



Cocoa production practices

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8.1 Cocoa production activities

Cocoa households undertake various activities on their cocoa farms throughout the course of the year. Each of these activities requires certain investments in labour and inputs to produce good yields. However, many cocoa households in Ghana and Côte d'Ivoire do not consistently apply good agricultural practices (GAP). GAP typically refers to the use of good planting material, proper shade management, maintaining and improving soil fertility, weed and pest control, and post-harvest management practices.¹ Various manuals are available that provide detailed guidance for adoption of these practices.^{2,3,4}

Households make different choices about the amount of capital and labour they are willing to invest in cocoa production. For instance, those with a good supply of household labour may opt to carry out all production activities, as recommended. Those with less household labour may choose to carry out some activities less thoroughly or not at all, while others may be willing to invest in hired labour to make up the difference. Overall, those households that carry out good agricultural practices generate higher cocoa yields, which results in higher income and allows them to re-invest the following year. This is sometimes described as a 'high input-high output' system. Nevertheless, all investments come with a degree of risk. Poor rains, strong Harmattan winds, pests and diseases are just some of the factors that can affect yields and result in a poor return on investment. Some studies suggest that certain types of farmers - lead farmers, trained farmers, certified farmers and male farmers - are relatively better implementers of GAP than other farmers.^{5,6}

In reality, many households in Ghana and Côte d'Ivoire under-invest in GAP, which leads to a 'low input-low output' system (Figure 8.1). Low yields are typically attributed to low input use, inadequate weeding and farm maintenance, insufficient pest and disease control, poor shade management, low rates of fertiliser use, and the old age of some cocoa farms. Various studies have proposed reasons for low

¹ 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/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/>.

² ICCO (2009). Manual of Best Known Practices in Cocoa Production. Available at https://www.icco.org/about-us/international-cocoa-agreements/cat_view/30-related-documents/32-consultative-board-on-the-world-cocoa-economy.html

³ CCE Certification Capacity Enhancement Sustainable Cocoa Trainers' Manual - For Access to Certification and Increased Productivity - Ghana Version 2.1 - June 2016. Available at https://www.kakaoforum.de/fileadmin/Redaktion/Downloads/Oeffentliche_Downloads/Infomaterial/CCE_Ghana_Curriculum_v2.1_Juni2016.pdf

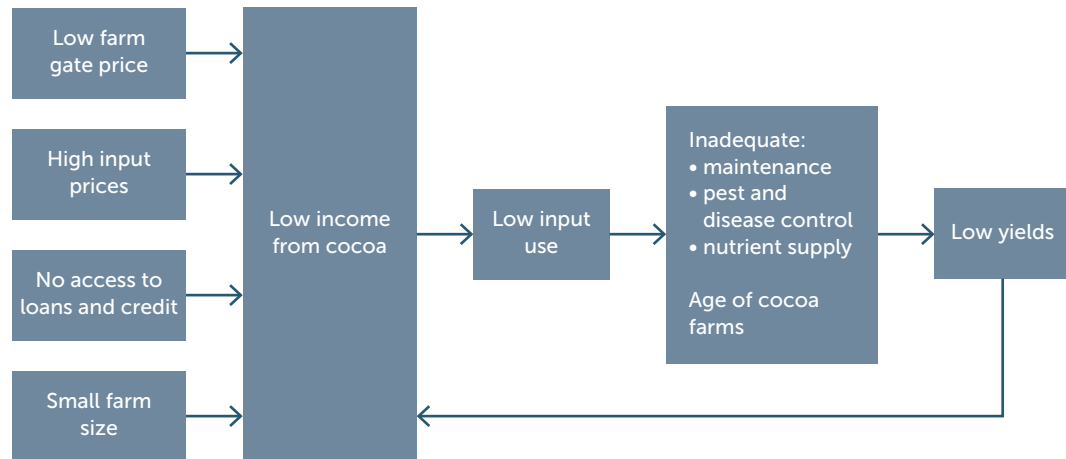
⁴ Roy Bateman (2008-2015). Pesticide Use in Cocoa A Guide for Training Administrative and Research Staff 1st Edition: August 2008 2nd Edition: December 2009 (revised March 2010) 3rd Edition: draft December 2013; revisions finalised September 2015. Available at https://www.icco.org/about-us/international-cocoa-agreements/cat_view/68-icco-workshops-and-seminars/82-sps-africa.html

⁵ 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>

⁶ Maytak, L. (2014). Discussion and Comparison of Farm Level Data Collection Methods for Five Cocoa Studies in Côte d'Ivoire. Washington, Prepared for Cocoa Collaborative Learning Group facilitated by the Sustainable Food Lab: 26.

GAP adoption rates including the availability, cost or timeliness of input supply;^{7,8} household labour constraints and the relatively high cost of hired labour; a lack of farmer knowledge; a lack of savings or credit to make investments;⁹ and, poor availability of equipment for spraying or pruning.^{10,11}

Figure 8.1 Causes of low yield in farmers' cocoa in West Africa¹²



In our household survey, respondents were first asked whether or not a given activity was carried out in the past year, and if so, more detailed questions followed on labour days, input use, and costs.

In Ghana, a relatively high proportion of respondents reported doing land clearing (48%), land preparation (37%), and cocoa planting (52%) in the past year. This suggests that many households are actively expanding or rehabilitating their land with cocoa, which is further supported by our data presented in the Land chapter. The application of granular fertiliser (39%), liquid fertiliser (53%) herbicides (51%) pesticides (88%) and fungicides (74%) was frequently reported by Ghanaian respondents. Virtually all farmers (95%) reported doing at least some weeding. Weeding is a laborious, yet necessary, task to ensure that the cocoa trees are not

⁷ Barrientos, S.W & Asenso Akyere, K. (2008). 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>

⁸ 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://www.gov.uk/dfid-research-outputs/final-report-assessing-the-poverty-impact-of-sustainability-standards-fairtrade-in-ghanaian-cocoa>

⁹ 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/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/>

¹⁰ Pruning is the removal of unwanted branches from a cocoa tree. It is seen as an important operation and can affect yield for months, even years, as well as affecting the shape and structure of the tree for the rest of its life. Insects and diseases multiply more on unpruned cocoa trees with dense canopies than on trees that have been opened up by pruning and display well-aired canopies. Pruning can also stimulate flowering and pod production. Afouakva, E.O. (2014). Cocoa Production and Processing Technology. CRC Press, Taylor & Francis Group, Boca Raton. Available at <https://books.google.nl/books?isbn=1466598239>

¹¹ Barrientos, S.W & Asenso Akyere, K. (2008). 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>

¹² 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>

competing with weeds for nutrients. A relatively high proportion of Ghanaian farmers reported pruning (82%) their trees, which is important for maintaining good yields. As expected, virtually all cocoa households harvested their cocoa, and carried out pod breaking, fermenting and drying of the beans (Table 8.1).

In Côte d'Ivoire, a notable proportion of cocoa households engaged in land clearing (25%), land preparation (27%) and cocoa planting (32%) in the last season, although at lower rates than those reported in Ghana. Ivorian cocoa households reported lower rates of granular fertiliser (16%), liquid fertiliser (6%), herbicide (32%) and fungicide (15%) application. However, a high proportion reported applying pesticides (75%). Most Ivorian farmers engaged in weeding (91%), although a much lower proportion reported pruning their cocoa trees compared with Ghanaian respondents. Virtually all respondents reported harvesting cocoa, with a similar proportion carrying out pod breaking, fermenting and drying activities. Some farmers may not have harvested their cocoa because young cocoa trees had not begun to yield, or because old trees had been abandoned (Table 8.1).

Table 8.1 Cocoa activities, percent of cocoa households doing each activity, by country

	Ghana	Côte d'Ivoire	pvalue	sig
Land clearing	48%	25%	0.00	***
Land preparation	37%	27%	0.00	***
Planting	52%	32%	0.00	***
Granular fertiliser	39%	16%	0.00	***
Liquid fertiliser	53%	6%	0.00	***
Manure	6%	4%	0.19	
Herbicides	51%	32%	0.00	***
Pesticides	88%	75%	0.00	***
Fungicides	74%	15%	0.00	***
Weeding	95%	91%	0.00	***
Pruning	82%	40%	0.00	***
Harvesting	100%	94%	0.00	***
Pod breaking	99%	96%	0.00	***
Fermenting	100%	95%	0.00	***
Transporting	82%	70%	0.00	***
Drying	100%	95%	0.00	***
N	1,318	908		

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

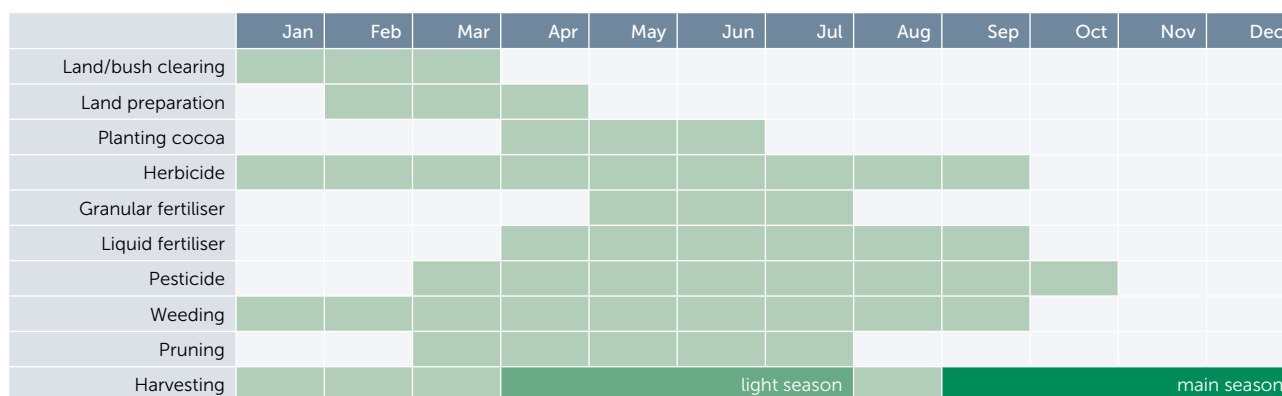
For most cocoa production activities, we find no statistically significant difference between the proportion of male and female-headed cocoa households undertaking the activity. However, a slightly higher proportion of male-headed households (54%) reported applying herbicide than female-headed households (39%) (*highly significant*), using fungicides (male-headed 75%, female-headed 66%, *highly significant*) and doing pruning (male-headed 84%, female-headed 72%, *highly significant*).

In Côte d'Ivoire, the only cocoa activity where we find a statistically significant difference between male and female-headed households is in herbicide application, which was carried out by 33% of male-headed households and only 15% of female-headed households (*highly significant*).

8.2 Timing of cocoa activities

In Ghana, most preparatory activities such as land clearing, land preparation and planting take place in the early part of the year. Inputs are applied at various moments prior to the start of the main cocoa season, and some, such as liquid fertilizer are applied multiple times. Most households weed at least twice. Most respondents report that the main season starts in September (even though it officially begins in October) and runs until the end of December. A smaller proportion of respondents indicated that the main season can run into January. The light season runs from about April to July (although some respondents indicated it began in March, with others reporting it finishing in August). In reality, respondents frequently reported harvesting cocoa outside of the main season, though in comparatively lower quantities (Figure 8.2).

Figure 8.2 Timing of cocoa activities, Ghana



Source: Author's interpretation of survey data on timing of activities. Respondents reported doing some activities throughout the year, peaking at certain times.

In Côte d'Ivoire, most preparatory activities are carried out in the early part of the year, and the timing of input application is similar to that in Ghana. Most Ivorian respondents reported that the main harvest season begins in October, a month later than reported in Ghana. Most respondents also said that the main season ends in January, although some indicated that it can run into February. The light season runs from about April onwards, with no clear end point in the middle of the year. As in Ghana, many Ivorian respondents reported also harvesting smaller volumes of cocoa outside of the main season (Figure 8.3).

Figure 8.3 Timing of cocoa activities, Côte d'Ivoire

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Land/bush clearing												
Land preparation												
Planting cocoa												
Herbicide												
Granular fertiliser												
Liquid fertiliser												
Pesticide												
Weeding												
Pruning												
Harvesting												
	Light season						Main season					

Source: Author's interpretation of survey data on timing of activities. Respondents reported doing some activities throughout the year, peaking at certain times.

8.3 Inputs – fertiliser, herbicide, pesticide and fungicide

Controlling cocoa diseases is a key element of cocoa farm management. Farmers need to be able to recognise the symptoms of a disease, understand the causes and know what treatments to apply.¹³ The major pests in West Africa are reported to be Cocoa Swollen Shoot Virus Disease (CSSVD), mistletoe, capsids (insects) and black pod disease.^{14,15}

In Ghana, the Cocoa Health and Extension Division (CHED) provides free services for fungicide and pesticide application through the Cocoa Disease and Pest Control (CODAPEC). CODAPEC is also tasked with identifying CSSVD outbreaks and countering the spread of disease by uprooting infected trees. CODAPEC's national spraying programme works with spraying gangs, which are formed of selected community members and who are paid by CODAPEC for the amount of land sprayed. The spraying gangs are given free pesticides (to combat capsids) and fungicides (to combat black pod) as well as fuel to perform the spraying tasks. The spraying gangs are supposed to spray each farm four times a year between July and September. The national spraying programme is paid for through deductions made from the 'Free on Board' (FOB) price received by COCOBOD for cocoa sales. Therefore, it may be argued that cocoa producers indirectly pay the costs of the spraying programme through the lower producer price that they receive from

¹³ Bateman, R. (2009) Pesticide Use in Cocoa. A Guide for Training Administrative and Research Staff 1st Edition: August 2008. 2nd Edition: December 2009 (revised March 2010). London: ICCO. Available at https://www.icco.org/sites/sps/documents/manual_icco_2nded_final.pdf

¹⁴ Barrientos, S.W & Asenso Akyere, K. (2008). 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>

¹⁵ N'Guessan, K.F., Kebe, B.I., Aka, A.R., N'Guessan, W.P., Kouakou, K., Tahi, G.M. (2013). Major Pests and Diseases Situations and Damage Assessment. Protocols in Côte d'Ivoire. Integrated Management of Cocoa Pests and Pathogens in Africa project lunch Oak Plaza Hotel, Accra, 15th to 18th April, 2013. Powerpoint presentation, Centre National de Recherche Autonome (CNRA). Available at https://www.icco.org/about-us/international-cocoa-agreements/cat_view/68-icco-workshops-and-seminars/80-pests-and-pathogens-africa-accra-april-2013.html

COCOBOD.¹⁶ The functioning of CODAPEC and the national spraying programme has been assessed in several studies.^{17,18,19,20} Many of these negatively critique the effectiveness, timeliness, and frequency of the spraying programme and the overall impact of the CODAPEC mass spraying programme is unclear. Where CODAPEC has claimed success,²¹ other studies suggest that production increase can be the result of additional private expenditures on spraying or other factors.^{22,23,24,25}

CODAPEC also supports Ghanaian farmers through the Hi-Tech fertiliser distribution programme, which aims to boost cocoa yields.²⁶ To be eligible for free fertiliser, farmers are required to first have their cocoa plantations measured by a CHED field officer.²⁷ Timely fertiliser delivery is important for effective use. Fertiliser needs to be applied before the rainy season so nutrients can be better absorbed by the soil and late application typically results in poorer results. The Cocoa Research Institute Ghana (CRIG) has recommended an application level of 371 kg per ha.²⁸ Like the spraying programmes, the cost of the Hi-Tech programme is deducted from the FOB price received by COCOBOD. Some studies have shown that the Hi-Tech programme has had a positive effect on cocoa yields.²⁹

Ghanaian farmers that do not benefit from the mass spraying or Hi-Tech programmes can buy inputs, either at an input shop, at the market, or from the purchasing clerk. One recent study found that there is a shortage of 'approved' chemical inputs, with most input shops found to be stocking counterfeit chemicals.³⁰ In this study major chemical suppliers voiced their dissatisfaction with the current public input distribution system and are trying to develop direct market strategies.

¹⁶ Laven, A. (2010). *The risks of inclusion: Shifts in governance processes and upgrading opportunities for cocoa farmers in Ghana*. Amsterdam: KIT.

¹⁷ *ibid*

¹⁸ Kumi, E., Daymond, A. (2015). Farmers' Perceptions of the Effectiveness of the Cocoa Disease and Pest Control Programme (CODAPEC) in Ghana and Its Effects on Poverty Reduction. *American Journal of Experimental Agriculture* 7(5): 257-274, 2015, Article no.AJEA.2015.128. Available at http://www.journalrepository.org/media/journals/AJEA_2/2015/Mar/Kumi752015AJEA16388.pdf

¹⁹ Barrientos, S.W & Asenso Akyere, K. (2008). 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>

²⁰ Anang, B. T., Adusei, K., Mintah, E. (2011). Farmers' assessment of benefits and constraints of Ghana's cocoa sector reform. *Current research journal of social sciences*, 3(4), 358-363. Available at http://www.worldcocoafoundation.org/wp-content/uploads/files_mf/anang2011.pdf

²¹ Laven, A. (2010). *The risks of inclusion: Shifts in governance processes and upgrading opportunities for cocoa farmers in Ghana*. Amsterdam: KIT.

²² 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>

²³ Kumi, E., Daymond, A. (2015). Farmers' Perceptions of the Effectiveness of the Cocoa Disease and Pest Control Programme (CODAPEC) in Ghana and Its Effects on Poverty Reduction. *American Journal of Experimental Agriculture* 7(5): 257-274, 2015, Article no.AJEA.2015.128. Available at http://www.journalrepository.org/media/journals/AJEA_2/2015/Mar/Kumi752015AJEA16388.pdf

²⁴ Laven, A. (2010). *The risks of inclusion: Shifts in governance processes and upgrading opportunities for cocoa farmers in Ghana*. Amsterdam: KIT.

²⁵ Barrientos, S.W & Asenso Akyere, K. (2008). 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>

²⁶ Baah, F., & Anchirinah, V. (2010). Looking for convergence: Stakeholders' perceptions of cocoa extension constraints in Ghana. *Journal of Science and Technology (Ghana)*, 30(3). Available at <https://www.ajol.info/index.php/just/article/download/64626/52401>

²⁷ Steijn, C. (2016). Towards sustainable cocoa production: a mixed method assessment of the influence of local governance modes on the farm level impact of private cocoa certification standards in Ghana. Master Thesis Sustainable Development, University of Utrecht, KIT. Amsterdam. Available at <https://dspace.library.uu.nl/bitstream/handle/1874/337181/Steijn%205572940%20master%20thesis%20final.pdf?sequence=2&isAllowed=y>

²⁸ Gockowski, J., Sonwa, D. (2010). Cocoa Intensification Scenarios and Their Predicted Impact on CO₂ Emissions, Biodiversity Conservation, and Rural Livelihoods in the Guinea Rain Forest of West Africa. *Environmental Management*, DOI 10.1007/s00267-010-9602-3. Available at http://www.worldcocoafoundation.org/wp-content/uploads/files_mf/gockowski2010.pdf

²⁹ Kolavelli *et al.*, 2016 ; Farmers in the Brong Ahafo, Ashanti, and Eastern region that applied fertilisers at the recommended rate reported a mean yield of 619 kg per ha which was, at that time, 381 kg more than the mean yield of farmers that did not use fertiliser. In the Western Region, the yield difference was 239 kg per ha.

³⁰ Laven, A. and Van Heck, P. (2015) Ideation of Small Medium Enterprise (SME) Services in Cocoa Growing Communities in Ghana. M&S, Barry Callebaut, Solidaridad, KIT.

Some studies have shown that there are regional price differences and quality differences for fungicides and pesticides.^{31,32}

In Côte d'Ivoire, input distribution is largely conducted through private channels, and inputs are not provided for free. For instance, fertiliser is mainly accessed through input shops, private spraying gangs, and sometimes through cooperatives.³³ One recent study shows that Ivorian cocoa farmers spend comparatively little on inputs compared with that spent on hired labour.³⁴

8.3.1 Input use

In our household survey, respondents were asked whether or not they used certain inputs on their cocoa farms in the past year, how many times they applied the inputs, the quantity they applied (if known) and whether the inputs were given for free or purchased by the household (Table 8.3).

In Ghana, we find that input use is relatively common among cocoa households. Granular fertiliser was applied by 39% of cocoa households, usually once per year. Most of those who used granular fertiliser were given it for free.

Liquid fertiliser was found to be applied on 53% of Ghanaian cocoa farms. Many of these farms received multiple sprayings, with an average of nearly three times per year. Again, most of those using liquid fertiliser were given it free. A small proportion of farmers are purchasing additional amounts of fertiliser than that provided by COCOBOD.

Ghanaian respondents reported applying herbicides in 51% of cases. Of these, many used herbicides more than once, with an average of two applications per year. Farmers do not receive herbicides for free from COCOBOD programmes, and so all respondents using herbicide purchased these themselves.

Most Ghanaian farmers use pesticides (88%) to cope with pests and diseases on the farm which reduce yields. Of those using pesticides, most sprayed three per year. Just over half of all respondents reported being given some pesticides for free, while two-thirds reported purchasing them. The high proportion of respondents purchasing inputs suggests that they are perceived to be an important productivity boosting input and that the number of free sprayings is perceived to be insufficient to meet farmer needs.

³¹ 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://www.gov.uk/dfid-research-outputs/final-report-assessing-the-poverty-impact-of-sustainability-standards-fairtrade-in-ghanaian-cocoa>

³² 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>

³³ 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.

³⁴ 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/133209052e4238ff6de0f471f1f51abb.pdf/GlobalFood_DP103.pdf

Ghanaian cocoa farmers also frequently report using fungicides (74%). Those who did so applied fungicides twice per year. More respondents reported receiving fungicides for free than any other input. Again, a small proportion of households purchased additional amounts over and above those received for free. Only 12% of Ghanaian cocoa households reported purchasing inputs of any kind on credit.

We find no statistical difference in the proportion of male and female-headed households in Ghana using granular fertiliser, liquid fertiliser or pesticides. We do, however, see small but statistically significant differences in the proportion of female-headed households using herbicides (39%) compared with male-headed households (54%) and a slightly lower proportion of female-headed households using fungicides (66%) compared with male-headed households (75%).

In Côte d'Ivoire, a smaller proportion of respondents report using inputs compared with Ghanaian cocoa farmers. The main reason for this difference is that most Ivorian farmers do not receive any inputs for free.

Granular fertiliser was applied by only 16% of respondents, and only 6% use liquid fertiliser. However, 32% of Ivorian cocoa farmers reported using herbicide, all of whom bought it themselves. Most Ivorian farmers apply pesticides (75%), which are seen to be vital to preventing crop losses. Most Ivorian farmers who use pesticides purchase them themselves, although a substantial proportion also received some pesticides for free. Nevertheless, Ivorian farmers still spray pesticides less frequently than Ghanaian cocoa farmers, averaging two applications per year. Only 15% of Ivorian cocoa farmers reported using fungicides, which is much lower than that reported by Ghanaian farmers. Only 7% of Ivorian cocoa farmers reported purchasing any kind of inputs on credit.

Table 8.2 Percent of cocoa households using inputs, by country

	Ghana	Côte d'Ivoire	pvalue	sig
Granular fertiliser	39%	16%	0.00	***
Liquid fertiliser	53%	6%	0.00	***
Manure	6%	4%	0.19	
Herbicides	51%	32%	0.00	***
Pesticides	88%	75%	0.00	***
Fungicides	74%	15%	0.00	***
N	1,318	908		

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

Table 8.3 Percent of cocoa households given and purchasing inputs (of those using inputs), by country

	Ghana given	Ghana purchased	Côte d'Ivoire given	Côte d'Ivoire purchased
Granular fertiliser	82%	27%	3%	96%
Liquid fertiliser	81%	38%	11%	93%
Herbicide	1%	99%	1%	97%
Pesticide	64%	76%	38%	88%
Fungicide	84%	47%	55%	56%

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

8.3.2 Input services

In focus group discussions, participants were asked about their satisfaction with input services in their area.

In Ghana, the institutional support provided to cocoa farmers by COCOBOD and its departments is greater than that provided to farmers of other crops. Nevertheless, focus group participants were quite critical of CODAPEC, and 9 of the 11 groups expressed low satisfaction with the delivery of services. The main issue was an insufficient supply of inputs, and farmers not receiving all the spraying rounds they need. This finding is in line with previous studies, and is supported by our survey data which shows that many cocoa households do not receive inputs, and those who do so tend to receive fewer applications than recommended.

"We get spraying only once, while they should come 3-4 times a year." (FGD, Central Region, Ghana)

"You need to be registered, show your passbook and be present when inputs are distributed. It doesn't always work well." (FGD, Brong Ahafo, Ghana)

Other complaints included late timing of the spraying, general lack of available spraying equipment, and a lack of maintenance support for the spray machines.

"I don't believe they use the list, they just pick a location and spray that particular area." (FGD, Ashanti Region, Ghana)

"Instead of bringing the chemicals, they keep some for themselves. The selection for hiring sprayers is a bit corrupt." (FGD, Central Region, Ghana)

"They refuse to spray my farm because I did not have money to pay them." (FGD, Central Region, Ghana)

"Sometimes the spraying gangs come with excuses that the machines are spoiled and they want money from the farmers." (FGD, Ashanti Region, Ghana)

"The government doesn't pay the sprayers enough. Sometimes farmers need to pay sprayers something in addition." (FGD, Ashanti Region, Ghana)

Only one community involved in the focus group discussions expressed satisfaction with the spraying services they received, although still they indicated they would like more pesticides and fungicides as the quantities provided were believed to be insufficient. When the current availability of inputs is compared with five years ago, some participants complained that they receive fewer inputs from CODAPEC than before. Participants perceived this to be due to smuggling of inputs to neighbouring countries, or inputs being sold on the black market for profit and therefore not reaching the farmers.

“There were more inputs available and the price was lower five years ago. The government was doing the supply of inputs free of charge. We have a problem of shortage at the moment, most approved chemical are smuggled. It seems the government is not aware of smuggling.” (FGD, Ghana, Western Region)

Ten out of 12 focus groups were also not satisfied with the way fertiliser was being provided by CHED. The most frequent complaints were that fertiliser was supplied in insufficient amounts and too late. Another problem was that not every farmer gets the fertiliser as the farm has to be first measured, and they need to be member of a farmer group.

“If your farm is very far, they don’t come for measurement.” (FGD, Ashanti Region, Ghana)

“They will not tell you when they visit your farm. If you are not around, you will miss out.” (FGD, Brong Ahafo, Ghana)

Some Ghanaian participants indicated that they prefer granular over liquid fertiliser because, it was explained, liquid fertiliser requires the use of a machine, money is needed for fuel and it requires more applications. However, the household survey data collected in this study does not support this view as more Ghanaian cocoa households reported using liquid fertiliser than granular fertiliser (Table 8.2).

Ghanaian focus group participants were also not satisfied with private input suppliers. In 13 communities, input shops were discussed by focus groups. In 12 of the 13 groups, participants said an input shop was present and, in 10 out of 12 cases, participants were not satisfied with the main reason stated that it was due to the lack of input availability, including those products recommended by CRIG. Participants also perceive that input prices in local shops are too high, which is a common complaint in rural value chains across sub-Saharan Africa. Participants said that input prices keep increasing, especially prices of recommended brands. One group blamed rising import prices for increasing prices, while another group claims that the input price correlates with the cocoa price. (This may be an effect of national inflation, which has hovered between 10-20% per annum for most of the last decade, or currency fluctuations). In response to high prices, farmers said they sometimes

switch to cheaper brands, use fewer inputs, or stop using inputs altogether. Inputs sold by private input suppliers are sometimes thought to be counterfeit, or diluted. However, an assessment of input quality would require a separate study to ascertain the extent of the problem. Finally, it was stated that the people that sell the products are not always sufficiently knowledgeable.

“The ones that sell the products do not have technical expertise (they can only sell it). It is better to go to extension officers, they also sell inputs.” (FGD, Ashanti Region, Ghana)

“If the prices were lower, we would buy more.” (FGD, Eastern Region, Ghana)

“It was better 5 years ago concerning the price. The prices have increased. As government increases the price of cocoa, prices of inputs also increase. We buy fewer inputs because of price increases.” (FGD, Ashanti Region, Ghana)

In Côte d’Ivoire, most focus group participants discussed private input distribution, although a few farmers also said that they received some inputs from the Conseil du Café-Cacao (CCC). In terms of private spraying, participants made a distinction between private spraying gangs and mechanised spraying. Private spraying gangs are paid CFA 5,000 per day (without lunch) and are active in most communities. However, focus group participants had mixed views on their functioning. Spraying gangs were discussed in 11 focus group locations, and were found to be active in nine of these communities (they were not available in two communities). In three communities farmers expressed satisfaction with the service, two had mixed views, and four were not satisfied for a variety of reasons. Reasons for being dissatisfied included: “It is not enough”; “It is not for free”; “We have to pay for the fuel”; and, “There are no trained people to do the spraying.” Some positive experiences about private spraying gangs were: “We are happy that the groups are there”; “The groups have the right skills”; and, “The results of spraying are noticeable.”

Ivorian participants also gave their views on private liquid fertiliser spray services. These services were found to be present in only six of eleven communities visited, with the level of satisfaction varying across communities. In two communities, participants were generally satisfied because they believe the sprayers do a good job and it saves them from having to do the work themselves. Some said that the sprayers have received the necessary training, while others said they have not. When farmers believe the sprayers lack skills, they hire them less often. Other groups had mixed or negative views due to the cost of the service and their belief that, as cooperative members, they should receive the service for free.

Ivorian focus group participants also discussed their views of local input shops. Input shops were found to be present near to nine of the eleven communities where inputs were discussed. Most of these groups expressed their dissatisfaction with the local input shop and frequently mentioned that prices are too expensive. Less frequently

participants complained that the product quality is bad, or that products have already expired. Sometimes farmers said they feel ‘cheated’ as the input shops re-label expired products or counterfeit products. The distance the farmers have to travel is also a factor, as this incurs additional transport costs which make the inputs relatively more expensive. Participants in only two communities said they were positive about their local input shop.

“The prices of inputs have gone up while the quality has gone down. The products are killing our plants. We are being cheated by the sellers; they re-label cheap brands to make us think we buy good quality, but it is actually a cheap knock-off.” (FGD, Guémon, Côte d’Ivoire)

“We cannot buy inputs in the village; we need to go 26 km to the nearest town to buy. The costs of the inputs are high and we also need to pay for transport for ourselves as well as for the products.” (FGD, Cavally, Côte d’Ivoire)

Ivorian participants also explained that another way of procuring inputs is through *pisteurs* (cocoa traders). While some participants said this is more expensive than going to town themselves, *pisteurs* occasionally provided inputs on credit, with a 100% interest rate to be repaid in the main season.

“Some of the pisteurs help you to get access to inputs and they respect the price fixed by the CCC.” (FGD, Cavally, Côte d’Ivoire)

Compared with 5 years ago, Ivorian participants in all 10 focus groups perceive a negative change relating to inputs. The main reason given was that prices have been increasing, sometimes adding that accessibility has not improved in rural areas.

“The inputs are available, but they are expensive. The price increases every year. We still use the same amounts, though we just pay more. We are forced to buy inputs to make our cocoa work.” (FGD, Béliér, Côte d’Ivoire)

“The prices of inputs increases with the price of cocoa, but when the cocoa price drops the inputs stay the same price.” (FGD, Cavally, Côte d’Ivoire)

8.4 Labour activities

Cocoa households employ a combination of household labour, hired labour and communal labour. A recent study commissioned by the International Cocoa Initiative (ICI) reported that, in Ghana, households use an average of 120 labour days per hectare of cocoa, including household, hired and communal labour. The same study reported quite some variation in the number of labour days used per hectare in

Côte d'Ivoire, ranging from 73 labour days/ha in Haut-Sassandra, 120 days/ha in Loh Djoboua, and 154 days/ha in Nawa.³⁵

In our household survey, respondents were first asked whether or not they knew the number of labour days spent per activity for all of their cocoa land. Only those respondents who answered affirmatively were asked further questions about the number of labour days used. This question had the function of excluding inaccurate estimations from the dataset, since labour days can be difficult for farmers to estimate.

In Ghana, across all activities, between 40% and 55% of respondents reported knowing how many labour days were used, depending on the activity. In Côte d'Ivoire, between 50% and 80% of respondents reported likewise. This confirms that many farmers do not know the amount of labour invested on their farms, and therefore efforts to calculate labour days require extreme care in data collection.

In Ghana and Côte d'Ivoire, only around a third of all cocoa households keep records of any kind (Table 8.4). Of those who do keep records, most record the volume sold, the price, and the amount of income received (Table 8.5).

Table 8.4 Percent of households keeping written records for cocoa last year, by country

	Ghana	Côte d'Ivoire	pvalue	sig
Percent keeping records	32%	36%	0.05	**
std.error	1%	2%		
N	1,318	907		
cocoa_records_yn				

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

Table 8.5 Percent of households recording each type of information (of those who reported keeping any records)

Record type	Ghana	Côte d'Ivoire	pvalue	sig
The volume sold, the price and money received	91%	98%	0.00	***
Money spent on inputs	46%	2%	0.00	***
The volume produced	35%	61%	0.00	***
Money spent on hired labourers	24%	1%	0.00	***
Number of days household members spent labouring	16%	0%	0.00	***
Don't know	1%	1%	0.72	
N	422	327		

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

³⁵ 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

8.4.1 Labour days per activity

In Ghana and Côte d'Ivoire, we find a lower number of labour days committed per activity than in most studies. We hypothesise several reasons for our figures being lower than other studies. We hypothesise several reasons for this.

In our study, we find that many cocoa households do not carry out all cocoa activities (Table 8.1). Those who do not carry out the activity are assigned '0 days', which pulls down the average number of days for the activity. However, some other studies calculate the average of *those doing* the activity (i.e. excluding those who should be assigned 0 days), which results in a higher average. Some other studies also base their figures on 'expert' estimates, or expected labour days if good practices have been followed. Our approach has been to calculate, as accurately as possible, actual practices across the entire sample of respondents. Another reason that our figures may be lower than some studies is because we have not included labour days for fermenting and drying cocoa, as there is little labour involved while the cocoa is lying fermenting or drying. If asked, respondents usually report the number of days the cocoa is lying fermenting and drying, giving an incorrect impression of actual labour used.

In Ghana, we find cocoa households spend, on average, 53 labour days per hectare (Table 8.4). The majority of these days are household labour days, although these are averages. In reality, different households invest different combinations of household and hired labour. The main activity for which communal labour is used is pod breaking. Weeding was found to take the most labour days per hectare, because it is a laborious task and because most households do it 2-3 times per year. Harvesting and pod breaking were also reported take a relatively high number of labour days.

Table 8.6 Mean labour days per cocoa activity, per hectare, Ghana

	Household days	Hired days	Communal days	Total days
Land clearing	0.57	1.51	0.02	2.09
Land preparation	0.67	0.31	0.04	1.02
Planting	2.30	0.23	0.15	2.68
Granular fertilizer application	0.74	0.15	0.03	0.92
Liquid fertilizer application	1.08	0.79	0.07	1.94
Manure/compost application	0.12	0.04	0.00	0.16
Herbicides application	2.13	0.60	0.03	2.75
Pesticides application	2.20	1.80	0.12	4.12
Fungicides application	2.19	0.60	0.19	2.97
Weeding	4.06	7.73	0.15	11.94
Pruning	2.19	0.77	0.07	3.03
Harvesting	6.36	1.56	0.09	8.02
Pod breaking	2.55	0.21	5.98	8.75
Fermenting				-
Drying				-
Transporting	1.64	0.58	0.56	2.78
Total labour days/ha	28.80	16.88	7.50	53.17

Note: The number of observations (N) varies between activities and is not reported in the table for ease of reading. The N values for Ghana are as follows: land clearing 309; land preparation 203; planting 290; granular fertiliser 256; liquid fertiliser 344; manure 38; herbicides 247; pesticides 528; fungicides 372; weeding 449; pruning 415; harvesting 462; pod breaking 496; transporting 382.

In Côte d'Ivoire, we find that cocoa households spend, on average, 32 labour days per hectare (Table 8.7), which is considerably lower than that reported in Ghana. The main reason why we find lower labour days in Côte d'Ivoire is because relatively few households apply inputs (Table 8.1), and thus do not require labour for these activities. There are also other contributing reasons. Ivorian households do weeding less frequently, which lowers the total number of labour days. Ivorian cocoa households also tend to have larger cocoa plots and so spread their household labour over more land. They also have lower yields than Ghanaian cocoa households, which means they need fewer labour days for harvesting and pod breaking. Few Ivorian households reported the use of hired labour.

There was found to be no statistically significant difference in the number of labour days used per hectare by male and female-headed households.

In general, we are reasonably confident about the average number of labour days reported across the sample, even though individual respondents may have estimated a little higher or a little lower. Accuracy is helped by the approach to only include responses from those who believed they knew how many labour days were used per activity. Furthermore, we also removed a few extreme outlier values (farther than 4 standard deviations from the mean) which we consider very likely to be erroneous data entry errors.

Table 8.7 Mean labour days per cocoa activity, per hectare, Côte d'Ivoire

	Household	Hired	Communal	Total
Land clearing	0.65	0.18	0.15	0.99
Land preparation	1.05	0.17	0.14	1.37
Planting	1.55	0.03	0.02	1.61
Granular fertilizer application	0.32	0.04	0.00	0.37
Liquid fertilizer application	0.03	0.03	0.00	0.06
Manure/compost application	0.11	0.00	0.00	0.12
Herbicides application	0.78	0.08	0.03	0.89
Pesticides application	0.29	0.50	0.02	0.81
Fungicides application	0.08	0.08	0.01	0.16
Weeding	6.08	1.55	1.89	9.51
Pruning	0.95	0.58	0.13	1.66
Harvesting	6.67	0.48	0.55	7.71
Pod breaking	1.74	0.12	4.47	6.32
Fermenting				-
Drying				-
Transporting	0.41	0.22	0.13	0.76
Total labour days/ha	20.71	4.05	7.56	32.32

Note: The number of observations (N) varies between activities and is not reported in the table for ease of reading. The N values for Côte d'Ivoire are as follows: Land clearing 129; land preparation 128; planting 153; granular fertilizer 76; liquid fertilizer 46; manure 21; herbicides 154; pesticides 443; fungicides 91; weeding 353; pruning 92; harvesting 390; pod breaking 526; transporting 455.

Besides the average number of labour days used per hectare for each activity among all farmers, it is of research value to know the typical number of labour days used for an activity among those doing that activity. Table 8.8 presents the median number of labour days used per activity, considering only the farmers who did each activity. The table includes all household, hired and communal labour. We advise against making a summation of these labour days since a summation would not accurately represent the total labour days used per hectare by a typical cocoa household.

Table 8.8 Median labour days per cocoa activity, per hectare, (of those doing the activity only), by country

	Ghana	N	Côte d'Ivoire	N
Land clearing	5	290	4	124
Land preparation	3	190	5	125
Planting	5	270	4	145
Granular fertiliser	2	251	2	75
Liquid fertiliser	4	335	1	46
Manure	3	37	2	21
Herbicides	7	230	2	142
Pesticides	5	513	1	433
Fungicides	4	357	1	90
Weeding	15	420	14	336
Pruning	4	395	3	92
Harvest	9	423	9	368
Pod breaking	9	464	6	501
Fermenting				
Drying				
Transporting	4	364	1	434

Note: The following table should be used for reference only for each activity, as it excludes households that have not done the activity. The columns should not be summed to generate a total, as this does not represent the total median labour days.

8.4.2 Labour availability and affordability

Cocoa households rely on a combination of household, hired and communal labour for the various cocoa activities that need to be carried out through the year. In general, households rely on their own household labour for the majority of cocoa activities. However, for certain labour intensive activities, additional labourers may need to be hired to supplement household efforts. Of course, in reality, cocoa farmers take many different approaches. For example, some absentee landowners or 'retirees' may hire more labourers than average. On the other hand, poorer households may choose not to hire additional labour and try to make do with household labour, even if it means they use sub-optimal labour inputs for some activities.

The availability and affordability of hired labour go hand in hand. As the supply of hired labourers decreases, the cost of labour naturally increases.³⁶ The scarcity of

³⁶ Barrientos, S.W & Asenso Akyere, K. (2008). 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>

hired labourers can also be seasonal, fluctuating with labour demand for certain cocoa activities, and interacting with labour demands for other crops at the same time.³⁷ Some studies have attributed labour scarcity to the emergence of alternative income-generating activities, such as palm oil, rubber tree agriculture, gold mines, vegetable production or trade.³⁸ Other studies have argued that labour shortages are driven by an absence of youth, who have migrated to urban areas to look for education or better employment opportunities.^{39,40} In Côte d'Ivoire, it has been argued that migrant Burkinabé labourers have now become landowners, which has reduced the supply of labour and simultaneously increased demand.⁴¹ While the availability of hired labourers is a problem for cocoa households, it also suggests that local economies are growing stronger and presenting more diversified employment opportunities to the wider population. Indeed, some studies have pointed out that labour availability is not so much the problem, but rather the affordability of hired labour. People will work as hired labourers provided the wage is better than their alternative options, and will also take into account the intensity of the work.^{42,43} The difficulty is that labouring on a farm is relatively hard work, and cocoa households may be reluctant to meet labourers' wage demands.

In our study, participants discussed changes in labour availability and affordability during focus group discussions.

In Ghana, all focus groups agreed that labour availability and affordability is getting worse and offered a range of reasons for this. The most frequently cited reason was that labourers were moving to districts where they can engage in goldmining and potentially earn more money than farm labouring. The second most frequently cited reason is that 'youth' are staying in school longer. This suggests that sensitization efforts to eliminate child labour and improve educational opportunities are working, although the side-effect is that it reduces labour supply and thus raises the cost of hired labour. Another common reason is that people (including migrants) are busy trying to establish and improve their own farms (including via *abunu* land tenure arrangements) and this is seen as more valuable than working as a labourer. Less prominently, respondents occasionally mentioned that youth are disinterested in cocoa farming and have moved to the towns and cities. In focus group discussions,

³⁷ 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>

³⁸ *ibid*

³⁹ 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/en/page/article/marktconcentratie-en-prijsvorming-in-de-mondiale-waardeketen-voor-cacao/>

⁴⁰ 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>

⁴¹ Ruf, F., Agkpo, J. (2008). Etude sur le revenu et les investissements des producteurs de café et de cacao en Côte d'Ivoire. Available at <http://agritrop.cirad.fr/548837/>

⁴² 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

⁴³ Ruf, F., Agkpo, J. (2008). Etude sur le revenu et les investissements des producteurs de café et de cacao en Côte d'Ivoire. Available at <http://agritrop.cirad.fr/548837/>

we observed that participants sometimes discussed the increased cost of hired labour alongside higher costs of living generally. It is possible that participants are unaware of inflation, which has ranged between 12% and 17% in recent years.

"You cannot even hire labours because of illegal mining. All labourers rather choose to work in illegal mining because it pays more. If you have money, you can get some people, but it is expensive. The quality of labour has also decreased, mostly because labourers work fewer hours." (FGD, Ashanti Region, Ghana)

"It is difficult to get labour, because everybody wants their own farm instead of doing day labour. Youth are not interested in farming; most of them go to mining activities." (FGD, Ashanti Region, Ghana)

Ghanaian focus group participants discussed how they cope with increasing labour costs in different ways. Some said they hire less labour and rely more on inputs (e.g. use herbicides for weeding instead of machete) whilst other said that they try to rely more on household labour or the system of shared labour even though we find few such cases in the household survey data. Some participants complained that they have less household labour availability as the government does not allow them to use their children on the farm.

"Labour is available, but expensive. As the cost of living increases, day labourers ask for more. During the main cocoa season, there is competition for labour. Who pays the highest price wins. Most of the farmers are using herbicide so they don't have to use labour for weeding." (FGD, Eastern Region, Ghana)

In Côte d'Ivoire, focus group participants also said that labour availability and affordability has become worse over the last five years. Participants argued that labour costs have increased over recent years, in line with the increasing price received for cocoa. Participants suggested that when the price of cocoa increases, labourers start asking more money for the same task. This may be an inflationary effect, which participants have difficulty articulating and describing in inflation-adjusted terms.

"The prices have increased for labour. The increase in the price of cocoa leads to increases in the price of labour, but also of inputs and even of food." (FGD, Gôh, Côte d'Ivoire)

Participants also discussed how labour has become scarcer since the remaining labourers have started to negotiate for higher wages. It was said that more labourers have become landowners themselves and have chosen to invest their labour on their own land. Some focus groups mentioned that there is now less migrant labour and little child labour. One group noted that youth are less interested in working as labourers and stay at school longer, which means that households depend more on their own labour resources.

“We can hardly find labourers anymore as everyone has their own farm now. They are busy with their own farm. Labour is expensive as it is rare so we now use abusa sharecroppers on cocoa to have labour.” (FGD, Haut-Sassandra, Côte d’Ivoire)

“The government has stopped the trafficking of child labour - in the past there were more migrant labour.” (FGD, Me, Côte d’Ivoire)

8.4.3 Labour types – household, hired and communal

Most cocoa households make extensive use of family labour as there is no perceived cost (although there is an opportunity cost), and household labourers have an interest in maintaining the quality of their activities. As discussed above, hired labour can be prohibitively expensive for some households, and tends to be avoided unless there is additional work to be done, or skilled labour is needed for certain activities. Another labour source is communal labour. In Ghana, these labour exchange groups are known as *nnoboa*.

In our household survey, respondents were asked “Who did [activity] - household, hired or communal labour?” Table 8.9 presents the proportion of cocoa households using household, hired and communal labour per activity.

In Ghana, a higher proportion of respondents reported using household labour than hired labour for nearly all activities. The exceptions were land clearing and weeding – both heavy and laborious tasks. Households also tended to use more hired labour for the application of liquid fertiliser, pesticides and fungicides. This may be explained by the fact that the spraying and safety equipment may not be owned by the household and is a skilled task. For most activities, respondents reported using either household or hired labour – not both. We found that a substantial proportion of households combined both labour types only for harvesting (25%) and weeding (27%), presumably due to the high labour requirements of these activities. Pod breaking was the only activity which employed a substantial amount of communal labour.

In Côte d’Ivoire, household labour is also more commonly used than hired labour for most cocoa production activities. Compared with Ghana, there were lower rates of hired labour use for most activities with the exception of liquid fertiliser, pesticide and fungicide application. However, as discussed above, a relatively low proportion of Ivorian households apply these inputs at all. Few cocoa households combine household and hired labour, usually opting for one type or another. Communal labour is mainly used alongside household labour for pod breaking. Around a fifth of respondents said communal labour is also used for land clearing and weeding activities.

Table 8.9 Percent of households using household, hired and communal labour (of those doing the activity), by country

	Ghana Household	Ghana Hired	Ghana Communal	Côte d'Ivoire Household	Côte d'Ivoire Hired	Côte d'Ivoire Communal
Land clearing	40%	71%	3%	71%	35%	20%
Land preparation	80%	36%	7%	85%	24%	12%
Planting	92%	24%	10%	97%	7%	4%
Granular fertiliser	85%	34%	9%	77%	28%	5%
Liquid fertiliser	55%	54%	6%	47%	60%	4%
Manure	78%	40%	4%	95%	18%	3%
Herbicides	75%	38%	6%	80%	24%	4%
Pesticides	55%	57%	5%	37%	70%	3%
Fungicides	62%	40%	6%	48%	59%	8%
Weeding	55%	71%	4%	70%	44%	21%
Pruning	68%	39%	5%	88%	18%	5%
Harvest	81%	43%	7%	83%	26%	11%
Pod breaking	82%	15%	77%	91%	19%	80%
Fermenting	92%	8%	17%	86%	20%	3%
Transporting	66%	44%	28%	46%	51%	13%
Drying	96%	7%	1%	86%	20%	1%

Note: Table 8.9 is a summary of data compiled from each activity. After indicating that their household had undertaken the activity in the last year, survey respondents were asked "Who did [activity] for cocoa - household, hired or communal labour?". Multiple responses could be provided so percentages may add up to more than 100%. A more detailed summary is provided below.

Figure 8.4 Cocoa, percent of households using household, hired and communal labour per activity, Ghana

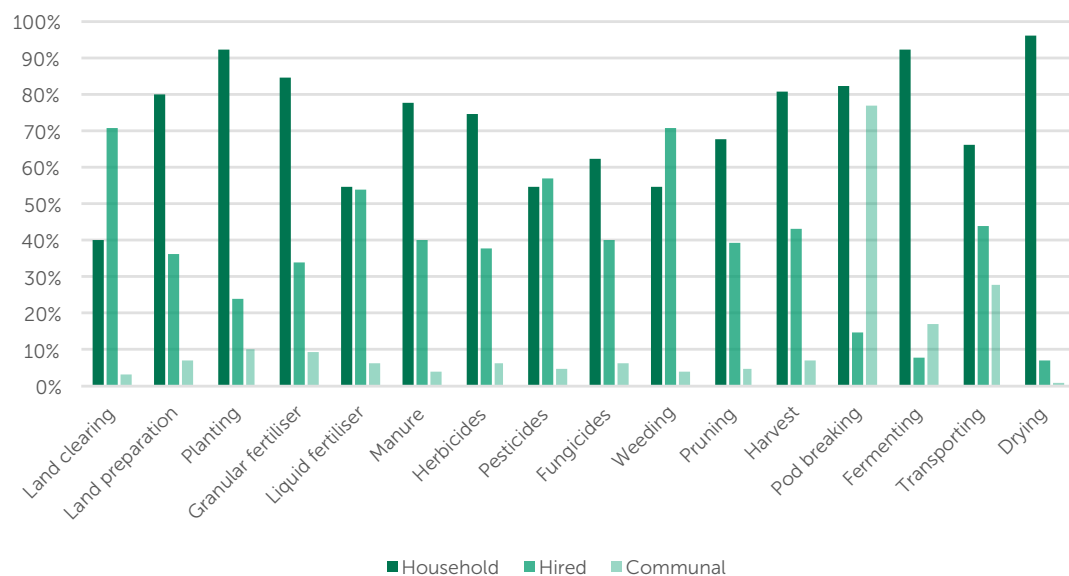
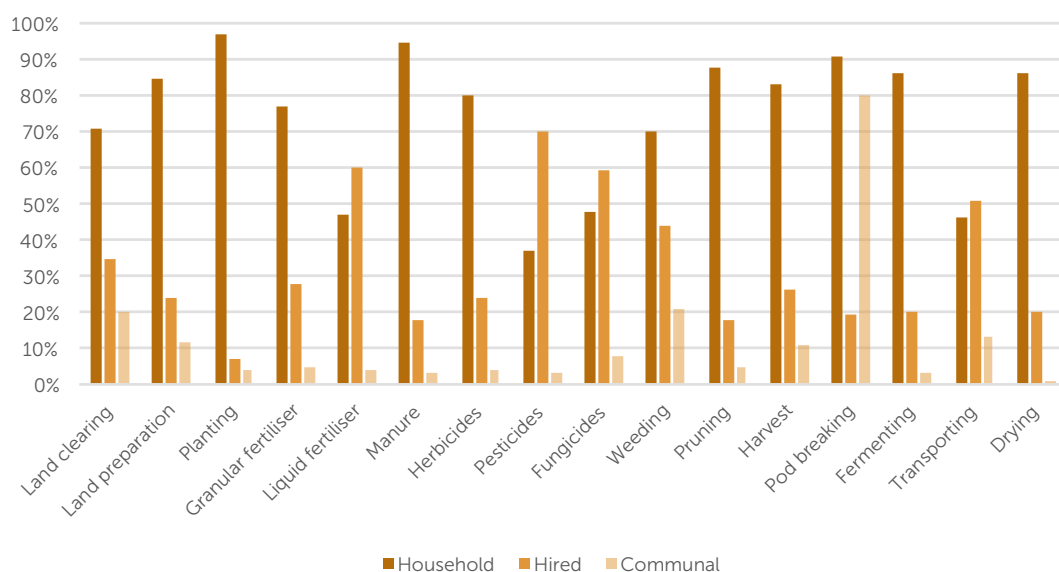


Figure 8.5 Cocoa, percent of households using household, hired and communal labour per activity, Côte d'Ivoire



In Ghana, for many activities there was found to be no statistically significant difference in hired labour use between male and female-headed cocoa households, or differences were quite small. However, around 20% more female-headed households used hired labourers than male-headed households for the application of liquid fertiliser, herbicide, pesticide and fungicide. Female-headed households also hire labourers for pruning much more frequently (Table 8.10). This suggests that the hypothesis that female-headed households need to hire more labour is valid, but should not be overstated.⁴⁴ One reason for this difference is that female-headed households tend to be slightly smaller, and therefore it is likely that they have a greater need for hired labour. Some women may also feel they lack the strength for heavier activities – something they frequently mentioned in focus group discussions – and hire labourers for these tasks.

Gender disaggregated data on hired labour for Côte d'Ivoire is not presented here due to the low number of female-headed households producing cocoa as one of their most important crops.

⁴⁴ Barrientos, S.W & Asenso Akyere, K. (2008). 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>

Table 8.10 Cocoa, proportion of female and male-headed households using hired labour, per activity, Ghana

	Ghana female head	Ghana male head	pvalue	sig
Land clearing	75%	71%	0.46	
Land preparation	43%	35%	0.19	
Planting	23%	25%	0.68	
Granular fertiliser	40%	32%	0.22	
Liquid fertiliser	74%	49%	0.00	***
Manure	47%	38%	0.54	
Herbicides	53%	36%	0.00	***
Pesticides	72%	54%	0.00	***
Fungicides	55%	38%	0.00	***
Weeding	78%	70%	0.02	**
Pruning	57%	35%	0.00	***
Harvest	53%	41%	0.00	***
Pod breaking	17%	15%	0.37	
Fermenting	12%	8%	0.05	*
Transporting	41%	45%	0.29	
Drying	10%	6%	0.04	**

Note: p-value from a one-way ANOVA test. This table shows the proportion of male and female-headed households hiring labour for each activity. It does not show the intensity with which hired labour was used alongside household labour. Côte d'Ivoire data is not presented because of the very low number of observations.

8.4.4 Hired labour costs

The hired labour rate varies from activity to activity depending on how laborious the task is and whether it requires specific expertise or equipment.⁴⁵ Labour costs can also fluctuate within a season depending on labour scarcity, which partly explains why labour costs vary from location to location.⁴⁶

In our household survey, farmers who had hired labour for a particular activity were asked if they knew how much they paid per day, and, if so, how much. The rate for a hired labour differs slightly per activity in both countries (Table 8.11). In Ghana, hired labourers earn between US\$4.91 and US\$7.05 per day, while those in Côte d'Ivoire earn between US\$2.20 and US\$6.42 per day. Hiring labourers for activities that require heavy work, such as transporting, typically costs more than for lighter activities, such as planting, harvesting. Pod breaking typically costs the least of all activities. Activities that require some basic technical skills, such as chemical spraying, also cost more than most cocoa activities. We consider the Ghana figures to be more robust than the Côte d'Ivoire figures because the sample size of Ivorian respondents growing cocoa, hiring labour and knowing the price they paid is a quite low.

⁴⁵ Selten, M. (2015). Certification and wage labour in the cocoa sector in Ghana. Wageningen University, Master: Management, Economics and Consumer Sciences, Department: Agricultural Economics and Rural Policy Analysis (AEP), LEI. Available at <http://www.cocoaconnect.org/sites/default/files/publication/selten%20thesis%20wage%20workers%20ghana%2008122015.pdf>

⁴⁶ 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

These reported daily rates for hired labourers are more than many studies report cocoa farmers earning per day.^{47,48} It would be unusual if this was the case. If labouring for others was more profitable than farming cocoa on one's own land, then we would expect more households to opt to be 'professional' labourers instead. However, in our demographics chapter, we showed that few respondents reported household income from labouring on other peoples farms. There are several possibilities that could explain this finding. First, survey respondents may have reported daily labour rates that are too high. However, as these rates were corroborated in focus group discussions this seems unlikely. Another possibility is that estimations of household cocoa income in other studies is too low, something we discuss when we present our cocoa profitability model in Chapter 13. Alternatively, opportunities to labour on other household's land may be too infrequent to be a reliable source of income. Working as a farm labourer is also often said to be longer and harder work than labouring on one's own farm.

Table 8.11 Average of regional median daily rates, Ghana and Côte d'Ivoire

	Ghana		Côte d'Ivoire	
	Cedis	US dollar	CFA	US dollar
Land clearing (USD/ha)	22	\$5.63	3,234	\$5.37
Land preparation (USD/ha)	22	\$5.76	2,116	\$3.51
Planting (USD/ha)	19	\$4.91	1,500	\$2.49
Granular Fertiliser application (USD/ha)	22	\$5.76	1,994	\$3.31
Liquid Fertiliser application (USD/ha)	27	\$7.05	3,869	\$6.42
Manure/compost application (USD/ha)	22	\$5.77	-	-
Herbicides application (USD/ha)	21	\$5.46	2,104	\$3.49
Pesticides application (USD/ha)	25	\$6.54	3,598	\$5.97
Fungicides application (USD/ha)	23	\$6.04	3,254	\$5.40
Weeding (USD/ha)	21	\$5.61	2,078	\$3.45
Pruning (USD/ha)	26	\$6.85	-	-
Harvesting (USD/ha)	22	\$5.76	1,326	\$2.20
Pod breaking (USD/ha)	22	\$5.64	-	-
Fermenting (USD/ha)				
Drying (USD/ha)				
Transporting (USD/ha)	27	\$7.17	3,319	\$5.51

Note: Exchange rate used from January 2016. Calculations were made as follows: i) outliers were removed at country level ii) the median hiring cost is computed per country region iii) the above table reports the average of the regional median.

⁴⁷ Fountain, A.C. and Hütz-Adams, F. (2015) Cocoa Barometer 2015-USA Edition. Available at <http://www.cocoabarometer.org/>

⁴⁸ Balineau, B., Bernath, S., Pahuatini, V. (2016). 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. AFD and Barry Callebaut. Available at <https://www.afd.fr/fr/cocoa-farmers-agricultural-practices-and-livelihoods-cote-divoire>

8.4.5 Labour – male and female roles

In the household survey, respondents were asked, “Who did [the activity] - men, women or both?”

In Ghana, male and female respondents reported that men participate in virtually all cocoa production activities at very high rates (98-100%). Male and female respondents also agreed - in the household survey and in focus group discussions - that women typically engage in cocoa production activities at lower rates than men (Table 8.12). In Ghana, the most common activities that women participate in are planting, granular fertiliser application, manure application, pod breaking, transporting and drying. These are almost always done alongside men. Women rarely participate in heavy, labour intensive activities such as land clearing and weeding, and have much lower participation in the application of inputs.

In Côte d’Ivoire, men were reported have very high participation rates (97-100%) for virtually all cocoa production activities. Women engage in cocoa production activities much less frequently than women in Ghana. In Côte d’Ivoire, the main activity where women play a substantial role is pod breaking (Table 8.12).

Table 8.12 Cocoa, percent of respondents who reported that men, women or both usually do the activity, by country

	Ghana		Côte d’Ivoire		Sig (men)	Sig (women)
	Men	Women	Men	Women		
Land clearing	100%	6%	100%	3%		*
Land preparation	98%	47%	98%	19%		***
Planting	95%	75%	97%	31%		***
Granular fertiliser	98%	50%	97%	15%		***
Liquid fertiliser	100%	23%	100%	0%		***
Manure	90%	55%	100%	15%	**	***
Herbicides	98%	35%	100%	2%	**	***
Pesticides	100%	22%	99%	2%		***
Fungicides	99%	26%	99%	2%		***
Weeding	99%	17%	99%	5%		***
Pruning	99%	8%	99%	2%		***
Harvest	98%	44%	100%	14%	***	***
Pod breaking	99%	71%	100%	50%		***
Fermenting	96%	48%	99%	5%	***	***
Transporting	98%	60%	98%	13%		***
Drying	93%	79%	99%	18%	***	***

Note: For each activity, respondents were asked “Who did land clearing for cocoa - men, women or both?” In the case that both men and women contributed labour to the activity, this is reflected in the percentages ascribed to each. Therefore, figures may add up to more than 100%.

Figure 8.6 Who does each cocoa activity, men women or both, Ghana

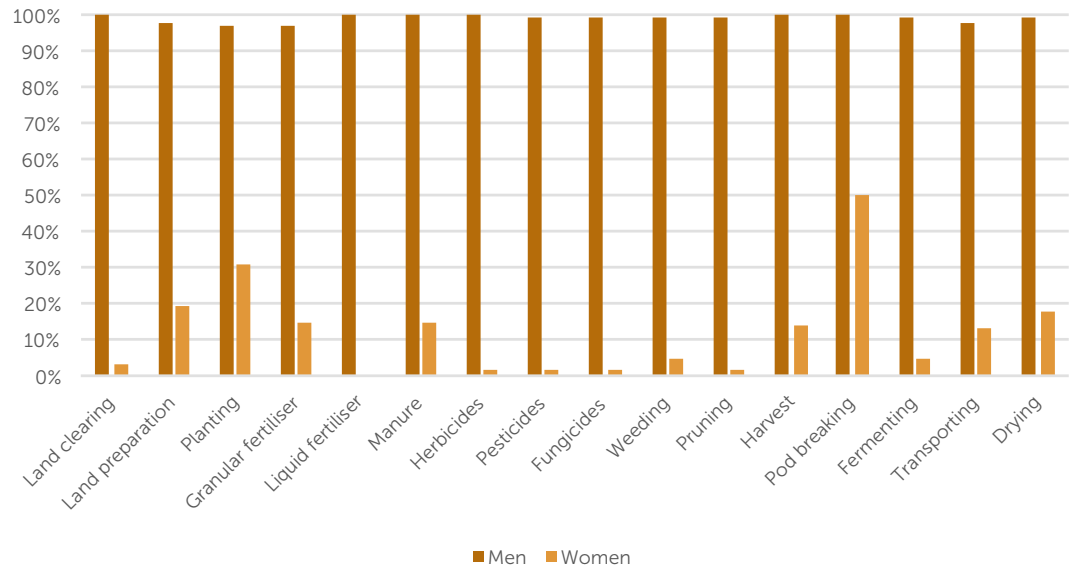
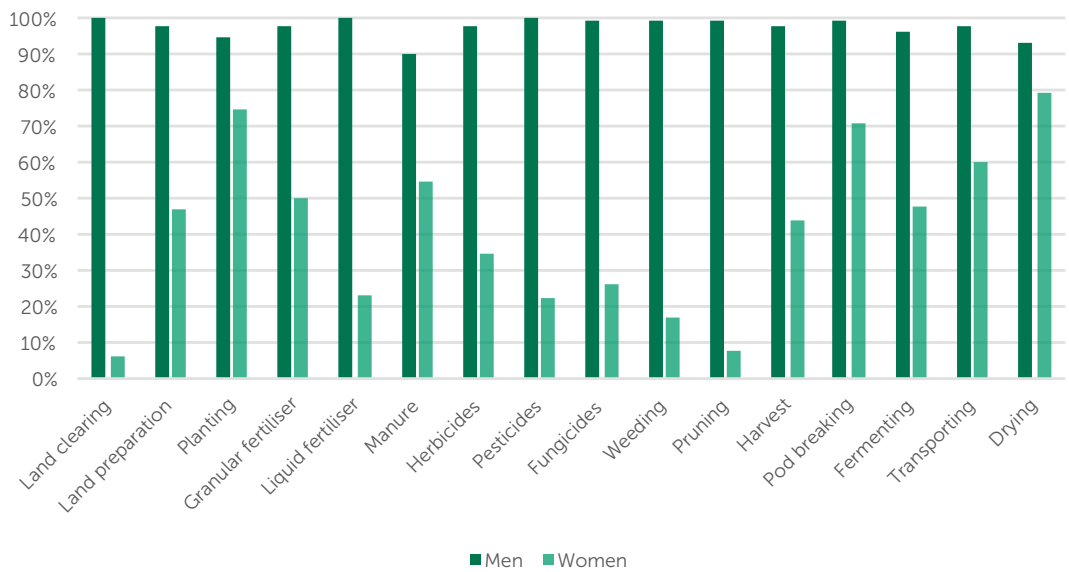


Figure 8.7 Who does each cocoa activity, men women or both, Côte d'Ivoire



During focus group discussions, participants discussed the distribution of roles in cocoa production tasks.

In Ghana, focus group participants confirmed that men participate in all cocoa activities, with women sometimes accompanying them. Virtually all focus group participants said that men usually spend more time working on cocoa farms than women (one group said both). It was often said that men “take the lead”, and go to the farm earlier in the morning. As the head of the household, men assume responsibility for maintaining the cocoa farm well and “ensuring the household has a good income”. Participants discussed how cocoa activities are physically demanding

and require strength, (e.g. land clearing and spraying) and are difficult (e.g. pruning) and therefore primarily involve men, as “men have the strength” and “men have the knowledge”. Married women are seen more as supporters, helping out their husbands. Typical women’s tasks were described as food preparation for the men that were working on the cocoa farm, and fetching water for spraying. Women may help to take care of the young cocoa farms in the first few years, which are usually intercropped with food crops, such as plantain and cassava.

In Côte d’Ivoire, focus group participants also confirmed that men play the dominant role in all cocoa activities, for the same reasons expressed in Ghana. The main difference is that Ivorian women play a smaller role in cocoa activities than women in Ghana, which is consistent with the finding that a smaller proportion of Ivorian female-headed households opt to produce cocoa than Ghanaian female-headed households.

We are aware that these findings on gender roles in cocoa production may run counter to some narratives. One commonly cited statistic is that “women provide 68% of the labour” for cocoa.^{49,50,51} This statistic can be traced back to an African Development Bank report.⁵² However, we have confidence in our findings on the roles of men and women in cocoa production because there was good agreement between male and female respondents in the household survey,⁵³ and this was corroborated in focus group discussions by male and female participants.

8.5 Losses

In our household survey, respondents reported their cocoa losses from cocoa pests and diseases. It is important to note that, in some cases, respondents had difficulty with the difference between diseases and pests, and determining between on farm and post-harvest losses. Therefore, the figures presented below should be viewed as an approximation only. Furthermore, disease and pest conditions are highly likely to change from year to year.

⁴⁹ ICI. (2018). Recognising women’s work in cocoa production, today and every day. Available at <https://cocoainitiative.org/news-media-post/recognising-womens-work-in-cocoa-production-today-and-every-day/>

⁵⁰ Marston, a. (2016). Women’s rights in the cocoa sector, examples of emerging good practice. Oxfam discussion papers. Available at <https://oxfamilibrary.openrepository.com/bitstream/handle/10546/600528/dp-womens-rights-cocoa-sector-good-practice-100316-en.pdf>

⁵¹ Nieburg, O. (2017). A long way to go’ to equality for women cocoa farmers. Confectionary News. Available at <https://www.confectionarynews.com/Article/2017/11/02/Women-cocoa-farmers-A-long-way-to-go-to-equality>

⁵² African Development Bank. (2015). Economic Empowerment of African Women through Equitable Participation in Agricultural Value Chains. Available at https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Economic_Empowerment_of_African_Women_through_Equitable_Participation_in_Agricultural_Value_Chains.pdf. Other papers have also cited this figure including Oxfam. (2016). Women’s rights in the cocoa sector, examples of emerging good practice. Available at <https://policy-practice.oxfam.org.uk/publications/womens-rights-in-the-cocoa-sector-examples-of-emerging-good-practice-600528>. However, the original source was not able to be traced beyond the African Development Bank paper where on page 48 this quotation was cited as Fair Labour Association, ESI 2015. We have found an executive summary of the what is possibly the intended citation, but this does not reference the statistic. An attempt to contact the authors via the given email address was unsuccessful.

⁵³ For example, female respondents in male headed households also reported that men engage in cocoa production activities more frequently than women.

In Ghana, a little over half of cocoa households reported experiencing losses from cocoa diseases (52%) in the past year. Black pod was the most frequently reported disease, followed by CSSVD (Table 8.15). Most respondents reported either no or mild/low effects of disease on their cocoa farms, with 12% saying the problem was ‘severe’ (Table 8.16). In Ghana, 57% reported losses from pests, with capsids being the most frequently reported pest. Most households experiencing pests also said the effect was none or mild/low, with 16% reporting severe problems.

In Côte d’Ivoire, a significantly lower proportion of respondents reported cocoa diseases than Ghanaian respondents (31%). This is an interesting finding given that a smaller proportion of Ivorian farmers use chemical inputs overall, and with fewer applications on average per year. Compared with Ghana, a similar proportion reported CCSVD, while substantially fewer reported black pod disease (Table 8.14).

The effect of diseases on those experiencing them was most frequently reported to be none or mild/low, with only 7% reporting severe problems (Table 8.16); 45% of Ivorian cocoa households reported some losses from pests. The most commonly reported pests were *Foreurs de tige* (stem borer), *Akate* (capsids), mirids and mistletoe. Of those experiencing pests, most reported no or mild/low effects, with only 7% reporting the problem to be severe (Table 8.16).

Table 8.13 Cocoa, percent of respondents experiencing cocoa losses from diseases, pests, and during storage

	Ghana	Côte d’Ivoire	pvalue	sig
Cocoa diseases	52%	31%	0.00	***
Cocoa pests	57%	45%	0.00	***
Losses during storage	16%	2%	0.00	***
N	1,318	908		

Table 8.14 Percent of cocoa households experiencing losses from types of disease, by country

Disease	Ghana	Côte d’Ivoire	pvalue	sig
Black pod disease	44%	12%	0.00	***
Swollen shoot disease (CSSVD)	14%	16%	0.25	
Other	9%	4%	0.00	***
Blight thread	5%	1%	0.00	***
Le chancre		4%		
N	1,318	910		

Table 8.15 Percent of cocoa households experiencing losses from types of pest, by country

Pest	Ghana	Côte d'Ivoire	pvalue	sig
Akate (capsids)	50%	26%	0.00	***
Mistletoe	16%	21%	0.00	***
Mirids	15%	24%	0.00	***
Rodents	13%	9%	0.00	***
Black ants	8%	4%	0.00	***
Termites	5%	11%	0.00	***
Other	4%	1%	0.00	***
Foreurs de tige (stem borer)	0%	30%	-	-
Mousse verte	0%	10%	-	-
Don't know	0%	1%		
N	1,318	910		

Table 8.16 Disease and pest severity, by country

	Ghana Disease severity	Ghana Pests severity	Côte d'Ivoire Disease severity	Côte d'Ivoire Pests severity
None	48%	43%	69%	55%
mild/low	23%	22%	13%	21%
medium	16%	19%	12%	17%
severe	12%	16%	7%	7%
N	1,318	1,318	910	910

8.6 Summary

In Ghana, around half of all cocoa households reported clearing land and planting cocoa in the last year. In Côte d'Ivoire, around a quarter did land clearing and a third planted cocoa. This appears to confirm that land under cocoa is increasing and that planting or (or replanting) is a fairly common practice.

In Ghana, a much higher proportion of cocoa households use fertiliser, herbicide, and fungicide than in Côte d'Ivoire. Both countries have relatively high rates of pesticide use. Ghanaian households also apply pesticides and fungicides a greater number of times per year than Ivorian households, though still below recommended frequencies.

In Ghana and Côte d'Ivoire, respondents have difficulty estimating the number of labour days spent per activity in cocoa. For many activities, only around half of respondents said they knew how many labour days they spent per activity, due to poor record-keeping on hired labour costs and household labour days.

In Ghana and Côte d'Ivoire, records are only kept by one third of cocoa households. Of those keeping records, most only keep records on volume produced and sold, the price, and amount of money received. A much smaller proportion of respondents in Ghana kept records of money spent on inputs and hired labour, while in Côte d'Ivoire records were not kept on these items.

On average, households in Ghana reported spending 53 labour days per hectare on cocoa production activities. In Côte d'Ivoire, only 32 labour days are used per hectare. These averages do not include labour days for cocoa fermentation and drying. In Ghana and Côte d'Ivoire, the cocoa activities that require the highest number of labour days are weeding and harvesting.

In Ghana and Côte d'Ivoire, the availability and affordability of hired labour is perceived to be getting worse. In Ghana, this was most frequently attributed to farm labourers moving to other sectors (gold mining, work in the towns). In both countries, participants said that young people are staying in school longer instead of working as labourers, and that more people are working to establish their own cocoa farms instead of selling their labour. However, focus group participants often noted that increases in hired labour costs were broadly in line with increases in other costs and in the price of cocoa. This suggests that inflation also plays a role.

In Ghana, household labour is the predominant source of labour for most cocoa activities, as there is no perceived cost (although there is an opportunity cost). Ghanaian households more frequently use hired labour for heavy and laborious tasks (land clearing and weeding), and for the spray application of fertiliser, pesticides and fungicides. Most often, households use either household labour or hired labour, rather than a combination of both.

In Côte d'Ivoire, households rarely hire labour for cocoa production. When they do, it is usually for the spray application of fertiliser, pesticides and fungicides. Less frequently, labourers may be hired for weeding and transport.

In Ghana and Côte d'Ivoire, communal labour is very rarely used, except for pod breaking alongside household labour. In Côte d'Ivoire, a small proportion of households also involve communal labour for weeding and land clearing.

Female-headed households and male-headed households use similar rates of hired labour for most cocoa activities. The main exceptions are the spray application of liquid fertiliser, herbicides, pesticides and fungicides, for which about 20% more female-headed households hire labour than male-headed households. This suggests that female headed households do hire labourers at a higher rate, but that differences with male-headed households should not be overstated.

In Ghana, respondents reported that men nearly always engage in all cocoa activities. Male and female respondents agreed that women generally engage in cocoa production activities at lower rates than men. In focus group discussions, women were often described as ‘supporters’. Women usually participate in lighter work, such as planting, pod breaking, fermenting and drying. Women also participate in complementary activities, such as food preparation for the labourers, fetching water for spraying, and taking care of the young cocoa farms.

In Côte d’Ivoire, men participate in all cocoa activities, while women participate at much lower rates, even compared with Ghanaian women. The main cocoa activity where women contribute alongside men is ‘pod breaking’.

The cost of hired labour varies per activity, as some activities are heavier and more physical and some require more technical skill or equipment. In Ghana, the cost of hired labour ranges from US\$ 4.91 to US\$ 6.85 per day, depending on the activity, while in Côte d’Ivoire it ranges from US \$2.20 to US \$5.97.

In Ghana, the use of granular fertiliser (39%) and liquid fertiliser (53%) to boost yields is common. Farmers also frequently use herbicides (51%) to control weeds, and pesticides (88%) and fungicides (74%) to control pests and diseases. The relatively high rates of input use can be largely attributed to COCOBOD programmes, which provide free inputs to many cocoa households. However, focus group participants often perceived the government’s input supply services to be worse than 5 years ago. The amount and timeliness of inputs supplied were frequently mentioned concerns.

In Côte d’Ivoire, fertiliser, herbicides and fungicides are applied by a much smaller proportion of cocoa households than in Ghana. However, the majority of cocoa households (75%) do apply pesticides. The difference in input use with Ghana can largely be attributed to the fact that most Ivorian households do not receive inputs for free through government programmes or other sources.

In Ghana, 52% of cocoa households reported experiencing losses from cocoa diseases in the past year compared with 31% in Côte d’Ivoire. This is interesting considering a smaller proportion of Ivorian farmers use chemical inputs. In Ghana, the highest proportion reported losses from black pod disease (44%) with only 14% reporting CSSVD. In Côte d’Ivoire, much fewer respondents reported black pod (12%) with 16% reporting CSSVD. In Ghana, 12% said they had a severe problem compared with 7% in Côte d’Ivoire.

In Ghana, 57% reported losses from pests, with capsids being the most frequently reported pest. In Côte d’Ivoire, 45% of cocoa households experience some losses from pests with the most commonly reported being *Foreurs de tige* (stem borer), *Akate* (capsids), mirids and mistletoe. In Ghana, 16% reported severe problems compared with only 7% in Côte d’Ivoire.