigneri, M. and Serra, R. (2016). Researching the Impact of Increased Cocoa Yields on the Labour Market and Child Labour Risk in Ghana and Côte d'Ivoire. ICI Labour market research study. Available at: http://www.cocoainitiative.org/wp-content/uploads/2016/12/market_research_full_web.pdf

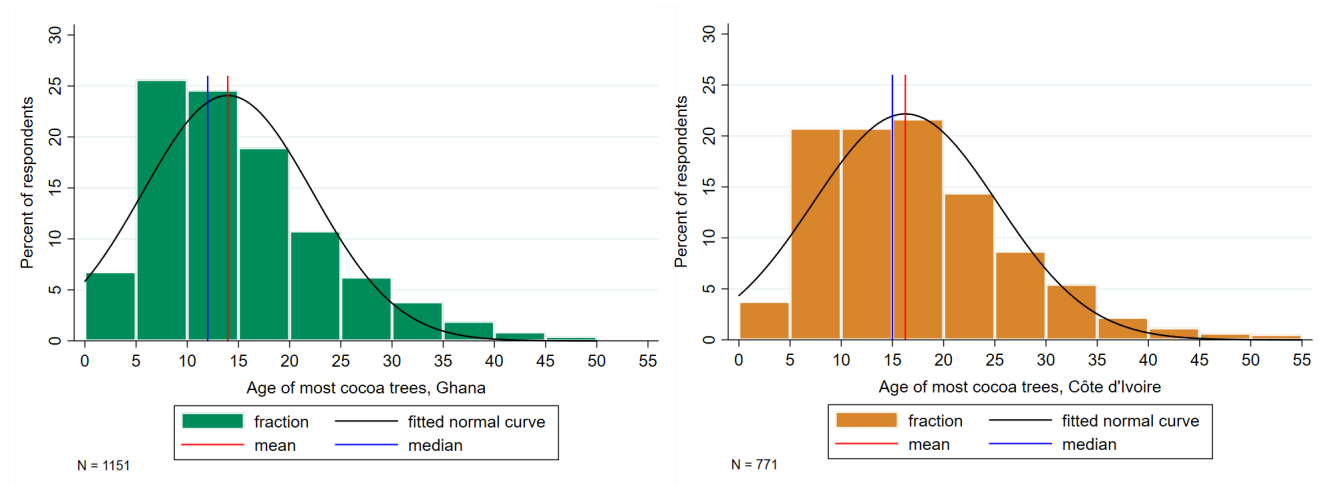
⁸⁶ Barry Callebaut. (2017). Cocoa Farmers in Côte d'Ivoire continue to live in poverty. Press release. Available at <https://www.barry-callebaut.com/news/2017/02/cocoa-farmers-cote-divoire-continue-live-poverty>

Table 6.24 Mean age of most cocoa trees on a farm (years), by country

	Ghana	Côte d'Ivoire	pvalue	sig
mean	14.21	16.21	0.00	***
std.error	0.26	0.32		
N	1,159	770		
cocoa_trees_most				

Note: p-value from a one-way ANOVA test. The question was asked, 'how many years old are most of your cocoa trees?'

Figure 6.9 Mean age of most cocoa trees on a farm in Ghana and Côte d'Ivoire (years)



To understand in more detail the age of trees for each household, respondents were asked to estimate the amount of land they had with trees i) younger than 5 years, ii) 5-25 years iii) more than 25 years old (Table 6.25).

A remarkably high proportion of cocoa households in Ghana (71%) and Côte d'Ivoire (48%) reported having at least some trees younger than 5 years old⁸⁷ (Table 6.25), which further suggests that future cocoa supply is likely to continue increasing. As expected, most land is under cocoa of productive age (5-25 years), with roughly equal amounts of young and older cocoa phasing in and phasing out (Table 6.25).

Table 6.25 Cocoa, mean land size under cocoa with trees of different ages (ha), by country

	Ghana	Côte d'Ivoire	pvalue	sig
Trees 5 years or younger (ha)	0.86	0.70	0.00	***
Trees 5-25 years old (ha)	2.29	2.64	0.00	***
Trees more than 25 years old (ha)	0.51	0.84	0.00	***
N	1,189	781		
cocoa_trees_age_5yo_ha				
cocoa_trees_age_5_25yo_ha				
cocoa_trees_age_25yo_ha				

Note: p-value from a one-way ANOVA test

⁸⁷ This is supported by a later finding in our 'production activities' block of questions. In Ghana, 52% of respondents reported planting at least some cocoa just last year, with a further 32% in Côte d'Ivoire saying the same.

6.4.5 Cocoa varieties

The main cocoa varieties are Criollo, Forastero and Trinitario. As a generalisation, Criollo and Trinitario trees produce fine or flavour cocoa beans, while bulk cocoa beans come from Forastero trees.⁸⁸ Only 5% of the world's production is fine or flavour cocoa. Farmers and researchers, sometimes use different names for cocoa varieties, leading to confusion. Box 6.1 explains the different cocoa varieties.

Box 6.1 Explanation of different cocoa varieties

The most commonly grown cocoa tree is Forastero. It is most likely native to the Amazon basin. Today, Forastero is mainly grown in Africa, Brazil and Ecuador. This variety is hardier and more resistant to diseases and is said to have a much higher yield than the Criollo variety. Forastero cocoa has purple-coloured beans and is mainly used to give chocolate its full-bodied flavour. There are many Forastero subspecies: for example, Amelonado, Cundeamor and Calabacillo. Amelonado cocoa is the most extensively planted cocoa of all.

Trinitario is a natural hybrid biological class resulting from cross-pollination. Trinitario combines the best of the two other main varieties: the hardiness and high yield of Forastero and the refined taste of Criollo. The quality of the cocoa varies between average and superior. It is the predominant fine flavour cocoa. Trinitario populations are usually variable in pod and bean characteristics because the parents have highly contrasting characters. They can now be found in all the countries where Criollo cocoa was once grown: Colombia, Mexico, Venezuela, the Caribbean islands, in parts of Southeast Asia,⁸⁹ and many more.

In Ghana and Côte d'Ivoire, 'Amazonia' is referred to as one of the cocoa varieties. Amazonia is a sub-species of Forastero, whose origins can be traced back to planting materials collected in 1944 and distributed to the West African Cocoa Research Institute headquarters in Tafo, Ghana and Ibadan in Nigeria. These were widely distributed and second and third generations of Amazon known as 'F3 Amazon' or 'Mixed Amazon' were also later developed by the early 1960s.

In Côte d'Ivoire, this variety is also known as 'Ghana variety'.⁹⁰ Tetteh Quarshie is the oldest variety still in production in Ghana. The variety is named after the Ghanaian agriculturalist who introduced cocoa to Ghana. The pods introduced by Tetteh Quarshie are of the Amelonado variety, which is a Forastero sub-species.⁹¹ In Côte d'Ivoire, 'Cacao Français' is another variety that is often referred to, which is an Amelonado type with some Trinitario germplasm.⁹²

⁸⁸ ICCO (2017) Fine or flavor cocoa. Last updates January 2017. Available at <https://www.icco.org/about-cocoa/fine-or-flavour-cocoa.html>

⁸⁹ Barry Callebaut. (n.d). Theobroma cacao, the food of the gods. Available at <https://www.barry-callebaut.com/about-us/media/press-kit/history-chocolate/theobroma-cacao-food-gods>

⁹⁰ Pokou, N., N'Goran, J., Eskes, A., Sangaré, A. (2009). Cocoa farm survey in Côte d'Ivoire. In International Workshop on Cocoa Breeding for Farmers' Needs.

⁹¹ Aikpokpodion, P.O. (2012). Defining Genetic Diversity in the Chocolate Tree, *Theobroma cacao* L. Grown in West and Central Africa, Genetic Diversity in Plants, Prof. Mahmut Caliskan (Ed.), ISBN: 978-953-51-0185-7, InTech, Available from: <http://www.intechopen.com/books/genetic-diversity-in-plants/defining-geneticdiversity-in-the-chocolate-tree-theobroma-cacao-l-grown-in-west-and-central-africa>

⁹² Pokou, N., N'Goran, J., Eskes, A., & Sangaré, A. (2009). Cocoa farm survey in Côte d'Ivoire. In International Workshop on Cocoa Breeding for Farmers' Needs.

Forastero is the most widely used cocoa variety. Both Ghana and Côte d'Ivoire produce mainly varieties which are a Forastero sub-species. To improve productivity and precocity of production, hybrid varieties have been introduced.

In Ghana, the Seed Production Division (SPD), a subsidiary of the Ghana Cocoa Board (COCOBOD), is charged with producing and distributing seedlings to farmers.⁹³ In Ghana, hybrid cocoa seed pods are crosses between Amelonado and upper Amazon clones, both sub-species of Forastero, produced through hand pollination.⁹⁴ Since 2015, these hybrid cocoa seedlings and the pods are freely distributed to farmers.⁹⁵

In Côte d'Ivoire, the Centre National de Recherche Agronomique (CNRA) developed another new hybrid called 'Cocoa Mercedes'.⁹⁶ 'Cocoa Mercedes' was introduced and extensively promoted and freely distributed by the Conseil du Café-Cacao (CCC), and Nestlé.

In Ghana and Côte d'Ivoire, raising clones and seedlings is heavily promoted, and less focus is put on (side) grafting as rehabilitation strategy.⁹⁷ This despite some reported downsides of the hybrid seeds and seedlings. For example, hybrid varieties require more care, including more harvesting rounds, which can interfere with other activities such as the production of other crops or trading responsibilities.⁹⁸ According to another study, hybrid seeds deplete soil nutrients faster if not accompanied by fertiliser. Furthermore, hybrid seeds tend to have shorter production cycles because of the physiological stress in producing higher yields.⁹⁹ A recent study states that the success of hybrids is highly dependent on the conditions under which it is grown, including the weather.¹⁰⁰

In our study, we find in Ghana the most common variety to be 'hybrid' (66%) followed by 'Amazonia' (42%). Tetteh Quarshie is reportedly produced by 15% of respondents. In Côte d'Ivoire, the most frequently reported variety was 'Amazonia' (45%) (sometimes called 'Ghana variety'). 'Cacao Français' is produced by a further 19% of households in Côte d'Ivoire (Table 6.26).

⁹³ <https://cocobod.gh/oursubsidiaries.php>

⁹⁴ Kolavalli, S., Vigneri, M. & Gockowski, J. (2016). The Cocoa Coast: the board managed cocoa sector in Ghana. Ghana strategy support program, International Food Policy Research Institute (IFPRI). Available at <http://www.ifpri.org/publication/cocoa-coast-board-managed-cocoa-sector-ghana>

⁹⁵ Ghanaweb. (2015). COCOBOD distributes seedlings to farmers. Available at <https://www.ghanaweb.com/GhanaHomePage/business/COCOBOD-distributes-seedlings-to-farmers-355130>

⁹⁶ Yapo, K. D., Ouffoue, S. K., N'guessan, B. R., Okpekon, T. A., Dade, J., Say, M., & Kouakou, T.H. (2014). Contrôle de la qualité par la détermination de métaux lourds dans une nouvelle variété de cacao (cacao mercedes) en Côte d'Ivoire. Journal de la Société Ouest- Africaine de Chimie, 37, 56. Available at http://www.soachim.org/files/volume_37/8-KD%20Yapo%20et%20al%20Vol%20037%202014%2056-64.pdf

⁹⁷ Brako, D.E. (2015) Farmers' Willingness to Pay for Cocoa Grafting in the Eastern Region of Ghana. Thesis. Departement of Agricultural Economics and Agribusiness, School of Agriculture, College of Basic and Applied Sciences, University of Ghana, Legon. Available at http://ugspace.ug.edu.gh/bitstream/handle/123456789/8107/DOMP%20ERICH%20BRACO_FARMERS%E2%80%99WILLINGNESS%20TO%20PAY%20FOR%20COCOA%20GRAFTING-2015.pdf?sequence=1

⁹⁸ Asante-Poku A., Angelucci F. (2013). Analysis of incentives and disincentives for cocoa in Ghana. Technical notes series, MAFAP, FAO, Rome. Available at <http://www.fao.org/3/a-at551e.pdf>

⁹⁹ Victor, A., Gockowski, J., Agyeman, N., Dziwornu, K. (2010). Economic cost-benefit analysis of certified sustainable cocoa production in Ghana. Available at <https://pdfs.semanticscholar.org/72cc/ce52ecb5a7f894008ea7a547c15ba0df520d.pdf>

¹⁰⁰ Wessel, M., & Quist-Wessel, P. F. (2015). Cocoa production in West Africa, a review and analysis of recent developments. NJAS-Wageningen Journal of Life Sciences, 74, 1-7. Available at <https://doi.org/10.1016/j.njas.2015.09.001>

Table 6.26 Cocoa, varieties, by country

Variety	Ghana	Côte d'Ivoire	pvalue	sig
Tetteh Quarshie	15%	0%	0.00	***
Amazonia (Ghana)	42%	45%	0.10	
Hybrid	66%	7%	0.00	***
Hybride (2nd generation, (Mercédes)	0%	5%	0.00	***
French (Cacao Français)	0%	19%	0.00	***
Tout venant	0%	12%	0.00	***
Other	0%	1%	0.02	**
Don't know	3%	4%	0.07	*

6.5 Summary

Land tenure arrangements in both Ghana and Côte d'Ivoire are rooted in the countries' histories, and have undergone several attempts at reform. In Ghana, the customary system has remained dominant, while in Côte d'Ivoire a shift occurred from communal property to private property. Regardless, a high proportion of households in both countries consider that they 'own' their land. In focus group discussions, there were no reports that participants considered their land ownership to be insecure in either country.

In both Ghana and Côte d'Ivoire, land is becoming scarcer. Focus group participants offer a range of reasons why scarcity is increasing, including a growing population, immigration and other economic activities competing for agricultural land. In the future, access to land in cocoa growing areas is expected to become more difficult still due to population growth. Climate change and desertification are expected to affect marginal lands disproportionately. We note that land scarcity is not a phenomena specific to cocoa growing areas in Ghana and in Côte d'Ivoire, but rather a frequently expressed concern throughout much of sub-Saharan Africa.

However, land scarcity does not appear to be near a crisis point. Although land is harder to come by and is now more expensive, respondents in both countries reported owning and cultivating much larger farms than those typically reported by smallholders in East Africa, where we have conducted many other studies. We also find that households still have a fair amount of fallow land at their disposal in both Ghana (0.76 ha) and Côte d'Ivoire (2.74 ha).

Ivoirian households cultivate all their crops on larger plots of land (5.36 ha) than Ghanaian households (4.77 ha). In addition, Ivorian households have a greater number of land plots (3.3) on which they cultivate crops than Ghanaian households (2.58).

Most households in both Ghana (86%) and Côte d'Ivoire (98%) reported owning at least some land. In Ghana, the average amount of land owned is 4 ha, compared with nearly 8 ha in Côte d'Ivoire.

In both Ghana and Côte d'Ivoire, cocoa households own more land than non-cocoa households. In Ghana, cocoa households own an average of 4.30 ha, compared to 3.30 ha for non-cocoa households. In Côte d'Ivoire, cocoa households owned an average of 8.48 ha, compared to 6.92 ha for non-cocoa households. We hypothesize that this is a two-way relationship – a larger land holding makes it easier to allocate some land for cocoa, and good income from cocoa makes it easier for farmers to invest in more land (including via abunu arrangements).

Female-headed households typically own land, contrary to some narratives. In Ghana, an even higher proportion of female headed households (91%) reported owning land than male headed households (85%). In Côte d'Ivoire, virtually all male and female headed households said they own some land. These findings may suggest that female headed households' access to land is changing, possibly due to legislative changes (e.g. regarding inheritance) and enforcement of women's rights. These findings should not be interpreted more broadly in terms of 'female land ownership'. We are unsure about the extent to which any changes also apply to married women in male headed households.

However, female headed households still own less land than male headed households on average. In Ghana female-headed households own a little less land on average (3.49 ha), compared with male-headed households (4.19 ha). The disparity in Côte d'Ivoire is greater, with 4.54 ha for female headed households, compared with male headed households owning 8.16 ha.

Migrant households in Ghana cultivate approximately the same amount of land as autochthonous households, on average. However, a higher proportion of autochthonous households (91%) own land than migrant households (71%). Migrant households compensate by undertaking abunu arrangements more frequently (45%) than autochthonous households (26%).

Virtually all migrant and autochthonous households in Côte d'Ivoire own some land, and both groups own considerably more land than Ghanaian households. Ivorian migrants own about 1 ha less land than autochthonous households. Ivorian migrant households appear to compensate by cultivating a higher proportion of their own land and leaving a smaller proportion fallow. As a result, migrants in Côte d'Ivoire actually cultivate all their crops on a little more land than autochthonous households.

In terms of land under cocoa, Ghanaian households reported cultivating cocoa on an average of 3.65 ha, with the majority cultivating between 2 ha and 5 ha. Most respondents

said that their household ‘owns’ the cocoa land (82%) with a further 28% reporting that their household is engaged in abunu farming. This means that a considerable proportion of households that own cocoa land are also trying to acquire more land through the abunu system. On average, Ghanaian cocoa households have 0.78 hectares of cocoa under abunu arrangements. (The average of only those doing abunu is 2.82 ha).

Ivorian households have slightly bigger cocoa farms (4.17 ha) than in Ghana, with most households reporting cocoa farms of between 2 and 5 ha. In Côte d’Ivoire, virtually all respondents said that their household ‘owns’ the cocoa land.

In Ghana, male-headed households cultivate a little more cocoa land (3.77 ha) than female-headed households (3.02 ha). However, a higher proportion of female headed households (90%) own some cocoa land than male headed households. We find no statistical difference in the mean amount of cocoa land owned by each group. One reason for the difference in mean cocoa land cultivated has to do with the proportion of male headed (29%) and female headed (19%) households who do abunu farming. In Côte d’Ivoire, we find no statistical differences between male and female headed households because the sample size of female headed households producing cocoa is too small.

Cocoa production is contributing to deforestation in Ghana and Côte d’Ivoire. A fairly high proportion of respondents in Ghana (46%) and in Côte d’Ivoire (35%) reported that their household had increased the amount of land under cocoa in the past five years, with very few reportedly decreasing their land under cocoa. It is concerning that most respondents in Ghana (84%) and Côte d’Ivoire (66%) did so not by clearing bush or a natural area, rather than by converting land under other crops. This is rational economic behaviour – newly cleared land typically has good soil fertility for productive cocoa. Some households may even expand cocoa plantations primarily to strengthen their tenure claims in a context of increasing land scarcity. Based on focus group responses, we believe that this is also driven by generally strong cocoa prices in recent years. We are unsure whether or not the scale of planting could lead to supply outpacing global demand when the cocoa matures in the coming years. A structural surplus on the world market would inevitably depress prices.

The average age of cocoa trees in Ghana was 14 years and in Côte d’Ivoire 16 years. A high proportion of cocoa households in Ghana (71%) and Côte d’Ivoire (48%) reported having at least some trees younger than 5 years old, hinting at an increase in future cocoa supply. As expected, most land is under cocoa of productive age (5-25 years), with roughly the same amount of land with young cocoa phasing in and land with older cocoa phasing out.

‘Hybrid’ cocoa varieties are much more frequently planted in Ghana than in Côte d’Ivoire. This may be explained by support from COCOBOD in Ghana to distribute free or subsidised hybrid cocoa seedlings and pods.