International COCOA Initiative

The Impact of ICI's Community Development Programme in Ghana and Côte d'Ivoire on Child Labour

ICI Analysis

January 2021

This study was conducted by ICI to understand the impact of a three-year community development programme on child labour and its severity. The programme was funded from the contributions of ICI members.

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SUMMARY

Cocoa-growing communities in Côte d'Ivoire and Ghana face several development challenges, including limited access to quality education and basic health care services; weak physical infrastructure including roads, electricity and mobile telephone networks; dependence on a single livelihood source; and low agricultural productivity. Coupled with these is the involvement of children in hazardous activities in cocoa farming, which can affect their health and development and can also interfere with their school attendance. The International Cocoa Initiative (ICI) implemented a community development programme over 4 years (2015-2018) in cocoa-growing communities in Côte d'Ivoire and Ghana with the overall aim of improving these communities' capacity to protect children.

The study was conducted to complement an external evaluation of the ICI's community development programme, which assessed the impact of the programme at community level, e.g. by comparing changes in ICI-supported communities between 2015 and 2018 with changes in a similar set of non-assisted communities.[1] The evaluation concluded that the programme brought several positive impacts to the assisted communities, especially in relation to education, community mobilisation and women's empowerment, but it did not measure the impact of the programme on child labour.

This paper assesses the impact of ICI's Community Development Programme on the prevalence and severity of hazardous child labour by comparing data collected from the assisted communities to a selection of non-assisted communities in the same geographic areas.

The study uses child labour data from 504 households in 41 communities in Côte d'Ivoire (21 programme and 20 control communities), and 446 households in 24 communities in Ghana (14 programme and 10 control communities, collected in January 2019.

We examine five different outcome indicators in relation to child labour: : a child-level indicator of whether a child is engaged in hazardous work; a household-level indicator of whether any child in the household is engaged in hazardous work; the number of different hazardous tasks a child engaged in; and for children aged 12 years or older, the number of hours per day, and the number of days per week the child engaged in hazardous tasks;[2] and whether a child was enrolled in school.

To account for differences between programme and control communities, the study uses data on community-level indicators from ICI's PCCF tool (Protective Cocoa Community Framework, a community profiling and needs assessment tool), collected before the programme started in 2015 in programme and control communities.

Since community selection for the programme was informed by a set of community indicators, some of which may also be correlated with child outcomes, we expect that **child labour prevalence would differ between programme and control communities *even in the absence of the programme*. To address community selection bias in our**

[1] BIRD (2020) External Evaluation of ICI's Community Development Programme, 2015-2018

[2] These two indicators are calculated only for children aged 12 years or older because it is very difficult for younger children to provide reliable estimates on how long they have been doing hazardous work.

sample, we apply *propensity score matching* to establish a comparable reference group from our control communities, using the available baseline community data.

Côte d'Ivoire

When we look at the **prevalence of child labour** in communities in Côte d'Ivoire, we estimate that the programme has:

- **reduced the prevalence rate of hazardous child labour** in programme communities in Côte d'Ivoire by 10.6 percentage points, from an estimated 62% in control communities down to an estimated 51% in ICI assisted communities. This corresponds to a 17% reduction in the prevalence of hazardous child labour.
- **reduced the proportion of households with at least one child doing hazardous work** by 12 percentage points in ICI assisted communities, from an estimated 75% in control communities to an estimated 63% in ICI assisted communities, corresponding to a 16% reduction in hazardous child labour at household level.

The estimated effects on prevalence are statistically significant at the 10% level (in other words, the likelihood for these results to occur in these data *by chance* if such an effect was *not* present is lower than 10%).

When we look at the programme's impact on the **severity of child labour** in Côte d'Ivoire, our data indicate that the programme has:

- **reduced the average number of different hazardous tasks** children do from an estimated 1.3 in control communities to 1.1 in ICI assisted communities;
- **reduced the number of hours children spend working on hazardous tasks** in cocoa on a working day from an estimated 4'22h in control communities to an estimated 3'13h in ICI assisted communities (amongst children aged 12 years or older), corresponding to a 26% decrease in hours worked;
- **reduced the average number of days per week on which a child works** from an estimated 2.0 days in control communities to an estimated 1.8 days in ICI assisted communities (amongst children aged 12 years or older), corresponding to a 10% reduction in the number of days on which a child worked per week;
- **increased school enrolment** from an estimated 69% in control communities to an estimated 84% in ICI assisted communities, corresponding to a 22% increase.

The estimated effects on child labour severity are estimated with lower precision on a reduced sample.

Ghana

When we look at the **prevalence of child labour** in communities in Ghana, our estimates **suggest:**

- **a decrease in the prevalence of hazardous child labour among children** in programme communities, although this estimate is not **statistically significant**.
- **a decrease in the prevalence of child labour at *household* level**, although this estimate is not statistically significant.

The fact that our data do not allow us to find statistically significant effects on child labour prevalence in Ghana is partly explained by the relatively small sample size: a substantial share of control communities had to be discarded from the Ghana sample for lack of comparability to the programme communities.

When we look at the programme's impact on the **severity of child labour** in Ghana the results indicate that the programme has:

- not reduced the average number of different hazardous tasks children do in Ghana, but;
- **reduced the average number of hours children work on hazardous tasks in cocoa on a working day** from an estimated 1.28h in control communities to an estimated 1.03h in ICI assisted communities, corresponding to a 28% reduction in hours worked;
- **reduced the average number of days per week on which a child worked** from an estimated 1.0 in control communities to an estimated 0.7 in ICI assisted communities, corresponding to a 30% reduction in the number of days on which a child worked per week (this result is statistically significant at the 5% level);
- had **no significant effect on school enrolment in Ghana** (which already approaches 100% in all communities in the sample, leaving little room for improvement).

These results show that ICI's community development programme has achieved its key objective of reducing children's engagement in hazardous child labour in cocoa growing communities in Côte d'Ivoire. For Ghana, results are indicative of a decrease in child labour, but do not allow us to see a statistically significant effect, most likely due to the small sample size.

This study also makes a novel attempt to capture impact on child labour not only in terms of a binary outcome, but also in terms of child labour *severity:* we show that the ICI programme in both countries has resulted in children working less often and for fewer hours; and that in Côte d'Ivoire, children are also exposed to a smaller number of different hazards.

It is important to note that the community development programme was not designed to facilitate a robust evaluation of its impact on child labour, and baseline data on child labour prevalence were not collected at the start of the project. We therefore have had to resort to second-best impact evaluation methods, using observational data from a limited number of children from programme and control communities. While the method we apply is sufficiently solid to allow for the conclusion that tangible impacts were achieved in relation child labour in both countries, the precise estimates remain subject to potential bias, since unobserved differences between programme and control communities may not be accounted for.

The findings on child labour presented in this report should be viewed alongside the other impacts of the project in both countries, which are outlined in the external evaluation report.[3]

[3] BIRD (2020) External Evaluation of ICI's Community Development Programme, 2015-2018

INTRODUCTION

Cocoa-growing communities in Côte d'Ivoire and Ghana face several development challenges, including limited access to quality education, water, sanitation and basic health care services; weak physical infrastructure including roads, electricity and mobile networks; dependence on a single livelihood source; and low agricultural productivity. Coupled with these is the involvement of children in hazardous activities in cocoa farming. Children's participation in hazardous work can affect their health, moral and social development and can also prevent or limit their school attendance.

The International Cocoa Initiative (ICI) implemented a community development programme over 4 years (2015-2018) in cocoa-growing communities in Côte d'Ivoire and Ghana with the overall aim of improving these communities' capacity to protect children.

This paper assesses the impact of ICI's Community Development Programme on the prevalence and severity of hazardous child labour, by comparing data collected from the assisted communities to a selection of non-assisted communities in the same geographic areas.

Background

The strategic objectives of ICI's Community Development Programme were to: strengthen knowledge, capacities, systems and services that protect children and mitigate child labour at the local level through child-centred community development processes; and to empower communities – specifically women, children and youth – to take and enact decisions that better protect children and safeguard children's rights.

The programme included the following activities at the local level:

- community profiling and needs assessment
- definition, resourcing and implementation of "Community Action Plans" (CAP), defined in a participatory and inclusive process by community members, with the support of ICI, which outline the community's highest priority needs related to community development and child protection, and instrumental for lobbying government authorities on community's needs
- community awareness-raising about child labour and child protection issues set-up, capacity building
- mobilisation of community child protection committees, composed of male and female volunteers, whose main tasks are to conduct awareness raising activities related to child labour and the importance of education at community and household level, and to identify children at risk or engaged in child labour.
- activities to promote the participation and decision-making of women, youth and children, including savings groups, income generating activities, children's clubs
- building of partnerships with local government, businesses and civil society organisations to generate resources and meet needs in a coordinated, holistic manner
- improved access to quality education and vocational training, with improvements of educational infrastructure such as for example building or renovating school classrooms, latrines, water points at school, or teachers' accommodation, depending in the community's needs; setting-up bridging classes to facilitate the reintegration of out-of-school children into formal schooling, provision of school material and birth certificates for children identified at risk

- Set-up of “community service groups”, composed of young community members who are equipped with tools, protective clothing and footwear by ICI and trained to do specific hazardous tasks on the cocoa farm; farmers can then request their services at below market wages and thereby substitute children’s engagement in these tasks.

A total of 75 communities (46 communities in Côte d’Ivoire, 29 in Ghana) were selected for the programme in 2015, following an initial community-level needs assessment using ICI’s Protective Cocoa Community Framework (PCCF) tool. Community characteristics which were used to inform selection into the programme included: the overall level of community empowerment and economic development, accessibility of the community, community size, and access to basic services, including available education infrastructure. We know from existing research that several of these community selection criteria are also correlated with child labour prevalence. We therefore have reason to assume that the levels of child labour prevalence in the selected communities differed from that in the non-selected communities at baseline, which needs to be taken into account as we evaluate the impact of the programme on child labour.

Following selection of communities, programme implementation started progressively in 2015, with 58 communities (19 in Ghana and 38 in Côte d’Ivoire) receiving the first interventions in 2015, and 17 communities (10 in Ghana and 7 in Côte d’Ivoire) receiving the first interventions in 2016. Interventions continued until the end of 2018.

The following components were implemented in all 75 communities:

- Preparation of community development plans (CAP) and support for their implementation
- Set-up of Community Child Protection Committees (CCPC)

The following components were implemented in most communities:

- Support for Income Generating Activities (IGA), mainly for women
- Set-up and equipment of community service groups
- Set-up of Village Savings and Loans Associations (VSLA)
- Support to educational infrastructure (renovation or construction of classes, latrines, teachers’ accommodation
- Individual remediation activities for children at risk.

Study objective

The study seeks to estimate the impact of the Community Development Programme on child labour prevalence and severity, after three years of implementation. To do so, ICI uses child labour prevalence data collected in January 2019 in a sample of assisted and non-assisted (control) communities, and community-level data to account for community differences. Given that the programme had several components, not all of which were implemented in each community, the study does not aim to assess the impact of different components on respective beneficiaries, but **to estimate an overall average impact on children in programme communities**.

Sample

Data are available from 1,009 children living in 504 households in 41 communities in Côte d’Ivoire (21 programme and 20 control communities), and 861 children living in 446

households in 24 communities in Ghana (14 programme and 10 control communities; see Table 1 for an overview of the sample composition).

In **2015, an initial community-level assessment** (using ICI's PCCF tool, details described in the next section) was conducted in a larger number of communities. This information was used to inform selection of communities to be included in the programme. We use the non-selected communities to draw our **control sample**, and exploit these community-level baseline data to balance out initial differences between assisted and non-assisted communities.

The sample for the child labour prevalence survey was drawn irrespective of the number and type of interventions children or their households had participated in. In each community, approximately 12 households were randomly selected for interview. Within each household, two children were randomly selected for interview, from all children in the household aged 5 to 17. Hence, the sample comprises a range of beneficiaries who were exposed to the programme at different levels, where some may have benefitted directly from several activities targeted at selected groups of children or households, and others only from community-level interventions.

Table 1: Sample composition

	Programme communities	Control communities	Total
Côte d'Ivoire			
# children	518	491	1009
# households	260	244	504
# communities	21	20	41
Ghana			
# children	495	366	861
# households	259	187	446
# communities	14	10	24

Data

Community-level data were collected in both countries using ICI's community assessment tool, the Protective Cocoa Community Framework (PCCF), **in 2015 and again in 2019** by individuals hired and trained by ICI on the use of the tool. The PCCF collects information on a rich set of community characteristics to capture the community's overall level of development, community empowerment, child protection and women's empowerment. The following elements of these community-level data are of particular relevance because they were taken into consideration for selection of communities into the programme by ICI:

- Total population size
- Presence and quality of education infrastructure
- Access to infrastructure and other social services such as healthcare
- Presence of other NGOs

The **child labour prevalence survey** was conducted in January 2019 in programme and control communities in both countries. January falls in the main cocoa harvesting period in both countries and therefore in a period of high labour demand on the cocoa farms. In each community, 12 households with at least one child aged 5 to 17 years were randomly selected for interview through a random walk method. Data was collected by hired enumerators, trained by ICI, using a data collection tool developed by ICI. The child labour data collection tool included a **household module** administered to the head of household,

or if unavailable, another knowledgeable adult in the household; and a **child module** administered to 2 children randomly selected from all children aged 5 to 17 living in the household.

The household module collected information on household characteristics, including:

- A complete roster of household members with details on each household member's age, sex, marital status, education level, schooling status, and holding of a birth certificate
- Information on the household's cocoa production, and labour use in cocoa production
- Non-cocoa household income

The child interview collected information on relevant child outcomes including:

- Engagement in hazardous tasks in cocoa production, including hours worked per day and days worked per week during a 7-day recall period
- Schooling status
- Engagement in household chores

METHODOLOGY

ICI uses these data to assess the impact of its community development programme on children's engagement in child labour. The explanatory variable of interest is whether or not the household resides in a community assisted by ICI's Community Development Programme.

The main outcome of interest is whether or not a child engaged in hazardous work. We randomly select one of the children interviewed per household for this analysis, in order to avoid any bias from correlation between children living in the same household. Second, we also examine programme effects at the household level, by defining as the outcome whether at least one of the children interviewed within the household engaged in hazardous child labour.

In addition to a binary classification of whether or not children engaged in hazardous child labour, we also capture the severity of hazardous work done by children, and their school participation. We use four additional outcome indicators at the child level:

- the number of different hazardous tasks a child has done in the last 7 days;
- the number of hours a child reports having done hazardous tasks on the cocoa farm on a working day in the last 7 days (which takes the value zero for children who did not do any hazardous work);
- the number of days a child reports to have done hazardous work over the last 7 days; and
- an indicator for whether or not the child is currently enrolled in school.

Since it is very difficult for younger children to report accurate estimates of days and hours they have engaged in hazardous work, we examine these indicators only for children aged 12 years or older.

For the analysis of these indicators, we again randomly select one child interviewed per household, in order to avoid bias from intra-household correlation. For the reported days worked per week and hours worked per day, we randomly select one of the interviewed

children aged 12 years or older in the household. The sample for these two outcome indicators therefore differs from the sample for the other indicators.

Table 2 shows summary statistics for the main outcome variables and some key child characteristics in our samples of children and households from Côte d'Ivoire and Ghana. For all child level indicators, these summary statistics are calculated for one randomly selected child per household. The hazardous child labour rate is higher amongst children in the sample communities in Côte d'Ivoire, at 50%, than in Ghana, at 30%. In both countries, rates of households with at least one child in hazardous child labour are markedly above the rates at child level (64% of households in Côte d'Ivoire and 47% of households in Ghana), which is due to the fact that older children are more likely engage in hazardous work, and most households in the sample have children in different age groups.

Table 2: Summary Statistics

Côte d'Ivoire	
sample size: 504 children in total, 299 children aged 12 years or older	
Share of children who have been doing hazardous work in last 7 days	50%
Share of households with at least one child interviewed having done hazardous work in last 7 days	64%
Average number of different hazardous tasks children have done in last 7 days	0.97
Average number of hours children have worked on a working day (for children aged 12 years or older)	3,7 hours
Average number of days children have worked in last 7 days (for children aged 12 years or older)	2.2 days
Share of children currently enrolled in school	83%
Share of boys	54%
Average age of children	10.6 years
Share of children living with their biological parents	89%
Ghana	
sample size: 465 children in total, 315 children aged 12 years or older	
Share of children who have been doing hazardous work in last 7 days	30%
Share of households with at least one child interviewed having done hazardous work in last 7 days	47%
Average number of different hazardous tasks children have done in last 7 days	0.42
Average number of hours children have worked on a working day (for children aged 12 years or older)	1.2 hours
Average number of days children have worked in last 7 days (for children aged 12 years or older)	0.83 days
Share of children currently enrolled in school	97%
Share of boys	50%
Average age of children	11 years
Share of children living with their biological parents	87%

Method for estimating programme impact

Community selection for the programme was informed by a set of community indicators. For some of these indicators, such as access to infrastructure, access to quality education, and level of women's empowerment, we know from previous research that they

are correlated with child labour[4]. We therefore have reason to assume that ***even in the absence of the programme*, child labour prevalence rates would have differed between programme and control communities**. We therefore apply an econometric strategy to address such bias. Our preferred strategy is *propensity score matching*, to establish a comparable reference group with balanced observable community characteristics between programme and control communities. The propensity score should be interpreted as the probability for a community to be selected for the programme, conditional on a set of observed community characteristics. The PCCF data collected in 2015 provide an optimal choice of matching parameters since the actual selection of communities into the programme was informed by this data. In addition to the information contained in the 2015 PCCF data, considerations for community selection also include: the cocoa and chocolate companies buying from these communities (with the aim of ensuring inclusion of communities supplying to several different cocoa and chocolate companies); and the geographic location of communities (to facilitate the provision of support and monitoring).

It is important to note that while propensity score matching allows to address part of the community selection bias present in the data, it can only balance out differences in *observed* community characteristics. There may be other unobserved differences between the programme and control groups which may affect child outcomes, so that some bias may remain in the estimated programme effects. Our results therefore should be interpreted as indicative evidence of the effect of the ICI programme on child labour.

We check the robustness of our main results by using regression analysis as an alternative estimation method.

RESULTS

Descriptive statistics: Programme and control communities

For both countries, the 2015 PCCF data reveal that programme communities differed from control communities on a range of indicators at baseline, as shown in Table 3.

In Côte d'Ivoire, programme communities had overall less access to services and infrastructure. For example, the average distance to the nearest primary and secondary health centres was higher by an average of 5 km in programme communities compared to control communities; and the share of communities accessible by road all year and with access to the electricity grid was lower amongst programme than amongst control communities. Programme communities were also less likely to have any projects by other NGOs in operation at the time of assessment. Both programme and control communities in Côte d'Ivoire had very poor access to schools at kindergarten and secondary levels. Regarding access to primary schools, programme communities were in a slightly better starting situation with 81% having a primary school within the community, against 70% of control communities.

In Ghana, differences between programme and control communities at baseline show a slightly different and less clear-cut pattern. While for programme communities the average distance to the nearest primary health centre was lower (4 km) than for control

[4] See for example ICI 2019 "Using community level data to understand child labour risk in cocoa-growing areas of Côte d'Ivoire and Ghana"

communities (9 km), the share of communities accessible all year by road and with electricity grid access was lower amongst programme communities. Only one control community, and none of the programme communities, had any project by another NGO in operation at baseline. In Ghana, all except one of the programme communities had schools at kindergarten and primary level within the community, against slightly lower shares in control communities (9/10 and 8/10, respectively). By contrast, presence of lower secondary schools was higher in control communities than in programme communities.

In both countries, total population size was on average lower by approximately one third in programme communities as compared to control communities.

Table 3: Key community indicators in programme and control communities

Cote d'Ivoire	Control communities (total #: 20)	Programme communities (total #: 21)	
Mean distance to primary health centre (in km)	7	13	***
Mean distance to secondary health centre (in km	17	23	***
% of communities with electricity access	40%	24%	***
% of communities accessible by road all year	75%	67%	***
% of communities where other NGOs were active	60%	33%	**
% of communities with a kindergarten	10%	10%	
% of communities with a primary school	70%	81%	**
% of communities with a lower secondary school	5%	0%	***
Mean community population	2,695	2,077	***
Ghana	Control communities: (total #: 10)	Programme communities: (total #: 14)	
Mean distance to primary health centre (in km)	9	4	***
Mean distance to secondary health centre (in km)	20	20	
% of communities with electricity access	89%	57%	***
% of communities accessible by road all year	78%	71%	*
% of communities where other NGOs were active	11%	0%	***
% of communities with a kindergarten	89%	92%	
% of communities with a primary school	78%	92%	***
% of communities with a lower secondary school	56%	39%	***
Mean community population	1,814	1,205	***

Note: *, **, *** indicate whether a t-test of mean difference between treatment and control communities is statistically significant at 10%, 5% or 1% level.

Results from propensity score matching based on community characteristics

To avoid potential bias due to these differences in community characteristics between assisted and control communities, we use community variables as matching parameters. This is because *communities* were selected into the programme in consideration of some key community indicators (whereas at household level, we are not concerned about selection bias because within each community, households were selected into the sample randomly). As matching parameters, we consider all indicators collected through the PCCF in 2015 which were used to inform community selection, and which are also

potentially correlated with child outcomes. Specifically, these indicators include population size, presence of education facilities, access to infrastructure and other social services, and the presence of other NGOs. We choose as propensity score components the largest set of parameters which reflect all these dimensions, and which achieve an optimal balance across the treatment and control sample in terms of these observed characteristics.

Impact in Côte d'Ivoire

For the Côte d'Ivoire sample, the community variables combined into a propensity score that turn out to obtain the best balance are: the total population of the community; presence of primary school in the community; distance to the nearest primary and secondary health centre (in kilometres); whether any other NGO was present in the community at the time of community selection; whether the community is connected to the electricity grid; and whether the road to access the community is tarred.

We then apply a kernel matching estimator[5] to obtain estimates of the impact of the programme. We include only observations for which the propensity score (i.e., the estimated probability of being selected for the programme) falls in a range of "common support", meaning that both programme and control observations are present in this range.[6] By imposing "common support", we ensure that for each programme community, we have control communities in our sample which could have been selected for the programme with similar probability, judging from a set of observed community characteristics (see Figure 1 in Appendix I).

We conduct a balance analysis to check whether the propensity score is specified appropriately to balance out differences between the programme and control sample. Table 4 and Figure 2 in Appendix I show that bias for the propensity score has been reduced in the matched sample by 99.9% down to a remaining bias of 0.1%; and for each of the individual components of the propensity score, the remaining bias is below a threshold of +/-25%.This is the best balance that could be achieved from a series of trials of different compositions of propensity score parameters from the observed community characteristics.

Results on the impact of the ICI programme in Côte d'Ivoire are summarized in Table 4. The estimates indicate that **the programme has reduced the prevalence rate of hazardous child labour in programme communities in Côte d'Ivoire** by 10.6 percentage points. The share of *all children* estimated to be in hazardous child labour is at 62% in control communities and 51% in assisted communities, **corresponding to a 17% reduction in hazardous child labour** prevalence.

When we examine the outcome indicator whether *any child within a household* engaged in hazardous child labour, we see that after matching, **the programme has reduced prevalence of hazardous child labour at household level in Côte d'Ivoire** by 12 percentage points. The estimated share of *all households* with at least one child in hazardous child labour is 75% in control communities and 63% in programme

[5] We choose an Epanechnikov kernel function and a bandwidth of h=0.06.

[6] We define the area of common support by dropping observations from programme communities whose propensity score is higher than the maximum or less than the minimum propensity score of the controls.

communities, **corresponding to a 16% reduction in hazardous child labour at household level.**

When we look at the **severity of child labour**, again using a sample of children each randomly selected from all interviewed children, we find that **the** programme has…

- **reduced the average number of different hazardous tasks a child has done in the 7-day reference period from 1.33 to 1.06** (this indicator is zero for children who do not do hazardous work at all), which corresponds to a 20% reduction in the number of hazardous tasks;
- reduced the number of hours per working day spent doing hazardous tasks, for children aged 12 years or older (which is zero for children who do no hazardous work) by more than 1 hour, from an estimated 4'22h to 3'13h, which corresponds to a reduction by 26 percent ;
- reduced the average number of days per week on which children hazardous work was done, for children aged 12 years or older (zero for children who do no hazardous work) by 0.2, from 2.0 days to 1.8 days on average, which corresponds to a reduction by 12 percent ;
- **increased school enrolment** from 69% in control communities to 84% in programme communities, which in relative terms corresponds to an increase by 22 percent.

Results on hours worked should be interpreted with caution given that it can be difficult, even for older children, to provide estimates of the number of hours they have done an activity. The estimated effects are statistically significant at the 10% level, except for the effects on child labour severity, which are estimated with lower precision on a reduced sample.

Table 4: Effect of ICI community development programme on child labour prevalence and severity and school participation; estimates for matched samples in Côte d'Ivoire.

Outcome indicator	ICI assisted	Non-assisted	Difference	t-stat
% of children engaged in hazardous child labour	**51.3%**	**62.0%**	**-10.6***	**-1.60**
% of households with at least one child in hazardous child labour	**63.2%**	**75.2%**	**-12.1****	**-1.96**
number of different hazardous tasks the child has done	1.06	1.33	-0.27 tasks	-1.47
number of hours a child has worked on a working day (children age 12+)	**3.13 h**	**4.22 h**	**-1.09** hours**	**-1.57**
number of days per week a child has worked (children aged 12+)	1.76	2,01	-0,24 days	-0.72
% of children enrolled in school	**83.6%**	**68.7%**	**14.9****	**2.85**

Note: * indicates a statistically significant impact at 10%, ** at 5%.

Impact in Ghana

For the Ghana sample, we need to combine a different set of community variables into a propensity score to obtain an optimal balance across the programme and control sample, given that the general community development context, including access to services, infrastructure and education, is different from Côte d'Ivoire. The community parameters which yield the most effective propensity score are: distance to the nearest secondary health centre (in km); whether the community is connected to the electricity grid; whether the community is accessible by road all year; whether any agricultural extension services or Farmers Field Schools have been delivered in the community; and whether the community has obtained support from authorities for actions that benefit children.

As for the Côte d'Ivoire analysis, we apply a kernel matching estimator[7] to obtain estimates of the programme effect; and include only observations for which the propensity score falls in a range of "common support"[8] to ensure that we have suitable control observations for each programme community.

From the Ghana sample, we have to discard a higher share of children, as compared to the Côte d'Ivoire sample, for lack of common support (see propensity score histogram for the Ghana sample in Figure 3in the Appendix I). In total, we drop 112 children from the sample and estimate our programme effects on the remaining sample of 297 children.

We also conduct a balance analysis (presented in Table 7/ Figure 4 in Appendix I) to check whether the propensity score is effective in balancing out differences between the ICI-assisted and non-assisted communities. We manage to reduce the standardised percentage bias in the matched sample by 99.4% down to a remaining bias of 0.5% in the propensity score; and to a remaining bias of less than +/-2% in almost all of the individual components of the propensity score (except distance to secondary health centres, where the remaining bias is 20% and hence still within an acceptable range).

Results for the impact of the ICI programme are summarized in Table 5. The estimates indicate that the programme has reduced the prevalence of hazardous child labour among *children* in programme communities by 3 percentage points (from an estimated prevalence of 32.9% to 29.9% within the matched sample; see Table 5). In relative terms, this corresponds to a reduction in hazardous child labour by 9 percent. The estimated effect is however not statistically significant at conventional significance levels, which is not surprising in the light of the reduced sample size.

At *household* level, the programme effect is smaller in magnitude and estimated with less precision. The results indicate that in the matched sample, prevalence of child labour at household level decreased from 49.2% in the control communities to 48.3% in the programme communities, corresponding to a **relative decrease by 2 percent; but not statistically significant**.

When we examine our different **measures of child labour severity**, the results indicate that:

- **children do slightly *more* different hazardous tasks** in programme than control communities, but this difference is not statistically significant;

[7] We choose an Epanechnikov kernel function and a bandwidth of h=0.06.

[8] We define the area of common support by dropping observations from programme communities whose propensity score is higher than the maximum or less than the minimum propensity score of the controls.

- **children aged 12 years or older work shorter hours** in programme than in control communities : The estimated average number of hours these children work per day (which is zero for children who do not do any hazardous work) is lower by 26 minutes in programme than in control communities, which corresponds to a 23% reduction;
- **children work fewer days per week** in programme than control communities. The results indicate a reduction in days worked per week (which is zero for children who do not do any hazardous work) from 1.04 days in the matched control to 0.68 in the matched programme sample, corresponding to a 32% decrease.
- While the results on child labour severity are estimated with more precision than the effect on a binary child labour indicator, only the change in days worked per week falls within the conventional threshold of statistical significance at the 10% level.
- **There is no significant change to school enrolment**. While school participation is very high and approaches 100% in all communities in the sample, we find that it is still slightly higher in the matched sample in programme communities (99.3%) than in control communities (98.1%); again this difference is not statistically significant.

Table 5: Effect of ICI community development programme on child labour prevalence and severity and school participation; estimates for matched samples in Ghana

Outcome indicator	ICI assisted	Non-assisted	Difference	t-stat
% of children engaged in hazardous child labour	29.9%	32.9%	-3.0%	-0.47
% of households with at least one child in hazardous child labour	48.3%	49.2%	-0.9%	-0.13
number of different hazardous tasks the child has done	0.49	0.41	0.08 tasks	0.79
number of hours a child has worked on a working day (children age 12+)	1.03 h	1.28 h	-1.26 hours	-1.27
number of days per week a child has worked (children aged 12+)	**0.68**	**1.04**	**-0.36** days**	**-1.76**
% of children enrolled in school	99.3%	98.1%	1.2%	0.75

Note: * indicates a statistically significant impact at 10%, ** at 5%.

Checking the robustness of the results

We check the robustness of the main results presented above by applying multiple regression analysis, using the same samples of children and a set of control variables which corresponds to the matching parameters used in our main analysis.

For Côte d'Ivoire, the regression analysis overall confirms that the ICI Community Development Programme has significantly reduced the prevalence of hazardous child labour; however, the estimated effect size is smaller than what the matching analysis indicates. We now find a reduction in child labour prevalence by around 4 percentage points, which in relative terms corresponds to a reduction by around 8 percent.

For Ghana, the regression analysis also confirms that the programme has reduced the prevalence of hazardous child labour. Using a regression model which controls for community characteristics only (not for child and household characteristics), we find that hazardous child labour prevalence is lower by 3.7 percentage points, corresponding to a reduction by 11 percent on the sample mean, and this results is now statistically significant at the 5% level. Details on these robustness checks are provided in Appendix II.

CONCLUSIONS

The results from this study show that ICI's Community Development Programme achieved its key objective of reducing children's engagement in hazardous child labour in cocoa growing communities in Côte d'Ivoire. In Ghana, results are indicative of a decrease in child labour, but not statistically significant. The estimates in Ghana are compromised by the relatively small sample size: since several control communities turned out to be observably different from programme communities, we had to discard a relatively large share from the sample.

This study also makes a novel contribution to existing impact studies by **capturing impact on child labour not only in terms of a binary outcome, but also in terms of child labour severity.** Our data show that the ICI Programme in both countries resulted in children working fewer hours per day, and fewer days per week. In Côte d'Ivoire the programme also resulted in children being exposed to fewer different types of hazard.

The programme was not initially designed to allow for a robust evaluation of its impact on child labour. Baseline data on child labour prevalence were therefore not collected in 2015, posing additional challenges for impact estimation. We therefore resort to second-best impact evaluation methods, using observational data from a limited number of children from programme and control communities. The method we apply is sufficiently solid to allow for the conclusion that tangible impact was achieved, but we are less confident about the estimated magnitude of impact in terms of child labour reduction. The estimates remain subject to potential bias, since unobserved differences between programme and control communities may not be accounted for.

In addition to these results on child labour, it is worth noting that the project resulted in other positive impacts at community level, which are not discussed here, but are detailed in a separate external evaluation report.[9]

[9] BIRD (2020) External Evaluation of ICI's Community Development Programme, 2015-2018

APPENDICES

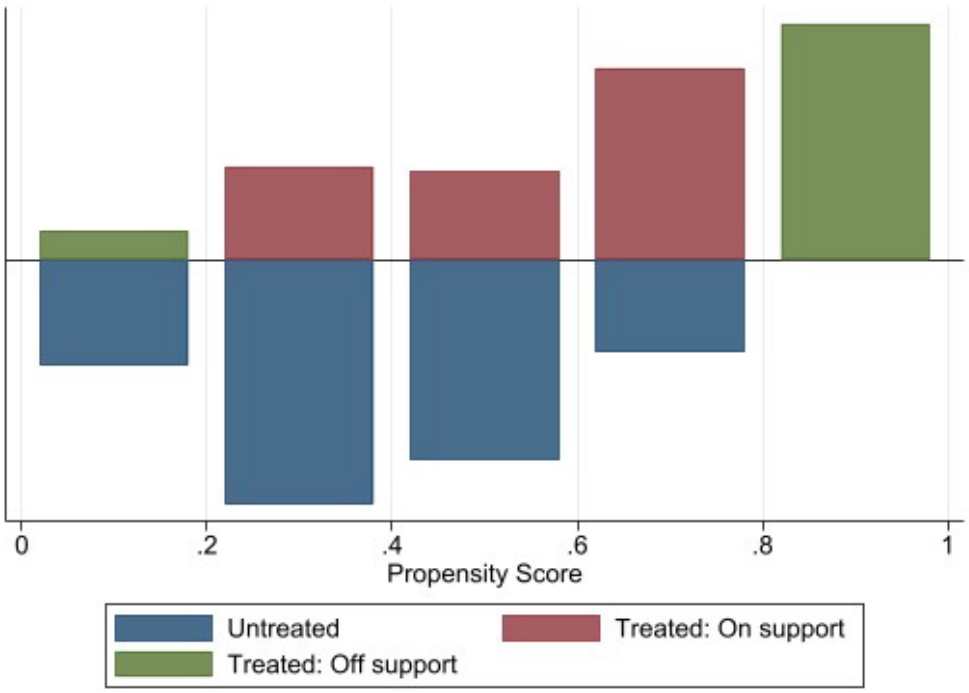
Appendix I - Checks on common support and balancing properties of estimated propensity scores

To check whether the propensity score we have specified has the desired properties, we assess the range of common support on the propensity score, and results from a balancing analysis, for both Côte d'Ivoire and Ghana.

Côte d'Ivoire sample

Figure 1 shows a propensity score histogram for the sample of children in Côte d'Ivoire by treatment status. Red and green bars represent children in programme communities, blue bars represent children in control communities. The green bars represent those children in the programme communities which we drop due to lack of common support, meaning we have insufficient appropriate control observations to match them to. In total, we drop 108 children from the sample and estimate our programme effects on the remaining sample of 396 children.[10]

Figure 1: Propensity score histogram and area of common support for Côte d'Ivoire sample



The balance analysis for the Côte d'Ivoire estimates presented below in Table 4 and Figure 2 shows the standardised percentage bias[11], before and after matching, for the

[10] The standardized percentage bias is calculated, following the formula by Rosenbaum and Rubin (1985), as the % difference of the sample means in the programme and control samples as a percentage of the square root of the average of the sample variances in the programme and control groups.

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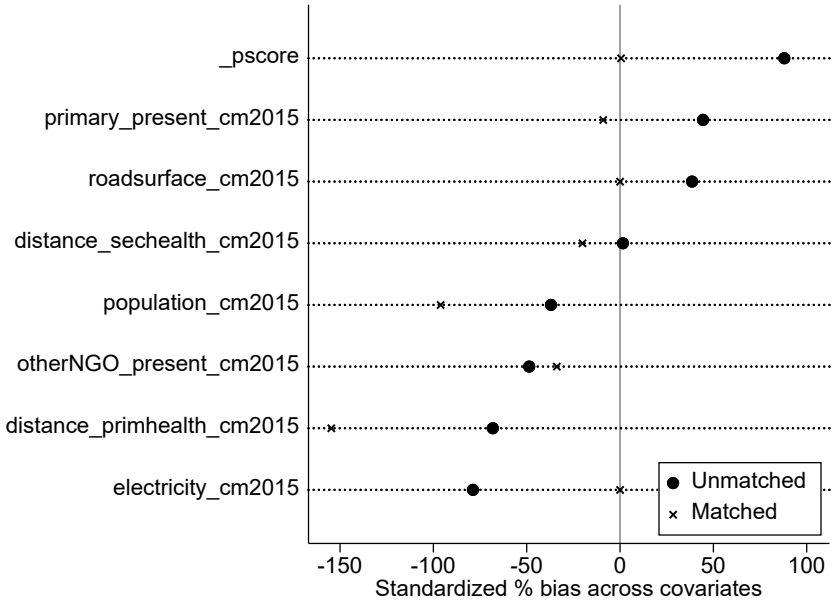
propensity score and each of its components. We can see that the propensity score has been reduced in the matched sample by 99.9% down to a remaining bias of 0.1%. The standardized percentage bias is also significantly reduced in the matched sample for each of the individual propensity score components, and the remaining bias is below a threshold of +/-25% for all components.

Table 6: Balance analysis for unmatched and matched programme (treated) and control samples for propensity score and each of its components, for the Côte d'Ivoire sample

Variable	Unmatched / Matched	Mean Treated	Mean Control	%bias	%reduct |bias|
_pscore	U	.63658	.40234	115.7	
	M	.53606	.53593	0.1	99.9
population_cm2015	U	2057.8	2685.8	-22.0	
	M	1968.6	2192	-7.8	64.4
primary_present_cm2015	U	.79231	.70492	20.2	
	M	.64474	.65221	-1.7	91.4
distance_primhealth_cm2015	U	12.546	6.9016	54.3	
	M	7.1711	6.9591	2.0	96.2
distance_sechealth_cm2015	U	22.573	16.852	51.7	
	M	20.612	19.925	6.2	88.0
otherNGO_present_cm2015	U	.33077	.60246	-56.5	
	M	.48684	.48531	0.3	99.4
electricity_cm2015	U	.23077	.40984	-39.0	
	M	.31579	.21464	22.0	43.5
roadsurface_cm2015	U	.09231	.30328	-54.8	
	M	.07895	.10961	-8.0	85.5

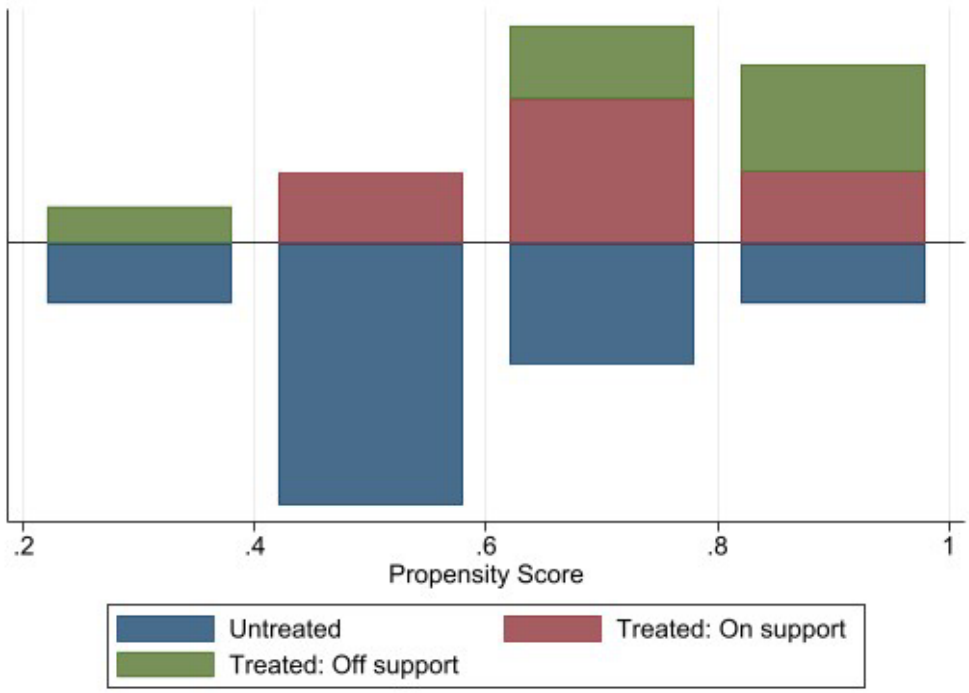
Figure 2: Comparison of the standardised bias before and after matching for the Côte d'Ivoire sample.



Ghana sample

Figure 3 shows a propensity score histogram for the sample of children in Ghana by treatment status (analogous to Figure 2 above for the Côte d'Ivoire sample). We have to discard 112 children from the Ghana sample and estimate our programme effects on the remaining sample of 297 children.

Figure 3: Propensity score histogram and area of common support for Ghana sample.



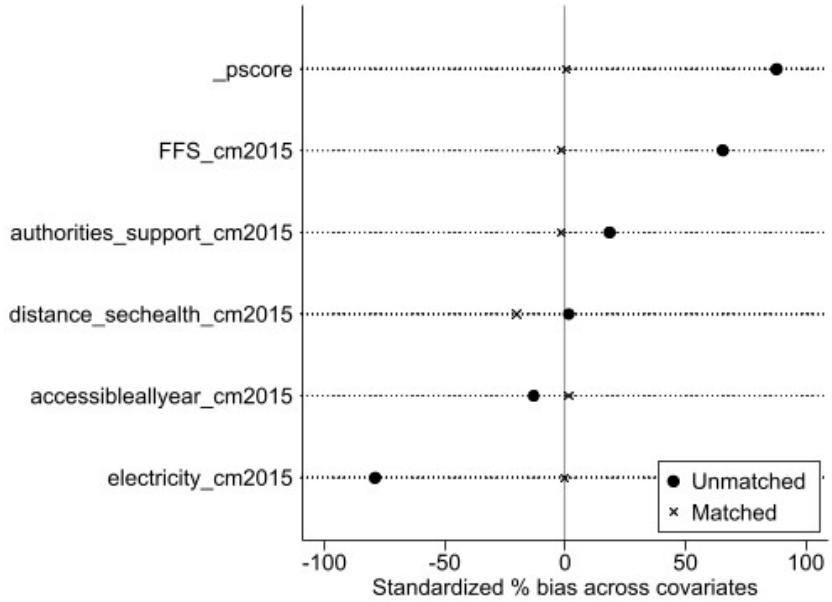
The balance analysis presented in Table 7 and Figure 4 shows that we manage to reduce the standardised percentage bias in the matched sample by 99.4% down to a remaining bias of 0.5% in the propensity score; and to a remaining bias of less than +/-2% in almost all of the individual components of the propensity score (except distance to secondary

health centres, where the remaining bias is 20% and hence still within an acceptable range).

Table 7: Balance analysis for unmatched and matched programme (treated) and control samples for propensity score and each of its components, for the Ghana sample.

Variable	Unmatched / Matched	Mean Treated	Mean Control	%bias	%reduct |bias|
_pscore	U	.68836	.54248	88.0	
	M	.63974	.6389	0.5	99.4
distance_sechealth_cm2015	U	20.05	19.882	1.5	
	M	19.034	21.262	-20.1	-1227.2
electricity_cm2015	U	.56757	.89349	-78.8	
	M	-.7483	.7483	0.0	100.0
accessibleallyear_cm2015	U	.71815	.77515	-13.1	
	M	.7551	.7483	1.6	88.1
FFS_cm2015	U	.70656	.39572	65.6	
	M	.7483	.7551	-1.4	97.8
authorities_support_cm2015	U	.57143	.48	18.3	
	M	.7483	.7551	-1.4	92.6

Figure 4: Comparison of the standardised bias before and after matching for the Ghana sample.



Appendix II - Robustness checks on impact estimates

To check the robustness of these results, we run multiple regression analysis on the same sample of children, using a binary hazardous child labour indicator as the outcome variable. We run a logit regression model and include only those children which fall in the area of common support established through the propensity score matching. This alternative method allows us to also control for child and household characteristics. However, regression analysis is a second best option for estimating treatment effects in the given set-up because regression by its nature imposes a functional form of the relationship between the community characteristics and the outcome variables, which as such shapes the estimated size of the programme effect. We run several logit regressions in which we introduce different sets of covariates sequentially, including the community characteristics which optimize balance between programme and control sample in the matching analysis; child characteristics (child's age and sex, and whether the child is living with her biological parents); and household characteristics (the household head's age and whether the household is headed by a single woman).

For Côte d'Ivoire, the regression analysis overall confirms that the ICI community development programme has significantly reduced the prevalence of hazardous child labour; however, the estimated effect size is smaller than what the matching analysis indicates. We now find a reduction in child labour prevalence by around 4 percentage points, which in relative terms corresponds to a reduction by around 8 percent.

For Ghana, the regression analysis also confirms that the programme has reduced the prevalence of hazardous child labour. When we include as controls only the community characteristics also used for the matching analysis, and also an indicator for the we find that hazardous child labour prevalence is lower by 3.7 percentage points, corresponding to a reduction by 11 percent on the sample mean, and this results is now statistically significant at the 5% level. However, the effect measured by regression is not robust to including child and household controls in the model which makes us less confident.