International COCOA Initiative

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

Researchers:
Marcella Vigneri and Renata Serra, with Ana Lucia Cardenas

Editor:
Sherelle Wilson

Jacobs Foundation
World Cocoa Foundation
Lindt Cocoa Foundation
IFC International Finance Corporation World Bank Group
idh the sustainable trade initiative

PUTTING CHILDREN FIRST

The International Cocoa Initiative is a leading organisaton that promotes child protection in cocoa-communities. ICI works with the cocoa industry, civil society, farmers' organisations, international organisations, and national governments in cocoa-producing countries to ensure a better future for children and to advance the elimination of child labour.

VISION

ICI's vision is of thriving cocoa-growing communities where children's rights are respected and protected, and where child labour has been eliminated.

MISSION

ICI works to improve the lives of children in cocoa-growing communities, safeguarding their rights and contributing to the elimination of child labour by supporting the acceleration and scale-up of child-centred community development and of responsible supply-chain management throughout the cocoa-sector.

Acknowledgements: This research study has been co-funded by the generous support of the Lindt Cocoa Foundation, Sustainable Trade Initiative, World Cocoa Foundation, Jacobs Foundation and the International Finance Corporation.

Disclaimer: Please note that the opinions expressed within this report are those of the authors and do not necessarily reflect the views of the International Cocoa Initiative or those of the research study donors. The recommendations for policies and interventions however, were developed in collaboration with ICI and the research study donors.

Researcher Affiliations and Acknowledgements: The authors (Marcella Vigneri, Oxfam GB; Renata Serra, University of Florida and Ana Cardenas, Secretariat of Social Development Mexico) would like to thank the in-country research collaborators who led and organized data collection and thus made possible this research:

For the Ghana case study: Dr. Olivia Agbenyega (Kwame Nkrumah University of Science & Technology), Ebenezer Owusu-Addo (Kwame Nkrumah University of Science & Technology), Emmanuel Sraku (Ghana Cocoa Board) and the fieldwork team.

For the Côte d'Ivoire case study: the whole research team at the Centre Ivoirien de Recherches Economiques et Sociales (CIRES), especially Dr Abdoulaye Kouma and Dr Ibrahim Diarra.

The authors would also like to thank Sherelle Wilson (ICI) for her guidance during the whole research process; Dr Amanda Berlan, Senior Lecturer in Ethical Business, University of Coventry, and an anonymous reviewer for valid comments and feedbacks.

Table of Contents

List of Acronyms

CL: Child Labour

F CFA: Franc *Communauté Financière Africaine (*Franc of the West African Financial Community)

FGD: Focus Group Discussion

HH: Household

HL: Hazardous child labour

ICI: International Cocoa Initiative

SCP: Sustainable Cocoa Programme

WFCL: Worst Forms of Child Labour

S.D.: Standard Deviation

Exchange rates (September 2015)

1 F CFA = 0.00202 US$
1 Ghanaian Cedis (GH¢) = 0.25 US$

Introduction

The International Cocoa Initiative (ICI) commissioned the present research study to examine the impact of increased cocoa yields on the child labour risk and the labour market in Ghana and Côte d'Ivoire. This study comes at a crucial time when the cocoa industry is investing in improving coca yields as one of the main conduits for higher incomes and sustainability of the sector in West Africa. The projected one million cocoa shortage as a result of low-yielding and low productivity cocoa production in the region, in the context of a 25-30% projected increase in cocoa demand by 2020 due to emerging markets such as the Middle-East, Brazil, China and India, has therefore propelled efforts to assist small-scale farmers in enhancing their productivity (Hütz-Adams and Fountain, 2012; MARS, 2012 and Adu-Ampomah, 2013).

Since much of the production relies on smallholder farming, cocoa production in Ghana and Côte d'Ivoire tends to be labour intensive. Producers use a combination of family, hired and communal labour on land under cocoa cultivation. Household members, both adults and children of smallholder cocoa farmers, have traditionally been the main source of household labour. Therefore, in the face of current initiatives to boost yields and cocoa supply, there is a growing concern that the higher pressure to enhance yields may push smallholders to use more family labour, and possibly more child labour, or involve a greater proportion of children in hazardous activities.

The purpose and aim of this research study is to fill these research gaps by examining four interrelated questions: (1) What are the conditions that determine the demand of adult labour and children's work? What are the key features of the labour supply for cocoa in the village? (2) What production technologies are being implemented to increase land productivity, and what implication does this have on the labour demand? (3) To what extent are higher yields associated with higher labour demand? To what extent may incomes derived from improved cocoa productivity respond to the labour demand? (4) Is there evidence of higher hazardous child labour or child labour occurring where programmes exist to increase cocoa yields? What factors are associated with a higher risk of incidence of hazardous and child labour? The findings from research on the four questions above will inform what policy actions can be taken at the local and national level to mitigate the child labour risk while ensuring productivity gains are made.

The International Cocoa Initiative (ICI) has identified these research gaps as a priority to be addressed in order to understand and potentially mitigate child labour risks in expanding sustainability strategies of the cocoa sector. ICI intends to support stakeholders in the cocoa sector (including chocolate companies, governments of cocoa producing countries and international donors) through this research, by testing relevant hypotheses and identifying the prerequisites for ensuring that investments in cocoa productivity do not increase the child labour risk. Furthermore, ICI will identify through the findings of this study, which characteristics of the cocoa farming household – i.e. adults, children and production conditions – are more likely to increase the risk of hazardous and child labour. These characteristics can be used as 'markers' to track over time the risk of child labour occurrence under different typologies of public and private investments in land productivity through the use of survey instruments similar to those designed for this study.

Key Findings from the Research Study

Increased Yields, Children's Work Days, Child Labour (non-hazardous) and Hazardous Child Labour

- **There was no indication in either country that increasing yields increases the overall probability or likelihood that the child labour (non-hazardous) and hazardous child labour rate (factoring in all hazardous tasks) will increase.**
- Labour demand models were used to measure the effect of increasing yields on the demand for children's work days. **Increasing yields in Ghana was found to increase children's work days** (not categorised by hazardous or non-hazardous activities) which was statistically significant, however this was not statistically significant for Côte d'Ivoire.
- When examining the mean differences in the number of work days spent by children on hazardous tasks between low and high yield farmers, **in Ghana children aged 15-17 spent more work days applying chemicals/plant protection products on high yield farms as compared to low yield farms, which was statistically significant (from a low baseline).** There was no statistical difference in the use of children's work days on hazardous tasks between high yield and low yield farmers in Côte d'Ivoire.

Labour Supply and Demand for Cocoa Farming

- **One of the main challenges that cocoa farm-managers face is access to adequate and affordable sources of labour to work on their cocoa farms.** The research in both countries confirms that household labour remains a vital input for cocoa production, counting as a major component of total labour use. **Both qualitative and quantitative data suggest that hiring labour is expensive in the two study countries.**
- The constraints identified operate differently for men and women cocoa farmers. Partly, this is due to their different ability to draw on household labour and/or to hire workers. For instance, **women farmers sampled in Côte d'Ivoire, the majority of whom were widowed or divorced, received very limited help from household members (much less than their male counterparts) and therefore employed significantly more hired labour days than men. In Ghana, women cocoa farmers described the high costs of paid labour and the shortage of youth labour from within the household as a major problem, and more so than what was reported by men cocoa farmers.**

Labour Use and Yields by Land Size

- **In both Ghana and Côte d'Ivoire, less labour days are used per hectare as land size increases (both for household and hired labour), hereby indicating a potential labour constraint for farmers with larger landholdings.**
- **Labour productivity is progressively greater at higher land quartiles. However, a comparison of yields by land quartile suggests that the increase in labour productivity does not fully compensate for the decline in labour use**

Labour Demand by Yield Levels

- Farmers surveyed in both countries were divided into three groups; 1. low yield farmers; 2. medium yield farmers and 3. high yield farmers. More than 80% of farmers in both countries were found to be in the low and medium yield groups.
- **Overall, high yield farmers have a greater use of household, hired and children's work days as compared to low and medium yield farmers.** However, the proportion of children's work days within the total household labour use for both countries across yield range levels, remains fairly constant (between 5-7% for Côte d'Ivoire and 31-34% for Ghana).

Yields, Child Labour (Non-hazardous) and Hazardous Child Labour by Programme Participation[1]

- **In Côte d'Ivoire, farmers who participate in either a public or private programme to increase yields have significantly higher yields than non-programme participants.**
- **Programme participants in Ghana did not have statistically significant higher yields relative to non-programme participants.**
- Furthermore, in **Côte d'Ivoire, participants in either type of programme were found to have a statistically significant lower child labour (non-hazardous) rate** than non-participants **– but no difference in the hazardous child labour rate.**
- In **Ghana, farmers with larger landholdings** (i.e. those managing between 3.5 and 38 hectares) **who benefitted from a child labour/worst forms of child labour awareness campaign were found to employ significantly more child labour (non-hazardous)** than their counterparts.
- Similarly, **farmers with large landholdings participating in private investment programmes to raise yields in Ghana, were found to use significantly more hazardous child labour** relative to non-programme participants.
- In **Côte d'Ivoire, farmers who were not participating in private investment programmes to raise yields used a significantly higher share of child labour (non-hazardous) as compared to programme members.**

Factors associated with the Child Labour (non-hazardous) and Hazardous Child Labour Risk

Regression analysis was used on the combined farmer-child dataset in each country case study, in order to identify which farmer's and children specific characteristics are more likely to be associated with the risk of child labour (non-hazardous) and hazardous child labour. According to the study:

[1] Caution needs to be exercised when interpreting these findings. There is no implication here that participation in programmes leads farmers to have low/high yields or use more/less child labour (non-hazardous) or hazardous child labour.

Child Labour (Non-Hazardous) in Ghana is most likely to occur among:

- Men farmers
- Medium yield farmers (relative to low yield farmers)
- Farmers owning less land holdings
- Farmers hiring more labour

Hazardous Child Labour in Ghana is most likely to occur among:

- Women farmers
- Farmers who have not been exposed or have been less exposed to WFCL awareness raising campaigns
- Older farmers
- Farmers that own multiple owned land holdings for cocoa production
- During the peak harvest season
- Boys more than girls
- Low yield farmers (relative to high yield farmers)
- Older children

Child Labour (Non-Hazardous) in Côte d'Ivoire is most likely to occur among:

- Children working during the peak season.
- Children of farmers with no/less formal education

Hazardous Child Labour in Côte d'Ivoire is more likely to occur among:

- Children who have not been born in the village - a child born in the village is 23% less likely to be involved in hazardous child labour than a child born elsewhere.
- Children living with lower yield range farmers than medium yield range farmers
- Older children (14-17) - (nearly 20% of children aged 14-17 are engaged in hazardous child labour compared to 5% aged 12-13 and 13% aged 5-11).

Structure of the Report

The report is structured as follows. It begins by reviewing definitions of child labour and by summarising the main points that emerge from the background literature review (section 1). It then describes the methodology used to conduct the analysis, both qualitative and quantitative (section 2). Section 3 and section 4 present in turn a detailed discussion of the evidence emerging from the analysis of quantitative and qualitative data collected in Ghana and Côte d'Ivoire respectively, under the four research questions pertinent to the study. Finally, section 5 summarises the key findings from the analysis, and draws the key policy recommendations of the study.

1. Summary from the literature review[2]

1.1 Definitions of child labour and hazardous child labour

The International Labour Organisation (ILO) distinguishes between child work, which includes permissible work activities by children at a given age, and child labour (CL), defined as work which is mentally, physically, socially or morally dangerous or harmful to children, or work which interferes with children's education, deprives them of education, forces them to leave school prematurely, or puts children into a stressful situation where they try to combine school attendance with long and heavy work. The worst forms of child labour (WFCL) are defined in Article 3 of ILO Convention 182 according to four categories: a) all forms of slavery or practices similar to slavery, b) the involvement of a child in prostitution or pornography, c) the involvement of a child in illicit activities such as drug production or trafficking, and d) any work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children. Categories a) to c) above are characterized as the unconditional worst forms of child labour, while category d) is also termed as hazardous child labour. Both of them are to be immediately eradicated as a matter of priority.

Both Ghana and Côte d'Ivoire have signed the ILO Convention 182 and committed to eliminating the worst forms of child labour as a matter of urgency. Both countries have also adopted several pieces of legislation to translate this commitment into action at national and sub-national level. Such laws and provisions have been specifically detailed for the cocoa farming sector, given its crucial role in the countries' economy and the heightened concerns around the presumed high incidence of CL and WFCL in cocoa (Tulane, 2009).

Table 1.1 reports the typologies of child work as identified in the cocoa sector of Ghana and Côte d'Ivoire, including what constitutes child labour and hazardous work for children of given ages. As evidenced when comparing the two countries in the table, the government of Ghana has provided a more detailed list of tasks that are permissible and not permissible for given age categories, and adopted a more conservative (e.g. wider) definition of child labour and hazardous child labour in cocoa farming.

[2] Most of this section draws heavily from a literature review document written for this project by Dr. Amanda Berlan (see Berlan, 2014). This was commissioned as a background paper for this study.

TABLE 1.1. Child work, child labour and hazardous activities in Ghana and Côte d'Ivoire's cocoa sectors

Child work (permissible):	Child labour (not-permissible)	Hazardous activities (to eliminate with urgency):
Ghana		
Age 5-7: Accompanying adults to farm, but not undertaking any task Age 8-11: Supervising young children; help cooking/serving food; help running farm errands; picking pods under cocoa trees; uprooting weeds Age 12-14: Plucking within hand-reach pods; pod gathering; fetching water for spraying (but then leaving the farm before spraying); scooping and removal of beans; carting minor loads Age 15-17: Weeding with age appropriate cutlass; pod heaping; breaking pods with breaking mallet or hitting on the ground; drying fermented cocoa beans	Age 8-11: Doing permissible work more than 1 hr/day or 7 hrs/week Age 12-14: Working more than 2 hrs/day or 14 hrs/week on school days Working more than 3 hrs/day or 18 hrs/week on weekends or holidays Age 15-17: Working more than 3 hrs/day or 21 hrs/week for heavy manual work, or working more than 42 hrs/week for light duties Working unsupervised by adults or working alone on the farm in isolation Working on the farm between 6pm and 8am	For children of any age (< 18): Land clearing (with machete) Tree felling Burning bush Applying fertilizer/fungicide Spraying insecticide Being present during pesticide spraying or re-enter a sprayed farm in less than 12 hours Pod plucking (with hook) Pod breaking (with knife) Weeding with cutlass Removing of mistletoe with cutlass Working with motorized mist blower, knapsack sprayer and chainsaw Climbing trees > 2.5m height Carting beans (if > 30% of body weight & > 3km; any distance if > 50% weight)
Côte d'Ivoire		
	For children of any age (< 18): Put their lives in danger Damage their health, security, or morality Harm their physical or mental development Deprive them of their childhood, their potential and their dignity Deprive them of their schooling or the opportunity to go to school Prevent them from scholarly diligence or having the aptitude to benefit from the instruction received	*For children of any age (< 18):* Cutting of trees Burning of fields Application of chemicals (insecticides, herbicides, fungicides, etc.) Application of chemical fertilizer Chemical treatment of fields/plants Carrying of heavy loads *Carrying of loads is prohibited if exceeding the following:* Children 14 to 15 years of age: 8Kg. Children 16 to 18 years of age: 10 Kg. Transport by wheelbarrow Children 14 to 17 years of age: 40 Kg, vehicle included.

Source: Consolidated by the authors based on Government of Ghana, Hazardous Activity Framework for the Cocoa Sector (2008), and Government of Côte d'Ivoire, Ministry of Civil Service and Labour, Arrêté No. 2250, (March 2005), and Arrêté No. 009, (January 2012)**.**

1.2 Understanding the determinants of child labour and WFCL

Despite the efforts of governments and other agencies to define and categorize CL, there is still considerable subjectivity in measuring what constitutes 'hazardous' work and WFCL. This is because some of the definitions hinge upon knowing the age of the child (which is not common knowledge in many rural communities), as well as many other variables, such as the child's weight, the load weight, and the distance covered in order to determine, for instance, whether carrying heavy loads is hazardous or not in any given circumstance. Moreover, CL measures depend on whether survey respondents are able to measure time accurately, and over varying recall periods.

Furthermore, data on CL/WFCL are not entirely reliable due to intrinsic methodological problems, such as the recurrent failure to include children in any empirical work on the topic, or the use of inappropriate research methods when doing research with children, such as the administration of long questionnaires, the reliance on structured (rather than open-ended) questions, and the lack of knowledge of what may be culturally sensible and meaningful in the local context (Boyden and Ennew, 1997). In many communities, respondents know that child labour is viewed negatively by governments, development agencies and researchers alike. The internalisation of socially unacceptable behaviour is known to lead survey respondents to under-report or minimize the extent of a problem, in this case child labour, whether consciously or unconsciously – leading to the so-called social desirability bias (Nederhof, 1985). These and similar other problems often prevent capturing a complete or accurate picture of the situation.

Even with these caveats, existing research does converge on some crucial conclusions. First, the incidence of CL in cocoa farming remains persistent. Children in both countries often start working before the legal minimum age of employment, and some of the older children exceed the maximum number of allowable working hours for their age group. According to the most recent Tulane report (Tulane University, 2015) there were 2 million children working in hazardous conditions in cocoa production in 2013/14 in Ghana and Côte d'Ivoire combined. There is of course a high degree of variability in this statistics of CL, with some regions in Côte d'Ivoire exhibiting 30-40% prevalence compared to others that have only a prevalence of 5%.

Second, the determinants of CL are complex, household poverty being only one. Sometimes CL and hazardous work emerge in response to the need to find something valuable for children to do, in the absence of adequate schooling and training alternatives. This may be more the case in Côte d'Ivoire, where a high number of children are found to be out of school (INS, 2014), and school facilities are particularly scarce in rural areas. Moreover, parents worry about the prospects of their cocoa farms as well as their children's future prospects: transmitting cocoa farming skills to the next generation is a way to make sure their land will be managed effectively over the long period. Because of this and of the wider cultural underpinnings of CL in cocoa farming, family demand for, and utilisation of CL, may not respond quickly to an increase in yields or income.

Other research, supported by ICI (Buono, 2010), shows that WFCL in cocoa farms is tied to a wider phenomenon of WFCL in other agricultural/economic activities, and that parents' use of CL is

subject to wider social pressures and norms on which parents themselves have limited control. In other words, an exclusive focus on eradication of WFCL in the cocoa value chain (as argued by many international actors) will not have traction in the absence of a more comprehensive improvement in the life of communities, and the absence of a better understanding of parental investment in children's future and of how agricultural labour markets function.

1.3 Linkages between productivity-enhancing interventions and labour demand and supply

Despite the scale of initiatives undertaken to increase cocoa yields and cocoa households' incomes, there are very few studies that assess their actual impact on yields and incomes, and the extent to which, when higher yields and income from cocoa occur, these will have an impact on the demand for labour in general, and their effect on CL/WFCL specifically. This study is a first step to filling in this knowledge gap.

The key issues that have been discussed so far in the existing body of evidence can be summarised as follows:

- Interventions that increase yields may not increase household income as much as expected. Abankwah et al. (2010) find this to be the case when studying the impact of the mass pesticide-spraying programme in Ghana. The high inflation rate experienced in the country over the period of the study eroded famers' higher income generated by the impact of the programme. The authors also found that, although families claimed to be more willing to spend on children's education, the observed school enrolment rate did not increase correspondingly.
- Some productivity-enhancing interventions, by taking over some of the labour intensive tasks, such as Cocoa Diseases and Pests Control Exercise Committee (CODAPEC) mass spraying campaign rolled out by the government of Ghana, have not led to additional pressure on household labour (Abankwah et al., 2010).
- Interventions that increase yields may not be taken up by farmers, or might be only sparingly adopted, if they require additional labour that farmers cannot access for whatever reason (e.g. shortage of labour supply, or high costs).
- One study predicted that if some cocoa farms increase their yields, this will increase both hired and child labour (Nkamleu and Kielland, 2006). This would in turn increase the opportunity cost of working on own farms for farmers with a low yields potential. If these predictions of higher yields generating higher pressure on child labour are true for 'low productivity' farmers, this will reinforce the knock on effect on CL incidence for farmers stuck in a 'low productivity' trap.
- If women cocoa farmers are more likely to send children to school and to reduce their time spent on cocoa farming, productivity-enhancing interventions that address women's farmers' needs and are more gender balanced may be more likely to reduce the pressure on CL (Asenso-Okyere et al., 2013).

1.4 Understanding demand and supply of adult labour and links to child labour

In both Ghana and Côte d'Ivoire, the shortage of adult labour supply is often considered one of the main causes of child labour incidence (IPEC, 2007). Understanding the extent to which constraints to the availability of adult labour can be released is essential to understanding possible and effective actions to reduce both CL and WFCL.

The literature review suggests that labour is particularly needed during two periods: Oct-Dec (main harvest) and Jan-April (pre-planting activities such as land clearing, felling, lining, pegging for example). Adult labour in cocoa is hired on an 'occasional' or 'permanent' basis, and is often not 'local'. In Ghana, for instance, 60% of the hired adult labour is not from the community and 45% of hired workers have come from another region (NPECLC, 2008). Farmers complain that there is no ready availability of adult workers from which they can easily draw upon as needed, and wages are too high. However, while wages in cocoa farming are well above the government national minimum wage (7 GH¢), they are still perceived by workers to be low, and named as one reason for labour scarcity (Barrientos et al, 2007). On the other hand, and as found by this research study, farm wages are perceived as too high for cocoa farm managers.

Evidence on whether an increased demand of labour would increase child labour is ambiguous in the literature. While the quality of schools in cocoa areas can be questioned, the very existence of school in the community and an increase in school attendance may reduce the supply of child labour. Some studies (e.g. Asenso-Okyere et al., 2013) suggest a significant negative relationship between farm size, taken as proxy for labour requirement, and the likelihood that a child will be in full time schooling and less likely to be engaged in child labour. Nonetheless, it is important to note that children can still combine work and schooling as evidenced by the Tulane study (2015). Other studies (Gockowski et al., 2010) question the assumption that farmers will apply more labour inputs in response to new practices that are more labour intensive. If labour is difficult to secure, the above study suggests that farmers apply the new practices selectively. There is also compelling qualitative evidence that young people are very reluctant to do agricultural work of any sort because of its low social status (Anyidoho et al., 2012).

1.5 Implications from the literature review

There are three relevant implications from the literature review that informed the conceptual framework of this study.

1. Children must be included as research subjects of the fieldwork, and this must be done in an ethically sensible way (Boyden and Ennew, 1997). Unlike other studies where children were administered long and tiring survey instruments (leading to answers being largely meaningless), this research has made appropriate use of participatory research methods, using drawings and other tools for children to express their views on the topic, also selecting for interview only children 10 years or older to avoid the stress and discomfort that younger children could experience in this kind of research exercise carried out in a tight timeframe.

2. The link from interventions to increased yields and increased household income, from income to the demand of labour, and from the demand of labour to reliance on CL/WFCL, cannot be assumed a priori. These are questions to be carefully addressed through empirical research, investigating each of the links above separately.
3. Most studies surveyed in the literature review do not pay sufficient consideration to the problem of reverse causation. A number of multiple factors may also intervene in the relationship between yields and WFCL, operating through various channels and at different scales (household composition, community dynamics in relation to cocoa farming, and broader regional labour markets). This study attempts to separate out these causal mechanisms in a number of ways, based on a mixed method approach where quantitative research methods are complemented and integrated with in-depth qualitative analysis.

When considering the main objective of this study, to understand and identify conditions to mitigate the potential risk of child labour in the cocoa sectors of Ghana and Côte d'Ivoire in response to investments to increase sector yields, the research identified challenges at two levels. The first one is that productivity-enhancing interventions may have an ambiguous effect on child labour. On the one hand, if the increase in yields increases farmers' incomes, this may lead to a reduction in child labour (as farmers will be more able to pay for children's school fees and hire adult labourers). On the other hand, the substitution of child labour with hired adult labour (and an increase in the hours of children's school attendance) may depend on other factors and on non-income choices, such as the household head's/parent's/children's view of education, the opportunity cost of child schooling, the availability of an adult labour market, the prevailing wage rates, and the responsiveness of adult labour supply to increased demand. Research suggests that there is a declining or at least limited supply of adult labourers to hire, and also a gradual disappearance of shared labour practices in cocoa production (Barrientos et al., 2007). Additional evidence also shows that households in the highest productivity brackets and households with a larger number of children have a greater propensity to rely on child labour (Agbenyega and Gockowski, 2002).

The second challenge is that producers may respond to cocoa yield-enhancing interventions in different ways. For instance, they may divert input use (heavily subsidized under some cocoa specific interventions) to other crops, switch to more labour intensive production technologies, or divert labour to other competing livelihoods – all choices that may reduce the impact on cocoa yields.

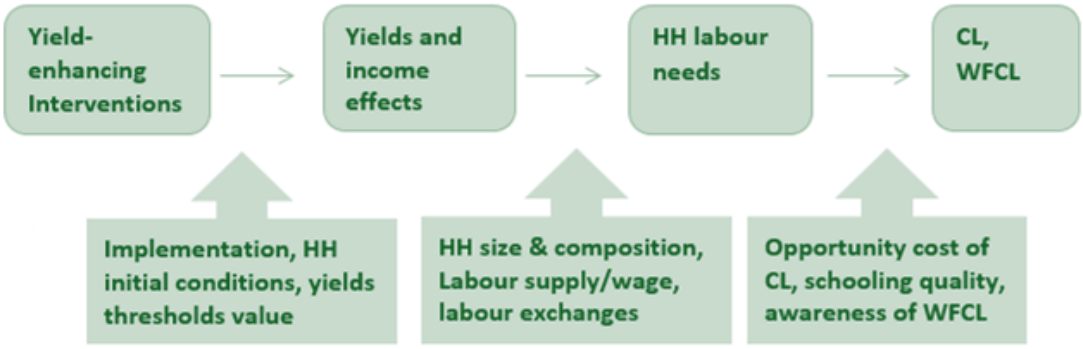
Both points above imply the impossibility of anticipating a priori the impact of yield-enhancing interventions on the child labour risk. Whether yield-enhancing interventions produce their intended positive effects on income, and to what extent this will in turn affect choices around child labour use, is thus a testable empirical question.

2. Methodology

While in principle a rise in cocoa land productivity is expected to increase producers' incomes and reduce the incidence of child labour by relaxing households' budget constraint for hiring paid labour, this outcome is crucially dependent on a number of factors, among which are the prices of outputs and inputs; the availability of adult labour and its affordability; and the degree of substitutability between adult and child labour on cocoa related tasks.

Figure 1 below exemplifies a number of possible links that could be examined when assessing the impact of yield-enhancing interventions on CL and WFCL (see top part of the diagram). Each link represents a different possible aspect of the overall relationship. As illustrated in the brief literature review in section 1, none of these links can be assumed a priori, as each is in turn affected by a number of factors, some of which are illustrated in the bottom part of the diagram by boxes with arrows pointing upwards.

FIGURE 2. Linking higher yields to changes in Labour demand in cocoa farming



Firstly, interventions may or may not lead to an increase in yields and household income, depending on the type of interventions, on household welfare and initial conditions, and on whether there is a minimum yield threshold that needs to be reached for higher incomes to materialize. Secondly, the extent to which higher yields and increased household income affect the household requirements for labour use in cocoa, depends on the household size and household composition, as well as on opportunities to hire labour or take advantage of social practices of labour exchange. Thirdly, whether increased labour needs imply more or less child labour depends on the opportunity cost of child labour, on the existence of adequate schooling facilities or better alternatives for children. In addition, the occurrence of child labour or worst forms of child labour will also depend on the degree of local awareness of what constitutes child labour and hazardous farming activities for children in different age groups.

In sum, there are several routes through which increase yields could affect the incidence of child labour or hazardous child labour. One is that the size of the yield increase resulting from specific interventions needs to be sufficiently large enough to generate an increase in household income that is sufficient in order for farmers to contemplate substituting adult labour (drawn from within households or from the local labour supply) for CL.

There are, however, other instances where households with higher cocoa yields may use more child labour or hazardous child labour: i) when the increase in profits resulting from higher yields is not sufficient to enable producers to substitute child labour with adult labour; ii) when, even if higher yields generate a significant increase in cocoa profits, there is a shortage in the local labour supply, for either or both waged and non-paid labour (such as rotational labour arrangements in the community, sharecroppers, and unskilled migrant labourers); iii) when producers on larger landholdings face higher production costs per unit of land, and in the absence of economies of scale (a common findings in the literature on cash crop smallholders in sub-Saharan Africa) they need to complement (rather than substitute) adult labour with child labour to generate higher yields; iv) when there is no other affordable possibility for child activities (accessible schooling, child care arrangements during the peak season in the cocoa crop calendar) that the household sees as useful.

It is also important to note the type of production technology that induces the yield increase may have a direct impact on the demand for child labour. It may not always be the case that the production technology adopted in cocoa farming is labour intensive, or that child labour and hired adult labour are substitutable. There are some tasks which cocoa producers would never have a child do, as they might not be physically able to perform it (for example carrying heavy loads, clearing land for cocoa cultivation), or there may be some tasks for which hired labour and child labour require different levels of supervision that may also be costly to the farmer. This study provides some evidence on the different types of adult and child labour requirements featuring under different levels of cocoa production technologies adopted.

The research questions are listed below:

RQ1. What are the conditions that determine the demand of adult labour and children's work? What are the key features of the labour supply for cocoa in the village?
RQ2. What production technologies are being implemented to increase land productivity, and what implication does this have on the labour demand?
RQ3. Are higher yields associated with higher labour demand? To what extent may incomes derived from improved cocoa productivity respond to the labour demand?
RQ4. Is there evidence of higher hazardous child labour or non-hazardous child labour occurring where programmes exist to increase cocoa yields? What factors are associated with a higher risk of incidence of hazardous and non-hazardous child labour?

2.1 Quantitative methodology

2.1.1 Sampling methods and Survey Data: Ghana

This section briefly explains the organisation of the survey data collected for the Ghana case study. The fieldwork was carried out in November and December 2014 in two regions, Ashanti and Western North, representing respectively old and relatively new areas of production in the larger picture of the country cocoa belt. The logic for choosing these two regions was driven by the need to meet two different objectives:

1. Cover at least two cocoa production areas to ensure data captured producers from areas with a different history of cocoa production expansion (the Western North region being the last area opened up to cocoa cultivation and Ashanti being a more traditional producing region).
2. Revisit a number of farmers who in 2012 were registered onto a private sector programme, which will be referred to as the "Sustainable Cocoa Programme GH". This is an investment programme, which aimed at increasing yields and income for participants through the provision of services and inputs to improve farming practices. All cocoa farmers revisited are located in the Sefwi Wiawso administrative district (also known as the Boako 'cocoa' district).[3]

TABLE 2.1. Sampling frame: Ghana

Region	District	Village	Minutes to nearest cocoa buying station	Minutes to nearest cocoa farm	N obs	FGDS carried out
Ashanti	Asante Akim Central	Ekutuase	16	53	83	Yes
	Atwima	Mponua-Nyinahim	17	55	75	Yes
	Adansi East	Twerebuana	11	36	74	Yes
	Offinso	Kyebi	17	54	87	Yes
N. Western	Sefwi-Wiawso	Bosomoiso	14	71	74	Yes
		Aboagyekrom	8	49	27	Yes
		Okwabena	10	13	16	-
		Asarekrom	7	13	20	-
		Abrabra	15	34	32	-
		Kankyiabo	9	43	8	-
		Asafo	15	90	25	Yes
		Afrimkrom	6	43	37	Yes
		Suiano	12	64	11	-
		Pewodie	20	29	27	Yes
		Boako	18	75	44	Yes
		Punikrom	10	75	35	Yes
		Kantankrobo	8	32	17	Yes
	Juabeso-Bia	Mansokrom	14	28	115	Yes
		Nkatieso	14	57	110	Yes
Total					917	

Source: *adult's questionnaire, Ghana*

[3] Appendix 1 explains in detail the challenges faced in this study to use the panel of farmers purposefully built for this study.

Table 2.1 details the location of the survey sites in Ghana by region, districts, village and sample size. The sampling procedure adopted for the quantitative part of this study consisted of choosing a first and second strata at the districts and village level for which baseline data from other work on cocoa farming in Ghana was available. The baseline data used as a sampling frame came from two different sources: 1) the privately sponsored "Sustainable Cocoa Programme" described above, for which data from the Sefwi Wiawso administrative district (also known as the Boako 'cocoa' district in the Western North region) was available, and in respectively one other administrative district (Bosomoiso) in the Western North region; and 2) four administrative districts in the Ashanti region where the Ghana Cocoa farmers Survey by Oxford University had conducted its last round of a panel study of cocoa farmers in late 2010.

The main reason for not randomly sampling these geographical units was to revisit as many farmers covered by other research studies for which survey data for cocoa farmers was available from 2010 and 2012. This would have enabled to use a panel to measure with exact precision the changes observed over time for the same farmers, particularly for a subsample of farmers who participated in private programmes to increase and sustain yields.

Unfortunately, in Ghana, even though it was possible to revisit successfully some of the targeted farmers for this exercise, significant and irreconcilable differences in the reported size of land between baseline and end line prevented the use of such data to compare rigorously changes it over time of farmers' incomes, their family labour choices, and in particular, their use of child labour resulting from higher yields.

With these criteria in mind, the quantitative fieldwork targeted a population of 900 cocoa farm-managers to visit in a six weeks period. Given the number of districts and villages pre-selected for the administration of the survey investments, the exercise involved collecting data from 75 farm-managers per village.

At an operational level, once the team reached each survey site, the survey manager made contact with Cocobod district officer in the area and/or the purchasing clerks of major LBCs and tried first to set up revisits with either the pre-set list of Oxford panel cocoa farmers, or with that from the 'Sustainable Cocoa Programme' depending on their location. In order to reach the target sample size of 75 farmers per village, the key informants in each village were then asked to gather a comprehensive list of all cocoa producers from which to select based on the following criteria:

1. Ensure a 15% selection of women cocoa farmers to enable an adequate analysis of gender issues, deemed to be an important aspect of the child labour story.
2. Begin sampling from the farmer listed as the 6th one on the list of eligible cocoa farmers, and subsequently selecting every 6th farmer on the list satisfying the condition above a until the target sample size was reached in each village.
3. In Sefwi Wiawso, except for farmers selected from Bosomoiso village (a survey site formerly visited by the Oxford panel), the rest of the farmers selected to reach the target sample size (299) were selected from the "Sustainable Cocoa Programme GH" initiative.

In the sample, 65% of the respondents were men farmers, a significant lower share than what is observed in the actual cocoa farming population in Ghana (where the proportion of male farmers is 80% circa). Within the sample of farm-managers, 423 children aged 10 to 17 were randomly selected from those listed in the household roster section of the farm-managers' questionnaires. The decision to exclude children younger than 10 years of age was based on the assumption, shared by much literature on studies conducted with children, that young children in the settings studied tend to be very shy and are often reluctant to give full responses. The children interviewed were asked to give information about their family background, their work on cocoa farms and perceptions about life in a cocoa village and what the cultivation of the tree crop means for their outlook in life. Questions were asked using brief and simple terms, and plenty of scope was left for children to give their opinion in a free text format. The children's questionnaire was only 3 pages long, and the interviews lasted on average no more than 15 to 20 minutes. Consent was sought and obtained from the children's guardians prior to carrying out the interview.

It is important to note that children interviewed with structured questionnaires and linked to a sub-sample of the adults' farm-manager questionnaires were different from those participating in the drawing activity as part of the qualitative fieldwork (see below). This was an intentional research choice made not only to avoid any 'contamination' of information between the two research tools, but also to increase the variety of views gathered from children in cocoa villages.

2.1.2 Sampling methods and Survey Data: Côte d'Ivoire

In Côte d'Ivoire the fieldwork was conducted locally by a team of researchers from the *Centre Ivoirien de Recherches Economiques et Sociales* (CIRES) during December 2014 and January 2015.

Villages for the study were selected from four regions, and five district-level administrative units (*départements*) within them, as follows: Indenié-Djuablin (Abengourou), Nawa (Soubré and Buyo), Loh Djiboua (Divo) and Haut-Sassandra (Daloa). The choice of regions and districts was dictated by the need to have a sample broadly representatives of the different conditions in the country's cocoa sector, thus reflecting areas of both higher and lower land productivity (yields), areas with different degrees of actors' interventions, and areas with greater and lower rates of labour migration.

Within the five districts, 26 villages were purposefully selected with the intention to revisit a number of farmers for whom baseline information from the Sustainable Cocoa Programme CDI survey conducted in 2010/11 was available (see below). The main questionnaire was administered to 904 cocoa farm managers, just above the target sample of 900, from 26 villages. It is important to note that the percentage of women cocoa farm managers is very low in our sample (5%), cocoa farm manager characteristics for cocoa farm managers according to the Côte d'Ivoire data are further discussed in section 4.1.2.Table 2.2 lists the administrative units visited and the sample size for each. The same table gives also the distance to some basic infrastructures at village level, for basic comparative information. For most villages the nearest cocoa farm is three to five km away. There is more variation in terms of distance to the nearest cocoa buying

station, which goes from 0 km for Gbatina (Buyo) to a maximum of 16 km for Wawapeko (Divo). The nearest health centre and primary school are within 5 km for the majority of villages, but these distances are greater than 10 km for four and three villages, respectively.

TABLE 2.2. Sampling frame: Côte d'Ivoire

Region	District / *Village*	N obs	Nearest cocoa buying station (Km)	Nearest cocoa farm (Km)	Nearest health clinic (Km)	Nearest primary school (Km)	Included in the qualitative FGDs
Indenié-Djuablin	**Abengourou**	**204**	**7.08**	**5.09**	**2.05**	**5.30**	**-**
	Ettienkro	10	4.30	6.00	1.70	1.90	-
	Améakro	18	4.61	2.47	5.67	22.60	-
	Abronamoué	35	0.59	4.22	0.91	0.44	Yes
	Ebilassokro	82	12.90	6.53	1.10	7.45	Yes
	Apprompom	24	0.91	3.40	0.98	0.80	-
	Kouaméziankro	35	6.19	4.83	4.47	0.31	Yes
Nawa		**226**	**5.41**	**3.45**	**5.37**	**4.31**	**-**
	Soubré	**87**	**4.39**	**3.47**	**4.13**	**0.47**	**-**
	Zogbodoua	24	13.90	4.30	4.92	0.53	-
	Kagninanko	54	0.59	3.13	2.32	0.48	Yes
	Grebouo2	9	1.96	3.33	12.90	0.27	Yes
	Buyo	**139**	**6.04**	**3.43**	**6.15**	**6.72**	**-**
	Gbatina	7	0.00	3.29	15.00	2.00	-
	Gliglo1	104	7.65	3.44	1.91	8.76	-
	Dapéoua	28	1.60	3.46	19.70	0.29	Yes
Loh Djiboua	**Divo**	**382**	**9.90**	**4.65**	**9.05**	**8.59**	**-**
	Yobouékoffikro	1	6.00	0.10	0.01	0.00	Yes
	Groh2	7	0.86	4.36	1.43	71.80	-
	Wawapeko	40	16.10	2.96	4.03	21.30	-
	Gbagbam	304	9.90	4.85	9.58	6.21	Yes
	Douaville	21	2.11	5.90	15.60	0.57	Yes
	Babokon-Dida	7	8.00	4.00	6.01	1.71	-
	Awalezo	2	4.00	1.25	4.00	4.00	-
Haut-Sassandra	**Daloa**	**92**	**2.24**	**4.01**	**3.00**	**0.63**	**-**
	Nigbeigbeue	9	0.16	5.11	8.58	0.58	-
	Guetouzon1	11	0.94	10.70	2.00	0.16	-
	Niouboua	11	3.77	3.64	0.20	0.14	Yes
	Luenoufla	12	0.30	3.35	1.28	1.02	-
	Brizeboua	19	1.56	3.24	1.00	0.50	Yes
	Krikoréa1	11	3.93	1.91	5.73	0.36	Yes
	Guédéguhé	19	4.00	2.22	4.02	1.23	-
	Total	**904**					

Source: *adult's questionnaire, Côte d'Ivoire*

Similar to Ghana, the aim was to revisit as many farmers covered by other research studies for whom 2010 survey data was available for the study. For Côte d'Ivoire, only 204 farmers could be tracked from the previous 2010 survey, due to a high attrition rate and potentially also due to the population movements following the crisis. Moreover, only a few farmers (24) were found to be part of the programme both in 2010 and 2014, which meant that it was also not possible to

conduct any panel level data analysis. In the sampled households, one child aged 10-17 per household was randomly selected and, if available, administered a shorter questionnaire. The target sample for children to be interviewed from the farm manager households was a bit lower than in Ghana, and totalled 330 children.

2.2 Qualitative methodology

The purpose of the qualitative fieldwork was to gain information that could complement and better explain the findings from the quantitative survey. The qualitative fieldwork included two elements:

1. Focus group discussions (FDGs) with adults, to explain local views about the prospects of cocoa farming on: i. Modalities of employment of family labour; ii. Opportunities for and constraints to use hired labour; iii. Schooling facilities and their perceived quality/returns to education; iv. Reasons for cocoa families' decision to employ child work in cocoa; v. Identify tasks considered unacceptable for children of a given age; and vi. Understand perceptions of why some children may perform hazardous child labour, and/or work long hours or not attend school.
2. Group sessions with children aged 10-14 to grasp, through drawing and similarly child-friendly forms of communication, their typical daily activities, likes and dislikes around daily routines, possibly hard or uncomfortable tasks, and their hopes and aspirations.

Qualitative fieldwork was conducted in 14 villages in Ghana (listed in Table 2.1, last column) and in 12 villages in Côte d'Ivoire (as shown in the last column Table 2.2). In Côte d'Ivoire, three villages were purposely selected (non-randomly) in each of the four regions, according to criteria that could ensure a wide representation of community characteristics, such as population size and infrastructures: there are thus both small and large villages, with and without infrastructures.

As for the FGDs element, it was decided to identify and work with four different categories of adults: village leaders/leading personalities, such as the chief, cocoa extension workers (respectively COCOBOD and ANADER staff), spiritual leader, teacher, elected representative (FG1), male farm managers (FG2); women with children in school, some of them cocoa farm managers (FG3 in Ghana and FG4 in Côte d'Ivoire); male youth aged 18-30 years old working in cocoa, either on their (family) farm or as waged labourers, since they represent an additional source of labour supply in any village (FG4 in Ghana and FG3 in Côte d'Ivoire).

Each focus group included about 5-8 participants, who were recruited as follow. Upon arrival in each village, the research would perform the initial formalities, and ask the chief or the main contact in the village who the main personalities of the village were (including elders, local authorities, and teachers) and would set a time for them to participate. This would constitute the first focus-group discussion. The participants to the following FGDs were recruited through a snowball sampling technique, by starting with a key informant or village personality, who would then identify one or more suitable participants to a given FGD, and the latter would indicate other suitable participants, until meeting the intended number of participants.

Although participants in a FGD are not supposed to "represent" in a statistical sense a particular demographic/social group, an effort was made to identify participants drawn from different backgrounds. The rule of thumb was that a group needed to be large enough to gather diverse perceptions but small enough to allow everyone to share insights. Participants were given some advance notice regarding the date and time of the FGD and were presented with an informed consent form (to which they would agree by signing or by oral consent).

Other focus groups were considered for the study, such as those with teachers, and sharecroppers/caretakers. Due the limited time frame, local teams did not deem possible holding more than four FGDs in any village. Teacher(s) were invited to join FG1 (which was an appropriate choice, since many villages had only one teacher available); and young sharecroppers and migrants occasionally joined FG4.

Under the second component of the qualitative fieldwork, the research team carried out an activity with a group of 4-6 children per village, boys and girls aged 10-14. Children were identified with the help of a teacher, pastor or village leader. Their parents or other responsible adults were contacted in advance to obtain informed consent. The local research teams were instructed to organise the activity in a quiet environment where there were not too many outsiders observing and disturbing. Each participating child was given paper and coloured pencils and asked to draw pictures representing what he/she would normally do when out of school. Children were then tactfully probed, in individual conversations, to interpret their drawings and make any additional comments. The latter activity is labelled for convenience as FG5. This type of participatory research method (adapted from Boyden and Ennew; 1997) has been specifically recommended in work with children, to allow them to express themselves non-verbally and more freely.

The drawing activity offers a complementary set of perspectives to the individual interviews held with the sample of children aged 10-17, drawn from the farm managers' households (see quantitative methodology section). Children are usually more relaxed when they engage in hands-on activities rather than formally interviewed with a questionnaire, and it is thus expected that in such situations, children would be truthful and less defensive. At the same time, this activity is considered less effective with children 15 years of age and older, who see themselves as "grown-ups" and may consider the drawing exercise as too childish for their age. Upon consultation with the local teams, it was therefore decided to restrict the age group for FG5 to children 10 to 14 years old.

Qualitative data were recorded using a recorder, and notes were also taken during the session. Analysis on the qualitative data was performed in excel, using a simple but effective methodology where answers and opinions are first regrouped by theme (e.g. costs and availability of hired labour; views on child labour; and so on), and coding is subsequently performed to capture and classify views grouped by frequency within each theme (Eliot and Associates, 2012).

2.3 Measurement issues and key variable definitions: Ghana and Côte d'Ivoire

2.3.1 Land size correction factors

Most of the analysis conducted in this study is presented by looking at variables measured per unit of land under cocoa cultivation in hectares. This is a useful practice that allows one to understand how efficient farmers are in their agronomic practices on each unit of land cultivated, rather than in absolute levels. By looking at the amount of production harvested and inputs applied on each unit of cultivated land, it is possible to examine if there are economies of scale in the adopted production technology; and if farmers are efficient in using the minimum amount of plant protection inputs required to generate the optimal potential from each unit of land (given the quality of land).

It is also known that smallholders are not always able to report accurately the size of their landholdings, and in the absence of records that account for actual size, this central measure of analysis often introduces a biased picture around productivity indicators that are constructed around it. In this study the reported measure of land size was corrected as follows to get a more accurate measure of actual land productivity. In Ghana, the study first looked at how this measurement issue was tackled in similar rural quantitative surveys (e.g. Harvard Baseline Study of Cocoa farming in Ghana, 2009), and found that farmers tend to over report land size. We also used a small sample of randomly selected landholdings from those included in the reported information from the farm manager questionnaire in our sample. Column 1 in Table 2.3 reports the average reported and measured farm size (median and mean) for all 90 measured farms. Based on this information the the land size variable was adjusted using a reduced correction factor of 36% applied to the figures reported by the respondents. The difference in the means between reported and corrected land size appears to be statistically significant, confirming the relevance of accounting for this measurement problem in the subsequent analysis.

In Côte d'Ivoire past surveys administered in the same regions and villages covered by this study show that farmers tend to overestimate the land size they own and cultivate. For instance, the Sustainable Cocoa Programme 2010 baseline survey calculated an over-reporting of about 19%, by comparing the land size reported by farmers and the land size measured by GPS. Since the villages surveyed by the current study in 2014 are a sub-sample of those covered in the 2010 study, a decision was made to apply the same correction factor to all self-reported land size. Thus, land and yield (production divided by land size in hectares) measures were corrected using the same reduction factor of 15.8%.

TABLE 2.3. Measured versus reported farm size: Ghana and Côte d'Ivoire

	(1) Ghana			(2) Côte d'Ivoire		
	Sample size	Median	Mean	Sample size	Median	Mean
Measured/	918	1.04	1.31	903	3.37	5.05
corrected size (ha)			(1.11)			(-0.21)
Reported size (ha)	918	1.62	2.05	903	4.00	6.00
			(1.73)			(1.73)
Over-reporting		0.56	0.56***		0.158	0.158***

***Note**: Standard deviations of means in parentheses. *** suggests a 1% level of statistically significant difference in the t-test of difference in means.* ***Source**:* adult's questionnaire, Ghana and Côte d'Ivoire

2.3.2 Bias affecting self-reported data on child work-days and child labour

The study of sensitive issues, such as child labour, is known to be affected by all sorts of biases leading to responses that at times fail to give a faithful representation of the underlying situation. This study has employed methods that were aimed to minimise these biases, by adopting proven quantitative and qualitative research techniques. These included not using explicitly the term 'child labour' during fieldwork activities, but rather asking information about it in the broader context of labour use and composition within the households, as well as instructing the national research teams to use caution in the phrasing of child labour related questions (as illustrated in the training materials and manuals prepared for the fieldwork).

Nonetheless, very low rates of utilisation of children's work-days as well as low incidence of child labour and hazardous activities are noted in the Côte d'Ivoire study. These reported figures are low when comparing them not only with the ones obtained from the Ghana study, but also with data reported in other recent surveys on child labour in cocoa farming (Tulane University, 2015).

Although it is not possible to say with certainty which figures approximate the true reality, one partial explanation for the low figures in the Côte d'Ivoire study is that respondents were more affected by "social desirability bias".[4]

Social desirability bias impairs the researcher's aim to identify the extent of a problem, such as child labour. However, if it can be assumed that respondents are similarly affected by such bias, the data generated can still be used to examine differences at the margin (across locations for instance), and to perform correlation and regression analysis to identify the influence of different variables on child labour. This is an acceptable hypothesis for this study, whose scope it was to understand the extent to which child labour may vary with yields, technology levels and other farm characteristics.

2.3.3 Definition and construction of key variables

Yield group and Technology levels

The Ghana Cocoa Research Institute (CRIG) has set out technology level guidelines to show different yield levels that cocoa farmers can achieve under different farming practices. Different technology levels are derived based on an engineering approach (where costs are built up from the steps involved in the production process) that allows one to see how efficient producers are in their production process, i.e. if they allocate their working capital efficiently to gain maximum yields against labour and chemical inputs they can afford to pay for). This approach generates the three following T-levels, which have been used as guidelines for farmers' choices of production technology in both Ghana and Côte d'Ivoire in other studies (LMC, 2012):

[4] This means that respondents who are aware that child labour is socially unacceptable and contrary to national laws tend to under-report and give very low figures (Nederhof, 1985). The primary data collection teams and training differed in both countries due to context, different team members which may have also had an impact on the differing figures obtained although the same resources and guidance was shared.

T1 traditional production, very low input levels, yield 250-300 kg per ha
T2 improved maintenance, medium input levels, yield 550-600 kg per ha
T3 high input levels, yield 1.4-1.5 tonnes per ha

These technology levels also offer a framework to understand what would be required for farmers to close the technology *gap* between T1/T2 levels and T3, and achieve a 'sustainable' increase in land productivity. In the data collected for this study, it was necessary to redefine these technology levels starting from yield ranges around the values suggested by this approach in order to avoid losing observations for which we had yield values corresponding to the exact values used by this approach. In practice this means that what the research refers to as technology levels of production are yield ranges that include the values set out by this engineering approach. Table 2.4 illustrates the choice made by country.

TABLE 2.4. Technology levels as yield ranges using ICI 2014/15 Ghana and Côte d'Ivoire survey data

CRIG T-levels	(1) Ghana adapted yield ranges	(2) Côte d'Ivoire adapted yield ranges
T1 yields of250-300 kg per ha	T1: yields ≤ 400	T1: yields]100 -250]
T2 yields of 550-600 kg per ha	T2: yields]400-850]	T2: yields]260-590]
T3 yields of 1.4-1.5 tonnes per ha	T3: yields]850-2000]	T3: yields >610

***Source**:* adult's questionnaire, Ghana and Côte d'Ivoire, and LMC, 2012

In the specifics of this study, this technology level framework is a useful tool to establish: 1) The distribution of sample farmers across the three T-levels, and 2) whether being a T3 farmer relative to a T1 farmer puts higher pressure on the demand for household adult's and children's days of work.

Gross revenue margins

Gross margin from income revenue were generated by netting out the cost of all hired labour and the cost of all plant protection products (fertilizer, fungicides and insecticide) that farmers directly paid for from the revenue of cocoa sales. All the relevant information was sourced from section 4 and 6 of the farm-manager questionnaires administered in both countries. We refer to this as a measure of gross margin as it does not net out other production costs such as tools and materials used for all farming tasks for which no information was collected during the fieldwork, and that we expect to have a constant weight in our measure of cocoa revenues.

Village level wages

Using data on daily and contract wages paid by each farm manager for one person day of work, village wage variables were generated by first averaging paid labour by task, then averaging across type of labour (daily and contracted), and then taking village level means.

Yields and Land Productivity

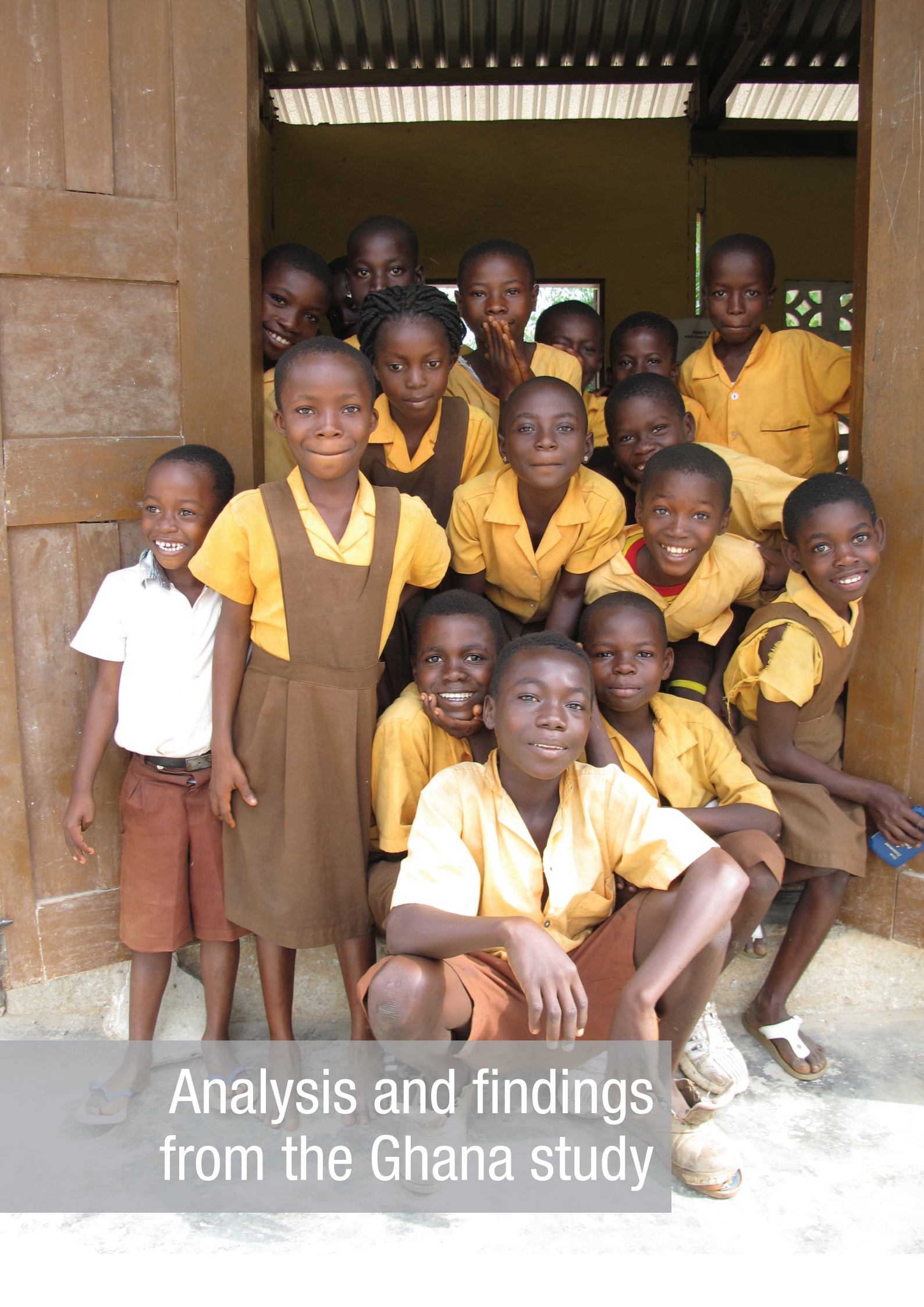
Quantity of cocoa produced (kg) per hectare. Land productivity is also used in this report as an alternative term to yields.

Child Labour and Hazardous Child Labour

Please refer to section 1.1 for the definition of child work, child labour and the worst forms of child labour (includes hazardous child labour) according to the ILO and national legislation. In this report and for research question 4, child labour refers to children who are engaged in non-permissible work but who are not undertaking hazardous activities and is referred to as 'non-hazardous child labour' or 'child labour (non-hazardous)'. Children who are engaged in hazardous activities form a separate 'hazardous child labour' category.

Children's Work Days

This refers to the overall contribution of children to household labour for cocoa farming and does not distinguish between the various sub-categories of children's work: permissible work, child labour (non-hazardous) or hazardous child labour.



Analysis and findings from the Ghana study

This section presents the findings from both the quantitative and qualitative analysis conducted in Ghana. It first describes the context of the study sites, including perceptions around life in a cocoa village by participants in focus group discussions, and the main characteristics of the adult farmers' sample and the children's sample. It then addresses the four research questions raised in the study.

3.1 Profiling cocoa communities in the study sites

3.1.1 The village context

Cocoa is considered the main livelihood and the most important economic activity in all cocoa villages covered in this study. Leading personalities from the Afrimkrom village (Sefwi Wiawso administrative district, Boako cocoa district, Western region) for instance stated that households "use income from cocoa to pay children's school fees, health care and housing. Cultivation of cocoa trees and customary rights on landholdings under cocoa facilitate access to credit since cocoa is commonly used as collateral given its high market value. Cocoa is the village livelihood" (FG1). At the same time, many respondents complained that cocoa production has become challenging, due to the prevalence of diseases (black pod), the insufficient access to plant protection inputs, the resulting decline in yields, and the inability of many farmers to keep up optimal farming practices. Participants in FG1 from Asafo (Boako cocoa district, Western region) observed that although weather changes are one cause for fluctuations in production levels, the recent production decline is due to the irregular supply of fertilizer. In Bosomoiso (Sefwi Wiawso cocoa district, Western region), farmers complained that fertilizers and other chemicals (plant protection inputs) were too expensive.

Focus groups with young men also emphasised the wide and important benefits from cocoa. Youth in Twerebuana (Adansi East, Ashanti) stated that: "Life would be difficult without cocoa. Cocoa is the only viable economic activity in the village"; and youth in Mansokrom (Juabeso cocoa district, Western region) confirmed that: "Cocoa farming is important and is the only economically viable activity. Increasing yields will improve living standards". At times, youth were the most optimistic about the prospects of cocoa for their village future. However, they also adamantly emphasised the lack of inputs and complementary programmes. They insisted that if the government did not provide better support, the prospects of cocoa could be dire.

Women found that there are serious problems in the villages, due to lack of infrastructure, water, and sanitation. They also demanded more access to inputs, credit and farm manager skill training. There was no particular mention of problems about women's access to land. This may be the case because much of the conversations revolved around issues of labour, as this was presented as the main focus of the study. Women noted their lack of capital and knowledge in improving farms. They were in general quite pessimistic about the future of cocoa farming and demanded alternative livelihood options.

Cocoa farming is also losing its appeal among new generations. FGDs with youth pointed to education and socio-economic change as the major reasons why many young people search for off-farm or urban jobs. Farmers themselves stated that farmers are not respected: farm jobs are

deemed to be for uneducated people and are not taken seriously. This has an important impact on the aspirations of new generations. Some farmers do not want their children to become farmers and some of the youth stated they are not interested in cocoa farming.

3.1.2 A profile of cocoa farm managers

The choice of districts for rolling out the Ghana survey for this study was determined by a combination of different research objectives. Firstly, by the intention to revisit a number of farmers covered by other research studies in order to create a panel – either of farmers, or a village level panel - to investigate the effect of land productivity changes over time for the same producers or in the same cocoa villages as previously mentioned (see p.16). The second objective was to cover a diverse set of geographical areas broadly mirroring the distribution of high and medium production in the macro data. Table 3.1 shows the 2013/14 distribution of cocoa production recorded by Cocobod which was used to inform the sampling process and to understand the contribution of different districts to the overall regional cocoa production.[5]

TABLE 3.1. Cocoa production in Metric Tons (MT): trends in Ashanti and Western N. regions, 2009/2010 to 2013/2014

Region / Cocoa district (Administrative district)	2009/2010		2010/2011		2011/2012		2012/2013		2013/2014	
	MT	%	MT	%	MT	%	MT	%	MT	%
Ashanti	**97,307**	**100%**	**170,872**	**100%**	**134,295**	**100%**	**137,379**	**100%**	**156,871**	**100%**
Agona	3,623	4%	6,512	4%	4,520	3%	6,484	5%	8,518	5%
Ampenim	3,394	3%	5,634	3%	3,653	3%	4,556	3%	4,085	3%
Antoakrom	10,445	11%	17,560	10%	14,524	11%	11,974	9%	14,427	9%
Bekwai	11,211	12%	17,325	10%	14,193	11%	11,966	9%	14,781	9%
Effiduase	3,064	3%	4,896	3%	4,179	3%	3,982	3%	4,501	3%
Juaso	4,834	5%	8,277	5%	7,873	6%	7,027	5%	9,262	6%
Konongo (Asante Akim Central)	**4,084**	**4%**	**8,465**	**5%**	**8,295**	**6%**	**7,040**	**5%**	**10,358**	**7%**
Tepa	7,477	8%	19,361	11%	12,728	9%	15,574	11%	17,029	11%
Mankranso	4,770	5%	10,302	6%	7,859	6%	10,141	7%	10,273	7%
New Edubiase (Adansi East)	**11,401**	**12%**	**19,437**	**11%**	**16,297**	**12%**	**14,435**	**11%**	**18,133**	**12%**
Nkawie	8,484	9%	14,953	9%	10,695	8%	12,327	9%	11,276	7%
Nsokote	5,764	6%	9,695	6%	7,869	6%	6,979	5%	6,958	4%
Nyinahin (Atwima)	**6,598**	**7%**	**12,794**	**7%**	**9,657**	**7%**	**11,582**	**8%**	**12,666**	**8%**
Obuasi	4,677	5%	8,508	5%	7,067	5%	7,182	5%	8,227	5%
Offinso	**7,481**	**8%**	**7,156**	**4%**	**4,886**	**4%**	**6,129**	**4%**	**6,378**	**4%**

Table continues on next page

[5] Cocobod is the state marketing board which regulates in Ghana all exports and to whom all cocoa purchased by private companies converges.

Region/Cocoa district (Administrative district)	2009/2010		2010/2011		2011/2012		2012/2013		2013/2014	
	MT	%	MT	%	MT	%	MT	%	MT	%
Western North	**183,616**	**100%**	**330,951**	**100%**	**282,663**	**100%**	**243,076**	**100%**	**238,993**	**100%**
Akontombra	14,014	8%	25,722	8%	22,698	8%	14,821	6%	16,593	7%
Sefwi Anhwiaso	9,518	5%	17,501	5%	12,846	5%	12,817	5%	16,958	7%
Asawinso	13,128	7%	27,216	8%	23,577	8%	20,324	8%	22,463	9%
Asempaneye	14,312	8%	22,991	7%	20,268	7%	18,812	8%	18,980	8%
Bonsu Nkwanta	24,362	13%	44,594	13%	38,874	14%	33,166	14%	28,979	12%
Debiso	16,349	9%	40,548	12%	34,531	12%	27,851	11%	20,178	8%
Essam	14,398	8%	28,642	9%	27,533	10%	21,835	9%	15,719	7%
Fosukrom	6,180	3%	10,319	3%	8,582	3%	10,852	4%	11,154	5%
Bodi *	-	0%	-	0%	-	0%	-	0%	12,363	5%
Juabeso	**28,188**	**15%**	**46,737**	**14%**	**37,168**	**13%**	**33,316**	**14%**	**21,263**	**9%**
Sefwi Wiawso	**21,624**	**12%**	**33,479**	**10%**	**28,200**	**10%**	**23,348**	**10%**	**28,988**	**12%**
Sefwi Bekwai	9,763	5%	14,706	4%	14,581	5%	11,115	5%	14,887	6%
Sefwi Kaase	4,575	2%	8,401	3%	6,775	2%	5,462	2%	3,229	1%

Source: *COCOBOD research department. * Cocoa district created in crop year 2013/2014.*

Table 3.2 illustrates a number of features in the data collected for this study. The majority of farmers surveyed are male, 49 years old, and on average with at least 6 years of schooling. The average size of cocoa farming households in the sample is just under 5 members, of which about half are children (0-17 years old).

TABLE 3.2. Socio-demographic characteristics of surveyed cocoa farm managers

	Ashanti				Western N.		Total
	Atwima	Adansi East	Offinso	Asante Akim Central	Sefwi-Wiawso	Juabeso-Bia	
N observations	75	74	87	83	356	242	917
% Men in sample	69	76	66	67	65	68	67
Age (mean)	52.91	47.7	57.61	50.54	47.38	47.26	49.08
Education (# years schooling) (mean)	6.23	7.38	6.66	7.34	6.11	6.14	6.39
Household size (mean)	4.85	4.24	3.93	4.67	4.53	4.14	4.38
Adult equivalent household size (mean)	3.32	2.51	2.36	2.83	2.83	2.64	2.75
Tot. person days in cocoa	326.47	137.82	148.57	201.78	210.6	133.04	187.05
HH tot. person days in cocoa	110.96	66.03	41.71	67.35	63.15	50.5	62.3
HH children days used in cocoa	30.99	22.18	16.61	21.88	17.9	16.78	19.26
Tot hired days in cocoa	215.51	71.8	106.86	134.43	147.45	82.53	124.75
% using fertilizer	43	62	41	34	32	32	36
% using fungicide	88	55	9	83	9	84	85
% using insecticide	97	89	91	98	95	85	92
Kg cocoa produced in 2014	1,988.02	1,112.06	697.49	568.15	1,247.10	1,646.19	1,288.52
Cocoa land size (ha; median)	3.63	1.55	1.81	1.55	2.07	1.81	1.94
Yields (kg./ha; median)	361.82	504.35	241.21	281.41	402.02	526.64	402.02

Source*:* adult's questionnaire, Ghana

The total labour days employed on cocoa farming is 187, of which one third is household members (with a third of these reported to be children's work days).
The majority of respondents apply fungicide (85%) and insecticide (92%), whereas only 26% use fertilizer. The average amount of cocoa produced is Kg 1,288, on landholdings of just under 2 hectares in median. Median yields in the sample are Kg 400, which is a figure largely consistent with what other studies on cocoa in Ghana report. Finally, mean annual gross margins from cocoa sales are just over GH¢2,000, whereas annual median gross margins per hectare are just over GH¢632.

3.1.3 A profile of the children sampled

As explained above, this project also interviewed a number of children aged 10 to 17 who lived in the same household of the farm-managers surveyed. The intention of this exercise was to capture information about cocoa life as perceived by children and how they value cocoa cultivation from a small cross section of children living in the same households of farmers interviewed.

Table 3.3 shows a number of characteristics of the sampled children: the average age is 13, there are roughly as many boys (56% of the sample) as girls. Most children (83%) interviewed were born in the village, live on average one hour walking distance from their school. Nearly all the children interviewed were in school (96%) and had completed at least 6 years of education.

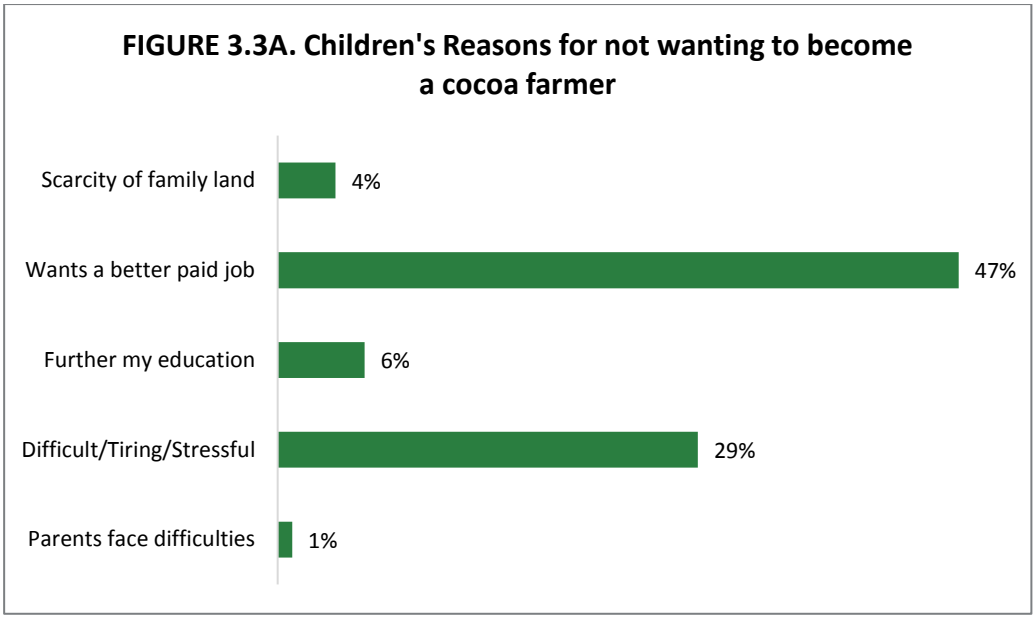
TABLE 3.3. Main characteristics of surveyed children in cocoa farm households

N Observations	**423**
Age	13.25
% boys	56
% born in village	83
Distance to school (minute; median)	60
% in School	96
Years school	5.88
% want to be a cocoa farmer	42
% doing hazardous child labour	49
% doing child labour (non-hazardous)	25

***Source**:* children's questionnaire, Ghana

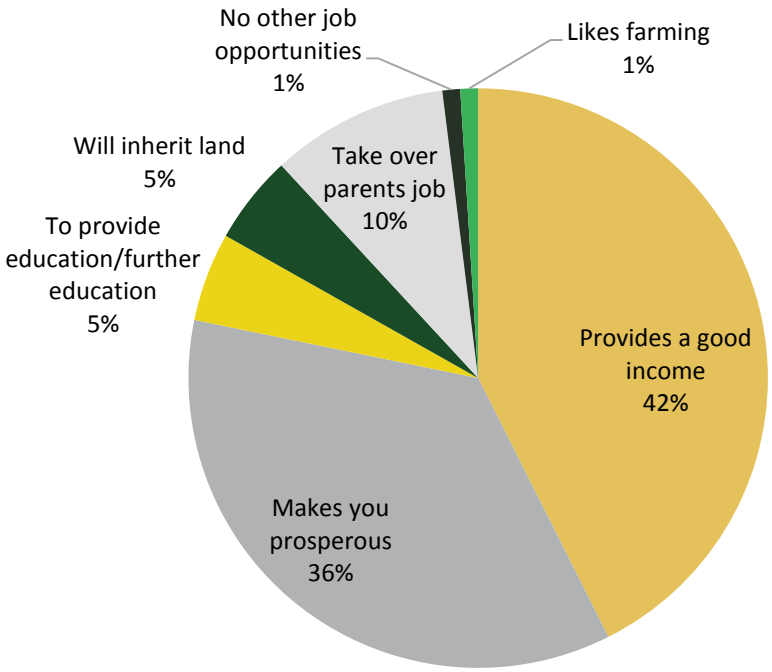
We also found that roughly half (49%) and a quarter (25%) of our sampled children were respectively engaging in hazardous or non-permissible cocoa farming tasks. As a way to initiate our conversation, children were asked whether they wanted to become cocoa farmers as adults; figures 3.3A and 3.3B illustrate the main replies that were given. Among the 58% of sampled children who said they did not want to go into cocoa faming, the most frequent reason given was that work on cocoa land was considered tiring and difficult, and therefore children wished for a different life style/career. Interestingly, those who said they did want to become cocoa farmers, explained that this was due to the fact that cocoa earns a good income and '*makes you prosperous*'.

FIGURE 3.3A. Children's Reasons for not wanting to become a cocoa farmer



***Source**:* children's questionnaire, Ghana[6]

FIGURE 3.3B. Chlidren's Reasons for wanting to become a cocoa farmer



***Source**:* children's questionnaire, Ghana[7]

[6] Sample size: 423

[7] ibid

3.2 Evidence on the four research questions

This section presents and interprets the findings of the Ghana study, linking them thematically to each of the four main research questions.

RQ1. What are the conditions that determine the demand of adult labour and children's work? What are the key features of the labour supply for cocoa in the village?

Key findings from research question 1:

1. Labour supply is not a major constraint but affordability is according to the data. Both qualitative and quantitative data show that hiring labour is expensive, with the average daily wage in the villages surveyed just under GH¢20, nearly three times higher than the current national minimum daily wage at GH¢7.
2. Daily waged work is the most frequently used type of hired labour, and women's work is the most frequently used type of family labour. Children working on cocoa farms represent roughly one third of total household labour.
3. The current situation with the supply of labour on cocoa farm features young people with aspirations different from working on family cocoa.
4. Total production is higher for farmers using both types of paid labour (daily and contract), and lower for farmers not using any hired labour at all. Yields are higher for farmers cultivating small landholdings and not using any hired labour. Gross cocoa profit are higher for farmers not hiring any labour.
5. Women cocoa farmers cannot afford to hire daily workers, use significantly more work days from children under the age of 15, and those with smaller landholdings face the highest production constraints.

This section examines the use of different types of labour inputs in cocoa farming: household adult labour, household children's work, hired daily waged labour, contract hired labour and *nnoboa*[8] (communal labour).

All measures of labour are expressed in terms of "labour days/work days", by multiplying the number of days worked by each individual in the crop year preceding the survey (end September 2013 to early October 2014) by the number of days worked in nay task and then aggregating data over all cocoa farming tasks by by the type of labour. This also applies to "children's work", which in this section is intended as the number of work days performed by children in the 2013-14 cocoa crop year. The discussion under research question 4 will then combine adult and children's data to qualify the type of work performed by children, and differentiate between hazardous child labour, child labour (non-hazardous) and permissible child work.

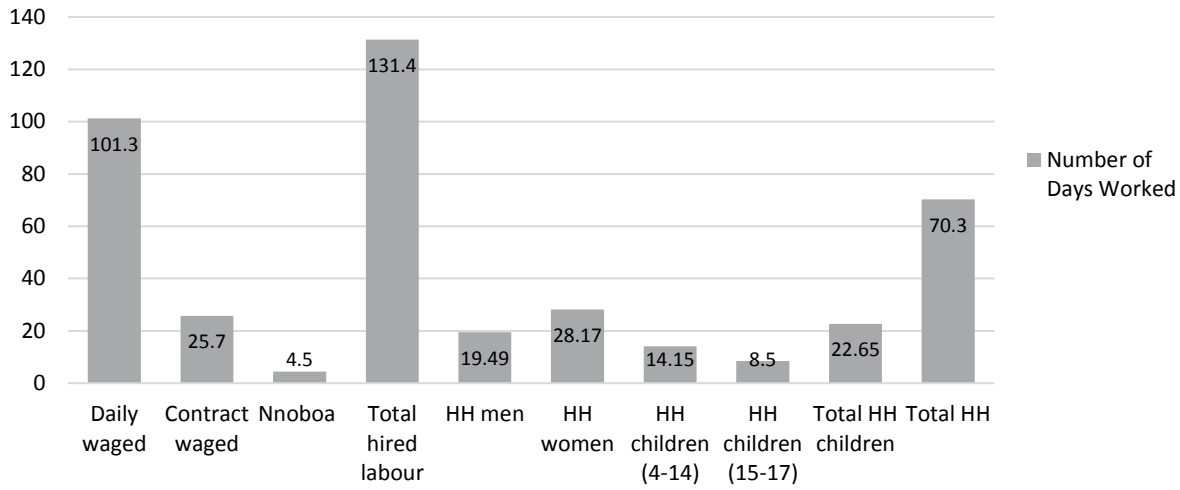
- *What percentage of households report the use of hired casual/permanent labourers? In which regions and districts?*

[8] Please see page 53 for further information about the nnoboa, communal labour arrangement

- *What is the percentage of household labour (adults and children) employed in cocoa production?*
- *What percentage of these households uses family or hired casual/permanent labourers aged 5-14 and 15-17 years old for seasonal or permanent work? In which regions and districts?*

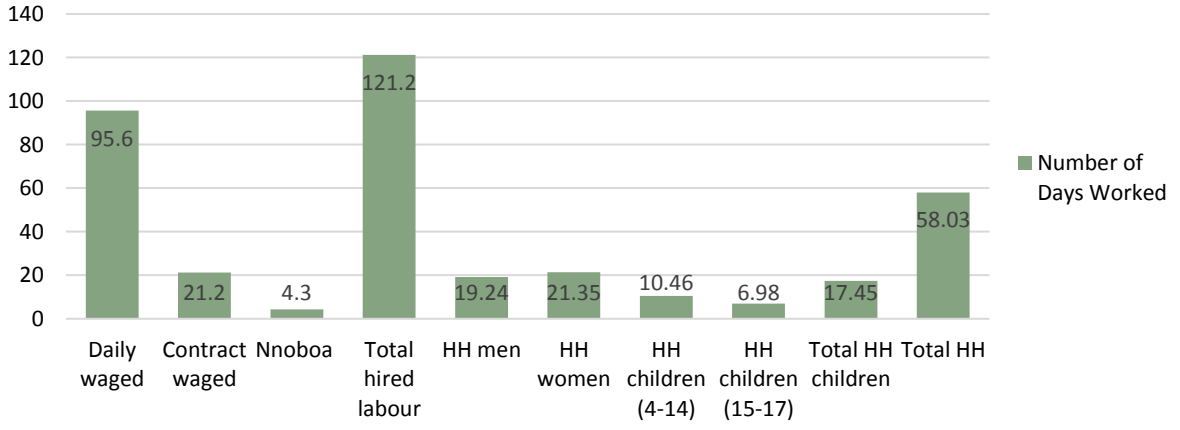
Figures 3.4A and 3.4B shows that daily waged work is the most frequently used type of hired labour in both the Ashanti and the Western North regions. Household women's work-days is the most frequently used type of family labour and children working on cocoa farms represent roughly a third of total household labour. Overall, there are also more work days worked by children under 15 years old than work days worked by children aged 15 to 17.

FIGURE 3.4A. Labour use (measured as person days of work over the last crop year) in Ashanti Region



Source: *adult's questionnaire, Ghana*[9]

FIGURE 3.4B. Labour use (measured as person days of work over the last crop year) in Western North Region



Source: *adult's questionnaire, Ghana*[10]

[9] Sample size: Ashanti – 319
[10] Sample size: Western North Region – 598

Table 3.4 shows this breakdown by district levels. When examining differences between regions and districts, daily waged work days is particularly high in the Atwima district, household women's work days are highest in the Atwima and Adansi East districts and children's work days are highest in the Ashanti region.

TABLE 3.4. Labour use (measured as person days of work*) at the region and district levels

Region / Adminstrative District	N	Daily waged	Contract waged	Nnoboa	Total hired labour	HH men	HH women	HH children (4-14)	HH children (15-17)	Total HH children	Total HH
Ashanti	**319**	**101.3**	**25.7**	**4.5**	**131.4**	**19.49**	**28.17**	**14.15**	**8.5**	**22.65**	**70.3**
Atwima	75	180.9	27.5	7.1	215.5	42.48	37.49	17.31	13.68	30.99	110.96
Adansi East	74	52.5	14.5	4.8	71.8	11.66	32.19	14.78	7.39	22.18	66.03
Offinso	87	67.4	37.2	2.3	106.9	7.69	17.41	10.02	6.59	16.61	41.71
Asante Akim Central	83	108.5	21.8	4.2	134.4	18.05	27.42	15.05	6.83	21.88	67.35
Western N.	**598**	**95.6**	**21.2**	**4.3**	**121.2**	**19.24**	**21.35**	**10.46**	**6.98**	**17.45**	**58.03**
Sefwi-Wiawso	356	121.8	22.6	3	147.4	21.96	23.29	11.16	6.74	17.9	63.15
Juabeso-Bia	242	57.1	19.2	6.2	82.5	15.24	18.49	9.44	7.33	16.78	50.5

Note:* *Person days of work = # individuals working * # days worked between the crop year running end of September 2013 and end of October 2014.* ***Source**: adult's questionnaire, Ghana*

- *Is there an adult labour supply readily available and what is the cost of hiring adult labour?*

This study accounted for two types of paid labour: daily waged and contract labour.

Daily waged labourers are individuals working mainly on a daily basis. In this case, farm-managers employ an individual or a number of people for a particular task and pay him or them directly at the end of every day for the entire period of work. Sometimes, the farmers add up the daily wages and pay the labourer according to the number of days worked.

Contract labourers are given a specific job to do during a set amount of time. A contractor has specific people they work with, so the labourer takes a contract, for example weeding a plot of a given size, charges the wage based on the size of the whole plot and then comes to work on the plot with his labourers and pays them. So contract labourers get paid for the whole work to be done on a given landholding. The contract labour is seasonal and not permanent in nature. The season and other factors such as how early the farmer wants the work to be done determine the wage levels.
Various informal conversations held in the field revealed that a major determinant of rural wages in cocoa is the prevailing price of cocoa. Other factors may include the conditions attached to the work - e.g. farmer providing food to the workers in which case the labour cost may be reduced.

TABLE 3.5. Daily and contract wages: village averages

Region	District	Village	N obs	Daily wages (GH¢)	Contract wages (GH¢)
Ashanti			**319**	**16.67**	**12**
	Atwima	Nyinahim	75	16.05	8.04
	Adansi East	Twerebuana	74	19.93	16.73
	Offinso	Kyebi	87	14	10.53
	Asante Akim Central	Ekutuase	83	17.1	12.63
Western N.			**598**	**18.73**	**15.34**
	Sefwi-Wiawso		356	17.89	13.85
		Bosomoiso	74	22.24	10.26
		Aboagyekrom	27	15.49	32.87
		Okwabena	16	17.41	40.56
		Asarekrom	20	17.84	4.47
		Abrabra	32	15.7	6.46
		Kankyiabo	8	21.94	9.46
		Asafo	25	16.85	12.22
		Afrimkrom	37	14.72	8.44
		Suiano	11	23.1	14.11
		Pewodie	27	17.53	22.65
		Boako	44	16.78	12.08
		Punikrom	35	15.82	9.15
		Kantankrobo	17	29.68	40.85
	Juabeso-Bia		242	20.3	17.6
		Mansokrom	115	19.88	16.89
		Nkatieso	110	19.99	14.87

***Source**: adult's questionnaire, Ghana.*

TABLE 3.5A. Daily and contract wages paid by task (wage bill): district averages

Region / District	Cocoa task							
	Land clearing, slash/ burning bush, tree felling, clearing debris	Weeding	Applying fertilizer, fungicide/ herbicide	Spraying insecticide	Pod plucking, gathering/ heaping, pod breaking	Fermenting	Carrying cocoa dry beans for sale	N obs
Daily Wages Cocoa farming Tasks (GH₵)								
Ashanti	**13.5**	**15.16**	**20.63**	**25.86**	**15.85**	**13.99**	**12.45**	**319**
Atwima	12.4	14.14	20.96	27.5	15.6	14.38	14.44	75
Adansi East	16	19.9	23.18	29.29	17.78	16	13.44	74
Offinso	12.33	11.7	19	23.06	13.51	10.83	10.25	87
Asante Akim Central	13.29	14.89	19.38	23.61	16.51	14.75	11.67	83
Western N.	**15.72**	**16.02**	**22.45**	**21.33**	**21.04**	**16.19**	**16.49**	**599**
Sefwi-Wiawso	15.62	15.45	21	21.11	20.78	15.95	14.73	357
Juabeso-Bia	16.17	18.27	28.24	22.23	22.08	16.75	21.78	242
Contract Wages Cocoa farming Tasks (GH₵)								
Ashanti	**297.11**	**229.43**	**122.67**	**51.25**	**104.75**	**93.75**	**81.56**	**319**
Atwima	450	256.82	150	45	45	-	60	75
Adansi East	300	239.04	60	-	40	-	110	74
Offinso	151.43	203.1	158	57.5	134	87.5	86.25	87
Asante Akim Central	287	218.75	-	-	200	100	70	83
Western N.	**206.89**	**257.26**	**122.44**	**118.17**	**138.44**	**52.5**	**48.13**	**599**
Sefwi-Wiawso	189.27	246.95	134.85	140	165.83	65	56.67	357
Juabeso-Bia	253.89	298.52	91.42	74.5	56.25	27.5	39.58	242

Source: adult's questionnaire, Ghana.

Table 3.5 and 3.5A show respectively the average wages paid across all villages and for different tasks, the wage bill paid for each type of hired labour, and suggests that farmers employ contract labour seasonally, mostly for heavier cocoa farming tasks such as land clearing, and are able to gain higher net revenues when only this type of labour is used (as illustrated in table 3.6).

A number of FGDs conducted with male youth approximately 18-30 years old provided additional details about the local labour market in cocoa villages. These discussions explained how youth see themselves contributing to cocoa farming, where they reported helping with weeding, cocoa plucking, mistletoe cutting, fungicide and insecticide spraying, harvesting and management. Many youth emphasised that cocoa is their main source of employment - but only in the main season – and several would like to see other opportunities beyond cocoa. Young people complained that cocoa farm-gate prices are too low, that there is no land for them to start their own cocoa trees, and that the cost of renting land is too high. Youth also discussed how availability of interest free loans, affordable plant protection inputs, and inputs could substantially improve their interest in cocoa production.

The problem of access to labour supply is a serious one that most focus groups emphasised. Reasons for the high costs of labour (which appeared to be nearly three times higher than the national minimum wage) were not always stated explicitly – but some people explained that "labourers charge high prices because they *believe* income from cocoa is high" (FG2, Boako), while others recognised that labour prices increase when cocoa price increases (FG1, Ekutuase).

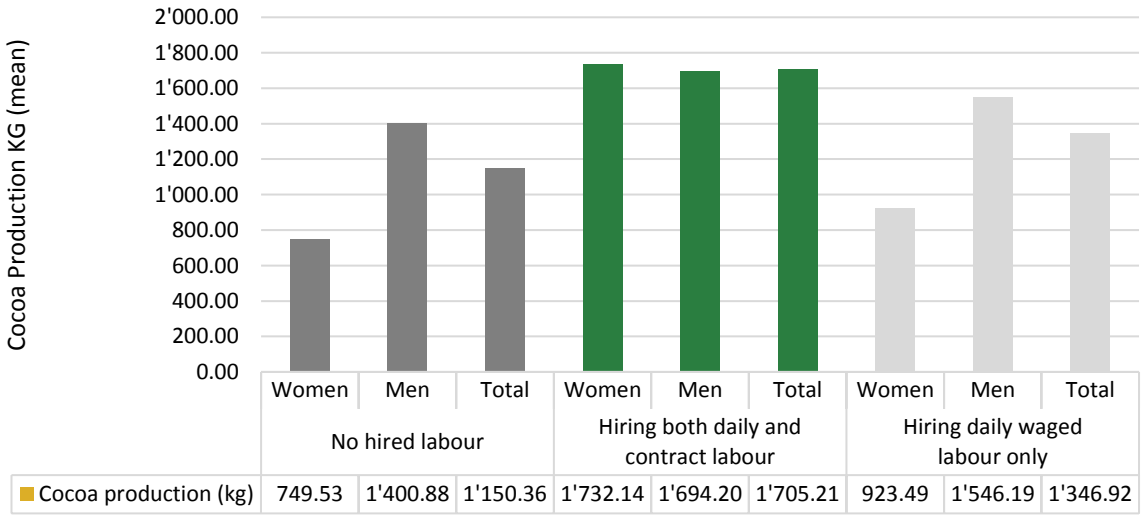
Labour was found to be particularly costly in villages around the country's border, possibly suggesting competition from migrant labour in these areas. For example, in Punikrom (Western North region) cocoa farmers are said to rely on immigrant labour from Togo and to pay labourers GH¢25/day. Shortage of labour is also linked to lack of land for farming. Several respondents, including youth themselves, claimed that new generations migrate or abandon cocoa altogether due to lack of land. The new generations are not uninterested in cocoa altogether (although some of them clearly have other aspirations) but they would demand better conditions to access inputs (land, capital, pesticides and fertilisers) to remain active in the sector. They would also expect higher cocoa prices be paid back to them as an additional economic incentive to remain active in the sector. In communities with more lucrative work options, labour scarcity is even greater, as youth are attracted by these alternatives, even when illegal, as in the case of illegal mining in Nyinahim (Ashanti).

- *What are the advantages and disadvantages (cost-benefit analysis) of hiring adult labour relative to the productivity gains?*

In order to compare production and land productivity gains for farmers using different labour arrangements, we look at cocoa production, yields and net revenues (gross and per unit of land) corresponding to sampled farmers: i) not using any hired labour, ii) using only contract, iii) using only daily waged labour, and iv) using both types of paid labour.

Figure 3.6 shows cocoa production kg (mean) under different labour scenarios. In the 'Total' columns for each type of labour used, total production is shown to be highest for farmers using both types of hired labour, and lowest for farmers not using any hired labour at all.

FIGURE 3.6. Cococa Production under different hired labour scenarios

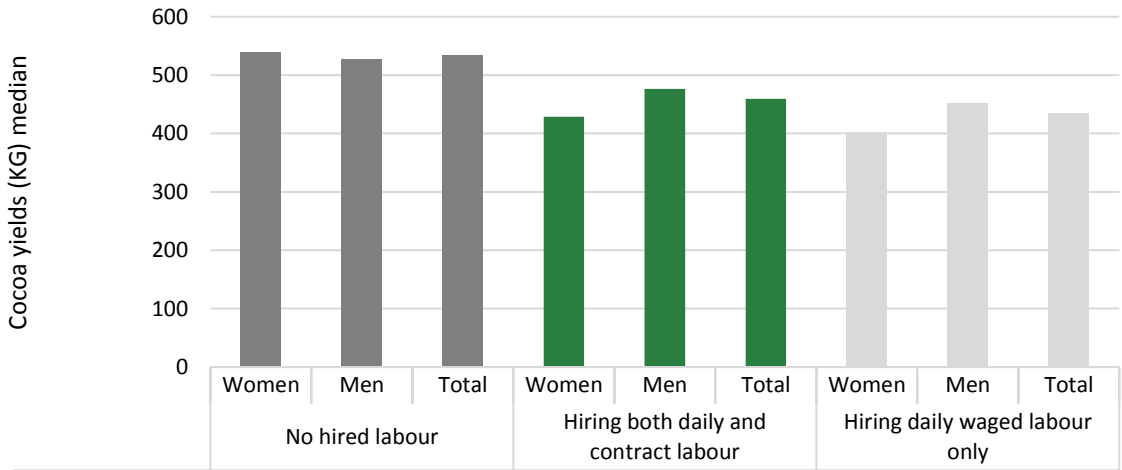


Source: *adult's questionnaire, Ghana*[11]

[11] Sample size: No hired labour - women (40), men (64), total (104). Hiring both daily and contract labour – women (63), men (154), total (217). Hiring daily waged labour only – women (128), men (272), total (400). Hiring contract labour only – women (13), men (33), total (46).

However, we find the reversed pattern for yields, which appears to be higher for farmers not using any hired labour at all, and lowest for farmers using daily waged labour as illustrated by Figure 3.6a. Given the production levels observed for these last two categories, it is possible that cocoa farmers not using any hired labour will have the lowest acreage under cocoa cultivation.

FIGURE 3.6A. Cocoa Yields under different hired labour scenarios



	Women	Men	Total	Women	Men	Total	Women	Men	Total
Cocoa yields (kg)	539.37	526.1	533.34	428.82	476.39	459.45	402.02	452.27	434.18

Source: *adult's questionnaire, Ghana*[12]

Similarly, gross margins (i.e. netted out only of labour and plant protection product costs, but not of other equipment used, or of any land rental payment), are predictably higher – both in absolute terms and per unit of land– for farmers not hiring any paid labour. Cocoa farmers hiring only contract labour are the second group with the highest gross margins.

Table 3.6 reports further summary statistics and the gross margins obtained under different hired labour scenarios from this exercise.

[12] ibid

TABLE 3.6. Production, Yields and Gross Margins under Different Hired Labour Scenarios

Variable	Unit measure	No hired labour			Hiring both daily and contract labour		
		Women	Men	Total	Women	Men	Total
Sample size	N observations	40	64	104	63	154	217
Land under cocoa	Ha (median)	0.77	1.36	1.30	2.07	2.33	2.33
Hired Labour	# individuals * # days worked	-	-	-	181.02	162.71	168.02
Wage bill	Total GH₵ spent for labour	-	-	-	2,000.56	2,033.07	2,023.63
Gross margins	GH₵ net cocoa revenue (median)	1,675.98	1,564.03	1,611.62	509.05	863.94	732.08
Gross margins/ha	(median)	1,496.87	1,224.05	1,287.42	182.15	313.81	273.3

Variable	Unit measure	Hiring daily waged labour only			Hiring contract labour only		
		Women	Men	Total	Women	Men	Total
Sample size	N observations	128	272	400	13	33	46
Land under cocoa	Ha (median)	1.55	2.07	1.94	2.12	2.59	2.33
Hired Labour	# individuals * # days worked	102.35	131.32	122.05	88.92	101.21	97.74
Wage bill	Total GH₵ spent for labour	1,723.31	2,211.66	2,055.39	236.15	363.88	327.78
Gross margins	GH₵ net cocoa revenue (median)	524.37	699.45	645.13	1,078.12	1,442.91	1,300.75
Gross margins/ha	(median)	272.37	246.47	251.62	513.04	439.12	458.85

***Source**: adult's questionnaire, Ghana*

The qualitative data confirm and complement these figures. For instance, in several villages the scarcity of labour supply and its subsequent high cost were discussed as being the main problem in the local labour market. It was noted that labour scarcity has been the main reason for the increase in the cost of labour over the last few years (e.g. from 15 to 20 New Ghana cedis per day in Nyinahim), although it was not possible to establish unequivocally whether high wages were the cause or the effect of labour supply constraints. At least one respondent reported labour shortage to be the main problem even for those willing to pay a higher wage. There is certainly migrant labour – with respondents reporting of workers coming from the Northern regions or other countries, such as Togo – but nobody mentioned this to be sufficiently supplied to meet actual labour needs or affordable.

Scarcity of daily labour seems to be due to various reasons, one of which is the fact widely noted, that "everyone already works on cocoa farms". This may be due in part to local arrangements that have made land available to more people (such as one programme in Kyebi whereby degraded forest lands are given out to farmers to plant and maintain trees while they grow foodstuffs until the canopy of the trees closes). Other factors that may have reduced the local supply of labour more recently are that educated youth have other aspirations than working on cocoa, and that children are now more often in school. Moreover, in villages where daily labour commands a higher wage, youth tend to work on others' farms, further reducing labour supply to their own families. While some youth emphasised their commitment to cocoa livelihoods, others expressed their desire to devote their efforts to other activities and livelihoods.

Table 3.7 below further shows that farmers use more hired labour (including a combination of daily waged, contracted and *nnoboa* rotational labourers) than household labour. Within household labour employed, children aged 17 and under represent, on average, one third of the family labour employed on cocoa farms.

Hired labour accounts for a larger share of total labour employed per hectare despite the high wages. Of the two types of paid labour, farmers seem to use more of daily labour than contract labour even if village level wages are roughly comparable across these two types of labour contracts as seen in table 3.5A. The amount spent on daily waged workers in the sample is eighteen times higher than that spent on contract labour. The quantitative data therefore suggest that farmers do hire labour, despite what was discussed in the FGDs, where the frequent comment was that labour is too expensive (about 10/15 to 20 Cedis a day; even up to 24 for plucking in Mansokrom), although many farmers cannot afford it.

TABLE 3.7. Key measures of labour use and cocoa yields

Indicator	Unit measure	Ashanti	Western N.	Total sample
Sample size	N observations	319	598	917
Cocoa production 2011/2012	Kg	1,116.45	1,515.15	1,378.04
Cocoa production 2013/2014	Kg	1,063.42	1,408.60	1,288.52
Yields in 2013	Kg/ha (median)	321.61	452.27	402.02
Labour productivity	Kg/person days	14	23.94	20.46
(HH person + hired labour days)/ha	Person days/ha	127.36	115.37	119.54
HH person days/ha	Person days/ha	52.89	43.99	47.09
HH adult days/ha	Person days/ha	35.23	29.84	31.72
HH children days/ha	Person days/ha	17.66	14.15	15.37
Hired labour days/ha *	Person days/ha	74.46	71.38	72.45
Paid labour days/ha †	Person days/ha	71.49	69.27	70.04
Total cost of hired labour/ha	(GH₵/ha)	916.07	1,148.37	1,067.56
Expenditure on daily wages/ha	(GH₵/ha)	848.13	1,101.98	1,013.67
Expenditure on contract wages/ha	(GH₵/ha)	67.95	46.39	53.89

* ***Note****: Includes Nnoboa groups.* † *Does not include Nnoboa groups.*

Source*: adult's questionnaire, Ghana*

Labour use by gender

In order to understand more clearly differences in the use of paid and family labour, we explored the gender differences in labour use. During a focus group exercise purposely organised with women, women cocoa farmers explained that they carry out many tasks on cocoa farms, such as pod gathering, weeding, pod breaking, fermenting and water fetching for pesticide application. Some women stated that they manage the farm and carry out all the operations – whereas others emphasised not having sufficient strength for some more physically demanding farming tasks (land clearing, tree felling), and this decreases their productivity. Women's workload is very heavy during peak cocoa season, especially considering their housework and other activities they engage in, in addition to the fact that in the peak of the cocoa season (September to January) children are more likely to attend school (FG3, Aboagyekrom). Several women stressed how much they felt disadvantaged by the fact that they do not have sufficient household labour to help. Because of the demand pressure on their time, some women feel they are not able to care properly for their younger children during cocoa season.

Another important insight from the qualitative data was that although both women and men reported facing similar high labour costs, women claimed to be particularly hit by the high costs of paid labour and by its shortage, many of them adamantly stating they simply cannot afford to hire daily workers. It was not clear whether women find it easier than men to hire workers when they have the financial means to do so; some women stated that workers prefer to be hired by men, since women are not believed to have the means to pay (FG3, Aboakyekrom). Others made the point that workers prefer to be hired by women in the knowledge that they will be better treated (FG3, Bosomoiso).

Table 3.7A shows a detailed breakdown in the quantitative data of the differences in key cocoa production variables by gender of the farm manager, also disaggregating the figures by land quartiles.

TABLE 3.7A. Key measures of labour use and land productivity, by land quartile and by gender

Variable	Unit measure	Western N.			Ashanti			Total		
		Women	Men	Total	Women	Men	Total	Women	Men	Total
Q1: [0.05, 1.17ha]										
Sample size	N observations	63	65	128	29	38	67	92	103	195
Education	Years schooling	3.98	7.52	5.78	5.38	7.68	6.69	4.42	7.58	6.09
Age of cocoa trees	(Mean)	14	19	17	17	17	17	15	18	17
Cocoa produced	Kg (mean)	490.77	759.13	627.05	344.83	538.65	454.76	444.77	677.79	567.85
Yield	Kg/ha (mean)	551.34	904.54	643.23	385.94	630.23	526.28	489.31	844.24	578.91
Fertilizer used	Kg/ha (mean)	107.49	184.2	146.15	125.32	299	228.35	112.47	225.2	172.51
Labour productivity	Kg/person days	7.31	36.6	22.55	9.43	10.51	10.04	8.01	26.88	18.14
HH labour/ha	Person days/ha	97.36	91.92	94.6	94.89	169.16	137.01	96.58	120.41	109.17
Children's work (under 15)/ha	Person days/ha	26.46	12.92	19.59	38.72	29.39	33.43	30.33	19	24.34
Children's work (over 15)/ha	Person days/ha	12.77	10.88	11.81	7.81	12.51	10.48	11.2	11.48	11.35
Daily waged labour/ha	Person days/ha	101.22	85.3	93.13	81.59	165.39	129.12	95.03	114.85	105.5
Contract labour/ha	Person days/ha	8.92	4.92	6.89	11.45	12.36	11.97	9.72	7.67	8.63
Nnoboa labour/ha	Person days/ha	1.3	2.9	2.11	4.13	8.26	6.47	2.19	4.88	3.61
Labour too expensive	% farmers stating	0.74	0.76	0.75	0.72	0.85	0.79	0.73	0.79	0.76
Labour not available	% farmers stating	0.13	0.06	0.09	0.16	0.09	0.12	0.14	0.07	0.1
Q2: [1.26, 1.94ha]										
Sample size	N observations	36	95	131	19	44	63	55	139	194
Education	Years schooling	2.89	6.83	5.75	4.79	8.07	7.08	3.55	7.22	6.18
Age of cocoa trees	(Mean)	17	17	17	16	19	18	17	17	17
Cocoa produced	Kg (mean)	866.32	1,182.90	1,095.90	494.08	792.05	702.18	737.73	1,059.17	968.04
Yield	Kg/ha (mean)	382.18	603.03	530.66	337.7	398.36	385.94	344.59	516.88	438.57
Fertilizer used	Kg/ha (mean)	71.63	89.99	84.87	100.44	158.89	140.56	80.5	108.83	100.65
Labour productivity	Kg/person days	10.4	30.81	25.2	9.02	7.98	8.29	9.92	23.58	19.71
HH labour/ha	Person days/ha	40.21	38.73	39.14	37.54	47.1	44.21	39.29	41.38	40.79
Children's work (under 15)/ha	Person days/ha	7	6.41	6.57	12.2	10.56	11.05	8.8	7.73	8.03
Children's work (over 15)/ha	Person days/ha	4.53	5.87	5.5	6.46	6.01	6.14	5.2	5.91	5.71
Daily waged labour/ha	Person days/ha	47.32	48.14	47.91	31.46	26.7	28.14	41.84	41.35	41.49
Contract labour/ha	Person days/ha	12.44	7.84	9.11	10.66	12.3	11.8	11.83	9.25	9.98
Nnoboa labour/ha	Person days/ha	2.86	2.46	2.57	1.35	2.77	2.34	2.33	2.56	2.49
Labour too expensive	% farmers stating	0.7	0.74	0.73	0.72	0.84	0.8	0.71	0.77	0.75
Labour not available	% farmers stating	0.15	0.12	0.13	0.17	0.08	0.11	0.16	0.11	0.12

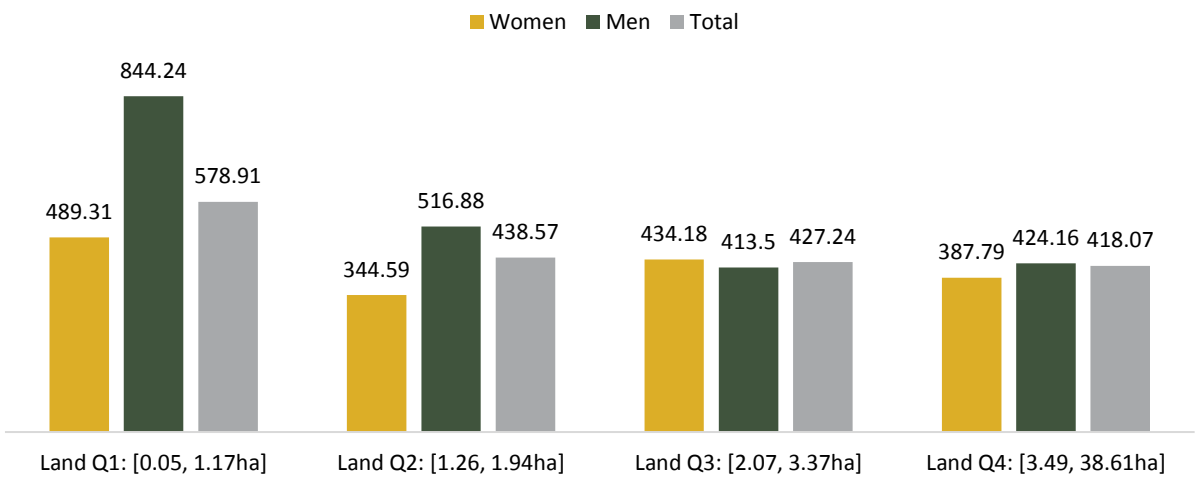
Table continues next page

Variable	Unit measure	Western N.			Ashanti			Total		
		Women	Men	Total	Women	Men	Total	Women	Men	Total
Q3: [2.07, 3.37ha]										
Sample size	N observations	45	90	135	12	53	65	57	143	200
Education	Years schooling	4.42	7.81	6.68	1.5	8.85	7.49	3.81	8.2	6.95
Age of cocoa trees	(Mean)	15	17	17	28	17	19	18	17	18
Cocoa produced	Kg (mean)	1,331.94	1,505.56	1,447.69	908.85	1,277.12	1,209.14	1,242.87	1,420.89	1,370.16
Yield	Kg/ha (mean)	452.27	482.42	482.42	339.2	361.82	361.82	434.18	413.5	427.24
Fertilizer used*	Kg/ha (mean)	46.06	127.75	100.31	13.27	129.06	102.84	38.9	128.18	101.05
Labour productivity	Kg/person days	11.79	22.92	19.21	14.03	26	23.79	12.26	24.06	20.7
HH labour/ha	Person days/ha	28.36	17.98	21.44	19.23	27.57	26.03	26.44	21.53	22.93
Children's work (under 15)/ha	Person days/ha	3.88	3.71	3.77	4.66	4.7	4.69	4.04	4.08	4.07
Children's work (over 15)/ha	Person days/ha	6.34	1.44	3.07	3.65	3.52	3.54	5.78	2.21	3.22
Daily waged labour/ha	Person days/ha	33.86	34.54	34.31	48.16	32.49	35.38	36.87	33.78	34.66
Contract labour/ha	Person days/ha	12.46	8.81	10.02	8.4	9.45	9.25	11.6	9.04	9.77
Nnoboa labour/ha	Person days/ha	6.38	1.19	2.92	0.67	2.49	2.15	5.18	1.67	2.67
Labour too expensive	% farmers stating	0.73	0.64	0.67	0.73	0.61	0.64	0.73	0.63	0.66
Labour not available	% farmers stating	0.14	0.23	0.2	0.27	0.16	0.18	0.16	0.2	0.19
Q4: [3.49, 38.61ha]										
Sample size	N observations	27	95	122	13	43	56	40	138	178
Education	Years schooling	4.52	7.12	6.54	4.85	6.21	5.89	4.63	6.83	6.34
Age of cocoa trees	(Mean)	18	20	20	17	20	19	18	20	20
Cocoa produced	Kg (mean)	3,089.82	3,092.76	3,092.11	2,923.08	2,593.75	2,670.20	3,035.63	2,937.27	2,959.38
Yield	Kg/ha (mean)	422.12	428.82	425.47	316.59	419.5	393.47	387.79	424.16	418.07
Fertilizer used	Kg/ha (mean)	112.31	119.26	117.65	114.22	151.17	142.1	112.93	129.08	125.28
Labour productivity	Kg/person days	21.95	33.22	30.73	12.9	16.49	15.64	19.01	28.09	26.04
HH labour/ha	Person days/ha	15.56	13.44	13.91	33.81	19.16	22.56	21.49	15.22	16.63
Children's work (under 15)/ha	Person days/ha	4.24	2.85	3.15	5.27	2.9	3.45	4.57	2.86	3.25
Children's work (over 15)/ha	Person days/ha	1.1	1.24	1.21	5.49	2.58	3.26	2.52	1.66	1.85
Daily waged labour/ha	Person days/ha	34.45	25.24	27.28	13.73	55.11	45.51	27.72	34.55	33.01
Contract labour/ha	Person days/ha	12.38	5.15	6.75	6.68	10.56	9.66	10.53	6.84	7.67
Nnoboa labour/ha	Person days/ha	0.57	1.17	1.03	0.77	1.41	1.26	0.64	1.24	1.1
Labour too expensive	% farmers stating	0.77	0.68	0.7	0.85	0.78	0.8	0.79	0.71	0.73
Labour not available	% farmers stating	0.12	0.15	0.14	0.08	0.1	0.09	0.1	0.13	0.13
Total sample										
Sample size	N observations	171	345	516	73	178	251	244	523	767
Education	Years schooling	3.95	7.3	6.19	4.49	7.77	6.82	4.11	7.46	6.39
Age of cocoa trees	(Mean)	16	18	17	18	18	18	17	18	18
Cocoa produced	Kg (mean)	1,201.57	1,713.13	1,543.61	935.53	1,317.63	1,206.50	1,121.98	1,578.53	1,433.29
Yield	Kg/ha (mean)	482.42	507.81	482.42	361.82	402.02	389.65	427.24	482.42	459.45
Fertilizer used	Kg/ha (mean)	84.86	125.58	111.87	96.29	181.22	155.66	88.05	143.01	125.1
Labour productivity	Kg/person days	11.55	30.49	24.3	10.7	15.94	14.41	11.29	25.54	21.05
HH labour/ha	Person days/ha	54.26	36.37	42.3	56.65	60.59	59.45	54.97	44.62	47.91
Children's work (under 15)/ha	Person days/ha	12.91	5.95	8.26	20.26	10.98	13.68	15.11	7.66	10.03
Children's work (over 15)/ha	Person days/ha	7.5	4.38	5.42	6.36	5.83	5.98	7.16	4.87	5.6
Daily waged labour/ha	Person days/ha	61.6	45.29	50.69	50.96	64.9	60.84	58.42	51.96	54.02
Contract labour/ha	Person days/ha	11.14	6.8	8.24	9.89	11.04	10.71	10.77	8.25	9.05
Nnoboa labour/ha	Person days/ha	2.85	1.86	2.19	2.24	3.53	3.15	2.67	2.43	2.5
Labour too expensive	% farmers stating	0.73	0.7	0.71	0.75	0.76	0.76	0.74	0.72	0.72
Labour not available	% farmers stating	0.13	0.15	0.14	0.16	0.11	0.13	0.14	0.13	0.14

***Source**: adult's questionnaire, Ghana*

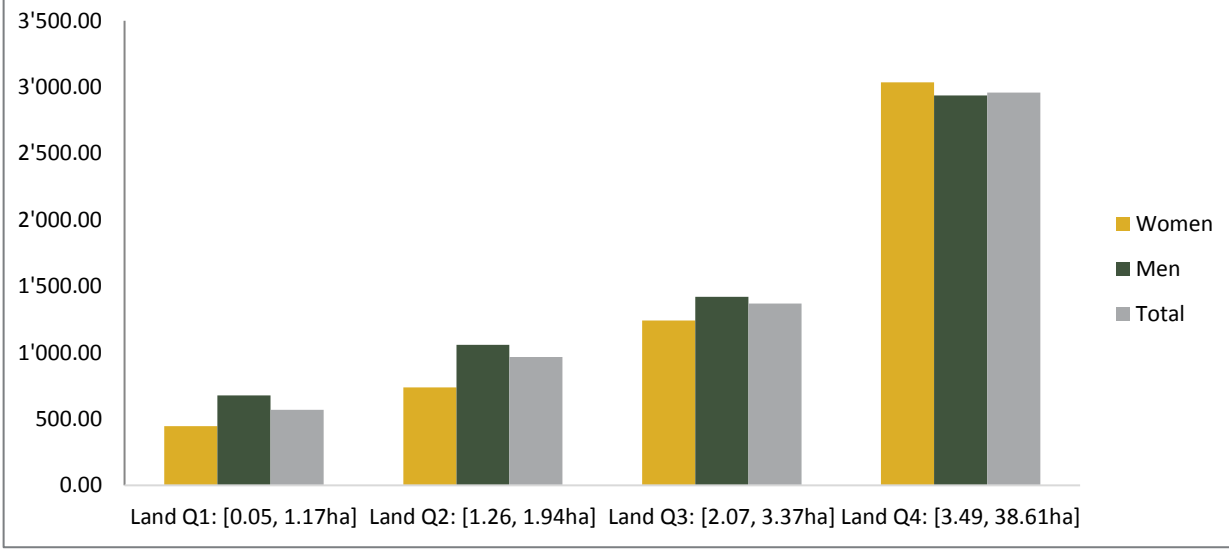
Cocoa production and yields are significantly higher on men's managed cocoa farms on smaller landholdings, i.e. in relation to the lowest quartile of land. Here men farmers obtain on average yield levels that are double those obtained by women farmers; and sell 20% more cocoa than women. However, the gender difference in both indicators decreases and becomes negligible in the top land quartile. This suggests that it is women farmers with smaller landholdings (those managing up to 1.17 ha under cocoa cultivation) that face the most binding production constraints.

FIGURE 3.7. Cocoa Yields (kg/ha) by Land Quartile and Gender



Source: *adult's questionnaire, Ghana*[13]

FIGURE 3.7A Cocoa Production by Land Quartile and Gender



Source: *adult's questionnaire, Ghana*[14]

[13] Sample size: Land Q1 (women 92, men 103, total 195) Land Q2 (women 55, men 139, total 194) Land Q3 (women 57, men 143, total 200) Land Q4 (women 40, men 138, total 178)

[14] Sample size: Land Q1 (women 92, men 103, total 195) Land Q2 (women 55, men 139, total 194) Land Q3 (women 57, men 143, total 200) Land Q4 (women 40, men 138, total 178)

Differences in the composition of labour used also exists between men and women in cocoa farming, and again these appear more pronounced when we break down the data by land quartiles. The use of paid labour (of which daily waged workers are the category mostly used) in the entire sample of cocoa farmers is significantly higher for men farmers only in the bottom land quartile (a result driven by the Ashanti region although not the case for the Western N. region), but the gender difference disappears for farmers managing larger landholdings (i.e. those in the third land quartiles), suggesting the need to switch to some form of hired labour when the land acreage under cultivation is no longer sufficient to maintain cocoa activities at scale. Similarly, in the overall sample, household labour inputs are higher for men farmers relative to those reported by women farmers, although these gender differences again are no longer significant in the top two largest land quartiles. The quantitative data appear to support largely the views gathered during the FGDs, that women cocoa farmers are more constrained in their ability to access labour (on smaller landholdings), and this is in turn positively correlated with observed levels of land productivity (yields). Women in cocoa farming appear to be more exposed to a 'small land size-low production/productivity trap'.

In order to explore further the issue of labour use, gender and land size, the same table 3.7A also shows a breakdown of children's work days, separating children under 15 and children that are 15 years and above. Women with lower acreage under cocoa (especially in the bottom land quartile and to some extent in the second from bottom one), use significantly more labour inputs from children under the age of 15. This finding is not surprising given that men's control of older children's work is part of their higher control over HH labour: younger children are less productive, hence generally left to help on women's farms, especially when these are small in size. This gender specific difference disappears in the top two land quartiles, where total labour inputs from children of both age groups become a negligible share of total household labour days used.

RQ2. What production technologies are being implemented to increase land productivity, and what implication does this have on the labour demand?

Key findings from research question 2:

1. Total labour input per hectare nearly doubles between low and high yield cocoa farmers, however the composition of labour use remains the same for all yield categories.
2. While farmers employ twice as much hired labour than adult household labour across all yield levels, the number of children's work days worked per unit of land employed by high yield farmers is double than that employed by low yield farmers.
3. For some specific cocoa farming tasks (pod plucking/heaping/breaking, weeding, carrying water for spraying the farm, and carting cocoa beans from the farm to the household) the number of child days employed is double amongst high yield farmers as compared to low yield farmers.
4. Children aged 15-17 years spent more work days on applying chemicals/plant protection products on high yield farms as compared to low yield farms (statistically significant).
5. Sharecropping is still practiced, however it is no longer a common practice. Similarly, nnoboa shared labour arrangements, have become less popular because farmers prefer to work for pay.

- *How many labour input person days are required?*
- *What impact does this have on the household division of labour and time allocation as observed in a sub-sample of low/medium and high productivity households?*
- *What types of labour do cocoa producers' use and for which tasks?*

This section examines the labour used for farmers with different yield/technology levels and the situation of nnoboa and sharecropping.

As noted in section 2, this study adapts the technology level framework developed by CRIG to group sampled farmers into categories of low, medium and high yield range levels which broadly correspond to the three technology levels identified by CRIG. This disaggregation is useful to see whether being a high yield farmer as compared to a low yield farmer, increases the pressure on the demand for household adult's and children's work and how.

Table 3.8 provides summary statistics on the farm characteristics and cocoa labour productivity by yield level.

TABLE 3.8 Yields, Labour and Non-Labour Use by Yield Ranges (Technology level)

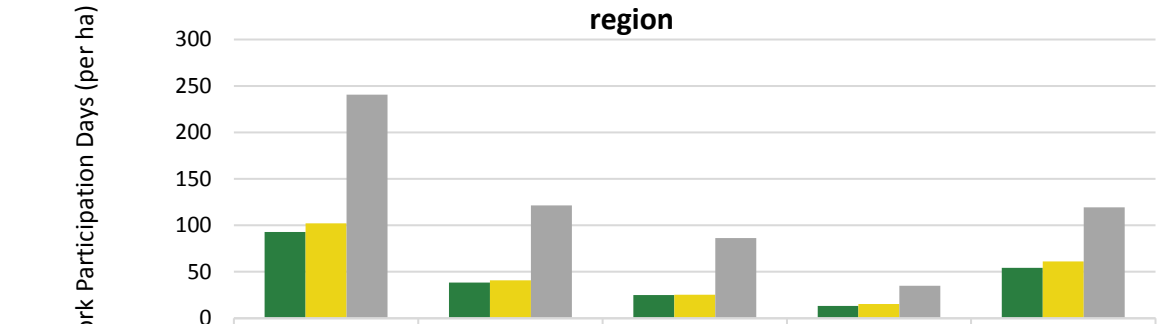
Indicator	T1: yields ≤ 400	T2: yields >400-850	T3: yields >850-2000
	Ashanti		
Sample size	194 (60.82%)	79 (24.76%)	40 (12.54%)
Land (ha; median)	2.07	2.07	1.30
Kg fertilizer/ha	52.87	129.11	321.82
Ltr fertilizer/ha	0.37	0.9	1.82
Kg cocoa/labour	8.81	18.62	29.9
Share land (ha) under TQ	0.14	0.17	0.09
Share land (ha) under Amazon	0.2	0.25	0.36
Share land (ha) under Hybrid	0.67	0.58	0.54
Share land (ha) no shade	0.06	0.01	-
Share land (ha) light shade	0.19	0.19	0.17
Share land (ha) moderate shade	0.39	0.41	0.33
Share land (ha) heavy shade	0.36	0.39	0.5
	Western N.		
Sample size	260 (43.48%)	199 (33.28%)	121 (20.23%)
Land (ha; median)	2.20	2.20	1.43
Kg fertilizer/ha	72.06	92.36	156.1
Ltr fertilizer/ha	0.11	0.23	0.3
Kg cocoa/labour	8.64	23.06	41.96
Share land (ha) under TQ	0.13	0.16	0.11
Share land (ha) under Amazon	0.16	0.15	0.17
Share land (ha) under Hybrid	0.7	0.7	0.72
Share land (ha) no shade	0.05	0.02	0.01
Share land (ha) light shade	0.18	0.16	0.15
Share land (ha) moderate shade	0.39	0.45	0.35
Share land (ha) heavy shade	0.38	0.37	0.49

* *Including Nnoboa groups.*

***Source**: adult's questionnaire, Ghana*

Figures 3.8 and 3.8A show data by yields levels for each region. Total labour input per hectare nearly doubles between low and high yield groups, but the composition of labour use remains the same for all categories of labour. This suggests two features of the relationship between higher yields and associated changes in labour demand. First, higher yields, possibly associated with higher technology of production, require substantially larger inputs of labour, including of children's work days. Secondly, there is no obvious positive association between higher land productivity and higher share of children's work days in relation to total household labour use (although children's work days are higher amongst high yield farmers).

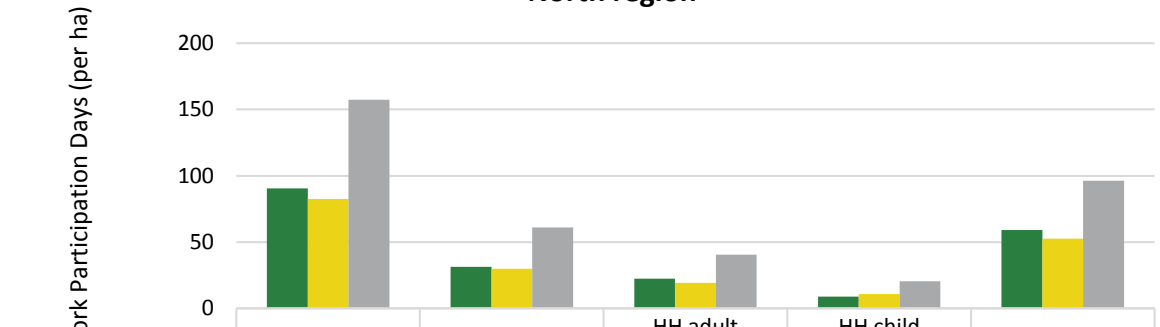
FIGURE 3.8 Labour use by Yield Ranges (Technology level) Ashanti region



	Labour/ha	HH days/ha	HH adult days/ha	HH child days/ha	Hired labour/ha
T1: yields ≤ 400	92.94	38.54	25.16	13.38	54.39
T2: yields >400-850	102.17	40.85	25.36	15.49	61.32
T3>850	240.56	121.3	86.43	34.87	119.26

Source: adult's questionnaire, Ghana[15]

FIGURE 3.8A Labour use by Yield Ranges (Technology level) Western North region



	Labour/ha	HH days/ha	HH adult days/ha	HH child days/ha	Hired labour/ha
T1: yields ≤ 400	90.47	31.3	22.39	8.91	59.17
T2: yields >400-850	82.53	29.91	19.25	10.67	52.62
T3: yields > 850	157.32	60.99	40.51	20.48	96.33

***Source:** adult's questionnaire, Ghana[16]*

Interestingly, while the amount of child days employed per unit of land doubles from the lowest to the highest yield levels, it still represents less than 15% of total labour days employed within the group of farmers in the highest yield range. The data also show that farmers employ twice as much hired labour than adult household labour.

Labour use by yield range suggests that in the high yield group of farmers, cocoa remains a labour intensive crop, and that being in this high yield group does not relax the burden of labour demand shortage faced by farmers. It is also possible that the constant proportion of children's work days

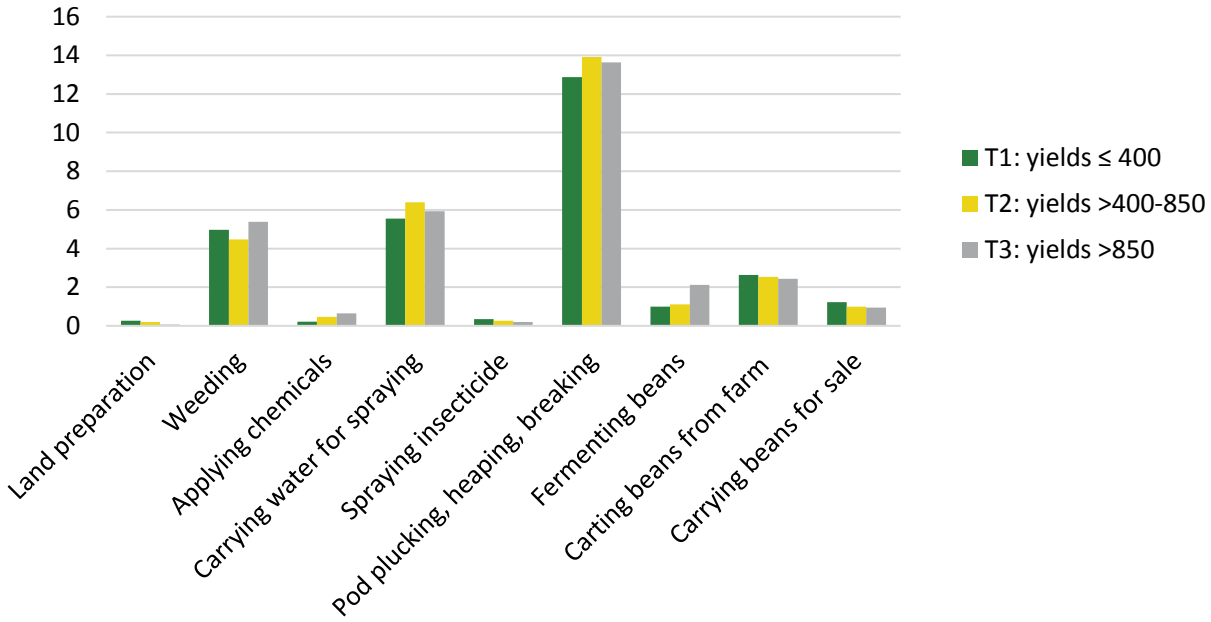
[15] Sample size, Ashanti Region: T1 (194) T2 (79) and T3 (40)

[16] Sample size, Western North Region: T1 (260), T2 (199) and T3 (121)

of work found across different yield range groups could be symptomatic of the imperfect substitutability between adult and child labour.

In order to get a more detailed picture on the use of children's work days on cocoa related tasks, figure 3.9 provides an additional break down of children's days of work per unit of land by task, yield-group, and table 3.9 also disaggregates children's work days between those aged 15 to 17 and the younger ones, aged 5 to 14.

FIGURE 3.9 Children's Number of Work Participation Days per ha on Different Tasks by Yield Levels (aged 5-17)



Source: *adult's questionnaire, Ghana*[17]

[17] Sample size: T1 (208), T2 (189) and T3 (100)

TABLE 3.9 Means number of children's work days, by cocoa farming task, and by yield ranges

Indicator	T1: yields ≤ 400	T2: yields]400-850]	T3: yields]850-2000]
Children 15 - 17			
# Observations	111	96	53
Land preparation	0.19	0.12	0.07
Weeding	2.87	1.83	3.75
Applying chemicals	0.07	0.20	0.56
Carrying water for spraying	1.97	2.22	1.88
Spraying insecticide	0.12	0.06	0.20
Pod plucking, heaping, breaking	4.90	4.41	4.85
Fermenting beans	0.39	0.32	0.92
Carting beans from farm	1.00	0.75	1.08
Carrying beans for sale	0.48	0.38	0.54
Children 5 - 14			
# Observations	158	154	80
Land preparation	0.08	0.08	0.00
Weeding	2.10	2.64	1.64
Applying chemicals	0.15	0.26	0.08
Carrying water for spraying	3.54	4.17	4.05
Spraying insecticide	0.22	0.20	0.00
Pod plucking, heaping, breaking	7.97	9.50	8.78
Fermenting beans	0.61	0.79	1.20
Carting beans from farm	1.63	1.79	1.36
Carrying beans for sale	0.74	0.62	0.41
Total			
# Observations	208	189	100
Land preparation	0.26	0.20	0.07
Weeding	4.97	4.47	5.39
Applying chemicals	0.22	0.47	0.64
Carrying water for spraying	5.55	6.39	5.93
Spraying insecticide	0.34	0.26	0.20
Pod plucking, heaping, breaking	12.88	13.91	13.63
Fermenting beans	1.00	1.11	2.12
Carting beans from farm	2.63	2.54	2.44
Carrying beans for sale	1.22	1.00	0.95

***Source**: adult's questionnaire, Ghana*

The harvest related tasks (pod plucking, heaping and breaking) are the most commonly used across all yield ranges and age-specific groups, suggesting that at least some of these tasks are not substitutable with adult labour. Weeding is the second most frequently reported task in which children aged 15 to 17 are employed, followed by carrying water for spraying purposes, which is the second most frequently performed task among children aged 5 to 14. There are some specific tasks, such as land preparation, applying chemicals, and spraying insecticide for which under aged child work use is negligible regardless of the yield range and age of the children.

Nonetheless, children aged 15-17 years spent more work days on applying chemicals/plant protection products on high yield farms as compared to low yield farms, which was statistically significant. The results are shown in table 3.9A.

TABLE 3.9A T-Test Difference between T1 and T3 Use of Child Work Participation Days by Hazardous Tasks

	T1 different from T3	
Children aged 15-17	Mean difference	T-test
Land preparation	0.12	(0.68)
Weeding	-0.88	(-0.81)
Applying chemicals	-0.49**	(-2.11)
Carrying water for spraying	0.09	(0.16)
Spraying insecticide	-0.08	(-0.46)
Pod plucking, heaping, breaking	0.05	(0.05)
Fermenting beans	-0.53	(-1.87)
Carting beans from farm	-0.08	(-0.21)
Carrying beans for sale	-0.06	(-0.22)

Source: *adult's questionnaire, Ghana*

Although this section of the analysis is still silent on the type of child work used (i.e. hazardous, non-hazardous child labour or permissible work), it does suggest the existence of a clear task specific pattern in the use of children on cocoa. There are tasks where children do not appear to be substitutable for adult (paid or family) labour, these are the most physically demanding tasks such as land clearing, or those that carry a higher health-related risk (such as those that entail the manipulation of chemicals/plant protection inputs). The youngest group of children virtually does not engage with physically demanding tasks such as land clearing/land preparation, and does very little on the high risk tasks such as applying chemicals and spraying insecticide.

What is the current situation of the community/shared labour schemes?

As suggested by Amanor (2010), the progressive expansion of cocoa production from the Eastern to the Western end of Ghana's cocoa belt has meant that the modalities for accessing both land and labour – the two major inputs to cocoa production - have changed dramatically over time, following the progressive agricultural commodification of both inputs. Sharecropping, for example, which has traditionally been a customary institution for the landless migrants and local landless villagers to cultivate cocoa, has shifted to become a means to access cheap labour whenever family ties can no longer be accessed without some kind of formal return (in kind or in term of acquired land rights). Sharecropping has also become a means for cocoa farm owners to manage land owned by others in return for additional cocoa to sell.

In Ghana there are two main sharecropping systems, *Abunu* and *Abusa*. The *Abunu* sharecropper can either take a share of half the proceeds from the crop, or share on a 50:50 basis the land that he or she helps to develop. Even after the land is divided, the owner may also pass his or her share to the cropper on an *abusa* basis. *Abunu* is a tradition that has facilitated the settlement

of new areas by migrant farmers allowing the redistribution of land that would otherwise have been left idle. *Abusa* is used to describe a system in which either the caretaker receives one-third and the owner the other two-thirds, or both sides receive a third with the final third being set aside for the purchase of inputs. In the past when land was plentiful, *abusa* normally referred to a contract in which the participant received one-third of the crop and the owner two-thirds (*see* Hill 1957). Most of this type of caretaking is on mature, bearing farms.

Many farms in the more established cocoa growing regions are managed by *abusa* sharecroppers. Often this is because the owner is either too old to manage his farm, or has too many separate plots. Otherwise, *abusa* is practised where the owner is absent or is busy developing his/her own farm.

The sampling strategy of this study did not allow to give sufficient attention to such sharecropping institutional arrangements. This was because the sampling approach consisted of taking a list of all cocoa farmers in a community from a register available either from the list of active LBCs, or to use lists prepared by the village Chief or by the Cocobod district officers. This method was followed in order to survey individuals selling cocoa and also responsible (and therefore knowledgeable) of cocoa related decisions (i.e. how much labour to use and hire out of the household, how much fertilizer/fungicide/chemicals to buy/spray their farms on, on how much land).

Given their modality of land access, abusa/abunu sharecroppers are not typically registered as cocoa farmers' in charge' of production decisions who could answer any relevant information in the questionnaires prepared for this study. The few cases we managed to cover with our sampling strategy are individuals who operate under a mixed system whereby they manage their own farms, and also work as sharecroppers on others' farms (but are not responsible on these for production related decision).

In order to tap into this topic, the research has done two different things. First, we checked in the GLSS 6 data (2014), the share of *Abunu* and *Abusa* and found that even in this nationally representative sample, both types of sharecroppers currently represent a very small minority of cocoa households, respectively 8% and 3% of the sample.

Secondly, we looked at abunu and abusa sharecroppers and profiled a number of features, which are reported in table 3.9B. The figures in this table should only be taken as suggestive of what the productive features of these type of farmers are, given the very small sample size they represent in the regions covered under this study. Key points of reflection can be summarised as follows:

1. Abusa sharecroppers have the highest level of yields, a finding in line with many other studies on the topic.
2. This higher yields are associated with relatively higher levels of hired labour, and higher use of fertilizer per unit of land.
3. Although there is no difference in the amount of children's work days used per unit of land across all categories, the abusa sharecroppers in the sample use in absolute terms much more children's work days of work than their abunu or farm-owner counterparts.

TABLE 3.9B Sharecropping as captured in the ICI Labour Study Survey Data

Variables	Unit measures	Owner	Abunu (1:2)	Abusa (1:3)
Sample size	N observations	819 (89%)	46 (5%)	15 (2%)
Yields	Kg cocoa/ha (median)	402.02	211.69	482.42
Labour productivity	Kg cocoa/labour days used	20.86	9.68	27.00
Hired labour productivity	Kg cocoa/hired labour days	32.23	18.04	93.58***
Hired person days/ha	(Hired persons * N days worked)/ha	74.88	54.43	57.01
HH person days/ha	(HH persons * N days worked)/ha	47.23	37.29	26.57
Child person days/ha	(HH children * N days worked)/ha	15.17	14.59	14.05
Child person days	HH children * N days worked	18.94	21.59	35.67***
% Hired labour	Hired labour/total labour	0.57	0.58	0.51
Fertilizer/ha	Kg/ha	123.94	49.73	141.94
Fungicide/ha	Kg/ha	2.41	1.06	0.26
Insecticide/ha	Lit/ha	4.53	5.46	5.34

*** suggests a 1% level of statistically significant difference in the t-test of difference in means between being Abusa sharecropper relative to being a land owner or Abunu sharecropper **Source**: adult's questionnaire, Ghana

The results around yields and higher labour productivity confirm a tendency found elsewhere in the literature (Besley, 1995; Robertson, 1987; Sjaastad, 1987; Takane, 2002; Vigneri, 2005) that there is a higher quality of labour supervision carried out by abusa sharecroppers on landholding they do not own (but from which they have great interest to obtain higher productivity to increase the relative size of the share they get by contract). In line with this is also the finding that abusa sharecroppers use higher amounts of fertilizer on the intensive margin, as this is often paid for (at worst on a shared basis) and supplied by absentee owners. The intensity of hired labour use is higher than that of family labour, their use of children's work days on the intensive margin is equal to that of abunu and owner famers, though in absolute term abusa sharecroppers use more children's work days than both owner and abunu farmers.

Although the qualitative data collection phase did not include a focus group specifically with farmers in sharecropping arrangements, some of them did participate in FGDs. For instance, in Aboagyekrom, one participant in the FGD with young people declared to be a caretaker doing *abusa*. Most of the information regarding sharecropping arrangements comes from questions such as: "Is the practice of sharecropping on cocoa (abunu and abusa) still in use in this village? Are cocoa land-owners using more or less sharecroppers? Why?"

Respondents from five villages stated that the practice of sharecropping is still very common in their communities (Atwereboana, Ekutuase, Kantankrubo, Kyebi, and Nkatieso). In Mansokrom and Punikrom, however, respondents argued that although the 'abunu' and 'abusa' arrangements are available, they are not easily accessible, given the scarcity of land available for the practice of these arrangements. Various reasons were given as to why sharecropping was still practiced. Some farmers own more than one farm, which they cannot take care of on their own, hence they sharecrop out a farm to others (Kantankrubo). Farmers who are "physically weak" and can't continue working on the farms find these arrangements convenient (Kyebi). In Nkatieso, farmers observed that: "It is difficult to get labour because workers prefer sharecropping arrangement rather than doing daily work". It seems thus that, while farmers

would prefer to hire occasional workers as needed (to have the highest flexibility), people with no land prefer to work in sharecropping arrangements than as daily workers.

Another type of hired labour traditionally used in cocoa production in Ghana, is *nnoboa*, a shared labour group practice common for neighbouring farmers. Nnoboa does not entitle to a monetary payment for the help offered on neighbours' cocoa farms, but is simply an exchange of labour hours spent on each other's farms. Nnoboa arrangements are available in some villages (Aboagyekrom) but their incidence has generally declined in time because farmers prefer to work for a pay, and when these arrangements exist, the group size is smaller than it used to be. Farmers in Kantankrubo lamented that: "It is always difficult get others to help you these days, as such we rely on hired labour". Others mentioned, as another reason for the decline of Nnoboa, that "there is no love among farmers anymore" (FG1, Punikrom). A respondent noted that nnoboa arrangements have declined because the intensity of work on farms has gone up, and is therefore unmanageable on a sharing labour scheme, especially in the peak of the harvest season (FG1, Nkatieso).

RQ3. Are higher yields associated with higher labour demand? To what extent may incomes derived from improved cocoa productivity respond to the labour demand?

Key findings from research question 3:

1. Yields are not found to increase as a result of either more household or hired labour.
2. Farmers who had higher yields in the past (from 2012) currently use significantly more household adult and child days of work.
3. There is statistically significant evidence of higher yields occurring on smaller landholdings. If it is smallholders who have higher yields, this implies that as land size increases, farmers are unable to reduce their unit production costs or to allocate efficiently labour and non-labour inputs.
4. Gross cocoa margins – the proxy measure of cocoa income used in this study - decreases as land size increases, a finding which holds especially in the Western North region.
5. Wages are the single highest production cost. Farmers with smallest landholdings spend more on paid labour, it is farmers with the largest landholdings that have the lowest revenues from cocoa, both in absolute levels and per unit of land.
6. An increase in gross margins has a positive and statistically significant impact on both the demand for adult household and younger children's working days (aged 4-14) but no statistically significant effect on the working days for hired adult labour[18].
7. Farm owners have a marginally lower labour demand for children's work days than growers not owning land.

- *What is the difference in cocoa yield/profitability with and without labour?*

[18] It is important to note that the results emerging from the underlying regression analysis need to be taken with caution. This is because the data available only allowed estimating the effect of gross margin on labour demand, with both indicators referring to the same crop year.

All farmers use some kind of labour on their cocoa holding, whether it is their own, from family members, or hired (paid and in some shared system arrangement).

In this section we first present production related variables across different yield ranges to show how the use of labour and other inputs per unit of land changes for different categories of producers (low, medium and high yield ones). Then we run a cross section regression of yields and cocoa income to assess the effect of different types of labour. Finally, we estimate three labour demand models to test the impact of past yields[19] on different types of household labour.

Table 3.8 presented data on the use of production inputs by yield ranges. There are three main differences between low (up to 400 Kg of cocoa per hectare) and high yield (of over 850 Kg of cocoa per hectare) producers. The average size of land under cocoa cultivation halves on high relative to low yield farmers; the use of fertilizer, insecticide and total labour used per unit of land rises dramatically amongst high yield farmers, and labour productivity on high yield farms is about three times higher than that observed on low yield farms.

It is clear from the figures presented in this table that cocoa production in Ghana remains a labour intensive sector; all categories of labour days are used more intensively by the high yield farmers. On the composition of labour use, the data shows that producers increase more the use of household adult labour per unit of land in Ashanti, and use more children's work days per unit of land in the Western North region in the high yield bracket in comparison to the low yield bracket.

We now turn to explain the effect of different labour use on land productivity by estimating a linear regression model for cocoa yields, which allows one to understand and model the relationship between cocoa yields and the explanatory variables. The model uses as explanatory variables a rich set of production related variables, ranging from farmers' human capital (age, gender, education level), the quality of farming practices (as proxied by the chosen shading system, the age of the tree stock, and the amount of plant protection products applied), and their geographical location (district dummies).[20] We then estimated four different models to predict yields for: 1. Farmers using both hired and household labour, 2. Farmers using only hired labour, 3. Farmers using only household labour, and 4. Farmers not using any labour at all (household or hired).

The results of these estimated models are presented in table 3.10. Household labour appears to have no statistically significant impact on yields, and hired labour – though statistically significant – has a negligible size. These findings – which appeared surprising for a labour intensive production technology such as cocoa - were further probed by comparing the predicted value of the yield regression estimated using different categories of labour. These predicted yields were estimated to be 468 Kg/ha regardless of the typology of labour used on cocoa.

[19] In order to deal with the problem of endogeneity when estimating inputs and outputs that refer to the same point in time, we have used a measure of past yields to estimate the effect of land productivity on farmers' labour demand.

[20] The estimation of a linear regression model is potentially biased by endogeneity and omitted variables not measured or not available from survey data (e.g. soil quality and land investments). While the authors fully acknowledge these data related issues as possible sources of bias (and this will require some caution in interpreting the size effect of the selection of regressors) the researchers are fairly confident about the direction of impact of the variables as these are in line with other studies conducted using a panel of cocoa farmers in the same fashion (Vigneri, 2005, 2008, 2016).

TABLE 3.10: Yield regressions to estimate effect of different labour demand/use (continues)

Dependent variable: Ln (kg/ha)	(1)			(2)		
	Coeff.	S.D.	T-stat	Coeff.	S.D.	T-stat
Ln(land)	-0.15	0.04	-4.06	-0.15	0.04	-4.07
% farmers using fertilizer	0.05	0.08	0.55	0.04	0.08	0.47
Ln(fertilizer/ha)	0.01	0.02	0.44	0.01	0.02	0.62
% farmers using insectide	-0.35	0.11	-3.09	-0.36	0.11	-3.13
Ln(insecticide/ha)	0.33	0.04	7.73	0.34	0.04	7.89
% farmers using fungicide	-0.01	0.08	-0.15	-0.02	0.08	-0.22
Ln(fungicide/ha)	0.15	0.06	2.52	0.16	0.06	2.69
Ln(HH lab days/ha)	0	0.02	-0.05	0	0.02	0.14
Ln(Hired lab days/ha)	0.04	0.02	2.36	-	-	-
Farmer is male	0.1	0.05	1.89	0.09	0.05	1.76
Age farmer	0.01	0.01	1.27	0.02	0.01	1.48
Age farmer squared	0	0	-1.4	0	0	-1.59
Schooling years farmer	0	0.02	-0.08	0	0.02	0
Schooling years farmer squared	0	0	0.17	0	0	0.16
Age of tree stock	0.03	0.01	3.54	0.03	0.01	3.34
Age of tree stock squared	0	0	-3.4	0	0	-3.2
Share acreage heavy shade trees	0.37	0.16	2.26	0.39	0.17	2.37
Share acreage moderate shade trees	0.28	0.16	1.72	0.3	0.17	1.79
Share acreage light shade trees	0.35	0.17	2.03	0.35	0.17	2.05
Atwima	0.14	0.1	1.44	0.14	0.1	1.37
Adansi East	0.31	0.1	2.98	0.3	0.11	2.83
Offinso	-0.04	0.11	-0.36	-0.03	0.12	-0.3
Sefwi Wiawso	0.31	0.08	3.77	0.31	0.08	3.76
Juabeso-Bia	0.52	0.09	5.86	0.5	0.09	5.54
Constant	4.71	0.34	13.9	4.75	0.34	13.92
N observations		743			743	
F-test (explanatory variable jointly significant)		15.82***			15.55***	
R2-adjusted		0.34			0.33	

Legenda: *** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level. **Source**: adult's questionnaire, Ghana

TABLE 3.10: Yield regressions to estimate effect of different labour demand/use (continued)

Dependent variable: Ln (kg/ha)	(3)			(4)		
	Coeff.	S.D.	T-stat	Coeff.	S.D.	T-stat
Ln(land)	-0.15	0.03	-4.4	-0.16	0.04	-4.45
% farmers using fertilizer	0.05	0.08	0.55	0.04	0.08	0.47
Ln(fertilizer/ha)	0.01	0.02	0.44	0.01	0.02	0.62
% farmers using insectide	-0.35	0.11	-3.08	-0.35	0.11	-3.1
Ln(insecticide/ha)	0.33	0.04	7.75	0.34	0.04	7.9
% farmers using fungicide	-0.01	0.08	-0.16	-0.02	0.08	-0.21
Ln(fungicide/ha)	0.15	0.06	2.52	0.16	0.06	2.68
Ln(HH lab days/ha)	-	-	-	-	-	-
Ln(Hired lab days/ha)	0.04	0.02	2.38	-	-	-
Farmer is male	0.1	0.05	1.89	0.09	0.05	1.77
Age farmer	0.01	0.01	1.27	0.02	0.01	1.51
Age farmer squared	0	0	-1.41	0	0	-1.61
Schooling years farmer	0	0.02	-0.08	0	0.02	0.01
Schooling years farmer squared	0	0	0.18	0	0	0.15
Age of tree stock	0.03	0.01	3.54	0.03	0.01	3.34
Age of tree stock squared	0	0	-3.4	0	0	-3.21
Share acreage heavy shade trees	0.37	0.16	2.26	0.39	0.17	2.38
Share acreage moderate shade trees	0.28	0.16	1.72	0.3	0.17	1.79
Share acreage light shade trees	0.35	0.17	2.03	0.35	0.17	2.04
Atwima	0.14	0.1	1.44	0.14	0.1	1.37
Adansi East	0.31	0.1	2.98	0.3	0.11	2.84
Offinso	-0.04	0.11	-0.36	-0.04	0.12	-0.32
Sefwi Wiawso	0.31	0.08	3.77	0.31	0.08	3.77
Juabeso-Bia	0.52	0.09	5.86	0.49	0.09	5.54
Constant	4.71	0.34	13.94	4.75	0.34	13.98
N observations		743			743	
F-test (explanatory variable jointly significant)		16.48***			16.23***	
R2-adjusted		0.34			0.33	

Legenda: *** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level. **Source**: adult's questionnaire, Ghana

This regression analysis, therefore, qualitatively offers additional supporting evidence on the existence of widespread inefficiencies in farmers' allocation of production inputs (labour) and in their farming practices.

The FGDs explained part of the causes for these inefficiencies; for example, when asked about what agricultural programmes had reached their village and what effects these had on their yields (land productivity), respondents described hardships recurrently encountered in cocoa farming (especially caused by cocoa tree diseases, lack of access to inputs and expensive labour) rather than stating the positive impact of these programmes on their yields. Women also noted the many development problems which persisted in their villages, especially complaining about the poor quality of water and sanitation facilities, the lack of access to credit and of alternative livelihoods to cocoa. None of the interviewees made the observation that they could afford to hire workers at the current cost. In fact, the majority, especially women and young farmers, observed that as the wage for daily labour had gone up, they had found it increasingly difficult to pay the costs upfront. Several respondents noted that the bulk of cocoa farm operations is being increasingly carried out by men and women adult household members.

Table 3.11 shows gross margins by land quartile, (i.e. revenues from cocoa sales net of all labour and plant protection product costs, but not of other equipment used, or of any land rental payment). The first interesting feature is the striking difference in cocoa gross margins between the lowest land quartile in the Western North and Ashanti regions. Farmers in the former region have gross margins that are triple those observed in the Ashanti region, a result which is consistent with the districts surveyed in the Western region currently being those with higher production (and consequently revenue) potential, which is consistent with the fact that these areas are the last ones with virgin forest available for new cocoa planting. However, the Western region's cocoa gross margins decrease by more than half as the size of landholdings increase (i.e. between the top and bottom land quartiles). The most striking figure in this table, however, remains the size of the wage bill paid by cocoa farmers; across all land quartiles and in both regions, this is the single most expensive item for cocoa producers, which confirms once again how unaffordable hiring paid labour is for the majority of cocoa farmers in Ghana.

TABLE 3.11 Gross margins on different land quartiles

	Western N.	Ashanti	Total
Q1: [.05, 1.17]			
Gross Margin	1,568	435	1,169
Revenue from sale	4,695	2,929	4,073
Total Production Costs	3,128	2,493	2,904
Total Wage Bill	2,521	1,966	2,325
Total non-lab input costs	607	527	579
Q2: [1.26, 1.94]			
Gross Margin	1,106	492	879
Revenue from sale	2,191	1,261	1,847
Total Production Costs	1,085	769	968
Total Wage Bill	818	550	719
Total non-lab input costs	267	219	249
Q3: [2.07, 3.37]			
Gross Margin	748	635	709
Revenue from sale	1,683	1,321	1,560
Total Production Costs	935	686	851
Total Wage Bill	732	520	660
Total non-lab input costs	204	167	191
Q4: [3.49, 38.61]			
Gross Margin	759	639	720
Revenue from sale	1,502	1,485	1,497
Total Production Costs	743	846	777
Total Wage Bill	528	613	556
Total non-lab input costs	215	232	221
Total			
Gross Margin	1,042	547	870
Revenue from sale	2,512	1,750	2,247
Total Production Costs	1,471	1,203	1,378
Total Wage Bill	1,148	916	1,068
Total non-lab input costs	322	287	310

Note: *Farmers' wage bill was derived by summing up for each respondent the cost paid for each type of labour (contract and daily) across all tasks.*
Source*: adult's questionnaire, Ghana*

- *What impact may productivity and potentially higher incomes have on the demand and supply of adult and child labourers (aged 5-14 and 15-17 years old)?*

In order to test the effect of increasing yields on household adult and child labour demand, we estimated three sets of labour demand models, first using adult household labour only as dependent variable, then children's work days, first in the aggregate and then by separating between children aged 5 to 14, and 15 to 17. The results of these estimated models are reported in Table 3.12. The model were estimated using a log-linear specification, with all continuous variables in natural logarithm, and selected linear terms (such as age, education, and years of farmer's experience in cocoa faring) entered in quadratic form.

The models are generally well fitted, though OLS estimates on cross section data are always prone to measurement errors and endogeneity bias, so the reliability of the size effect in the estimated coefficients should be taken with caution. The OLS estimates are used to suggest the size effect and statistical significance of different variables on the chosen dependent indicator.

The point estimates in column 1 show that a 10 percent raise in past yields generates a 2.8 percent increase in the demand for household adult labour. A similar size effect is found in the children's work demand model, where the demand for children's work days increases by 3 percent for each 10 percent increase in past yields. When the latter specification is disaggregated by child age, the estimates suggest that the largest demand pressure from increased yields occurs on children's work days for the 5-14 age group for whom a 10 percent increase in yields generates a 2.8 percent increase in children's work days for this age group.

When using current yields for this estimation, the point estimates similarly showed that a 10 percent raise in yields generated a 3 percent increase in the demand for household adult labour. A similar size effect was found in the children's work demand model using current yields. The estimates also suggest that a10 percent increase in yields generates a 2.7 percent increase in work days for children under 15 years of age.

TABLE 3.12 The demand for household adult labour and children's work days as a function of yields

Dependent variable:	(1) HH adult labour per ha			(2) HH child days labour (4-17) per ha			(3) HH child days labour (15-17) per ha			(4) HH child days labour (5-14) per ha		
	Coeff.	S.D.	T-value	Coeff.	S.D.	T-value	Coeff.	S.D.	T-value	Coeff.	S.D.	T-value
Yields 2012 (logged)	0.28	0.06	4.53	0.30	0.06	5.00	0.10	0.04	2.27	0.28	0.06	4.85
Farmer is male	-0.49	0.13	-3.85	-0.30	0.13	-2.27	-0.23	0.11	-2.17	-0.26	0.12	-2.16
Age farmer	0.04	0.03	1.43	0.09	0.03	2.95	0.04	0.02	1.47	0.07	0.02	2.92
Age farmer squared	0.00	0.00	-1.17	0.00	0.00	-2.61	0.00	0.00	-1.01	0.00	0.00	-3.06
Schooling years farmer	0.14	0.04	3.70	0.10	0.04	2.75	0.07	0.03	2.51	0.03	0.03	1.00
Schooling years farmer squared	-0.01	0.00	-3.83	-0.01	0.00	-3.24	-0.01	0.00	-3.06	0.00	0.00	-1.40
Years of experience in cocoa farming	-0.05	0.02	-2.58	-0.04	0.02	-2.19	-0.01	0.01	-0.99	-0.03	0.02	-1.85
Years of experience in cocoa farming squared	0.00	0.00	0.99	0.00	0.00	0.86	0.00	0.00	-0.10	0.00	0.00	1.11
HH adult equivalent size	0.29	0.04	7.08	-0.04	0.03	-1.21	0.05	0.03	1.61	-0.06	0.03	-1.98
Farmer is owner	0.02	0.23	0.09	-0.26	0.23	-1.11	-0.25	0.20	-1.28	-0.08	0.21	-0.39
Farmer is abunu sharecropper	-0.05	0.32	-0.15	-0.26	0.32	-0.81	-0.46	0.24	-1.90	0.14	0.29	0.46
Share acreage light shade trees	-0.11	0.43	-0.26	0.16	0.38	0.43	0.14	0.27	0.52	-0.01	0.35	-0.03
Share acreage moderate shade trees	0.28	0.41	0.67	0.47	0.36	1.30	0.30	0.25	1.21	0.20	0.33	0.60
Share acreage heavy shade trees	0.33	0.40	0.81	0.25	0.36	0.71	0.21	0.25	0.86	0.00	0.32	0.01
% farmers reporting hiring labour unaffordable	0.19	0.11	1.70	0.33	0.12	2.84	0.14	0.09	1.61	0.23	0.10	2.20
Village level wages for cocoa tasks (logged)	-0.01	0.07	-0.13	0.09	0.06	1.43	0.00	0.05	0.09	0.13	0.05	2.30
Constant	-0.20	1.16	-0.17	-3.25	1.15	-2.83	-1.03	0.93	-1.10	-3.15	0.95	-3.31
N observations	826			826			826			826		
F-test (explanatory variable jointly significant)	10.30***			6.80***			3.90***			*5.28****		
R2-adjusted	0.18			0.13			0.06			0.10		

Legenda: **** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level.*

Source*: adult's questionnaire, Ghana*

We then estimated the same set of household labour demand models, by replacing yields as the variable of interest with gross margins per hectare (i.e. revenues from cocoa sales - net of all labour and plant protection product costs, but not of other equipment used, or of any land rental payment - for each unit of land) as shown in table 3.13.

Interestingly, these results show that an increase of the cocoa gross margin is statistically significant for the demand of household adult and household children's work (younger children aged 5-14) but has no significant effect on any type of hired paid labour. A 10 percent increase in net cocoa revenues generates 1.2 percent increase in adult family labour demand and a 1.6 percent increase in younger children's work days. No evidence was found of higher net revenues increasing the demand for hired adult labour. This result suggests that as net income from cocoa increases, growers do not substitute household adult and younger children's working days with paid labour. This may be driven by the higher costs associated with higher production levels, which may push growers to increase the labour demand on household labour. When all types of labour are aggregated, the current analysis shows a weak association between increasing incomes and increasing paid labour demand. Further analysis broken down by cocoa farmer types (gender, productivity thresholds, but also income thresholds) could identify unequivocally for which type of farmer higher income would generate a substitution between HH child and adult workers and hired/paid labour.

Very interesting to also the finding on the 'gender' effect; women cocoa growers are more likely to use household adult days for cocoa work than men growers. However, there is no statistically significant gender difference in any of the paid work labour demand models, or in any of the children work days demand models; men and women growers alike have the same labour demand. Land owners have a marginally lower demand for children's work days than growers not owning land. This result could be picking up a wealth effect in that land owners are able to substitute children's work with other forms of adult labour. In particular, contract labour demand is significantly higher for growers owning land.

Two different patterns emerge from these estimates. First, as yields (land productivity) increases, both household adult and children's work days increase. Secondly, higher net income from cocoa sales has a –positive and statistically significant impact on both the demand for household adult and children's work days.

This analysis, however, remains silent on the possible effects of rising yields on the incidence of child and hazardous child labour. The next section presents the findings from this additional analysis.

TABLE 3.13 The demand for household adult, children's and paid hired labour working days as a function of gross margins (continues)

Dependent variables	**HH Adult labour**			**Children work (All)**			**Children work (Over 15)**		
Explanatory variables									
	Coef.	*Std. Err.*	*t*	*Coef.*	*Std. Err.*	*t*	*Coef.*	*Std. Err.*	*t*
Gross margins (logged)	**0.12**	**0.04**	**2.76**	**0.15**	**0.04**	**3.49**	0.02	0.04	0.54
Dummy = 1 if respondent's has negative gross margin	**0.77**	**0.27**	**2.88**	**1.16**	**0.27**	**4.30**	0.18	0.22	0.84
Farmer is male	**-0.32**	**0.12**	**-2.68**	-0.18	0.12	-1.46	-0.17	0.11	-1.60
Age farmer	0.04	0.03	1.41	**0.08**	**0.03**	**2.79**	0.03	0.02	1.41
Age farmer squared	0.00	0.00	-1.21	**0.00**	**0.00**	**-2.62**	0.00	0.00	-1.00
Schooling years farmer	**0.08**	**0.03**	**2.27**	0.04	0.04	1.19	**0.05**	**0.03**	**1.82**
Schooling years farmer squared	**-0.01**	**0.00**	**-2.74**	**-0.01**	**0.00**	**-2.04**	**-0.01**	**0.00**	**-2.44**
Years of experience in cocoa farming	0.00	0.02	-0.04	0.01	0.02	0.48	0.01	0.01	0.49
Years of experience in cocoa farming squared	0.00	0.00	-0.49	0.00	0.00	-0.92	0.00	0.00	-1.05
HH adult equivalent size	**0.36**	**0.04**	**9.23**	0.02	0.03	0.52	**0.07**	**0.03**	**2.32**
Farmer is owner	-0.21	0.22	-0.99	**-0.38**	**0.21**	**-1.77**	-0.32	0.20	-1.60
Farmer is abunu sharecropper	-0.21	0.28	-0.73	-0.46	0.29	-1.61	**-0.50**	**0.24**	**-2.13**
Share acreage light shade trees	-0.04	0.41	-0.10	0.31	0.37	0.83	0.18	0.26	0.68
Share acreage moderate shade trees	0.33	0.39	0.85	**0.61**	**0.34**	**1.79**	0.33	0.24	1.38
Share acreage heavy shade trees	0.40	0.39	1.03	0.42	0.34	1.22	0.23	0.24	0.98
% farmers reporting hiring labour unaffordable	**0.19**	**0.10**	**1.88**	**0.34**	**0.11**	**3.08**	0.14	0.09	1.60
Dummy = 1 if district is Atwima	0.29	0.22	1.29	-0.15	0.24	-0.62	0.34	0.22	1.54
Dummy = 1 if district is Adansi East	0.12	0.22	0.56	-0.08	0.24	-0.35	-0.04	0.22	-0.17
Dummy = 1 if district is Offinso	**-0.45**	**0.22**	**-2.09**	**-0.56**	**0.23**	**-2.46**	-0.19	0.20	-0.94
Dummy = 1 if district is Sefwi Wiawso	-0.16	0.18	-0.87	**-0.74**	**0.20**	**-3.67**	-0.08	0.18	-0.47
Dummy = 1 if district is Juabeso Bia	**-0.54**	**0.21**	**-2.63**	**-0.76**	**0.22**	**-3.44**	-0.05	0.20	-0.26
Dummy = 1 if respondent in 2nd land quartile	**-0.59**	**0.16**	**-3.78**	**-0.41**	**0.17**	**-2.46**	-0.12	0.15	-0.80
Dummy = 1 if respondent in 3rd land quartile	**-1.04**	**0.16**	**-6.71**	**-0.72**	**0.17**	**-4.28**	**-0.35**	**0.15**	**-2.40**
Dummy = 1 if respondent in 4th land quartile	**-1.75**	**0.18**	**-9.51**	**-1.05**	**0.19**	**-5.60**	**-0.64**	**0.16**	**-4.09**
Constant	1.26	0.81	1.55	-0.67	0.84	-0.80	-0.36	0.66	-0.55
N observations	826			826			826		
F-test (explanatory variable jointly significant)	17.99			9.75			3.85		
R2-adjusted	0.33			0.21			0.09		

TABLE 3.13 The demand for household adult, children's and paid hired labour working days as a function of gross margins (continued)

Dependent variables	**Children work (Under 15)**			**Paid work**			**Daily waged work**			**Contract waged work**		
Explanatory variables	*Coef.*	*Std. Err.*	*t*	*Coef.*	*Std. Err.*	*t*	*Coef.*	*Std. Err.*	*t*	*Coef.*	*Std. Err.*	*t*
Gross margins (logged)	**0.16**	**0.04**	**3.84**	0.00	0.04	0.05	-0.02	0.05	-0.54	0.04	0.04	1.07
Dummy = 1 if respondent's has negative gross margin	**1.22**	**0.25**	**4.93**	**1.56**	**0.25**	**6.20**	**1.62**	**0.28**	**5.84**	0.26	0.28	0.92
Farmer is male	-0.17	0.11	-1.47	0.00	0.12	0.00	0.03	0.12	0.21	-0.13	0.12	-1.01
Age farmer	**0.06**	**0.02**	**2.57**	0.01	0.03	0.24	-0.02	0.03	-0.63	**0.05**	**0.03**	**1.80**
Age farmer squared	**0.00**	**0.00**	**-2.89**	0.00	0.00	-0.42	0.00	0.00	0.56	**0.00**	**0.00**	**-1.91**
Schooling years farmer	-0.02	0.03	-0.55	-0.03	0.03	-0.95	-0.05	0.04	-1.23	0.02	0.04	0.47
Schooling years farmer squared	0.00	0.00	-0.05	0.00	0.00	1.58	**0.01**	**0.00**	**1.71**	0.00	0.00	-0.23
Years of experience in cocoa farming	0.01	0.01	0.75	**0.03**	**0.01**	**2.42**	**0.04**	**0.02**	**2.29**	**0.03**	**0.01**	**1.92**
Years of experience in cocoa farming squared	0.00	0.00	-0.62	**0.00**	**0.00**	**-2.44**	**0.00**	**0.00**	**-2.27**	**0.00**	**0.00**	**-1.87**
HH adult equivalent size	-0.01	0.03	-0.38	0.01	0.03	0.24	0.02	0.04	0.47	-0.02	0.04	-0.62
Farmer is owner	-0.21	0.20	-1.05	0.34	0.23	1.49	0.05	0.24	0.20	**0.44**	**0.20**	**2.18**
Farmer is abunu sharecropper	-0.08	0.27	-0.30	0.16	0.30	0.54	-0.30	0.32	-0.93	**0.65**	**0.29**	**2.27**
Share acreage light shade trees	0.17	0.35	0.47	0.36	0.36	1.00	0.60	0.46	1.33	-0.21	0.40	-0.54
Share acreage moderate shade trees	0.38	0.33	1.17	0.56	0.34	1.62	**0.84**	**0.45**	**1.88**	-0.34	0.37	-0.92
Share acreage heavy shade trees	0.22	0.32	0.68	**0.66**	**0.34**	**1.93**	**1.05**	**0.44**	**2.39**	-0.55	0.37	-1.48
% farmers reporting hiring labour unaffordable	**0.24**	**0.10**	**2.37**	**0.50**	**0.12**	**4.29**	**0.43**	**0.12**	**3.73**	0.17	0.11	1.51
Dummy = 1 if district is Atwima	-0.32	0.24	-1.34	-0.19	0.22	-0.86	0.07	0.24	0.28	**-0.59**	**0.26**	**-2.28**
Dummy = 1 if district is Adansi East	-0.17	0.25	-0.67	**-0.41**	**0.22**	**-1.87**	**-0.52**	**0.25**	**-2.06**	-0.21	0.27	-0.78
Dummy = 1 if district is Offinso	**-0.61**	**0.22**	**-2.78**	**-0.33**	**0.20**	**-1.65**	**-0.66**	**0.23**	**-2.80**	0.24	0.28	0.87
Dummy = 1 if district is Sefwi Wiawso	**-0.76**	**0.19**	**-3.93**	**-0.37**	**0.17**	**-2.18**	-0.22	0.19	-1.19	**-0.55**	**0.22**	**-2.52**
Dummy = 1 if district is Juabeso Bia	**-0.86**	**0.21**	**-4.12**	**-0.77**	**0.19**	**-4.01**	**-0.77**	**0.21**	**-3.64**	**-0.43**	**0.23**	**-1.90**
Dummy = 1 if respondent in 2nd land quartile	**-0.38**	**0.16**	**-2.45**	**-0.48**	**0.15**	**-3.17**	**-0.62**	**0.16**	**-3.75**	0.22	0.16	1.44
Dummy = 1 if respondent in 3rd land quartile	**-0.63**	**0.15**	**-4.11**	**-0.44**	**0.15**	**-2.93**	**-0.60**	**0.17**	**-3.62**	**0.28**	**0.16**	**1.69**
Dummy = 1 if respondent in 4th land quartile	**-0.73**	**0.17**	**-4.29**	**-0.49**	**0.16**	**-3.04**	**-0.75**	**0.18**	**-4.10**	**0.47**	**0.19**	**2.53**
Constant	-0.35	0.75	-0.46	**1.90**	**0.80**	**2.36**	**2.24**	**0.88**	**2.54**	-0.58	0.83	-0.70

N observations	826	826	826	826
F-test (explanatory variable jointly significant)	6.76	17.21	17.99	2.64
R2-adjusted	0.18	0.28	0.30	0.06

The reference category for shade system is full sun/no shade
The reference category for districts is Asante Akim Central
The reference category for land quartiles is the bottom/smallest land quartile
***Source**: adult's questionnaire, Ghana*

RQ4. Is there evidence of higher hazardous child labour or non-hazardous child labour occurring where programmes exist to increase cocoa yields? What factors are associated with a higher risk of incidence of hazardous and non-hazardous child labour?

Key findings from research question 4:

1. Farmers managing larger landholdings and members of the "Sustainable Cocoa Programme" aiming at raising cocoa productivity, and those who said to be exposed and benefitting from awareness campaigns, appear to employ significantly more hazardous child labour.
2. Most children help with almost all aspects of farm work. This is considered a socially acceptable practice. Children start helping on the farm at quite a young age — before turning 10.
3. Children implicitly admitted to practices of child labour in 8 out of the 13 villages through discussion around their drawings, and reported skipping school days at least once a week to help on the farm, especially when cocoa beans are due for drying.
4. Just under half of the children sampled in Ghana fall under the category of hazardous child labour, and a quarter of children under the category of non-hazardous child labour.
5. There is a high incidence (on average 50% of the sampled children) of both categories of child labour among low yield farmers, with a particularly high incidence of both hazardous and non-hazardous child labour among low yield farmers in the Ashanti region.
6. Hazardous child labour is more likely to occur: i. Among women farmers, ii. Among farmers who have been exposed to WFCL awareness programme for fewer years, iii. Among older farmers, and iv. Among farmers that own more land. It is most likely to occur during the harvest months, to affect boys more than girls, and v. among low yield farmers (relative to high yield ones).
7. Child Labour (non-hazardous) is more likely to occur: i. Among men farmers, ii. Among medium yield farmers (relative to low yield farmers), iii. Among farmers owning less land; v. Among farmers hiring more labour. vi. Older children are at higher risk of CL, which is more likely to occur in the Asante Akim Central district of the Ashanti region.

In order to identify effective strategies and actions to mitigate the risk of child labour in Ghana cocoa farming, the findings under this research question are divided into two sections. In the first one we describe potential differences between yields and the incidence of different categories of child labour between farmers members and non-members of three interventions: 1) a "Spraying Initiative", which was a spraying programme to combat pests and diseases 2) a private investment programme which will be referred to as the "Sustainable Cocoa Programme GH" (SCP GH), which was initiated in 2012 and offered a package of incentives (material and in training) to boost and sustain production among participating farmers, and 3) a "Child labour Awareness Campaign" which covered all the villages in which the data collection took place, with the objective to improve the communities understanding of the risks of non-hazardous child labour and hazardous child labour.

In the second section, probit regression models are estimated to identify significant correlates that increase the probability of CL an HL incidence. This last segment of the analysis will be used to suggest possible policy actions and interventions to offset the risk of child labour.

Defining child work and labour categories in the data

The government of Ghana has adopted a clear definition of hazardous activities, child labour, and permissible work by children, on the basis of age brackets, time spent in school, time spent on farming/labour related tasks, and the type of farming tasks performed.

The data for this study collected information on how often children missed school to work on the cocoa farm and asked children about farming tasks they engaged in on their households' farms. It was not possible to collect as detailed information as would have been required to establish whether some of the tasks are hazardous on a case-by-case basis (e.g. the weight of the loads carried by children of a given weight, or whether sharp tools or age-appropriate tools were used by each individual child for plucking cocoa pods). Therefore, some assumptions had to be made in order to decide under which category to include any given task. These assumptions were based on insights provided directly by collaborators on the ground as well as on the drawings done by children.

Hazardous child labour variable: it includes all children below the age of 18 working on the farm and engaging in any of the following activities: tree felling, slashing bush, burning bush, applying fertilizer, and applying fungicide, spraying insecticide, pod plucking and pod breaking. While the first six categories are unequivocally listed as hazardous by the government of Ghana (HAF for cocoa sector, 2008), the latter two are considered hazardous only if children use machetes and any other sharp tools. Observations from field informants as well as the children's drawings (see Appendix 2) suggest that, children do use machetes and other sharp tools when carrying out these activities. We also included weeding among the hazardous activities, but only for children less than 15 years of age, since weeding performed by children older than 15 years of age is not considered to be hazardous if the sharp tools used are age-appropriate. Although one cannot know whether this is the case, the research preferred to opt for a more conservative definition of hazardous tasks. The assumption made for this study is that children under 15 years of age perform weeding mostly with cutlass and other sharp tools, as corroborated by the drawings done by children (see Appendix 2). The definition of children engaged in hazardous activities applies regardless of whether children attend school.

Child labour[21] (non-hazardous) variable: includes children below 15 years of age, not engaged in hazardous tasks (as defined above) but who reported skipping school to work on the household cocoa farm at least twice a month.

Finally, the category *child work (permissible)* includes: i) children below 15 years who are engaged in non-hazardous activities and who have either never skipped school or have skipped school no

[21] In this study, child labour refers to children who are engaged in non-permissible work but who are not undertaking hazardous activities.

more frequently than: “at least once in the past month” and “once in a while”; ii) children aged 15-17 engaged in farm work if they are working on non-hazardous activities regardless of their school attendance (or school enrolment) as 15 is the minimum working age in Ghana.

Please note that these are mutually exclusive categories, children who are engaged in hazardous child labour have not been included in the child labour category for the purpose of this study. Consequently the child labour category is referred to as “child labour (non-hazardous)”.

Public and private investments to increase yields and decrease child labour

In order to understand whether yields are significantly higher for cocoa farmers receiving the benefits of programmes aiming to increase cocoa productivity, and whether any difference in yields associated to programme participation is in turn correlated with a higher incidence of the three categories of child labour discussed above, we compared mean differences across farmers members and non-members of the following three programmes:

Spraying Initiative. This initiative aimed to promote at scale good farming and pruning practices among cocoa farmers.

Sustainable Cocoa Programme (SCP) GH: this is a private initiative launched in 2012 in Ghana, featuring a voluntary participation process whereby all cocoa farmers in a village were offered to register and receive training in best cocoa farming practices. All farmers surveyed for this study in the Boako cocoa district (the Sefwi-Wiawso administrative district) are current members of the programme.

Child Labour and Worst form of child labour (WFCL) Awareness raising Campaign/Programme. Ghana has benefitted from a thorough, nationwide campaign against the worst forms of child labour. In the study we asked farmers whether they had participated in such programmes that specifically focus on CL/WFCL.

Table 3.14 compares yields and categories of child labour use across these three initiatives. The first two columns show means test differences between farmers participating in the ‘Sustainable Cocoa Programme GH’ and the rest of the sample, by land quartile and in the whole sample.

TABLE 3.14 Yields, Labour, CL and HL use by programme participation and land quartile[22]

		Sustainable Cocoa Programme GH		WFCL Awareness Raising Programme		Spraying Initiative	
	Variable	Member	Not member	Received	Not received	Received	Not received
Q1 [.05, 1.17]	Yields (mean)	781.82	703.81	737.03	519.47	772.86	680.75
	Hazardous child labour %	48	45	42	54	42	50
	Child labour (non-hazardous) %	22	33	33	23	29	31
	HH child days/ha	31.86	36.41	33.22	38.27	29.03	41.30
	HH days/ha	101.51	89.27	94.27	90.87	81.70	105.08
	Hired labour/ha	109.90	95.25	130.51***	43	79.12	121.64
	# Observations	23	51	48	26	38	36
Q2 [1.26, 1.94]	Yields (mean)	653.63	554.37	413.50	736.95	461.82	720.91***
	Hazardous child labour %	46	51	48	53	44	55
	Child labour (non-hazardous) %	29	24	0	0	26	25
	HH child days/ha	14.07	18.82	15.62	21.29	15.93	18.62
	HH days/ha	39.67	48.95	43.37	52.07	41.50	50.47
	Hired labour/ha	55.27	72.74	49	111.93***	45.22	89.89***
	# Observations	35	70	75	30	54	51
Q3 [2.07, 3.37]	Yields (mean)	473.17	511.37	485.37	528.47	401.40	601***
	Hazardous child labour %	59	53	1	1	55	56
	Child labour (non-hazardous) %	20	14	15	19	18	14
	HH child days/ha	8.56	8.17	7.01	12.10***	10.44**	5.99
	HH days/ha	22.66	24.48	24.29	22.24	30.80***	16.03
	Hired labour/ha	48.42	43.48	53.45***	22.18	40.32	51.01
	# Observations	41	64	78	27	55	50
Q4 [3.49, 38.61]	Yields (mean)	432.84	423.88	426.53	429.32	417.48	438.72
	Hazardous child labour %	66***	38	43	63	38	60***
	Child labour (non-hazardous) %	22	25	29***	5	27	20
	HH child days/ha	5.69	6.76	6.92	4.38	8.18***	4.20
	HH days/ha	17.59	23.95	19.72	28.59	23.77	19.07
	Hired labour/ha	43.65	50.27	54.02	25.50	54.37	40.04
	# Observations	32	56	69	19	48	40
Total Sample	Yields (mean)	565.72	544.25	530.26	608.87*	494.37	619.10***
	Hazardous child labour %	55	47	48	56	45	55**
	Child labour (non-hazardous) %	23	24	25	20	25	22
	HH child days/ha	13.42	16.91	14.04	20.03***	15.03	16.41
	HH days/ha	39.81	45.17	40.86	49.69	41.95	44.75
	Hired labour/ha	59.88	64.51	66.03	54.53	52.70	74.10**
	# Observations	131	241	270	102	195	177

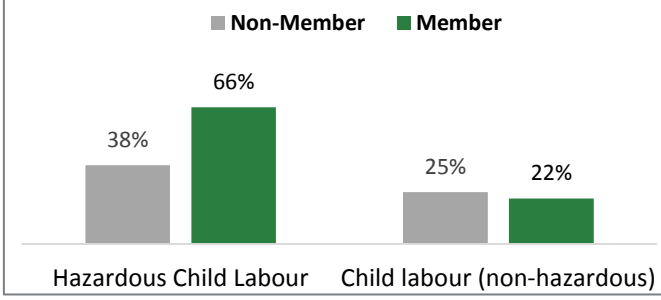
Source: adult's and children's questionnaire, Ghana

Legenda: *** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level.

[22] The equivalent table for Côte d'Ivoire is table 4.18

Table 3.14 suggests that the only statistically significant difference between the two groups occurs in the top land quartile, where participants to the programme have a 28 percentage point higher incidence of hazardous child labour as shown in Figure 3.14. No difference between the two groups is otherwise found even in yields.

FIGURE 3.14: SCP-GH Members vs Non-Members by CL and HL Top Land Quartile: ≥ 3.49



Source: *adult's and children's questionnaire, Ghana*[23]

Columns 3 and 4 in table 3.14 show means differences in yields and child labour categories for farmers reporting been exposed to awareness campaigns on the worst forms of child labour, against farmers who have either not been exposed to these campaigns or declared not finding this campaign beneficial. At the third land quartile, which groups farmers managing on average larger landholdings, farmers benefitting from WFCL awareness programmes hire significantly more adult paid labour per unit of land, and use significantly less children's work days, though do not show any statistically significant difference in the use of either hazardous or child labour (non-hazardous). This result is also confirmed in table 3.14A which shows farmers within the third land quartile benefitting and not benefitting from the WFCL awareness raising campaign.

TABLE 3.14A Yields, Labour, CL and HL use by WFCL awareness raising by programme participation for Land Q3 farmers

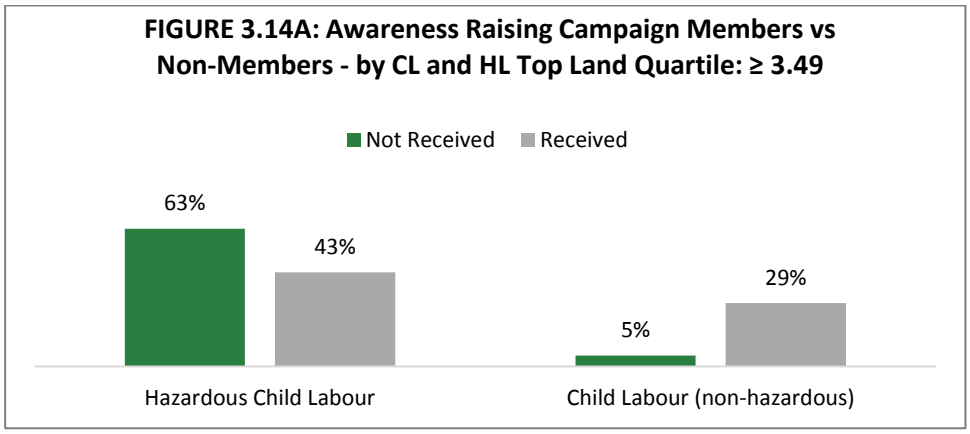
	WFCL Awareness Raising Programme		
	Variable	**Received**	**Not received**
Q3 [2.07, 3.37]	Yields (mean)	485.37	528.47
	Hazardous child labour %	1	1
	Child labour (non-hazardous) %	15	19
	HH child days/ha	7.01	12.10***
	HH days/ha	24.29	22.24
	Hired labour/ha	53.45***	22.18
	# Observations	78	27

Legenda*: *** Significant at 1% level.*

[23] Sample size: SCP-GH - members (32) and non-members (56)

Surprisingly, in the top range of cocoa landholding size, the data shows a statistically significant higher incidence (of 24 percentage points) of child labour (non-hazardous) among farmers exposed and benefitting from the awareness campaigns as illustrated by Figure 3.14A. Unfortunately, responses from FGDs do not help us to clarify the reason for this result. It may well be the case that awareness campaigns are offered in communities known for their higher incidence of CL and HL). Yields are found to be on average significantly higher among farmers not benefitting or participating in these programmes only when looking at the full sample, i.e. without any disaggregation by land quartile.

FIGURE 3.14A: Awareness Raising Campaign Members vs Non-Members - by CL and HL Top Land Quartile: ≥ 3.49



Source: *adult's and children's questionnaire, Ghana*[24]

Finally, columns 5 and 6 in table 3.14 report the tests in mean differences between farmers who had received spraying under the Spraying Initiative, and those who hadn't. As shown by table 3.14B (presentation of the same data for spraying initiative as shown in table 3.14), in both the second and third land quartile, non-Spraying Initiative famers have statistically significant higher yields than Spraying Initiative farmers. As for the use of children in cocoa farming, we found that in the top land quartile non-Spraying Initiative farmers had 22 percentage points higher incidence of hazardous child labour than Spraying Initiative farmers, despite no associated difference in the same land quartile range in cocoa productivity.

TABLE 3.14B - Yields, labour, CL and HL use by Spraying Initiative programme participation

Land quartile	Spraying Initiative	Yields (mean)	Hazardous child labour %	Child labour (non-hazardous) %	HH child days/ha	HH days/ha	Hired labour/ha	# Observations
Q1 [.05, 1.17]	**Received**	772.86	42	29	29.03	81.7	79.12	38
	Not Received	680.75	50	31	41.3	105.08	121.64	36
Q2 [1.26, 1.94]	**Received**	461.82	44	26	15.93	41.5	45.22	54
	Not Received	720.91***	55	25	18.62	50.47	89.89***	51
Q3 [2.07, 3.37]	**Received**	401.4	55	18	10.44**	30.80***	40.32	55
	Not Received	601***	56	14	5.99	16.03	51.01	50
Q4 [3.49, 38.61]	**Received**	417.48	38	27	8.18***	23.77	54.37	48
	Not Received	438.72	60***	20	4.2	19.07	40.04	40

Source: *adult's and children's questionnaire, Ghana* ***Legenda****: *** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level.*

[24] Sample size: Awareness raising campaign - Not received (19) and Received (69)

The overall results were found to be interesting; with no statistically significant difference in average yields among participants in the programmes that clearly aimed to raise cocoa productivity, and no evidence of significantly lower incidence of child labour (non-hazardous) or hazardous child labour among farmers exposed and benefitting from child labour awareness campaigns.

Some caution needs to be exercised when interpreting these findings, however, as it is not possible to tell whether less productive farmers or those using more CL/HL are more likely to join or be enrolled on such programmes. Establishing this important causal relation would require further research.

Nonetheless, while no causal inference was estimated to establish the direct impact of participation in any of the three programmes on either higher yields or the incidence of one of the two forms of child labour (something that could indeed be explored in further research extensions to this study), we supplemented the quantitative analysis with the careful inspection of qualitative data, which recorded farmers and community opinions on public investment programmes and on community perceptions on child labour. All 14 villages where FGDs were conducted benefit from the Spraying Initiative. Some respondents expressed reservations on the modalities of implementation, the anticipated effectiveness of the programme, and questions surrounding the criteria for qualifying to participate.

Interestingly, farmers found that, when delivered appropriately, such programmes were effective and they could benefit in those cases. For instance, respondents from FG1 in Afrimkrom stated that access to fertilizer, fungicides, and insecticides had indeed improved yields, and found that the initiative was generally helpful. Kyebi and Mansokrom were two other villages where farmers expressed positive opinions about the programmes, stating that “the spraying initiative has revived interest in cocoa farming” (FG1, Kyebi).

One possible reason for the difference in views is that Kyebi, Ekutuase and Mansokrom villages seem to have received some kind of NGO interventions that provided complementary programmes. For instance, one certification programme organised farmer scholar programmes, and new hybrid cocoa breeds were introduced by extension services. This contrasts with instances such as those found in other villages where farmers complained most about the interventions while also highlighting that there was “no investment pack to increase yields” and “no external support” (FG2).

Though male farm owners were not entirely satisfied with existing programmes, many clearly benefit from them. The situation is completely different when as reported by women and by male youth during the focus group discussions. Women’s focus groups were unanimous in stating that there are no programmes for women farmers, that existing programmes mainly benefit men and “discriminate against women” (FG3, Pewodie). Some women also observed that it would be better to have fertilizers and other inputs available in stores at low cost.

Youth focus groups, composed by young men, generally reinforced some of the opinions given by older farmers regarding delays with the initiative, and also saw in the spraying initiative an

opportunity to earn a salary. In fact, one of the most positive effects of the programme was considered to be the employment opportunities, with people being hired to spray pesticides, or to cut mistletoe, remove and replant cocoa trees affected by swollen shoot disease. Youth in Afrimkrom wished that the initiative could be turned into a permanent job for them. Youth in Aboagyekrom also confirmed their positive views about such opportunities, but also complained that their fathers would too often take over these jobs.

When discussing the impact of the Spraying Initiative on yields and production, youth stated the desirability of making these inputs available for sale, at affordable prices. Most respondents also complained there were no agricultural programmes for youth.

Although the qualitative data did not directly address the question of how child labour situations can be alleviated, they described the current situation of child labour in the surveyed villages, and what the views by different stakeholders are on this important issue.

Most FGDs with adults tended to convey the impression that children's primary school attendance had increased rapidly in the villages visited, that education is valuable and child labour is not a good thing. Leading personalities in the villages and farm managers (FG1 and FG2), who presumably were more exposed to awareness programmes regarding child labour, were adamant in explaining that children should not be allowed to work on the farm and that child labour is no longer practiced. They expressed their appreciation of the value of education, even for youth who want to be farmers, since education is associated with better use of farm inputs and knowledge of new agricultural techniques. These village elites also underlined that education is valuable to open opportunities for alternative jobs in the future. Many respondents participated in or knew about the government programmes promoting knowledge about issues of child labour, where they learned that children should not carry out hazardous tasks.

Women respondents equally appreciated the fact that children should go to school but also shared concerns about the current state of education and the children's prospects. Some women noted that children remain unemployed even after graduating from school, while others explained that if children are not in school, probably it is because they are not interested in education. Respondents in Mansokrom lamented that secondary school fees are too high and that the lack of primary school teachers discourages children from attending school. Women, more than men, also recognised that children must, and do help outside school hours, on a variety of farm tasks. They described the tasks performed by children in much detail, while pointing out that children normally perform such tasks only during weekends and holidays.

TABLE 3.15. Most frequent activities drawn by children, by age group and gender (frequencies)

Activity	Age group			Gender	
	< 12	12 - 14	15-17	Female	Male
Farm work					
Plucking cocoa	6	25	17	22	29
Gathering cocoa	4	7	10	12	12
Weeding	5	3	2	6	10
Carrying cocoa	3	6	4	8	6
Going to the farm	2	6	5	5	4
Drying cocoa	0	1	4	2	3
Breaking cocoa	1	2	1	1	3
Spraying cocoa	0	1	2	1	2
Fermenting cocoa	1	0	1	0	2
Other					
Fetching water	7	27	21	27	29
Cooking	4	11	9	17	8
Pounding fufu	3	7	2	6	6

***Source**: children's drawings, Ghana*

Children confirmed such a picture in their drawings (see appendix 2). These sessions, which as described in the methodology section, were realized by children aged 10 to 14, gathered together, but working independently on their drawings. Table 3.15 reports the main activities, which the children drew most frequently, next to the number of children who represented such activity, by age group and gender. Most children help with almost all aspects of farm work: pod plucking, pod gathering, weeding, carting of beans to the house, insecticide spraying, and fetching of water to the farm. Children start helping with these tasks at quite a young age — before turning 10 years old—and there is no obvious gender difference in the farm tasks girls and boys carry out.

During the conversations that followed the drawing exercise, several children also expressed that they find some of these activities tedious, specifically heaping and plucking pods, weeding, insecticide spraying, and carting of fermented beans. Children from Punikrom, Boako district, aged 10 to 14 pointed out that these tasks puts them at risk of getting injured and contracting diseases, and gives them body pains and neck aches. In addition, children implicitly admitted to practices of child labour. Children who participated in 8 out of the 13 villages' focus groups admitted to skipping school at least once a week (normally on Fridays) to help on the farm, especially when cocoa beans are due for drying. A child from Nkatieso, in the 10-14 age category, commented on his drawing saying that it is common for children to work as paid labourers on other people's farms during the weekends to help pay for school fees. One child also highlighted that orphaned children skip school more often to work on farms and make ends meet. A handful of children from different villages, ages 10 to 17 during the survey data collection, mentioned that they go to the farm at dawn before school, often missing the first school lesson. Some children from Punikrom specifically mentioned that if they refuse to help in the mornings, they are denied food and money for school, and have to go to class on empty stomachs.

In addition to farm work, boys and girls across all ages and in all villages engage in household chores. They often help their mothers with cooking, cleaning utensils, pounding fufu, collecting firewood, carting of foodstuffs to the house, and fetching water. Some children even help sell Abenkyi and other crops. Overall, children seem to value cocoa because it provides income to cover their school fees, uniforms, and other household necessities.
While the FGDs revolved mainly around the pros and cons of government programmes, and community views on child schooling and labour, the survey questionnaire asked respondents whether they participated in both public and private sector programmes, as well as in awareness raising programmes on the issues of child labour. In the section below, we use quantitative data on yields, and adult and child labour utilisation, and differentiate these outcomes between participants and non-participants to these programmes.

Finally, Table 3.16 shows yields, gross margins and share of farmers in different yield ranges (low, medium and high) by child labour category and region. The data set used for this exercise is from the children's sample, which counts in total 423 observations. In the table below, however, permissible child work and children not working at all on cocoa were dropped, therefore reducing the sample size used for the analysis to 310 observations.

A few features in the data are worthwhile commenting. Just under half of the sampled children fall under the category of hazardous child labour, and a quarter of them carry out child labour (non-hazardous). At the regional level, the incidence of both categories of child labour is dominant in the Western North region sites surveyed. There is no statistically significant difference in the mean values of land productivity (yields) across categories of child labour. The only dimension where we find a marked difference in child work categories is when the data are disaggregated by yield ranges, which mirror production technology levels as discussed earlier in the report. There is a high incidence (on average 50% of the sampled farmers/children questionnaire) of both categories of child labour at the lowest level of yields (for farmers producing on average up to 400 Kg of cocoa per hectare). Regionally the data shows that it is low productivity farmers in the Ashanti region that use more of both hazardous and child labour (60% of farmers). However, the number of farmers engaging hazardous and child labour drop consistently with higher yield levels (with 33% and 35% of medium yield farmers using respectively hazardous and child labour (non-hazardous), and 16% and 18% of high yield farmers using the same categories). These correlations would suggest that both types of non-permissible child labour are used mostly by the low yield farmers. These figures are silent on what the drivers of child labour for farmers are, or on the characteristics of children that are more likely to engage in either type of work.

TABLE 3.16. Profiling child labour categories against cocoa farm-manager characteristics[25]

	Hazardous child labour			Child labour (non-hazardous)		
	Western. N	Ashanti	Total	Western N.	Ashanti	Total
N observations	120	86	206 (49%)	58	46	104 (25%)
Yield (median)	482.42	337.7	402.02	482.42	291.46	407.76
Gross margins (median)	774.73	437.8	625.87	988.33	484.1	756.05
% Stating hiring labour unaffordable	79	67	74	64	74	68
% farmers in low yield group (≤ 400 kgs/Ha)	44	6	51	36	6	47
% farmers in medium yield group (> 400-850] kgs/Ha)	37	28	33	41	27	35
% farmers in high yield group (> 850-2000] kgs/Ha	19	12	16	22	13	18

***Source**: children's questionnaire, Ghana*

Table 3.16A below presents the percentage of children engaged in permissible work, non-hazardous child labour and hazardous child labour by yield level. Again, it is mostly the low yield farmers who use both hazardous child labour and non-hazardous child labour (as mentioned, child labour and hazardous child labour are mutually exclusive categories).

TABLE 3.16A. Child Labour Categories by Yield Category

	Hazardous Child Labor	Child Labour (non-hazardous)	Child work (permissible)	No Children working
% low yield farmers (105-400] kgs/Ha)	53	20	30	8
% medium yield farmers (>400-850] kgs/Ha)	51	28	12	10
% high yield farmers (> 850-2400] kgs/Ha	42	23	23	11

***Source:** adult's and children's questionnaire, Ghana*

In order to explain the determinants of children's hazardous activities and child work typology, we estimated two probit regression models to identify these factors, and their size effects influencing the probability of child labour (non-hazardous) and hazardous child labour.

[25] The equivalent table for Côte d'Ivoire is table 4.19

3.2 Explaining the incidence of child labour (non-hazardous) and hazardous child labour

Using the sub-sample of children aged 10 to 17 matched to the adult farmers' surveyed under this study, table 3.17 shows the effect on the probability of hazardous child labour and child labour (non-hazardous) of a combination of adult farmers' characteristics, children's characteristics and a number of controls related to productivity.

TABLE 3.17. The determinants of hazardous and non-hazardous child labour: results from probit estimations[26]

Dependent Variable:	Hazardous child labour			Child Labour (non-hazardous)		
	dF/dx	Std. Err.	z	dF/dx	Std. Err.	z
Dummy = 1 if legal guardian is male	-0.18	0.10	-1.87	0.11	0.05	2.23
# Years membership in WFCL awareness prog.	-0.04	0.03	-1.68	0.01	0.01	1.00
# Years membership in WFCL awareness prog. * legal guardian male	0.05	0.03	1.61	-0.03	0.02	-1.55
Dummy = 1 if legal guardian is married	-0.14	0.09	-1.58	0.08	0.07	1.31
Dummy = 1 if legal guardian was born in the village	0.07	0.06	1.08	-0.06	0.04	-1.59
Years of schooling of legal guardian	0.00	0.02	0.09	-0.01	0.01	-0.61
(Years of schooling of legal guardian)^2	0.00	0.00	0.04	0.00	0.00	0.74
Age legal guardian	0.04	0.02	2.53	-0.02	0.01	-1.60
(Age legal guardian)^2	0.00	0.00	-2.33	0.00	0.00	1.49
Child age	0.33	0.16	2.02	0.53	0.11	4.05
(Child age)^2	-0.01	0.01	-1.94	-0.02	0.00	-4.48
Dummy = 1 if child is male	0.20	0.06	3.52	-0.05	0.03	-1.59
Dummy=1 if tiring task done between Oct. - Dec.	0.26	0.06	4.47	0.03	0.03	0.75
T-level 2 (med input: med output)	-0.11	0.07	-1.60	0.10	0.04	2.33
T-level 3 (high input: high output)	-0.16	0.09	-1.77	0.07	0.06	1.22
ln(yields in 2012)	-0.06	0.07	-0.90	0.02	0.04	0.63
Number of cocoa farms owned	0.04	0.02	1.70	-0.04	0.02	-2.48
Share of hired labour days in tot days of labour used	0.02	0.10	0.17	-0.13	0.06	-2.19
Walking distance to school by age group (minutes)	0.00	0.00	1.05	0.00	0.00	0.40
Squared walking distance to school by age group (minutes)	0.00	0.00	-0.99	0.00	0.00	0.66
Dummy = 1 if district is Atwima	0.14	0.13	1.03	-0.10	0.03	-1.98
Dummy = 1 if district is Adansi East	0.20	0.13	1.47	-0.10	0.03	-1.89
Dummy = 1 if district is Offinso	-0.11	0.13	-0.87	0.05	0.08	0.69
Dummy = 1 if district is Sefwi Wiawso	0.08	0.11	0.79	0.01	0.06	0.25
Dummy = 1 if district is Juabeso Bia	-0.03	0.12	-0.26	-0.01	0.06	-0.20
Number of obs		366			366.00	
Wald chi2(24)		70.23			95.43	
Prob > chi2		0.00			0.00	
Pseudo R2		0.15			0.27	
Log pseudolikelihood		-216.10			-145.78	

***Source**: adult and children's questionnaire, Ghana*

Table 3.18 presents in a matrix format the results of the econometric analysis above to highlight the risk factors that are most likely to trigger the occurrence of hazardous and non-hazardous child labour, specific to cocoa farming in the districts surveyed in Ghana.

[26] The equivalent table for Côte d'Ivoire, is table 4.19

Cells highlighted in green suggest a negative marginal effect on the probability of a CL category occurring, whilst cells highlighted in amber as having a positive effect on the probability of any CL category occurring. The higher the number of starred markers in each cell, the higher the strength of the effect of any given explanatory variable listed in the first column on the likelihood of hazardous or child labour occurring. One, two and three stars correspond respectively to 10%, 5%, and a 1% statistical level of significance for any effect, and will be labelled accordingly as weak, medium and strong effects.

TABLE 3.18. Factors associated with higher and lower incidence of CL and HL[27]

Possible Determinants of HL/CL (*by Probit predictions*)	**CL**	**HL**
Adult farmer responsible of child is male	positive (**)	negative (**)
# Years member WFCL awareness prog.	N.E.	negative (**)
# Years member WFCL awareness prog. AND legal guardian is male	N.E.	N.E.
Adult farmer responsible of child is married	N.E.	N.E.
Adult farmer responsible of child was born in the village	N.E.	N.E.
Years of schooling of adult farmer responsible	N.E.	N.E.
Age adult farmer responsible	N.E.	positive (***)
Child age	positive (***)	positive (***)
Child is Male	N.E.	positive (***)
Tiring task carried out during harvest season		positive (***)
Medium yields relative to low yields	positive (***)	N.E.
High yields relative to low yields	N.E.	negative (**)
Yields in 2012	N.E.	N.E.
Number of cocoa farms owned	negative (***)	positive (**)
Walking distance to school by age group (minutes)	N.E.	N.E.
Share (%) of hired labour	negative (***)	N.E.

Legenda: *HL is Hazardous child labour; CL is Child Labour; N.E. No Effect.*

Source*: adult and children's questionnaire, Ghana*

Based on our analysis, the incidence of HL (hazardous child labour) is more likely to occur when:

1. The farmer responsible for the child is a woman (medium effect);
2. The fewer the years the adult farmer responsible for the child has been exposed to awareness programmes on WFCL (medium effect);
3. The older the farmer responsible for the child (medium effect);
4. The older the child (strong effect);
5. During the busy months of harvest leading to the major crop season of sales (strong effect)
6. Among boys (strong effect);
7. For low yield farmers relative to high yield farmers;
8. For farmer owning more cocoa plots

[27] The equivalent table for Côte d'Ivoire, is table 4.20

The incidence of CL (child labour, non-hazardous) is more likely to occur when:

1. The farmer responsible for the child is a man (medium effect);
2. The older is the child (strong effect);
3. For medium yield farmers relative to low yield farmers;
4. The lower the number of cocoa farms owned, possibly a proxy for wealth (medium effect);
5. The lower the share of hired labour used (strong effect).

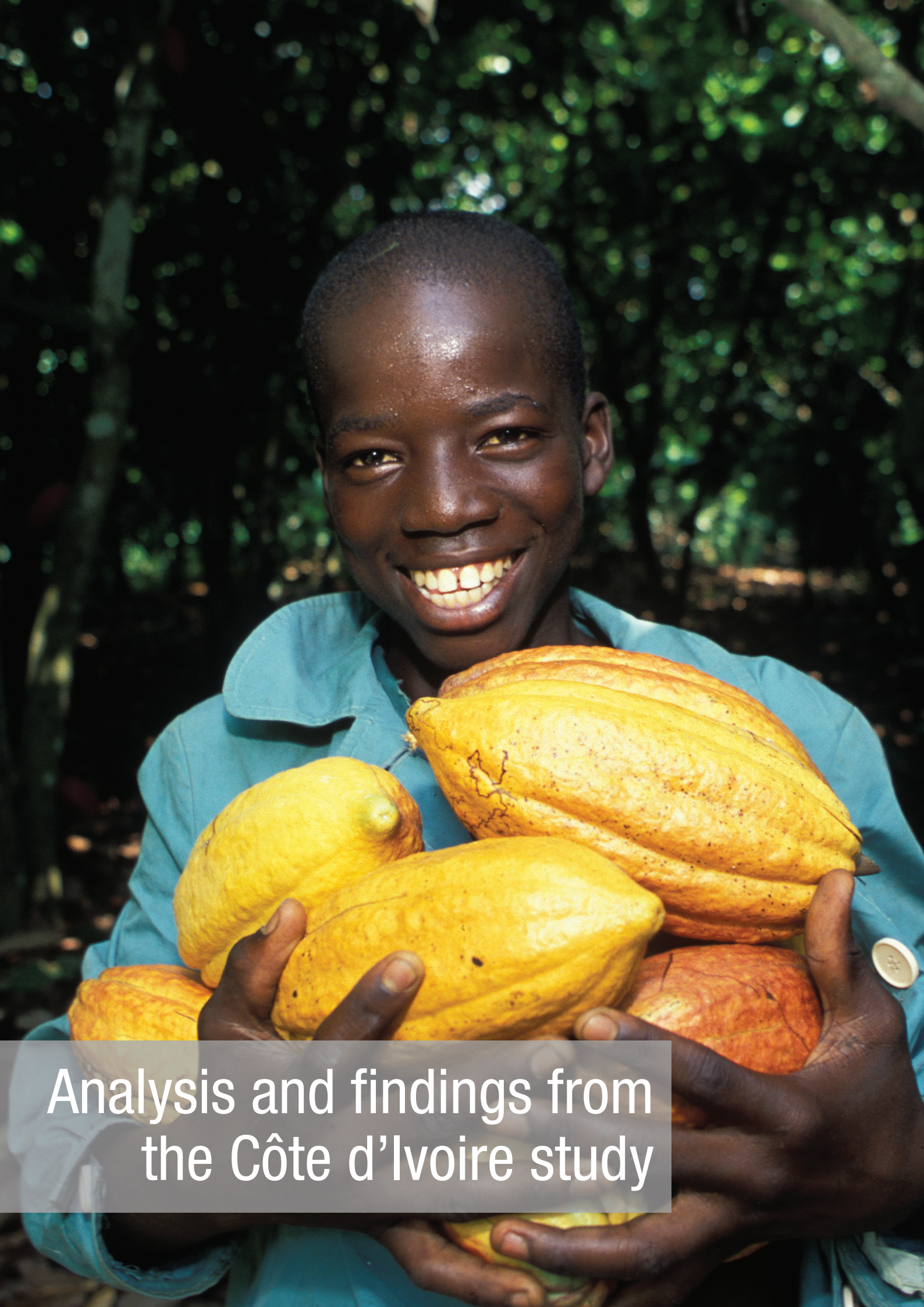
To sum up, the risk analysis carried out by probit estimation suggests that the risk of incidence of HL occurrence is higher among women cocoa farmers, less exposed to child labour awareness programmes, older cocoa farmers. It is also more likely to occur among boys, among older children, during the peak season of harvesting and sales, and mostly among low yield farmers.

The risk of CL is more likely among men cocoa farmers and older children. It is also more likely to occur among medium yield farmers, and among producers owning less cocoa plots and less able to pay for hired, non-family labour.

Using a separate regression model, the research also found that land size did not influence the probability of child labour (non-hazardous) or hazardous child labour occurring[28].

Section five will draw on the main findings from both the Ghana and Côte d'Ivoire study to draw some key policy recommendations and interventions from this study.

[28] These results are available upon request from ICI



Analysis and findings from the Côte d'Ivoire study

This section reports results from the analysis conducted with both quantitative and qualitative data collected during fieldwork in Côte d'Ivoire. After describing the context of the study sites, and the main characteristics of the adult farmers' sample and the children's sample, it addresses the four main research questions. The analysis is organized by theme, and will draw on the qualitative or quantitative evidence iteratively, as in the Ghana case study.

4.1 Profiling cocoa communities in the study sites

4.1.1 The village context

One of the aims of the qualitative data collection exercise was to gather information on local perceptions about village life, the role of cocoa farming and main issues and concerns. The responses from the focus group discussions (FGDs) are reported and analysed to convey what the cocoa economy represents today to different segments of the rural population. One recurrent element that emerges from the FGDs is that cocoa is considered to be the main source of income in most villages and is viewed as important for the country's economy as a whole. Respondents explained how the revenues from cocoa have allowed the development of village infrastructures, such as modern houses, roads and markets. Some youths also declared that cocoa farming is the main reason why people stay in the village (FG3, Yobouekro, Divo). This general positive view is also reflected in responses to the children's survey questionnaires, with over 90% of children stating that cocoa is important in the village economy.

At the same time, village members do not deny that cocoa farming today presents many challenges. Those most frequently mentioned are: diseases, lack of water and lack of fertilisers. The combination of these challenges has reportedly led to a decrease in yields – although respondents did not give any precise figure regarding the size of the yield decrease and the timing.

Cocoa also competes with palm oil and rubber, and many farmers seem to be attracted to these other crops. Even in those settings, however, the attachment to cocoa remains. Leading personalities in a village in Soubré district stated that: "Cocoa has regained its title as the main economic driver of the village after rubber took over for a little while when its market value was high compared to that of cocoa. But now cocoa farmers are growing cocoa again because prices are more favourable" (FG1, Kagninanko). These statements possibly reflect positive perceptions of the reforms introduced by the government in the sector since 2012, which included the establishment of a floor gate-price for cocoa, and other interventions initiated by the private sector.

Informants from Grebouo II (Soubré) estimated that 90% of the population works on cocoa, while only the remaining 10% is devoted to palm oil and rubber, which were introduced only recently. Furthermore, several focus groups discussions (FGDs) participants mentioned problems associated with these alternative crops. Youth in Kagninanko explained that a palm oil factory not far from the village attracted youth, but that "in retrospect [it] has caused land saturation" (FG3, Kagninanko, Soubré). Leading personalities in another village in the same district explained that: "Cocoa production will remain stagnant due to the land grabs and land saturation by a

certain company. This situation doesn't allow new plantations to be formed and so yields won't be able to increase" (FG1, Grebouo II, Soubrè).

In their FGDs, women dwelt more than men on the difficulties of village life, lamenting the paucity of infrastructures in their villages, especially water and sanitation, transport, health services and school facilities in some cases. This state of affairs not only is considered to lead to lower living standards in the village, but also to inhibit women's income generating activities – e.g. lack of road to transport goods to the market, lack of electricity for refrigeration and so on.

Women generally work in both subsistence agriculture and cocoa farming, mostly helping their husbands, but also working on their own account if they have access to land. However, women would like to see more income-generating activities, as options are at the moment restricted, and include selling cooked rice (FG4, Brizeboua, Daloa), or growing peppers (FG4, Krikoria I, Daloa).

4.1.2 A profile of cocoa farm managers

The average farmer in our sample is male, 47 years old, has less than 4 years of schooling, almost 23 years of experience in cocoa farming, and lives in a household of about 6 members, of which 3.63 are adult members and 2.58 are children (Table 4.2). Over 95% of respondents are male in our sample, and only 6% live in households that are female headed (the majority of women farm managers surveyed, are widowed separated or divorced). It is only in the Abengourou district (Indenié-Djuablin region) that the percentage of women respondents is a bit higher (12%) and the percentage of female-headed households is 16%. These figures could suggest a higher rate of male out-migration from this region. While 92% of farm managers in the Daloa district (Haut-Sassandra region) were born locally, this percentage drops to 18% and 13% in Abengourou (Indenié-Djuablin) and in Divo (Loh Djiboua) respectively. In these two regions, the majority of farmers come either from other regions in Côte d'Ivoire (55% in the case of Indenié-Djuablin) or from other countries (56% for Loh Djiboua).

Farmers were asked to report the amount of land they owned separately from the size of the land they cultivate to cocoa. As explained in the methodology section, these measures have been adjusted downward, since it is the case that farmers over-estimate the size of land they own or cultivate. Furthermore, although the tables in this study report, whenever possible, show both the median and mean values for land size (and yields), the focus in the commentary and analysis will be on the median values, so as to net out the effect of outliers.

Land ownership and cocoa land size vary by regions (Table 4.2A). While farmers in Loh Djiboua and Nawa own about 4.21 ha of land (median value, adjusted by the correction factor; 5 ha, unadjusted), and cultivate 3.37 ha to cocoa (4ha unadjusted), farmers in Haut-Sassandra own and cultivate on average 1.68 ha of land (2 ha unadjusted). Yields are higher in the Indenié-Djuablin and Nawa regions (just over 300 kg/ha, adjusted median value), and lowest in Loh Djiboua (156 kg/ha), whereas yields in Haut-Sassandra hover in the middle range (almost 200 kg/ha). These differences remain of similar order of magnitude, although of course values are correspondingly higher when looking at mean yield values. Although regional differences depend

on a complex set of factors (from soil and environmental conditions to policy), a cursory look of the use of non-labour inputs provides a partial explanation for this, since fertilizer use, and to some extent insecticide use, are found to be higher in the Indenié-Djuablin and Nawa regions, than in the other two regions. Interestingly, a higher percentage of farmers participated in programmes aimed to increase yields in Indenié-Djuablin (53%) and Nawa (44%) than in the other two regions between 2009 and 2013, where yields are lower. The relationships between yields and labour demand use, and between yields and programme participation, are aspects that this Côte d'Ivoire case study will examine in more detail in the following sections.

TABLE 4.2. Socio-demographic characteristics of sampled cocoa farm managers

	Total	Indenié-Djuablin (Abengourou)	Nawa (Soubré and Buyo)	Loh Djiboua (Divo)	Haut-Sassandra (Daloa)
N observations	904	204	226	382	92
% Men in sample	95%	88%	96%	98%	98%
% Female in sample	5%	12%	4%	2%	2%
Age (mean)	47.18	47.14	46.50	47.70	46.79
Years of schooling (mean)	3.52	5.45	3.08	1.93	6.88
Years of experience in cocoa farming (mean)	22.54	19.18	25.02	23.79	19.10
Born in the region	41%	18%	39%	13%	92%
Born other regions	24%	55%	30%	30%	8%
Born abroad	35%	27%	31%	56%	0%
1 Spouse	78%	77%	73%	79%	87%
2-4 Spouses	22%	23%	27%	21%	13%
Household composition					
Female head	6%	16%	4%	3%	1%
HH size	6.21	5.80	7.31	5.98	5.38
Adults in HH (>17 y.o.)	3.63	3.75	4.07	3.49	2.87
Children in HH (0 - 17 y.o.)	2.58	2.05	3.23	2.49	2.51
Other related members in HH	0.95	1.57	1.01	0.70	0.48
Non-related individuals in HH	0.19	0.30	0.32	0.07	0.12

Source: *adult's questionnaire Côte d'Ivoire*

TABLE 4.2A. Cocoa-related characteristics of surveyed cocoa farm managers

	Total			Indenié-Djuablin (Abengourou)			Nawa (Soubré and Buyo)		
	Mean	**S.D.**	**Median**	**Mean**	**S.D.**	**Median**	**Mean**	**S.D.**	**Median**
Cocoa farms owned	1.68	1.92	1.00	2.17	1.55	2.00	1.67	3.12	1.00
Cocoa farms cultivated	1.37	0.78	1.00	1.66	1.11	1.00	1.26	0.58	1.00
Total farm area (in ha)	6.85	8.97	4.00	8.03	12.50	4.00	8.54	10.87	5.00
Total farm area (in ha) [adjusted]	5.77	7.55	3.37	6.76	10.53	3.37	7.19	9.16	4.21
Total area under cocoa (in ha)	5.99	7.63	4.00	7.27	9.15	4.00	7.12	10.30	4.00
Total area under cocoa (in ha) [adjusted]	5.04	6.43	3.37	6.12	7.71	3.37	5.99	8.67	3.37
Average age cocoa all cocoa farms	23.58	10.98	23.00	21.74	12.65	18.00	24.82	9.20	25.00
Cocoa produced in 2013 (in kg)	1,369	2,678	700	2,192	4,587	1,000	1,708	2,393	1,000
Cocoa yields 2013 (kg/ha) [adjusted]	314.0	283.6	237.5	394.6	341.7	308.8	396.1	295.8	308.8
Use fertilizer		21%			23%			42%	
Use fungicide		20%			42%			6%	
Use insecticide		73%			61%			91%	
Participated/benefited from programme to increase cocoa yields		32%			53%			44%	

	Loh Djiboua (Divo)			Haut-Sassandra (Daloa)		
	Mean	**S.D.**	**Median**	**Mean**	**S.D.**	**Median**
Cocoa farms owned	1.47	1.16	1.00	1.49	0.94	1.00
Cocoa farms cultivated	1.32	0.70	1.00	1.24	0.48	1.00
Total farm area (in ha)	6.28	5.36	5.00	2.47	2.43	2.00
Total farm area (in ha) [adjusted]	5.29	4.52	4.21	2.08	2.04	1.68
Total area under cocoa (in ha)	5.52	4.95	4.00	2.33	2.25	2.00
Total area under cocoa (in ha) [adjusted]	4.65	4.16	3.37	1.96	1.89	1.68
Average age cocoa all cocoa farms	24.42	11.15	22.50	19.42	11.18	17.00
Cocoa produced in 2013 (in kg)	971	1,307	520	398	337	318
Cocoa yields 2013 (kg/ha) [adjusted]	236.1	231.4	156.4	258.4	196.9	192.4
Use fertilizer		10%			11%	
Use fungicide		17%			26%	
Use insecticide		76%			52%	
Participated/benefited from programme to increase cocoa yields		15%			28%	

Source: *adult's questionnaire Côte d'Ivoire*

4.1.3 A profile of the children sampled

Within the households of the sampled farm managers, 330 children were selected at random (see section 2: methodology) and administered a short questionnaire. Of these 330 children, 32% were girls; 58% were 13 years old and under (in particular, 71 were under 11 years of age, and 120 were aged 12-13 years), while 42% (139) were above the age of 14 (Table 4.3). More than 80% were children of the matched sampled farmer, 92% were born in the village, and 68% went to school. All these characteristics have a high variability by region (see Table 4.3A). For instance, in Indenié-Djuablin (Abengourou district), only 55% children were sons or daughters of the sampled farmer, almost 20% were not born in the village, and about 1/3 of children aged 12 and above lived with neither the mother nor the father. The last two figures are a much higher percentage than for other regions, and reflect the higher levels of migration already noted for the sampled adults in this area. At the same time, children in the Indenié-Djuablin region have higher rates of school enrolment than children in Loh Djiboua and Nawa, and comparable to those in Haut-Sassandra (over 80% school enrolment, primary and secondary school combined).

TABLE 4.3 Main characteristics of surveyed children in cocoa farm households

	All sample			
	< 11 y.o.	**12-13 y.o.**	**14-17 y.o.**	**Total**
N Observations	71	120	139	330
% girls	28 (39.4%)	33 (27.5%)	46 (33.1%)	107 (32.4%)
Son/Daughter to HH head	58 (81.7%)	101 (84.9%)	114 (82%)	273 (83%)
Born in village	68 (95.8%)	110 (91.7%)	127 (91.4%)	305 (92.4%)
Go to school	59 (83.1%)	93 (77.5%)	73 (52.5%)	225 (68.2%)
Father does not live in village	5 (7%)	10 (8.3%)	19 (13.8%)	34 (10.3%)
Mother does not live in village	5 (7%)	16 (13.3%)	19 (13.9%)	40 (12.2%)

Source: *children's questionnaire, Côte d'Ivoire*

Distance to primary and, especially, secondary schools plays a role in determining differences in children's school enrolment. The correlation coefficient between school enrolment and distance to the nearest secondary school is -0.10 (and significant at 7% level), while it is a bit lower (-0.09) in the case of distance to nearest primary school. This is particularly telling, since school enrolment for children aged 14-17 is only 52% - against 83% for children under 11 years old, and 77% for children aged 11-14.

TABLE 4.3A. Main characteristics of surveyed children in cocoa farm households: region levels

	Indenié-Djuablin (Abengourou)				Nawa (Soubré and Buyo)			
	< 11 y.o.	12-13 y.o.	14-17 y.o.	Total	< 11 y.o.	12-13 y.o.	14-17 y.o.	Total
Children	20 (100%)	27 (100%)	33 (100%)	80 (100%)	17 (100%)	30 (100%)	41 (100%)	88 (100%)
Females	7 (35%)	8 (29.6%)	12 (36.4%)	27 (33.8%)	9 (52.9%)	10 (33.3%)	14 (34.1%)	33 (37.5%)
Son/Daughter to HH head	14 (70%)	15 (55.6%)	15 (45.5%)	44 (55%)	12 (70.6%)	27 (90%)	39 (95.1%)	78 (88.6%)
Born in village	18 (90%)	21 (77.8%)	26 (78.8%)	65 (81.2%)	16 (94.1%)	29 (96.7%)	39 (95.1%)	84 (95.5%)
Go to school	19 (95%)	24 (88.9%)	24 (72.7%)	67 (83.8%)	12 (70.6%)	24 (80%)	24 (58.5%)	60 (68.2%)
Father does not live in village	3 (15%)	6 (22.2%)	13 (39.4%)	22 (27.5%)	1 (5.9%)	2 (6.7%)	3 (7.3%)	6 (6.8%)
Mother does not live in village	1 (5%)	9 (33.3%)	10 (30.3%)	20 (25%)	3 (17.6%)	1 (3.3%)	2 (5%)	6 (6.9%)

	Loh Djiboua (Divo)				Haut-Sassandra (Daloa)			
	< 11 y.o.	12-13 y.o.	14-17 y.o.	Total	< 11 y.o.	12-13 y.o.	14-17 y.o.	Total
Children	31 (100%)	53 (100%)	45 (100%)	129 (100%)	3 (100%)	10 (100%)	20 (100%)	33 (100%)
Females	11 (35.5%)	13 (24.5%)	12 (26.7%)	36 (27.9%)	1 (33.3%)	2 (20%)	8 (40%)	11 (33.3%)
Son/Daughter to HH head	29 (93.5%)	50 (96.2%)	41 (91.1%)	120 (93.8%)	3 (100%)	9 (90%)	19 (95%)	31 (93.9%)
Born in village	31 (100%)	50 (94.3%)	44 (97.8%)	125 (96.9%)	3 (100%)	10 (100%)	18 (90%)	31 (93.9%)
Go to school	25 (80.6%)	35 (66%)	11 (24.4%)	71 (55%)	3 (100%)	10 (100%)	14 (70%)	27 (81.8%)
Father does not live in village	1 (3.2%)	1 (1.9%)	2 (4.5%)	4 (3.1%)	0 (0%)	1 (10%)	1 (5%)	2 (6.1%)
Mother does not live in village	1 (3.2%)	4 (7.5%)	5 (11.4%)	10 (7.8%)	0 (0%)	2 (20%)	2 (10%)	4 (12.1%)

Source: *children's questionnaire, Côte d'Ivoire*

52% of the children sampled in Côte d'Ivoire, responded that they would like to become a cocoa farmer in the future. The main reasons provided was that it provides a good income (46%), that they would be able to take care of children/family (13.1%) followed by a keen interest in farming (11.9%). For the children that responded that they would not want to be a cocoa farmer in the future, the main reasons reported was that it is difficult/tiring/stressful/risk job (29%), followed by the desire to continue with further education outside of cocoa/disinterested (26%).

4.2 Evidence on the four research questions

RQ1. What are the conditions that determine the demand of adult labour and children's work? What are the key features of the labour supply for cocoa in the village?

Key findings from research question 1:

1. Household labour is a vital input in cocoa production, counting as a major component of total labour use among most farmers, especially those in Buyo and Soubré. Within the household labour category, women's and children's work contribute, respectively, around 12.5% and 5% of total household work; with adult men undertaking the rest.
2. Labour supply is not a major constraint but affordability is according to cocoa farm managers. While less than 15% of farmers stated that labour is unavailable, 44% of the respondents stated that labour is too expensive – as wages have increased. About half of sampled farmers hire some type of labour, either on a daily basis or under a seasonal contract. Farmers in Abengourou do the most hiring; and over 2/3 of workers there originate from neighbouring countries.
3. Total labour use per hectare is inversely related to land size: at the top land quartile (>5.9 ha), household labour per hectare is less than one fourth of what it is in the bottom land quartile (<1.7 ha); and the quantities of hired labour per hectare in the top land quartile are less than half as those employed on the smallest cocoa farms. Since labour and non-labour inputs are likely to be complements in cocoa production, rather than substitutes, farmers who are unable to apply sufficient amounts of labour per hectare end up with lower yields. Indeed, farmers in the top land quartile have lower yields (242 kg/ha) than farmers in the first quartile (333 kg/ha).
4. When comparing characteristics of farmers according to their hiring behaviour, we find that farmers who hire both daily and contract labour have the highest level of cocoa production, cultivate the largest landholdings, have the highest yields, and the highest gross margins per hectare (all measured at median values), than farmers who hire either type of labour or no labour at all. This data show that hiring labour can be beneficial in Côte d'Ivoire, and may lead to greater monetary gains. The fact that many farmers (especially with larger cocoa holdings) are possibly utilising a sub-optimal quantity of hired labour, as mentioned earlier, appears to be even more compelling, and needs to be addressed.

This section analyses both quantitative and qualitative data (responses from FGDs) to examine the main characteristics of the demand and supply of adults' and children's work on cocoa farms. Data on labour employed by farmers come from the farm managers' questionnaires. As in the Ghana case study, all typologies of labour are expressed in terms of "labour days per hectare", which is obtained by multiplying the number of days worked per individual by the number of workers in any given category, per hectare. This also applies to "children's work", which, in this terminology, simply indicates the amount of days of work performed by children, without implying whether this is permissible or non-permissible form of child work. The latter type of

qualification is only possible when incorporating the responses from the child questionnaire.[29] Thus in section 4 under research question 4, we will be able to characterise the type of work performed by children, and the associated characteristics of the farm households, for the subset of farms for which we can combine information from both the adult and children's questionnaires.

The farm manager's questionnaire gives information on two broad categories of labour, always reported as total number of days worked per hectare during the last cocoa season (Table 4.4). The first is the category of household labour, which includes the contribution of household adult men, adult women and children on the main cocoa tasks. The second category is that of hired labour, and includes labour hired on a daily basis (daily waged), labour hired on the basis of a longer-term contract, usually a crop season, and finally labour available through work groups, which involves the mobilisation of a group of workers, normally on a reciprocal basis, for a specific task. Though the latter is not technically hired labour, it is included in this category since workers generally receive some form of compensation, normally in the form of food and drinks, besides accruing the right to receive help on their own cocoa farms. All the labour figures are reported by the farmer and refer to the previous cocoa season, 2013-14.

TABLE 4.4. Labour use (measured as person days of work*) at the region and district levels

Region	District	N	Daily waged	Contract waged	Work groups	Total hired labour	HH men	HH women	HH children (<11)	HH children (12-13)	HH children (14-17)	Total HH children	Total HH
Indenié-Djuablin	**Abengourou**	**204**	**13.67**	**26.59**	**35.40**	**75.66**	**50.12**	**18.62**	**1.47**	**1.84**	**1.92**	**2.58**	**66.35**
Loh Djiboua	**Divo**	**382**	**7.65**	**11.99**	**14.80**	**34.44**	**70.23**	**10.95**	**2.86**	**3.23**	**7.46**	**6.60**	**85.90**
Haut-Sassandra	**Daloa**	**92**	**1.03**	**7.40**	**11.71**	**20.14**	**37.07**	**12.31**	**3.29**	**3.32**	**5.18**	**5.48**	**53.07**
Nawa		**226**	**2.43**	**11.10**	**11.92**	**26.62**	**110.80**	**13.83**	**0.90**	**2.15**	**6.67**	**5.06**	**127.81**
	Soubré	87	1.85	17.90	14.79	37.44	121.85	15.99	0.27	1.64	8.58	3.76	140.30
	Buyo	139	2.80	6.87	10.12	19.88	103.79	12.52	1.28	2.37	6.04	5.82	119.99

Note: Person days of work = *# individuals working * # days worked between the crop year running end of September 2013 and end of October 2014.* ***Source:*** *adult's questionnaire, Côte d'Ivoire*

- *What is the percentage of household labour (adults and children) employed in cocoa production?*

Several FGDs revolved around the issues of household labour and the norms governing family members' contribution to cocoa farming. Most farmers said they benefit from family members' help. Women work along with men on various tasks such as land cleaning, cooking, gathering cocoa pods, and breaking cocoa (Niouboua) as well as drying cocoa beans. Children help by carrying water for spraying and breaking cocoa pods (FG2, Kouameziakro). There seems to be

[29] Though the farmer questionnaire asks about the number of work days performed by children in different tasks, the child questionnaire enables us, instead, to identify typologies that could be considered as child labour or hazardous activities.

consensus on the fact that tasks are age-related. Some respondents during the FGD shared the view that children shouldn't start cocoa-related work before the ages of 10 (some other say 15) when they can learn to do the work and perform farming activities (FG2, Gbagbam). According to the focus group discussions, from the age of 15, youth can clear cocoa to land; at 18 they can pluck pods or harvest cocoa; and when adults, they can transport cocoa beans/pods (FG2, Yobouekro). According to an FGD, youth aged 21 years or older can be involved in the tasks of chemicals' spraying, carrying heavier loads and harvesting (FG2, Kagninanko).

However, many farmers stated that family labour does not cover their needs (children go to school, women perform other activities). One respondent explained that women and children only work when they want to, helping in the phases of plucking cocoa, pod breaking and bean drying. The survey data on household labour seem to confirm that household women's and children's contribution, in terms of number of working days over the last season, is not very large, amounting to 12.5% and 5%, respectively, of the total household labour (see Table 4.4). The above figures are pretty constant across locations (for instance, the number of women's labour days is around 20). Instead, the number of adult male days varies from a minimum of 37 days in Daloa to a maximum of 122 days in Soubré. Indeed, the considerable differences in the amount of household labour days used across districts are exclusively driven by variation in household men's days.

The available data show that farmers in Divo and Buyo use the greatest number of children's work days (6.6 and 5.8 respectively over the last season), followed by the number of children's working days employed in Daloa (5.48 days). Farmers in Abengourou use instead the lowest number of children's working days. The child's age is an important factor: the use of children's work on cocoa farms across all districts is lower among children in the lowest age category (under 11 years) but increases for older children (14-17 years old). The difference in child work by age is particularly pronounced in Soubré, where working days by children aged 14-17 are more than five times higher than working days by children aged 12-13.

- *Is there an adult labour supply readily available and what is the cost of hiring adult labour?*

Focus Group Discussions with male youth included several questions regarding labour supply to their own family farms or other people's farms, how the wage level (if any) compares with alternative forms of employment, and whether cocoa farming is an attractive option.

Many youths said they help in their family cocoa farms. They see this as duty but they lament the fact that they are not financially compensated. Some youth thus stated that they prefer to work on other people's farms to earn money. According to the focus group discussions, however, farming wage labour is not an attractive option for most young men, especially when compared to gold panning and other off-farm activities, which pay better wages. Some young men said that they prefer to work on contract (rather than as daily labourers) "because cleaning cocoa is easier" (FG4, Niouboua): in some villages, contract work is offered especially for cleaning farms in the month of February. Respondents explained that, if migrant labour is available, such workers prefer land-tenure contracts (sharecropping) – presumably to hired labour. Moreover, some

youth explained that because of socio-economic change (modernisation), aspirations of the new generations have changed, which make wage labour even less attractive.

Most young men seem to regard cocoa farming (at least in theory) as a desirable option, but feel there are two main types of constraints. First, land access is mostly through inheritance, and also many young men believe they will have very little land passed onto them as the older generation have supposedly sold out land to migrants and foreigners, without thinking of their offspring's needs, thus causing conflicts between migrants and local youth (FG3, Grebouo II, Soubrè). Secondly, young farmers have limited access to inputs, and according to the youth interviewed, this is aggravated by the absence of agricultural programmes specifically targeting young cocoa farmers.

When considering the perspectives of those who hire labour (the men and women who manage their own cocoa farm) a complex picture emerges, which highlights the many constraints to the hiring of labour.

Some respondents emphasise that hired labour is scarce and most respondents mentioned that it is expensive when available. The scarcity of labour is due to different causes, including the emergence of alternative forms of employment (such as palm oil or rubber tree agriculture or gold mines) and alternative income generating activities, such as vegetable production or trade. In Douaville, the reduction in cocoa labour force is explained by the presence of an industrial gold mine 5km away from the village, and the fact that workers prefer to work in the mine rather than on cocoa farms.

Several farmers mentioned the political crisis and the war as causes for the reduction in migrant labour. In many villages, respondents refer to foreign workers settling in the country and acquiring land as the reason for their reduced availability as workers. One respondent stated that labour (for cleaning) is difficult to find, because "previous Burkinabè labourers are now farm owners" (FG2, Krikoria I, Daloa). Similar statements were made in Brizeboua and Niouboua (both in Daloa), where "everyone has their own plot now" (FG2). Several others confirmed that migrants from Burkina Faso are scarce now (FG2, Grebouo II), one reason being the emergence of development projects in that country (FG2, Kagninanko).

Very few people dissented with the view that labour is scarce and expensive. One leading personality said that: "there is no difficulty in obtaining labour in this village. There is even abundance of labour" (FG1, Krikoria I). But then farm managers from the same village expressed the view that labour is difficult to find, now that Burkinabè labourers own land (FG2, Krikoria I).

The high or increased costs of labour were a constant reference in FGDs. Some farmers reported an increase in wages (over a non-specified time period): from 1000 to 2000 F CFA for daily wages, and from 120,000 to 200,000 F CFA for a 6 months fixed contract (FG1, FG2, Gbagbam, Divo). Respondents in Douaville (Divo) referred to even higher increases: from 1000 to 5000 F CFA for a daily wage, and from 20,000 to 35,000/ha CFA for a contract wage. Other informants confirmed similar wage levels, for instance 1500-2000 F CFA for daily labour in Kouameziakro (Abengourou), and up to 2500 F CFA in Dapeoua (Buyo) for weeding, plucking, cutting and applying

fertilizer/pesticides. Contract workers cost somewhere between 22000-35000 F CFA/ha (up from 15000f/ha two years ago, according to farmers in FG2, Grebouo II, Soubré) or up to 180,000/200,000 F CFA (FG2, Ebilassokro, Abengourou). One respondent explained that the cost of contract workers is higher when paid on credit (250,000f/ha) than in cash (200,000f/ha).

The rich evidence from the FGDs reported above fit the information on labour costs by type of hired labour and tasks reported in the quantitative data. Table 4.5 shows that average wages are mainly between 2000 and 3000 F CFA, while median wages are a bit lower, especially for contract labour. A breakdown of wages by tasks (Table 4.5A) shows that spraying insecticide commands a higher wage than most other tasks, while carrying water for spraying is among the lowest paid tasks.

It is worth emphasising that the highest wages are comparable to the official minimum wage. The minimum monthly wage was raised by the government in 2013 from 36,600 F CFA to 60,000 F CFA, which corresponds to a daily wage of just below 3000 F CFA. The problem is that the enforcement of the higher minimum wage is apparently very spotty, even in the urban public sector. The prevailing paid wages are, de facto, much lower, especially in rural areas, and the minimum daily agricultural wage is 2000 F CFA.

TABLE 4.5. Daily and contract wages: village averages

Region	District	Village	N obs	Daily wages (F CFA)		Contract wages (F CFA)	
				Mean	Median	Mean	Median
Indenié-Djuablin	**Abengourou**		**204**	**2,649.07**	**1,750.00**	**2,959.57**	**1,531.25**
		Ettienkro	10	2350	1500	2,590.61	1,646.83
		Améakro	18	3168.75	2000	2,523.21	1,298.12
		Abronamoué	35	2547.101	1500	3,975.60	2,380.95
		Ebilassokro	82	2150	1590	2,692.28	1,250.00
		Apprompom	24	2962.5	2700	1,948.61	1,618.59
		Kouaméziankro	35	3833.333	2666.667	3,218.91	1,678.57
Loh Djiboua	**Divo**		**382**	**2,457.01**	**2,000.00**	**4,095.30**	**2,500.00**
		Yobouékoffikro	1	-	-	-	-
		Groh2	7	2350	1500	7,328.57	7,328.57
		Wawapeko	40	2550	1500	2,557.74	1,944.44
		Gbagbam	304	2488.916	2000	4,426.84	2,850.00
		Douaville	21	2366.667	2000	2,669.26	1,666.67
		Babokon-Dida	7	1666.667	1500	1,166.67	1,000.00
		Awalezo	2	1500	1500	857.14	857.14

Table continues on next page

Region	District	Village	N obs	Daily wages (F CFA)		Contract wages (F CFA)	
				Mean	Median	Mean	Median
Haut-Sassandra	**Daloa**		**92**	**2,791.67**	**2,083.33**	**2,288.44**	**1,227.68**
		Nigbeigbeue	9	-	-	-	-
		Guetouzon1	11	2166.667	2166.667	3,690.48	2,380.95
		Niouboua	11	3500	3500	1,789.68	1,833.33
		Luenoufla	12	-	-	4,444.44	4,444.44
		Brizeboua	19	-	-	4,322.62	3,095.24
		Krikoréa1	11	-	-	656.25	656.25
		Guédéguhé	19	2,000.00	2,000.00	647.62	557.14
Nawa			**226**	**1,979.83**	**2,000.00**	**2,881.08**	**2,142.86**
	Soubré		**87**	1,776.67	1,750.00	2,975.27	2,071.43
		Zogbodoua	24	-	-	3,209.06	2,750.00
		Kagninako	54	1,711.11	1,500.00	2,437.05	1,875.00
		Grebouo2	9	1,875.00	1,875.00	5,035.71	1,821.43
	Buyo		**139**	**2,047.56**	**2,000.00**	**2,735.24**	**2,142.86**
		Gbatina	7	2,163.33	2,163.33	2,362.58	2,362.58
		Gliglo1	104	2,012.50	1,500.00	2,567.75	1,904.76
		Dapéoua	28	2,075.00	2,000.00	3,190.26	3,809.52

Source: *adult's questionnaire, Côte d'Ivoire*

FGD participants attributed the increase in rural wages to the following factors (not mutually exclusive): the rise in living standards, increased costs of living, and the emergence of alternative forms of employment (mining, labour in palm oil or rubber plantations), which pay better. Furthermore, farmers declared that their incomes remain low, thus hiring labour is expensive in relative terms. With yields (and earnings) allegedly decreasing, and production at low levels (FG1 Yobukruo, Douaville), farmers face financial constraints and are unable to pay labour, especially because some workers refuse to work on credit.

Since the need for labour is not continuous but peaks during February (for farm cleaning), the months of the lean harvest (March-April) and of the main harvest (September-January), many farmers try to rely on family labour for the most part and then hire labour on an occasional basis. A practice that seems to echo with several other respondents is one where farmers: "… hire youth for cleaning, and use shared labour groups and land tenure systems" (FG1, Niouboua, Daloa). Youth are hired by contract, when there is the difficulty to find more permanent labour (FG2, Brizeboua, Daloa).

Women farmers complained even more than their male counterparts about the difficulty of hiring labour. Workers may cost up to 120,000 F CFA per year, if from neighbouring countries (Togo, Benin and Burkina Faso), but local workers are even more expensive. Several respondents do the work themselves, if unable to hire workers. Some ask their brothers, others their parents or their husbands.

TABLE 4.5A. Daily and contract wages paid by task (wage bill): district averages

District	Land clearing, slash/burning bush, tree felling, clearing debris	Weeding	Applying fertilizer, fungicide/ herbicide	Water carrying for spraying	Spraying insecticide	Pod plucking, gathering/ heaping, pod breaking	Fermenting
Daily waged labour (in F CFA)							
Abengourou	1,666.67	1,869.50	2,670.00	1,750.00	3,556.85	2,247.06	2,400.00
Divo	1,566.67	2,565.05	2,700.00	1,812.50	2,346.15	1,948.72	2,000.00
Daloa	1,250.00	2,500.00	-	2,500.00	2,500.00	4,500.00	4,500.00
Soubré	-	1,750.00	1,200.00	3,000.00	-	1,600.00	-
Buyo	-	2,203.33	1,812.50	1,833.33	2,625.00	1,585.71	2,000.00
Contract waged labour (in F CFA)							
Abengourou	2,794.88	2,187.25	1,569.44	375.00	7,554.69	659.83	3,326.83
Divo	3,572.94	3,400.09	3,851.50	635.06	6,035.80	6,439.85	6,015.73
Daloa	3,081.04	1,198.41	-	-	-	1,516.67	2,500.00
Soubré	1,222.22	3,010.24	2,650.00	-	2,354.17	1,285.71	5,000.00
Buyo	1,464.29	2,446.64	1,458.15	467.61	2,979.38	3,725.21	3,770.00

Source: *adult's questionnaire, Côte d'Ivoire*

- *What percentages of households report the use of hired casual/permanent labourers? In which regions and districts?*

Survey data show a noticeable difference across districts in hired labour and its composition, not just in household labour (Table 4.4). Again data are for the total number of days worked during the last cocoa season. Farmers in Abengourou use the highest amount of hired labour (75 labour days) while using comparatively less household labour than in all other districts (66 days), except in Daloa. Conversely, farmers in Soubré and in Buyo use much less hired labour (37 and 20 days, respectively) but employ on average 140 and 120 household labour days, respectively. Daloa farmers, instead, employ lower amounts of both hired and household labour on their farms, which can be explained by the fact their cocoa land is smaller in size, and production volumes are the lowest when compared to other districts in the sample (Table 4.2A). Work groups provide an important share of hired labour in all districts, around 40-50% on average. In those districts where hired labour is more frequent, it is the contract waged, and to a lesser extent the daily waged category, that pushes the average wage up.

At first glance, from the survey data, differences in the use of hired labour do not appear to be closely related to differences in the cost of labour across locations – as reported in Tables 4.5 and 4.5A. It is apparent that, although wages in Abengourou (where farmers hire the most) are among the lowest, wages in Divo are comparable to those in Daloa and Buyo, where hiring is much more common. In other words, even a causal inspection of the data suggests no clear negative relationship between wages and quantity utilised of hired labour. Possibly other factors, such as personal relationships and access to wide social networks, determine the hiring of workers on cocoa farms, especially when it comes to contract workers.

TABLE 4.5B. Place of origin of workers hired by cocoa farm managers (frequencies)

District	Place of origin of hired labour				
	Same village	Same district	Other regions	Other countries	Total
			Women farmers		
Abengourou	9	-	3	12	24
Divo	6	-	-	1	7
Daloa	2	-	-	-	2
Soubré	-	-	1	-	1
Buyo	1	-	2	1	4
Total	18	-	6	14	38
			Men farmers		
Abengourou	34	1	10	94	139
Divo	194	4	9	81	288
Daloa	27	2	2	4	35
Soubré	15	2	2	2	21
Buyo	15	12	18	6	51
Total	285	21	41	187	534

Source: *adult's questionnaire, Côte d'Ivoire*

Just over half of the workers come from the same village as the farm managers, whereas a third comes from abroad (Table 4.5B). The districts with the highest incidence of foreign workers are Abengourou (106 out of 163 workers hired) and Divo (82 out of 295), which happen to be also the districts with the highest numbers of hired workers.

All farmer respondents have been divided into four land quartiles, with the following cut-off points: land below 1.7 ha in quartile 1; land between 1.7ha and less than 3.4 ha in quartile 2; land between 3.4ha and less than 5.9 ha for quartile 3; and land 5.9 ha and above in the last quartile. The study also disaggregated the data men and women farm managers. Table 4.7 shows the substantial differences in the utilisation of different forms of labour by gender of the farm manager and by land quartile. It is worth recalling that the percentage of women cocoa farm managers is very low in our sample (5%). As a consequence, results from gender-differentiated data analysis should be taken with caution, since the sampled women may not be representative of the whole population of women cocoa farmers. These gender-disaggregated results remain nevertheless informative and worthy of attention.

- *What are the advantages and disadvantages (cost-benefit analysis) of hiring adult labour relative to the productivity gains?*

Table 4.6 compares different performance indicators; cocoa production, yields (production/hectare), and gross margins, across farmers, using 1. no hired labour, 2. both daily and contract labour, 3. only daily labour and 4. only contract labour. Gross margins are calculated as the total value of cocoa sales net of the costs of plant protection inputs and of hired labour inputs. Two values are reported below: total gross margins and gross margins per hectare. Table 4.6 reports also the land size and the average labour costs (both total and per hectare values) corresponding to different classes of producers.

A comparison of the four groups of farmers based on their hiring labour choices leads to the following observations: farmers who hire both types of paid labour have the highest level of cocoa production, cultivate the largest landholdings, have the highest yields, and the highest gross margins per hectare. The result on gross margin per hectare being the highest for farmers who hire both daily and contract workers is particularly striking, since the wage bill per hectare is also much higher for farmers in this category: 300,000 F CFA against less than half this amount for farmers hiring only daily labour and about 184,000 F CFA for farmers hiring only contract labour. Evidently, the gains from higher cocoa production and yields (374 kg/ha for farmers hiring both types of labour compared to 272 kg/ha for those who hire no labour) that are made possible by the additional hired labour more than compensate the greater wage bill.

However, there are some interesting differences by gender. First, almost half of men farmers hire no labour, while this is the case for less than one quarter of women farmers sampled. This is not surprising since table 4.7 shows that women farmers, having access to lower levels of household labour, compensate by hiring proportionately more labour than their male counterparts. One third of cocoa farming women hire only contract labour, one third hire both daily and contract labour. Among men farmers who hire labour, a higher proportion (24%) hire only contract labour rather than using daily labour alone or both types of paid labour (about 14% in each category).

TABLE 4.6. Production, Yields and Gross Margins under Different Hired Labour Scenarios

Variable	Unit measure	No hired labour			Hiring both daily and contract labour		
		Women	Men	Total	Women	Men	Total
Sample size	N observations	10	415	425	14	124	138
Cocoa production	Kg (mean)	2,326.11	959.29	988.72	617.14	2,445.70	2,260.20
Land under cocoa	Ha (mean)	4.08	4.44	4.43	2.71	6.75	6.34
Land under cocoa	Ha (medium)	3.16	2.53	2.53	2.95	4.21	4.21
Yields	Kg/ha (median)	371.14	197.94	197.94	247.43	290.97	283.25
HH person total days	Person days/ha, (mean)	63.90	84.37	83.89	40.64	83.65	79.28
Paid labour	Person days/ha (mean)	-	-	-	59.92	62.09	61.88
Total cost of hired labour	F CFA (mean)	-	-	-	129,350	320,325	300,951
Gross margins	F CFA (mean)	1,691,250	673,023	694,947	322,881	1,357,184	1,259,038
Gross margins per hectare	F CFA/ha (mean)	276,128	140,538	140,816	146,046	137,074	141,033

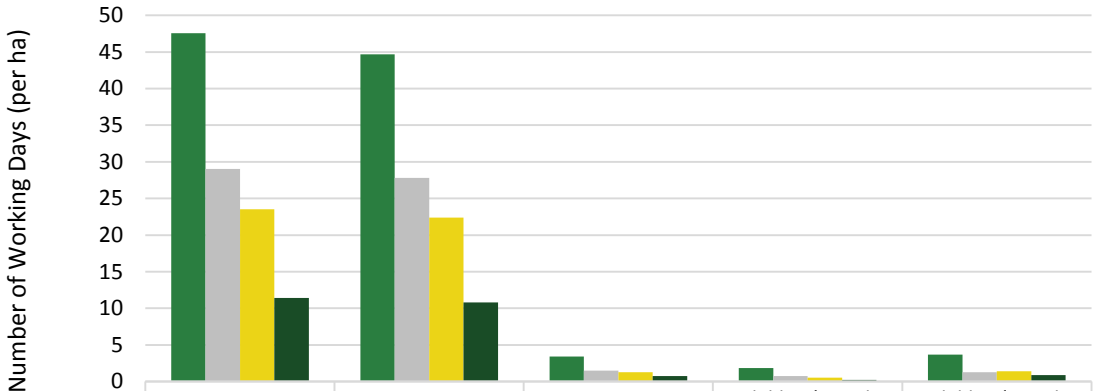
Variable	Unit measure	Hiring daily waged labour only			Hiring contract labour only		
		Women	Men	Total	Women	Men	Total
Sample size	N observations	6	118	124	15	202	217
Cocoa production	Kg (mean)	1,732.50	1,301.25	1,322.29	748.00	1,622.55	1,561.81
Land under cocoa	Ha (mean)	6.32	4.53	4.61	3.90	5.80	5.66
Land under cocoa	Ha (medium)	5.47	3.37	3.37	2.53	3.37	3.37
Yields	Kg/ha (median)	267.22	237.53	237.53	205.86	267.22	237.53
HH person total days	Person days/ha, (mean)	13.83	84.47	81.06	63.07	111.52	108.17
Paid labour	Person days/ha (mean)	30.50	24.82	25.10	48.13	37.05	37.82
Total cost of hired labour	F CFA (mean)	284,852	129,114	136,650	119,067	189,238	184,388
Gross margins	F CFA (mean)	945,190	803,760	810,659	424,400	927,336	892,084
Gross margins per hectare	F CFA/ha (mean)	149,273	135,540	135,540	89,074	119,359	112,728

Source: *adult's questionnaire Côte d'Ivoire*

Labour Use by Gender

When comparing labour use by land quartiles (women and men together), the number of household labour days per hectare is lower at higher land quartiles, ranging from 47.58 person/days per hectare in the lowest land quartile to 11.44 person/days in the top land quartile (Figure 4.7). This is to be expected, since a finite number of household members get spread over more hectares of land – and this is the case also when looking at men and women farmers separately.

FIGURE 4.7. Key measures of household labour use by land quartile



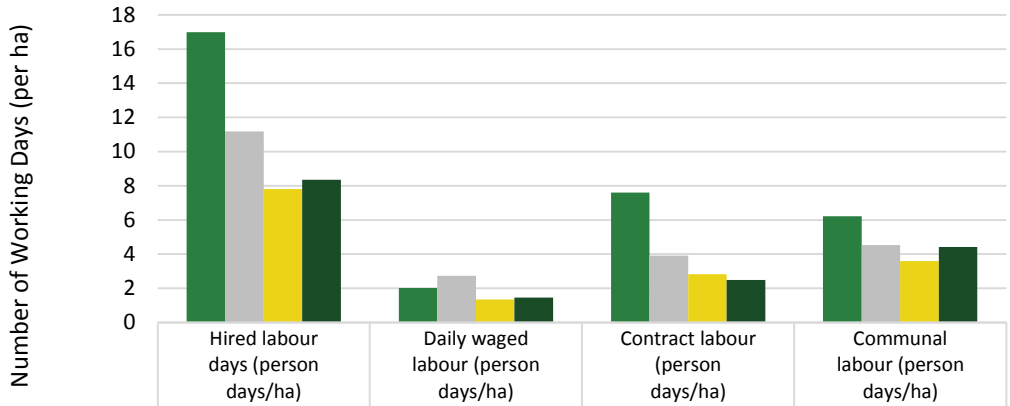
	HH labour (person days/ha)	HH adult labour (person days/ha)	HH children's work participation (person days/ha)	Children's work participation: 13 and under (person days/ha)	Children's work participation: 14 and above (person days/ha)
Q1 [0, 1.69] (ha)	47.58	44.69	3.43	1.84	3.67
Q2 [1.70, 3.37] (ha)	29.04	27.79	1.48	0.77	1.3
Q3 [3.78, 5.90] (ha)	23.51	22.41	1.26	0.52	1.42
Q4 [6.06, 69.05] (ha)	11.44	10.82	0.74	0.23	0.89

Source: *adult's questionnaire Côte d'Ivoire*[30]

However, as the size of landholdings increase, farmers do not always compensate for the lower level of household labour use by hiring in more paid labour per hectare (figure 4.7A). For instance, farmers in the bottom land quartile hire 16.98 labour days per hectare against 11.18 days in the second from bottom land quartile, and 7.8 days in the third quartile. In particular, the number of work-days by contract workers per hectare decreases from 7.6 person/days in the first land quartile to 2.49 days in the last one. Consequently, the total amount of labour per hectare (i.e. total days of labour, household + hired) decreases from about 58 days/ha in the first quartile to 15 days/ha in the top land quartile.

[30] Sample size (number of observations): Q1 (259), Q2 (266), Q3 (188) and Q4 (290)

FIGURE 4.7A. Key measures of hired labour use by land quartile

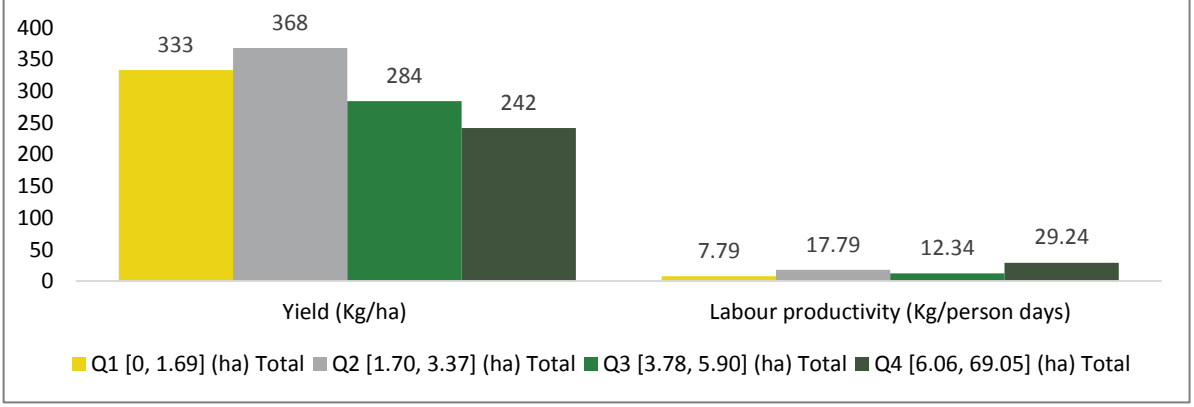


	Hired labour days (person days/ha)	Daily waged labour (person days/ha)	Contract labour (person days/ha)	Communal labour (person days/ha)
Q1 [0, 1.69] (ha) Total	16.98	2.02	7.6	6.22
Q2 [1.70, 3.37] (ha) Total	11.18	2.73	3.91	4.53
Q3 [3.78, 5.90] (ha) Total	7.8	1.34	2.82	3.6
Q4 [6.06, 69.05] (ha) Total	8.35	1.45	2.49	4.41

Source: *adult's questionnaire Côte d'Ivoire*[31]

One may object that lower total labour use per hectare at higher land quartiles would not be a problem, if farmers were able to substitute capital for labour and thus enhance efficiency in this way. This is the case to some extent here, as evidenced from the fact that labour productivity is progressively greater at higher land quartiles. However, a comparison of yields by land quartile suggests that the increase in labour productivity does not fully compensate for the decline in labour use: farmers in the top land quartile have lower yields (242 kg/ha) than farmers in the bottom quartile (333 kg/ha) as illustrated by figure 4.7B. Later on, we will show that this state is also reflected in profitability margins.

FIGURE 4.7B. Yields and labour productivity by land quartile



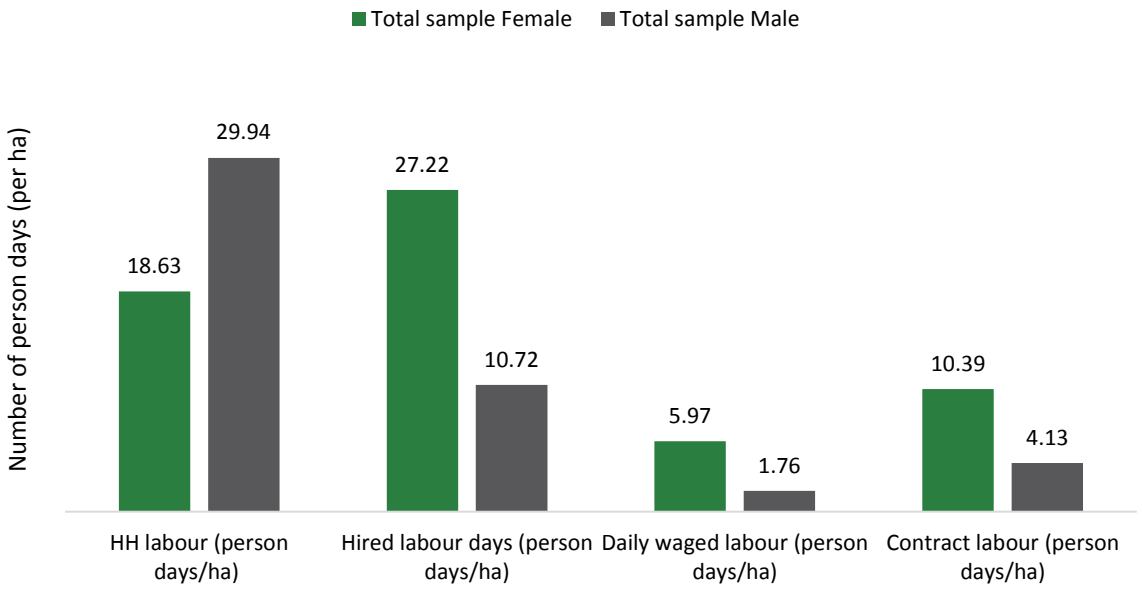
Source: *adult's questionnaire Côte d'Ivoire*[32]

[31] Sample size (number of observations): Q1 (259), Q2 (266), Q3 (188) and Q4 (290)

[32] Sample size (number of observations): Q1 (259), Q2 (266), Q3 (188) and Q4 (290)

An important aspect to note (as shown in figure 4.7C) is that women farmers employ fewer household labour days than men farmers, but employ significantly more hired labour days: about 2.5 times as much contract labour days than men, and more than three times daily waged labour days. One possible explanation for this gender gap in hired labour day's pattern is that the sampled women farm managers have on average lower access to household labour: 19 household labour days against 30 days for men, a difference of more than 50%. Women farmers thus seem to hire daily or contract workers to make up for the shortfall in household labour. The total number of labour days (household + hired) ends up to be slightly higher for women than men farmers: 42 vs. 36 person-days/ha. Data from FGDs with women also confirmed that one of their major constraints is the limited access to household labour, and that they often have to work on their cocoa farms without much assistance from their family members, which was also observed in the Ghana case study.

FIGURE 4.7C. Hired labour used by gender



Source: *adult's questionnaire Côte d'Ivoire*[33]

Table 4.7A shows the summary statistics related to the key measures of labour use and cocoa production by land quartile and gender. Women and men farmers' yields are very similar across the whole sample (315 and 314 kg/ha respectively), but there are some differences when looking across land quartiles: women have higher yields than men in the bottom land quartile (and in the top land quartile, though the very small sample in this group does not enable one to infer this as a generalisable finding) but lower in the second and third from bottom land quartiles. The small sample of women is slightly more concentrated in the lower land quartile.

[33] Sample size (number of observations): Female (45) and Male (859)

TABLE 4.7A. Key measures of labour use and land productivity, by land quartile and by gender (continues)

Variable	Total sample			Q1 [0, 1.69] (ha)			Q2 [1.70, 3.37] (ha)		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
N observations	45	859	904	14	245	259	14	252	266
Household adult equivalent size	4.04	4.39	4.37	4.06	3.72	3.74	4.02	4.20	4.19
Years of schooling	2.91	3.55	3.52	2.93	4.09	4.03	2.77	3.57	3.53
Age of cocoa farms	20.82	23.69	23.58	15.00	19.58	19.37	17.67	23.64	23.37
Cocoa produced (Kg)	1,163	1,380	1,369	396	438	436	972	1,044	1,040
Yield (Kg/ha)	315	314	314	389	330	333	331	370	368
Cost of inputs (F CFA/ha)	13,057	24,190	23,645	21,168	30,160	29,700	11,934	25,259	24,557
Labour productivity (Kg/person days)	44.07	14.82	16.26	6.06	7.89	7.79	82.60	14.19	17.79
HH labour (person days/ha)	18.63	29.94	29.38	28.91	48.59	47.58	14.32	29.86	29.04
HH adult labour (person days/ha)	17.85	28.35	27.83	27.30	45.63	44.69	14.19	28.54	27.79
HH children's work (person days/ha)	1.11	1.86	1.83	2.33	3.48	3.43	0.22	1.53	1.48
Children's work: 13 and under (person days/ha)	0.12	0.94	0.90	-	1.94	1.84	0.06	0.80	0.77
Children's work: 14 and above (person days/ha)	1.94	1.74	1.75	5.25	3.58	3.67	0.22	1.35	1.30
Hired labour days (person days/ha)	27.22	10.72	11.52	65.38	14.37	16.98	14.01	11.03	11.18
Daily waged labour (person days/ha)	5.97	1.76	1.97	13.92	1.37	2.02	3.63	2.68	2.73
Contract labour (person days/ha)	10.39	4.13	4.43	23.85	6.73	7.60	7.98	3.70	3.91
Communal labour (person days/ha)	3.95	4.83	4.79	5.25	6.27	6.22	2.23	4.65	4.53
Total days of labour (household + hired) (person days/ha)	41.72	35.83	36.11	89.04	56.69	58.34	25.29	36.24	35.70
Labour too expensive (%)	58.97	43.38	44.25	72.73	40.11	41.92	53.85	41.53	42.35
Labour not available (%)	12.82	14.92	14.80	9.09	17.65	17.17	15.38	13.66	13.78

Source : *adult's questionnaire**, Côte d'Ivoire.***

TABLE 4.7A. Key measures of labour use and land productivity, by land quartile and by gender (continued)

Variable	Q3 [3.78, 5.90] (ha)			Q4 [6.06, 69.05] (ha)		
	Female	Male	Total	Female	Male	Total
N observations	11	177	188	6	185	290
Household adult equivalent size	4.07	4.96	4.91	3.97	4.98	4.95
Years of schooling	2.00	2.63	2.59	4.83	3.66	3.70
Age of cocoa farms	36.00	26.31	26.56	25.83	26.37	26.36
Cocoa produced (Kg)	794	1,412	1,376	3,950	3,040	3,069
Yield (Kg/ha)	174	291	284	375	238	242
Cost of inputs (F CFA/ha)	8,678	24,742	23,802	6,134	14,428	14,167
Labour productivity (Kg/person days)	9.96	12.49	12.34	99.03	26.95	29.24
HH labour (person days/ha)	20.91	23.67	23.51	2.23	11.74	11.44
HH adult labour (person days/ha)	20.05	22.56	22.41	1.88	11.11	10.82
HH children's work (person days/ha)	1.06	1.27	1.26	0.42	0.75	0.74
Children's work: 13 and under (person days/ha)	0.24	0.53	0.52	0.30	0.23	0.23
Children's work: 14 and above (person days/ha)	1.72	1.40	1.42	0.09	0.92	0.89
Hired labour days (person days/ha)	7.95	7.79	7.80	8.46	8.35	8.35
Daily waged labour (person days/ha)	2.40	1.28	1.34	0.75	1.48	1.45
Contract labour (person days/ha)	2.48	2.84	2.82	0.97	2.54	2.49
Communal labour (person days/ha)	3.07	3.64	3.60	6.74	4.33	4.41
Total days of labour (household + hired) (person days/ha)	25.80	27.77	27.66	3.95	15.76	15.39
Labour too expensive (%)	50.00	50.00	50.00	60.00	43.71	44.23
Labour not available (%)	10.00	10.29	10.27	20.00	17.22	17.31

Since the sample of women cocoa farmers is very small in size, Table 4.7B runs a mean t-test on the differences in the variables just discussed. These tests show that differences in household size, cocoa production levels, hired labour, and children's work days are not statistically different between men and women farmers. However, the t-test confirms the main difference already observed, which is that sampled women farmers employ a significantly lower amount of adult household labour than men farmers. Women farmers also appear to have a significantly higher labour productivity (calculated as number of work days divided by cocoa production levels) than men farmers – although the difference may also be due to other unobserved characteristics.

TABLE 4.7B
T-test of mean differences between women and men farmers (total sample)

	Mean difference	T-statistic
Household adult equivalent size	-0.348	(-1.23)
Cocoa produced (Kg)	-216.1	(-0.52)
Labour productivity (Kg/person days)	29.25***	(3.98)
HH adult labour (person days)	-38.62**	(-3.12)
HH child labour (person days)	-2.099	(-0.80)
Hired labour days (person days)	15.08	(1.12)

***Legenda**: * p<0.05, **p<0.01, *** p<0.001. **Source:** adult's questionnaire, Côte d'Ivoire.*

Overall, surveyed farm managers responded that they did not find it difficult to find workers. Only 14.8% of the sample agreed with the statement that: "labour is not available", compared to 44% declaring that: "labour is too expensive" (Table 4.7A). This may be partly explained by a non-insignificant degree of labour mobility for farmers in our sample, as noted in Table 4.5B. Women farmers were more likely than men to state that labour is too expensive (59% against 43% of male farmers). This was also found in the comments given in the FGDs. Women in Kouameziankro (Abengourou) reported that labour costs are high and women cannot afford the costs upfront. Others commented that workers are not very happy to be hired by women farmers, who are less likely to have cash in hand.

- *What percentage of these households uses hired casual/permanent labourers aged 5-13 and 14-17 years old for seasonal or permanent work? In which regions and districts?*

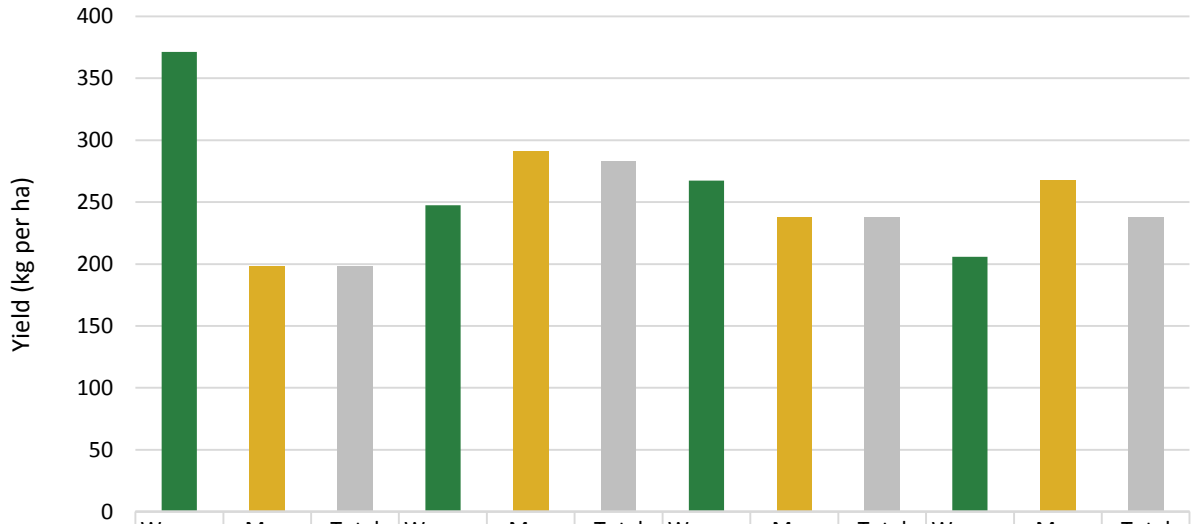
While respondents admitted to using a limited amount of work days from child family members in cocoa production (see Table 4.4), no respondent to either the survey or the FGDs mentioned hiring of child workers for money. As mentioned earlier in the methodology section, this may not imply absence of children's work, and may instead be result from farmers adapting their responses to social desirability biases. One woman respondent referred to the fact that: "some youth between the ages of 10 and 15 work in the farms with their fathers under an annual contract with the boss" (FG4, Kouameziakro) – referring to the fact that children are put to work when one of their family member is involved in contract labour or share-cropping. Other participants, however, explained that the use of child labour has declined because of the awareness campaigns against child labour (FG1, Kagninanko and Grebouo II).

Men farmers hiring both types of labour cultivate larger landholdings: their median land size is 4.2 ha, versus 2.5 ha for farmers hiring no labour and 3.4 ha for farmers hiring either daily or contract labour alone. Men farmers hiring both types of labour also attain higher yields (291 kg/ha vs. 198 kg/ha for farmers who hire no labour, median values and as shown in figure 4.7D) - and higher gross margins per hectare. It should be remarked, however, that this group of farmers represent only a small fraction (124 out of 859, or 14%) of our sample. As remarked earlier, almost half of the men farmers hire no labour and have lower yields (198 kg/ha) on relatively smaller landholdings. Evidence from focus group discussion confirms this picture. Men farmers explained that their lower revenues from cocoa production do not allow them to pay workers in cash, and most workers refuse to work on credit (FG2, Yobouekro, Divo). Long-term hiring is also not always profitable, because "workers do not respect the contract and work only under the supervision of the farm manager" (FG2, Gbagbam).

For women farmers, the situation is a bit different as those who hire no labour have higher yields (371 kg/ha, median – as shown in figure 4.7D) and greater gross margins per hectare (276,128 F CFA, median) than women farmers in all other groups. Household labour does not need to be supervised and there are no trust issues - factors mentioned by women in FGDs with regard to hired workers. Household size plays a role here. Women cocoa farmers not hiring any labour live in households significantly larger (5.18 members in adult equivalence scale) than the households of women hiring both daily and contract labour (3.49 members) or of women farmers hiring only either daily or contract labour (3.20 and 4.13 members). Women in smaller households, and with less help from other household members need to hire labour, especially daily waged labour, which can be expensive and clearly reduces their gross margins. The difference in household size across the four categories of men cocoa farmers is found to be negligible. This confirms that hiring labour by men farmers is less dependent on household size than on affordability constraints.

All these gender specific results should be taken with caution given the small sample of women surveyed that was mentioned above (5% of the sample). While these findings may be telling, one should refrain from generalising them to the larger context.

FIGURE 4.7D Yields by labour use and gender



	Women	Men	Total	Women	Men	Total	Women	Men	Total	Women	Men	Total
	No hired labour			Hiring both daily and contract labour			Hiring daily waged labour only			Hiring contract labour only		
yield kg/ha	371.14	197.94	197.94	247.43	290.97	283.25	267.22	237.53	237.53	205.86	267.22	237.53

Source: *adult's questionnaire Côte d'Ivoire*[34]

[34] Sample size: No hired labour – women (10) men (415) total (425). Hiring both daily and contract labour – women (14), men (124) total (138). Hiring daily waged labour only – women (6), men (118) total (124) and Hiring contract labour only – women (15), men (202) total (217).

RQ2. What production technologies are being implemented to increase land productivity, and what implication does this have on the labour demand?

Key Findings from research question 2:

1. Farmers in the higher yield range category (above 600 kg/ha) use labour and non-labour inputs more intensively than farmers in medium (260-590 kg/ha) and low (250 kg/ha or less) yield ranges. For instance, the use of hired labour per hectare goes up by 24%, and plant protection inputs by more than 40%, in the high yield category as compared to the low yield category.
2. Although children's work days increase as the yield category increases, the percentage of children's work in relation to total household labour use remains fairly constant across yield range levels and children's work utilisation remains quantitatively limited, representing only about 7% of total household labour use in the highest yield level.
3. Among the child tasks that increase amongst medium yield level farmers as compared to low yield range farmers, are pod plucking and gathering; and amongst high yield farmers as compared to medium farmers, children seem to do more weeding and more carrying water for spraying, as well spraying insecticide (although the reported incidence of the latter is lower than at low yield ranges).

- *How many labour input person days are required? What impact does this have on the household division of labour and time allocation as observed in a sub-sample of low/medium and high productivity households? What types of labour do cocoa producers' use and for which tasks?*

One of the objectives of the research is to identify the different requirement of labour for farmers operating in distinct technological environments. For this purpose, sampled farmers were subdivided into three categories, corresponding respectively to low, medium and high yield range levels. As mentioned in the methodology section (section 2.3.3), these three categories correspond to three technology levels – respectively, low input/low output; medium input/medium output; and high input/high output – under the assumption that farmers obtaining higher yields use inputs more intensively. The three categories correspond to the following yield ranges in the Côte d'Ivoire sample: 100-250, 251-599, and ≥600kg/ha.[35]

[35] Farmers with yields<100 were excluded as they represent a very dis-homogenous category.

TABLE 4.8. Yields, Labour and Non-Labour Use, by Yield Ranges* (Technology Level)

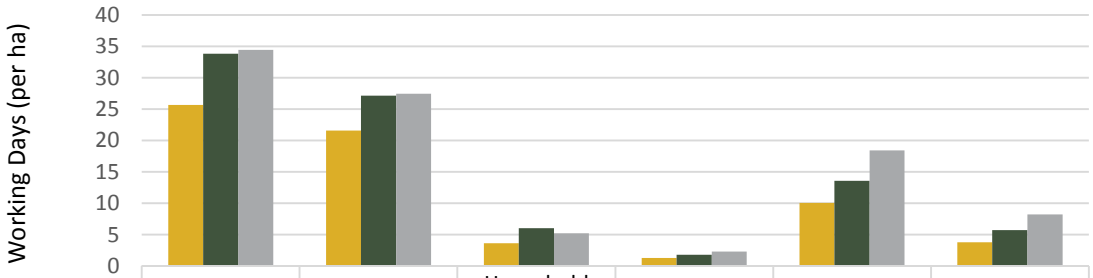
	Yields = [100-250]	*Rate of change*	Yields = [251-599]	*Rate of change*	Yields ≥600
Sample size	285		303		107
Household size (mean)	6.07	*9%*	6.63	*-1%*	6.53
% of female farmers	6.67	*-35%*	4.95	*12%*	5.61
% of female farmers who are widows, separated or divorced	57.89	*10%*	64.29	*-61%*	40.00
Land size ha (median)	3.37	*0%*	3.37	*-33%*	2.53
Total labour input (household + hired) per hectare	31.90	*24%*	41.75	*6%*	44.64
Household person days per hectare	25.66	*24%*	33.85	*2%*	34.46
Household men days per hectare	21.59	*20%*	27.16	*1%*	27.47
Household women days per hectare	3.61	*40%*	6.03	*-15%*	5.22
Household child days per hectare	1.27	*30%*	1.82	*20%*	2.29
Hired person days per hectare	10.04	*26%*	13.60	*26%*	18.42
Shared/group work per hectare	3.80	*34%*	5.72	*30%*	8.23
Fertilizer per hectare (kg)	13.95	*46%*	25.70	*41%*	43.33
Fungicide per hectare (lts)	0.16	*54%*	0.34	*6%*	0.36
Insecticide per hectare (lts)	1.12	*31%*	1.64	*23%*	2.13

***Source**: adult's questionnaire, Côte d'Ivoire. ***Note**: The yield ranges were slightly modified in this table, to obtain discontinuous categories and eliminate those observations falling into the middle*

Table 4.8 presents key farmers' data by yields ranges. As expected, most farmers fall into the first low yield (41%) or second medium yield (44%) category, while the percentage of farmers in the top yield range level is the lowest (15%). Women farmers follow more or less the same distribution. More interestingly, the majority of women farm managers in the lowest and medium yield range levels are widowed, separated or divorced (respectively 58% and 64%) suggesting that they may lack help from adult men in the household.

Changes in the labour and non-labour inputs per hectare across the three technology groups show increasing intensity in the use of inputs. Farmers in the medium technology category use, per hectare, 24% more household labour, 26% more hired labour, 46% more fertiliser, and between 30% and 54% more plant protection inputs than farmers in the low technology category. Similarly, farmers in the highest yield range category use inputs more intensely than those at medium yield range levels, for instance 26% more hired labour and 41% more fertiliser per hectare. The increase in household labour use is however limited: farmers in the highest technology level apply only 2% more household labour per hectare than farmers in medium yield ranges – and use on average less women's labour days (as shown in figure 4.8). The median land size at high yield levels (at 2.5 ha) is lower than landholding size at low or medium yield range levels (both are at 3.4 ha), confirming that the intensity of production is highest on smaller landholdings.

FIGURE 4.8. Labour Use by Yield Ranges (Technology level)



	Household person days per hectare	Household men days per hectare	Household women days per hectare	Household child days per hectare	Hired person days per hectare	Shared/group work per hectare
Yields = [100,250]	25.66	21.59	3.61	1.27	10.04	3.8
Yields = [251,599]	33.85	27.16	6.03	1.82	13.6	5.72
Yields ≥600	34.46	27.47	5.22	2.29	18.42	8.23

Source: *adult's questionnaire Côte d'Ivoire*[36]

Although the data shows an increase in children's work days as the yield level increases, a pattern consistent with that observed for other labour inputs, it is equally important to point out that children's work use remains quantitatively limited, representing only about 7% of total household labour use in the highest yield level (at 2.3 work days per hectare).

In order to see what children do on cocoa farms across yield levels, Table 4.9 reports the average number of work days worked by children on main cocoa tasks. Among the tasks where children's work days increase amongst medium yield farmers in comparison to low yield farmers, are pod plucking and gathering are the leading ones; amongst high yield farmers in comparison to medium yield farmers, children seem to do more weeding, more carrying water for spraying, and more spraying insecticide (although the reported incidence of the latter is very low, just above 2 work days per season). The question of whether the observed increase in children's work days along with yield levels implies more or less child labour is addressed under the next research question.

[36] Sample size: yields 100-250 (285), Yields 251-599 (303), Yields more than 600 (107)

TABLE 4.9
Mean number of children's work days, by cocoa farming task, and by yield ranges

	Yields = [100 ≤ 250]	Yields = (> 250 ≤ 600]	Yields > 600
Mean child days (all tasks)	**5.11**	**3.84**	**5.89**
Mean child days /ha	**1.27**	**1.82**	**2.29**
Child days (weeding)/ha	**2.03**	**0.97**	**2.57**
Child days (pod plucking & gathering)/ha	**1.79**	**2.04**	**1.71**
Child days (carry water for spraying)/ha	**0.34**	**0.26**	**0.72**
Child days (carting beans)/ha	**0.20**	**0.14**	**0.24**
Child days (fermenting)/ha	**0.31**	**0.08**	**0.06**
Child days (apply fertiliser/fungicide)/ha	**0.20**	**0.05**	**0.12**
Child days (carry cocoa for sale)/ha	**0.21**	**0.15**	**0.19**
Child days (spray insecticide)/ha	**0.02**	**0.02**	**0.24**
Child days (land preparation)/ha	**0.00**	**0.13**	**0.04**

Source: *adult's questionnaire, Côte d'Ivoire*

- *What is the current situation of the community/shared labour schemes?*

Data from Table 4.7A showed that work groups represent, on average, almost half of total hired labour, quite a significant portion. Table 4.8 shows that the importance of this component of labour actually increases with yield levels, with higher yield levels farmers making significantly greater use of work groups than those at lower ones. For instance, farmers in the yield level range above 600 kg/ha employ per hectare more than twice the number of work-days from labour groups than farmers in the 100-250 kg/ha range (8.23 days vs. 3.80). It is important to note that the rate of increase in this component of labour (34% and 30%, respectively, from low to medium and from medium to high yield range levels) is higher than for any other component – as commented earlier, the increase in hired labour from one yield level to the next is about 26% while that for household labour is 24% and 2% in going, respectively, from low to medium, and from medium to high yield levels.

The qualitative data confirm these findings: FGDs revealed that labour sharing practices are still common practice. They are relied upon for carrying out several cocoa-related tasks, such as cleaning farms in Brizeboua and in Krikoria I, where work groups are organized along family ties. In Dapeoua, labour sharing is common for weeding, harvesting and cocoa pod breaking, especially among people of the same ethnic group. On the other hand, labour sharing seems to be on the decline in other villages. In Grebouo II this is due to misunderstandings and conflict among farmers.

Many respondents mentioned that workers who previously offered labour for a wage now prefer to work as sharecroppers. Most farm managers thus rely on this system (also called "land tenure system") to offset the problem of scarcity of labour and ensure some level of production. This is

the case in Kouameziakro, Ebilossokro and Dapeoua. Most of the tenants are from the Baoulé, Abron and various Burkinabé ethnic groups (Grebouo II).

Shared labour practices (work groups) are mostly not available to women. Several women farmers manage to maintain production in their cocoa fields thanks to sharecropping (land tenure) (FG4, Kagninanko). For instance, a respondent stated that: "Cost of labour is high, so [women] use a land tenure system because the workers can thus do all the necessary work…and it helps to overcome the absence of communal labour because there are no support groups in the village. Tasks are performed individually" (FG4, Grbouo II).

Several reservations were voiced in FGDs about the viability of sharecropping practices. According to some, the land tenure system has disappeared in their village because farmers refuse to work on a plantation that won't bring them anything at the end of harvest (FG1, Yobouekro). Farmers from Grebouo II state that "land tenure system is unsatisfactory" and when they face shortage of hired labour (for weeding) they prefer to use herbicides instead.

Overall, the data in Table 4.8 show that farmers who use inputs more intensively, including labour, also obtain higher yields: they hire more labour per hectare, use more work groups, and also more household labour. However, they do not seem to employ large quantities of children's work days. Even when allowing for social desirability bias affecting responses, it is still clear that the percentage of children's work days used relative to total household labour remains constant across yield range levels. This would suggest that children's work days may not be positively correlated with yield increases (although children's work days are higher at the highest yield level in comparison to the lowest yield level category).

RQ3. Are higher yields associated with higher labour demand? To what extent may incomes derived from improved cocoa productivity respond to the labour demand?[37]

Key Findings from research question 3:

1. Cocoa profitability tends to decrease for farmers cultivating larger landholdings. Gross margins per hectare are about 50% higher for farmers on landholdings comprised between 1.7 and 3.4 ha (second from bottom land quartile) than for farmers on landholdings over 6 ha (top land quartiles). As cocoa landholdings go up, the costs of inputs per hectare increase more rapidly than yields, so farmers earn less per unit of land (gross margins per hectare decline).
2. Data from this research do not show any significantly positive association linking use of different types of work, including that by children, on current yields in Côte d'Ivoire. The use of plant protection inputs (fertilisers, fungicides and pesticides) though is both positively and significantly correlated to yields.
3. An increase in past yields leads to a significantly greater demand for household labour but does not have instead a significant impact on the demand for children's work days. The variables that seem to affect the quantity employed of children's work days are whether the farmer is male (positive) and household size (negative) – indicating that farmers in smaller households may have greater demand for children's work days.
4. The above results point to the fact that, while there is some correlation between land productivity (yields) and household labour demand, the relationship between land productivity and the demand for children's work days is not supported by the data for Côte d'Ivoire.

In this sub-section, the study examines further the relationship between yield levels and labour demand. To explain the effect of different types of labour use on cocoa productivity (yields), we estimated a linear regression model, where the dependent variable is "yields" and the explanatory variables include farmers' characteristics (age, gender, years of schooling), the quality of their farming practices (as proxied by the chosen shading system), use of labour and non-labour inputs, and their geographical location (district dummies), which may also capture proximity to different infrastructures, including schooling facilities.[38]

The results from the regression, which are reported in Table 4.10, indicate that few of the independent variables have statistically significant influence on yields. Besides the district level effects, the most significant variables are the non-labour inputs. The variables "the farmer uses

[37] It is important to note the methodological limitations underlying the findings on income and labour demand. This is because the researchers used income realised in October 2014 to estimate the effect on labour (HH adults/children, and paid workers) demand used between September 2013 and October 2014.

[38] The estimation of a linear regression model is potentially biased by endogeneity and omitted variables not measured or not available from survey data (e.g. soil quality and land investments). While the authors fully acknowledge these data related issues as possible sources of bias (which in turn implies some caution in interpreting the size effect of the selection of regressors) the authors are fairly confident about the direction of impact of the variables as these are in line with other studies conducted using a panel of cocoa farmers in the same fashion (Vigneri, 2005, 2008, 2016).

fungicides" and the total cost of plant protection inputs (which covers cost of fertilisers, fungicides, and pesticides used) are both positively and significantly correlated to yields. However, neither household labour nor hired labour variables have a significant effect on yields.

TABLE 4.10. Yield regressions to estimate effect of different labour demand

Yields	Coef.	t-statistic	P>t
Land size	-0.07	-1.31	0.192
Farmer uses fertilizer	-0.03	-0.35	0.723
Farmer uses fungicide	0.18	2.15	0.032
Farmer uses insecticide	0.09	0.69	0.491
Cost of non-lab inputs	0.12	3.50	0.001
HH labour per ha	0.07	1.62	0.107
Hired labour per ha	-0.02	-0.62	0.538
Farmer is male	0.31	1.71	0.088
Age	0.02	1.36	0.176
Age squared	0.00	-1.28	0.202
Years of schooling	0.01	0.51	0.608
Years of schooling squared	0.00	0.21	0.836
Share acreage heavy shade	-0.29	-1.47	0.142
Share acreage moderate shade	-0.15	-0.89	0.373
Share acreage light shade	-0.25	-1.58	0.115
District (Abengourou as ref. category)			
Divo	-0.35	-3.35	0.001
Daloa	-0.65	-4.23	0.000
Soubré	-0.13	-0.79	0.430
Buyo	0.02	0.14	0.890
Constant	3.96	7.00	0.000
# Obs.		371	
F-test (explanatory var jointly significant)		5.53***	
R-squared (adjusted)		0.19	

***Source**: adult's questionnaire, Côte d'Ivoire*

In order to examine the relationship between the demand for different labour typologies and variables proxying for farmers' income, Table 4.11 computes how different measures of production costs, gross revenues and gross margins (defined as gross revenues minus costs of labour and plant protection inputs) vary by land quartile. There is a discernible pattern. The total costs of hired labour and plant protection inputs increase steeply between the bottom and the top land quartile. So does the total gross margins measure.

However, this is not the case when the same variables are measured per unit of land. The costs of hired labour per hectare and of plant protection inputs per hectare are highest in the bottom land quartile and then decrease progressively at each subsequent land quartile.
Gross revenues per hectare and gross margins per hectare increase from bottom to second from bottom land quartile, but then decrease afterwards, indicating lower profitability of farmers in land quartiles 3 and 4 (the top land quartile) than farmers in quartile 2. This implies that, when

moving to the second from bottom land quartile, farmers manage to increase input use and obtain higher yields, thus boosting their gross earnings. However, above the second from bottom land quartile, farmers face declining yields on larger landholdings. Given the higher production costs sustained in the top two land quartiles (which include farmers with cocoa landholdings above 3.4 ha), their revenues and margins per hectare decline.

In order to evaluate the effect of increasing yields on household adult and children's work, two sets of labour demand models were estimated, using as dependent variables respectively, adult household labour (adult work days), and children's work days, both measured per unit of land (hectare). These estimates were run using a log-linear specification, with all continuous variables in natural logarithms to smooth the effect of outliers. The yield variable is lagged to estimate the impact of past levels of land productivity (yields) on current labour demand.

TABLE 4.11. Gross margins on different land quartiles

	Land quartiles				
Margins/costs	**Q1 [0, 1.69] (ha)**	**Q2 [1.70, 3.37] (ha)**	**Q3 [3.78, 5.90] (ha)**	**Q4 [6.06, 69.05] (ha)**	**Total**
Cost hired labour	55,642.66	80,542.48	109,722.90	220,022.40	108,946.80
Cost hired labour/ha	41,712.68	29,775.99	23,385.89	20,647.47	29,872.80
Cost plant protection inputs	36,467.86	70,405.66	113,218.80	150,857.50	86,584.05
Cost plant protection inputs/ha	29,699.69	24,557.37	23,802.32	14,167.19	23,644.88
Gross margins	245,767.40	643,138.60	820,239.50	1,942,418.00	844,835.10
Gross margins/ha	187,921.40	227,213.40	168,116.20	148,160.70	187,039.70
Gross profits/ha	259,536.50	281,546.80	215,304.40	183,196.30	240,602.40

Source: *adult's questionnaire, Côte d'Ivoire*

Table 4.12 reports the results of these regressions. Since OLS estimates on cross section data are prone to measurement errors and endogeneity bias, the interpretation of the size effect of the estimated coefficients should be taken with caution. The first column shows that past yields is one of the most significant determinants of the demand for household labour. A 10% increase in (past) yields induces a 12% increase in the demand for household adult labour, and this is statistically significant at 1% level. Two other factors that are positively related to the demand for household labour are whether the farmer is male, and the share of the tree acreage under heavy shade. Furthermore, the village-level wage for hired labour is negatively and significantly related to the use of household adult labour. This is counterintuitive in that it implies complementarity between household and hired labour – but since this is the only variable that captures location effects, the coefficient sign may also reflect other unobserved geographical characteristics.

TABLE 4.12.

The demand for household adult labour, and children's work days as a function of yields

Dependent variable:	(1)			(2)		
	HH adult days, per ha			HH child days, per ha		
	Coeff.	S.D.	T-value	Coeff.	S.D.	T-value
Yields, lagged value (logged)	0.12	0.05	2.65	-0.04	0.05	-0.92
Yields, current value (logged)						
Farmer is male	0.62	0.21	2.98	0.28	0.11	2.41
Age of farmer	0.00	0.02	-0.08	0.03	0.02	1.51
Age of farmer squared	0.00	0.00	-0.09	0.00	0.00	-1.52
Farmer's years of schooling	-0.04	0.03	-1.23	0.04	0.03	1.32
Farmer's years of schooling squared	0.00	0.00	0.18	0.00	0.00	-1.72
Years of experience in cocoa farming	-0.02	0.01	-1.57	0.00	0.01	-0.31
Years of experience in cocoa farming squared	0.00	0.00	0.64	0.00	0.00	0.29
HH adult equivalent size	0.02	0.02	0.92	-0.03	0.02	-1.66
Share of land owned by farmer	0.06	0.31	0.20	-0.12	0.36	-0.35
Share acreage light shade trees	0.13	0.20	0.67	-0.38	0.21	-1.80
Share acreage moderate shade trees	-0.02	0.20	-0.11	-0.01	0.22	-0.05
Share acreage heavy shade trees	0.50	0.23	2.20	-0.16	0.23	-0.67
% farmers reporting hiring labour unaffordable	-0.01	0.07	-0.13	-0.03	0.07	-0.37
Village level wages for cocoa tasks (logged)	-0.25	0.06	-4.35	-0.09	0.06	-1.36
Constant	4.93	1.04	4.75	1.23	1.05	1.18
N observations	630			546		
F-test (explanatory variable jointly significant)	5.06***			2.32***		
R2-adjusted	0.12			0.07		

Source: *adult's and children's questionnaires combined, Côte d'Ivoire.*

As for the demand for children's work days (column 2), the coefficient for lagged yields does not appear to be statistically significant (and is anyway negative). The variables whose coefficients are statistically significant in this regression instead are the gender of the farm manager and household size (measured in adult equivalent scale) – in addition to the percentage of the tree stock under light shade. Male farmers use more children work days than women farmers; whereas farmers from households with more adult members use less children work days than farmers in households with fewer members.

In conclusion, there is no evidence that increased current and past yields (lagged) have any effect on the demand for children's work days. The only variables that have a statistically significant influence are being a male cocoa farmer, the share of the cocoa trees under light shade, and the adult household equivalent size.

The above results suggest that, while there may be a relationship between land productivity (yields) and (adult) household labour demand, the relationship between yields and children's work days is not supported by the data. It is important to qualify these results based on whether

some of the work carried out by children constitutes child labour (non-hazardous) or involves tasks that are hazardous for the child. This is dealt with in the next section – under research question 4.

Labour demand regressions were also carried out to examine whether a proxy for farmers' income, that is, gross margins (revenues net of the costs of hiring labour and purchasing inputs), has any impact on farmers' demand for various forms of labour: adult household labour, children's work days and paid labour, with the latter also separated into its two components of daily labour and contract labour. In all the regressions, the dependent variable is measured in person days, and per hectare. It should also be noted that paid labour is used in the regressions rather than hired labour, since the latter also includes other types of labour for which the farmer does not give financial compensation.

The results of regressions, as shown in table 4.13, show that gross margins (measured per hectare and in logarithmic values) are hardly significant in explaining the demand for the various types of labour, except in the regression for adult household labour, where this proxy measure for income is positively significant, and only at the 10% level. The use of gross margins as independent variables for explaining both adult and children's work demand does not alter in any substantial way the results obtained in the previous regressions where yields were the main independent variable (reported in Table 4.12). For instance, male farm managers have higher demand of both adult and children's work days.

Regarding the regressions explaining the use of paid labour, we already commented on the fact that gross margins does not appear to have any significant statistical relationship. When it comes to the understanding of other determinants, we note that female farmers have a higher use of contract labour workers – and thus of paid labour – and farmers from smaller households (measured in adult equivalent scale) hire more paid labour (partly daily and partly contract workers). Another interesting result is that farmers who state that hiring labour is unaffordable are more likely to employ more paid labour, but this result is mainly driven by the hiring of more daily workers. In other words, if labour is unaffordable, the main option for farmers is to hire daily workers rather than workers for the entire season – a result already mentioned during the focus group discussions. The average level of village wage is positively related to all forms of paid labour and negatively related to adult household. It should also be pointed out that 79 of the farmers faced a financial loss that year, that is, the gross margins measure is actually negative for them.

Dependent variable:	(A) HH Labour days, per ha			(B) Child days, per ha			(C) Paid Labour days, per ha			(D) Daily workers days, per ha			(E) Contract workers days, per ha		
	Coeff.	S.D.	T-value	Coeff.	S.D.	T-value	Coeff.	S.D.	T-value	Coeff.	S.D.	T-value	Coeff.	S.D.	T-value
Gross margins (ln value)	**0.087**	0.049	1.77	0.038	0.054	0.71	-0.012	0.058	-0.2	0.022	0.052	0.42	-0.020	0.052	-0.38
Farmer is male	**0.648**	0.219	2.95	**0.244**	0.120	2.04	**-0.581**	0.231	-2.52	-0.184	0.191	-0.97	**-0.496**	0.231	-2.15
Age farmer	0.002	0.021	0.11	0.034	0.021	1.57	0.020	0.026	0.76	0.006	0.024	0.24	0.014	0.022	0.61
Age farmer squared	0.000	0.000	-0.27	0.000	0.000	-1.6	0.000	0.000	-0.14	0.000	0.000	-0.25	0.000	0.000	0.25
Schooling years farmer	-0.040	0.029	-1.37	0.037	0.030	1.24	-0.038	0.034	-1.11	-0.006	0.027	-0.24	-0.027	0.032	-0.84
Schooling years farmer squared	0.001	0.003	0.27	-0.004	0.003	-1.65	**0.006**	0.003	2.01	0.000	0.002	0.2	**0.006**	0.003	2.03
Years of experience in cocoa farming	-0.020	0.012	-1.62	-0.006	0.012	-0.5	-0.015	0.012	-1.18	0.006	0.008	0.69	-0.016	0.011	-1.42
Years pf experience in cocoa farming squared	0.000	0.000	0.63	0.000	0.000	0.48	0.000	0.000	0.93	0.000	0.000	-0.81	0.000	0.000	1.13
HH adult equivalent size	0.026	0.021	1.24	-0.027	0.019	-1.38	**-0.057**	0.027	-2.14	-0.028	0.019	-1.47	-0.038	0.025	-1.53
Share of land owned by farmer	0.035	0.293	0.12	-0.147	0.369	-0.4	**0.804**	0.331	2.43	0.385	0.154	2.5	0.434	0.317	1.37
Share acreage light shade trees	0.112	0.204	0.55	-0.401	0.219	-1.83	0.261	0.209	1.25	0.000	0.169	0	0.194	0.188	1.03
Share acreage moderate shade trees	-0.042	0.205	-0.21	-0.026	0.227	-0.11	0.293	0.218	1.34	0.142	0.174	0.81	0.015	0.194	0.08
Share acreage heavy shade trees	**0.479**	0.229	2.09	-0.188	0.238	-0.79	0.363	0.246	1.48	-0.257	0.194	-1.32	0.362	0.221	1.64
% farmers reporting hiring labour unaffordable	-0.006	0.073	-0.08	-0.025	0.073	-0.35	**0.274**	0.094	2.93	**0.296**	0.068	4.38	0.059	0.087	0.67
Village level wages for cocoa tasks (logged)	**-0.238**	0.058	-4.14	-0.085	0.065	-1.3	**0.483**	0.068	7.11	**0.287**	0.046	6.26	**0.317**	0.067	4.73
Constant	4.307	1.186	3.63	0.526	1.247	0.42	-5.378	1.302	-4.13	-3.504	0.979	-3.58	-3.264	1.266	-2.58
N observations			624			542			622			624			622
F-test (explanatory variable jointly significant)			4.69***			2.16***			18.79***			6.69**			8.82***
R2-adjusted			0.1209			0.0704			0.2577			0.1416			0.2127

Source: *adult's and children's questionnaires combined, Côte d'Ivoire.*

RQ4. Is there evidence of higher hazardous child labour or non-hazardous child labour occurring where programmes exist to increase cocoa yields? What factors are associated with a higher risk of incidence of hazardous and non-hazardous child labour?

In order to identify factors most associated with non-permissible child work, children were differentiated according to whether they were: doing no work or permissible work, involved in child labour or performing hazardous tasks.

Key Findings from research question 4:

1. More boys than girls are involved in non-hazardous child labour and hazardous child labour.
2. Yields are higher for farmers employing no CL/HL (356 kg/ha, median value) than for farmers employing child labour (285 kg/ha) or for farmers employing children in hazardous work (198 kg/ha). Regression analysis also confirms there is no significant positive relationship between yield range levels and the incidence of CL or HL.
3. One third of farmer respondents stated they participated in a private or public programme to enhance cocoa yields, and slightly less (30%) declared to participate in a child labour awareness and WFCL programme. There is wide variation by location, however.
4. Our analysis shows that farmers who participate in either a (public or private) programme to enhance yields or in WFCL sensitisation programmes experience significantly higher yields than non-programme participants (respectively, 389 compared to 277 kg/ha and 400 kg/ha compared 275 kg/ha).
5. Furthermore, participants in either type the yield enhancing or the child labour awareness raising programme have a significantly lower incidence of child labour (non-hazardous) than non-participants – and the difference in terms of HL is not significant. Another important difference is in the quantity of hired labour per hectare, which is about three times higher for programme participants than non-participants (more so in case of the WFCL sensitisation programmes).
6. The most important predictors of non-hazardous child labour are: the child age (positive), the education of the adult farmer (negative) and whether the tasks carried out by the child occur in the peak harvest season. The most significant predictors for hazardous activities are: the age of the child (negative) and whether the child is born in the village (negative). Furthermore, children living in farms in the medium yield range levels are less likely to do hazardous activities than children living in farms belonging to the low yield range level. Again, there is no positive relationship between farmers' yield level and the incidence of CL or HL.

This section identifies different categories of child labour according to the type of work they do, and then examines whether the incidence of these categories differs, first, between farmers in different yield range categories, and, second, between farmers who participate in programmes to enhance yields and farmers who do not. Finally, results from a probit regression analysis are examined to identify which factors are most likely to be associated with the occurrence of child labour (non-hazardous) or hazardous child labour, and to derive possible policy actions and interventions to avert the risk of child labour. The analysis draws from the children's and the farm manager's questionnaire data combined. During the survey, 330 children were randomly selected in the households of sample farmers (one per household, and according to children's availability) and were administered a short questionnaire.

Analysis of children's data; child labour (non-hazardous) and hazardous child labour categories

Table 4.14 indicates that about 22% of the children sampled were 11 years old and under, 36% were aged 12-13, and the remaining 42% were 14 years and above. Responses were separated in these age categories to track what children do at different ages. According to Côte d'Ivoire legislation (also summarised in a table in the method section),[39] no child should work below the age of 14, while children 14 and above can work full time. Moreover, no child below the age of 18 can perform a list of hazardous activities, which for cocoa farming includes: tree felling, slashing bush, burning bush, applying fertilizer fungicide or insecticide.

TABLE 4.14. Children's responses by age groups (continues)

	All sample							
	5-11 y.o.		12 - 13 y.o.		14 - 17 y.o.		Total	
	N	%	N	%	N	%	N	%
N observations	71	21.5	120	36.4	139	42.1	330	100.0
Thinks cocoa is important in community	65	92.9	110	93.2	130	94.2	305	93.6
Wants to be cocoa farmer	31	43.7	67	55.8	74	53.6	172	52.3
Helps family with cocoa	40	58.0	67	55.8	109	78.4	216	65.9
Helps only during weekends or before/after school	41	75.9	48	61.5	36	34.0	125	52.5
Helps sometime each week	3	5.6	8	10.3	18	17.0	29	12.2
Helps only some months	10	18.5	14	18.0	27	25.5	51	21.4
Some tasks are tiring/annoying	39	56.5	66	55.0	96	71.1	201	62.0
Skipped school to work on cocoa	4	6.0	6	5.1	10	8.0	20	6.5

Source: *adult's and children's questionnaires combined, Côte d'Ivoire.*

[39] Labour code (art. 23-8), Décret n° 96-204 of 7 March, 1996 (regulating length of work) and Arrêté n° 009 EMEASS/CAB of 19 January, 2012, indicating the list of hazardous work activities forbidden to children.

TABLE 4.14. Children's responses by age groups (continues)

	Indenié-Djuablin								Nawa							
	5-11 y.o.		12 - 13 y.o.		14 - 17 y.o.		Total		5-11 y.o.		12 - 13 y.o.		14 - 17 y.o.		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
N observations	20	25.0	27	33.8	33	41.3	80	100.0	17	19.3	30	34.1	41	46.6	88	100.0
Thinks cocoa is important in community	20	100.0	27	100.0	33	100.0	80	100.0	14	82.4	29	96.7	38	92.7	81	92.1
Wants to be cocoa farmer	13	65.0	23	85.2	25	78.1	61	77.2	1	5.9	9	30.0	14	34.2	24	27.3
Helps family with cocoa	5	25.0	10	37.0	20	60.6	35	43.8	7	43.8	12	40.0	34	82.9	53	60.9
Helps only during weekends or before/after school	7	63.6	5	41.7	6	28.6	18	40.9	11	91.7	8	57.1	4	12.9	23	40.4
Helps sometime each week	0	0.0	2	16.7	3	14.3	5	11.4	0	0.0	0	0.0	3	9.7	3	5.3
Helps only some months	4	36.4	5	41.7	12	57.1	21	47.7	1	8.3	4	28.6	9	29.0	14	24.6
Some tasks are tiring/annoying	4	21.1	10	37.0	17	53.1	31	39.7	7	41.2	11	36.7	32	80.0	50	57.5
Skipped school to work on cocoa	0	0.0	1	3.7	0	0.0	1	1.3	1	5.9	1	3.5	0	0.0	2	2.4
Cocoa tasks child helps with:																
Land clearing	0	0.0	0	0.0	1	3.0	1	1.3	0	0.0	2	6.7	1	2.4	3	3.4
Tree felling	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.4	1	1.1
Slashing bush	1	5.0	0	0.0	3	9.1	4	5.0	1	5.9	2	6.7	1	2.4	4	4.6
Burning bush	0	0.0	0	0.0	1	3.0	1	1.3	0	0.0	0	0.0	0	0.0	0	0.0
Clearing debris	0	0.0	0	0.0	1	3.0	1	1.3	1	5.9	1	3.3	1	2.4	3	3.4
Weeding	2	10.0	5	18.5	10	30.3	17	21.3	3	17.7	2	6.7	12	29.3	17	19.3
Applying fertilizer	0	0.0	0	0.0	1	3.0	1	1.3	1	5.9	0	0.0	2	4.9	3	3.4
Applying fungicide	0	0.0	0	0.0	1	3.0	1	1.3	0	0.0	0	0.0	0	0.0	0	0.0
Water carrying for spraying	0	0.0	1	3.7	2	6.1	3	3.8	1	5.9	3	10.0	18	43.9	22	25.0
Spraying insecticide	0	0.0	0	0.0	1	3.0	1	1.3	0	0.0	0	0.0	1	2.4	1	1.1
Pod plucking	0	0.0	2	7.4	5	15.2	7	8.8	1	5.9	3	10.0	19	46.3	23	26.1
Pod gathering/heaping	4	20.0	8	29.6	14	42.4	26	32.5	7	41.2	8	26.7	32	78.1	47	53.4
Pod breaking	0	0.0	3	11.1	4	12.1	7	8.8	0	0.0	1	3.3	2	4.9	3	3.4
Carting fermented beans to the house	0	0.0	2	7.4	2	6.1	4	5.0	0	0.0	2	6.7	9	22.0	11	12.5
Drying cocoa beans	0	0.0	3	11.1	3	9.1	6	7.5	3	17.7	8	26.7	13	31.7	24	27.3
Carrying dry cocoa beans for sale	0	0.0	0	0.0	1	3.0	1	1.3	0	0.0	1	3.3	0	0.0	1	1.1

Source: *adult's and children's questionnaires combined, Côte d'Ivoire.*

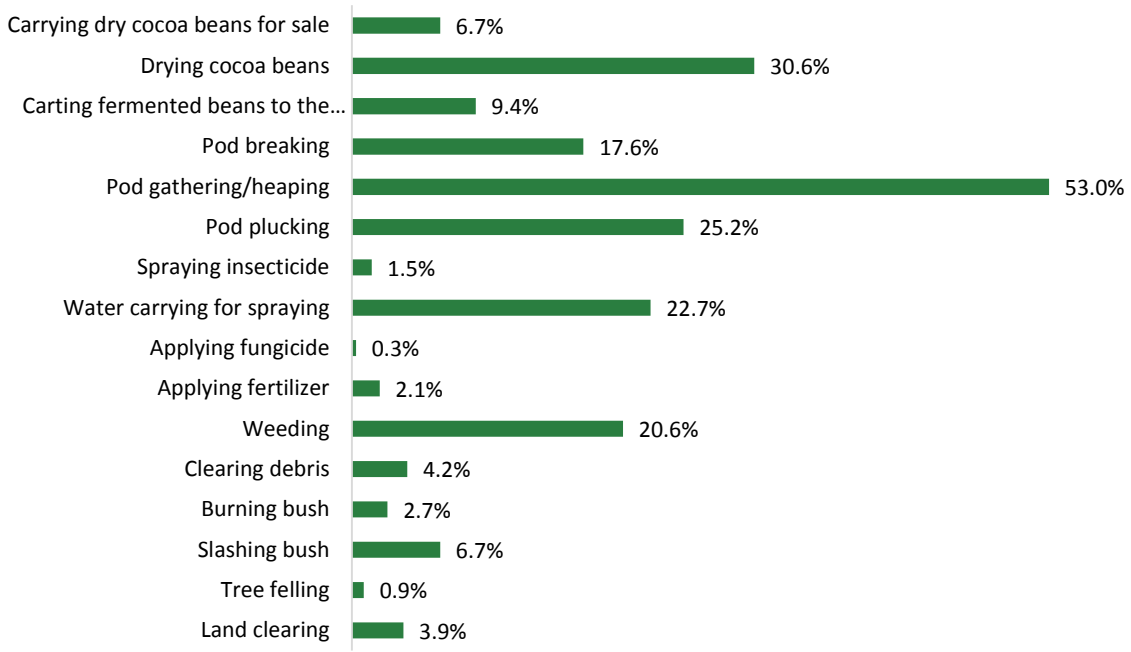
TABLE 4.14. Children's responses by age groups (continued)

	Loh Djiboua								Haut-Sassandra							
	5-11 y.o.		12 - 13 y.o.		14 - 17 y.o.		Total		5-11 y.o.		12 - 13 y.o.		14 - 17 y.o.		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
N observations	31	24.0	53	41.1	45	34.9	129	100.0	3	9.1	10	30.3	20	60.6	33	100.0
Thinks cocoa is important in community	28	93.3	44	86.3	39	88.6	111	88.8	3	100.0	10	100.0	20	100.0	33	100.0
Wants to be cocoa farmer	15	48.4	30	56.6	23	51.1	68	52.7	2	66.7	5	50.0	12	60.0	19	57.6
Helps family with cocoa	25	83.3	36	67.9	35	77.8	96	75.0	3	100.0	9	90.0	20	100.0	32	97.0
Helps only during weekends or before/after school	20	71.4	27	64.3	13	36.1	60	56.6	3	100.0	8	80.0	13	72.2	24	77.4
Helps sometime each week	3	10.7	6	14.3	11	30.6	20	18.9	0	0.0	0	0.0	1	5.6	1	3.2
Helps only some months	5	17.9	3	7.1	4	11.1	12	11.3	0	0.0	2	20.0	2	11.1	4	12.9
Some tasks are tiring/annoying	25	83.3	35	66.0	31	72.1	91	72.2	3	100.0	10	100.0	16	80.0	29	87.9
Skipped school to work on cocoa	2	7.4	1	2.0	0	0.0	3	2.6	1	33.3	3	30.0	10	52.6	14	43.8
Cocoa tasks child helps with:																
Land clearing	0	0.0	2	3.8	4	8.9	6	4.7	1	33.3	1	10.0	1	5.0	3	9.1
Tree felling	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	10.0	2	6.1
Slashing bush	4	12.9	3	5.7	6	13.3	13	10.1	0	0.0	0	0.0	1	5.0	1	3.0
Burning bush	0	0.0	0	0.0	2	4.4	2	1.6	1	33.3	1	10.0	4	20.0	6	18.2
Clearing debris	1	3.2	3	5.7	3	6.7	7	5.4	0	0.0	0	0.0	3	15.0	3	9.1
Weeding	9	29.0	7	13.2	11	24.4	27	20.9	3	100.0	1	10.0	3	15.0	7	21.2
Applying fertilizer	0	0.0	1	1.9	2	4.4	3	2.3	0	0.0	0	0.0	0	0.0	0	0.0
Applying fungicide	0	0.0	0	0.0		0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Water carrying for spraying	14	45.2	10	18.9	17	37.8	41	31.8	1	33.3	2	20.0	6	30.0	9	27.3
Spraying insecticide	0	0.0	0	0.0	2	4.4	2	1.6	0	0.0	0	0.0	1	5.0	1	3.0
Pod plucking	10	32.3	15	28.3	14	31.1	39	30.2	2	66.7	6	60.0	6	30.0	14	42.4
Pod gathering/heaping	22	71.0	26	49.1	28	62.2	76	58.9	3	100.0	7	70.0	16	80.0	26	78.8
Pod breaking	8	25.8	15	28.3	20	44.4	43	33.3	0	0.0	2	20.0	3	15.0	5	15.2
Carting fermented beans to the house	5	16.1	3	5.7	5	11.1	13	10.1	1	33.3	0	0.0	2	10.0	3	9.1
Drying cocoa beans	15	48.4	28	52.8	20	44.4	63	48.8	0	0.0	3	30.0	5	25.0	8	24.2
Carrying dry cocoa beans for sale	2	6.5	4	7.6	4	8.9	10	7.8	2	66.7	4	40.0	4	20.0	10	30.3

Source: *adult's and children's questionnaires combined, Côte d'Ivoire.*

Virtually all the children interviewed for this study responded that cocoa is important in their community but only over half of the children stated that they aspire to become cocoa farmers. Still the majority of children stated that they help on cocoa farms (this includes any number of days, including only few days per cocoa season), more so those aged 14-17 (78% of them) than those aged below 14 (56%). The most frequent activities mentioned by children are pod gathering and heaping, weeding, pod plucking, and carrying water for spraying as shown in figure 4.14.

FIGURE 4.14 Children's Participation in Cocoa Farming Tasks (5-17 years)

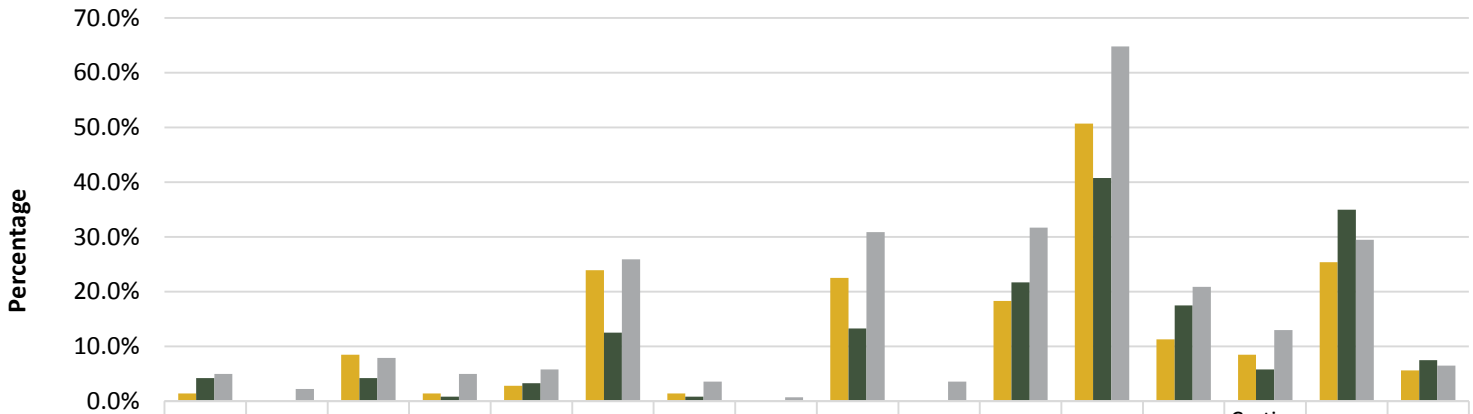


Source: *adult's and children's questionnaire Côte d'Ivoire*[40]

Older children are more likely to carry out all of these activities. Tellingly, older children are also those more likely to state that they find some of the cocoa tasks tiring or annoying (71% against 55% in other age groups). While younger children (76% of those aged 5-11, and 62% of those aged 12-13) help (only) on weekends and on school holidays, only one third of older children stated so – thus implying that they could be helping on other days too. This is confirmed by the fact that older children are less likely to attend school: 53% of children aged 14 and above attend school against 78% of those aged 12-13, and 83% of those 11 years old or younger (see Table 4.4A). Older children may thus be more likely to work during the school day. Figure 4.14A shows children's participation in farming tasks by age group.

[40] Sample size (330)

FIGURE 4.14A Children's Participation in Cocoa Farming Tasks by Age Group



	Land clearing	Tree felling	Slashing bush	Burning bush	Clearing debris	Weeding	Applying fertilizer	Applying fungicide	Water carrying for spraying	Spraying insecticide	Pod plucking	Pod gathering/heaping	Pod breaking	Carting fermented beans to the house	Drying cocoa beans	Carrying dry cocoa beans for sale
5-11 years	1.4%	0.0%	8.5%	1.4%	2.8%	23.9%	1.4%	0.0%	22.5%	0.0%	18.3%	50.7%	11.3%	8.5%	25.4%	5.6%
12 - 13 years	4.2%	0.0%	4.2%	0.8%	3.3%	12.5%	0.8%	0.0%	13.3%	0.0%	21.7%	40.8%	17.5%	5.8%	35.0%	7.5%
14 - 17 years	5.0%	2.2%	7.9%	5.0%	5.8%	25.9%	3.6%	0.7%	30.9%	3.6%	31.7%	64.8%	20.9%	13.0%	29.5%	6.5%

Source: *adult's and children's questionnaire Côte d'Ivoire*[41]

Schooling in Ivorian rural communities clearly makes a significant difference in terms of child involvement in cocoa farm work (Table 4.15). Children who are in school are less likely to help on cocoa farm or to state they find the tasks "tiring or annoying". They rarely "help sometimes each week" (5% against 27% of children not in school) and more likely to help "only during some months". When considering all cocoa tasks (bottom part of Table 4.15) far lower percentages of children who are in school perform tasks deemed "tiring or annoying" versus those not in school.

[41] Sample size: 5-11 (71), 12-13 (120), 14-17 (139)

TABLE 4.15. Children's responses by school participation and age groups (continued)

	5-11 y.o.				12 - 13 y.o.				14 - 17 y.o.				Total			
	Not school		School		Not school		School		Not school		School		Not school		School	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
N observations	12	16.90	59	83.10	27	22.69	92	77.31	66	47.48	73	52.52	105	31.91	224	68.09
Thinks cocoa is important in community	11	91.67	54	93.10	23	88.46	87	94.57	59	90.77	71	97.26	93	90.29	212	95.07
Wants to be cocoa farmer	6	50.00	25	42.37	16	59.26	51	54.84	40	60.61	34	47.22	62	59.05	110	49.11
Helps family with cocoa	6	54.55	34	58.62	19	70.37	48	51.61	56	84.85	53	72.60	81	77.88	135	60.27
Helps only during weekends or before/after school	4	50.00	37	80.43	8	38.10	40	70.18	9	16.98	27	50.95	21	25.61	104	66.67
Helps sometime each week	2	25.00	1	2.17	4	19.05	4	7.02	16	30.19	2	3.77	22	26.83	7	4.49
Helps only some months	2	25.00	8	17.39	4	19.05	10	17.54	9	16.98	18	33.96	15	18.29	36	23.08
Some tasks are tiring/annoying	6	50.00	33	57.89	19	70.37	47	50.54	48	73.85	48	68.57	73	70.19	128	58.18
Skipped school to work on cocoa	0	0.00	4	6.90	0	0.00	6	6.45	1	1.92	9	12.33	1	1.18	19	8.48
Cocoa tasks child helps with:																
Land clearing	0	0.00	1	1.69	3	11.11	2	2.15	6	9.09	1	1.37	9	8.57	4	1.78
Tree felling	0	0.00	0	0.00	0	0.00	0	0.00	2	3.03	1	1.37	2	1.90	1	0.44
Slashing bush	1	8.33	5	8.47	2	7.41	3	3.23	8	12.12	3	4.11	11	10.48	11	4.89
Burning bush	0	0.00	1	1.69	0	0.00	1	1.08	5	7.58	2	2.74	5	4.76	4	1.78
Clearing debris	1	8.33	1	1.69	1	3.70	3	3.23	3	4.55	5	6.85	5	4.76	9	4.00
Weeding	1	8.33	16	27.12	8	29.63	7	7.53	23	34.85	13	17.81	32	30.48	36	16.00
Applying fertilizer	0	0.00	1	1.69	0	0.00	1	1.08	3	4.55	2	2.74	3	2.86	4	1.78
Applying fungicide	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	1.37	0	0.00	1	0.44
Water carrying for spraying	3	25.00	13	22.03	8	29.63	8	8.60	31	46.97	12	16.44	42	40.00	33	14.67
Spraying insecticide	0	0.00	0	0.00	0	0.00	0	0.00	3	4.55	2	2.74	3	2.86	2	0.89
Pod plucking	2	16.67	11	18.64	11	40.74	15	16.13	25	37.88	19	26.03	38	36.19	45	20.00
Pod gathering/heaping	6	50.00	30	50.85	14	51.85	35	37.63	45	68.18	45	61.64	65	61.90	110	48.89
Pod breaking	1	8.33	7	11.86	6	22.22	15	16.13	18	27.27	11	15.07	25	23.81	33	14.67
Carting fermented beans to the house	0	0.00	6	10.17	3	11.11	4	4.30	13	19.70	5	6.85	16	15.24	15	6.67
Drying cocoa beans	4	33.33	14	23.73	14	51.85	28	30.11	26	39.39	15	20.55	44	41.90	57	25.33
Carrying dry cocoa beans for sale	0	0.00	4	6.78	2	7.41	7	7.53	6	9.09	3	4.11	8	7.62	14	6.22

Source: *adult's and children's questionnaires combined, Côte d'Ivoire.*

In order to better study the determinants of child labour (non-hazardous) and hazardous child labour, the children were divided in three categories, as follows:

- No work/permissible work: this includes children <14 not performing any work; and children 14 and above not performing any hazardous work;
- Child labour (CL, non-hazardous): children <14 performing any kind of work on cocoa farms (but not hazardous activities) AND either not attending school or stating that they skipped school to work on cocoa-related tasks;
- Hazardous child labour (HL): children of any age group performing the following tasks, which are considered hazardous for children under 18 by Côte d'Ivoire legislation: land clearing, tree felling and slashing, bush burning, applying fertiliser/pesticide and spraying insecticide.

Responses from both the adult questionnaire and the (matched) children's questionnaires were combined to construct the above categories. The adult questionnaires gave information on the detailed tasks performed by all members (including children) in the household, while the children's questionnaire indicated whether the child skipped school to perform cocoa tasks or performed some other dangerous activities on the household's cocoa farm. Both questionnaires gave information on whether the child attended school, thus allowing us to cross responses for verification. Unfortunately, not all 330 children could be matched with a farmer in the adult sample. The resulting matched children-farmer sample is thus reduced to 291 observations. It is important to note, that similar to the Ghana study, child labour (non-hazardous) has been examined as a separate category to hazardous child labour. This means that children engaged in hazardous child labour have not been included in the child labour (non-hazardous) count in this study.

The incidence of CL and HL by age group and gender for this sample of children is given in Table 4.15a. The number of children falling under either the CL or the HL category is low, each representing about 11% of the sample. These percentages are lower than those found in the Ghana data. We are not in the position to judge whether these data reveal truthfully the underlying reality, and it is possible that there is some amount of under-reporting (due to the social desirability issues already noted). In any case, these data have to be interpreted with caution.

A comparison with the findings from qualitative data also confirms the difficulty of capturing an unambiguous picture of the child labour phenomenon. Children's drawings offer insights into children's representation of their own world and are complemented by their explanations of the drawings' meanings, which were noted down by researchers. Most children drew objects and situations linked to their life when not in school (few children refused to draw or to comment on their drawings).

A good proportion of children mentioned they would go to the farm with their parents or their brother, and help on work the field, mainly on weekends or when not in school. Some children mentioned that if they refused to go to the farm, their accompanying household member would be upset and punish them. Although many children pictured themselves in the farm or attending to cooking, very few drew scenes where a child uses hazardous tools or appears in dangerous

situations. An interesting finding is that many children pictured themselves with a ball, just playing. Appendix 2 provides examples of the children's drawings, selecting those that most relate to their engagement in cocoa farming activities. The drawings here indicate that some children assist with weeding, carrying loads and cocoa pod breaking. However, as mentioned below, these typologies of drawings represent only a small proportion of the overall drawings. Again, it is difficult to know the extent to which the participating children were instructed by their vigilant parents/guardians to censor these types of representations or the children themselves wanted to give a positive image of their lives, however the data collection was planned so that with the parent's consent, the children's parent's would not be present during the drawing activity, which appears to have been the case.

When it comes to data from focus group discussions with adults, the emerging picture is equally nuanced. On the one hand, many respondents showed that they were aware that young children are supposed to be in school and work only for a limited number of hours (according to age). They stated that "work on the farm is dangerous for children's health" (FG4, Koumeziakro); and that "children mainly learn while on the farm, because they aren't strong enough to do work" (FG2, Ebilassokro): "Children under the age of 15 should not work in the fields. They just carry water" (FG2, Yobuekro). Mothers are "conscious that children should not work" (FG4, Ebilassokro) and so "do farm work without their children's help to allow them focus on school" (FG4, Kagninanko).

As reinforcement to these points, respondents from different focus groups and across communities placed a high value on children's schooling. Box 1 conveys some of the benefits from children's education as expressed in FGDs.

Box 1. Benefits of education, selected quotes (various villages)

"It is more useful for children who will be farmers to go to school because they will have better agricultural practices" (FGD 1, Ebilassokro).

"There is a difference in agricultural practices between farmers who have been and who have not been to school" (FGD 2, Yobuekro)

"Children must go to school to learn how to read and write no matter what future profession they choose. Children who can read and write help their illiterate parents" (FGD 2, Gbagbam)

"[Educated children] won't need to ask for help all the time like we [farmers] do" (FGD 2, Dapeoua)

"Not knowing how to read and write will limit the children's evolution in society" (FGD 4, Douaville)

On the other hand, FGDs also revealed another reality; children may not be able to attend school as much as they would like to, and are therefore asked to work on cocoa farms. Several reasons were given for why children may not be able to go to school, such as: lack of money, orphan

status, and children refusing to go to school or parents refusing to send them to school (FG2, Gbagbam). Explanations for why children work on farms sometimes referred to the importance of imparting valuable life skills: “When out of school, children should accompany parents to the farm because they need to know the importance of working the land. They understand that exposing a child to farm work does predispose them to such activity” (FG1, Yobouekro). “Children must learn how to work in case school doesn't work out for them, they can easily become farmers” (FG2, Koumeziakro).

At other times, however, the necessity/convenience aspect was emphasised: “Youth who aren't in school should work on cocoa because we are old and tired and cocoa is becoming more difficult to produce” (FG1, Krikoria). “All youth should attend school, but those who don’t should work on the farm to help their parents and avoid becoming juvenile delinquents”. (FG2, Gbagbam). “Youth should be totally involved in cocoa growing... not having learned farming techniques at a young age is a barrier” (FG1, Yobouekro).

Going to the farm for out-of-school children is also a consequence of lack of alternative options for child-care: “Children accompany parents to the farm when out of school so they do not remain at home unsupervised” (FG4, Kouameziakro). Some mothers say that children stay at home, other say that children accompany them in the fields but they do not participate in field work (FG4, Douaville). Older children seem to work for money: “Most youth do household labour, and therefore like to work on the farms in order to make some money and help pay for children school fees” (FG3, Gbagbam).

Some of the statements suggest that some of the tasks undertaken by children are not all of permissible nature. Several cocoa farmers wish their children could help more: “in activities such as harvesting with a pitchfork, weeding with a machete, and pulverization when at least 15 years of age” (FG2, Grebouo II). “Now children are only engaged in plucking, assembling, drying, and sorting, and only if aged 14 or above. School is important but it shouldn't stop those that want to become cocoa farmers” (FG2, Kagninanko).
All in all, the above statements seem to suggest that children’s contribution to cocoa farming may be more active in cocoa farming activities than what our quantitative survey data suggest, and some of it may constitute non-hazardous child labour or hazardous child labour. School enrolment for children in the sample is only 68%, and much lower (52%) for children aged 14 and above (table 4.3A). Secondary schools are often not accessible and a universal primary school enrolment policy had not yet been introduced in Côte d’Ivoire at the time of this study.

Going back to the survey data analysis, the incidence of child labour (non-hazardous) and hazardous child labour is higher among boys than that among girls (Table 4.15A). There are almost twice as many boys performing child labour (non-hazardous) than girls, and more than four times as many boys performing hazardous activities than girls, while the number of boys in the sample is only 52% higher than that of girls.

TABLE 4.15A. Child labour categories (by age groups and gender)

		No work/light work	Child labour (non-hazardous)	Hazardous child labour	Total
5-11 years old	Female	23	2	3	28
	Male	34	4	5	43
	Total	57	6	8	71
12-13 years old	Female	26	6	1	33
	Male	68	15	4	87
	Total	94	21	5	120
14-17 years old	Female	40	4	2	46
	Male	72	4	17	93
	Total	112	8	19	139
All ages	Female	89	12	6	107
	Male	174	23	26	223
	Total	263	35	32	330

Source: *adult's and children's questionnaires combined, Côte d'Ivoire.*

In terms of age, the percentage of children in the CL category doubles in the 12-13 age group (18%) relative to the 5-11 age group (9%) too, but it is very low among 14-17 years old (6%) – possibly the result of child labour (non-hazardous) being defined for this age category as work that interferes with schooling *only if* the child attends school. The fact that children in this age group are not legally expected to be in school (and in fact many do not attend) means that the incidence of CL is very low here. The data also show a non-linear increase of hazardous child labour with age groups. While more than 12% of children in the 5-11 age group perform hazardous activities, the correspondent percentage for children 11-12 is a low 5% and for children aged 14-17 is 16%. It is difficult to speculate the reason for this drop in the middle age category, but it is possible that there is a greater amount of under-reporting here.

The breakdown by districts (Table 4.15B) shows that the districts with the highest incidence of child labour (non-hazardous) are Daloa (36%) and Divo (13%); whereas the districts with the highest incidence of HL are Daloa (27%), Soubré (18%) and Divo (14%). Buyo appeared to have the lowest incidence of CL (3%) and no reported case of HL.

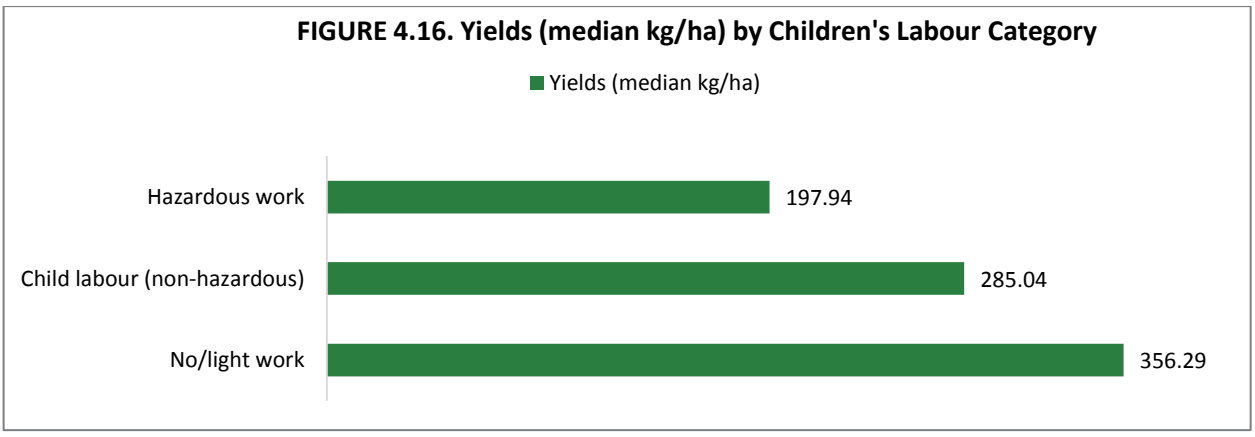
TABLE 4.15B. Child labour categories (by age groups and district)

District	Age group	No work/light work	Child labour	Hazardous child labour	Total
Abengourou	5-11 years old	17	1	1	19
	12-13 years old	19	3	0	22
	14-17 years old	24	0	2	26
	All ages	60	4	3	67
Divo	5-11 years old	20	4	4	28
	12-13 years old	35	11	4	50
	14-17 years old	32	0	8	40
	All ages	87	15	16	118
Daloa	5-11 years old	2	0	1	3
	12-13 years old	6	2	0	8
	14-17 years old	2	7	6	15
	All ages	10	9	7	26
Soubré	5-11 years old	12	1	2	15
	12-13 years old	7	2	1	10
	14-17 years old	6	0	3	9
	All ages	25	3	6	34
Buyo	5-11 years old	1	0	0	1
	12-13 years old	14	2	0	16
	14-17 years old	29	0	0	29
	All ages	44	2	0	46
All districts	5-11 years old	52	6	8	66
	12-13 years old	81	20	5	106
	14-17 years old	93	7	19	119
	All ages	226	33	32	291

Source: *children's questionnaire, Côte d'Ivoire*

The researchers next examined the breakdown of child labour categories against different farmer characteristics. One of the aims of this study is to investigate the correlation between cocoa yields and the incidence of child labour (non-hazardous) and hazardous child labour. Our data shows that yields are higher for farmers employing no CL/HL (356 kg/ha, median value) than for farmers employing non-hazardous child labour (285 kg/ha) or for whom children do hazardous work (198 kg/ha) (Figure 4.16 and Table 4.16).

FIGURE 4.16. Yields (median kg/ha) by Children's Labour Category



Source: *adult's and children's questionnaire Côte d'Ivoire*[42]

[42] Sample size: No/light work (173), Child labour (non-hazardous) (25), hazardous work (19)

Furthermore, farmers for which we observe CL or HL use less hired labour (44% and 55% less, respectively) than farmers who employ no CL/HL. This latter result calls for further analysis to probe whether there may be substitutability between CL/HL and hired labour. The qualitative data also seems to support this conclusion. A farmer stated: "Those who use child labour don't want to hire labour because it is expensive" (FG1, Niouboua, Daloa) – hinting at a possible negative association between hired labour and CL. It can also be noted that, in families with HL, land size seems to be greater and household size smaller than in households with no/permissible work – though one cannot tell whether these differences are statistically significant or not from Table 4.16.

TABLE 4.16. Profiling child labour categories against cocoa farm manager characteristics (by district)

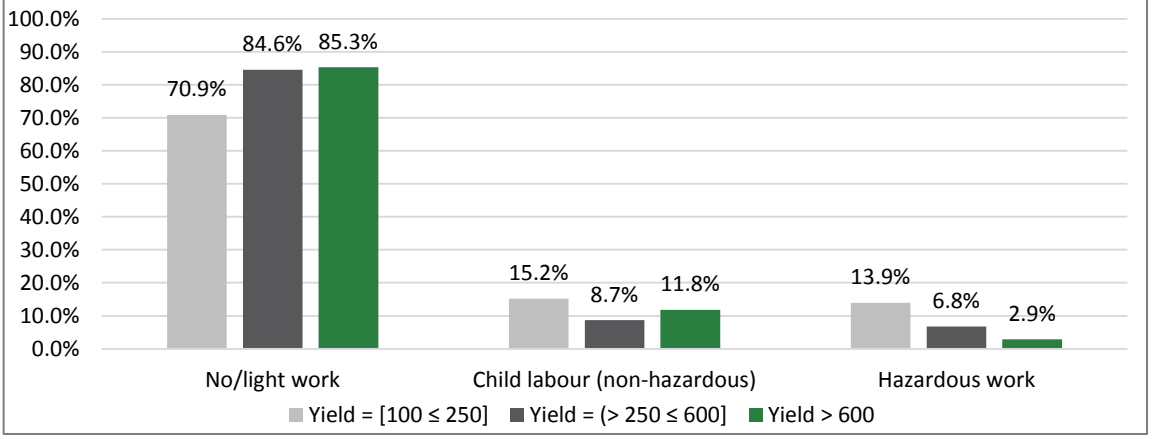
	Total				Abengourou				Divo			
Farm Characteristics	No/light work	Child labour (non-hazardous)	Hazardous work	Total	No/light work	Child labour	Hazardous work	Total	No/light work	Child labour (non-hazardous)	Hazardous work	Total
Yields (median kg/ha)	356.29	285.04	197.94	308.35	371.14	415.24	255.34	365.70	296.91	154.39	153.40	264.30
Land size (median ha)	3.37	3.37	4.21	3.37	3.37	12.21	5.05	3.37	3.37	4.21	4.21	3.37
HH size (mean)	7.61	7.32	7.26	7.55	6.92	8.00	6.33	6.93	7.19	7.85	7.13	7.29
Hired person days/ha (mean)	16.22	9.01	7.11	14.59	29.14	35.33	2.29	27.90	8.32	7.04	7.44	8.02
Yield levels (frequencies)												
Yield = [100 ≤ 250]	56 (70.9%)	12 (15.2%)	11 (13.9%)	79 (100%)	13 (92.9%)	0 (0%)	1 (7.1%)	14 (100%)	24 (63.2%)	8 (21.1%)	6 (15.8%)	38 (100%)
Yield = (> 250 ≤ 600]	88 (84.6%)	9 (8.7%)	7 (6.8%)	104 (100%)	85 (86.2%)	2 (6.9%)	2 (6.9%)	29 (100%)	28 (84.9%)	3 (9.1%)	2 (6.1%)	33 (100%)
Yield > 600	29 (85.3%)	4 (11.8%)	1 (2.9%)	34 (100%)	11 (100%)	0 (0%)	0 (0%)	11 (100%)	5 (71.4%)	2 (28.6%)	0 (0%)	7 (100%)
Total	173 (79.7%)	25 (11.5%)	19 (8.8%)	217 (100%)	49 (90.7%)	2 (3.7%)	3 (5.6%)	54 (100%)	57 (73.1%)	13 (16.7%)	8 (10.3%)	78 (100%)

	Daloa				Soubré				Buyo			
Farm Characteristics	No/light work	Child labour (non-hazardous)	Hazardous work	Total	No/light work	Child labour	Hazardous work	Total	No/light work	Child labour (non-hazardous)	Hazardous work	Total
Yields (median kg/ha)	320.99	380.05	178.15	296.91	475.06	367.61	263.92	415.68	339.33	479.30	-	339.33
Land size (median ha)	0.84	1.26	1.68	1.26	2.53	4.21	5.05	3.37	3.37	13.05	-	3.37
HH size (mean)	7.43	5.50	9.67	7.13	7.04	6.50	6.60	6.94	9.74	9.50	-	9.73
Hired person days/ha (mean)	8.91	6.04	14.25	8.83	25.84	13.40	5.20	21.84	4.91	0.00	-	4.64
Yield levels (frequencies)												
Yield = [100 ≤ 250]	1 (20.0%)	2 (40.0%)	2 (40.0%)	5 (100%)	6 (66.7%)	1 (11.1%)	2 (22.2%)	9 (100%)	12 (92.3%)	1 (7.7%)	0 (0%)	13 (100%)
Yield = (> 250 ≤ 600]	5 (50.0%)	4 (40.0%)	1 (10%)	10 (100%)	15 (88.2%)	0 (0%)	2 (11.8%)	17 (100%)	15 (100%)	0 (0%)	0 (0%)	15 (100%)
Yield > 600	1 (100%)	0 (0%)	0 (0%)	1 (100%)	4 (66.7%)	1 (16.7%)	1 (16.7%)	6 (100%)	8 (88.9%)	1 (11.1%)	0 (0%)	9 (100%)
Total	7 (43.8%)	6 (37.5%)	3 (18.8%)	16 (100%)	25 (78.1%)	2 (6.3%)	5 (15.6%)	32 (100%)	35 (94.6%)	2 (5.4%)	0 (0%)	37 (100%)

Source: *children's and adult's questionnaires, Côte d'Ivoire*

Figure 4.16A and the bottom part of Table 4.16 show that a higher percentage of farmers in the low input/low output category employ non-hazardous child labour (15%) or hazardous child labour (14%) than farmers in the middle (9% and 7% respectively use CL and HL) or high yield range levels (12% and 3% use CL and HL respectively). This may suggest, although it needs to be verified by regression analysis, the lack of a positive relationship between CL/HL and higher yield range categories.

FIGURE 4.16A. Children's Work Categories by Yield Range



Source: *adult's and children's questionnaire Côte d'Ivoire*[43]

When we examine the breakdown by districts, there are some surprising differences. Yields are higher for farmers using CL than for farmers employing only permissible child work in Abengourou (415 vs. 371 kg/ha) and in Buyo (479 vs. 339 kg/ha), and to some extent also in Daloa (380 vs. 321 kg/ha). In Abengourou and Buyo, where the yield differences are more important, median land size for farmers using CL is significantly greater than for all other groups (12 and 13 ha respectively). This suggest that, despite the larger household size and, at least in some cases, the above than average level of hired labour per hectare used by these farmers, these appear to have much greater labour requirements than most other farmers. For this very small sample of farmers who employ CL in Abengourou and Buyo, therefore, it looks like CL and yields may be positively related – but there are only 2 such farmers in each district, 4 altogether, therefore these results are by no means generalizable, especially as a similar association is found nowhere else in the sample.

[43] Sample size: Yield 100-250 (79), Yield 251-600 (104), Yield above 600 (34)

Public and private programmes to increase cocoa yields and decrease child labour

Several programmes are being implemented in the cocoa regions in order to enhance yields. These include both private and government funded programmes, providing farmers with training in best farming practices, and sometimes access to cocoa seedlings and other inputs. Farmers were asked whether they participated in any existing programme, to name the programme, and whether they benefitted from participation in these initiatives and if so, how.

Only one third of the respondents stated they participated in a private or public programme to enhance cocoa yields (Table 4.17). Of those, the majority stated that they just participated in a programme, while only 4% thought they benefitted from the programme. Although all respondents were asked to name the programme they were part of at the time of survey, only 18% of farmers had given that information (Table 4.17A). The majority mentioned training or farmer field schools. Over 3% of farmers mentioned the Sustainable Cocoa Programme CDI, and 2% of respondents reported being members of a certification scheme. It is possible that farmers do not know the name of the programme they are part of, or that they cannot distinguish between the training/farmer field schools and the Sustainable Cocoa Programme CDI, which are sometimes overlapping.

The districts that registered the highest proportions of farmers in yield-enhancing programmes were Abengourou and Soubré, where respectively 53% and 45% of sampled farmers were reached. Divo was the district where programme penetration appears to be the lowest (15%), while in Daloa and Buyo respectively, 28% and 43% of farmers reported participating in any programme. A higher percentage of women farm managers participated or benefitted from a programme (44%) than men farmers (31%), though of course women represent a very small share of the overall sample.

TABLE 4.17. Farmers who participated or benefitted from programmes to increase cocoa yields, by district and sex

District	Neither			Participated			Benefitted			Totals
	Female	Male	Total	Female	Male	Total	Female	Male	Total	
Abengourou	14	81	95	11	95	106	-	3	3	204
Divo	6	320	326	1	38	39	1	16	17	382
Daloa	1	65	66	-	17	17	1	8	9	92
Soubré	1	46	47	2	38	40	-	-	-	87
Buyo	3	77	80	3	50	53	1	5	6	139
Total	25	589	614	17	238	255	3	32	35	904
%	55.56	68.57	67.92	37.78	27.71	28.21	6.67	3.73	3.87	100.00

Source: *adult's questionnaire, Côte d'Ivoire*

TABLE 4.17A. Type of programme

Programme type	Freq.	Percent
Farmer Field School	93	10.29
Sustainable Cocoa Programme CDI	31	3.43
Certification Scheme	18	1.99
Other	17	1.88
NA/non-response	745	82.41
Total	***904***	***100***

Source: *adult's questionnaire, Côte d'Ivoire*

These low programme penetration rates were confirmed by qualitative data. Participants in the FGDs advocated the need to intensify yields given poor soils, but complained that: "Cocoa production decreases every year due to lack of phytosanitary products and diseases, there are no programmes that give us support or hope for the future of cocoa farming" (FG2, Krikoria I, Daloa). Some FGDs reported that although new phytosanitary products and pesticides were made available in the past, their quality and effectiveness were not always obvious, even within the same village.

Farmers were also asked whether they participated in a programme that aims to raise awareness of child labour and the worst forms of child labour. About 30% of farmers in our sample participated or benefitted from such programmes, a slightly lower percentage than in the case of yield-enhancing programmes (Table 4.17B). Very few farmers identified the programme as beneficial (all of them men with one exception) – however, this might be a reflection of how the question was framed, which perhaps may have induced farmers to think of benefits only in terms of higher cocoa profitability (rather than overall children's and household welfare). Soubré, Abengourou and Buyo were the districts where these programmes appear to be more widespread (58%, 49% and 48% participation rate respectively), while Divo and Daloa register participation rates below 10%.

TABLE 17B. Farmers who participated or benefitted from WFCL programmes, by district and sex

District	Neither			Participated			Benefitted			Totals
	Female	Male	Total	Female	Male	Total	Female	Male	Total	
Abengourou	15	87	102	9	90	99	-	-	-	201
Divo	7	333	340	-	23	23	1	14	15	378
Daloa	2	78	80	-	5	5	-	3	3	88
Soubré	1	35	36	2	49	51	-	-	-	87
Buyo	4	69	73	3	63	66	-	-	-	139
Total	29	602	631	14	230	244	1	17	18	893
%	65.91	70.91	70.66	31.82	27.09	27.32	2.27	2.00	2.02	100.00

Source: *adult's questionnaire, Côte d'Ivoire*

These geographical differences in the reach of the sensitisation programmes against child labour were also noted in FGDs. The villages where farmers talked about these awareness programmes were mostly in the Abengourou district (Kouameziakro, Ebilassokro, Abronamoue) and ANADER was indicated as the agency that promoted most effectively the CL awareness messages. An

American NGO led a child labour awareness campaign in Yobouekro (Divo). In another village in Divo, some villagers stated that, though they were not reached by programmes related to child labour, mass media communication had made them aware about child labour realities (Douaville).

In discussions about child labour awareness programmes, respondents showed they were clearly able to articulate the learning from these campaigns. “Children shouldn't be implicated in any activities that may be harmful to them such as carrying heavy loads or applying pesticides, and using machetes for weeding. Starting from 14 years of age they may be involved in plucking, assembling, cracking, drying and bringing water” (FG2, Dapeoua, Buyo). One farmer stated: “We are against child labour here. At 15 they can start to do some work like cleaning. But even if they want to be farmers they must go to school first” (FG2, Niouboua, Daloa). It is difficult to establish the extent to which these responses reflect internalization of messages vs. social desirability biases, whereby participants in FGs respond what that they think researchers want to hear.

Campaigns against child labour were considered to be useful, although there was admission that poverty may induce parents to make children work rather than being idle (FG1, Gbagbam, Divo). Others expressed the opinion that child labour is also a form of socialization and reproduction of social labour, and it is associated to the lack of awareness on the importance of educating a child (FG1, Dapeoua, Buyo). Some respondents expressed scepticism regarding the effects of such awareness campaigns, due to culture. “Children must learn to work the land at a young age in order to be independent and take care of their own families one day. This legitimises child labour in this village” (FG1, Grebouo II, Soubré).

The next step in the analysis is to examine whether participants in programmes experience higher yields than non-participants, and whether any difference in yields associated to programme participation is in turn correlated with a higher incidence of non-hazardous child labour or hazardous child labour. Since farmers did not give informative responses regarding the specific programme they were part of, we consider participation in two categories of programmes: i) public and private programmes aimed to enhance cocoa yields (whether by different cocoa companies or by the government; and ii) programmes to sensitise participants to recognize and eliminate practices of worst forms of child labour. It should be noted that collapsing a number of programmes in category i) is not only a practical choice, but also finds legitimacy in the fact that the farmer field schools/training agencies often work in close collaboration with major cocoa companies and their interventions often have overlapping elements.

FIGURE 4.18. Yield (mean) comparisons between members and non-members of yield enhancing programmes

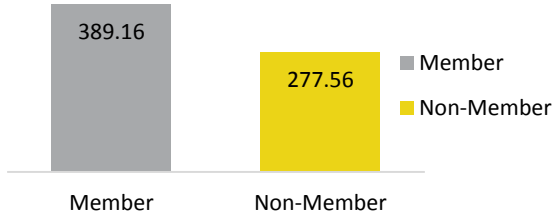


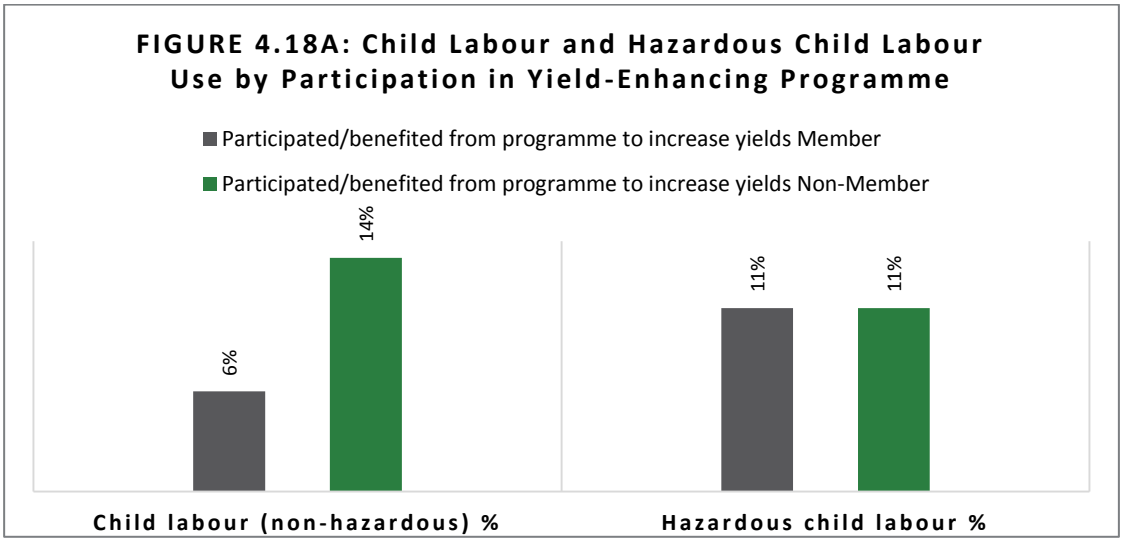
Table 4.18 compares mean differences between farmer members and non-members of the two types of programmes – also indicating whether the mean difference is statistically significant – across the whole sample and across land quartiles.

The first interesting result as seen in figure 4.18, is that farmers who

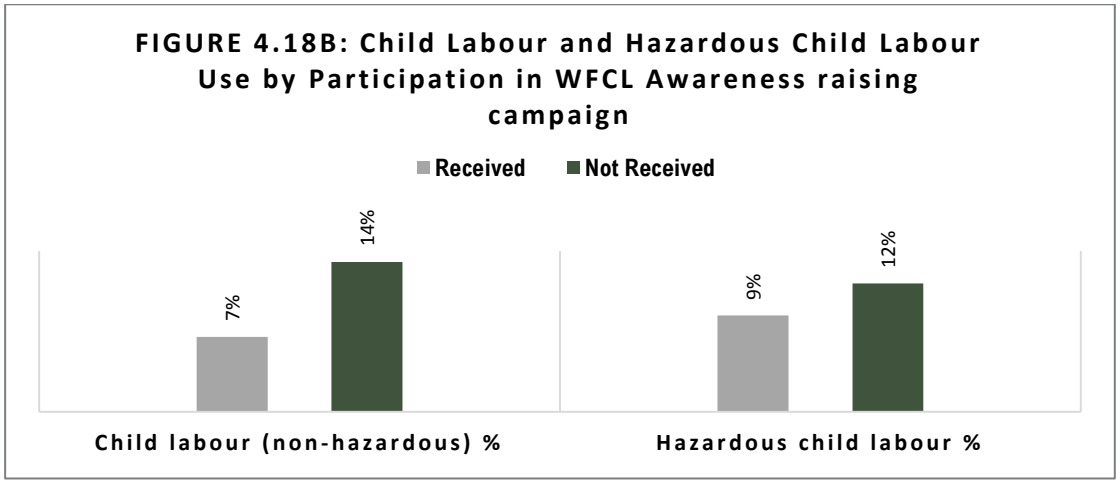
voire

participate in public or private programmes to enhance yields (and also farmers in CL/WFCL awareness raising programmes) experience statistically significantly higher yields (1% level) than non-programme participants. The latter have yields that are only 71% and 68% of farmers in the two categories of programmes, respectively (278 kg/ha vs. 389 kg/ha and 275 kg/ha vs. 400 kg/ha) – a very significant disadvantage.

The other important result is that both categories of programme participants have a significantly lower incidence of child labour (non-hazardous) than non-participants (figure 4.18A and figure 4.18B). While there is no difference in the hazardous child labour rate amongst members and non-members participating in yield enhancing programmes however, the incidence of hazardous child labour among participants in the CL/WFCL awareness raising programmes is lower than non-participants, but the difference is not statistically significant.



Source: *adult's and children's questionnaire combined, Côte d'Ivoire*[44]



Source: *adult's and children's questionnaire combined, Côte d'Ivoire*[45]

[44] ibid

[45] Sample size: Received (106) and Not Received (224)

Another important difference is in the quantity of hired labour per hectare, which is about three times higher for programme participants than non-participants (more so in case of the CL/WFCL awareness raising programmes) as shown in figure 4.18C. This evidence would suggest that farmers who participate in the two types of programmes for some reason are able to adequately substitute child labour for hired labour, although this preliminary descriptive analysis cannot explain whether this association runs from programme participation to labour use, or the other way around.

FIGURE 4.18C. Hired Labour Days per hectare (mean) by programme participation

Source: *adult's and children's questionnaire combined, Côte d'Ivoire*

The breakdown by land quartile as shown in table 4.18, reveals that the differences between programme participants and non-participants are not all statistically significant within each land quartile. In particular, differences in yields disappear in the bottom and third from bottom land quartile; non-hazardous child labour is only statistically significantly lower among farmers in programmes to enhance yields in the top land quartile; and the incidence of hazardous child labour is only significantly reduced among participants in CL/WFCL awareness programmes in the first land quartile.

TABLE 4.18. Yields, Labour, CL and HL use by programme participation and land quartile [46]

Programme type	Participated/benefited from programme to increase yields			Participated/benefited from WFCL sensitization programme		
	Yes	No	Mean difference	Yes	No	Mean difference
Yields (mean)	389.16	277.56	111.60***	400.30	275.27	125.03***
Child labour (non-hazardous) %	6	14	-8**	7	14	-7*
Hazardous child labour %	11	11	0.00	9	12	-3
HH child days/ha	2.14	2.30	-0.16	1.78	2.46	-0.69
HH labour days/ha	32.63	29.38	3.25	33.34	29.13	4.21
Hired lab days/ha	21.31	7.53	13.78***	23.35	6.94	16.41***
No. obs	112	218	330	106	224	330
Land quartile 1: [0, 1.69] (ha)						
Yields (mean)	418.74	363.97	54.77	439.58	358.50	81.08
Child labour (non-hazardous) %	8	16	-8	5	17	-12
Hazardous child labour %	8	10	-2	0.00	13	-13*
HH child days/ha	4.37	5.59	-1.22	3.37	5.89	-2.52
HH labour days/ha	56.35	53.56	2.79	56.87	53.52	3.35
Hired lab days/ha	29.58	8.55	21.03**	33.65	8.18	25.47***
No. obs	30	56	86	26	60	86
Land quartile 2: [1.70, 3.37] (ha)						
Yields (mean)	470.41	286.87	183.53***	488.15	288.49	199.65***
Child labour (non-hazardous) %	9	15	-6	6	16	-9
Hazardous child labour %	6	13	-7	6	12	-5
HH child days/ha	2.29	1.23	1.06	2.29	1.32	0.97
HH labour days/ha	33.29	28.49	4.79	37.20	26.43	10.77**
Hired lab days/ha	15.71	7.83	7.87**	19.85	5.84	14.00***
No. obs	40	55	95	36	59	95
Land quartile 3: [3.78, 5.90] (ha)						
Yields (mean)	299.47	255.38	44.09	297.04	255.47	41.57
Child labour (non-hazardous) %	6	13	-7	11	11	0.00
Hazardous child labour %	18	6	11	6	11	-5
HH child days/ha	0.40	1.64	-1.24	0.56	1.61	-1.05
HH labour days/ha	22.91	25.68	-2.77	25.22	24.83	0.39
Hired lab days/ha	10.18	7.62	2.57	9.20	7.93	1.27
No. obs	19	52	71	20	51	71
Land quartile 4: [6.06, 69.05] (ha)						
Yields (mean)	283.39	202.80	80.59	312.01	188.59	123.42**
Child labour (non-hazardous) %	0.00	12	-12*	5	10	-5
Hazardous child labour %	19	14	05	24	12	12
HH child days/ha	0.51	0.54	-0.02	0.39	0.59	-0.20
HH labour days/ha	8.58	9.13	-0.55	8.81	9.04	-0.22
Hired lab days/ha	28.97	6.10	22.86**	28.64	5.83	22.81**
No. obs	23	55	78	24	54	78

Source: *children's and adult's questionnaires, Côte d'Ivoire*

[46] The table equivalent for the Ghana case study, is table 3.14

These findings are based on a relatively small sample so any findings should be taken with caution, however the data suggests a positive correlation between programme participation and higher yields, and a lower incidence of child labour (non-hazardous). Furthermore, some caution needs to be exercised when interpreting these findings. It is not possible to tell whether participation in programmes leads farmers to have high yields or use less child labour (non-hazardous)/hazardous labour or whether the order of causation is reversed, i.e. that less productive farmers using more CL/HL are less likely to join or be enrolled on such programmes. Establishing this important causal relation would require further research.

4.3 Explaining the incidence of child labour (non-hazardous) and hazardous child labour

In order to test the above relationships in a multivariate setting Table 4.19 estimates the determinants of the probability of a child being involved respectively in CL and HL using two Probit regression models. The regressors used in these models include: the child age and gender, the age of the farmer who is responsible for the child, gender, education and marital status, distance to school, a dummy variable indicating whether the child was born in the village, past yields, the number of cocoa farms owned by the farm managers (a proxy of wealth), the percentage of hired labour person days over total labour days, the yield range levels and the district dummies. The variable 'peak-dummy' indicates whether children tasks fall in the peak labour season (September to January) or not. Squared values of age and education variables are added to account for non-linear effects. The distance to school variable is derived as follows: distance to the closest primary school for children 11 years and younger, and distance to the nearest secondary school for children aged 12 and older.

In order to test the above relationships in a multivariate setting Table 4.19 estimates the determinants of the probability of a child being involved respectively in CL and HL using two Probit regression models. The regressors used in these models include: the child age and gender, the age of the farmer who is responsible for the child, gender, education and marital status, distance to school, a dummy variable indicating whether the child was born in the village, past yields, the number of cocoa farms owned by the farm managers (a proxy of wealth), the percentage of hired labour person days over total labour days, the yield range levels and the district dummies. The variable 'peak-dummy' indicates whether children tasks fall in the peak labour season (September to January) or not. Squared values of age and education variables are added to account for non-linear effects. The distance to school variable is derived as follows: distance to the closest primary school for children 11 years and younger, and distance to the nearest secondary school for children aged 12 and older.

In the CL regression, the statistically significant variables are the demographic characteristics of the child and of the farmer living in the same household, as well as the 'peak' dummy. Child age is significantly and positively related to the incidence of non-hazardous child labour (though at a decreasing rate). Older children here mean comparison of 12-13 years old children versus <11 since children 14 and above can work full time. Farmer's years of schooling are negatively related to child labour (non-hazardous), suggesting that higher number of years in school reduce the probability that a child will voluntarily or involuntarily engaged in non-hazardous child labour or hazardous child labour. The positive coefficient of the peak dummy suggests that child labour is

most likely to occur during the peak season, when farmers' demand for labour is greatest. The negative coefficients on the district dummies suggest that the incidence of child labour (non-hazardous) in Daloa is higher than in any other district.
In the HL regression, the variable that stands out as most significant (and this has been the cases in all the specification tried and not reported) is whether the child was born in the village. A child born in the village is 23% less likely to be involved in hazardous child labour than a child born elsewhere. This finds confirmation in the qualitative data. Some of the FGDs highlighted that it is farmers from outside of the village and Côte d'Ivoire that make children work on the farms (FG1, Brizeboua).

Furthermore, children living with farmers in the medium yield range levels are 6% less likely to do hazardous activities than children from households where the adult respondent falls in the low yield range category.

Surprisingly, the coefficient for child age is negative (and statistically significant). However, the relationship is not linear, as shown by the positive coefficient for the square value of child age. As previously mentioned, our raw data indicate the incidence of hazardous child labour is 13% in the age group 6-11 years old, goes down to about 5% in the 12-13 age group, and then gets to almost 20% for children aged 14-17. This result suggest that younger and older children are more exposed to the risk of HL, and there may be a task specific explanation underlying this result which is not revealed by the probit regression. In terms of district, children in Soubré are significantly more likely to carry out hazardous activities than children in Daloa.

TABLE 4.19. The determinants of hazardous and non-hazardous child labour: results from probit estimations[47]

	Child labour			Hazardous child labour*		
	dF/dx	S.D.	Z-statistic	dF/dx	Std. Err.	Z-statistic
Participated in WFCL programme	0.000	0.001	-0.21	-0.018	0.026	-0.69
Married (=1)	0.001	0.002	1.75	0.042	0.023	1.24
Age of farmer	0.000	0.000	-1.85	0.004	0.005	0.65
Age of farmer squared	0.000	0.000	2.01	0.000	0.000	-0.69
Years of schooling	-0.001	0.001	-2.64	0.010	0.010	1.03
Years of schooling squared	0.000	0.000	2.24	-0.001	0.001	-0.97
Age of child	0.017	0.025	3.63	-0.095	0.049	-2.15
Age of child squared	-0.001	0.001	-3.7	0.004	0.002	2.39
Sex of child (Male = 1)	0.000	0.001	-0.2	0.033	0.024	1.31
Child was born in village	-0.001	0.004	-0.74	-0.232	0.115	-2.97
Peak dummy	0.007	0.010	3.15	0.055	0.048	1.46
Yield range 1 is reference category						
Yield range 2	0.000	0.001	0.28	-0.062	0.031	-2.16
Yield range 3	0.001	0.002	0.62	-0.058	0.022	-1.89
Ln lagged yield	0.000	0.001	-1.22	0.013	0.018	0.72
Number of cocoa farms owned	0.000	0.000	-0.21	0.001	0.005	0.29
Share of hired labour	-0.001	0.002	-0.67	0.033	0.062	0.53
Distance to school	0.000	0.000	1.35	-0.003	0.003	-0.97
Distance to school squared	0.000	0.000	-1.13	0.000	0.000	0.87
District: Daloa is the reference category						
Abengourou	-0.003	0.004	-2.96	0.007	0.057	0.13
Divo	-0.005	0.007	-2.62	0.048	0.060	0.89
Buyo	-0.002	0.003	-3.9			
Soubré	-0.001	0.002	-2.28	0.273	0.151	2.83
No. Obs.		210			210	
Wald chi2 **		37.27 (22)			41.37 (21)	
Prob > chi2		0.0221			0.005	
Pseudo R2		0.422			0.234	
Log pseudolikelihood		-44.34			-48.83	

****Note**: Buyo removed as it predict failure perfectly. ** Degrees of freedom in parenthesis.*

***Source:** children's and adult's questionnaires, Côte d'Ivoire*

Table 4.20 convert in a matrix format the risk factors associated with either CL or HL, as predicted by the Probit regressions. Each of the characteristics is associated with either an increased chance of CL/HL (*positive*), or a decreased chance of CL/HL (*negative*) or has no significant statistical effect (*N.E.*). Few of the characteristics appear to have a positive or negative impact on CL/HL that is statistically significant. Age of the child and conducting tasks during harvest season increase the chance of child labour (non-hazardous), whereas farmer's education (as measured

[47] The equivalent table for Ghana is table 3.17

by years of schooling) reduces the risk of CL. The negative impact of child's age and child born in the village on the probability of HL suggests that younger children not born in the village are most at risk of hazardous child labour. Most relevant for this study, there does not appear to be any positive relationship between more productive farmers (those falling in the higher yield ranges) relative to the low yield ones, who seem to be more exposed to the risk of CL/HL and for those who have higher current or higher past yields.

TABLE 4.20. Factors associated with higher and with lower incidence of CL and HL[48]

Possible Determinants (*by probit predictions*)	**CL**	**HL**
Participation in WFCL awareness programme	N.E.	N.E.
Adult farmer responsible of child is married	N.E.	N.E.
Age of adult farmer responsible	N.E.	N.E.
Years of schooling of adult farmer responsible	negative	N.E.
Child age	positive	negative
Child is Male	N.E.	N.E.
The child is born in the village	N.E.	negative
Tiring task carried out during harvest season	positive	N.E.
Medium yields relative to low yields	N.E.	negative
High yields relative to low yields	N.E.	N.E.
Past yields	N.E.	N.E.
Number of cocoa farms owned	N.E.	N.E.
Walking distance to school by age group (minutes)	N.E.	N.E.
Share (%) of hired labour	N.E.	N.E.

Legend: *HL is Hazardous child labour; CL is Child Labour; N.E. No significant Effect.* ***Source:*** *children's and adult's questionnaires, Côte d'Ivoire*

Similar to the Ghana study, a separate regression model was run to understand whether the land size for cocoa cultivation has a significant and independent impact in explaining the incidence of child labour (non-hazardous) and hazardous child labour[49]. Due to the relationship between land size and yields, yield was omitted as a variable (which was not the case for Table 4.20 where yield was a variable)). The findings show that land size is not statistically significant in the child labour probit regression and it does not change any of the determinants listed above. However, land size is significant in the hazardous child labour regression. Farmers with higher cocoa land acreage are more likely to put children to work on hazardous activities, other things being equal. It is important to note, that the variable measuring the number of cocoa farms the farmers is owner of (which can be considered a proxy of wealth) is positively correlated with the hazardous child labour variable. This supports evidence from other studies, which suggest that there is a positive relationship between land wealth and hazardous child labour.

[48] The equivalent table for Ghana is table 3.18

[49] The relevant table is available upon request from ICI

5. Study conclusions and implications

Much of cocoa production in Ghana and Côte d'Ivoire, the top two world producers of beans, relies on smallholder farming and tends to be labour intensive. While producers use a combination of family, hired and communal labour for cocoa cultivation, household members - both adults and children of smallholder cocoa farmers have traditionally been the main source of labour input to the farm.

For this reason, the many public and private initiatives that are run in both countries to boost and sustain land productivity (yields) and cocoa supply from these countries have led experts and civil society organisations to raise concerns that the higher pressure to raise yields may push smallholders – who are historically cash constrained – to use more family labour, possibly more child labour, or involve a greater proportion of children in hazardous activities.

The International Cocoa Initiative has commissioned this research study in both Ghana and Côte d'Ivoire to better understand the context and potential reality of these yield enhancing initiatives and their impact on the risk of child labour incidence, as no adequate evidence exists so far to measure and assess the extent of this problem.

This study has attempted to fill this important research and evidence gap by examining four research questions: (1) what are the conditions that determine the demand of adult labour and children's work? What are the key features of the labour supply for cocoa in the village? (2) What production technologies are being implemented to increase land productivity, and what implication does this have on the labour demand? (3) To what extent are higher yields associated with higher labour demand? To what extent may incomes derived from improved cocoa productivity respond to the labour demand? (4) Is there evidence of higher hazardous child labour or child labour occurring where programmes exist to increase cocoa yields? What factors are associated with a higher risk of incidence of hazardous and child labour?

This section summarizes the key findings from the rich body of evidence generated from the two country case studies to inform the four research questions above. It also offers a number of policy recommendations on possible actions that can be taken by different actors in the cocoa industry to mitigate the risk of child labour potentially arising from increases in land productivity.

Key findings

1. *What are the conditions that determine the demand of adult labour and children's work? What are the key features of the labour supply for cocoa in the village?*

In both countries household labour remains a vital input for cocoa production, counting as a major component of total labour use. There are differences in the observed patterns of household labour used, since in Côte d'Ivoire women's and children's work contribute respectively 12.5% and 5% of total household work, implying that most household work on cocoa

is undertaken by adult men[50]. In Ghana, instead, women's work is the most frequently used type of family labour (39%), and children represent roughly one third of total household labour used in cocoa farms (32%). Survey data also suggests that in Ghana children under 15 years old put in more working days on cocoa than children aged 15 to 17.

Labour affordability for cocoa is a major constraint for farmers, which is particularly pronounced in Ghana more so than in Côte d'Ivoire. In Ghana, the average daily wage in the villages surveyed, at almost GH¢20 (US$ 5) is nearly three times higher than the current national minimum daily wage at GH¢7 (US$ 1.75). In Côte d'Ivoire on the other hand, average daily wages hover between F CFA 2000 and 3000 (US$4 to 6), which is equal to or just below the official national minimum wage (F CFA 3000) established by the government but also above the minimum agricultural wage in rural areas (F CFA 2000). Nonetheless, 44% of the respondents in Côte d'Ivoire stated that labour in the village – over half of which is indigenous and a third of which is from neighbouring countries – is still considered to be too expensive. This suggest that while hiring labour is common among cocoa farmers, both qualitative and quantitative data suggest that hiring labour is expensive for farmers (particularly in Ghana).

The high cost of paid labour in Ghana is also exacerbated by the shortage in the supply of young labourers available for cocoa farming. Young people in the village have either other aspirations than working on cocoa and wish to invest in further education, would rather work as paid labourers on other farms rather than for free on their own household's cocoa farm, or would rather work or on other non-cocoa livelihoods. The problem of adult labour availability is also obvious in some districts in Côte d'Ivoire (Daloa, Soubré), but in other cocoa areas (Abengourou and Divo especially) the influx of migrant workers from other parts of the country or other countries has helped maintain a more regular labour supply. According to the findings from the quantitative data, 14% of cocoa farm managers in Ghana and 15% of cocoa farm managers in Côte d'Ivoire responded that unavailability of adult labourers for cocoa is the main constraint to their not hiring additional labour for their farms. This suggests that the main barrier for farmers from hiring additional adult labour is due to the affordability rather than availability.

When comparing cocoa farmers according to their labour hiring behaviour, we found the following patterns: in Côte d'Ivoire farmers who hire both daily and contract labour have the highest level of cocoa production, manage the largest landholdings, have the highest yields, and gain the highest gross margins per hectare relative to farmers who hire either only one type of paid labour or no labour at all. This is a particularly striking finding, given a wage bill per hectare of F CFA 300,000 F CFA (about US$ 600).

In Ghana, total cocoa production is found to be higher for farmers using both types of paid labour (daily and contract), and lower for farmers not using any hired labour at all. On the other hand, and contrary to the findings in Côte d'Ivoire, yields are higher for farmers cultivating smaller landholdings and not using any hired labour. Gross cocoa profits, defined as revenues from cocoa

[50] According to key stakeholders and other research, the 12.5% of women's contribution to the total household working days (adults and children) appears to be low. While this is what the data collected under this study purports, there may have been underreporting of women's work days or an over-reporting of men's work days by respondents (95% of respondents were male cocoa farm managers). Further research should be done to examine this aspect.

sales net of labour and chemical costs, are also found to be higher – both in absolute terms and per unit of land (ha) – for farmers not hiring any labour. These differences partly reflect the evidence that the availability and affordability of hired labour are more constrained among the surveyed farmers in Ghana than in Côte d'Ivoire.

The research obtained a more nuanced picture of labour demand patterns with regards to gender. In Côte d'Ivoire, where the proportion of women sampled was very small (5% of total sample) women farm managers (several among whom are widowed or divorced in our sample) employ fewer household labour days than men farmers, but employ significantly more hired labour days: about 2.5 times as much contract labour than men, and more than three times daily waged labour. Almost half of the men farmers surveyed did not hire any paid labour.

In Ghana, women cocoa farmers were found to be hit by the high costs of paid labour and by the shortage of youth labour from within the household more than men cocoa farmers. Many women farmers stated during the focus group discussion sessions that they are not able to afford paid workers, with quantitative data showing they use significantly more work days from children under the age of 15. This finding was coherent with the reality that in Ghana men cocoa farmers often have higher control than women on the work of older children in the household, while younger children – who are less productive – are typically left to help on women's cocoa farms, especially when women manage smaller landholdings.

In both Ghana and Côte d'Ivoire, less labour days are used per hectare as the land size increases (both for household and hired labour), indicating a potential labour constraint for farmers with larger landholdings. At the top land quartile (≥3.49 ha) in Ghana, household labour days per hectare (including children's work days) is 16.63 days compared to 109 household cocoa labour days observed at the bottom land quartile (≤1.7 ha); and the quantities of daily waged labour per hectare in the top land quartile (33 days) are less than a third as those employed on the smallest cocoa farms (105.5 days). Similarly, in Côte d'Ivoire, in the top land quartile (>5.9 ha), the 11.44 household cocoa labour days per hectare (including children's work), is less than one fourth of what it is in the bottom land quartile (<1.7 ha, 47.58 days); and the quantities of hired labour days per hectare in the top land quartile are less than half as those employed on the smallest cocoa farms.

2. *What production technologies are being implemented to increase land productivity, and what implication does this have on the labour demand?*

In order to categorise production technologies currently implemented in Côte d'Ivoire and Ghana, the researcher adapted an analytical framework introduced by the Cocoa Research Institute of Ghana and based on an engineering approach that generates potential yield ranges building up from the calculation of the costs involved in cocoa production process. This approach enables to group cocoa farmers in each country into the following three categories: 1. low yield farmers, using traditional production methods, and very low input levels; 2. medium yield farmers, who carry out improved maintenance of their cocoa farms with medium input levels; and 3. high yield farmers (exceptionally low in numbers in both countries), who use high input

levels and for whom the potential high level productivity has typically been seen on experimental farms.
The first point to notice, is that based on simple data descriptive statistics from both countries, is the persistence of an inverse relationship between yields (land productivity) and size of landholdings: higher yields are found on smaller landholdings, a result that suggests the existence of scale inefficiency in cocoa farming. If it is smallholders who have higher yields, this implies that, as land size increases, farmers are unable to reduce their unit production costs and to allocate labour and non-labour inputs efficiently.

Using this production technology framework, we looked at patterns of labour use per unit of land across the three categories of farmers. In Ghana, total labour input per hectare (i.e. combining paid and household labour) nearly doubles between low yield and high yield range farmers, although the proportion of each type of labour used is the same in all three yield categories; in each of the three yield range groups we find that hired paid labour is double the adult household labour, and children worked days represents about a third (33 %) of total household labour days. In Côte d'Ivoire, total labour use also increases from low to medium to high yield ranging farmers, but less dramatically than in Ghana. The use of hired labour per hectare increases by 26% from low to medium and from medium to high yield farmers, but household labour increases by less, and by only 2% from medium to high yield farmers. Moreover, although there is an increase in the use of children's work-days in correspondence to higher yield levels, the share of child work-days in total household labour remains fairly constant across the three yield range levels, representing 5% of total household labour use among low yield farmers, and 6.6% of total household labour use among high yield farmers.

There is however a change in the type of cocoa tasks carried out by children in different yield range groups; for example in Côte d'Ivoire weeding and carrying water for spraying are much more frequently observed among high yield farmers relative to low and medium yield farmers; whereas spraying chemicals (although the reported incidence of the latter is very low) is more common among low yield farmers. In Ghana, the number of child days employed on pod plucking/heaping/breaking, weeding, carrying water for spraying the farm, and carting cocoa beans from the farm to the household is double among high yield level farmers relative to low yield farmers.

3. *To what extent are higher yields associated with higher labour demand? To what extent may incomes derived from improved cocoa productivity respond to the labour demand?*

The relationship between yields and labour demand is difficult to disentangle when using cross section data of the type collected for this study. For this reason, and bearing in mind the methodological caveats that follow from least square estimates of datasets of one time period, the approach adopted here has been two pronged. The research first estimated a Cobb-Douglas production function using yields as the dependent variable to evaluate qualitatively the marginal effect of different types of labour on land productivity. The study then estimated different models of household labour demand on past yields and other labour demand related predictors.

The country level results of this exercise do not differ qualitatively from one another: 1. yields are not found to increase significantly as a result of a marginal increase in either household or hired labour use; 2. On the other hand, the higher the recalled yields from the past (2012 in Ghana and 2010 in Côte d'Ivoire) the higher the demand on household adult labour. The only country specific difference emerging from the estimates of these labour demand models is the significant effect of past yields on child work demand in Ghana, for which no corresponding evidence was found in the Côte d'Ivoire data.

Moreover, we found compelling evidence in both countries that cocoa gross margins – the proxy measure of cocoa income for this study – decrease with land size. This is not surprising given that wages are the most expensive component in total production costs; and that yields are smaller on larger landholdings. Finally, in Ghana the study found that higher net income from cocoa sales has virtually no impact on the demand for household labour, both adult and children's.

4. *Is there evidence of higher hazardous child labour or non-hazardous child labour occurring where programmes exist to increase cocoa yields? What factors are associated with a higher risk of incidence of hazardous and child labour?*

Given the international importance of cocoa production in Côte d'Ivoire and Ghana, a number of private and public initiatives are rolled out in each country to promote and sustain yield increases. To establish whether these programme have had the intended effect on yields, and whether in turn this has put pressure on cocoa farming households' use of child work in non-permissible or hazardous tasks, each country case study has focused on those few programmes that the majority of surveyed farmers reported being part of and benefitting from. In addition, and given the main theme of this study, the research explored the link between programme participation, yields and child labour incidence for farmers exposed to awareness campaigns to raise community knowledge on the risks of engaging children in hazardous or age inappropriate farming tasks. It is important to note that since these results and findings are suggestive based on the data and a small sample of farmers participating in programmes, no generalizable conclusions should be made.

In Côte d'Ivoire, farmers who participate in either a public or private programme (Farmer field schools or the "Sustainable Cocoa Programme CDI") to raise yields or in a programme to sensitise communities against the Worst Forms of Child Labour (WFCL) experience significantly higher yields than non-programme participants. Furthermore, participants in either type of programme have a statistically significant lower incidence of child labour than non-participants – whereas no difference in the incidence of hazardous child labour was found between participants and non-participants to any of these programmes. Moreover, the qualitative data revealed that, although campaigns against child labour were considered to be useful, there were also admissions that poverty may induce parents to make children work rather than being idle, as children's help on the farm is part and parcel of a culture that values the contributions of work on the farm from a young age. When children are not in school, respondents stated they should spend time in the farm learning valuable skills.

In Ghana the findings around the impact of these programmes on yields were quite surprising. Here we considered three kind of programmes; 1) a "Spraying Initiative 2) a private "Sustainable Cocoa Programme GH" (SCP GH), which was initiated in 2012 and offered a package of incentives (material and in training) to boost and sustain production among participating farmers, and 3) a "Child labour Awareness Campaign" which covered all the villages in which the data collection took place, with the objective to improve the communities understanding of the risks of child labour and hazardous child labour. For each of these programmes we looked at farmers in different land quartiles to capture any difference in yields and CL/HL incidence by land size.

The farmers with the largest land-holdings (managing over 3.5 hectares) who said to be exposed and benefitting from awareness were found to employ significantly more child labour than farmers not exposed to these campaigns. Similarly, the farmers in the top land-quartile participating in the 'Sustainable Cocoa Programme' were found to employ significantly more hazardous child labour relative to those not participating to the programme. Finally, non-Sustainable Cocoa Programme farmers were found to employ a significantly higher share of hazardous child labour than SCP GH farmers. Interestingly, in none of these programmes was a significant difference in yields identified between programme members (or campaign beneficiaries) and their counterparts.

Qualitative information was used to further understand the higher incidence of both categories of child labour across larger farmers for some of these programmes. In Ghana most children help with almost all aspects of farm work: pod plucking, pod gathering, weeding, carting of beans to the house, insecticide spraying, and fetching of water to the farm. Children start helping with these tasks at quite a young age, even before turning 10 years old. Several children expressed finding some of these farming tasks tiring, specifically referring to heaping and plucking pods, weeding, insecticide spraying, and carting of fermented beans. Children also implicitly admitted to practices of child labour; when commenting on their drawing activities, some children (in 8 out of the 13 villages) admitted to skipping school at least once a week (normally on Fridays) to help on the farm, especially during the peak season when cocoa beans are due for drying. The quantitative data in Ghana also showed that nearly half of the sampled children engage in hazardous child labour, and a quarter of them belong to the child labour category.

No statistically significant difference was found in Ghana between land productivity outcomes (yields) across the two categories of child labour, although farmers in the low yield range (i.e. those producing on average up to 400 Kg of cocoa per hectare) were found to use significantly more of both categories of child labour. In Côte d'Ivoire farmers not using any non-hazardous child labour or hazardous child labour were found to have significantly higher land productivity (yields) than those employing child and hazardous child labour.

Finally, the last segment of the study estimated in each country the key determinants of child and hazardous child labour by means of probit regression models. In both countries, hazardous child labour was found to be more likely among older children. Otherwise in Côte d'Ivoire, the risk of child labour was higher during peak season, and lower among more educated farmers. In Ghana, the risk of child labour was found to be higher among men farmers and medium yield farmers.

The risk of hazardous child labour was found to be higher in Ghana among boys, among women cocoa farmers, among older farmers, during the peak harvest season, among low yield range farmers, and for those exposed for fewer years to campaigns against the WFCL. In Côte d'Ivoire instead, hazardous child labour risk was found to be higher among children who were not born in the village and those living with low yield range farmers.

What actions can be taken at the local and national level to mitigate the child labour risk while ensuring productivity gains are made?

Recommendations for Policies and Interventions

This study found that in both Ghana and Côte d'Ivoire there is no significant effect of higher yields on the risk of a higher incidence of child and hazardous child labour. This is an important finding, which, together with a number of other findings that emerged from the research, warrant the recommendations reported below.

Increasing yields in Ghana is found to increase children's work days (not categorised by permissible and non-permissible work), however this is not statistically significant in Côte d'Ivoire. When categorising children's work by hazardous tasks, in Ghana children aged 15-17 years spent more child work days applying chemicals/plant protection products on high yield farms as compared to children in the same age group living in low yield farmers' households. This result was statistically significant (although the number of children's work days for this age group is very low across yield levels). Household labour remains central to smallholder cocoa production, and children are expected to take part in some capacity on the family farm, especially when alternatives are lacking. The quantitative and qualitative findings also indicate an important gender dimension of labour use, with women farmers facing greater difficulties in accessing adult household and casual labour relative to men farmers.

The research also shows that although labour supply is available in cocoa communities, the high cost of waged labour (more so in Ghana, where the daily wage is nearly three times higher than the national minimum wage) represents a major affordability barrier, which prevents cash strapped farmers from hiring the optimal amount of paid labour.

When comparing farmers that have benefitted from programmes to either enhance cocoa productivity or reduce child labour, programme participants in Côte d'Ivoire were found to have statistically significant higher yields and lower incidence of child labour than non-programme participants. This was not the case in Ghana. While these findings are not suggestive of causal effects of programmes on child labour outcomes, they do suggest the existence of specific labour constraints for farmers who participate in programmes to increase yields and reduce child labour in Ghana.

Labour Market Interventions

The following action points were identified on the basis of the research findings.

Firstly, at the community level, communal and shared labour arrangements can be organised to meet the labour demand of high productivity farmers and address the labour constraints faced by women cocoa farm managers.

Secondly, the cocoa sector could also train and equip service providers that operate on a subsidised fee for service basis, both for spraying and also for other specific cocoa farming tasks. This could involve specialised groups of work for spraying, pruning, and pod breaking, amongst other areas. It would be particularly important to involve the youth (of an appropriate age for the specific tasks) in these professionalized labour service groups, so as to provide them with some form of employment as well as training and skills, and thus enhance their interest in cocoa farming and increase youth employment. This will also help to ease the demand for children's work days in specific hazardous tasks since this research has shown high vulnerability to hazardous child labour among older children.

Thirdly, affordable labour saving technologies, such as more efficient harvesting technologies and techniques, should be further explored by research institutions and cocoa companies, to examine how the labour demand for children's work days among high yield farmers, farmers with large or multiple-landholdings and farmers using child labour (both non-hazardous and hazardous) can be reduced without sacrificing productivity.

Finally, more comprehensive efforts should be undertaken by both the government and private companies to improve the functioning of the rural labour markets, so as to provide a secure and affordable local labour supply for small-holder farmers whilst boosting rural employment opportunities. For instance, the supply of migrant-labour for cocoa-farming in certain regions of Côte d'Ivoire appears to have relaxed the labour constraint for some farmers. The governments/cocoa marketing companies' provision of an organised and trained labour force in Ghana during the peak harvest season could have a similar effect. Other useful interventions to benefit high productivity and farmers with large land-holdings could include leveraging information technology, including radio and phone text messages, to increase the sharing or publishing of data on prevailing wage rates for skilled and semi-skilled labour; as well as of information on the labour availability at the community and district levels, particularly in communities where there are sometimes shortages of adult labour.

Non-Labour Market Interventions

The study has shed light on a number of other factors that carry a high risk of child labour (non-hazardous) and hazardous child labour in cocoa. Older children (both countries), boys (Ghana), being born outside of the village (Côte d'Ivoire), the timing of the peak harvest season, as well as the farmer's age, educational level (Côte d'Ivoire) and gender (Ghana) are all characteristics associated with a higher incidence of child labour. The identification of such risk factors should be used to develop specific messages and targeted interventions.

Firstly, improving coverage of existing interventions that increase access to additional income generating activities and access to credit for farmers requiring the additional hired labour (e.g. older farmers, farmers living with disabilities, women farmers) is recommended. Relaxing constraints on the side of labour affordability would also be valuable for low yield farmers who are particularly vulnerable to the high cost of paid labour and who by survey data count 52% of the entire sample in Ghana and 41% in Côte d'Ivoire.

Secondly, improving access to post-primary school education, apprenticeships and vocational training for youth in both countries, coupled with targeted awareness raising on the dangers of hazardous child labour amongst older children, could potentially reduce the hazardous child labour rate observed in this age group.

Thirdly, farmer and household characteristics that may increase the risk of children's engagement in child labour (non-hazardous) and hazardous child labour should be considered in the criteria for targeting of social protection interventions. More specifically, households with a greater risk of children's engagement in child labour (non-hazardous) and hazardous child labour in cocoa-growing communities should be covered by social protection programmes which aim to benefit older farmers, female farmers and those with children for instance. In addition, awareness raising campaigns should be better targeted to those most at risk (older farmers, older children, farmers with lower education levels) and during key child labour risk periods (peak harvest season) in order to increase effectiveness of these campaigns. As a result of the high incidence of older children engaged in hazardous application of plant protection products in Ghana amongst high yield farmers, additional trainings on the dangers and regulations should be delivered to those selling agricultural plant protection products, adult farmers and children aged 14-17 engaged in cocoa farming.

Recommendations for Further Research

One of the initial intentions of this study was to evaluate the impact of selected sustainability programmes in each country by revisiting farmers for which baseline data existed in order to understand the yield changes observed over time for the same set of farmers, assess their measurable effect on farmers' incomes, their family labour choices, and in particular, their use of child labour resulting from potential higher yields. This was not possible due to issues with land measurement in Ghana and the inability to locate many of the farmers in Côte d'Ivoire for whom 2010 baseline data was available. As a result of this study, there is now baseline information for farmers participating in yield-enhancing programmes. It is recommended that additional research and an impact evaluation be conducted against this baseline data to further understand the causal effects of programme participation to increase yields, on yields, child labour and hazardous child labour.

Further research into the child labour and hazardous child labour risk for children of sharecroppers in the context of increasing productivity is also recommended. The research study examined the situation of sharecropping to some extent, through the focus group discussions in both countries and the Ghana Living Standards Survey 6 (2013) data however, due to the focus on cocoa farm managers the study did not go into detail. This question would require a research

focus on its own right to understand whether other labour arrangements exist and are viable at scale to reduce the need for farmers to use child labour and hazardous child labour.

References

Abankwah, V., Aidoo, R. and Osei, R.K. (2010) "Socio-economic impact of government spraying programme on cocoa farms in Ghana" in the *Journal of Sustainable Development in Africa*, vol.12, no.4, pp.116-126

Adu-Ampomah, Y. (2013) "Overview of Cocoa Research Institute of Ghana's Cocoa Research Programs", *World Cocoa Foundation*, Presentation.

Agbenyega, O. and Gockowski, J. (2002) *Labour practices in the cocoa sector of Ghana with a special focus on the role of children: Findings from a 2001 survey of cocoa producing households*. Report submitted to International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria.

Anyidoho, W.A., Leavy, J., Asenso-Okyere, K. (2012) *Perceptions and aspirations: a case study of young people in Ghana's cocoa sector*. Sussex: IDS Bulletin, Vol.43, No.6

Asenso-Okyere, K., Sarpong, D.B., Okyere, C.Y., Mensah-Bonsu, A. & Asuming-Brempong, S. (2013) "Modelling the Determinants of Farmers' Decision on Exclusive Schooling and Child Labour in the Cocoa Sector of Ghana" in *Global Journal of Human Social Science Economics*, Vol. 13 Issue 3

Berlan, A. (2014) *ICI Labour Market Research Study: Literature Review* Background Paper, Geneva: International Cocoa Institute.

Besley, T. (1995) "Property Rights and Investment Incentives: Theory and Evidence from Ghana". *Journal of Political Economy*, 103:5, pp. 903-37.

Barrientos, S., Asenso-Okyere, K., Asuming-Brempong, S., Sarpong, D., Akua Anyidoho, N., Kaplinsky, R. and Leavy, J. (2007) *Mapping Sustainable Production in Ghanaian Cocoa*. London: Cadbury.

Boyden, J. and J. Ennew (1997), *Children in Focus: A Manual for Participatory Research with Children*, Radda Barnen Save the Children, Sweden.

Buono, Clarisse (2010), *Vie quotidienne, normes sociales et travail des enfants dans les communautés productrices de cacao (Côte d'Ivoire)*. Geneva: International Cocoa Initiative.

Eliot, S. and Associates (2012) *Using Excel to Organize Qualitative Data for Analysis*, Qualitative Researcher website [online, accessed February 15, 2015] http://www.qualitative-researcher.com/wp-content/uploads/2013/02/UsingExceltoOrganizeCodeQualData.pdf

Gockowski, J., Asamoah, C., David S., Gyamfi, I., and Kumi, M. A. (2010) "An Evaluation of Farmer Field School Induced Changes in Ghanaian Cocoa Production" in the *Journal of International Agricultural and Extension Education*, Vol.17, No.3, pp.43-56

Hütz-Adams, F. and Fountain, A.C. (2012) *Cocoa Barometer* 2012.

INS (2014) *Enquete nationale sur la situation de l'emploi et du travail des enfants (ENSETE 2013). Rapport descriptif sur le travail des enfants (rapport final)*. Abidjan: Ministere d'Etat, Ministere du Plan et du Developpement

IPEC (2007) *Rooting out child labour from cocoa farms*. Paper No. 2: Safety and Health Hazards. Geneva: International Labour Office

MARS, 2012. (*website consulted in July 2014*)

Nederhof, A. J. (1985) "Methods of coping with social desirability bias: A review", *European Journal of Social Psychology*, 15, 263-280.

Nkamleu, G.B. & Kielland, A. (2006) "Modelling farmers' decisions on child labour and schooling in the cocoa sector: a multinomial logit analysis in Côte d'Ivoire" in *Agricultural Economics*, vol. 35, p. 319-333

Robertson, A. F. (1987) *The dynamics of productive relationships: African share contracts in comparative perspective*. Cambridge: Cambridge University Press.

Sjaastad, Espen and Daniel W. Bromley (1997) "Indigenous land rights in sub-Saharan Africa: appropriation, security and investment demand" *World Development*, 25, pp. 549-62.

Takane, Tsutomu (2002) *The cocoa farmers of Southern Ghana: incentives, institutions, and change in rural West Africa*. Chiba: Institute of Developing Economies Japan External Trade Organization.

Tulane (2010) *Fourth Annual Report: Oversight of Public and Private Initiatives to Eliminate the Worst Forms of Child Labour in the Cocoa Sector in Côte d'Ivoire and Ghana*. September 2010.

Tulane (2009) *Third Annual Report: Oversight of Public and Private Initiatives to Eliminate the Worst Forms of Child Labour in the Cocoa Sector in Côte d'Ivoire and Ghana*. October 2009.

Tulane University (2015) *Final Report 2013/14: Survey Research on Child Labour in West African Cocoa Growing Areas*, School of Public health and Tropical Medicine. Tulane University.

Vigneri, M. (2005) *Trade Liberalisation and Agricultural Performance: Micro and Macro Evidence on Cash Crop Production in Sub-Saharan Africa*. DPhil thesis. Oxford: Oxford University.

Appendix 1. Challenges in building a panel of revisited cocoa farmers

One of the initial intentions of this study was to evaluate the impact of a private programme in each country, which will be referred to in both instances as the "Sustainable Cocoa Programme" (SCP). The rationale for building a panel was to measure with exact precision the yield changes observed over time for the same set of farmers, particularly for a subsample of farmers who participated in private programmes to increase and sustain yields. The objective was to assess their measurable effect on farmers' incomes, their family labour choices, and in particular, their use of child labour resulting from higher yields

Ghana

In Ghana we were able to successfully include in our sample 299 farmers who had joined the 'Sustainable Cocoa programme GH' in 2012. However, even if it was possible to revisit all the targeted farmers for this exercise, it was subsequently realised that we did not have in hand a *working* panel. As illustrated in Table A1.1, there were significant and irreconcilable differences in the reported size of land between baseline and end line.

Reported difference in production (rising on average) and land size (decreasing on average) led us to conclude that information on these key variables had not measured consistently over time, making impossible a meaningful comparison in the panel data the research attempted to collate. Changes in yields (land productivity) between the two points in time, both at the district level and in the aggregate, seem thus to be mainly driven by measurement error in the land variable. This was an unfortunate outcome that highlighted the critical need to ensure that baseline data is collected as accurately as possible if it is to be used for research undertakings such as this, trying to effectively measure causal effects and interventions' impact over time.

For the present analysis it was therefore decided to use only the cross sectional data from the 2014 survey collected for this study. Short of the possibility to conduct a rigorous impact analysis, the study compares outcomes (in terms of both yields and child labour) between participants to the *Sustainable Cocoa Farming Programme GH* and all other farmers sampled (who were not reached by the programme at the time of the survey, and resided out of the Boako district.

TABLE A1.1. Ghana: Collating baseline and endline data from the 'Sustainable Cocoa Programme'

Village	N obs	Age		Hectares under cocoa		% Using fertilizer		Kg. Cocoa		Yield	
		2011	2013	2011	2013	2011	2013	2011	2013	2011	2013
Kantankrobo	17	56.53	55.65	1	1.62	0.94	0.12	1,960.00	1,621.32	1,842.29	1,029.17
Aboagyekrom	27	42.38	42.07	1.34	3.24	0.96	0.52	-	1709.52	-	308.75
Okwabena	16	54	49.81	1.22	3.64	1	0.31	1,584.00	1,978.52	952.99	409.69
Asarekrom	20	51.3	50.15	1.27	2.63	1	0.25	1,222.40	1,035.94	976.27	279.06
Abrabra	32	43.25	44.31	1.47	3.24	1	0.5	1,276.00	1,101.56	578.65	273.37
Kankyiabo	8	40	41.13	1.91	2.73	1	0.13	1,032.00	921.88	439.92	366.15
Asafo	25	46.36	47.84	1.38	4.05	0.88	0.24	1,582.08	2,265.00	817.02	402.31
Afrimkrom	37	44	44.08	0.83	2.63	0.95	0.11	1,644.44	984.29	1,869.53	274.44
Suiano	11	38.27	45.27	1.2	3.44	0.91	0	1,320.73	920.45	1,116.78	272.43
Pewodie	27	45.19	46.04	2.04	4.45	0.67	0.15	1,590.52	1,337.13	479.99	257.29
Boako	44	48.64	49.89	1.17	3.24	0.95	0.34	1,394.61	1,012.07	1,020.90	180.86
Punikrom	35	47.76	49.17	1.15	2.83	1	0.23	1,678.63	1,448.21	792.92	308.75
Total	299	46.62	47.2	1.3	3.24	0.94	0.27	1,506.26	1,348.53	848.98	289.45

Source: *'Sustainable Cocoa programme' data, and 2014 ICI data, Ghana.*

Côte d'Ivoire

In Côte d'Ivoire, the national team identified in the 'Sustainable Cocoa Programme CDI' Survey a potentially useful baseline survey to build a panel data set. That survey was administered to 967 farmers (between the age of 18 and 55, and managing a cocoa farm of at least one hectare) from 64 villages from all departments and regions in Côte d'Ivoire. The present study set out to re-survey 299 farmers (about 1/3 of the sample size), who were part of the Sustainable Cocoa Programme CDI. Upon consultation with the local research teams, 17 (out of the 26 in total) villages were selected with the knowledge that a sub-set of farmers in them had been previously reached by the programme and surveyed in 2010/11.

Unfortunately, the size of the revisit sample panel was much smaller than expected. First of all, only 204 farmers could be tracked from the previous 2010 survey, due to a high attrition rate and potentially also due to the population movements following the crisis. Moreover, only 24 farmers were found to be part of the programme both in 2010 and 2014 (Table A1.2).

The small size of the farmer panel can be attributed to two reasons. First, the baseline survey took place in 64 villages spread throughout the entire country. Given the limited time and resources devoted to the present study, the national research team could only visit four departments and 26 villages, thus reducing sensibly the chance of tracking farmers from 2010. In addition, even after zooming on this smaller set of villages, it turned out that many farmers interviewed in 2010/11 were not available in 2014, so other farmers in the same villages (who did not participate in the 'Sustainable Cocoa programme CDI') were interviewed instead. Second, far more farmers than expected who were initially reached by the programme in 2010 no longer appeared to be part of the programme in 2014 (or at least they did not view themselves as such).

A comparison of the main characteristics of the revisited farmers shows that 'SCP CDI' and non-'SCP CDI' farmers had many similar characteristics, except that the 'SCP' farmers had on average seven two additional years of schooling relative to non-'SCP' farmers. Programme participants also cultivate larger landholdings, and live in slightly smaller households (see Table A1.2). Some of the farmers who were in the non-SCP CDI group in 2014 may have benefitted from some of the SCP CDI training activities in the past. However, methodologically speaking, they could not be considered as programme participants for the purpose of a rigorous impact evaluation. Moreover, the contours of the programme did not seem to be rigidly defined in order to exclude the possibility of spillover effects on non-SCP farmers, who could have been reached by some programme messages through their contacts with SCP farmers (see Table A1.3).

Given the small sample size, and the reasons explained above it was decided to forego any panel level data analysis. The Côte d'Ivoire case study was therefore also prepared using the 2014 cross-section data, including 904 cocoa farm managers and 330 children.

TABLE A1.2. Côte d'Ivoire: Collating baseline and endline data from the 'Sustainable Cocoa Programme'

Indicators in 2014	Total		SCP farmers in 2010		Non SCP farmers in 2010		Means test
Sample size	204		24		180		
	N	**%**	**N**	**%**	**N**	**%**	
Female respondent	21	10.29	2	8.33	19	10.56	
Owns at least one farm	204	100.00	24	100.00	180	100.00	
Marital status							
Not married	17	8.54	2	8.33	15	8.57	
Married	166	83.42	20	83.33	146	83.43	
Widow/er	8	4.02	1	4.17	7	4.00	
Separated/Divorced	8	4.02	1	4.17	7	4.00	
	Mean	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**P-value**
Age	46.86	10.74	46.96	10.20	46.85	10.84	0.963
Years of schooling	4.68	4.10	7.00	4.90	4.61	4.06	0.159
Total size cocoa farms (ha, self report)	5.09	7.15	7.09	5.08	4.82	7.36	0.145
Total size cocoa farms (ha, GPS)	4.28	6.02	5.97	4.28	4.06	6.19	0.145
Household size	6.13	2.50	5.38	2.22	6.23	2.53	0.117
Number of adults in HH	3.56	1.76	3.08	1.44	3.62	1.79	0.159
Number of children in HH	2.57	1.93	2.29	1.81	2.61	1.94	0.455

Source: *"Sustainable Cocoa Programme CDI" 2010/11 and ICI 2014 (Farm Manager questionnaire) data, Côte d'Ivoire*

Table A1.3

Côte d'Ivoire Farmers who participated or benefitted from programme to increase cocoa yields, by village

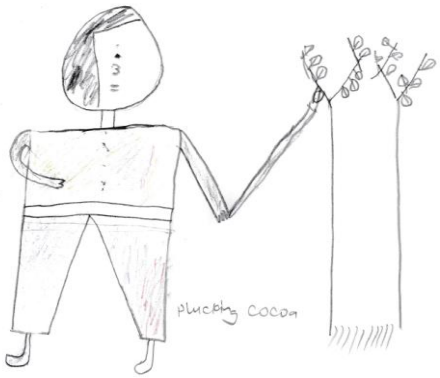
District/Village	Neither	Participated	Benefited	Total
Abengourou	**95**	**106**	**3**	**204**
Ettienkro	8	2	0	10
Améakro	10	8	0	18
Abronamoué	14	20	1	35
Ebilassokro	40	42	0	82
Apprompom	8	16	0	24
Kouaméziankro	15	18	2	35
Divo	**326**	**39**	**17**	**382**
Yobouékoffikro	0	1	0	1
Groh2	1	5	1	7
Wawapeko	36	4	0	40
Gbagbam	289	11	4	304
Douaville	0	13	8	21
Babokon-Dida	0	4	3	7
Awalezo	0	1	1	2
Daloa	**66**	**17**	**9**	**92**
Nigbeigbeue	6	2	1	9
Guetouzon1	4	1	6	11
Niouboua	8	3	0	11
Luenoufla	12	0	0	12
Brizeboua	11	8	0	19
Krikoréa1	7	2	2	11
Guédéguhé	18	1	0	19
Soubré	**47**	**40**	**0**	**87**
Zogbodoua	0	24	0	24
Kagninako	47	7	0	54
Grebouo2	0	9	0	9
Buyo	**80**	**53**	**6**	**139**
Gbatina	0	4	3	7
Gliglo1	77	24	3	104
Dapéoua	3	25	0	28
Total for SCP villages	**111**	**170**	**23**	**304**
Grand Total	**614**	**255**	**122**	**904**

Appendix 2. Sample of children's drawings

GHANA

Weeding in Nyinahin:

Plucking cocoa in Nyinahin (left) and Bosomoiso (right):



Children's activities in Kyebi:

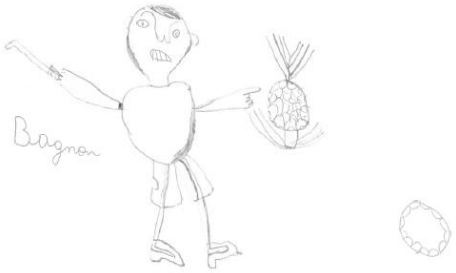
Children's activities in Ekutuase:

Children's activities in Nkatiekrom:

CÔTE D'IVOIRE

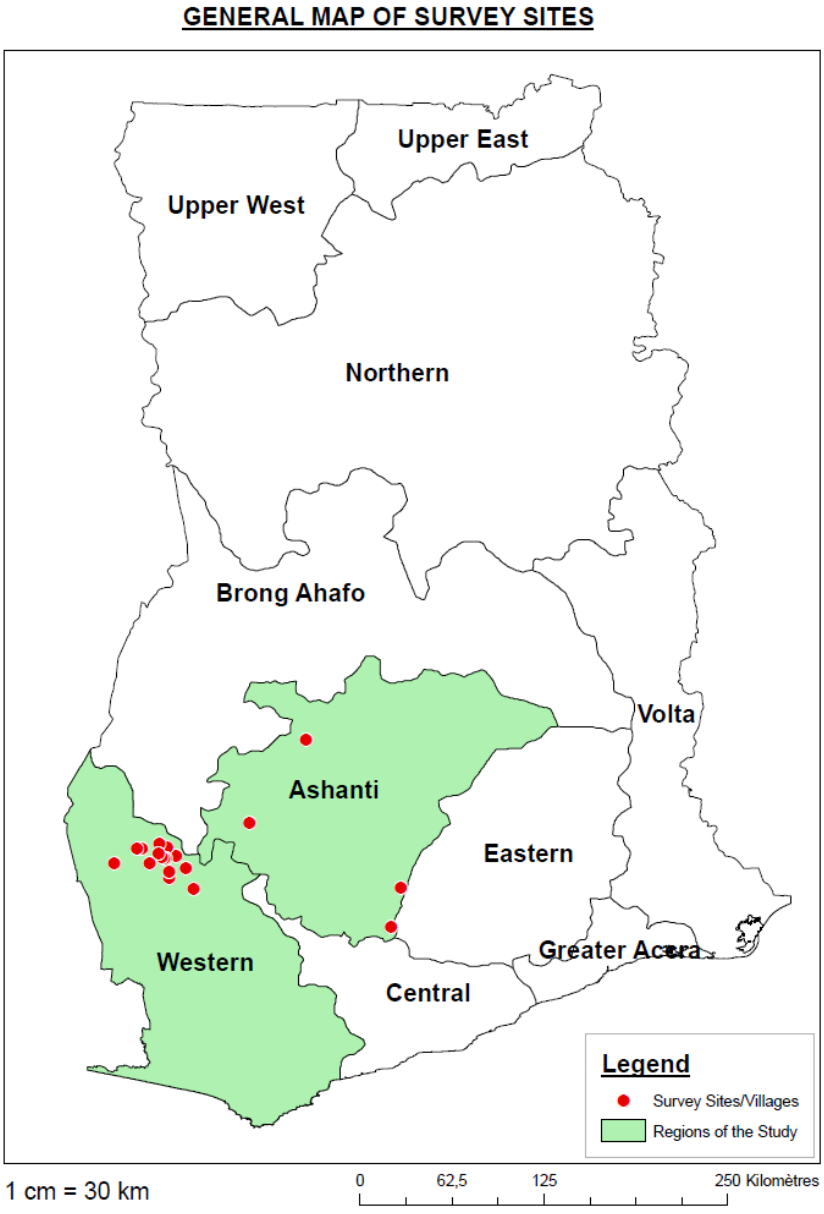
Kagninanko

Grebouo

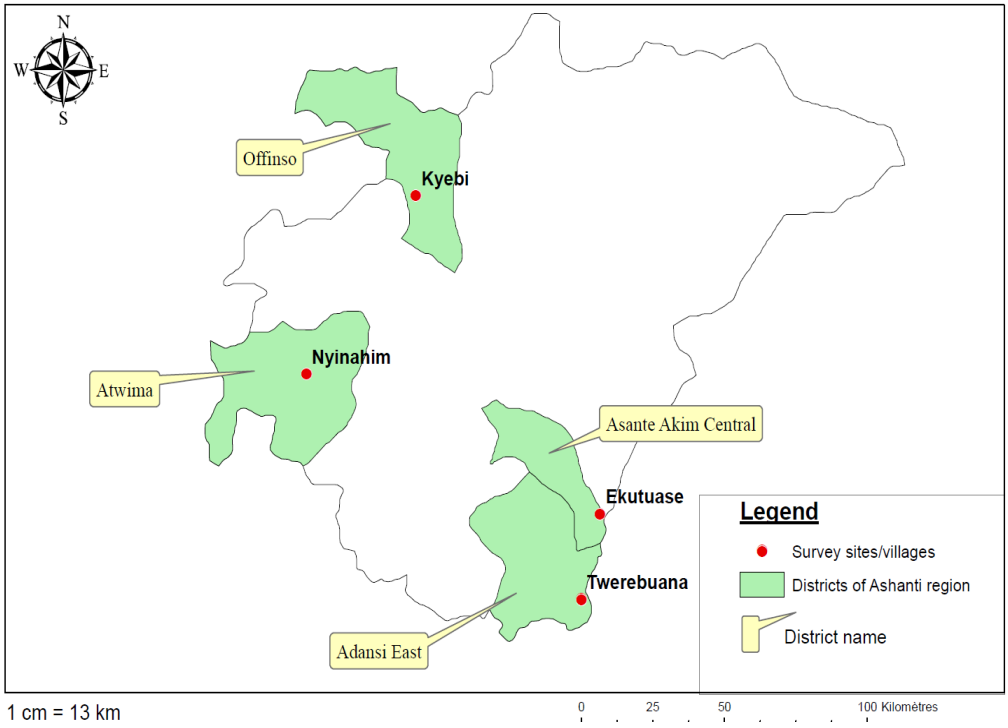


Appendix 3. Maps of Survey Sites

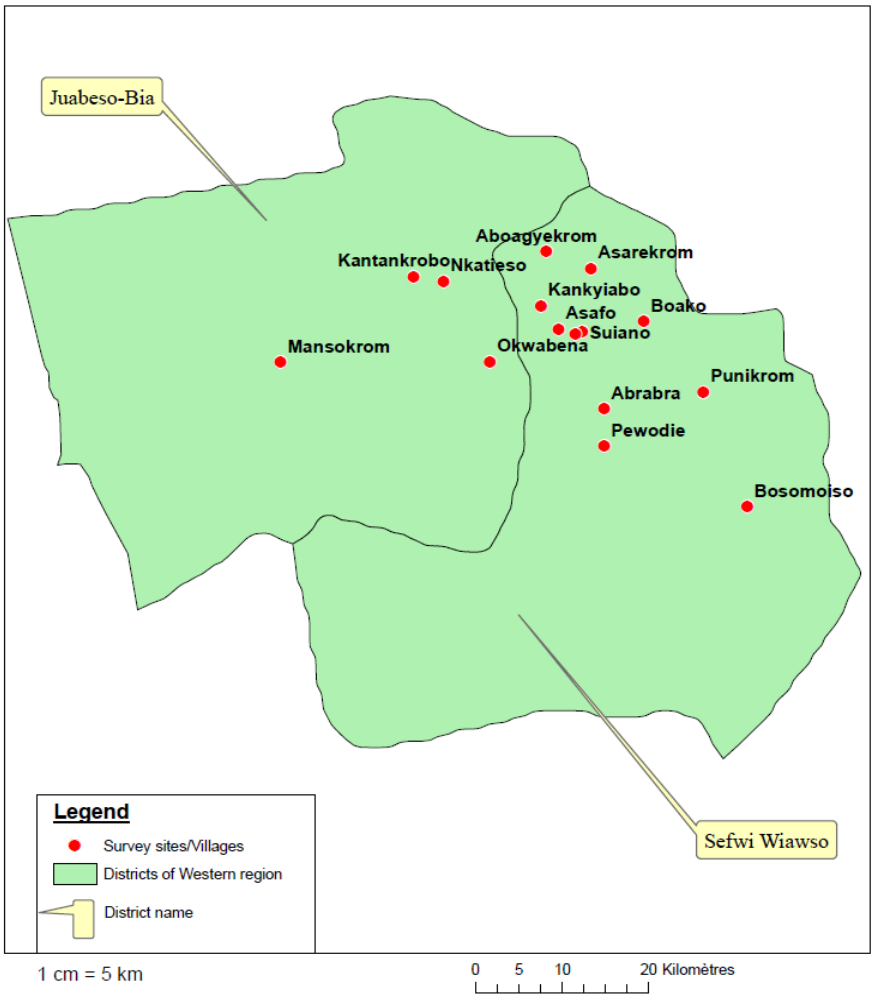
GHANA



ASHANTI REGION SITES

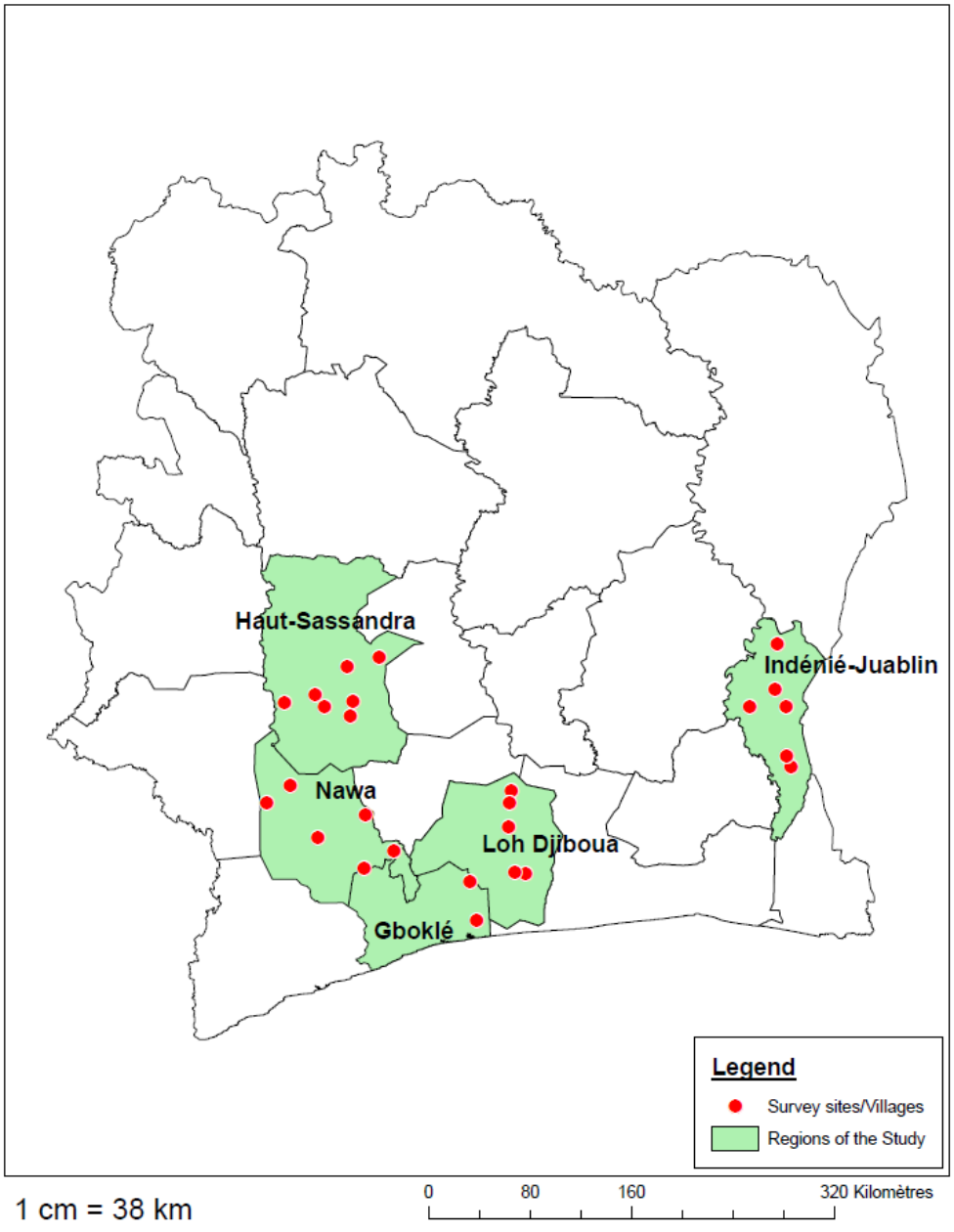


WESTERN SITES

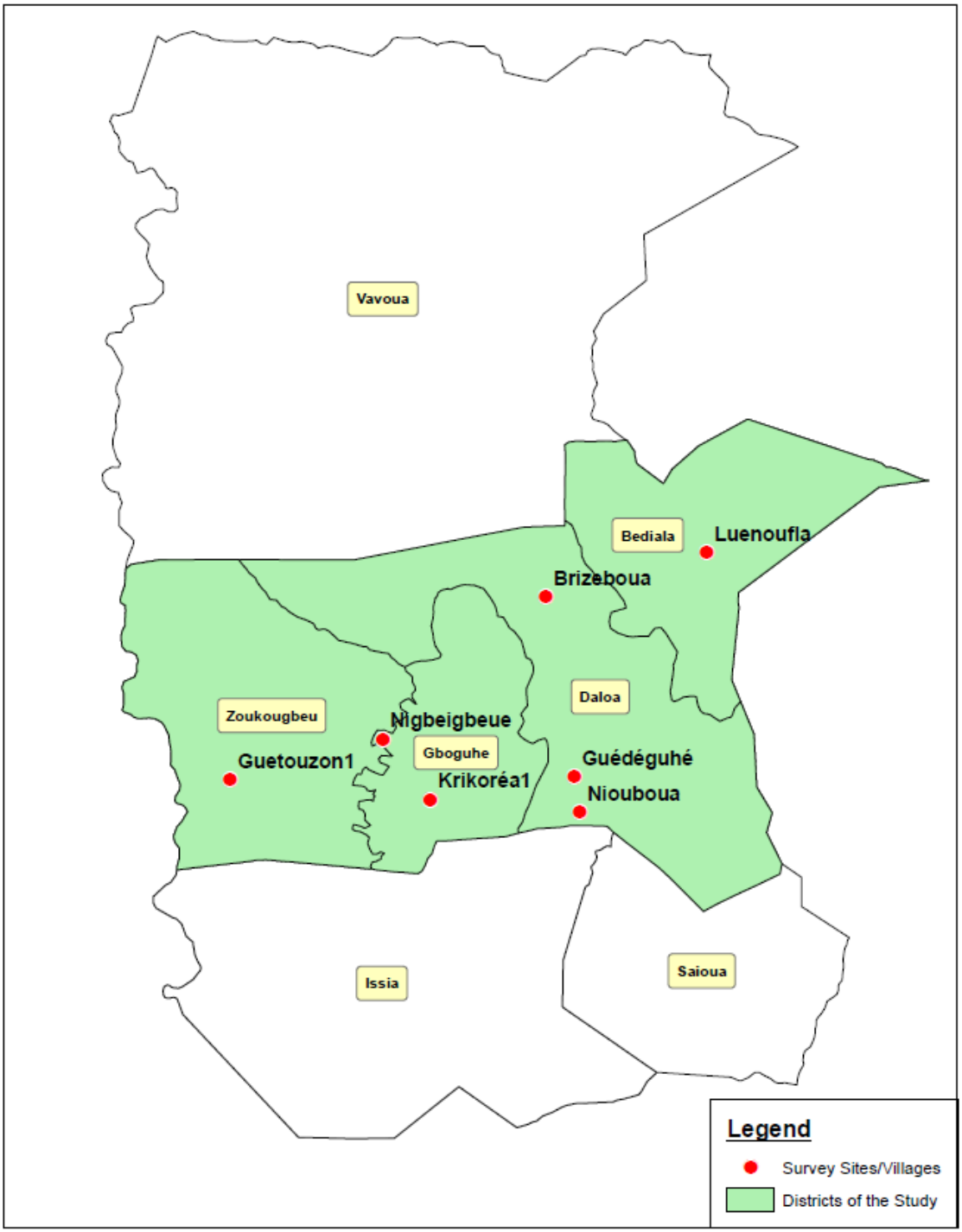


CÔTE D'IVOIRE

GENERAL MAP OF SURVEY SITES



HAUT-SASSANDRA SITES

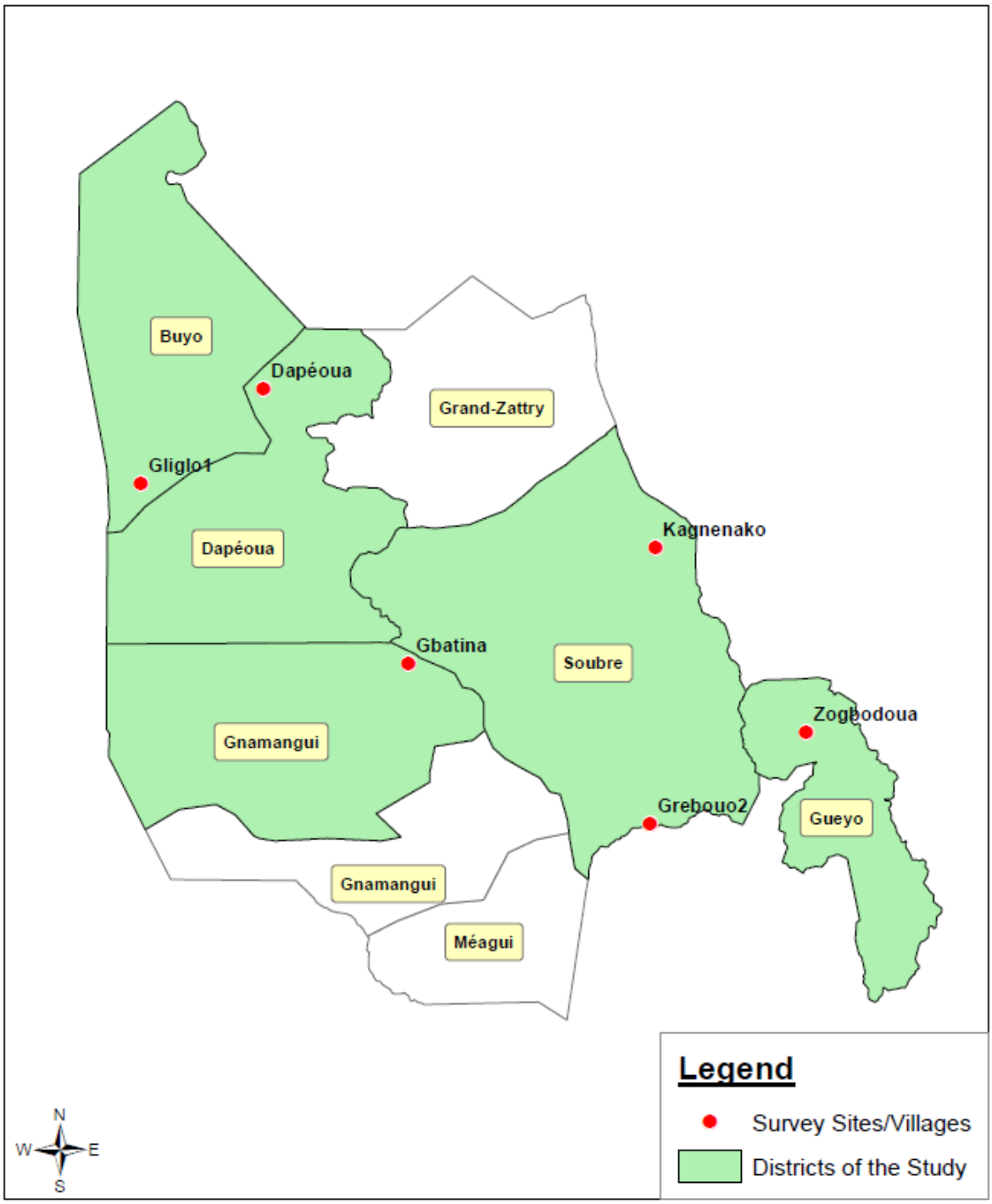


1 cm = 8 km

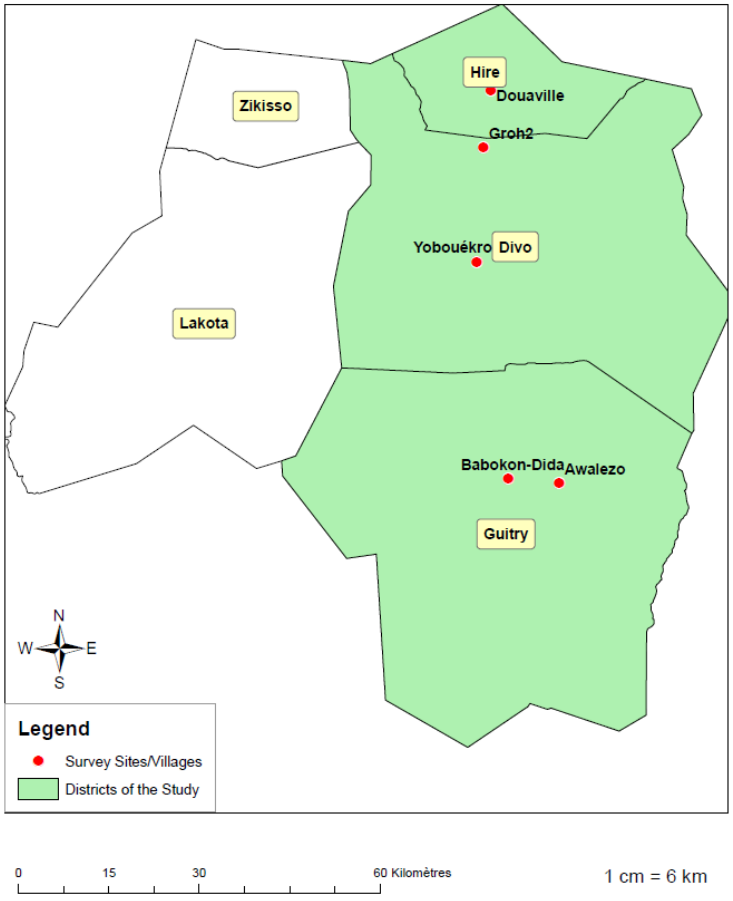
N
W E
S

0 15 30 60 Kilomètres

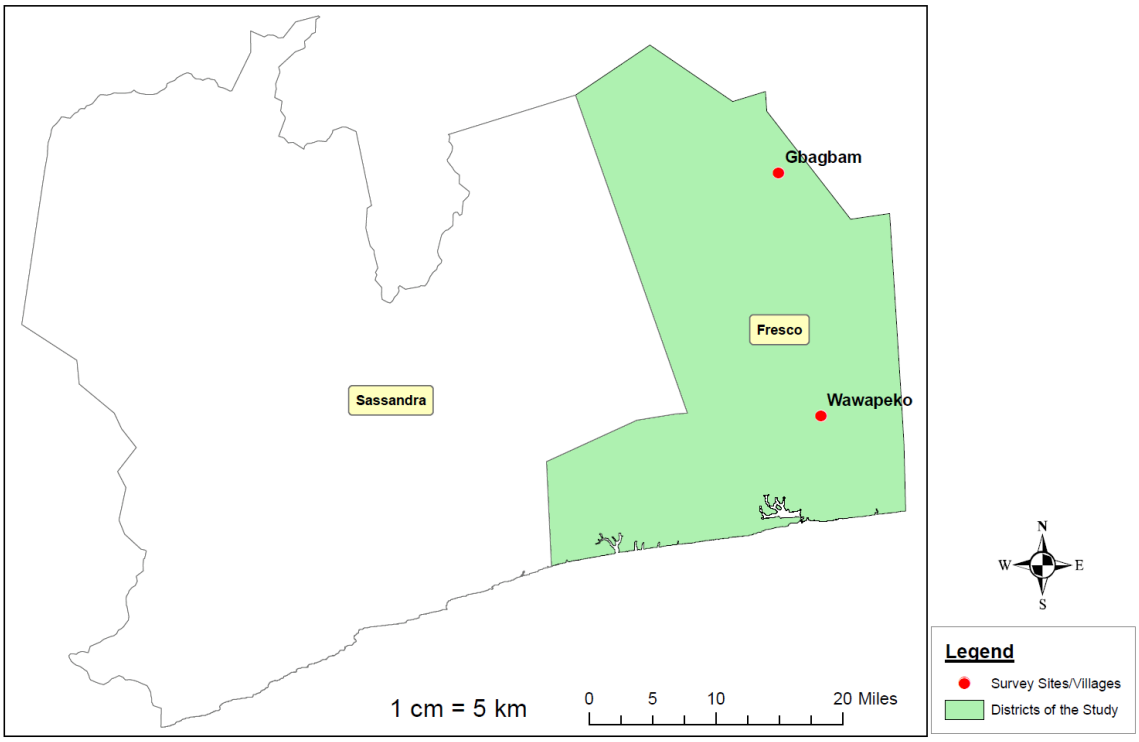
NAWA SITES


Buyo
Dapéoua
Grand-Zattry
Gliglo1
Dapéoua
Kagnenako
Gbatina
Soubre
Zogbodoua
Gnamangui
Grebouo2
Gueyo
Gnamangui
Méagui
Legend
Survey Sites/Villages
Districts of the Study
N
W
E
S
1 cm = 8 km
0
10
20
40 Miles

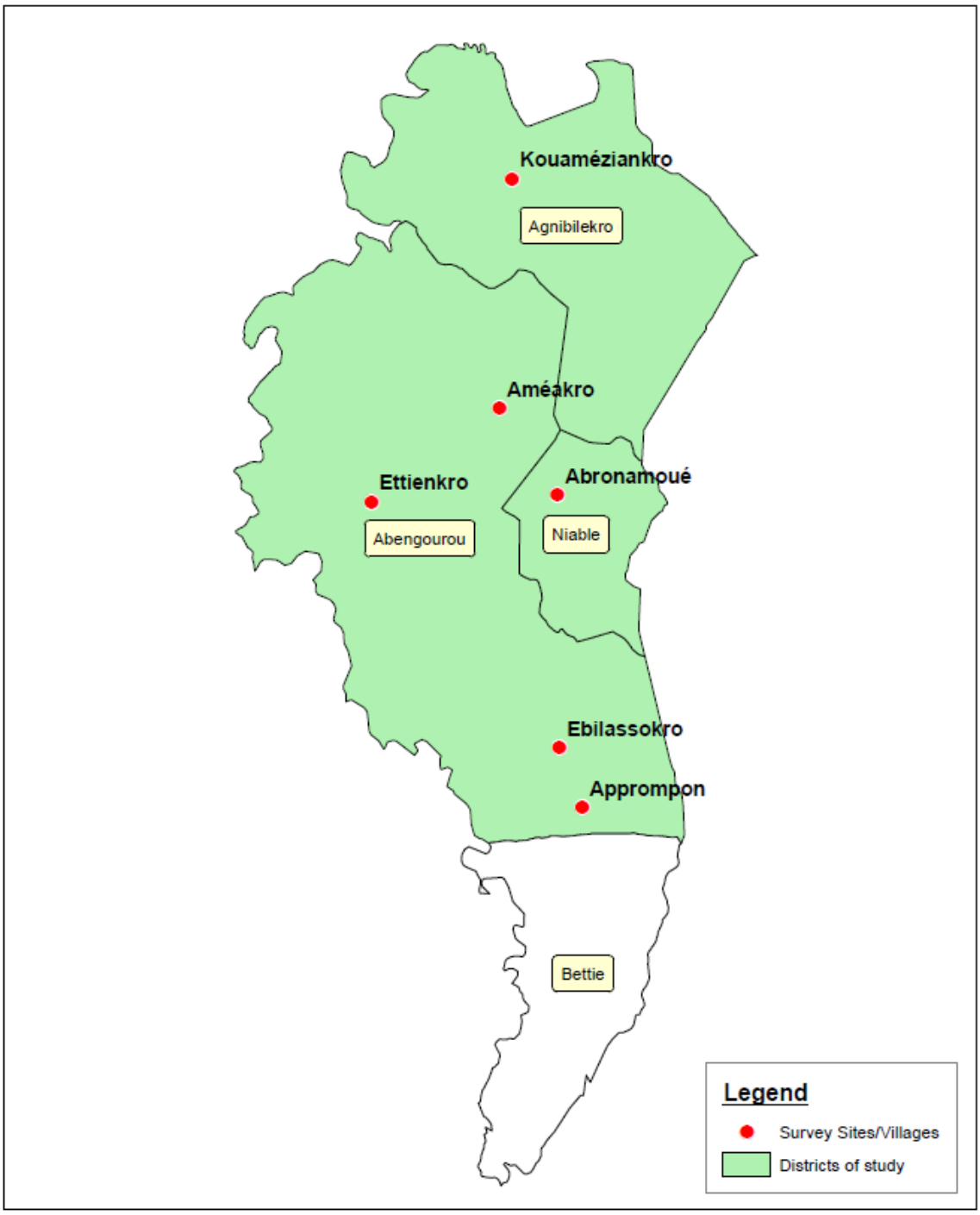
LOH-DJIBOUA SITES



GBOKLE SITES



INDENIE-JUABLIN SITES



THE INTERNATIONAL COCOA INITIATIVE (ICI)
www.cocoainitiative.org

ICI SECRETARIAT IN SWITZERLAND
Chemin de Balexert 9 | 1219 | Châtelaine Switzerland
Tel. : +41 22 341 47 25
Fax. : +41 22 341 47 26

ICI NATIONAL OFFICE IN CÔTE D'IVOIRE
II Plateaux, 6ème Tranche, Ilot 215, Lot 2518 | Abidjan-Cocody |
Côte d'Ivoire
Tel.: +225 22 41 09 14

ICI NATIONAL OFFICE GHANA
PO Box GP 21624 | Accra | Ghana
Tel.: +233 302 99 88 70