



## **Assessment of Effectiveness of Cocoa Industry Interventions in Reducing Child Labor in Cocoa Growing Areas of Côte d'Ivoire and Ghana**

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## **Assessment of Effectiveness of Cocoa Industry Interventions in Reducing Child Labor in Cocoa Growing Areas of Côte d'Ivoire and Ghana**

FINAL REPORT, October 2020

**Submitted to:**

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## World Cocoa Foundation Study Foreword

All stakeholders in the cocoa supply chain share the same goal: to eliminate child labor on family farms in West Africa and ensure a bright future for the children in cocoa-growing communities. Over the past years, the cocoa and chocolate industry has worked closely with the governments of Côte d'Ivoire and Ghana, cocoa-importing countries, farmer and civil society organizations, and international financial and technical partners to identify and implement the most effective interventions and approaches to achieve this goal and address the root causes of child labor.

This report by [NORC at the University of Chicago](#) provides important new research on what works and how to accelerate efforts to end child labor in the cocoa supply chain.

[The World Cocoa Foundation \(WCF\)](#) commissioned the research because we wanted an independent assessment of the impact of interventions funded by the cocoa and chocolate industry to reduce child labor. These industry actions include: support for child protection programs, awareness raising activities, education infrastructure and school materials, gender empowerment and women's livelihood development, capacity building of community institutions like child protection committees and school management committees, and other economic and social measures to raise farmer income and build strong communities.

The research by NORC confirms the effectiveness and impact of industry's work. The report concludes:

*"The results of the study demonstrated that **the Industry Intervention Package has led to a lower likelihood and lower prevalence of child labor and hazardous child labor**. Specifically, communities that received significant exposure to the Industry Intervention Package had a lower prevalence rate of hazardous child labor compared to similar communities that did not receive such interventions. In addition, the results also demonstrated that the likelihood of having at least one child engaged in hazardous work within agricultural households in communities that received the Industry Intervention Package in both Côte d'Ivoire and Ghana was lower compared to the households that did not receive the package."*

These findings reinforce earlier research by the International Cocoa Initiative (ICI), which showed that child labor monitoring and remediation systems supported by companies have the potential to reduce child labor by 50% among identified child laborers.<sup>1</sup>

This new research adds to the knowledge gleaned from the implementation experience of the strong national action plans of the governments of Côte d'Ivoire and Ghana, the Harkin-Engel Protocol Framework of Action, and the programs of UNICEF, International Labor Organization (ILO), ICI and other technical partners. We now have a strong evidence base to scale up successful interventions, catalyze increased investment, and accelerate implementation for national impact.

None of the work already done, or to be undertaken in the coming years, would be possible without strong partnerships involving dedicated and hard-working individuals, government institutions and civil society organizations. Undeniably, myriad efforts over the past decade by First Lady Dominique Ouattara, chair of the National Child Labor Oversight Committee in Côte d'Ivoire, have contributed enormously to a better understanding of the problem and possible solutions. The Ministry of Employment Relations and Labor in Ghana, the United States Department of Labor, along with others,

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<sup>1</sup> <https://annualreport2019.cocoainitiative.org/en/>

have demonstrated remarkable expertise and perseverance in the face of a host of complex issues. WCF and our member companies are grateful to all these partners.

Scaling up existing actions with demonstrated impact, building broader alliances, and planning on a wider range of actions is at the heart of industry's approach to ending child labor in the cocoa supply chain. Only by taking this more comprehensive approach can we ensure today's generation of children reach their full potential and have a chance at the bright future they deserve.



Richard Scobey  
President

The World Cocoa Foundation

## Executive Summary

This study reports on data collected from agricultural households in the cocoa growing area of Côte d'Ivoire and Ghana during the main cocoa harvest seasons in 2018/19 and was funded under a contract with the World Cocoa Foundation (WCF).

The main objective of this study is to evaluate **the impact of child labor reduction initiatives funded by the cocoa industry, the *Industry Intervention Package***, by comparing households in communities that received the package to households in similar communities that did not receive these interventions. Specifically, this study evaluates the impact of interventions on child labor and hazardous child labor among households in communities in Côte d'Ivoire and Ghana that received significant exposure to the *Industry Intervention Package*.<sup>2</sup>

The *Industry Intervention Package* consists of a range of interventions and approaches aiming to improve child protection in cocoa-growing communities. This includes Community Development approaches, as well as Child Labor Monitoring and Remediation Systems embedded in the supply chain that were supported by individual companies who are WCF partners. The *Industry Intervention Package* included activities to identify, monitor and support households with vulnerable children, as well as the wider community, including:

- Child protection and awareness-raising programs
- Education infrastructure/material assistance
- Gender awareness-raising programs
- Women's livelihood support programs
- Formation and strengthening of community child protection committees
- School Management Committees

It is important to note that the *Industry Intervention Package* was assessed as a whole and that the impact of individual interventions and/or categories of interventions was not assessed.

The research presented in this report relates to households involved in agriculture in the cocoa growing areas of Ghana and Côte d'Ivoire, focusing on children aged 5-17.

This study defines a case of **child labor** in cocoa production as any child 5-17 years old who worked in cocoa farming and worked more than maximum allowable hours of work for a given age group, and/or was exposed to hazardous activities related to cocoa farming. A child is considered in **hazardous child labor** if exposed to any of six types of hazardous activities related to cocoa farming.

The results of the study demonstrated that **the *Industry Intervention Package* has led to a lower likelihood and lower prevalence of child labor and hazardous child labor**. Specifically, communities that received significant exposure to the *Industry Intervention Package* had a lower prevalence rate of hazardous child labor compared to similar communities that did not receive such interventions. In addition, the results also demonstrated that the likelihood of having at least one child engaged in hazardous work within agricultural households in communities that received the *Industry Intervention Package* in both Côte d'Ivoire and Ghana was lower compared to the households that did not receive the package.

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<sup>2</sup> Significant exposure is defined as having received at least four types of interventions for at least three years before the survey.

This study does not report on forced child labor or labor trafficking because the methods needed to conduct a rigorous study on forced child labor are different than the methods used for analysis of child labor and beyond the scope of this report.<sup>3</sup>

### **Study Sample**

The sample used in this study comprised two parts:

- **The treatment sample:** The treatment sample included communities that WCF partners identified as “mature” – defined as *communities having received at least four types of interventions, implemented for at least three years before the survey, in cocoa growing areas of Côte d’Ivoire and Ghana*. Overall 76 communities were selected and seven agricultural households with at least one eligible child aged 5-17 were randomly selected from every sampled community in each country. In total, 524 households and 1,063 children were surveyed in Côte d’Ivoire and 533 households and 1,278 children in Ghana.<sup>4</sup>
- **The comparison sample:** As part of a separate United States Department of Labor (US DOL) cooperative agreement, NORC conducted a sectorally representative survey during the 2018/19 cocoa harvest season in cocoa growing areas of Côte d’Ivoire and Ghana. The comparison sample included in the study consisted of agricultural households from the US DOL 2018/19 child labor survey (the ILAB Sample) that did not receive the *Industry Intervention Package*. Accordingly, 41 communities from the ILAB sample were included as part of the comparison sample in each of the country covering total 1,431 households.

Data collection took place during the 2018/19 cocoa harvest season in both countries and matched the timing of the surveys of comparison group.

### **Evaluation Design**

To evaluate the impact of the *Industry Intervention Package* on child labor and hazardous child labor, a quasi-experimental design was used that followed a two-step approach. In the first step, a statistical matching was used to identify a set of treatment and comparison communities that were very similar with respect observable community characteristics. In the second step, using data from the matched sample of communities, multivariate regression analysis was used to control for a range of factors associated with child labor prevalence, and estimate the impact of the *Industry Intervention Package* on children’s engagement in child labor and in hazardous child labor in cocoa production within the households in the treatment communities.

This design addresses the fact that WCF communities were selected to receive support purposively, rather than randomly, as WCF member companies deliberately focused their interventions on communities assessed to have a higher risk of child labor. As a result, the WCF communities were different from the comparison communities in terms of infrastructure and socio-economic factors (for example access to primary schools, improved roads, electricity, level of poverty etc.), which are

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<sup>3</sup> Forced child labor is, by definition, an illicit activity with a vulnerable and hard-to-reach population. Probability based research methods would need to account for that from the outset and focus on areas where vulnerability would be highest (for example, encampments and forest land).

<sup>4</sup> It is important to note that when the sample was drawn, no conditions were imposed to restrict the sample to only mature communities where interventions were **active**. It is possible that the sampled communities not only included communities where interventions were active during the data collection, but also included some communities where interventions were no longer active (as the program ended before the survey was undertaken).

potentially correlated with child labor prevalence in a community. The data indicates that the WCF communities selected for interventions typically had poorer infrastructure than the comparison communities, with more prominent differences in Ghana. In order to disentangle the impact of the intervention package from these factors, it was necessary to balance out these differences.

### **Assessment of the Impact of Interventions**

In this section we present the findings of the impact assessment of the *Industry Intervention Package*. The complete description of the assessment is provided in section 7 of the report.

The impact estimates are based on the two-step quasi-experimental approach as mentioned above, which matches treatment to comparison communities to obtain an appropriate sample for analysis in a first step. In the second step, program impact was estimated at the community level and at the household level: the impact on the community level prevalence was estimated using matched treatment and comparison communities, controlling for community level factors that influence child labor prevalence. Similarly, for estimating the impact at the household level, the estimation controls for a range of potential child labor drivers (including both household level and community level factors) in the second step while estimating the impact using data from households in the matched treatment and comparison communities.

The study evaluates the impact of the *Industry Interventions Package* by assessing impact on **the prevalence rate at the community level, and likelihood of having at least one child in the household engaged in child labor and in hazardous child labor** in cocoa production. In addition, the study also estimates the impact on **the proportion of children in the household engaged in child labor and in hazardous child labor** in cocoa production which has been reported in Section 7.

While the full report examines program impact on both child labor and hazardous child labor, this summary focuses only on the impact of interventions on **hazardous child labor**, which is used as a proxy for assessing the “worst forms of child labor” in cocoa production. The findings from the analysis of impact on hazardous child labor indicate that:

- Communities that received significant exposure to the *Industry Intervention Package* had 15 percentage point lower prevalence rate of hazardous child labor compared to the communities that were similar, but did not receive such interventions which is equivalent to 31 percent reduction<sup>5</sup> in the prevalence rate of hazardous child labor in cocoa production.
- **The likelihood for a household to have at least one child in hazardous child labor in cocoa was much lower in communities that received the *Industry Intervention Package* than the households in comparison communities.**
  - Households in treatment communities were 17 percentage points less likely to have a child engaged in hazardous child labor in the full sample (comprising Côte d’Ivoire and Ghana) than households in the matched comparison communities after controlling for a range of potential exogenous drivers of child labor prevalence.
  - Households in treatment communities in Côte d’Ivoire were 26 percentage points less likely and in Ghana were 16 percentage points less likely to have a child engaged in hazardous child labor than in the matched comparison communities.

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<sup>5</sup> Compared to the prevalence rate of 47% in the matched comparison communities.

The measurement of impact reported above is based on a treatment sample that consists of randomly selected agricultural households in communities exposed to the *Industry Intervention Package*, including households that may have benefited directly as well as households that may not have directly benefitted. At the same time, it is possible that the households in the comparison sample may have benefited from interventions by other organizations, and hence diluted the estimated program impact.

It is important to keep in mind that the results presented above may not be generalizable for the entire cocoa growing area, since the communities that received the *Industry Intervention Package* were mostly concentrated in the areas with high cocoa production.

In addition, it is worth noting that the impact of the *Industry Intervention Package* was estimated using quasi-experimental design that has some limitations. Please refer to Annex 8.7 for more detailed description of the methodology, a discussion on the caveats and methodological limitations.

### **Conclusion**

The findings of this study show that the *Industry Intervention Package* has led to a lower likelihood of hazardous child labor among households in communities that received significant exposure to various interventions. This indicates that when significant effort is undertaken in addressing child labor, it is possible to reduce the prevalence of hazardous child labor in cocoa production.

While the *Industry Intervention Package* has been shown to be effective in reducing child labor, children continue to engage in hazardous work suggesting that continued efforts are needed by all stakeholders to tackle the root causes of child labor, as well as to increase interventions to combat child labor in cocoa growing areas.

Although the Harkin-Engel Protocol is coming to an end, the success of the protocol in bringing together government, international, and industry stakeholders to address child labor and hazardous child labor in the cocoa sector can serve as a model for continued engagement by all stakeholders. In particular, the success of the WCF industry partners' interventions should be noted. Additionally, efforts to combat child labor and hazardous child labor in respective supply chains should be increased given current successes.

More research is needed to better understand the effectiveness and sustainability of different types and combinations of interventions. In addition, future analysis should look beyond the binary categories of "in child labor" or "out of child labor" to also examine the intensity of work, severity of exposure to hazards, and the impact of interventions related to education on child labor and hazardous child labor.



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## Acronyms

CEA	Census Enumeration Area
CCDP	Cocoa Community Development Program
CDI	Côte d'Ivoire
CIT	Cognitive Interview Technique
CL	Child labor
CLCCG	Child Labor Cocoa Coordinating Group
CLMS	Child-labor Monitoring Services
CSOs	Community Service Organizations
EA	Enumeration Area
HCL	Hazardous child labor
ICI	International Cocoa Initiative
ILAB	U.S. Department of Labor's International Labor Bureau
ILO	International Labour Organization
Industry	International Chocolate and Cocoa Industry
IP	Implementing Partner
NGOs	Non-governmental organizations
NORC	NORC at the University of Chicago
OCFT	Office of Child Labor, Forced Labor and Human Trafficking
Protocol	Harkin-Engel Protocol
WCF	World Cocoa Foundation
WFCL	Worst forms of child labor
USDOL	United States Department of Labor

## 1. Introduction

In 2001, in response to evidence of children working under dangerous conditions in the West African cocoa sector, representatives from the International Chocolate and Cocoa Industry (Industry) signed the Harkin-Engel Protocol (Protocol), which included commitments to publicly acknowledge child labor in the cocoa sector, form an advisory group to provide guidance on appropriate remedies, and establish a joint foundation to provide interventions to address child labor directly. The Governments of Côte d'Ivoire, Ghana, and the U.S. Department of Labor (USDOL) began working alongside Industry in 2002 to address child labor in cocoa – mostly through technical assistance projects. These efforts expanded in September 2010, when the Governments of Côte d'Ivoire and Ghana, the USDOL, and Industry joined as partners to sign the Declaration and the accompanying Framework.

In the signing of the Declaration and Framework, these partners committed to take action to reduce child labor and the worst forms of child labor (WFCL) in cocoa production and to the goal of achieving a 70 percent reduction in the worst forms of child labor in the cocoa sectors of the two countries in the aggregate by 2020.

Since 2010, Industry members both individually and through the World Cocoa Foundation (WCF) and International Cocoa Initiative (ICI) have implemented numerous programs in Côte d'Ivoire and Ghana to reduce the prevalence of child labor in cocoa production. Although there have been some internal assessments of individual programs designed to reduce child labor, there has not been a comprehensive, independent, and scientifically rigorous study of the impact of these programs within each country as well as across Côte d'Ivoire and Ghana.

In 2016, NORC at the University of Chicago (NORC) was awarded a four year cooperative agreement by the USDOL's Bureau of International Labor Affairs<sup>6</sup> (ILAB) to conduct the 2018/2019 *Assessing Progress in Reducing Child Labor in Cocoa Production in Cocoa Growing Areas of Côte d'Ivoire and Ghana* survey. The ILAB 2018/19 study (*the ILAB study*) collected data on 2,809 households and 5,552 child surveys across Ghana and Côte d'Ivoire. In addition, NORC assessed the relative effectiveness of all interventions carried out between 2010 and 2018 as part of the larger ILAB study. These interventions included both Industry funded interventions as well as interventions funded by the host governments, Civil Society Organizations (CSO), and USDOL.

In order to understand the specific impact of Industry sponsored programs, WCF commissioned NORC to assess the outcomes of the *Industry Intervention Package* (including interventions focusing on Cocoa Community Development Program (CCDP) and Child-labor Monitoring and child-protection services (CLMS) within communities and organized farmer cooperatives) and its impact on overall prevalence rates of child labor and hazardous child labor.

The main objective of this research study is to evaluate whether the *Industry Intervention Package* has any impact on the rates of child labor and hazardous child labor in households that received the *Industry Intervention Package* as compared to the households in similar communities that did not receive the *Industry Intervention Package*.

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<sup>6</sup> ILAB leads USDOL's efforts to ensure that workers around the world are treated fairly and are able to share in the benefits of the global economy. ILAB's mission is to advance workers' rights and livelihoods, particularly for the world's most vulnerable workers. ILAB's Office of Child Labor, Forced Labor and Human Trafficking (OCFT) conducts and funds research, develops strategic partnerships, and funds an international technical cooperation program to eliminate child labor and the worst forms of child labor, forced labor, and human trafficking.

This report begins with Section 2 containing a description of the objectives of the report and definitions of the key technical terms used throughout the report such as working children, child labor and hazardous work (as a proxy of the worst forms of child labor).

Section 3 describes the analytic methodology and evaluation design of the quasi-experimental approach used for the quantitative analysis to assess the impact of the *Industry Intervention Package*.

Section 4 provides the description of sampling approach used to identify the treatment communities. We then present a short description of the data collection activities undertaken in the 2018/19 main cocoa harvest season and a brief description of the key characteristics of the samples in both countries.

Section 5 presents a description of the WCF sample with respect to children’s engagement in cocoa production, child labor in cocoa production, and hazardous work in cocoa production related activities.

Section 6 focuses on assessment of the impact of the *Industry Intervention Package* on child labor and hazardous child labor. It provides a brief description of the quantitative analysis undertaken to assess the impact and findings based on the quantitative analysis.

Section 7 presents the main conclusions of this study and discusses the scope of future research based on the learnings from the study.

## 2. Study Objectives

The main objective of the research study is to identify whether the *Industry Intervention Package* has led to lower rates of child labor and hazardous child labor among the households in communities that received the *Industry Intervention Package* as compared to the households in similar communities that did not receive the *Industry Intervention Package*.

Towards that objective this study carried-out the following tasks:

- Present estimates of children working, children engaged in child labor, and children engaged in hazardous child labor in cocoa production in communities where the *Industry Intervention Package* was implemented (WCF communities).
- Identify any differences in the rates of child labor and hazardous child labor in cocoa production between households in WCF communities and households in communities that did not receive the *Industry Intervention Package* (comparison communities).
- Evaluate whether the *Industry Intervention Package* implemented by WCF partners has reduced child labor and hazardous child labor in cocoa production among households in assisted communities.

### 2.1. Definitions

This report presents aggregate statistics (combining the data from cocoa growing areas of Côte d’Ivoire and Ghana) using a common definition of hazardous work developed through the Protocol<sup>7</sup>. The following section details the definitions of working children (children in employment), child labor, and hazardous child labor used throughout the report. In most instances, data analysis focuses on a twelve month reference period to remain consistent with previous surveys<sup>8</sup>. We use a “common definition” for

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<sup>7</sup>The common definition focuses on the “common ground” between the Ghanaian and the Ivorian definitions of child labor within a broader ILO framework and was used for surveys conducted in 2018/19

<sup>8</sup> Previous surveys used a twelve month reference period and are used as part of this study for comparison purposes.



both countries based on a broader ILO framework<sup>9</sup> to generate estimates on hazardous work performed by children in cocoa agriculture in cocoa growing areas of Côte d’Ivoire and Ghana. The common definition is used for both countries to allow aggregate estimates of the progress made in in cocoa growing areas of Côte d’Ivoire and Ghana and to allow for comparisons across countries and the USDOL funded survey (ILAB 2018/19).

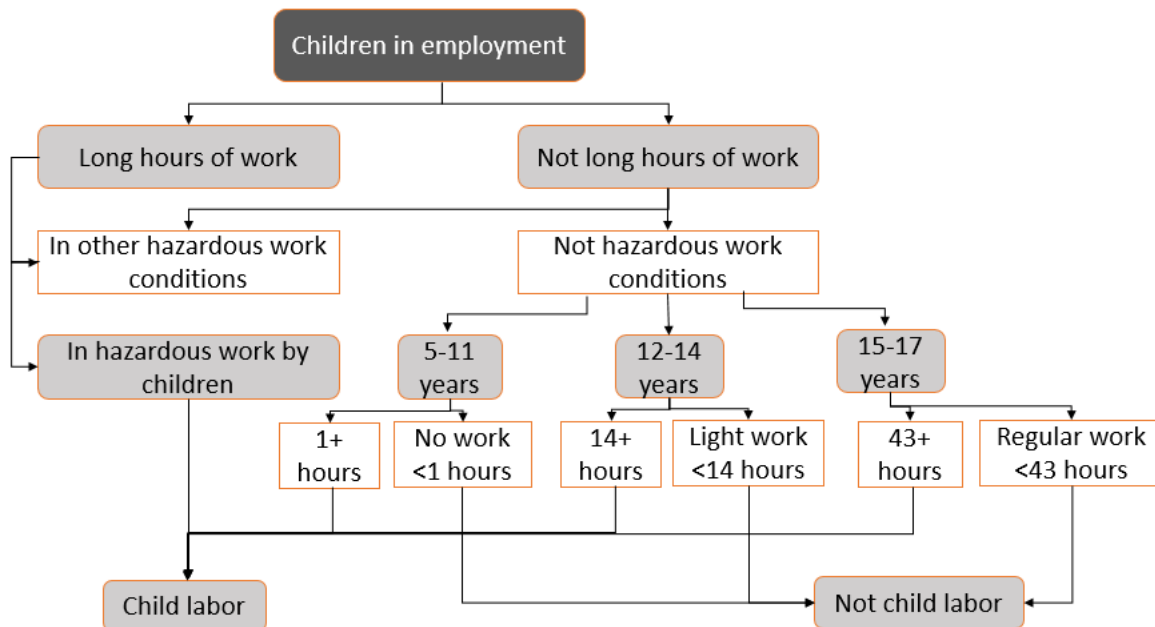
**2.1.1. Working children (children in employment)**

A working child is defined as a child (5-17 years old) who has worked at least one hour during the reference period in either paid or unpaid work. Child work is then split into three different categories: agricultural work, cocoa work, and non-agricultural work.

**2.1.2. Children in child labor**

The common definition of child labor is defined as any child in employment between 5-17 years old who is exposed to long working hours and/or hazardous working conditions.

Figure 1: Definition of Child Labor



The long working hours condition is defined as a child under twelve years old engaging in at least one hour of work during the reference period, a child 12-14 years old engaging in fourteen or more hours of work, or a child 15-17 years old engaging in 43 or more hours of work within the reference period.

**2.1.3. Children in hazardous work**

The common definition of hazardous work is constructed using six subcategories (listed below). A child is determined to have participated in hazardous work if they have been exposed to at least one subcategory of the common definition.

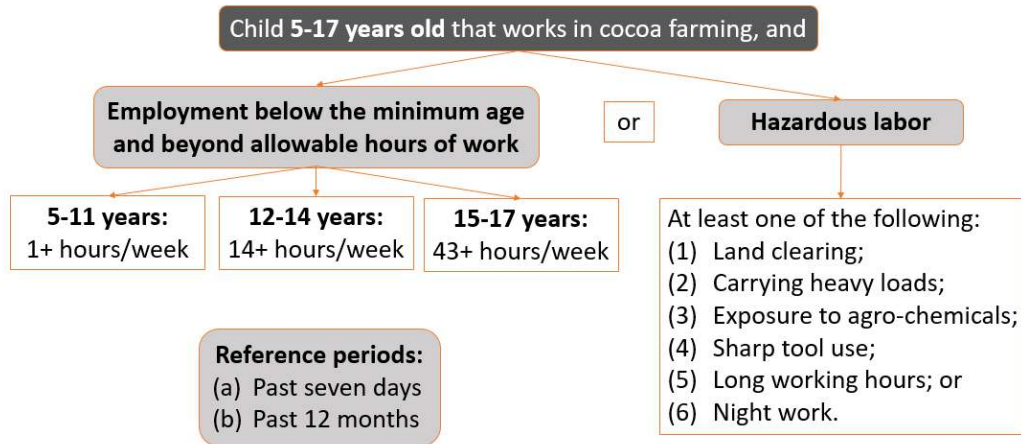
**2.1.3.1. Common definition and sub-categories of hazardous work**

<sup>9</sup> The common definition was developed by Tulane University. For more details, please consult the study report: Survey Research on Child Labor in West African Cocoa Growing Areas, Final Report, 2013-14, Tulane University.

The common definition of hazardous work consists of six sub-categories related to different types of hazards in agriculture:

1. Land clearing
2. Carrying heavy loads
3. Using agro-chemicals
4. Using sharp tools
5. Long working hours
6. Night work

Figure 2: Child Labor Common Definition



A child is exposed to hazardous work if they were exposed to at least one subcategory during the reference period.

- **Land clearing:** A child is exposed to a land clearing related hazard if the child engages in clearing of land, felling and chopping of trees, or burning.
- **Heavy loads:** A child is exposed a heavy load related hazard if the child carries a heavy load of wood or other loads while working in agriculture within the reference period. The definition of “heavy” is based on the child’s own perception on whether the load carried was heavy or not<sup>10</sup>.
- **Agro-chemicals:** A child is exposed to an agro-chemical related hazard if the child is engaged in spraying, carrying water for spraying, or work with agro-chemicals during the reference period. Spraying includes a child spraying pesticides or insecticides, being present or working in the vicinity of a farm during pesticide spraying or re-entering a sprayed farm within less than 12 hours of spraying. Working with agro-chemicals also includes a child having been involved in handling agro-chemical products such as purchasing, transport, storage, mixing, loading, washing of containers and spraying machine, and/or disposal.
- **Use of sharp tools:** A child is exposed to a sharp tool related hazard if the child uses machetes/long cutlasses for weeding, motorized equipment/machines, knapsack sprayers/chainsaws, a machete or sickle for harvesting, a harvesting hook for harvesting overhead cocoa pods, or a knife/sharp object/tool for breaking cocoa pods.
- **Long working hours:** A child is exposed to long working hours if a child works 43 hours or more.
- **Night work:** A child is exposed to night work if a child goes to or returns from the farm alone, or works on a farm between 6.00 p.m. and 6.00 a.m.

<sup>10</sup> It is the research teams’ view that this is the most valid way to measure “heavy loads” without necessitating the use of scales and diary based data collection methods.

### 3. Evaluation Design

In order to evaluate whether the interventions funded through the *Industry Intervention Package* were effective, we estimate the impact of “mature” projects on the prevalence of child labor and hazardous child labor by undertaking a quasi-experimental evaluation. Under this method we used a two-step approach to the evaluation:

- We selected “*mature communities*”- the communities that received sufficient exposure to interventions over an extended period of time.
  - Based on inputs from WCF partners, we operationalized the definition of “*mature communities*” as communities where the interventions were implemented for at least three years before the survey<sup>11</sup> and those which received at least four types of interventions.
- We then used statistical matching and multivariate regression techniques to estimate the impact of the *Industry Intervention Package*.

The challenge of conducting this impact assessment is that there was no pre-defined control group or even an explicit counterfactual group identified at the start of the interventions. Another significant concern is that communities exposed to multiple types of interventions appear to have been selected purposively, not randomly by the implementer. Lack of random assignment of a community to an intervention means that it is hard to disentangle the effect of the intervention from the effect of the selection criteria (for example, communities may have been selected based on their openness to receive interventions, their experience in cocoa farming, proximity to road and other infrastructure availability, or multiple, possibly confounding, variables).

In order to address the methodological challenges associated with the potential site selection issue related to the implementer’s choice of communities to strategically implement multiple interventions (chosen in a non-randomized manner) we used statistical matching techniques. The matching method identified a set of comparison communities from the full set of comparison sample that were observationally similar to the “mature” treatment communities with respect to key community characteristics that might influence site selection by the implementers.

Once the matched treatment and comparison communities were identified, we utilized the data from the matched communities and estimated a multivariate regression model (the attribution model) to causally detect the impact of the *Industry Intervention Package*. The model tested whether, after controlling for other confounders of children’s engagement in child labor and in hazardous child labor, the rate of child labor and hazardous child labor were lower in the communities that received significant exposure to the *Industry Intervention Package* compared to the similar communities that did not receive such interventions. In addition, the regression model also tested whether, after controlling for community and household level confounders, the rate of child labor and hazardous child labor were lower among the households living in the mature communities compared to the households living in the matched comparison communities.

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<sup>11</sup> Mature communities where the interventions were implemented for at least three years before the survey is defined as communities where interventions started before 2016.

## 4. Program Description, Sampling and Data collection

### 4.1. Program description

Since 2010, the Industry funded and implemented different categories of interventions in the cocoa-growing areas of Côte d'Ivoire and Ghana with the objective of reducing child labor and hazardous child labor in the cocoa sector. The Industry committed \$10 million to reducing child labor between 2010 and 2016 through individual companies implementing their own interventions. The companies have joined together for a larger scale CocoaAction program with an estimated \$400 million investment by the Industry between 2015 and 2020.<sup>12</sup>

For this study, NORC assessed the interventions funded by WCF members, focusing on the *Industry Intervention Package*. We received data from WCF partners on the types of interventions funded. Based on this data, the funded interventions were grouped into the following themes: support to school management committees, education infrastructure/material assistance, child protection awareness-raising programs, strengthening of community child protection committee (CCPC), gender awareness-raising programs, and women livelihood support programs. In addition, this study also included interventions funded under the CLMS which consisted of many sub-interventions targeted to identify households with vulnerable children, monitoring of vulnerable children and offer remediation services.

### 4.2. Sampling approach and sample size

**The treatment sample:** The treatment sample universe for the study was drawn from communities where the *Industry Intervention Package* was implemented. WCF partners provided a list of all communities where they had implemented interventions under the *Industry Intervention Package*.

The objective of the study was to identify the impact of the interventions on the communities that received sufficient exposure to the *Industry Intervention Package*. Based on suggestions from WCF partners, it was decided that the study sample would include only communities where interventions had been in place for at least three years and covered at least four intervention categories. The total number of eligible communities from which the sample was drawn can be found in Annex 8.3.1 Table 20 and Table 21.

Guided by sample size estimates, it was then decided that the study would include 76 communities from each country and draw a sample of 530 households, from which 5-17 years old children were interviewed.<sup>13</sup> It was expected the this sample size would be capable of detecting at least a 9 percentage point difference in child labor prevalence between the comparison households from the ILAB 2018/19 sample and the treatment households benefiting from the *Industry Intervention Package* at 5 percent level of significance with statistical power of 80 percent.

Then a sample of 76 communities was drawn for each country using the list of communities with interventions provided by each of the WCF partners. The number of communities per WCF partner was proportional to the total number of communities each WCF partner was present in. Once the communities were identified, seven agricultural households with at least one eligible child aged 5-17 were randomly selected from every sampled community based on a random walk method.

**The comparison sample:** As part of a separate U.S. DOL cooperative agreement, NORC conducted a sectorally representative survey during the 2018/19 cocoa harvest season in cocoa growing areas of

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<sup>12</sup> Self-reported by the international cocoa industry.

<sup>13</sup> The sample size calculation assumes the prevalence of child labor rate is 50 percent, and an intra-cluster-correlation (statistical similarity of households in a village) of 20 percent.

Côte d'Ivoire and Ghana. The comparison sample included in the study consisted of agricultural households from the U.S. DOL 2018/19 child labor survey (ILAB sample) that did not receive the *Industry Intervention Package*. Accordingly, 41 communities from the ILAB sample were included as part of the comparison sample in each of the country from which total 1,431 households were surveyed.

### **4.3. Data collection**

Data collection took place during the 2018/19 cocoa harvest season in both countries and matched the timing of the surveys of comparison group.

Through its local data collection partner Kantar, NORC implemented several types of surveys for collecting the data necessary for the study. Below we provide a description of surveys and fieldwork activities.

#### **4.3.1. Types and number of interviews completed**

In the 2018/19 round of data collection six surveys were administered:

1. Household roster
2. Household head
3. Child
4. Community
5. Cocoa Shed
6. School

The total number of child and household head interviews by region for Côte d'Ivoire and Ghana in the 2018/19 survey round can be found in Annex 8.3.1 Table 22. There were 1,278 child and 533 household head interviews completed in Ghana spread across six regions. In Côte d'Ivoire there were 1,063 child and 524 household head interviews completed across fifteen regions. Overall, there were 1,058 roster surveys, 1,057 household head surveys, 2,341 child surveys, 153 community surveys, 304 cocoa shed surveys, and 193 school surveys administered across Ghana and Côte d'Ivoire.

#### **4.3.2. Implementation of 2018/19 Survey**

Data collection took place in Ghana from December 6<sup>th</sup>, 2018 to January 25<sup>th</sup>, 2019 and from February 9<sup>th</sup>, 2019 to March 8<sup>th</sup>, 2019 in Côte d'Ivoire. The household roster was first administered to each household to determine which children would be eligible for interviews and to identify the household head. A household was considered to be complete once there was a household roster survey, household head survey, and a child survey for each eligible child.

Table 23 in Annex 8.3.1 details the household head and child survey response rates by household roster survey. Overall, at least 99 percent of households had a household head survey and over 90 percent have at least one child survey for Côte d'Ivoire and Ghana.

The community, cocoa shed, and school interviews were all conducted at the community level. The community level surveys were then linked to the households from the same community to provide additional information on the communities those households were a part of.

#### 4.4. Description of the WCF sample

##### 4.4.1. Respondents' Age and Gender: Head of Household and Children

Table 1 shows the breakdown of the household head characteristics and Table 2 shows the characteristics of the child respondents. The household heads were predominantly male with a greater proportion of female heads of household in Ghana than in Côte d'Ivoire.

Table 1: Respondent Characteristics: Head of Household, Agricultural Households in WCF communities, in Côte d'Ivoire and Ghana, 2018/19

			Total	Côte d'Ivoire	Ghana
Average Age (years)			48	48	48
Median age (years)			47	48	46
Gender	Male	Number	917	494	423
		Percent	87%	95%	80%
	Female	Number	137	28	109
		Percent	13%	5%	20%

Source: WCF Roster survey

Table 2: Respondent Characteristics: Children 5-17 Years, Agricultural Households in WCF communities, in Côte d'Ivoire and Ghana, 2018/19

			Total	Côte d'Ivoire	Ghana
Average Age (years)			10	10	11
Median age (years)			10	10	11
Gender	Male	Number	1,230	579	651
		Percent	53%	54%	51%
	Female	Number	1,111	484	627
		Percent	47%	46%	49%

Source: WCF Child survey

The median age of child respondents in Côte d'Ivoire and Ghana was 10 years. On average, both countries had a similar proportion of male and female child respondents.

Table 3: Type of Agricultural Household and Land Ownership, Agricultural Households in WCF communities, in Côte d'Ivoire and Ghana, 2018/19

	Total	Côte d'Ivoire	Ghana
Total number of agricultural households	1,002	490	512
Total number of cocoa households	949	475	474
Average land owned by households involved in agriculture (in acres)	14	17	11
Average land under cultivation by households involved in agriculture (in acres)	12	14	10
Average land under cocoa cultivation by cocoa-producing households (in acres)	8	9	8

Source: WCF Child survey

To better understand the importance of cocoa farming to agricultural households, we present data on land ownership, land under cultivation, and land under cultivation for cocoa farming in Table 3. Overall, 949 out of 1,002 agricultural households are involved in cocoa production (95%). The total number of acres owned is 14, including 12 acres cultivated (86%) and 8 acres under cocoa cultivation (57%). The average size of land owned was 17 acres in Côte d'Ivoire and 11 acres in Ghana. The average area under

cultivation was 14 acres in Côte d'Ivoire and 10 acres in Ghana. However, the average area under cocoa cultivation was more similar across the two countries with 9 acres in Côte d'Ivoire and 8 acres in Ghana. The difference in area of land under cultivation indicates that the average agricultural household in Côte d'Ivoire operated on much larger plot size overall, but Ghana farmers devoted more of their land to cocoa cultivation (73% compared to 53% respectively).

## 5. Descriptive Analysis: WCF sample

In this section, we present a descriptive analysis of data collected from the treatment sample consisting of mature communities (WCF sample). The descriptive analysis will allow us to obtain insights on children’s engagement in cocoa production and gauge the depth of the child labor and hazardous child labor issues in the cocoa sector.

The following section presents data from the WCF sample in Côte d’Ivoire and Ghana, including estimates of children’s (5-17 years old) engagement in cocoa production, child labor in cocoa production, and hazardous work in cocoa production. We present the aggregated statistics combining data from Côte d’Ivoire and Ghana and then present the breakdown by each country.

### 5.1. Estimate of Working Children in Cocoa Production in the WCF sample

Child respondents were asked whether they were engaged in cocoa production related activities in the twelve month period before the survey was undertaken. We used these responses to generate estimates of children working in agriculture include those doing permissible light work, as well as children engaged in child labor or hazardous child labor. Table 4 presents children’s engagement in cocoa production in the last twelve months. We start with the aggregate data that combined the sample from both countries, followed by the data separately for each country, and a comparison of the difference between the two countries.

Table 4: Estimates of Children Working in Cocoa Production in the Last 12 Months, Agricultural Households in WCF communities, in Côte d’Ivoire and Ghana, 2018/19

All Agricultural Households	Total	Côte d’Ivoire	Ghana	Diff (pp)*	Sig of diff^
Children Working in Cocoa Production	49%	31%	63%	-32	***

Source: WCF Child survey

\*Calculated as the difference between the Côte d’Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

On aggregate, nearly half of all children in agricultural households were engaged in some activities related to cocoa production. There was a large difference in children’s engagement in the cocoa sector between the two countries with more than twice as many children engaged in the cocoa sector in Ghana as in Côte d’Ivoire.

An important consideration to determine whether the nature of their work constitutes child labor or hazardous child labor is the number of hours worked per week. According to ILO guidelines<sup>14</sup>, children under the age of twelve should not be engaged in any work, and older children may only work in non-hazardous activities for a specified number of working hours per week depending on their age. Therefore, it is useful to explore the data on hours worked by children in different age groups.

<sup>14</sup> ILO, Convention 138 Concerning Minimum Age for Admission to Employment, (26 June 1973).

Table 5 presents the data on average hours worked in **any economic activity** by children in each age-group. We also present the percentage of children that exceeded the maximum hours of work allowed by ILO guidelines, a violation that would classify children in a given age group as child labor.

Table 5: Working Hours and Minimum Age, Children Working in Cocoa Production, Agricultural Households in WCF communities, in Côte d'Ivoire and Ghana, 2018/19

Number and percentage of children in agricultural households		Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff <sup>^</sup>
5-11 years	% Working 1 hour or more per week	32%	21%	42%	-21	***
	Average # of hours worked	3.0	2.5	3.6	-44	***
12-14 years	% Working 14 hour or more per week	13%	14%	13%	1	
	Average # of hours worked	6.1	5.2	6.7	-30	*
15-17 years	% Working 43 hour or more per week	3%	3%	2%	1	
	Average # of hours worked	8.8	7.6	9.6	-26	

Source: WCF Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

<sup>^</sup>Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

According to ILO standards, children under the age of twelve years (the minimum age for light work<sup>15</sup>) should not be engaged in any work activities. Consequently, any children in that age group who worked for at least one hour during the reference period would be considered to be in child labor. Data reported in Table 5 show that in aggregate, 32 percent of children in the 5-11 year age group worked for at least one hour in the week before the survey. Country disaggregation shows that the prevalence of children aged 5-11 working one hour or more was higher in Ghana (42%) than in Côte d'Ivoire (21%). On average, children in the 5-11 age group worked three hours in the week prior to the survey. Similar to the trend in working children, the average number of hours worked for this age group were higher in Ghana than Côte d'Ivoire (3.6 versus 2.5 hours).

Based on ILO standards, children in the 12-14 year age group can undertake up to 13 hours of non-hazardous activities weekly to be considered in *light work*. In aggregate, 13 percent of children in the WCF sample aged 12-14 were working more than the allowable limit for light work with similar proportions within each country. Overall, the number of hours worked per week for this age group was 6.1 hours, and the number of hours was higher in Ghana than Côte d'Ivoire (6.7 versus 5.2 hours).

Per ILO standards, children in the 15-17 year age group are allowed to undertake regular work and engage in up to 42 hours of non-hazardous work weekly. In aggregate, 3 percent of children in the 15-17 age group were working more than the ILO recommended maximum hours per week and there was no statistically significant difference between the two countries. In aggregate, children worked an average of 8.8 hours per week, including 7.6 and 9.6 hours in Côte d'Ivoire and Ghana respectively, however the difference was not statistically significant between the countries.

Detailed data on sex differences for average hours worked can be found in Table 24 in Annex 8.3.2 Overall, a larger proportion of female children aged 5-11 years worked more than the ILO recommended hours than their male counterparts. These female children also worked more hours, on average, than

<sup>15</sup> According to Article 7 of ILO Convention No. 138, national laws or regulations may permit the work of persons as from 13 years of age (or 12 years in countries that have specified the general minimum working age of 14 years) in light work which is: (a) not likely to be harmful to their health or development; and (b) not such as to prejudice their attendance at school, their participation in vocational orientation or training programs approved by the competent authority, or their capacity to benefit from the instruction received.



males both in aggregate (3.1 versus 2.9 hours) and at the country-level. However, this difference flips for children aged 12-14 where more male children (16%) work 14 hours or more per week than female children (10%). Finally, it is important to note that children in Ghana tend to work more hours per week on average compared to children in Côte d'Ivoire, regardless of gender.

Next, we present estimates of various work activities in cocoa production that children were involved in to gain insights on specific types of work in different phases of cocoa agriculture. The activities cover pre-harvest, harvest, and post-harvest activities that are broadly classified into five categories:

1. Land preparation (land clearing, felling and chopping, burning, or stumping)
2. Planting (preparing seedlings, planting seedlings, or sowing at stake)
3. Farm maintenance (weeding, working with insecticides/herbicides/fungicides/other chemicals, and carrying water for spraying)
4. Cocoa harvest activities (plucking, gathering, or breaking cocoa pods)
5. Post-harvest activities (carting fermented cocoa beans, drying cocoa beans, or carting dry cocoa beans to shed)

Table 6: Child Work Involved in Cocoa Production, All Children 5-17 Years Working in Cocoa Production, Agricultural Households, in Côte d'Ivoire and Ghana, 2018/19

Percentage of children working in cocoa production	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^
Land preparation activities in cocoa production	28%	51%	19%	32	***
Planting activities in cocoa production	26%	27%	25%	3	
Farm maintenance activities in cocoa production	54%	48%	56%	-7	**
Harvest activities in cocoa production	90%	88%	91%	-4	**
Post-harvest activities in cocoa production	49%	50%	49%	1	

Source: WCF Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 6 shows the most common activities for children to be involved in were harvest activities (90%) and farm maintenance activities (54%). The difference between children Côte d'Ivoire and Ghana was large in magnitude for land preparation (51% versus 19%) where the proportion of children engaged in these tasks was more than twice as high in Côte d'Ivoire.

Table 25 in Annex 8.3.18.3.2 presents the breakdown of different activities under each of the five groups of activities reported in Table 6. The five most common activities children were involved in were gathering and heaping cocoa pods, carrying water for spraying, breaking cocoa pods and fermentation, drying cocoa pods, and weeding.

## 5.2. Estimate of Child Labor and Hazardous Child Labor in Cocoa Production in the WCF sample

Next, we present the data on children's engagement in child labor and in hazardous work in cocoa production. Children who violated the maximum allowable working hours and/or were exposed to any of the six different types of hazardous activities in cocoa production would be considered as being engaged in the common definition of child labor in cocoa production.

The data presented in Table 7 compares the prevalence rates of child labor and exposure to hazardous work in cocoa production for children in agricultural households in WCF communities in Côte d'Ivoire and Ghana.

Table 7: Estimates of Children Working in Cocoa Production, Children Engaged in Child Labor in Cocoa Production, and Children Engaged in Hazardous Work in the Cocoa Sector in the Last 12 Months, 5-17 Years, Agricultural Households in WCF communities, in Côte d'Ivoire and Ghana, 2018/19

	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^
Children Engaged in Child Labor in Cocoa Production	42%	26%	54%	-28	***
Children Engaged in Hazardous Work in Cocoa Production	39%	24%	50%	-26	***

Source: WCF Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

During the 2018/19 harvest season, 42 percent of children in the WCF sample communities were engaged in child labor in cocoa production. The proportion of children engaged in child labor was more than twice as high in Ghana as in Côte d'Ivoire (54% versus 26%). The proportion of children engaged in hazardous work in cocoa production in the WCF sample communities follow a similar trend. While 39 percent of children in the sampled households were engaged in hazardous work in cocoa production in aggregate, the prevalence rate of hazardous child labor in Ghana was more than twice the rate in Côte d'Ivoire (50% versus 24%). Historically, it is important to note that both the prevalence rate of child labor and hazardous child labor were much higher in Ghana as compared to Côte d'Ivoire.<sup>16</sup>

Data reported in Table 26 in Annex 8.3.2 presents the sex and age group disaggregation of children engaged in child labor and in hazardous work in cocoa production in Côte d'Ivoire and Ghana. In 2018/19, 57 percent of children engaged in child labor were male while 43 percent were female. The proportion of children engaged in hazardous work is similar with 58 percent male and 42 percent female. When disaggregated by country, the sex differences were more pronounced in Côte d'Ivoire than in Ghana (67% versus 53% and 69% versus 54% respectively). The age-disaggregated data show that the children engaged in child labor and hazardous child labor, were mostly from the younger age group (5-11 and 12-14) in both countries.

### 5.3. Children's Engagement in the Components of Hazardous Child Labor in Cocoa Production in the WCF sample

In order to gain a deeper understanding of exposure to hazardous work, we investigate children's exposure to the six different types of hazards related to cocoa agriculture. Table 8 presents the data on exposure to each of the different types of hazards among all children in agricultural households in cocoa-growing areas of Côte d'Ivoire and Ghana.

In 2018/19, 39 percent of children in agricultural households were exposed to at least one of the six hazardous activities involved in cocoa production. In aggregate, use of sharp tools was the most commonly performed hazardous activity in cocoa agriculture (31%), followed by exposure to agro-chemicals (23%) and carrying heavy loads (22%).

A significantly greater proportion of children were exposed to four of the types of hazardous activities in Ghana than in Côte d'Ivoire. In fact, more than double the proportion of children were exposed to heavy loads, agro-chemicals, sharp tools, and night work in cocoa in Ghana. Overall, 40 percent of children in Ghana were exposed to sharp tools in cocoa compared to 19 percent of children in Côte

<sup>16</sup> Survey Research on Child Labor in West African Cocoa Growing Areas, Final Report, 2013-14, Tulane University.

d'Ivoire. Additionally, the proportion of children exposed to at least one hazardous work activity was also twice as high in Ghana (50%) than in Côte d'Ivoire (24%).

Table 8: Estimates of Percentages of all Children Exposed to Hazardous Work Activities in the Cocoa Sector, 5-17 Years, Agricultural Households in WCF communities, in Côte d'Ivoire and Ghana, 2018/19\*

Percentage of children in agricultural households exposed to:	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^
<b>Hazardous Work Activities</b>					
Land clearing in cocoa (V1) in cocoa	13%	16%	10%	6	***
Heavy loads in cocoa (V2) in cocoa	22%	12%	30%	-18	***
Agro-chemicals in cocoa (V3) in cocoa	23%	13%	32%	-19	***
Sharp tools in cocoa (V4) in cocoa	31%	19%	40%	-21	***
Long working hours in cocoa (V5) in cocoa	1%	1%	0%	1	*
Night work in cocoa (V6) in cocoa	1%	0%	2%	-2	***
Exposed to one or more variables in cocoa	39%	24%	50%	-26	***

Source: WCF Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Age disaggregation of engagement in hazardous activities is reported in Table 9 to determine how exposure to hazardous work activities var by age group. Similar to the findings in Table 8In 2018/19, 39 percent of children in agricultural households were exposed to at least one of the six hazardous activities involved in cocoa production. In aggregate, use of sharp tools was the most commonly performed hazardous activity in cocoa agriculture (31%), followed by exposure to agro-chemicals (23%) and carrying heavy loads (22%).

A significantly greater proportion of children were exposed to four of the types of hazardous activities in Ghana than in in Côte d'Ivoire. In fact, more than double the proportion of children were exposed to heavy loads, agro-chemicals, sharp tools, and night work in cocoa in Ghana. Overall, 40 percent of children in Ghana were exposed to sharp tools in cocoa compared to 19 percent of children in Côte d'Ivoire. Additionally, the proportion of children exposed to at least one hazardous work activity was also twice as high in Ghana (50%) than in Côte d'Ivoire (24%).

Table 8, Table 9 shows that the proportion of children exposed to one or more hazardous work activities was significantly larger in Ghana than in Côte d'Ivoire. For children aged 5-11, twice as many children in Ghana were exposed to at least one hazardous work activity (36% versus 15%). For children aged 12-14 and 15-17, the difference of exposure between the two countries was approximately 27 percentage points. For example, 76 percent of children in Ghana aged 15-17 were exposed to any hazardous work activities compared to 49 percent of children in Côte d'Ivoire.

Table 9: Estimates of Percentages of Children Exposed to One or More Hazardous Work Activities in the Cocoa Sector, 5-17 Years, Agricultural Households in WCF communities, by Age Group, in Côte d'Ivoire and Ghana, 2018/19

Percentage of children exposed to one or more hazards	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^
5-11 Years	26%	15%	36%	-21	***
12-14 Years	54%	37%	65%	-28	***
15-17 Years	66%	49%	76%	-27	***

Source: WCF Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Data presented in Table 27 and Table 28 in Annex 8.3.2 show the changes in children’s exposure to each of the six different types of hazards in cocoa agriculture disaggregated by age and sex in Côte d’Ivoire and Ghana. In both countries, the proportion of children exposed to each of the hazardous activities significantly increases as age child ages increase. For example, 18 percent of children aged 5-11 and 60 percent among children aged 15-17 used sharp tools (in aggregate).

Sex disaggregation shows that there was a higher proportion of boys exposed to any of the six hazardous activities compared to girls. The most prominent of these differences was exposure to land clearing and use of sharp tools. For example, 37 percent of boys in agricultural households were using sharp tools compared to 24 percent of girls. Additionally, the proportion of boys engaged in land clearing was double that of girls (17% versus 8%).

#### 5.4. Children’s Exposure to Multiple Hazardous Activities Related to Cocoa Production in the WCF sample

In addition to the estimates of children exposed to any of the six different hazardous activities, it is also important to note when children are involved in more than one hazardous activity. Focusing only on the rate of exposure to any hazardous activities provides an incomplete picture of the realities on the ground. For example, if some children were exposed to three hazards and others are exposed to only hazard then the hazardous labor would be the same for both children even though the child who was only exposed to one hazard is now better off. To that end, we present the data on exposure to multiple hazards among children working in cocoa production in Table 10.

Table 10: Estimates of Exposure of Children Working in Cocoa Production, 5-17 Years, to Multiple Types of Hazardous Work, Agricultural Households in WCF communities, in Côte d'Ivoire and Ghana, 2018/19

Percentage of children exposed to hazardous work (VI-V6)	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^
Not exposed to any hazard	21%	22%	21%	1%	
1 type of hazard	22%	18%	24%	-6%	**
2 types of hazard	22%	20%	22%	-2%	
3 types of hazard	23%	23%	23%	1%	
4 types of hazard	12%	16%	10%	6%	***
5 types of hazard	1%	1%	1%	0%	
Exposed to at least 1 hazard	79%	78%	79%	-1%	
Exposed to at least 2 hazards	57%	60%	56%	5%	
Exposed to at least 3 hazards	35%	40%	34%	7%	**

Source: WCF Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

In the WCF communities, 79 percent of children who worked in cocoa production were exposed to at least one hazardous activity and 57 percent were exposed to multiple hazards (two or more hazards). In aggregate, 35 percent of children working in cocoa were exposed to three or more hazards, and a higher proportion of children working in cocoa in Côte d’Ivoire were exposed to three or more hazards than in Ghana (40% versus 34%). Thus, children who worked in cocoa and engaged in hazardous activities were more vulnerable to multiple hazards in Côte d’Ivoire compared to the children in Ghana.

## 5.5. Children’s Exposure to Various Components of Agro-Chemical Products in the WCF sample

In addition to the six different types of hazardous activities, it is also important to understand the trend in children’s exposure to the sub-components that constitute each type of hazards. Agro-chemical related hazards are one of the top three most commonly performed hazardous activities (Table 8), and Table 11 shows children’s exposure to the five sub-components of agro-chemical related hazards.

Table 11: Disaggregation of Exposure to Agro-Chemicals, Children Working in Cocoa Production in the Last 12 Months, Agricultural Households in WCF communities, in Côte d’Ivoire and Ghana, 2018/19

Percentage of children working in cocoa exposed to agro-chemicals	Total	Côte d’Ivoire	Ghana	Diff (pp)*	Sig of diff^
<b>Exposed to any agro-chemical products</b>	<b>48%</b>	<b>41%</b>	<b>50%</b>	<b>-9</b>	<b>***</b>
Exposed to spraying pesticides or insecticides	4%	5%	3%	3	**
Being present/working in vicinity of farm during pesticide spraying	19%	14%	21%	-7	***
Reentering a sprayed farm within less than 12 hours of spraying	9%	9%	9%	0	
Carrying water for spraying	39%	32%	43%	-11	***
Having been involved in working with agrochemicals**	13%	9%	15%	-6	***

Source: WCF Child survey

\*Calculated as the difference between the Côte d’Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

\*\*Such as purchasing, transport, storage, mixing, loading, spraying/applying, washing of containers and spraying machine, and/or disposal

Of the five sub-components, exposure of children working in cocoa to carrying water for spraying (39%) was the most common. Being present or working in the vicinity of a farm during pesticide spraying (19%) and having been involved in working with agro-chemicals (13%) were the next most common agro-chemical related hazards.

Disaggregation by country indicates that the exposure to agro-chemicals was higher in Ghana for three of the five most common agro-chemical related hazards. The largest statistically significant difference between the two countries was exposure to carrying water for spraying (43% in Ghana versus 32% in Côte d’Ivoire), followed by being present or working in the vicinity of a farm during pesticide spraying and having been involved in working with agro-chemicals.

Table 29 in Annex 8.3.2 shows the age and sex disaggregation of exposure to agro-chemicals for children in cocoa work. Following the trend in exposure to any hazardous work, the exposure to agro-chemicals was much higher among male than female children (59% versus 41%). This difference was more pronounced in Côte d’Ivoire where 70 percent of male children working in cocoa production were exposed to agro-chemicals, compared to 30 percent of females. When contrasting exposure to agro-chemicals among age groups, the differences between Côte d’Ivoire and Ghana were much smaller in magnitude though still significant. For instance, 43 percent of children aged 5-11 were exposed to agro-chemicals in Côte d’Ivoire, compared to 37 percent in Ghana.

## 5.6. School Attendance among Children in Agricultural Households in the WCF sample

Overall, 91 percent of children in agricultural households within the WCF sample were attending school. Table 12 also shows that more children were attending school in Ghana compared to Côte d’Ivoire, regardless of age group and sex.

Table 12: School Attendance for Children in the Last 12 Months, Agricultural Households in WCF communities, in Côte d'Ivoire and Ghana, 2018/19

All children attending school	Total	Côte d'Ivoire	Ghana
Children 5-17 years	91%	84%	97%
<b>Sex</b>			
Boys 5-17 years	92%	86%	98%
Girls 5-17 years	90%	82%	96%
<b>Age Group</b>			
Children 5-17 years	92%	85%	98%
Children 12-14 years	95%	88%	99%
Children 15-17 years	82%	72%	89%

Source: WCF Child survey

Table 13 shows that 94 percent of children working in cocoa production were attending school in 2018/19. Similar to children in agricultural households in the WCF sample, a larger proportion were attending school in Ghana than in Côte d'Ivoire. This is the case across all age groups and for both sexes.

Table 13: School Attendance for Children Working in Cocoa Production in the Last 12 Months, Agricultural Households in WCF communities, by Age Group and Sex, in Côte d'Ivoire and Ghana, 2018/19

Children working in cocoa production attending school	Total	Côte d'Ivoire	Ghana
Children 5-17 years	94%	86%	97%
<b>Sex</b>			
Boys 5-17 years	94%	88%	97%
Girls 5-17 years	93%	83%	96%
<b>Age Group</b>			
Children 5-11 years	96%	94%	98%
Children 12-14 years	96%	88%	98%
Children 15-17 years	84%	69%	91%

Source: WCF & ILAB Child survey

## 6. Assessment of the Impact of Interventions on Child Labor and Hazardous Child Labor

The main objective of this report is to assess whether there was any impact from interventions funded by the Industry partners through the *Industry Intervention Package* on child labor and hazardous child labor in the cocoa sector of Côte d'Ivoire and Ghana.

In this section we present a brief description of the quantitative methodology used to assess the impact of the *Industry Intervention Package* and then present the findings of the quantitative analysis of impact.

It is important to note that **our analysis does not assess the effectiveness of individual interventions or organizations**. Given both the disparate types and overall number of interventions conducted between 2010 and 2018, it was not feasible to assess the effectiveness of each one due to data limitations. We can only assess the effectiveness of interventions implemented under the Child Labor Intervention Package as a whole.

## 6.1. Methodological Approaches

In order to evaluate whether the *Industry Intervention Package* is effective in addressing child labor issues in the cocoa growing areas of Côte d'Ivoire and Ghana, we focus on assessing the impact of implementation of multiple intervention categories in a community. In doing so, we also focus on communities where interventions were active for at least three years.

The quantitative assessment evaluates whether implementation of multiple interventions led to a lower rates of child labor and hazardous child labor in cocoa production in households, after controlling for other observable variables that can potentially affect child labor and hazardous child labor.

One of the major methodological challenges that constrained the evaluation was that the communities exposed to multiple types of interventions appear to have been selected purposively, not randomly by the implementing partners. As a result of this lack of random assignment of a community to an intervention, it was necessary to use an evaluation design that can address the selection issue in order to arrive at an unbiased estimate of impact that isolates the impact of the program from the differences between intervention and comparison communities due to strategic selection of communities for intervention by WCF partners.

In order to address the methodological challenges associated with the intervention assignment of communities by the Implementing Partners (IPs), we adopted a quasi-experimental design that followed a two-step approach:

- **Generate the counterfactual:** In the first step, we address the potential site selection issue related to the IPs' choice of communities to strategically implement multiple interventions by constructing the counterfactual that used statistical matching of communities from the WCF sample and the communities from ILAB 2018/19 sample.<sup>17</sup>
- **Estimate the program impact:** In the second step, once the community selection issue has been addressed by generating a set of matched treatment and comparison communities that were very similar with respect to key observable community characteristics that potentially affect selection, we then estimate multivariate regression models to test whether the rate of child labor and hazardous child labor were lower among the
  - Communities that received significant exposure to the *Industry Intervention Package* compared to similar communities that did not receive such interventions.
  - Households in communities where multiple interventions were implemented compared to the households in the matched comparison communities.

We develop a generic model of the relationship between children's exposure to child labor and hazardous work in cocoa production and their determinants using a theoretical model.<sup>18</sup> Finally, we test whether implementation of multiple interventions had any statistically significant effect on children's engagement in child labor and in hazardous child labor in cocoa production after controlling for other factors that influence a household's decision to engage children in child labor and in hazardous child labor.<sup>19</sup> It is important note that the estimated program impact is

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<sup>17</sup> Please refer to Annex 8.5.1 for a detailed description of the matching method used to generate the counterfactual group.

<sup>18</sup> The model has been presented in Annex 8.5.1. The model specifies the outcome variables (children's exposure to child labor/hazardous child labor) as a function of household, community, and school characteristics that are not expected to be directly influenced by the interventions

<sup>19</sup> Other influencing factors not of specific interest to research are often referred to as "covariates".

derived using the data from the households that live in the treatment communities and the matched comparison communities.

## 6.2. Data Sources

The analysis of the impact of the *Industry Intervention Package* was based on the child labor survey, head of the household survey, community leader survey and school surveys conducted by NORC during the 2018/19 main cocoa harvesting season in Côte d'Ivoire and Ghana.

NORC collected data from communities that WCF partners identified as “mature” – defined as communities having received at least four types of interventions, implemented for at least three years before the survey, in cocoa growing areas of Côte d'Ivoire and Ghana. In addition, NORC also collected data from the ILAB sample that did not receive the *Industry Intervention Package*.

The 2018/19 child labor survey captured data on children’s exposure to child labor and hazardous child labor, and the head of household survey captured various household level characteristics. The data from the survey of community leaders and schools was used to control for community and school infrastructure related influences on the outcome variable of interest (presence of improved roads, distance to the schools from the community, availability of cell phone coverage and school building construction material).

In addition, we also used the intervention data collected from WCF partners in 2018 as the basis for selecting the treatment communities.

## 6.3. Analysis and Findings

The quasi-experimental evaluation conducted two types of analysis:

1. A statistical matching technique to construct the counterfactual<sup>20</sup>, and
2. A multivariate regression analysis to estimate the impact of the *Industry Intervention Package* on child labor and in hazardous child labor in cocoa production in the treatment communities and in households in the treatment communities.

Statistical matching technique identified a set of treatment and comparison communities most similar with respect to observable community characteristics that are correlated to selection of sites by the implementers. Once the matched treatment and comparison communities were identified, multivariate regression analysis was used to estimate the impact of the *Industry Intervention Package* using data from households in the treatment and matched comparison communities.

While the details of the statistical matching analysis used for generating the counterfactual can be found in Annex 8.5.1, here we focus on summarizing the results of the study. We first present the results of the regression analysis that estimated the impact on community-level prevalence and then the results of household-level regression analysis used for estimating the impact of the *Industry Intervention Package* based on the data from the households in the treatment and matched comparison communities.

For the community level analysis, we estimate a regression model that assesses the impact on the prevalence rate at the community level. On the other hand, for assessing the impact at the household level, we estimate two regression models: one model defines the outcome variables as the likelihood (probability) of having at least one child engaged in child labor/hazardous child labor within the

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<sup>20</sup> I.e. generate a set of comparison communities that are most similar to the treatment communities with respect to observable characteristics that potentially influence community selection process



household, and the other model defines the outcome variables as the percent (rate) of children in the household exposed to child labor/hazardous child labor.

The regression models use household data from the matched communities (that are similar with respect to confounding characteristics) and community characteristic data to specify the outcome variables as a function of community characteristics for the community-level prevalence, while we specify the outcomes of the household-level regression as a function of household, community, and school characteristics. Finally, the models test whether (after controlling various covariates related to household, community and school characteristics) there was any statistically significant difference in children's engagement in child labor and hazardous child labor in cocoa production between the set of matched treatment and comparison communities and the households in the treatment communities and households in the matched comparison communities.

### **6.3.1. Impact on community level prevalence in child labor and hazardous child labor**

To test whether the treatment communities that received significant exposure<sup>21</sup> to multiple interventions benefited from such interventions, we first estimate whether the interventions had any impact on community level prevalence rates of child labor and hazardous child labor in the treatment communities compared to the matched comparison communities that were similar but did not receive such interventions.

The regression analysis presented in Annex 8.6 estimates the impact of interventions on community level prevalence rate of child labor and hazardous child labor controlling for community characteristics and infrastructure related factors that influence child labor and hazardous child labor. We present the summary of the regression results for the aggregated sample (Côte d'Ivoire and Ghana), and then separately for Côte d'Ivoire and Ghana in Table 16.

The results reported in Table 14 (based on the results reported in Table 40 in Annex 8.6) indicate that in the aggregate sample, the community level prevalence rate of child labor in cocoa production in the communities that received significant exposure to the Industry Intervention Package was 12 percentage points lower when compared to the matched comparison communities that did not receive any interventions which is equivalent to 25 percent reduction in the prevalence rate of child labor in cocoa production relative to the 49% prevalence rate observed in the matched comparison communities.

Country specific results show that for both Côte d'Ivoire and Ghana, the community level prevalence rate of child labor in cocoa production was 12 percentage points lower in the treatment communities than in the matched comparison communities. These were equivalent to a 29% reduction in Côte d'Ivoire and 19% reduction in Ghana relative to the respective prevalence rates in the matched comparison communities.

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<sup>21</sup> Defined as having exposed to at least 4 types of intervention for more than 3 years.

Table 14: Summary of Results: Impact of Industry Intervention Package on the community-level prevalence rate of child labor in cocoa production

Outcome variable	Sample	Reference value in households in matched comparison communities <sup>22</sup>	Treatment Effect <sup>+,++</sup>	Interpretation
Proportion of children (aged 5-17) in the community engaged in child labor	Total (Côte d'Ivoire and Ghana)	49%	-0.12	Due to the Industry Intervention Package, the community level prevalence rate of child labor in the treatment communities was 12 percentage points lower than the prevalence rate of child labor in the matched comparison communities.
	Côte d'Ivoire	40%	-0.12	Due to the Industry Intervention Package, the community level prevalence rate of child labor in the treatment communities in Côte d'Ivoire was 12 percentage points lower than the prevalence rate of child labor in the matched comparison communities.
	Ghana	60%	-0.12	Due to the Industry Intervention Package, the community level prevalence rate of child labor in the treatment communities in Ghana was 12 percentage points lower than the prevalence rate of child labor in in the matched comparison communities.

\*Quasi-experimental impact based on attribution analysis of the treatment and matched comparison communities.

\*\* Statistically **significant** at 10% or lower level of significance.

Next, we present the results of the estimation of impact of the *Industry Intervention Package* on the community level prevalence rate of hazardous child labor in cocoa production. The results presented in Table 15 below summarized the regression results reported in Table 41 in Annex 8.6.

The results in Table 15 indicate that similar to the case of the impact on child labor, the *Industry Intervention Package* led to a lower prevalence rate of hazardous child labor in cocoa production. In the aggregated sample, *Industry Intervention Package* led to 15 percentage points lower prevalence rate of hazardous child labor in the treatment communities than in the matched comparison communities that did not receive any intervention. This difference is equivalent to *31 percent reduction in the* prevalence rate of hazardous child labor in cocoa production relative to the 47% prevalence rate of hazardous child labor observed in the matched comparison communities. Country specific results indicate that due to the intervention, community level prevalence rate of hazardous child labor was 13 percent percentage points lower in the treatment communities in Côte d'Ivoire compared to the matched comparison communities which is equivalent to a 34% reduction relative to the prevalence rate of 39% in the matched comparison communities. On the other hand, in Ghana, the *Industry Intervention Package* led to 16 percentage points reduction in the prevalence rate of hazardous child labor in the treatment communities than in the matched comparison communities that did not receive any intervention which is equivalent to a 28% reduction relative to the prevalence rate of 58% in the matched comparison communities.

<sup>22</sup> Proportion of children in a community engaged in child labor.

Table 15: Summary of Results: Impact of Industry Intervention Package on the community-level prevalence rate of hazardous child labor in cocoa production

Outcome variable	Sample	Reference value in households in matched comparison communities <sup>23</sup>	Treatment Effect+,++	Interpretation
Proportion of children (aged 5-17) in the community engaged in hazardous child labor	Total (Côte d'Ivoire and Ghana)	47%	-0.15	Due to the Industry Intervention Package, the community level prevalence rate of hazardous child labor in the treatment communities was 15 percentage points lower than the prevalence rate of hazardous child labor in the matched comparison communities.
	Côte d'Ivoire	39%	-0.13	Due to the Industry Intervention Package, the community level prevalence rate of hazardous child labor in the treatment communities in Côte d'Ivoire was 13 percentage points lower than the prevalence rate of hazardous child labor in the matched comparison communities.
	Ghana	58%	-0.16	Due to the Industry Intervention Package, the community level prevalence rate of hazardous child labor in the treatment communities in Ghana was 16 percentage points lower than the prevalence rate of hazardous child labor in the matched comparison communities.

<sup>+</sup>Quasi-experimental impact based on attribution analysis on the households from the treatment and matched comparison communities.

<sup>++</sup> Statistically **significant** at 10% or lower level of significance.

Thus, the *Industry Intervention Package* led to a lower community level prevalence rate of child labor and hazardous child labor in cocoa production.

### 6.3.2. Impact on having at least one child in child labor and hazardous child labor in the Household

The community level impact estimates demonstrate how the *Industry Intervention Package* affects the prevalence rates at the community level after controlling for the observed differences between the matched treatment and comparison communities. However, since children’s engagement in child labor and in hazardous child labor is also affected by various child and household characteristics, it is important to assess whether the interventions affect children’s engagement in child labor and in hazardous child labor at the households level after controlling for household and children characteristics in addition to the community characteristics. In the following sections, we present the findings from the assessment of impact based on household level analyses.

To test whether the households in the treatment communities that received significant exposure<sup>24</sup> to multiple interventions benefited from such interventions, we first estimate whether the households in the treatment communities were less likely to engage at least one child in child labor or in hazardous child labor compared to the households in the matched comparison communities that were similar but did not receive such interventions.

The regression analysis presented in Annex 8.6 estimates the model controlling for child demographic characteristics, household and head of the household characteristics, community characteristics, and

<sup>23</sup> Proportion of children in a community engaged in hazardous child labor.

<sup>24</sup> Defined as having exposed to at least 4 types of intervention for more than 3 years.

school infrastructure. We present the summary of the regression results for the aggregated sample (Côte d’Ivoire and Ghana), and then separately for Côte d’Ivoire and Ghana in Table 16.

Table 16: Summary of Results: Impact of Industry Intervention Package on the Likelihood of having one child engaged in child labor in cocoa production in agricultural households

Outcome variable	Sample	Reference value in households in matched comparison communities <sup>25</sup>	Treatment Effect+, ++	Interpretation
Likelihood of at least one child (aged 5-17) engaged in child labor in the household	Total (Côte d’Ivoire and Ghana)	61%	-0.15	Due to the Industry Intervention Package, households in the treatment communities were 15 percentage points less likely to have a child engaged in child labor than the households in the matched comparison communities.
	Côte d’Ivoire	52%	-0.23	Due to the Industry Intervention Package, households in treatment communities in Côte d’Ivoire were 23 percentage points less likely to have a child engaged in child labor than the households in the matched comparison communities.
	Ghana	71%	-0.13	Due to the Industry Intervention Package, households in the treatment communities in Ghana were 13 percentage points less likely to have a child engaged in child labor than the households in the matched comparison communities.

<sup>+</sup>Quasi-experimental impact based on attribution model on the households from the treatment and matched comparison communities.

<sup>++</sup> Statistically **significant** at 10% or lower level of significance.

The results presented in Table 16 (based on results reported in Column (1) – Column (3) in Table 42 in Annex 8.6) indicate that in the aggregated sample, there was statistically significant impact of the *Industry Intervention Package* as the households from the treatment communities were less likely to have at least one child engaged in child labor than the households from the matched comparison communities where no treatment was offered by WCF partners.

Specifically, in the aggregate sample, when we control for the household, community, and school characteristics in regression, the households in the treatment communities were 15 percentage points less likely to have at least one child engaged in child labor compared to the households in the matched comparison communities that were similar but did not receive such interventions.

Country specific regression results reported in Table 16 show that similar to the findings of the aggregate sample, there was statistically significant impact of the *Industry Intervention Package* in Côte d’Ivoire and Ghana. Households in the treatment communities in Côte d’Ivoire were 23 percentage points less likely to have at least one child in child labor compared to the households in the matched comparison communities that were similar but did not receive such interventions. On the other hand, in

<sup>25</sup> Proportion of households with at least one child engaged in child labor.

Ghana, the households in the treatment communities were 13 percentage points less likely to have at least one child in child labor compared to the households in the matched comparison communities.

Next, we present how the Industry Intervention Package affected children’s exposure to hazardous child labor in cocoa production. Table 43 in Annex 8.6 presents the estimate of the impact of the Industry Intervention Package on the likelihood of having a child engaged hazardous work in cocoa production. Here in Table 17, we present the summary of the results based on the regression results reported in Table 43.

Table 17: Summary of Results: Impact of Industry Intervention Package on the Likelihood of having one child engaged in hazardous child labor in cocoa production in agricultural households

Outcome variable	Sample	Reference value in households in matched comparison communities <sup>26</sup>	Treatment Effect+, ++	Interpretation
Likelihood of at least one child (aged 5-17) engaged in hazardous child labor in the household	Total (Côte d'Ivoire and Ghana)	60%	-0.17	Due to the Industry Intervention Package, households in the treatment communities were 17 percentage points less likely to have a child engaged in hazardous child labor than the households in the matched comparison communities.
	Côte d'Ivoire	52%	-0.26	Due to the Industry Intervention Package, households in the treatment communities in Côte d'Ivoire were 26 percentage points less likely to have a child engaged in hazardous child labor than the households in the matched comparison communities.
	Ghana	69%	-0.16	Due to the Industry Intervention Package, households in the treatment communities in Ghana were 16 percentage points less likely to have a child engaged in hazardous child labor than the households in the matched comparison communities.

\*Quasi-experimental impact based on attribution analysis on the households from the treatment and matched comparison communities.

++ Statistically **significant** at 10% or lower level of significance.

Similar to the case of child labor exposure, the results shown above (based on regression results reported in Table 43 in Annex 8.6) indicate that in the aggregate sample, households from the treatment communities were less likely to have at least one child engaged in hazardous child labor than the households from the matched comparison communities where no treatment was offered by WCF partners. The estimate of the impact based on the specification that control for the household, community, and school characteristics in the regression (Table 43 in Annex 8.6) indicates that households living in the communities exposed to multiple treatments, on average, were 17 percentage points less likely to have a child exposed to hazardous child labor in cocoa production than the households from matched comparison communities that did not receive any intervention from WCF partners during the period.

<sup>26</sup> Proportion of households with at least one child engaged in hazardous child labor.

Country specific results also demonstrate similar findings (see Table 43 in Annex 8.6). In each country, households in the treatment communities were less likely to have at least one child engaged in hazardous child labor than the households from the matched comparison communities where no treatment was offered by WCF partners. The estimates of the impact indicate that the households in the treatment communities in Côte d’Ivoire and Ghana were respectively 26 and 16 percentage points less likely to have at least one child engaged in hazardous child labor compared to the households in the matched comparison communities that were similar but did not receive such interventions.

Thus, these results indicate that due to the *Industry Intervention Package*, households had a lower likelihood (chance) of having child labor and hazardous child labor in cocoa production than the households in the matched comparison communities.

### 6.3.3. Impact on the share of child labor and hazardous child labor in cocoa production per household

Next, we explore how the *Industry Intervention Package* affected the share of children per household in child labor and in hazardous child labor. Table 18 presents the summary of the results of impact based on the regression results presented in Table 44 in Annex 8.6.

Table 18: Summary of Results: Impact of Industry Intervention Package on the share of children per household engaged in child labor in cocoa production

Outcome variable	Sample	Reference value in households in matched comparison communities <sup>27</sup>	Treatment Effect+, ++	Interpretation
Proportion of children (aged 5-17) per household engaged in child labor	Total (Côte d’Ivoire and Ghana)	47%	-0.10	Due to the Industry Intervention Package, the share of children per household in child labor in the treatment communities was 10 percentage points lower than the prevalence rate of child labor in households in the matched comparison communities.
	Côte d’Ivoire	41%	-0.13	Due to the Industry Intervention Package, the share of children per household in child labor in the treatment communities in Côte d’Ivoire was 13 percentage points lower than the prevalence rate of child labor in households in the matched comparison communities.
	Ghana	56%	-0.11	Due to the Industry Intervention Package, the share of children per household in child labor in the treatment communities in Ghana was 11 percentage points lower than the prevalence rate of child labor in households in the matched comparison communities.

\*Quasi-experimental impact based on attribution analysis on the households from the treatment and matched comparison communities.

\*\* Statistically **significant** at 10% or lower level of significance.

The results reported in Table 18 (based on the results reported in Table 44 in Annex 8.6) indicate that in the aggregate sample, the share of children in child labor in cocoa production per households in the

<sup>27</sup> Proportion of children in a households engaged in child labor.

communities that received significant exposure to the *Industry Intervention Package* was 10 percentage points lower than in the matched comparison communities that did not receive any intervention. Country specific results show that for Côte d'Ivoire, the share of children in child labor in cocoa production per households was 13 percentage points lower among the households in the treatment communities than in the matched comparison communities. Similarly, the results for Ghana show that the share of children in child labor in cocoa production per households in the treatment communities was 11 percentage points lower than in the matched comparison communities.

Finally, we present the results of the estimation of impact of the *Industry Intervention Package* on the share of children per households exposed to hazardous child labor in cocoa production. The results presented in Table 19 below summarized the regression results reported in Table 45 in Annex 8.6.

The results in Table 19 indicate that similar to the case of the impact on child labor, the *Industry Intervention Package* led to a lower share of children per households exposed to hazardous child labor in cocoa production. In the aggregated sample, the share of children per households exposed to hazardous child labor was 11 percentage points lower among the households in the treatment communities than in the matched comparison communities. Similarly, share of children per households exposed to hazardous child labor was 13 percent percentage points lower in the treatment communities in Côte d'Ivoire compared to the matched comparison communities. For Ghana, the share of children per households exposed to hazardous child labor was 12 percentage points lower than in the matched comparison communities that did not receive any intervention. Thus, the *Industry Intervention Package* led to a lower share of children per households exposed to hazardous child labor in cocoa production.

Overall, the results of our quasi-experimental analysis indicate that after controlling for the covariates that typically influence children's exposure to child labor and hazardous child labor, households in communities that received multiple types of interventions through the *Industry Intervention Package* had a lower likelihood and a lower share of children per households in child labor and hazardous child labor in cocoa production than the households in the matched comparison communities.

The analysis presented above demonstrates that the *Industry Intervention Package* has led to **lower community level prevalence rate of child labor and hazardous child labor. In addition, it has led to lower likelihood as well as lower share of children per households in child labor and hazardous child labor**, in "mature" communities. This indicates that if significant effort is undertaken in combating child labor with implementation of complementary programs, it is possible to reduce child labor and hazardous child labor in cocoa production.

While the results reported above demonstrate that the *Industry Intervention Package* was effective in reducing child labor and hazardous child labor in the cocoa sector, it is important to keep in mind that the results may not be generalizable for the entire cocoa growing area as a whole since the mature communities were mostly concentrated in the areas with high cocoa production. Please refer to Annex 8.7 for a discussion on the caveats and methodological limitations related to the findings from the quasi-experimental evaluation reported above.

Table 19: Summary of Results: Impact of Industry Intervention Package on the share of children per household engaged in hazardous child labor in cocoa production

Outcome variable	Sample	Reference value in households in matched comparison communities <sup>28</sup>	Treatment Effect <sup>+,++</sup>	Interpretation
Proportion of children (aged 5-17) per household engaged in hazardous child labor	Total (Côte d'Ivoire and Ghana)	46%	-0.11	Due to the Industry Intervention Package, the share of children per household exposed to hazardous child labor in the treatment communities was 11 percentage points lower than the prevalence rate of hazardous child labor in households in the matched comparison communities.
	Côte d'Ivoire	40%	-0.13	Due to the Industry Intervention Package, the share of children per household exposed to hazardous child labor in the treatment communities in Côte d'Ivoire was 13 percentage points lower than the prevalence rate of hazardous child labor in households in the matched comparison communities.
	Ghana	53%	-0.12	Due to the Industry Intervention Package, the share of children per household exposed to hazardous child labor in the treatment communities in Ghana was 12 percentage points lower than the prevalence rate of hazardous child labor in households in the matched comparison communities.

<sup>+</sup>Quasi-experimental impact based on attribution analysis on the households from the treatment and matched comparison communities.

<sup>++</sup> Statistically **significant** at 10% or lower level of significance.

## 7. Conclusions and recommendations for future research

This study focuses on understanding the prevalence of child labor and hazardous child labor in communities where WCF partners implemented multiple interventions that were active for a considerable duration and assesses the impact of these interventions on the prevalence of child labor and hazardous child labor. In doing so, the study integrates quantitative survey data from a sample of communities where multiple interventions were implemented through the *Industry Intervention Package* and survey data from a set of communities from the sample of the ILAB 2018/19 child labor survey where no interventions were implemented to determine the impact of the *Industry Intervention Package*. The quantitative survey data is used to present estimates on the prevalence of child labor and hazardous child labor and to assess the effectiveness of the *Industry Intervention Package* on child labor and hazardous child labor in the cocoa growing areas of Côte d'Ivoire and Ghana.

Descriptive survey findings indicate that in the WCF sample, 42 percent of children in agricultural households were engaged in child labor in cocoa production in cocoa growing areas of Côte d'Ivoire and Ghana. Among the children in agricultural households, 39 percent were engaged in hazardous child labor in cocoa production.

<sup>28</sup> Proportion of children in a households engaged in hazardous child labor.



When the child's exposure to hazardous child labor is broken down by component parts, the most common types were use of sharp tools, exposure to agrochemical products, land clearing, and carrying heavy loads for both samples in both countries.

The quantitative assessment evaluated the impact of the *Industry Intervention Package* on two levels: at the community-level and at the household level. The analyses start with the assessment of impact at the community level by estimating the impact on the community-level prevalence rate of child labor and hazardous child labor in cocoa production. The results indicate that the *Industry Intervention Package*, led to a 25 percent reduction in the community-level prevalence rate of child labor in cocoa production in the full sample (with 29% reduction in Côte d'Ivoire and 19% reduction in Ghana). Similarly, the *Industry Intervention Package*, led to a 31 percent reduction in the community-level prevalence rate of hazardous child labor in cocoa production in the full sample (with 34% reduction in Côte d'Ivoire and 28% reduction in Ghana).

The household-level analyses indicate that the likelihood (chance) of having one child engaged in child labor and hazardous child labor in cocoa production in agricultural households and the impact on the proportion of children per household engaged in child labor in cocoa production. In communities that received the *Industry Intervention Package*, households were 15 percentage points less likely to have a child engaged in child labor (23 percentage points less likely in Côte d'Ivoire and 13 percentage points less likely in Ghana), and were 17 percentage points less likely to have a child engaged in hazardous child labor (26 percentage points less likely in Côte d'Ivoire and 16 percentage points less likely in Ghana).

Additionally, due to the *Industry Intervention Package*, the share of children per households in child labor in treatment communities was 10 percentage points lower than in the matched comparison communities (13 percentage points lower in Côte d'Ivoire and 11 percentage points lower in Ghana), and was 11 percentage points lower in terms of hazardous child labor (13 percentage points lower in Côte d'Ivoire and 12 percentage points lower in Ghana) than in the matched comparison communities.

Overall, the *Industry Intervention Package* has led to a lower likelihood as well as share of children per households in child labor and hazardous child labor among households in communities that received significant exposure to the interventions implemented by WCF partners. This indicates that when significant effort is undertaken in addressing child labor, it is possible to reduce children's exposure to child labor and hazardous child labor in cocoa production. This finding suggests that continued investment in existing treatment communities and an expansion of activities to new communities are essential to fight child labor and hazardous child labor in the cocoa sector.

Related to this successes of the *Industry Intervention Package*, an important takeaway from this report is that while sustained efforts to fight child labor are successful, it will also be important to understand what types and combinations of interventions are more effective in reducing child labor and hazardous child labor and how effectiveness may vary under different local conditions.

In addition, given that the component parts of hazardous child labor can directly impact the physical and psychological development of a child it is essential to understand each component part of hazardous labor (such as land clearing, agro-chemical use, sharp tool use, and carrying heavy loads) in order to focus efforts on the dimensions of hazardous labor most prevalent in a particular area. Thus, looking directly at hazardous child labor and especially, at the frequency of exposure to different hazard, rather than a binary categorization of a child as either "in" or "out" of child labor may be a way forward for future implementations.

Overall, it is important to understand child labor and hazardous child labor in cocoa production as a complex problem requiring multiple complementary solutions. Such an approach is often called a systems approach in which it is essential to understand the phenomena as being interrelated with, and dependent on, different facets of the system itself (economic, socio-cultural, international). For example, understanding the relationship between particular types of interventions focused on child labor prevention and remediation and how those interventions may interact or complement each other in order to most directly impact child labor. It is worthwhile to note that the *Industry Intervention Package* consisted of a combination of actions at community, household and individual level and there is strong evidence that such interventions, when implemented over a period of time, can significantly reduce children’s exposure to child labor and hazardous work in cocoa production.

## 8. Report Annexes

### 8.1. Annex I: Detailed Survey Design and Implementation

#### 8.1.1. Design of survey instruments

Quantitative questionnaires cover a wide array of subjects aimed at addressing the many factors that contribute to child labor and hazardous child labor in the cocoa sector. For each sampled household, all consenting children aged 5-17 were interviewed. In addition, the household head or other knowledgeable household member was interviewed using a household head questionnaire and a household labor roster. Within each sampled community, interviews were conducted with all village chiefs, cocoa shed operators, and K-12 public/private school head teachers.

To ensure comparability between data collection rounds, the aforementioned quantitative instruments were modeled upon those used in the 2008/09 and 2013/14 survey rounds. Prior to data collection, all survey instruments were vetted and reviewed through in-country stakeholder workshops which included representatives of host governments as well as industry and NGO partners. In addition, instruments were thoroughly reviewed by our local research teams followed by a field-based pre-test within communities that are demographically similar to, but outside of, the sampled communities. Learnings from the workshops, reviews, and pre-test were included to inform the final instrument design and carefully documented. ILAB was involved and provided input at each step in this process.

##### 8.1.1.1. Child Questionnaire

The child questionnaire captures data used to construct all child labor indicators and population estimates and is therefore of central importance to the study. To minimize bias and in accordance with ILO best practices, enumerators were trained to administer the child survey in private after obtaining parental consent to do so. Given the complex subject matter of the survey, enumerators conducted a pre-interview developmental assessment to determine the cognitive capacity of the child to comprehend key concepts and definitions covered in the survey. In cases where the developmental assessment suggests a child will not understand the majority of the survey questions, parents were asked to support the child in the interview (in all cases, enumerators are required to record information on the presence of other persons and the extent to which they influenced the child’s responses). Where appropriate, cognitive interviewing techniques are employed with younger children to reduce the risk of suggestibility, confabulation, and source-monitoring error. All child interviewing protocols, tools, and techniques were thoroughly covered in the enumerator training and enumerator manuals. The child questionnaire covers the following topics:

Migration and Movement. Respondents are asked questions about migration patterns, which are often a common component of the agricultural sector. These questions address respondents’

countries/towns/communities of origin, identify driving factors for migration, and identify decision-makers about migration.

Work Activities. Respondents are asked general questions about the nature of the work they do. This includes extensive probes on activities that may not be typically perceived as work among respondents, including unpaid household farming or business activities. This module also asks about the types of agricultural tasks performed, such as land clearing, burning, and carrying water for spraying. These questions address the extent to which a given respondent regularly performs these tasks, or only performs them from time to time.

Working Hours. Respondents are asked various questions about the hours they work, including times of day, the length of time in a given day, and the amount of time in a given week. These questions will address the extent to which working hours are typical for that respondent.

Injury and Illness. Respondents are asked to recall the extent to which they have experienced injuries or pain as a result of agricultural work. These may include broken bones, wounds, back pain, muscle pain, and others.

Heavy Loads. Respondents are asked to recall the types of loads they have carried, the circumstances under which they were carried, and the distance they may have carried them. With younger child respondents, NORC will ensure that enumerators ask children to estimate weights or distances using familiar items and locations within the community (versus units of measurement). However, youth aged 14-17 are asked to provide estimations based on distance, weight, and transportation mode. All children are asked to recall the extent to which carrying heavy loads resulted in immediate and/or ongoing physical pain.

Exposure to Environmental Hazards and Other Dangers. Respondents are asked to recall their levels of exposure to environmental hazards and chemicals. This may include the use of pesticides and herbicides, exposure to flames or fumes, and work at dangerous heights. These questions also address whether respondents experienced any health consequences as a result of this exposure, and the severity of any health consequences experienced.

Tools, Equipment, and Machinery. Respondents are asked to recall the types of equipment they normally use when performing agricultural activities. This includes the use of machetes, mist blowers, knives, or animal-drawn tools, and any injuries that may have resulted from the use of such tools. Conversely, respondents are also asked to recall the types of protective equipment they may have used while carrying out these activities. This may include protective boots, masks, and other gear.

Education. This module will assess the extent to which children have received or are receiving education or training. It will include brief a literacy and numeracy assessment as well as capture any reasons for missing school, dropping out, or repeating classes.

Project Activities and Sensitization. As various interventions will be taking place, respondents are asked to recall the extent to which they have benefitted from various project activities and sensitization efforts.

#### 8.1.1.2. Household Roster

The household roster collects basic demographic information on all household members, including sex, age, marital status, education, literacy status, as well as labor status over the past 7 days and 12 months.

#### 8.1.1.3. Household Head Questionnaire

The household head questionnaire is administered to the person(s) determined by the sampled household to be most knowledgeable about household farming practices and income, spending, and borrowing. The household head questionnaire includes modules on household socio-economic status, farming characteristics, migration patterns, use of and opinions on child labor, access to and use of credit (including input financing), participation in community projects, and future risk of agriculture-related injuries.

#### 8.1.1.4. Community Leader Questionnaire

The community leader questionnaire is administered to all village chief(s) within the community. In cases where a traditional leader cannot be interviewed, local assemblymen will be interviewed in their place. The community leader questionnaire collects a broad range of community-level indicators including on migration patterns, infrastructure, socio-economic status, governance, trends in cocoa production, project activities, and the incidence of child and forced labor.

#### 8.1.1.5. School Questionnaire

The school questionnaire is administered to head teachers (or their designated proxies) at all public and private schools serving K-12 pupils within the community. The school questionnaire collects general information on the school including trained teachers, enrollment figures, and school fees. In addition, the survey collects information on working children as well as head teacher opinions on the extent to which agricultural work influences educational outcomes in the community.

#### 8.1.1.6. Cocoa Shed Questionnaire

The cocoa shed questionnaire is administered to all cocoa shed operators/managers within the community. This brief survey collects information on cocoa shed capacity/volume and purchases as well as the extent to which the shed uses child labor and rates of pay for child workers.

### 8.1.2. Training

#### 8.1.2.1. Training of Trainers

To help facilitate the main enumerator training, a training of the trainers (TOT) was conducted for supervisors who were tasked to lead breakout sessions in the main training. The training of the supervisors was conducted from November 1<sup>st</sup>-3<sup>rd</sup>, 2018 for Ghana and January 10-17<sup>th</sup>, 2019 for Côte d'Ivoire. A total of 15 supervisors, 2 regional coordinators, 4 managerial team members from Kantar and 3 facilitators from NORC attended each training.

The training lasted for two days and the topics covered were:

- Cognitive interview technique (CIT)
- Head of household questionnaire review
- Child questionnaire review
- Roster questionnaire review
- Community leader questionnaire review
- School questionnaire review
- Cocoa shed questionnaire review
- Entry protocols
- Role of trainees during main enumerator training

At the end of training, feedback from supervisors was incorporated into the review of the scripts. Supervisors were better equipped to lead smaller groups during the enumerator training.

#### 8.1.2.2. Enumerator Training

The main training for Ghana was conducted from November 5-14<sup>th</sup> and was conducted from January 18-28<sup>th</sup>, 2019 for Côte d'Ivoire. A total of 113 participants were present for the training in Ghana and 98 participants were present for the training in Côte d'Ivoire.

Training was based on the following:

- Understanding the objectives of the research
- Understanding the questions and its administration requirement
- To be conversant with the field operations, survey methodology and protocols
- To state roles, responsibilities and expectations of interviewers and supervisor's involvement in the survey
- To carry out effective interview, using CAPI (Nfield)

#### Outcomes of Training

*By the end of the training, participants were:*

- Familiar with all the instrument
- Able to administer the assigned instruments for survey with confidence and accuracy
- Able to follow data collection process and plan as expected
- Effective handling of field materials

Training for the household and community teams were run co-currently. The household (head of household, child and the roster tools) were facilitated by NORC while the community questionnaires (school, community leader and cocoa shed) was handled by Kantar.

The topics that were addressed across all teams included:

- Techniques for interviewing young children
- Guidelines for tablets practice
- Child questionnaire guide
- Head of household questionnaire guide
- Community (Cocoa shed, community leader, school) questionnaire guide
- Child protection protocol
- Confidentiality and informed consent
- Interviewing techniques
- Stimulus worksheets
- Child safety referral

#### 8.1.3. Pilot

The objective of the pilot was to check the quality of survey material, its consistency and proper interpretation as intended by client and understood by respondents. The pilot was conducted to provide on-field learning experience for trainees and to ensure scripting instructions were properly implemented as well as skip patterns working accurately. Piloting was conducted in Ghana on November 10<sup>th</sup>, 2018 and in Côte d'Ivoire on January 26-27<sup>th</sup>, 2019. The household team screened and scheduled appointments with eligible households and later interviewed household heads and eligible children. The community teams conduct interviews with community leaders, schools' heads, and cocoa shed managers.

#### **8.1.4. Data collection**

Data collection for Ghana lasted from December 6<sup>th</sup>, 2018 to February 25<sup>th</sup>, 2019 and for Côte d'Ivoire from February 9<sup>th</sup>, 2019 to March 8<sup>th</sup>, 2019. Fifteen teams were deployed to field. Each team comprised a supervisor and four household interviewers, and one community interviewer. Each team was accompanied by one quality control officer. The teams were provided vehicles to facilitate their movement across the different communities as the roads leading to most of the localities were in bad shape. In each locality, our teams met the administrative and village authorities to explain the purpose of the study before starting the data collection.

The team (led by the supervisor) debriefed daily before the start of the field. The supervisor contacted households and assigned them to enumerators to conduct interviews after household heads had consented.

A list of seven agricultural households per community were chosen using a random walk. The Roster gets to the community, observe all the necessary community entry protocols with or without the supervisor. The roster team visited the EA a day earlier to screen the household for eligibility and recruit the head of household and the children (5 to 17 years old) who were available during the stay of the team in the EA.

### **8.2. Annex II: Common Definition of Child Labor & Hazardous Child Labor**

This section provides a description of the different components used to form the common definitions used to measure aggregate (between Côte d'Ivoire and Ghana) progress against the goals of the Harkin-Engel Protocol and then describes the local definitions of hazardous child labor.

#### **8.2.1. Common definition**

Unacceptable working hour conditions for the common definition is defined as a child under 12 years old engaging in at least one hour of work, a child between 12 and 14 engaging in 14 or more hours of work, or a child between 15 and 17 engaging in 43 or more hours of work within a 12 month reference period.

The common definition of hazardous child labor consists of six sub-categories:

1. Land clearing
2. Carrying heavy loads
3. Spraying and agro-chemicals
4. Sharp tools
5. Long working hours
6. Night work.

A child has been exposed to hazardous work during the reference period if they were exposed to at least one subcategory during the reference period.

Land clearing (1) is defined as a child engaging in land clearing, felling and chopping, or burning within the reference period. Heavy loads (2) is defined as a child carrying a heavy load of wood and other things during land clearing, loads of water for spraying, loads of fermented cocoa beans, loads of dry cocoa bean to the shed, or other loads within the reference period. The child's own definition of "heavy" is used.

Agro-chemicals (3) is defined as spraying, carrying water for spraying, or working with agro-chemicals during the reference period. Spraying includes a child spraying of pesticides or insecticides, being

present or working in the vicinity of farm during pesticide spraying or reentering a sprayed farm within less than 12 hours of spraying. Working with agro-chemicals includes a child having been involved in working with agro-chemical products.

Use of sharp tools (4) includes using machetes/long cutlasses for weeding, handling motorized equipment or machines, knapsack sprayer and/or chainsaw, harvesting with a machete or sickle, harvesting overhead cocoa pods with harvesting hook, or breaking cocoa pods with knife or a sharp object/tool during the reference period. Long working hours (5) is defined as a child working 43 hours or more during the reference period. Night work (6) is defined as a child going to or returning from the farm alone, or working on the farm between 6.00 p.m. and 6.00 a.m.

### 8.3. Annex III: Supplementary Descriptive Tables

#### 8.3.1. Sample and Data Collection Tables

Table 20: Côte d'Ivoire Sample Breakdown by Company\*

	Total	Ratio	Sample
A	52	37%	28
B	36	26%	20
C	34	23%	19
D	17	12%	9
TOTAL	139	100%	76

\*Company names anonymized.

Table 21: Ghana Sample Breakdown by Company\*

	Total	Ratio	Sample
E	110	52%	40
F	88	42%	32
G	12	6%	4
TOTAL	210	100%	76

\*Company names anonymized.

Table 22: Comparison of Sample Sizes by Survey Type, All Agricultural Households, in Côte d'Ivoire and Ghana, 2018/19

	Total	Côte d'Ivoire	Ghana
Household Roster	1,058	529	533
Head of Household	1,057	525	533
Child	2,341	1,063	1,278
Community	153	81	72
Cocoa Shed	304	111	193
School	193	89	104

Source: WCF Surveys

Table 23: Household Head and Child Survey Response Rates, Côte d'Ivoire and Ghana, All Agricultural Households, 2018/19

Percent of households with:	Total		Côte d'Ivoire		Ghana	
<b>Total household rosters</b>	1,062	N/A	529	N/A	533	N/A
Household head survey	1,058	100%	525	99%	533	100%
At least one child survey	1,013	95%	489	92%	524	98%
Correct number of child surveys	899	85%	410	78%	489	92%
No eligible children	35	3%	22	4%	13	2%
Data collection complete*	904	85%	414	78%	490	92%

Source: WCF Surveys

\*Percentage of households with a roster survey, a Household Head survey, and child surveys for all eligible children.

### 8.3.2. Descriptive Analysis Tables

Table 24: Working Hours and Minimum Age, Children Working in Cocoa Production, By Sex, All Agricultural Households, in Côte d'Ivoire and Ghana, 2018/19

Number and percentage of children in agricultural households		Total	Côte d'Ivoire	Ghana
<b>Sex: Male</b>				
5-11 years	% Working 1 hour or more per week	30%	19%	39%
	Average # of hours worked	2.9	2.4	3.5
12-14 years	% Working 14 hour or more per week	16%	18%	15%
	Average # of hours worked	7.2	6.6	7.7
15-17 years	% Working 43 hour or more per week	2%	5%	0%
	Average # of hours worked	9.2	9.3	9.1
<b>Sex: Female</b>				
5-11 years	% Working 1 hour or more per week	34%	22%	45%
	Average # of hours worked	3.1	2.6	3.7
12-14 years	% Working 14 hour or more per week	10%	8%	11%
	Average # of hours worked	5.0	3.3	6.0
15-17 years	% Working 43 hour or more per week	3%	0%	4%
	Average # of hours worked	8.3	4.7	10.2

Source: WCF Child survey



Table 25: Child Work Involved in Cocoa Production, All Children 5-17 Years in Cocoa Production, All Agricultural Households, in Côte d'Ivoire and Ghana, 2018/19

Percentage of children	Total	Côte d'Ivoire	Ghana
<b>Land preparation activities in cocoa production</b>			
Land clearing	21%	44%	12%
Felling and chopping	10%	21%	5%
Burning	6%	7%	5%
Stumping	8%	11%	7%
<b>Planting activities in cocoa production</b>			
Preparing seedlings	15%	19%	13%
Planting seedlings	16%	15%	16%
Sowing at stake	11%	8%	12%
<b>Farm maintenance activities in cocoa production</b>			
Weeding	35%	32%	36%
Spraying insecticides	3%	5%	3%
Applying fertilizer	5%	8%	3%
Applying fungicides/herbicides/other chemicals	2%	2%	3%
Carrying water for spraying	39%	32%	43%
Doing sanitation and pruning	7%	8%	6%
Doing mistletoe control	6%	11%	5%
<b>Harvest activities in cocoa production</b>			
Plucking cocoa pods	24%	32%	21%
Gathering and heaping cocoa pods	85%	81%	87%
Breaking cocoa pods and fermentation	41%	48%	38%
<b>Post-harvest activities in cocoa production</b>			
Carting fermented cocoa beans	35%	29%	37%
Drying cocoa beans	32%	40%	29%
Carting dry cocoa beans to shed	19%	23%	17%

Source: WCF Child survey

Table 26: Children Engaged in Child Labor and Children Engaged in Hazardous Work in Cocoa Production, All Agricultural Households, 5-17 Years, by Sex and Age Group, in Côte d'Ivoire and Ghana, 2018/19

	Children Engaged in Child Labor in Cocoa Production					Children Engaged in Hazardous Work in the Cocoa Production				
	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^
<b>Sex</b>										
Male	57%	67%	53%	14	***	58%	69%	54%	15	***
Female	43%	33%	47%	-14	***	42%	31%	46%	-15	***
<b>Age group</b>										
5-11 Years	46%	45%	46%	-1		42%	41%	42%	0	
12-14 Years	33%	32%	33%	-1		35%	34%	36%	-2	
15-17 Years	22%	23%	21%	2		23%	25%	23%	2	

Source: WCF & ILAB Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 27: Estimates of Percentages of Children Exposed to Hazardous Work Activities in the Cocoa Sector, 5-17 Years, All Agricultural Households, by Age Group, in Côte d'Ivoire and Ghana, 2018/19

Percentage of children in agricultural households working in cocoa exposed to:	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff <sup>^</sup>
<b>Age group: 5-11 years</b>					
Land clearing (V1)	6%	8%	4%	4	***
Heavy loads (V2)	16%	8%	23%	-15	***
Agro-chemicals (V3)	15%	9%	20%	-12	***
Sharp tools (V4)	18%	11%	24%	-13	***
Long working hours (V5)	0%	0%	0%	0	***
Night work (V6)	0%	0%	0%	0	***
Exposed to one or more Vs	26%	15%	36%	-21	***
<b>Age group: 12-14 years</b>					
Land clearing (V1)	21%	25%	18%	8	***
Heavy loads (V2)	28%	19%	35%	-16	***
Agro-chemicals (V3)	35%	20%	45%	-25	***
Sharp tools (V4)	47%	30%	58%	-28	***
Long working hours (V5)	1%	2%	1%	1	***
Night work (V6)	2%	0%	3%	-3	***
Exposed to one or more Vs	54%	37%	65%	-28	***
<b>Age group: 15-17 years</b>					
Land clearing (V1)	27%	38%	19%	19	***
Heavy loads (V2)	37%	23%	46%	-22	***
Agro-chemicals (V3)	40%	24%	51%	-27	***
Sharp tools (V4)	60%	44%	70%	-26	***
Long working hours (V5)	2%	3%	2%	2	***
Night work (V6)	3%	2%	4%	-3	***
Exposed to one or more Vs	66%	49%	76%	-27	***

Source: WCF Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

<sup>^</sup>Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 28: Estimates of Percentages of Children Exposed to Hazardous Work\* Activities in the Cocoa Sector, 5-17 Years, By Sex, All Agricultural Households, in Côte d'Ivoire and Ghana, 2018/19

Percentage of children in agricultural households working in cocoa exposed to:	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^
<b>Sex: Boys</b>					
Land clearing (V1)	17%	22%	12%	10	***
Heavy loads (V2)	23%	15%	30%	-15	***
Agro-chemicals (V3)	26%	17%	35%	-18	***
Sharp tools (V4)	37%	28%	45%	-17	***
Long working hours (V5)	1%	2%	0%	1	***
Night work (V6)	1%	0%	2%	-2	***
Exposed to one or more Vs	43%	31%	53%	-23	***
<b>Sex: Girls</b>					
Land clearing (V1)	8%	8%	7%	1	***
Heavy loads (V2)	21%	9%	30%	-20	***
Agro-chemicals (V3)	20%	8%	29%	-20	***
Sharp tools (V4)	24%	10%	35%	-26	***
Long working hours (V5)	0%	0%	0%	0	***
Night work (V6)	1%	0%	1%	-1	***
Exposed to one or more Vs	34%	17%	47%	-30	***

Source: Child survey 2008/09, 2013/14, and 2018/19

\*Measured based on Variables 1-6, as described in section 2 of this report

\*\*Calculated as the difference between the 2008/09 and 2018/19 rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 29: Disaggregation of Exposure to Agro-Chemicals, Children in Cocoa Households, by Age Group and Sex, in Côte d'Ivoire and Ghana, 2018/19

Number exposed to V3	Total	Côte d'Ivoire	Ghana	Diff (pp)*	Sig of diff^
<b>Age group</b>					
5-11 years	39%	43%	37%	6	
12-14 years	38%	34%	39%	-5	
15-17 years	24%	23%	24%	-1	
<b>Sex</b>					
Male	59%	70%	56%	14	***
Female	41%	30%	44%	-14	***

Source: WCF Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 30: Disaggregation of Exposure to Agro-Chemicals, Children in Cocoa Households Working in Cocoa Production in the Last 12 Months, by Age Group and Gender, in Côte d'Ivoire and Ghana, 2018/19

	Total	WCF	ILAB	Diff (pp)*	Sig of diff^
<b>Spraying pesticides or insecticides</b>					
<b>Age group</b>					
5-11 years	16%	17%	15%	2	
12-14 years	29%	34%	26%	8	
15-17 years	55%	49%	59%	-10	
<b>Sex</b>					
Male	87%	88%	86%	2	
Female	13%	12%	14%	-2	
<b>Being present or working in the vicinity of farm during pesticide spraying</b>					
<b>Age group</b>					
5-11 years	37%	34%	38%	-4	
12-14 years	36%	37%	35%	2	
15-17 years	27%	28%	27%	2	
<b>Sex</b>					
Male	66%	64%	67%	-2	
Female	34%	36%	33%	2	
<b>Reentering a sprayed farm within less than 12 hours of spraying</b>					
<b>Age group</b>					
5-11 years	25%	23%	27%	-4	
12-14 years	40%	48%	36%	12	*
15-17 years	34%	30%	38%	-8	
<b>Sex</b>					
Male	62%	61%	63%	-2	
Female	38%	39%	37%	2	
<b>Carrying water for spraying</b>					
<b>Age group</b>					
5-11 years	35%	37%	34%	3	
12-14 years	38%	40%	37%	3	
15-17 years	27%	23%	29%	-6	**
<b>Sex</b>					
Male	59%	57%	60%	-3	
Female	41%	43%	40%	3	
<b>Having been involved in working with agrochemicals*</b>					
<b>Age group</b>					
5-11 years	26%	30%	24%	6	
12-14 years	38%	36%	40%	-4	
15-17 years	35%	34%	36%	-2	
<b>Sex</b>					
Male	71%	71%	70%	1	
Female	29%	29%	30%	-1	

Source: WCF & ILAB Child survey

\*Such as purchasing, transport, storage, mixing, loading, spraying/applying, washing of containers and spraying machine, and/or disposal

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

#### 8.4. Annex IV: Descriptive Analysis- difference between the WCF sample and the comparison group

In this section, we explore differences between the WCF treatment sample (consisting of households from mature communities) and the comparison sample (consisting of agricultural households from ILAB 2018/19 survey that did not receive *Industry Intervention Package*) with respect to the main outcomes of interest – children’s engagement in cocoa farming, and exposure to child labor and hazardous child labor. We present a comparison of difference between the WCF and comparison sample starting with the aggregated sample (including Côte d’Ivoire and Ghana) and then for each country separately.

Before presenting the comparison, it is worthwhile to note that the WCF communities had poorer infrastructure (e.g., improved road, access to primary school, access to electricity grid etc.) than the comparison communities with more prominent differences in Ghana. As a result, the **naïve “unconditional differences”** do not account for underlying infrastructural, socio-economic- agro-climatic and other factors that might have influenced the potential differences in key outcome indicators beyond their treatment status. Thus, **any observed differences between the full set of comparison sample and the treatment sample cannot be taken as evidence of causality** (i.e., caused by the treatment).

##### 8.4.1. Comparison of engagement of children in cocoa work

Working children, as per an ILO and ICLS framework<sup>29</sup>, are defined as children (5 – 17 years old) who have worked at least one hour during the reference period in any economic activity, either paid or unpaid. For this study, the category of children working in cocoa includes both children in permissible light work and children in child labor.<sup>30</sup>

Table 31 presents children’s engagement in cocoa production for the last twelve months in aggregate, for Côte d’Ivoire and for Ghana.

Table 31: Children’s Engagement in Cocoa Production, All Agricultural Households, in Côte d’Ivoire and Ghana, 2018/19

	WCF	ILAB	Diff (pp)*	Sig of diff^
<b>Total</b>				
% of all children	49%	49%	0	
<b>Côte d’Ivoire</b>				
% of all Ivoirian children	31%	42%	-10	***
<b>Ghana</b>				
% of all Ghanaian children	63%	56%	7	***

Source: WCF & ILAB Child survey

\*Calculated as the difference between the WCF and ILAB rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The data presented above indicate that there was no difference in children’s engagement in cocoa production over the past twelve months in the aggregate between the WCF and the comparison sample.

<sup>29</sup> International Labour Organization (ILO), Report III: Child Labour Statistics, 18th International Conference of Labour Statisticians, Geneva, (November 24 – December 2008).

<sup>30</sup> It is important to note that, the definition of working children does not include children performing household chores within their own households.

However, a higher proportion of children in the WCF sample were engaged in cocoa work in Ghana, while the reverse was observed in Côte d'Ivoire.

#### 8.4.2. Comparison of engagement of children in child labor and hazardous work in cocoa production

Next we present the summary data on the main outcome of the report – the prevalence rates of child labor and hazardous child labor in cocoa production. Children who violated maximum allowable working hours (specific to each age group) and/or were exposed to any of the six different types of hazardous activities in cocoa production are considered as being exposed to child labor in cocoa production. Table 32 compares the prevalence rates of child labor and exposure to hazardous work in cocoa production for the WCF and comparison samples. **It is worthwhile to reiterate that the simple comparison of summary statistics presented below cannot be used to infer causality since the treatment and comparison communities were different with respect to various community characteristics that could have influenced the observed prevalence rates and thus need to be controlled for to assess the impact of the *Industry Intervention Package*.** The differences presented here in this section indicate the current status of the two groups and can be influenced by their historical differences to start with in addition to any influence of the intervention.

Table 32: Estimates of Children Engaged in Child Labor in Cocoa Production, and Children Engaged in Hazardous Work in the Cocoa Sector in the Last 12 Months, 5-17 Years, All Agricultural Households, in Côte d'Ivoire and Ghana, 2018/19

Children in all agricultural households		Children Engaged in Child Labor in Cocoa Production			Children Engaged in Hazardous Work in Cocoa Production		
		Percent	Diff (pp)*	Sig of diff <sup>^</sup>	Percent	Diff (pp)*	Sig of diff <sup>^</sup>
Total	WCF	42%	4	***	39%	5	***
	ILAB	46%			43%		
Côte d'Ivoire	WCF	26%	13	***	24%	14	***
	ILAB	40%			39%		
Ghana	WCF	54%	-3	*	50%	-2	
	ILAB	51%			48%		

Source: WCF & ILAB Child survey

\*Calculated as the difference between the WCF and ILAB rates in percentage points

<sup>^</sup>Significance of Difference \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Data reported in Table 32 show that 42 percent of children in the sample of WCF communities were engaged as child labor in cocoa production compared to 46 percent of children in the comparison sample. The difference was statistically significant indicating that the prevalence rate of child labor was lower among the households in the WCF sample compared to the comparison sample. The child labor prevalence rate in Côte d'Ivoire was 13 percentage points lower in the WCF households than in the comparison households, and the reverse was true in Ghana where the child labor prevalence rate was higher among the households in the WCF sample.

It is important to note that communities selected for interventions in Ghana by WCF partners were typically higher risk communities with lower income as well as poor infrastructure than the comparison communities<sup>31</sup> indicating that there is a possibility that given these differences in observable community characteristics, the child labor rates in the treatment communities were historically higher to start with. The differences presented here do not account for the differences in the infrastructure and other socio-economic factors that might have influenced the rate of child labor in a community. Also, it is

<sup>31</sup> Please refer to Table 38 in Annex 8.5.1 which presents the differences in community characteristics between the WCF and the comparison communities.

worthwhile to note that the treatment communities in Ghana included communities where interventions were already completed at least two years prior to the surveys and the supply chain connections were no longer involved in the community.

In the WCF sample, 39 percent of children were engaged in any of the six types of hazardous work in cocoa production. The difference in the prevalence rates between the comparison sample and the WCF sample was statistically significant with 43 percent of children in the comparison households engaged in hazardous work in cocoa production. Therefore, the WCF sample had a lower prevalence of hazardous child labor in cocoa production than the comparison sample. Country disaggregation shows that the prevalence rates of hazardous child labor were lower in the WCF sample than in the comparison sample for Côte d'Ivoire (by 14 percentage points), while the difference in prevalence rates between the two samples for hazardous child labor was not statistically significant in Ghana.

#### **8.4.3. Children's Engagement in Different Types of Hazardous Work in Cocoa Production**

In this section, we compare the exposure to the six types of hazardous work activities. In aggregate, exposure to five of the six types of hazardous work activities was lower in the WCF sample than in the comparison sample. However, these differences are relatively small in magnitude (no larger than 6 percentage points) and primarily driven by large differences in Côte d'Ivoire combined with stable numbers in Ghana.

In Côte d'Ivoire, more than double the proportion of children in the comparison sample (28%) were exposed to heavy loads than in the WCF sample (12%). Similarly, the proportion of children using sharp tools was 13 percentage points higher in the comparison sample (32%), versus the WCF sample (19%). The only significant difference between the samples in Ghana was for land clearing, which was 3 percentage points lower in the WCF sample than the comparison sample.



Table 33: Estimates of Percentages of all Children Exposed to Hazardous Work Activities in the Cocoa Sector, 5-17 Years, All Agricultural Households, in Côte d'Ivoire and Ghana, 2018/19

Percentage of children in agricultural households exposed to:	Total				Côte d'Ivoire				Ghana			
	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^
<b>Hazardous Work Activities</b>												
Land clearing in cocoa (V1)	13%	18%	-5	***	16%	23%	-7	***	10%	13%	-3	**
Heavy loads in cocoa (V2)	22%	28%	-6	***	12%	28%	-16	***	30%	28%	1	
Agro-chemicals in cocoa (V3)	23%	26%	-3	***	13%	21%	-8	***	32%	31%	1	
Sharp tools in cocoa (V4)	31%	36%	-6	***	19%	32%	-13	***	40%	41%	0	
Long working hours in cocoa (V5)	1%	1%	0		1%	1%	0		0%	0%	0	
Night work in cocoa (V6)	1%	2%	-1	***	0%	2%	-2	***	2%	2%	0	
Exposed to one or more variables in cocoa work	39%	43%	-5	***	24%	39%	-14	***	50%	48%	2	

Source: WCF & ILAB Child survey

\*Calculated as the difference between the WCF and ILAB rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

#### 8.4.4. Children’s Engagement in Multiple Hazardous Work in Cocoa Production

In this section we explore the prevalence of exposure to multiple types of hazardous work activities for children who worked in cocoa production. As stated earlier, 79 percent of children working in cocoa production in the WCF sample were exposed to at least one hazardous activity in 2018/19. In contrast, a significantly greater proportion of children (89%) working in cocoa production were exposed to at least one hazardous activity in the comparison sample. This difference was even more pronounced in Côte d’Ivoire. The proportion of children working in cocoa production exposed to any hazardous activities was 15 percentage points higher among children in the comparison sample than the WCF sample (93% versus 78%) in Côte d’Ivoire.

Additionally, a lower proportion of child in the WCF sample were exposed to three or more hazards. Overall, while 35 percent of children working in cocoa were exposed to three or more hazards in the WCF sample, while in the comparison sample 45 percent of children working in cocoa were exposed to three or more hazards. In Côte d’Ivoire, 40 percent of children in the WCF sample were exposed to three or more hazards compared to 54 percent in the comparison sample. This finding shows that the children who were working in cocoa production in the WCF sample were less typically vulnerable to significant number of hazards (three or more) than the children in the comparison sample. However, this difference is not an evidence of impact, rather just indicative of the difference that could have been contributed by various other factors including the pre-existing difference in community characteristics.

Table 34: Estimates of Children Working in Cocoa Production of Exposed to Hazardous Work Activities in Cocoa Households, 5-17 Years, in Côte d'Ivoire and Ghana, 2018/19

Percent of children exposed to hazardous work (V1-V6)	Total				Côte d'Ivoire				Ghana			
	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^
Not exposed to any hazard	21%	11%	10	***	22%	7%	15	***	21%	14%	6	***
1 type of hazard	22%	19%	3	*	18%	17%	1		24%	21%	3	
2 types of hazard	22%	24%	-2		20%	22%	-1		22%	26%	-4	*
3 types of hazard	23%	23%	0		23%	23%	1		23%	24%	-1	
4 types of hazard	12%	19%	-7	***	16%	26%	-10	***	10%	13%	-3	**
5 types of hazard	1%	3%	-3	***	1%	5%	-4	***	1%	2%	-1	**
Exposed to at least 1 hazard	79%	89%	-10	***	78%	93%	-15	***	79%	86%	-6	***
Exposed to at least 2 hazards	57%	69%	-12	***	60%	76%	-15	***	56%	65%	-9	***
Exposed to at least 3 hazards	35%	45%	-10	***	40%	54%	-14	***	34%	39%	-6	**

Source: WCF & ILAB Child survey

\*Calculated as the difference between the Côte d'Ivoire and Ghana rates in percentage points

^Significance of Difference \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### 8.4.5. Children’s Exposure to Various Components of Agro-Chemical Use

Table 35 presents the data on exposure to agro-chemicals broken down into different sub-components for children working in cocoa production in the WCF and comparison samples. A smaller percentage of children working in cocoa production were present or worked in the vicinity of farm during pesticide application in the WCF sample than in the comparison sample. This difference is primarily driven by the large difference in Côte d’Ivoire between the comparison and WCF samples. Similarly, a smaller

percentage of children working in cocoa production were involved in working with agrochemical products in the WCF sample than in the comparison sample (13% versus 17%).

Table 35: Disaggregation of Exposure to Agro-Chemicals, Children Working in Cocoa Production in the Last 12 Months, All Agricultural Households, in Côte d'Ivoire and Ghana, 2018/19

Percentage of children working in cocoa exposed to V3 (agro-chemicals)	Total				Côte d'Ivoire				Ghana			
	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^
<b>Percent exposed to V3 (agro-chemicals)</b>	48%	54%	-6	***	41%	51%	-10	***	50%	56%	-6	**
Spraying pesticides or insecticides	4%	5%	-2	**	5%	7%	-1		3%	4%	-2	*
Being present/working in vicinity of farm during pesticide spraying	19%	25%	-6	***	14%	26%	-12	***	21%	24%	-3	
Reentering a sprayed farm within less than 12 hours of spraying	9%	10%	-1		9%	12%	-3		9%	9%	0	
Carrying water for spraying	39%	39%	0		32%	33%	-2		43%	43%	0	
Having been involved in working with agrochemicals**	13%	17%	-4	**	9%	15%	-5	**	15%	19%	-4	*

Source: WCF & ILAB Child survey

\*Calculated as the difference between the WCF and ILAB rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

\*\*Such as purchasing, transport, storage, mixing, loading, spraying/applying, washing of containers and spraying machine, and/or disposal

#### 8.4.6. School Attendance among Children, Children Working in Cocoa Production, Children Engaged in Child Labor in Cocoa Production and Children Engaged in Hazardous Work in Cocoa Production

Next, we focus on the relationship between school attendance and child labor in Côte d'Ivoire and Ghana. The vast majority of all children in agricultural household, children working in cocoa, children engaged in child labor and in hazardous work in cocoa production were attending school for all age groups. There were marginal but statistically significant differences in school attendance between the WCF and comparison samples among children 5-11 and children aged 12-14 in agricultural households, children working in cocoa, children engaged in child labor and hazardous child labor. This indicates that in the WCF sample, children in general, as well as those engaged as child labor and hazardous child labor had slightly better school attendance. However, most of these differences were not statistically significant at the individual country level, but only prevalent for the total sample.

Table 36: School Attendance for All Children, Children Working in Cocoa, Children Engaged in Child Labor in Cocoa Production and Children Engaged in Hazardous Work in Cocoa Production, All Agricultural Households, 5-17 Years, in Côte d'Ivoire and Ghana 2018/19

Age Group Attending School	Total				Côte d'Ivoire				Ghana			
	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^
<b>Children in Agricultural Households</b>												
5-11 Years	92%	88%	4%	***	85%	80%	6%	***	98%	96%	2%	**
12-14 Years	95%	91%	3%	**	88%	85%	3%		99%	98%	1%	
15-17 Years	82%	77%	5%	*	72%	64%	8%		89%	88%	1%	
<b>Children Working in Cocoa Production</b>												
5-11 Years	96%	94%	3%	**	94%	90%	4%		98%	97%	1%	
12-14 Years	96%	91%	5%	***	88%	82%	6%		98%	98%	1%	
15-17 Years	84%	78%	6%	*	69%	66%	3%		91%	87%	4%	
<b>Children Engaged in Child Labor in Cocoa Production</b>												
5-11 Years	96%	94%	2%	*	94%	91%	3%		97%	96%	1%	
12-14 Years	96%	91%	5%	**	89%	83%	6%		98%	97%	1%	
15-17 Years	83%	78%	4%		65%	66%	-1%		90%	87%	4%	
<b>Children Engaged in Hazardous Work in Cocoa Production</b>												
5-11 Years	97%	94%	3%	*	94%	91%	4%		97%	96%	1%	
12-14 Years	96%	91%	5%	***	90%	83%	7%		98%	97%	1%	
15-17 Years	83%	78%	4%		65%	66%	-1%		90%	87%	4%	

Source: WCF & ILAB Child survey

\*Calculated as the difference between the WCF and ILAB rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

#### 8.4.7. Basic Literacy and Numeracy among Children Working in Cocoa Production, Children Engaged in Child Labor in Cocoa Production and Children Engaged in Hazardous Work in Cocoa Production

In order to understand the basic educational achievement of children working in cocoa production in we present data on basic literacy and basic numeracy among children in the WCF and comparison samples in Table 37. We also present the same data for children engaged in child labor and in hazardous child labor in cocoa production. Measurement of basic literacy involves two dimensions; the ability to read a short simple statement and ability to write a short simple statement. Numeracy is measured through the ability to perform simple calculations.

Table 37: Basic Literacy and Numeracy for Children Working in Cocoa Production, Children Engaged in Child Labor in Cocoa Production and Children Engaged in Hazardous Work in Cocoa Production, All Agricultural Households, 5-17 Years, in Côte d'Ivoire and Ghana, 2018/19

Children working in cocoa production, 5-17 years	Total				Côte d'Ivoire				Ghana			
	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^	WCF	ILAB	Diff (pp)*	Sig of diff^
<b>Children in Cocoa Production</b>												
Read short simple statement	67%	57%	10%	***	59%	46%	13%	***	70%	64%	6%	***
Write short simple statement	68%	57%	11%	***	62%	52%	10%	***	71%	60%	10%	***
Perform simple calculations	79%	71%	8%	***	73%	61%	12%	***	82%	79%	3%	
<b>Children Engaged in Child Labor in Cocoa Production</b>												
Read a short simple statement	69%	57%	11%	***	61%	47%	14%	***	72%	65%	7%	***
Write a short simple statement	70%	57%	13%	***	64%	52%	12%	***	73%	61%	11%	***
Perform simple calculations	79%	72%	7%	***	73%	61%	13%	***	81%	80%	2%	
<b>Children Engaged in Hazardous Work in Cocoa Production</b>												
Read a short simple statement	69%	57%	12%	***	62%	47%	14%	***	73%	65%	7%	***
Write a short simple statement	72%	58%	14%	***	65%	52%	13%	***	75%	62%	13%	***
Perform simple calculations	80%	72%	7%	***	74%	61%	12%	***	82%	81%	1%	

Source: WCF & ILAB Child survey

\*Calculated as the difference between the WCF and ILAB rates in percentage points

^Significance of Difference \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Overall, more than 65 percent of children working in cocoa production were literate (who can read or write a short simple statement) and 75 percent can perform basic calculations. Additionally, children working in cocoa production in the WCF sample had higher rates of literacy and numeracy (by 8 to 11 percentage points) than the children in the comparison sample. In both countries the literacy rate was higher for children in the WCF sample than the comparison sample. Similar trends were found among the children who were engaged in child labor and in hazardous child labor in cocoa with significantly better literacy and numeracy scores in the WCF sample than the comparison sample.

## 8.5. Annex V: Supplementary Quantitative Analysis

### 8.5.1. Construction of Counterfactual

It is likely that the Implementing Partners' (IPs') choice of which communities to be selected for implementing multiple interventions was not random. This means that the potential effects of purposive selection must be disentangled from the effect of the intervention itself. Otherwise, a "selection bias" may exist, leading the evaluator to risk misattributing impact or lack thereof. This is especially likely in the present case where only an endline and no baseline is available. For example, if IPs selected communities (possibly unwittingly) based on proximity to major roads (ease of access to the community)

and major roads facilitated business, then testing the effectiveness of multiple interventions by comparing treated communities to untreated communities might simply be picking up the effect of proximity to a major road, not the effectiveness of multiple interventions.

To mitigate the potential for community selection bias we statistically match communities that received intervention combinations to the communities that did not receive any intervention (comparison communities). The statistical matching method is used to identify a set of comparison communities that are very similar to the treatment communities with respect to observable characteristics that are correlated to selection of sites by the implementers and that may at the same time affect child labor outcomes.

Based on the observed differences in community characteristics and our understanding of the selection process of communities by IPs, we identified the community characteristics that likely played important role in the selection process. For the purpose of understanding the differences, in our matching process, we first used the survey data (from the community leaders' survey as well as from household survey) to explore if there were some particular characteristics that differentiate the communities that received multiple treatments from those received no intervention (comparison communities).

These variables considered can be classified as community infrastructure indicators (having access to improved road, access to grid electricity), remoteness indicator (community more than 20 km away from the district capital), indicator of access to school (primary school is nearby), economic indicators (whether the community is a low income community<sup>32</sup>), and relative importance of cocoa (whether cocoa is the most important source of income and whether cocoa production is relatively new in the community<sup>33</sup>).

Then we used statistical matching techniques to identify a set of treatment and comparison communities that are most similar with respect to observed characteristics that were expected to influence IP's community selection process.

In order to generate the counterfactual that is robust to the choice of matching method, among various potential matching methods to select set of treatment and comparison communities that are similar with respect to key community characteristics, we used one to one matching based on Mahalanobis metric matching (distance matching). The matching based on the Mahalanobis metric measures is a non-parametric method and is considered to have superior performance than other popular alternative matching methods such as the Propensity Score Matching (PSM). Here it is important to remember that the objective was to identify a set of treatment and comparison communities that are very similar with respect to community characteristics that influence community selection by the implementers and also outcomes. We used matching with replacement (so one comparison community was allowed to serve as a match for more than one treatment community if it was more similar to a given treatment community than other potential comparison communities based on its similarity of characteristics to the treatment community in consideration).

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<sup>32</sup> A community is classified as "low income" community if more than 50 percent of the respondents of the community had income within the bottom 40 percentile of income distribution for each country.

<sup>33</sup> The indicator variable included was a dummy variable that takes value one if more than 50 percent of the cocoa trees in the community were planted less than 10 years ago.

As described in Section 3 we selected treatment communities as the communities where the interventions were implemented for at least three years before the survey (i.e., communities where interventions started before 2016) and those received at least four types of interventions. From the industry intervention database, we had total 76 communities in each country were selected as treatment community.

For the comparison communities, we used the communities from the ILAB 2018/19 survey that did not receive any interventions from the *Industry Intervention Package*. There were total 41 such communities in each country that did not receive any intervention, and hence were used as the comparison communities to be matched with the 76 treatment communities in each country.

The statistical matching applied to the 76 treatment and 41 comparison communities in Côte d’Ivoire and Ghana in order to create two groups of communities such that the average value on an array of variables was the same for both groups (i.e., the groups of communities were statistically “balanced”).

Below we present the results of the Mahalanobis metric matching. In Côte d’Ivoire Mahalanobis metric matching led to a group of 48 treatment communities and 9 comparison communities that were perfectly balanced with respect the set of characteristics used in matching reported above.<sup>34</sup> The following tables present the results of balance check before and after the matching was applied.

Table 38: Matching Balance Check: Covariates before and after Mahalanobis Metric Matching in Côte d’Ivoire

	Comparison	Treatment	Diff	P-value	Comparison	Treatment
	Before				After	
Dummy: Primary school within 1 KM	0.98	0.79	18%	0.01	1.00	1.00
Dummy: Community has improved road	0.38	0.30	7%	0.43	0.29	0.29
Dummy: Community has electrical grid	0.63	0.48	15%	0.14	0.65	0.65
Dummy: Market within 10 KM	0.08	0.10	-2%	0.71	0.00	0.00
Dummy: Low income community	0.33	0.23	9%	0.29	0.08	0.08
Dummy: Cocoa is the most important source of income in community	0.85	0.97	-12%	0.02	1.00	1.00
Dummy: Community has more than half of cocoa trees planted in in last 10 years	0.50	0.23	27%	1.00	0.23	0.23

Based on the matching outcome, the sample of matched communities all had primary school within one KM from the community and all had cocoa as the most important source of income in the community. As a consequence, the external validity of the impact results is limited to the communities with primary school and communities where cocoa is the most important source of income.

In Ghana Mahalanobis metric matching led to a group of 39 treatment communities and 9 comparison communities that were perfectly balanced<sup>35</sup> with respect the set of characteristics used in matching reported above. The following tables present the results of balance check before and after the matching was applied.

<sup>34</sup> This indicates that a comparison community might have been used more than once as a match of different treated communities following matching with replacement.

<sup>35</sup> This indicates that a comparison community might have been used more than once as a match of different treated communities following matching with replacement.



Table 39: Matching Balance Check: Covariates before and after Mahalanobis Metric Matching in Ghana

	Comparison	Treatment	Diff	P-value	Comparison	Treatment
	Before				After	
Dummy: Primary school within 1 KM	0.92	0.82	10%	0.18	0.90	0.90
Dummy: Community has improved road	0.41	0.24	17%	0.08	0.31	0.31
Dummy: Community has electrical grid	0.95	0.64	30%	0.00	0.92	0.92
Dummy: Market within 10 KM	0.08	0.37	-29%	0.00	0.23	0.23
Dummy: Low income community	0.11	0.39	-28%	0.00	0.23	0.23
Dummy: Cocoa is the most important source of income in community	0.92	0.97	-5%	0.25	0.97	0.97
Dummy: Community has more than half of cocoa trees planted in last 10 years	0.92	0.82	10%	0.18	0.90	0.90

The matched treatment and comparison communities constructed the dataset that we used to assess the impact of intervention combinations on the prevalence of children’s engagement in child labor and in hazardous child labor.

### 8.5.2. Attribution model to estimate the impact of multiple interventions

#### 8.5.2.1. Literature review

In order to assess the impact of the *Industry Intervention Package* on child labor and hazardous child labor, we first need to identify the various channels through which interventions influence child labor. Through a literature review, we identified the following factors that typically affect child labor and, correspondingly, the major channels through which these factors affect and moderate child-labor outcomes: poverty, opportunity costs of child labor, household composition, access to capital markets, regulatory factors and production-related factors.

Poverty, especially in the form of adult household members’ wages, has been shown to have an important influence on child labor. Blunch, in an evaluation of the 1997 Core Welfare Indicators Survey in Ghana, finds that “Poverty affects the likelihood of engaging in harmful child labor positively.” Edmonds’s 2001 study (as cited in Basu and Tzannatos 2003), found that increased household income can explain 94 percent of the decline in child labor for households at the poverty line, illustrating the key role that income plays with regards to the level of child labor. This is also documented by Levy (1985), Rosenzweig (1981), Sakellariou and Lall (1998), and Cartwright (1998) who find that increases in women’s wages significantly decrease female child labor (as cited in Canagarajah and Nielsen 2001). In fact, the first two of these studies find that “that a 10 percent increase in women’s wage rates would decrease the female child’s labor force participation by as much as 10 percent”, while the last two “reach a similar conclusion.” Together, these studies highlight the important influence of poverty, and especially of wages, on child labor rates.

Opportunity costs, in the form of the expected returns to labor and its clearest substitute —education, also play an important role in affecting child labor. The daily wage earned through child labor, for example has a significant positive impact on the hours of work for children, according to Bhalotra and Heady (1998), as cited in Canagarajah and Nielsen (2001). The returns on child labor are also variable based on farm size, such that larger farms, which require more labor, but which do not have the ability to mechanize, see increased child labor.

Households also weigh the potential returns to education and its costs when determining the level of child labor. In an analysis of child labor in Zambia, Nielsen (1998), using the school's roofing as a proxy for school quality, found that in some cases, a school roof's poor condition increases the probability of working by 15 percentage points (as cited in Canagarajah and Nielsen (2001)). Accessibility to a primary school is likewise a determinant of child labor, as shown by Nielsen (1998) who found that presence of a primary school increases school attendance by 10 percentage points in some cases, whereas the availability of a passable road decreases child labor by more than 10 percentage points and also increases school attendance significantly. As children lack the agency to make these decisions themselves, their guardians will weigh these factors, the demand for labor and its expected returns, against the supply, quality and returns to education when determining levels of child labor.

Also, at play within these decisions is the household's composition, which includes household size and education levels, and shows intra-household variance for child labor based on age. This latter condition is summarized in the idea of "sibling complementarity," described by Basu and Tzannatos (2003) as the condition "where one child's labor makes it possible for another child to go to school." Citing DeGraff, Bilsborrow, and Herriman (1993), Canagarajah and Nielsen (2001) noted that the incidence of child labor is higher for the older children than for the younger children. Complementary to this, Nielsen (1998) finds that the higher the number of older siblings, the lower the probability of working and the higher the probability of attending school. Younger children, therefore, should be less likely to engage in child labor than their older siblings.

The relationship between age and child labor, however, is more complicated when considering the ages of older household members and the age of the household head. Grootaert (1998) and Nielsen (1998), for example, find that the higher the age of the household head the lower the probability of working. This is presumably influenced by the household head's own increased wealth over time. Older household members, on the other hand, who may themselves affect the dependency ratio in the household, have a negative impact on school attendance. Canagarajah and Coulombe (1998), for example, "find that the presence of household members older than 60 increases the probability of working and decreases the probability of attending school. In Ghana, the effect varies from 1 to 4 percentage points (Canagarajah and Nielsen, (2001). These impacts highlight the differential effects of household distributions within and across generations on child labor.

Capital markets are likewise a determinant of child labor, especially as it relates to the ability of a household to manage shocks. Households that lack access to credit and assets to shed see the greatest increase in child labor from such shocks. Nielsen (1998) finds that an indicator for whether or not a household owns an asset has a significant effect on both the probability of working and the probability of attending school by as much as 10-percentage-points.

However, regulatory factors can also include informal mechanisms such as culture, which dictate the cultural norms around child labor. Coulombe evaluates the differences of child labor as they related to religion and finds that Christians are more likely to attend school, and in rural areas they are also less likely to work than Muslims and those who practice traditional religion (Coulombe, 1998). He further finds that traditions and attitudes have a significant impact on child labor and can increase the probability of child labor by 30 percentage points. Similar to this, Webbink (2013) finds that culture context has a significant effect and that these factors affect child labor generally and may also have differential effects based on the gender of the child.

Production-related factors also serve an important role in determining child labor and are influenced by the sector, mode of production, and pricing for products. Perhaps most fundamental to production-related factors are the differential labor demands for across products and the ability for children to supply the required labor for these goods. In a rural setting, for example, the labor demands for different agricultural crops may vary significantly as will the demands for child labor for irrigation or pesticides. Regulatory factors also overlap with production-related factors in such cases where production is gender-based, creating differential labor demands across children. For example, Cogneau (2012) finds that cocoa bean harvesting is more a male task, whereas plantains are more a female crop. Production-related factors can further differential child labor based on age, as Cogneau argues that young kids are probably too young to be put to work significantly in cocoa bean harvesting.

As illustrated above, the factors which influence child labor may interact with one another. There are also variations in the relative importance of these factors depending on the context and market under consideration. However, as the literature demonstrates, these factors are key mechanisms in determining the supply and demand for child labor. As such, these same factors of poverty, opportunity costs of child labor, household composition, access to capital markets, regulatory factors and production-related factors are the key avenues for affecting child-labor outcomes.

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#### 8.5.2.2. Modelling Child Labor and Hazardous Child Labor

One of the main objectives of this study is to assess how *Industry Intervention Package* affects the main outcome variables of interest - children’s engagement in child labor and hazardous work as well as their prevalence rates within a household.

For assessing the impact of the *Industry Intervention Package*, it is important to develop a model-based approach which will be able to empirically test whether, after controlling for observable influences of different factors, interventions affect the outcome variables of interest. For this purpose, we apply a regression framework using a two-step approach. First we used a theoretical model of the household (HH) decision-making process to identify factors that might influence children’s exposure to child labor and hazardous work in cocoa production. Then we estimate whether, after controlling for such factors, the interventions affect children’s exposure to child labor and hazardous work in cocoa production.

In this section we develop a generic model that examines the relationship between children’s exposure to child labor and hazardous work in cocoa production and their determinants using a theoretical model of the household’s decision-making process. This generic model will serve as the base of the empirical analysis to be undertaken for addressing the research questions on the influence of different interventions on children’s exposure to child labor and hazardous work in cocoa production.

There are several factors that might affect the trade-offs that a family faces between sending children to school and engaging them in child labor (CL) in production activities. Using guidance from the literature review of previous research studies, we developed a theoretical model that examines for community  $c$  the household’s decision to subject its children to child labor. The approach accounts for the head of household  $i$ ’s concern for their children’s welfare ( $W_{c,i}$ ), opportunity cost of child (hazardous) labor ( $O_{c,i}$ ), and the relevant household characteristics. Toward that end consider the following model:

$$L_{c,i}^{CL} = f\{(W_{c,i}); (O_{c,i}); (Z_{c,i}); \varepsilon_i\}$$

where  $L_{c,i}^{CL}$  is the observed child labor function, and  $Z_{c,i}$  are household characteristics and  $\varepsilon_i$  is Normal deviate. Consider each of the explanatory variables in turn.

Child welfare might be proxied by the number of children in household, ( $C_{c,i}$ ) (more children implies less concern), level of household member’s education, ( $E_{c,i}$ ) (the higher it is the more a child might be

valued) and, and head’s perception about child work and benefit of education ( $M_{c,i}$ ). These result in the following sub-model:

$$W_{c,i} = f\{(C_{c,i}); (E_{c,i}); (M_{c,i})\}$$

Child labor has two opportunity costs, one financial and immediate, the other investment- related and delayed. The financial component comprises wages foregone (or the child works) and wages paid out to a labor substitute. A potential proxy variable for these would be the average product of labor for a household ( $AP_{c,i}$ , which is a function of farm and household characteristics) and average wage in the community ( $w_V$ ). The investment component might be captured by school quality and infrastructure ( $SC_V$ ). These result in the following sub-model:

$$O_{c,i} = f\{(AP_{c,i}) (w_V); (SC_V)\}$$

Household characteristics might comprise the demographic influence ( $D_{c,i}$ , includes religion, number of household members, head age, proportion of children in different age groups, proportion of girl child in the household, whether household migrated, presence of non-relative children in household), household wealth and liquidity ( $HW_{c,i}$ ) and farming characteristics ( $F_{c,i}$ ).

$$Z_{c,i} = f\{(D_{c,i}); (HW_{c,i}); (F_{c,i})\}$$

Finally, these sub-models are substituted into the model for  $L_{c,i}^{CL}$  and the combination is estimated this using a reduced form specification:

$$L_{c,i}^{CL} = \beta_C C_{c,i} + \beta_E E_{c,i} + \beta_M M_{c,i} + \beta_{SC} SC_c + \beta'_D D_{c,i} + \beta'_H HW_{c,i} + \beta_H F_{c,i} + \beta_V V_c + u_{c,i}$$

where  $V_c$  is a set of village/community characteristics that influence opportunity cost and average wage (through labor demand) in the community<sup>36</sup> and  $u_{c,i}$  is the normal error term assumed to be independently and identically distributed.

This equation will be used as the fundamental model of child and hazardous labor while we estimate program impact as specified in Section 6.1. Based on this expression, of the child labor function above, the following sets of variables are included in the regressions:

- **Children number:** Number of children (total).
- **Household demographic characteristics:** Head age, gender, total adult members, total member with secondary/above education, proportion in different age groups (5-11, 12-14 & 15-17), proportion of girl child in the household, religion, whether family migrated and whether non-relative children live in HH).
- **Household Head’s perception:** Value for education of children (head believes children should complete at least secondary education).
- **Farming characteristics:** whether produce cocoa, type of crop produced.
- **Household wealth:** asset (indicator of home quality and household asset/wealth).
- **Community characteristics:** Importance of cocoa (cocoa is the most important source of income), infrastructure (has improved road, has cell phone coverage, has primary or junior high school within

<sup>36</sup> We hypothesized that wages are highly correlated with the average product of labor (APL) and then introduced an additional model in which the average product of labor is a function of farm and household characteristics which are included in the model.

2 KM, has senior high school within less than 5 KM), remoteness (distance from district capital more than 20 KM).

- **School quality/infrastructure:** Indicator variable of infrastructure (school has concrete building).

#### 8.5.2.3. Results of Regression Analysis: Estimation of Attribution Model

Next, we present the regression results of estimation of attribution model used to test whether the households in the communities where multiple interventions were implemented had a lower share of children in child labor and children exposed to hazardous child labor than the communities that were similar but did not receive such interventions.

We estimate two regression models: one where the outcome variable was the probability of a household having at least one child in child labor and in hazardous child labor; and the other with the outcome variable as the share of children engaged in child labor and in hazardous child labor in the households (proportion of children exposed to child labor and hazardous child labor in cocoa production). The models specified the outcome variables as a function of household, community, and school characteristics. Finally, the model tested whether, controlling for other covariates, there was any statistically significant difference in children's engagement in child labor and in hazardous child labor in cocoa production among the households in the treatment communities compared to the households in the matched comparison communities.

### 8.6. Annex VI: Supplementary Analysis Tables

Table 40 and Table 41 present the results where the outcome variables were the proportion of children in child labor and hazardous child labor in cocoa production in the community estimated using non-linear least square regression with binomial family and logit link function.

Table 40: Treatment effect on the Community-level prevalence rate of child labor in cocoa production: Average treatment effects estimates based on GLM

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
<b>Average Treatment Effect on community level prevalence rate of child labor in cocoa production:</b> Difference in the proportion of child labor in cocoa production in the communities exposed to multiple interventions for 3 or more years and in the communities that did not receive such interventions	-0.122** (0.051)	-0.117*** (0.040)	-0.116** (0.057)
<b>Regression Results:</b> Generalized Linear Model <sup>37</sup> : Dependent Variable: Proportion of children in child labor in cocoa production in the community			
Treatment Dummy: Community exposed to multiple interventions for 3 or more years	-0.536** (0.223)	-0.577*** (0.199)	-0.497** (0.245)
Dummy: Côte d'Ivoire	-1.097*** (0.218)		
Dummy: Primary or Junior High school within 2 KM	0.038 (0.246)		0.248 (0.247)
Dummy: Senior High School within 5 KM	-0.190 (0.247)	0.046 (0.340)	-0.369 (0.265)
Dummy: Community has cell phone coverage	0.607* (0.352)	1.299*** (0.381)	0.121 (0.211)
Dummy: District capital more than 20 KM	0.008 (0.265)	0.472** (0.222)	-0.093 (0.230)
Stratum Dummy: Medium cocoa production	0.444 (0.357)	0.691** (0.283)	-0.204 (0.346)
Stratum Dummy: Low cocoa production	0.435 (0.292)	-0.332 (0.271)	0.765*** (0.353)
Stratum Dummy: Unclassified	-0.043 (0.399)	-0.349 (0.508)	-0.017 (0.506)
Constant	-0.150 (0.448)	-0.302 (0.594)	-0.536 (0.329)
Observations	174	96	78

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

<sup>37</sup> Generalized non-linear least square regression with binomial family and logit link function, estimated using maximum likelihood estimation.

Table 41: Treatment effect on the Community-level prevalence rate of hazardous child labor in cocoa production: Average treatment effects estimates based on GLM

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
<b>Average Treatment Effect on community level prevalence rate of hazardous child labor in cocoa production:</b> Difference in the proportion of hazardous child labor in cocoa production in the communities exposed to multiple interventions for 3 or more years and in the communities that did not receive such interventions	-0.148***	-0.132***	-0.161***
	(0.049)	(0.035)	(0.056)
<b>Regression Results: Generalized Linear Model<sup>38</sup>:</b> Dependent Variable: Proportion of children in hazardous child labor in cocoa production in the community			
Treatment Dummy: Community exposed to multiple interventions for 3 or more years	-0.656***	-0.667***	-0.688***
	(0.214)	(0.180)	(0.244)
Dummy: Côte d'Ivoire	-1.076***		
	(0.209)		
Dummy: Primary or Junior High school within 2 KM	0.107		0.338
	(0.296)		(0.297)
Dummy: Senior High School within 5 KM	-0.305	-0.159	-0.490*
	(0.242)	(0.354)	(0.264)
Dummy: Community has cell phone coverage	0.606*	1.303***	0.163
	(0.349)	(0.369)	(0.191)
Dummy: District capital more than 20 KM	-0.001	0.468**	-0.103
	(0.249)	(0.210)	(0.231)
Stratum Dummy: Medium cocoa production	0.241	0.445	-0.422
	(0.345)	(0.283)	(0.353)
Stratum Dummy: Low cocoa production	0.250	-0.576**	0.556
	(0.292)	(0.263)	(0.359)
Stratum Dummy: Unclassified	-0.256	-0.489	-0.327
	(0.412)	(0.573)	(0.530)
Constant	-0.196	-0.364	-0.580*
	(0.469)	(0.640)	(0.333)
Observations	174	96	78

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 42 and Table 43 present the results where the outcome variables were the likelihood of children's exposure to child labor and hazardous child labor in cocoa production in a household estimated using logistic regression model. Table 44 and Table 45 present the results where the outcome variables were the share of children in child labor and hazardous child labor in cocoa production per household estimated using non-linear least square regression with binomial family and logit link function.

<sup>38</sup> Generalized non-linear least square regression with binomial family and logit link function, estimated using maximum likelihood estimation.



Table 42: Probit Regression: Likelihood of having at least one child engaged in child labor in cocoa production in agricultural household: Estimated Marginal Effects

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
Treatment Dummy: Household living in a community exposed to multiple interventions for 3 or more years	-0.150*** (0.0533)	-0.232*** (0.0574)	-0.129* (0.0702)
Total number of children	0.0999*** (0.0208)	0.0506** (0.0224)	0.113*** (0.0245)
% of 12-14 children	0.172 (0.114)	0.0466 (0.123)	0.383*** (0.0908)
% of 15-17 children	0.283* (0.150)	0.132 (0.138)	0.354** (0.145)
% of girl children 5-17	-0.255*** (0.0660)	-0.378*** (0.107)	-0.100** (0.0440)
Head age	0.0444 (0.0288)	0.119*** (0.0310)	0.00538* (0.00327)
Head age Squared	-0.000380 (0.000284)	-0.00112*** (0.000287)	-5.97e-06* (3.11e-06)
Dummy: Head is male	0.0596 (0.0543)	-0.106 (0.0897)	0.0488 (0.0615)
Total number of adults	-0.0368** (0.0182)	-0.0537** (0.0222)	-0.0193 (0.0290)
Number of adults with secondary/above education	-0.0147 (0.0439)	0.0862* (0.0466)	-0.0709* (0.0370)
Dummy: Non-relative children staying	0.159 (0.124)	0.352*** (0.114)	0.0180 (0.140)
Dummy: Christian	-0.121** (0.0589)	-0.00993 (0.0570)	-0.137*** (0.0463)
Dummy: Cocoa Household	0.399*** (0.0685)	0.460*** (0.0476)	0.234** (0.110)
Dummy: Household produce commercial crop	-0.128* (0.0733)	-0.104 (0.0793)	-0.250*** (0.0934)
Dummy: Household produce food crop	-0.00783 (0.0713)	0.00733 (0.0685)	0.0638 (0.0947)
Dummy: Household has livestock farm	-0.00545 (0.0487)	0.0137 (0.0548)	-0.0513 (0.0581)
Amount of cocoa sold in 2017/18 harvest	4.95e-06 (2.27e-05)	-1.48e-05 (3.46e-05)	6.15e-05** (3.07e-05)
Asset Index <sup>39</sup> : Home quality	-0.0555* (0.0289)	-0.0821* (0.0456)	-0.0147 (0.0352)
	-0.0369*	-0.00439	-0.0424**

<sup>39</sup> First Principal Component based index of home quality (having house made of stone/burnt brick/cement/concrete and having toilet inside house).

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
Asset Index <sup>40</sup> : Non-agricultural assets	(0.0200)	(0.0228)	(0.0169)
Dummy: Children's family migrated	0.0879 (0.0573)	0.238*** (0.0645)	-0.0350 (0.0641)
Dummy: HH Head value education <sup>41</sup>	-0.173*** (0.0626)	-0.141** (0.0664)	0.218 (0.296)
Dummy: Cocoa is most important source of income in community	0.0449 (0.107)		0.143 (0.119)
Dummy: Community has improved road	0.0398 (0.0718)	0.0115 (0.0844)	-0.130* (0.0682)
Dummy: District capital more than 20 KM	0.0152 (0.0662)	0.143 (0.0871)	0.0260 (0.0604)
Dummy: Community has cell phone coverage	0.0885 (0.0789)	0.251*** (0.0948)	0.121 (0.0948)
Dummy: Senior High School within 5 KM	-0.162*** (0.0554)	-0.100 (0.0927)	-0.0455 (0.0521)
Dummy: Primary or Junior High school within 2 KM	0.0363 (0.0896)		0.0164 (0.0727)
Dummy: Côte d'Ivoire	-0.372*** (0.0723)		
Proportion of school having concrete building	-0.0372 (0.0620)	-0.00769 (0.123)	-0.0708 (0.0684)
Stratum Dummy: Medium cocoa production	-0.0604 (0.0776)	0.119 (0.113)	-0.0374 (0.0655)
Stratum Dummy: Low cocoa production	-0.0263 (0.0726)	-0.0907 (0.110)	0.0822 (0.0631)
Stratum Dummy: Unclassified	-0.176* (0.0993)	-0.218** (0.0974)	-0.0390 (0.133)
Observations	2,028	1,109	919
Pseudo R-squared	0.325	0.428	0.390

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

<sup>40</sup> First Principal Component based index of ownership of household non-agricultural assets such as radio, TV, refrigerator, bicycle, motor bike, cell phone, computer, sewing machine, and car.

<sup>41</sup> HH Head value education: head believes children should complete at least secondary education.

Table 43: Likelihood of having at least one child engaged in hazardous child labor in cocoa production in agricultural household: Estimated Marginal Effects

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
Treatment Dummy: Household living in a community exposed to multiple interventions for 3 or more years	-0.174*** (0.0551)	-0.257*** (0.0563)	-0.161** (0.0749)
Total number of children	0.104*** (0.0215)	0.0517** (0.0222)	0.123*** (0.0255)
% of 12-14 children	0.230** (0.112)	0.0662 (0.122)	0.494*** (0.0940)
% of 15-17 children	0.338** (0.143)	0.144 (0.141)	0.456*** (0.147)
% of girl children 5-17	-0.269*** (0.0649)	-0.385*** (0.107)	-0.124*** (0.0479)
Head age	0.0372 (0.0298)	0.120*** (0.0304)	0.00327 (0.00377)
Head age Squared	-0.000321 (0.000291)	-0.00113*** (0.000281)	-3.99e-06 (3.57e-06)
Dummy: Head is male	0.0686 (0.0548)	-0.112 (0.0923)	0.0714 (0.0595)
Total number of adults	-0.0329* (0.0179)	-0.0504** (0.0231)	-0.0115 (0.0267)
Number of adults with secondary/above education	-0.0115 (0.0451)	0.0759 (0.0469)	-0.0776** (0.0374)
Dummy: Non-relative children staying	0.0511 (0.122)	0.372*** (0.112)	-0.216 (0.157)
Dummy: Christian	-0.108* (0.0592)	0.0193 (0.0588)	-0.146*** (0.0535)
Dummy: Cocoa Household	0.386*** (0.0676)	0.456*** (0.0450)	0.251** (0.115)
Dummy: Household produce commercial crop	-0.108 (0.0699)	-0.110 (0.0776)	-0.213** (0.0930)
Dummy: Household produce food crop	-0.0326 (0.0736)	-0.0180 (0.0689)	0.0673 (0.120)
Dummy: Household has livestock farm	0.00504 (0.0571)	0.0282 (0.0557)	-0.0587 (0.0644)
Amount of cocoa sold in 2017/18 harvest	3.83e-06 (2.42e-05)	-1.01e-05 (3.65e-05)	4.92e-05* (2.62e-05)
Asset Index <sup>42</sup> : Home quality	-0.0711*** (0.0261)	-0.0767* (0.0447)	-0.0343 (0.0324)
	-0.0433**	-0.0121	-0.0566***

<sup>42</sup> First Principal Component based index of home quality (having house made of stone/burnt brick/cement/concrete and having toilet inside house).

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
Asset Index <sup>43</sup> : Non-agricultural assets	(0.0191)	(0.0222)	(0.0159)
Dummy: Children's family migrated	0.0937* (0.0537)	0.237*** (0.0635)	-0.0453 (0.0660)
Dummy: HH Head value education <sup>44</sup>	-0.161** (0.0657)	-0.116* (0.0676)	0.108 (0.246)
Dummy: Cocoa is most important source of income in community	0.0523 (0.105)		0.178 (0.147)
Dummy: Community has improved road	0.0415 (0.0735)	-0.00127 (0.0890)	-0.146* (0.0849)
Dummy: District capital more than 20 KM	0.00188 (0.0652)	0.111 (0.0914)	0.0461 (0.0629)
Dummy: Community has cell phone coverage	0.0757 (0.0821)	0.259*** (0.0999)	0.0915 (0.104)
Dummy: Senior High School within 5 KM	-0.167*** (0.0584)	-0.102 (0.101)	-0.0549 (0.0570)
Dummy: Primary or Junior High school within 2 KM	0.0250 (0.0906)		0.00964 (0.0802)
Dummy: Côte d'Ivoire	-0.354*** (0.0747)		
Proportion of school having concrete building	-0.0105 (0.0612)	-0.0283 (0.125)	-0.0785 (0.0676)
Stratum Dummy: Medium cocoa production	-0.101 (0.0820)	0.110 (0.125)	-0.0698 (0.0834)
Stratum Dummy: Low cocoa production	-0.0794 (0.0774)	-0.109 (0.118)	0.0266 (0.0817)
Stratum Dummy: Unclassified	-0.239** (0.103)	-0.222** (0.101)	-0.110 (0.173)
Observations	2,028	1,109	919
Pseudo R-squared	0.330	0.433	0.410

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

<sup>43</sup> First Principal Component based index of ownership of household non-agricultural assets such as radio, TV, refrigerator, bicycle, motor bike, cell phone, computer, sewing machine, and car.

<sup>44</sup> HH Head value education: head believes children should complete at least secondary education.

Table 44: Treatment effect on the Household-level rate of child labor in cocoa production: Average treatment effects estimates based on GLM

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
<b>Average Treatment Effect on the rate of child labor in cocoa production:</b> Difference in the share of child labor per household in cocoa production in agricultural households in the communities exposed to multiple interventions for 3 or more years and agricultural households in the communities that did not receive such interventions	-0.098*** (0.033)	-0.129*** (0.031)	-0.107*** (0.034)
<b>Regression Results: Generalized Linear Model<sup>45</sup>: Dependent Variable: Share of children per household in child labor in cocoa production</b>			
Treatment Dummy: Household living in a community exposed to multiple interventions for 3 or more years	-0.519*** (0.184)	-0.852*** (0.221)	-0.545*** (0.200)
Total number of children	0.074 (0.051)	-0.023 (0.055)	0.160* (0.087)
% of 12-14 children	0.637 (0.432)	0.102 (0.532)	1.667*** (0.352)
% of 15-17 children	1.005* (0.524)	0.501 (0.553)	1.814** (0.726)
% of girl children 5-17	-0.931*** (0.283)	-1.527*** (0.463)	-0.379 (0.240)
Head age	0.084 (0.094)	0.270*** (0.093)	0.031** (0.013)
Head age Squared	-0.001 (0.001)	-0.003*** (0.001)	0.000*** (0.000)
Dummy: Head is male	0.038 (0.192)	0.061 (0.516)	-0.067 (0.233)
Total number of adults	-0.048 (0.060)	-0.099 (0.101)	-0.016 (0.153)
Number of adults with secondary/above education	-0.001 (0.147)	0.432* (0.238)	-0.338** (0.144)
Dummy: Non-relative children staying	0.141 (0.448)	0.394 (0.669)	-0.006 (0.503)
Dummy: Christian	-0.463** (0.195)	-0.208 (0.333)	-0.605** (0.279)
Dummy: Cocoa Household	1.865*** (0.438)	2.583*** (0.789)	0.929 (0.580)
Dummy: Household produce commercial crop	-0.311 (0.217)	-0.188 (0.219)	-0.698** (0.347)
Dummy: Household produce food crop	-0.102 (0.221)	0.055 (0.266)	-0.103 (0.441)
Dummy: Household has livestock farm	0.092	-0.081	0.104

<sup>45</sup> Generalized non-linear least square regression with binomial family and logit link function, estimated using maximum likelihood estimation.

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
	(0.186)	(0.326)	(0.275)
Amount of cocoa sold in 2017/18 harvest	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Asset Index <sup>46</sup> : Home quality	-0.118 (0.093)	-0.208 (0.171)	-0.005 (0.128)
Asset Index <sup>47</sup> : Non-agricultural assets	-0.121** (0.059)	-0.087 (0.066)	-0.121** (0.061)
Dummy: Children's family migrated	0.091 (0.222)	0.873*** (0.215)	-0.522** (0.247)
Dummy: HH Head value education <sup>48</sup>	-0.648*** (0.221)	-0.461* (0.246)	1.837 (1.275)
Dummy: Cocoa is most important source of income in community	0.881** (0.448)		1.012* (0.578)
Dummy: Community has improved road	0.062 (0.247)	-0.040 (0.323)	-0.603** (0.292)
Dummy: District capital more than 20 KM	-0.300 (0.243)	0.058 (0.255)	-0.160 (0.293)
Dummy: Community has cell phone coverage	0.244 (0.218)	0.748** (0.336)	0.831** (0.361)
Dummy: Senior High School within 5 KM	-0.324* (0.196)	-0.021 (0.336)	0.069 (0.273)
Dummy: Primary or Junior High school within 2 KM	-0.405 (0.314)		-0.068 (0.301)
Dummy: Côte d'Ivoire	-0.969*** (0.269)		
Proportion of school having concrete building	-0.218 (0.199)	-0.063 (0.394)	0.043 (0.251)
Stratum Dummy: Medium cocoa production	-0.038 (0.331)	0.491 (0.563)	-0.144 (0.366)
Stratum Dummy: Low cocoa production	-0.195 (0.307)	-0.629 (0.497)	0.591 (0.377)
Stratum Dummy: Unclassified	-0.361 (0.436)	-0.766 (0.625)	0.032 (0.569)
Constant	0.152 (0.264)	0.490 (0.410)	-0.018 (0.373)
Observations	2,028	1,109	919

Robust standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

<sup>46</sup> First Principal Component based index of home quality (having house made of stone/burnt brick/cement/concrete and having toilet inside house).

<sup>47</sup> First Principal Component based index of ownership of household non-agricultural assets such as radio, TV, refrigerator, bicycle, motor bike, cell phone, computer, sewing machine, and car.

<sup>48</sup> HH Head value education: head believes children should complete at least secondary education.

Table 45: Treatment effect on the rate of hazardous child labor in cocoa production: Average treatment effects estimates based on GLM

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
<b>Average Treatment Effect on the rate of hazardous child labor in cocoa production:</b> Difference in the share of hazardous child labor in cocoa production among agricultural households in the communities exposed to multiple interventions for 3 or more years and agricultural households in the communities that did not receive such interventions	-0.107*** (0.034)	-0.134*** (0.034)	-0.121*** (0.037)
<b>Regression Results: Generalized Linear Model<sup>49</sup>:</b> Dependent Variable: Proportion of children in hazardous child labor in cocoa production in agricultural household			
Treatment Dummy: Household living in a community exposed to multiple interventions for 3 or more years	-0.580*** (0.196)	-0.904*** (0.245)	-0.642*** (0.196)
Total number of children	0.087* (0.051)	-0.017 (0.054)	0.160* (0.089)
% of 12-14 children	0.853* (0.439)	0.167 (0.539)	2.028*** (0.371)
% of 15-17 children	1.223** (0.497)	0.584 (0.586)	2.098*** (0.643)
% of girl children 5-17	-1.006*** (0.281)	-1.670*** (0.447)	-0.445* (0.242)
Head age	0.057 (0.098)	0.269*** (0.096)	0.024* (0.014)
Head age Squared	0.000 (0.001)	-0.003*** (0.001)	0.000** (0.000)
Dummy: Head is male	0.060 (0.174)	0.135 (0.523)	-0.074 (0.200)
Total number of adults	-0.026 (0.057)	-0.073 (0.091)	0.062 (0.155)
Number of adults with secondary/above education	-0.011 (0.135)	0.331* (0.178)	-0.334** (0.144)
Dummy: Non-relative children staying	-0.138 (0.441)	0.541 (0.704)	-0.703* (0.427)
Dummy: Christian	-0.447** (0.214)	-0.113 (0.379)	-0.600** (0.290)
Dummy: Cocoa Household	1.777*** (0.462)	2.570*** (0.818)	0.936 (0.583)
Dummy: Household produce commercial crop	-0.226 (0.203)	-0.166 (0.209)	-0.560* (0.324)
Dummy: Household produce food crop	-0.171 (0.226)	-0.022 (0.272)	-0.091 (0.498)
Dummy: Household has livestock farm	0.078	0.022	0.029

<sup>49</sup> Generalized non-linear least square regression with binomial family and logit link function, estimated using maximum likelihood estimation.

	Total	Côte d'Ivoire	Ghana
	(1)	(2)	(3)
	(0.189)	(0.312)	(0.268)
Amount of cocoa sold in 2017/18 harvest	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Asset Index <sup>50</sup> : Home quality	-0.178** (0.083)	-0.157 (0.162)	-0.112 (0.102)
Asset Index <sup>51</sup> : Non-agricultural assets	-0.144** (0.057)	-0.098 (0.062)	-0.172*** (0.060)
Dummy: Children's family migrated	0.115 (0.225)	0.936*** (0.210)	-0.538** (0.260)
Dummy: HH Head value education <sup>52</sup>	-0.630*** (0.228)	-0.389 (0.253)	1.267 (1.259)
Dummy: Cocoa is most important source of income in community	0.682 (0.416)		0.761 (0.586)
Dummy: Community has improved road	0.123 (0.257)	-0.019 (0.359)	-0.536* (0.293)
Dummy: District capital more than 20 KM	-0.237 (0.238)	0.071 (0.274)	-0.027 (0.285)
Dummy: Community has cell phone coverage	0.169 (0.225)	0.756** (0.351)	0.812** (0.340)
Dummy: Secondary school within 5 KM	-0.427** (0.208)	-0.059 (0.346)	-0.042 (0.265)
Dummy: Primary or Junior High school within 2 KM	-0.362 (0.309)		0.094 (0.298)
Dummy: Côte d'Ivoire	-1.009*** (0.268)		
Dummy: School has concrete building	-0.132 (0.201)	-0.224 (0.420)	0.129 (0.211)
Stratum Dummy: Medium cocoa production	-0.246 (0.334)	0.290 (0.566)	-0.340 (0.371)
Stratum Dummy: Low cocoa production	-0.386 (0.313)	-0.860* (0.489)	0.475 (0.377)
Stratum Dummy: Unclassified	-0.520 (0.456)	-0.837 (0.621)	-0.067 (0.565)
Constant	0.116 (0.269)	0.442 (0.434)	0.069 (0.354)
Observations	2,028	1,109	919

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

<sup>50</sup> First Principal Component based index of home quality (having house made of stone/burnt brick/cement/concrete and having toilet inside house).

<sup>51</sup> First Principal Component based index of ownership of household non-agricultural assets such as radio, TV, refrigerator, bicycle, motor bike, cell phone, computer, sewing machine, and car.

<sup>52</sup> HH Head value education: head believes children should complete at least secondary education.



## 8.7. Annex VII: Caveats and limitations of Quantitative Analysis

While an extensive effort was undertaken to address the research questions posed by this study using appropriate statistical methods, it is important to point out some caveats and limitations of the methods adopted. Understanding the caveats and context will be useful while interpreting the findings of the evaluation of impact of Industry Child Labor Package.

**Model-based approach and sample-size issues:** One of the major factors weakening the ability of any evaluation methodology to detect impact in the context of the present intervention is the that the interventions being evaluated were not implemented (geographically or via roll-out) in a way that facilitated evaluation or addressed the study's research questions. Ideally, groups of communities would have been randomly assigned to receive the interventions (or various combinations of intervention categories). Such randomization could have been spatial or over time. Instead, the lack of random assignment was made even more challenging by the retrospective nature of the study, and a lack of baseline data on beneficiaries with the present one. This limited the evaluation to a single cross-section, preventing the conditioning of performance on baseline levels and reducing further the scope for identifying pre-treatment variables with which to construct a strong counterfactual. Facing such unfavorable constraints, we addressed the research questions using available data by retro-fitting a model-based approach onto a quasi-experimental design. There were two main consequences of this approach. First, a model-based approach is based on "observables", that is, only on factors that could be and were measurable. Thus, the credibility of the evaluation depends on the degree to which the salient explanatory variables (e.g., household skills, perceived opportunity costs of own-children) were not omitted from the attribution models' specifications and the modelling of how the implementers selected beneficiaries. While our approach modeled sources of selection very carefully and checked for relationships that were robust to specification perturbations, it is still not perfect and may be vulnerable to unknown inaccuracies and biases.

In addition, it is also important to note that since there was no pre-treatment data available for matching, there is a possibility that some of the variables used for matching may have been affected by the intervention. In order to avoid that endogeneity issue, the model used binary values of the matching variables, which minimizes the likelihood of potential endogeneity.

**Lack of a baseline.** While an evaluation can be rigorously conducted with just an endline (i.e., one cross-section), such an empirical strategy is not advisable when observational units have very different initial (pre-treatment) levels on characteristics thought to influence performance on the outcomes of interest. For example, with a single cross-section it is not possible to know whether a household that acknowledges engaging in two types of hazardous labor after treatment previously had engaged in four types or no types. The former suggests effective treatment and the latter ineffective treatment. The present evaluation was hobbled by the existence of just an endline when much greater precision was called for given all the other empirical challenges of the study.