



# Nestlé Income Accelerator Program

Midline report of the pilot phase (2023)

June 2023

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## Citation

Habraken, R., & Diallo, O. 2023. *Nestlé Income Accelerator Program midline report of the pilot phase*. KIT Royal Tropical Institute, Amsterdam

## Acknowledgements

We gratefully acknowledge contributions from Jaap Voeten (KIT Royal Tropical Institute), Megan Passey (International Cocoa Initiative), Laurent Foubert (International Cocoa Initiative), and Josiane Djiofack Tsague. We also want to thank Adolphe Kadeoua and Abibatou Olakunle (NAZAN Consulting), our partner in Côte d'Ivoire for their valuable input to this report.

## Photo credit

All individuals in photos included in this report have provided their consent.

## Commissioned

This report was commissioned by Nestlé to monitor the progress of its Income Accelerator Program in Côte d'Ivoire.



# Acronyms

CCT	Conditional Cash Transfer
CLMRS	Child Labor Monitoring and Remediation System
CPI	Consumer Price Index
CSSVD	Cocoa Swollen Shoot Virus Disease
GALS	Gender Action Learning System
ICI	International Cocoa Initiative
IDH	Sustainable Trade Initiative
IGA	Income Generating Activity
ITT	Intent to Treat
KIT	Royal Tropical Institute
LI	Living Income
LICOP	Living Income Community of Practice
MoMo	Mobile Money
NCP	Nestlé Cocoa Plan
OECD	Organization for Economic Cooperation and Development
VSLA	Village Savings and Loans Association

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# Executive summary

## Executive summary

- The pilot Income Accelerator Program started in late 2020 by enrolling 1,030 cocoa farming households in two locations in Côte d'Ivoire. In early 2022, the program was expanded to another 10,000 households, but this midline impact report concentrates on the original 1,030, from which the pilot was able to reach 1,004 of the intended group of households. This midline report aims to present the intermediate effects of the program halfway its implementation, focusing on the effects observed 12 to 18 months after the start of the pilot phase.
- The pilot phase aimed to learn how to implement a comprehensive, innovative cash transfer program among cocoa farming households. The focus was to learn how to successfully roll out mobile money (MoMo) in rural areas, register participating households, verify conditions, and ensure that payments end up in the digital wallets of the participating farm households. The majority of the effort in the first year of the program also went into setting up and training pruning groups and convincing farm households to have (part of) their cocoa farm pruned.
- As part of the pilot phase, 55 pruning groups were set up and pruned 1,341 hectares of cocoa land, and 20,000 shade tree seedlings were distributed to participating households to stimulate agroforestry. 24 Village Savings and Loans Associations (VSLAs) were set up (VSLAs now cover 55 communities in the treatment group), 36 IGA trainings sessions provided, and the International Cocoa Initiative (ICI) built and/or upgraded three schools in participating communities.
- Despite initial challenges with the verification of MoMo accounts, almost all eligible households now have one (100% in the cooperatives' records, 96% in the KIT survey). Increased use of these accounts has enhanced convenience and efficiency in financial transactions for the households in the Accelerator. By registering almost all eligible farm households with MoMo accounts, the Accelerator has enabled secure and convenient electronic transactions. Members can now easily send and receive money, make payments, and access financial services through their mobile phones. This eliminates the need for physical cash transactions, which can be cumbersome and risky, especially in remote rural areas. The accounts provide a safe and reliable means of managing and utilizing financial resources, contributing to greater financial control for the households.
- At the household level, the following program outputs were observed per key area:
  - Education: commitments were made to enroll 2,782 of children of school age (6–16 years old) in school. Later verification confirmed that this number of children were indeed enrolled in school.
  - Pruning: 1,004 farm households had at least one hectare of their cocoa land pruned (or their entire farm if they owned less than a hectare of land) in the last two years.
  - Agroforestry: all households received and planted approximately 20 forest and fruit trees from the nurseries set up by Nestlé.



- Income diversification: 10 alternative income generating initiatives have been set up covering all communities involved. 86% of the households have at least one member enrolled in VSLAs. In terms of training participation, 47% of households indicated they had participated in a Gender Action Learning System (GALS) training.
- Cash transfers: 93% of households interviewed in the KIT survey report to have received at least one cash incentive since the start of the Accelerator program. However, difficulties with MoMo registration and verification of conditions (e.g., school enrollment) delayed implementation. On average, households reported to have received a cumulative amount of US\$70 in the first year, and US\$141 in the second year. Among those households who reported to having received a cash transfer, these numbers are US\$117 and US\$169 respectively. Despite the majority of households receiving cash transfers since the start of the pilot, the cumulative amounts received remain significantly below the intended EUR500. Based on self-reported use, the primary use of incentives is to pay for schooling fees followed by healthcare costs.
- In terms of impact at midline, farm households in the pilot group exhibit a greater level of commitment to cocoa production compared to the control group, as evidenced by their application of practices such as pruning, (organic) fertilizer, herbicides, as well as a larger allocation of their land for planting homegrown cocoa seedlings. An increasing proportion of households (13 percentage points) also hire temporary workers on their cocoa farm. The anecdotal evidence collected supports these findings. Interviewees attribute this primarily to the enhanced appearance of their farms as a result of quality pruning, which creates a more conducive and appealing working environment.
- The Accelerator pilot has had a positive influence on encouraging the development of alternative income sources (on average 0.6 sources more than in the comparison group), including selling livestock (effect size of 10 percentage points). Although cocoa remains the primary crop for generating income, it appears that the program has reduced its predominance as the sole source of income with 11 percentage points. The findings reveal that some households in the control group have shifted their focus towards rubber cultivation as the primary crop for income generation while for the treatment group cocoa remains the main source of income. In summary, the program has made a substantial contribution to increase and extend alternative income generating activities (IGAs).
- The Accelerator has effectively facilitated the establishment of VSLAs within the pilot communities, with a positive impact of 37 percentage points compared to the control group. VSLAs yield several advantages. Firstly, they provide a platform for financial inclusion and empowerment. By being a member of a VSLA, farm households gain access to financial services and resources that might have previously been unavailable to them. This enables them to save money and have a secure place to store funds in a community context. The VSLAs also offer opportunities for borrowing, allowing members to access credit for various purposes such as investing in their farms, starting small businesses, or meeting unexpected expenses.

- VSLAs are effective, as membership leads to higher levels of income diversification in terms of number of income sources (members have on average 0.4 sources more than non-members), the selling of livestock (effect of 11 percentage points) or running a business (effect of 13 percentage points), and the proportion of income from off-farm activities (2% for non-members vs. 5% for members). VSLA membership also increases the probability that the woman is involved in household decision-making regarding expenditures with 26 percentage points.
- The architectural pruning is positively correlated with cocoa farm productivity and increases average yield levels by almost 20% while increasing the probability that a farm household produces on average one metric ton of cocoa per hectare by 13 percentage points. Pruning also took place in a counterfactual situation (i.e., control group), but the results show that pruning only had an impact on productivity in the intervention group, suggesting that the quality of pruning matters (i.e., 'architectural' pruning done by trained and equipped pruning groups). Both the quantitative survey results and anecdotal evidence from the case studies reveal that pruning a hectare of cocoa land results in approximately two additional bags (~130kg) of cocoa. It should be noted that yield levels are also largely determined by the age of trees, precipitation and drought, diseases and pests, input use, and the availability of affordable and skilled labor.
- Higher yield levels translate into higher cocoa revenue per hectare (revenue from pruned farms in the intervention group is almost US\$140 more than pruned farms in the comparison group, and US\$170 more than non-pruned farms in the intervention group), but as pruning also led to higher cocoa investments in the control group and because pruning does not cover the entire farm for most farm households, no statistical difference is found between the treatment and control group in average cocoa profits (i.e., for the entire farm) and household income levels.
- Despite the relatively low amount of cash transferred annually vis-à-vis the intended annual transfer of EUR500, the results show that receiving cash transfers is correlated with increased income diversification (on average 0.2 income sources more per cash transfer received) and children's health expenditures (on average US\$5 annually more per child per US\$100 received). The effect on income diversification specifically suggests that the availability of financial resources through cash transfers serves as a catalyst for households to explore new income-generating opportunities beyond traditional agricultural practices.
- Although results are based on data from one treatment cooperative and therefore have limited robustness levels, the pilot is associated with a 19 percentage points' decrease in hazardous child labor prevalence when compared to the control group. Additionally, school enrollment rates have improved, with an eight percentage point increase among participating households compared to a four percentage point decrease in the comparison group, highlighting the program's intermediate success in promoting education.



- In the context of expanding the program on a larger scale, there are lessons to be learned:
  - Effective communication regarding cash incentives is essential to provide recipients with clear information about the amount they will receive and the specific practices that will be reinforced through these incentives. Enhancing the behavioral component of the financial incentives is crucial in promoting desired actions and behaviors.
  - Moreover, to prevent delays in implementation and increase the number of cash transfers made and cash received, the use of conditional cash transfers necessitates capacity building efforts to improve the monitoring and verification process, especially at cooperative and supplier level. This involves developing the necessary skills and resources to accurately assess and verify compliance with the conditions tied to the cash transfers. Strengthening the capacity for verification is also essential to ensure that participants can tie actions and behaviors to the cash incentives received.
  - This pilot study illustrates that promoting and establishing alternative IGAs requires a considerable amount of time, which then also needs to translate into actual additional income. This aspect should be taken into account when anticipating the impact of such activities halfway the program. Similar considerations apply to the effects of the pruning practices. Considering that the average cocoa farm size is approximately 3 to 3.5 hectares, the implementation of labor-intensive and time-consuming architectural pruning techniques means a significant amount of time will elapse before all farms are fully covered: increasing the average yield levels of the entire farm, rather than solely focusing on the specific plot that has undergone pruning, requires time.
- This midline impact report has certain methodological limitations that need to be acknowledged. Firstly, the study's findings have limited external validity (i.e., the level to which results are valid for a wider cocoa farming population) due to the implementation of the pilot project in only two specific locations in Côte d'Ivoire. This means that the effects observed at midline may not necessarily be representative when rolling out the program among a broader farm population or in different geographical contexts. Furthermore, the treatment group consists of households from two cooperatives that are located in very different parts of Côte d'Ivoire, but due to its evaluation design, this study ignores potential heterogeneous effects in the treatment group (i.e., households in one location might respond differently to interventions than households in another location). Additionally, while the comparison group in the study is drawn from the same area, it is important to note that they belong to different communities and cooperatives. This introduces a potential source of bias and lowers the robustness of the impact estimation, even though a matched difference-in-differences estimator was used. Therefore, it is crucial to interpret the study results with caution and consider these limitations when drawing conclusions or making generalizations about the overall impact of the intervention.







# 1 Introduction

## 1 Introduction

Cocoa farming households in Côte d'Ivoire face numerous challenges that negatively affect their livelihoods and well-being. These arise from a combination of structural and systemic factors within the cocoa industry, exacerbating the struggles already experienced by farmers and their families. Poverty, limited access to financial resources, inadequate infrastructure, volatile cocoa prices, and the prevalence of child labor are among the key issues. As a result, there is a pressing need for comprehensive initiatives that address these challenges in a more holistic way and foster sustainable development within cocoa growing communities. Nestlé's Income Accelerator Program, implemented as part of the Nestlé Cocoa Plan (NCP), represents one such initiative, aiming to enhance the livelihoods of cocoa farming households in Côte d'Ivoire through a multifaceted approach.

Nestlé's Income Accelerator program is an initiative implemented in collaboration with partners KIT Royal Tropical Institute, Rainforest Alliance, International Cocoa Initiative (ICI), and the Sustainable Trade Initiative (IDH), addressing a range of challenges faced by cocoa farming households through a holistic package of interventions. The program focuses on improving households' income as a means to address the risk of child labor in Nestlé's supply chain. It aims to achieve these objectives by addressing four key areas.

**School enrollment** is the first key aspect of the Accelerator program. Parents are encouraged to prioritize sending their children to school, and incentives are provided to households who commit to sending their children to school and ensuring their regular attendance. By reducing child labor prevalence and improving access to education, the program aims to contribute to the long-term well-being of cocoa farming communities. The construction of additional school facilities, supported by ICI in collaboration with Nestlé, further facilitates increased enrollment and access to education.

The second key component of the program is the promotion of **good agricultural practices**, and in particular *architectural* pruning. This is achieved through activities such as organizing subsidized pruning groups, which enable households to enhance the productivity and health of their cocoa trees. *Architectural* pruning involves examining the structure of the tree, selecting just one trunk and one crown and eliminating others, as well as eliminating dead branches, suckers ('gourmands') and secondary branches. Pruning helps control and prevent the spread of diseases and pests that can harm cocoa trees, leading to healthier trees with higher resistance to diseases. It also improves light penetration and air circulation within the cocoa canopy, stimulating growth, flowering, and fruit development. Furthermore, by encouraging the integration of shade trees, pruning supports sustainability efforts by providing benefits such as natural pest control, improved soil fertility, and enhanced biodiversity within cocoa farming systems. This practice rejuvenates cocoa farms, boosts the yield and quality of cocoa beans, and has the potential to enhance cocoa farming households' income.

Thirdly, the Accelerator aims to promote **agroforestry** by establishing nurseries to provide households with access to high-quality shade and fruit tree seedlings, offering several advantages. First and foremost, shade trees promote biodiversity by providing habitats for various flora and fauna, contributing to the overall ecological balance of cocoa farming



systems. Furthermore, these trees help improve soil fertility by reducing erosion, enhancing nutrient cycling, and increasing organic matter content. This, in turn, enhances the long-term sustainability and productivity of cocoa farms. Moreover, shade and fruit trees create opportunities for agroforestry practices, allowing farming households to diversify their income sources. This integration of agroforestry not only increases resilience but can also provide additional economic benefits to cocoa farming households. Each household receives twenty shade tree seedlings per year.

**Income diversification** is another key area of the program. Within each farm household, women are encouraged to join VSLAs to access financial services and save funds for future investments. Entrepreneurship training is provided to equip participants with the necessary skills and knowledge to explore alternative sources of income beyond cocoa farming. By empowering women with entrepreneurial skills, the program aims to enhance their economic resilience and improve overall income levels. Furthermore, the implementation of the GALS training seeks to promote women's leadership and decision-making within cocoa farming households and communities. This training enables women to participate actively in household decision-making processes, including financial management and resource allocation.

To incentivize active engagement and progress in each of the four key areas, the Accelerator offers a financial incentive of EUR100 per component. This incentive is designed to motivate households to actively participate in the program. By providing a monetary reward, the program aims to encourage households to embrace sustainable farming practices (namely pruning and agroforestry), prioritize income diversification and gender equality, and foster children's education to reduce child labor prevalence within cocoa farming households. These incentives not only serve as catalysts for long-term change, but also provide immediate financial support to households. To promote gender equality, two of the incentives are transferred to the male household member, while the other two incentives are transferred to the female. Figure 1 illustrates the four components of the Accelerator.

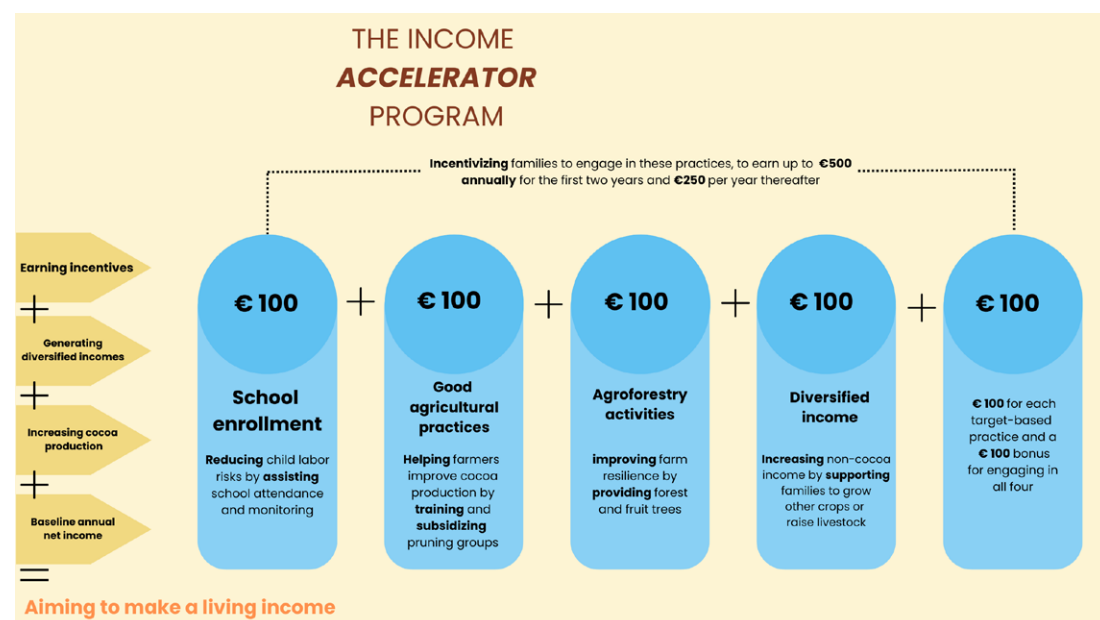
The pilot phase of the program aims to cover 1,030 cocoa farming households in two cooperatives and is deliberately designed as an essential learning phase to inform its subsequent scaling up. Beyond testing the effectiveness of the envisioned program pathways, the pilot phase seeks to gain valuable insights into the practical implementation of such an initiative. This phase provides an opportunity to identify strengths, weaknesses, and areas for improvement, enabling all program implementers (e.g., Nestlé, implementing traders, cooperatives, ICI, and Rainforest Alliance, amongst others) to refine strategies, approaches, and interventions. By actively learning from the pilot phase, the Accelerator aims to enhance its overall impact and sustainability as it is expanded to reach a larger number of cocoa farming households in Côte d'Ivoire in the test-at-scale phase (10,000 farming households enrolled in 2022).

In the next chapter, we provide a detailed explanation of the methodology employed for this midline assessment, outlining the steps taken to gather reliable data and analyze the results. We will then proceed to present an update on the progress made in implementing the pilot phase of the Accelerator, highlighting key developments and achievements.

Moving forward, the fourth chapter of this report examines the overall, average program impact of the Accelerator on various aspects including agricultural practices, farm productivity, economic outcomes, income diversification, food security and household expenditures, among other indicators. We will also delve into the program's effects on school enrollment rates and the prevalence of (hazardous) child labor.

Of particular interest are Chapters 5 and 6, which assess the specific effects of two essential components of the Accelerator: the pruning of cocoa trees and the establishment of VSLAs. It is worth noting that both these activities also occur in the control group. In the final analysis in Chapter 7, we investigate the effect of receiving cash transfers.

Figure 1. Components of the Income Accelerator Program







## 2 Methodology

This section presents the methodology employed for this midline impact report, which aims to understand the outcomes and effectiveness of the program halfway its implementation through a combination of quantitative and qualitative methods.

The evaluation employs a mixed-methods approach, combining quantitative analysis with qualitative case studies. The quantitative analysis compares data collected in 2022 and 2023 through a household survey, enabling the identification and measurement of the program's impacts on key indicators such as household income, cocoa productivity, adoption of farming practices, child school enrollment and child labor prevalence, income diversification, and food security.

The sample for both household survey rounds consists of 500 cocoa farming households, with data collected during the cocoa seasons 2021/2022 and 2022/2023. Half of the sample comprises households participating in the Accelerator, while the other half forms the comparison group, providing a counterfactual scenario. The comparison group consists of NCP farm households from two adjacent cooperatives in the same districts, minimizing the impact of geographical distances on the program estimates.

The household survey is conducted using a questionnaire that covers various modules, including household characteristics and composition, cocoa production, revenue and costs, and alternative incomes. To ensure accurate 2022 values, cocoa production-related questions address the mid-crop campaign of April 2021 to September 2021 and the main campaign of October 2021 to March 2022. Additionally, child labor prevalence surveys were conducted in February 2022 by ICI, capturing school enrollment and child labor prevalence, including hazardous work. The midline survey covered the mid-crop campaign from April 2022 to September 2022 and the main campaign from October 2022 to March 2023. Subsequently, child schooling and child labor prevalence data were also collected in March 2023 for the follow-up.

Data collection was facilitated using Open Data Kit (ODK) and Android tablets, enabling quality checks during data entry. Face-to-face interviews were conducted by a team of 12 enumerators, ensuring consistent data collection procedures.

Implementation progress data comes from the data systems of the main implementing partners, like ICI and the main trader responsible for organizing pruning groups, planting of shade trees, setting-up VSLAs, and rolling-out income diversification initiatives. They also verify MoMo accounts and whether households meet conditions for receiving the cash transfers.

In addition to the quantitative component, qualitative case studies are conducted to gain a deeper understanding of the program's impact at the individual household level. These case studies capture personal narratives and stories, providing nuanced perspectives on the potential changes experienced by the participants. 10 farming households were selected in the two cooperatives benefiting from the Accelerator activities (one per section/village).

# 2 Methodology





The findings of this midline impact evaluation are intended to inform evidence-based decision-making and contribute to the ongoing improvement and refinement of the Accelerator program.

### Estimating impact

To estimate the impact of the Accelerator, various econometric estimation techniques are employed in this report. The econometric analyses presented in Chapter 4 are based on a matched difference-in-difference method. This technique compares the changes over time between the treatment and control groups. In other words, the presented results should be interpreted as the gap in the trends that the two groups experienced over time. The first period covers the 2021–2022 campaign just before the start of the program.<sup>1</sup> The second period (midline) covers the first 18 months of the pilot, from April 2022 to March 2023, when activities were mostly focused on pruning and distributing shade trees. Effects found should be considered in that light.

One potential challenge in employing difference-in-differences estimations is the issue of participant mobility within and outside the intervention group. This pertains to households that may shift their membership from a cooperative involved in the program to a different cooperative that is not participating. In the group of households targeted for pilot participation, approximately 0.6% of the sampled households are no longer affiliated with the pilot cooperative. In contrast, within the comparison group, an average of 16% of the households have departed from their cooperative and joined another.<sup>2</sup>

All households in the selected sections of the two treatment cooperatives are eligible to participate in the program, which means that they should be analyzed as one group and should be considered as representing the treatment, regardless of whether they prune their cocoa trees, plant shade and fruit trees, send their children to school, and/or participate in income diversification training. This so-called intent-to-treat (ITT) analysis estimates the average impact on all households belonging to the treatment group, regardless of whether they met the conditions or received a cash transfer. In this way, it captures the success of the program in mobilizing households to participate. The exclusion of farm households who do not meet the conditions set for receiving the cash, and subsequently are not rewarded for whatever reason, tends to bias the interpretation toward a conclusion of greater efficacy of the Accelerator being evaluated because only participating farm households would be studied.

In Chapters 5 – 7, household-level fixed effects regressions are used to estimate the impact of specific activities like pruning and VSLAs as they are sometimes also organized in the control group. Table 1 presents a summary of the analyses conducted in this report.

.....  
1 The round 1 data were collected in March/April 2022 and covered the previous 12 months of the cocoa campaign. The Accelerator pilot was initiated in April 2021 with the pruning activities already conducted among some of the participants. Therefore, the pruning data might be slightly affected but since the other activities were not launched at the time, the round 1 data still holds for all the other KPIs of interest.  
2 An individual fixed effects regression demonstrates that farmers' perception of their cooperative has improved, with the treatment group experiencing a statistically significant greater degree of improvement compared to the control group.

Table 1. Analysis types

Specification	Result type	Defining treatment
Chapter 4:  Intent-to-treat (ITT) – average program impact	A comparison of Accelerator-eligible cocoa farming households with non-Accelerator cocoa farming households through a matched diff-in-diff analysis, regardless of whether the former group benefited or participated in the Accelerator. It provides an estimate of the average treatment effect based on the original intention of treatment assignment, allowing for an unbiased evaluation of the effectiveness of the Accelerator as a whole.	All farm households in the Accelerator cooperatives, regardless of (the extent of) their participation in the Accelerator.
Chapter 5:  Effect of (architectural) pruning	Analyzing the impact of architectural pruning, done by subsidized and trained pruning groups on various outcomes, including productivity, farming costs, cocoa revenue, and profit. This is done through a household fixed effects regression, where cocoa productivity, farming costs, cocoa revenue, and profit are regressed on the percentage of cocoa land pruned. By including individual fixed effects, we eliminate unobserved individual heterogeneity and the time-invariant unobserved factors, reducing the potential for bias. Moreover, we focus on within-individual variation, enhancing identification of causal relationships.	The analysis includes all farm households that performed pruning on a percentage of their cocoa land, treating pruning as a continuous treatment variable. It is important to note that households in the control group also engage in pruning activities. To assess whether the effect of pruning varies between the treatment group (subsidized pruning groups performing architectural pruning) and the control group (largely pruning done by the household), the original treatment status variable is interacted with the continuous pruning variable.
Chapter 6:  Effect of VSLA membership	Examining the impact of VSLA membership on various outcomes such as food security, empowerment, income diversification, and resilience. To conduct this analysis, a household fixed effects regression is employed, where the dependent variables of interest are regressed on household VSLA membership.	The treatment group consists of all farm households who are members of a VSLA in the communities participating in the Accelerator pilot. Moreover, VSLAs also exist in the control group, which allows investigating whether the effect of VSLAs in the control group is different compared to VSLAs part of the Accelerator group.
Chapter 7:  Effect of cash transfers	Investigating the impact of receiving cash transfers, on various outcomes including food security, farming costs, expenditures, income diversification, and the living income gap. To assess this impact, a household fixed effects regression is conducted, with the number of cash transfers received as the explanatory variable of interest.	The analysis focuses exclusively on the variation in the number of cash transfers received in the intervention group (i.e., households eligible to participate in the Accelerator) to isolate the impact of cash transfers as much as possible. Comparing the entire treatment group with the control group would largely replicate the ITT analysis.



In the remainder of this midline, only the predicted values of key indicators will be presented in tables and graphs, rather than the observed differences. This approach offers a better measure of the program's impact. When conducting econometric impact evaluations, accurately measuring the effects of a program or intervention is crucial. Simply relying on observed differences between a control group and a treatment group may not provide an accurate estimation of the program's impact. This is because multiple factors and external influences can affect outcomes, making it challenging to isolate the program's true effects.

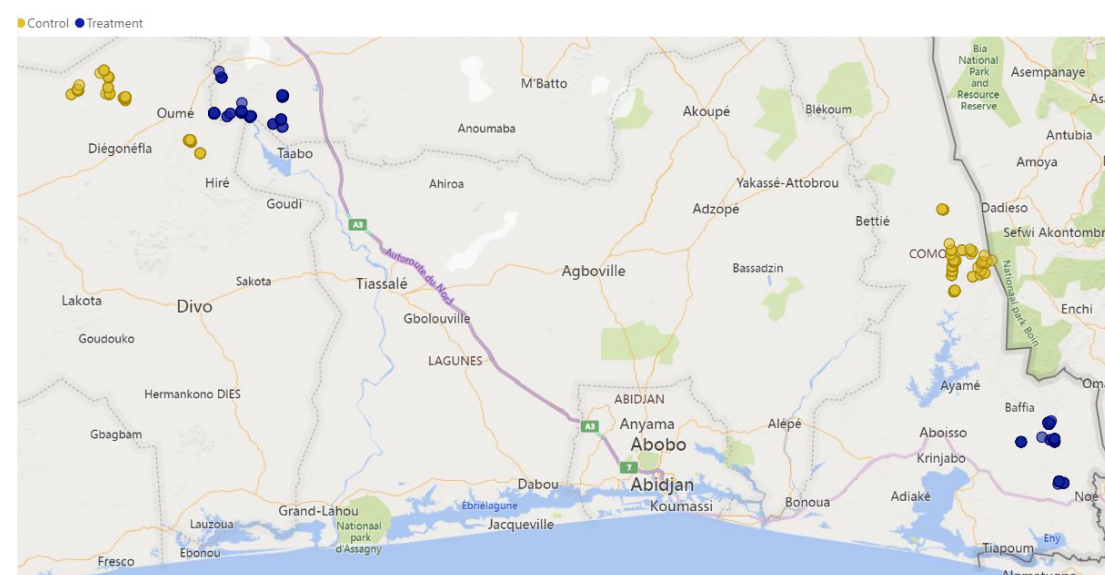
The econometric impact estimation techniques compare the predicted outcomes of the treatment group with the outcomes of the control group. By considering various factors and controlling for potential confounding variables and/or imbalances at the first wave, these predicted values provide a more accurate estimate of the program's impact and facilitate a more robust assessment of its effectiveness.

## Survey data

For the household survey, the same households that participated in the first survey wave in 2022 were retraced and interviewed again at midline to construct a panel dataset. This allows us to assess changes over time and attribute potential changes to the Accelerator. Of the 521 households interviewed in the first round, 26 were not interviewed in the second round of data collection. Since this 5% attrition rate is considered low, no attrition weights will be added to the analyses to correct for selective attrition that could bias the impact estimates. In addition, villages and households were sampled proportionally to size (due to the limited number of villages with sufficient cooperative members in the sampling frame), meaning the analyses are not corrected for the sampling design.

Data were collected among 521 cocoa farming households located in two Accelerator cooperatives and two control cooperatives. Figure 2 shows the geographical distribution of the households interviewed by original cooperative membership as observed during the start of the pilot in 2021.

Figure 2. Location of households by cooperative



The following differences are observed in the first survey round between the retained treatment group and the comparison group:

- Household demographics are significantly different between the two groups. The treatment group consists of larger families with younger household heads. They are less likely to be married and a larger proportion had not completed formal education.
- Households in the treatment group also have significantly less experience with cocoa farming, but they cultivate cocoa on larger farms, resulting in larger production volumes. They are also more productive, and a larger proportion of households produces on average 1m/t of cocoa per hectare compared to the control group. A larger production volume results in higher cocoa revenues and profits. They also invest more in inputs for cocoa production.
- The treatment households are significantly less diversified, as cocoa is a more important source of income for them compared to the control group. They also have fewer income sources.
- Despite having significantly higher household income levels, the Living Income gap of the treatment households is similar to the gap of the control group due to the former having larger families.

These results demonstrate that program participation was not assigned at random, and the control group does not resemble the treatment group perfectly. To ensure that differences in the first survey round do not affect the impact estimates (i.e., we cannot assume the parallel trend assumption with these differences between the treatment and comparison groups), we reweight the regressions with propensity score weights that are computed on the basis of differences in the first round between the treatment group and control group. This artificially makes the two groups more comparable on observable variables.<sup>3</sup>

As a more in-depth impact evaluation of the test-at-scale phase (with 10,000 farm households) will follow later this year, this report focuses on the most important outcome and impact indicators only. Moreover, as only two cooperatives participated in the pilot phase, the results might have limited external validity to other cocoa farming communities, especially as the program adapted some components based on learnings that arose from the pilot phase.

## Case studies

Alongside the quantitative analysis, we employ a qualitative assessment of the farmer's journey through the pilot in the past two years. This approach involved a semi-structured

<sup>3</sup> A kernel propensity score matching (PSM) was used with bandwidth of 0.03 to create the best match between the treatment and control group. Only households that were *on support* were kept in the analysis. For the matching variables and the confounders, a set of household characteristics and cocoa production characteristics was used to create the best balance in the propensity scores of the treatment and control groups. Of the 521 households, 470 households have no missing values on any of the variables of interest. Of these, 15 households were removed from the analysis, as they had either very high or very low propensity scores, meaning that they could not be matched.



strategy to interview farmers and some of their family members. The term “structured” refers to the systematic review of the adoption of pruning, agricultural practices such as fertilizer use and labor strategies, participation in training and income diversification activities, perception of the program including the cash transfers, and (potential) behavioral changes. Moreover, it explores dynamics in terms of decision-making and children’s schooling. On the other hand, “semi” means that household members were given the opportunity to freely share their opinions, perceptions, and motivations regarding the program.

The qualitative interviews were conducted with 10 households, one for each section sampled for the quantitative data collection.<sup>4</sup> Selection of participants for the interviews was based on the quantitative results: each household experienced changes in income and/or yields. The compilation of their stories provides explanatory and illustrative insights for learning purposes, complementing the quantitative implementation and impact findings with a comprehensive picture of the experiences and perspectives of cocoa farming households participating in the pilot. Profiles of selected respondents are presented below.



**Koffi Konan, Rémy** is a 53-year-old male farmer with no formal education who lives with his wife and six children, the youngest three attend primary school in their village while the eldest three are pursuing higher education in Abidjan and Toumodi. The household owns a total of six hectares of land (located 5 km away from the village) of which five hectares are currently dedicated to productive cocoa cultivation. Rémy has planted young trees in the remaining hectare to rejuvenate his plantation. Although his field is not affected by CSSVD, he knows of a few cases in the area and is very cautious with the tools he uses.

Rémy is quite invested in cocoa (“During the week, I stay overnight in a small shed because it is important to keep an eye on the field because of theft”) and hires some temporary workers (a group of 10–15 young men from the village) for weeding, applying phytosanitary products, harvesting, and pod breaking, mostly in the main season. Next to cocoa, the household also cultivates one hectare of rice, one hectare of maize, and some yam and cassava as food crops. They also cultivate bananas, eggplant, and tomatoes for his wife to sell in the market at Toumodi alongside her in-house activity of selling cooled yogurt, iced, and fresh fruit juices. Although this latter activity is too small-scale and dependent on power cuts to be profitable (she earns approximately FCFA43,000 per year), it does allow her to accumulate some savings. Therefore, cocoa remains the most important source of income (80%) while other crops contribute 20%.

<sup>4</sup> Data collection was rolled out in 10 sections of the participating cooperatives. Sections were randomly selected to be representative of the whole program. Since the activities offered can be at different stages in the sections, we aimed for the qualitative component to cover all these 10 sections and capture any possible differences related to implementation.



**Kouamé, Koffi** is a 45-year-old male farmer with basic literacy skills who lives with his wife and two young children, aged one and three. Their house is in the village, where they operate a small boutique shop adjacent to their larger house that is currently under construction. The household also supports the two children of Kouamé’s sister, who recently passed away, by paying their education fees.

Kouamé owns a total of three hectares of land, located approximately 3 km from the village. Of these, one hectare is currently dedicated to productive cocoa cultivation and another hectare is being prepared to rejuvenate trees affected by CSSVD and boost cocoa production in the coming years. Kouamé has a nursery in his cocoa field that he visits every day, often assisted by his wife (in particular during harvesting and drying periods). They also hire temporary workers, mostly for weeding three times per year, which they believe is key to deterring insects and small animals from the plantation.

Kouamé has always been a cocoa farmer as cocoa cultivation is a family tradition and he learned from his parents and grandparents how to work on their land. Next to his cocoa field, he has a small plot of cashew nuts and in addition to the regular shade trees he planted, he also intercroops his cocoa with banana trees, cassava, and yams. These are primarily destined for the household’s own consumption and only the surplus is sold in Toumodi’s market by Kouamé’s wife. She also uses part of the cassava to produce “attiéké” which is sold in their shop alongside the groceries she gets from the city and some products from the village. The shop contributes approximately 25% of the household’s total income. The completion of the new house, scheduled for this year, will serve the dual purpose of expanding both their shop and their living quarters.



**Ahoubé Koffi, Antoinette**, a 56-year-old female farmer with a primary education level, lives with her husband, 22-year-old daughter, and three grandchildren. The household owns a total of 11 hectares of productive cocoa land, with 3 hectares allocated to Antoinette and 8 hectares designated for her husband. Both land holdings are officially registered at the cooperative and were acquired 10 years ago when Antoinette’s husband retired from his public servant position in Abidjan.

The household’s farming activities have faced challenges due to her husband’s illness, which necessitates frequent visits to the city for medical treatment. Consequently, they are unable to actively participate in cocoa production and have resorted to engaging a sharecropper. Under this arrangement, the harvested cocoa is divided equally between Antoinette’s household and the sharecropper, who also contributes to the purchase of inputs required for cocoa cultivation.

Cocoa production constitutes a significant portion, approximately 80%, of the household’s overall income. The remaining income is derived from her husband’s pension and an additional source—Antoinette’s small business of selling food by the roadside.





**Affoue Kouadio, Rosalie** is a 67-year-old woman who has been a widow for 20 years, with no formal education. She lives with her two adult sons, her adult daughter, her son-in-law, and four grandchildren. Three of the children are of school age and are currently attending either the primary school of the village or the secondary school in the closest city, Toumodi.

Rosalie has six hectares of land of which four are used for cocoa. Because of the drought and CSSVD, only three hectares are currently productive, but the trees are all 25+ years old. She started rejuvenating one hectare by planting young cocoa trees as she prefers to continue with cocoa rather than investing in new crops such as palm or rubber. All five adult members of the household work in the cocoa field and also assist in the production of food crops (yams, bananas, cassava) cultivated mainly for their own consumption. Rosalie also uses the communal working group of youngsters set up by the cooperative in her village for intensive activities such as soil preparation, planting, post-harvest activities, etc.

Cocoa is the most important source of income as it is their only cash crop; the food crops are only sold if there is a surplus. But with the drought experienced in May of last year, all crops did not yield to their maximum and in addition to not getting enough money from cocoa, Rosalie's household also experienced food shortage between June and August. They got some support from the cooperative in the form of bags of rice that were later deducted from the sale of cocoa in the main campaign.



**Diallo, Mamadou**, a 37-year-old male farmer with Koranic education and basic spoken French, lives with his wife and three children. His household also includes his parents, brother, nieces, and cousins, resulting in a total of 17 family members under one roof. Mamadou bears the responsibility of managing both his own three hectares of cocoa land and the additional three hectares owned by his ailing father.

In addition to cocoa farming, Mamadou's household cultivates two hectares of coffee, three hectares of rubber, and five hectares of palm. Moreover, they possess seven hectares of fallow land that was previously a coffee plantation but has been abandoned due to labor shortages. Previously, they employed a permanent worker, who left due to dissatisfaction with the remuneration.

Cocoa serves as the primary source of income, contributing approximately 60% annually. Palm cultivation accounts for 30% of their income, while the remaining 10% comes from other crops. Mamadou's wife actively engages in cultivating and selling crops such as okra, eggplants, lettuce, and peppers, providing an additional source of income for the household.

Mamadou plays a crucial role in his community as the leader of a pruning group, comprising 40 members who performed pruning activities on 50 farms the previous year. Furthermore, he demonstrates a keen interest in income diversification training, as he has taken charge of the beekeeping activity introduced in his village.



**Kaboré, Hamado** is a 63-year-old male farmer who has not completed any formal education. He lives with his two wives, their eight children (four of whom are in Burkina Faso), and their sharecropper. Kaboré manages two separate cocoa plots, one measuring two hectares and the other three hectares. In addition to cocoa farming, he cultivates eight hectares of rubber, of which five hectares are currently productive. Kaboré also dedicates two hectares to coffee cultivation and recently planted five hectares of palm trees, although they are not yet mature enough for production.

Kaboré's agricultural journey began with coffee when he migrated from Burkina Faso before transitioning to cocoa farming. He has established an arrangement with his sharecropper, wherein if Kaboré covers all the costs of inputs, the sharecropper receives one-third of the harvest. However, if the sharecropper contributes to the purchase of inputs, they are entitled to half of the harvest. According to Kaboré, cocoa serves as the primary source of income for his household, accounting for approximately 70% of their total revenue. Coffee and rubber production follow as the next significant income sources. Additionally, Kaboré's two wives engage in IGAs; one sells food crops, while the other manages a small shop offering various items and food products. However, Kaboré is the main decision-maker regarding the revenue generated from these activities.



**Nebié, Yobissiwa** is a 35-year-old female farmer who lives in a cohabitation arrangement with her polygamous partner and her sister, all of whom are registered cocoa farmers at the cooperative. They live with their eight children. Yobissiwa owns 1.5 hectares of cocoa land, which is populated by productive cocoa trees. Her sister possesses 1.8 hectares of cocoa land, while her partner manages a substantial 10-hectare cocoa plantation. Despite each individual having their own plot, they work collectively on all three farms, employing a rotating schedule, and jointly make decisions regarding farm management and maintenance.

Yobissiwa's household hires temporary workers specifically for tasks such as weeding and the application of phytosanitary products like fungicides. The household does not cultivate coffee, palm, or rubber, as Yobissiwa, her sister, and her partner consider themselves dedicated cocoa farmers with no interest in diversifying into other cash crops. Instead, they primarily focus on cultivating food crops for personal consumption, selling any surplus on the market.

Cocoa serves as the primary and most significant source of income for Yobissiwa's household, contributing to at least 60% of their annual household income. The remaining income is derived from small business activities conducted by each adult member of the household. Yobissiwa, in particular, demonstrates a strong commitment to income diversification initiatives within her community. She holds the position of secretary in the VSLA and actively participates in a group of women dedicated to learning and practicing the production of soap, cocoa butter, and peanut butter. She also has a small shop, selling children's clothing.





**N'Dri Diby, Guillaume** is a 49-year-old male without formal education but with basic literacy skills. He lives with his spouse, his brother, his eight children, and one grandchild. The oldest four children (27, 23, 22, and 21 years old) already work in various agricultural activities in the village and around. The youngest four go to school and the grandchild is still too young to attend school.

Guillaume has five hectares of land (one is uncultivated) of which two hectares are used for cocoa cultivation. Although all his cocoa field, located 2 km away from the village, is covered with productive trees 5–25 years old, his yields have diminished since his plantation got infected by CSSVD. Although quite invested in cocoa production (he attended the one-day pruning demonstration organized in his village with 30 other farmers), Guillaume does not need his children in the field as he hires a permanent worker for eight months per year (paid FCFA 170,000) to perform all the necessary tasks with him.

Alongside the cocoa, Guillaume's wife cultivates plantain, yam, cassava, and groundnuts on the other two hectares of land owned by the household. Only the first crop is sold, the other crops being mainly for own consumption. Therefore, 80% of their income on average come from cocoa, the sale of plantain, 'attiéké' as well as other small products brought by Guillaume's wife from the village to resell in the city (avocados, oranges, tangerines, and bananas), which constitute the remaining 20%. She is quite invested in income diversification initiatives as she joined one of the village's VSLA (30 members) from which she borrowed money to expand her trading activity. She also participates in the group setting up a communal garden to produce okra and eggplant for the school canteen and to sell in the markets of Toumodi and Abidjan.



**Diallo, Djelika**, a 34-year-old female farmer, has not completed any formal education. She lives with her husband and six children. Both Djelika and her husband are registered members of the cooperative, and she personally owns 1.5 hectares of cocoa land. Djelika actively works on her farm, receiving assistance from her husband and hiring temporary workers for tasks such as weeding and the application of phytosanitary products.

In addition to cocoa farming, Djelika's household engages in the production and sale of rubber, which are primarily overseen by her husband. They have also planted palm trees, although the trees are still young and have not reached their productive stage. To diversify their income streams, Djelika has made an investment in a palm-processing machine. This machine allows her to produce palm oil for sale and rent it out to other women in her community. However, the revenue generated from this venture is modest, and Djelika estimates that cocoa constitutes approximately 90% of their household income, with rubber accounting for the remaining 10%.



**Kamara, Aboubacar** is a 50-year-old male with a senior high school education level. He is married polygamously to two women and lives with his five children and one grandchild. While the grandchild is too young for schooling, Aboubacar's two youngest children are enrolled at the village primary school and the oldest three go to secondary schools in Toumodi and Abidjan.

Aboubacar has eight hectares of land (two are uncultivated) of which four are used for cocoa (all productive but one hectare has trees over 25 years old). Next to cocoa, he also cultivates plantains, yam, cassava, and palm (not yet fully productive). In general, he manages the cash crops while his wives are in charge of the food crops although he helps them in heavy tasks such as land preparation and planting while the women assist with weeding the cocoa field, for example. Aboubacar also hires temporary workers to apply phytosanitary products and sometimes to help with the weeding. Cocoa remains the most important source of income (at least 80%) while food crops contribute 10–20% depending on sales (the price is not fixed and depends on the (female) buyers that come from Toumodi and Abidjan to negotiate the products). The cash earned from the sale of food crops is crucial to the household during the mid-crop season (June–August) when both money and food are scarce.

Aboubacar is a member of one of the village's pruning groups (15 members) and he has received training in skilled pruning (the full course in the first year and refreshers in subsequent years). There are five pruning groups in his village, all working under the supervision of one chief who runs a program based on producers' requests. Aboubacar's group works every Wednesday and is paid FCFA 25,000 for each new hectare pruned and FCFA 10,000 for a maintained hectare.



### 3 Implementation progress

#### Program activities

This section offers an overview of the implementation progress of the pilot and perceptions of participating households until January 2023. Capturing progress is crucial for understanding the pilot's effectiveness and whether the intended households did indeed benefit as intended.

The pilot was initiated in 2021 with the enrollment of households based on existing cooperative registries. However, enrollment turned out to be more complex than anticipated due to factors such as the dynamic nature of cooperative membership and registered members not actively farming cocoa. Moreover, adopting a household-based approach instead of solely focusing on including registered farmers posed additional challenges. To address these issues, duplicate records were identified (i.e., multiple household members are cooperative members), and efforts were made to identify spouses and eligible children. Additionally, establishing and verifying MoMo accounts for both farmers and their spouses proved challenging due to changing SIM cards and a lack of official identification documents.

After the enrollment phase, the first activity of the Accelerator program involved establishing pruning groups that were subsidized, equipped and trained to work on the 1,004 farms of participating households. By the time of the midline assessment in March 2023, two rounds of pruning had been conducted, with the third round in progress. Initially, some farmers were hesitant to authorize pruning groups on their farms; during the interviews, respondents indicated that observing how large parts of their cocoa trees were cut, fueled their hesitancy as they rely largely on cocoa for income. However, their concerns disappeared when they witnessed the positive outcomes experienced by early adopters. Moreover, the first round of distributing shade trees from Nestlé and cooperative nurseries took place between July and September of 2021 and 2022.

VSLAs were established in most communities to promote income diversification. These served as platforms for saving and accessing loans and also facilitated GALS training for women, primarily the spouses of male cocoa farmers and some female farmers. The objective was to enhance women's empowerment and their involvement in household decision-making processes. Furthermore, plans were made for technical income diversification and financial management training to develop entrepreneurial skills. However, effectively tracking individual enrollment in these activities and verifying the initiation and expansion of household-level IGAs presented significant challenges due to the heavy verification requirements; at the start of the Accelerator, it was unclear how setting up new IGAs or expanding existing ones would be captured as a condition. As a result, only demonstration activities at the community level are currently underway in the pilot phase, with the aim of establishing communal funds from which individuals can borrow money to establish their own IGAs.

Regarding the schooling component, ICI continued their Child Labor Remediation and Monitoring System (CLRMS) activities and established additional schooling facilities, including canteens, and provided school kits to eligible households. The two cooperatives also built and rehabilitated schooling facilities. However, identifying eligible children and verifying their enrollment in school presented obstacles due to the transient nature of households, remoteness of certain communities, and the fact that some children attended schools outside the program communities, such as in major cities for secondary education

### 3 Implementation progress



or families living both in Côte d'Ivoire and Burkina Faso. Consequently, cash transfers for this component were delayed, creating a discrepancy between meeting the conditions for receiving the cash transfer and effectively receiving it. Furthermore, households were often not aware of any cash transfers to their accounts due to inadequate information about (timing of) payments or changes in SIM cards/numbers.

Table 2 presents relevant figures related to the implementation of activities across the four key areas of the Accelerator pilot in 2022.<sup>5</sup> These numbers were provided by the organizations that are in charge of program implementation.

Table 2. Summary of activities in the pilot in 2022

	Cooperative 1	Cooperative 2
Pruning groups set up and equipped	25	30
Total amount paid to pruning groups (FCFA)	16 300 000	19 022 500
Shade trees distributed	9 680	10 710
Number of (new) VSLAs set up	8	16
Communities covered by (existing/new) VSLAs <sup>a</sup>	17	38
GALS and entrepreneurship training provided	1 full training and 1 refresher per year and per section (5 included in pilot phase)	1 full training and 1 refresher per year and per section (8 included in pilot phase)
Alternative income generation training	16	16
Schools built/upgraded	1	2
Canteens built/upgraded	1	0
Providing birth certificates to children (ICI)	313	139
School kits distributed (ICI)	172	119

Notes. <sup>a</sup> This number is higher than the number of sections participating in the program as ICI records this number at a lower administrative level.

## Participation and incentives

In two cooperatives, the Accelerator pilot aimed to include 1,030 farm households located in 43 sections.<sup>6</sup> Nestlé selected two cooperatives that were believed to have the institutional capacity in place to implement such a program. Based on the monitoring data tracking the roll-out of the program in 2022, the following observations were made:

- All of the 1,030 households have registered MoMo accounts (both spouses have an account or the single recipient has an account in case of single-headed households). In only three households, the spouses did not have access to an account.

<sup>5</sup> Data on implementation progress in the first quarter of 2023 were not yet available at the time of writing.

<sup>6</sup> Sections might include more than one village or community.

- Pruning services were provided to all participating households, and only 26 of the 1,030 eligible households had no area pruned. The goal of the Accelerator is to prune one hectare per participating household annually, but the data reveal that 43% of households exceeded this target in 2022, with half of them having up to two hectares pruned already that year. Overall, the subsidized pruning initiatives covered 1,341 hectares out of the total 2,788 hectares cultivated by cocoa farming households in the pilot communities in 2022. It is important to note here that not all farm households have more than a hectare of cocoa land, while not all households have had a second hectare pruned yet at the time of the interview.
- Agroforestry opportunities were also extended to all participants. On average, households received 20 shade and fruit trees to plant, preferably in the pruned sections of their cocoa plots. According to the data provided by the cooperatives, the households successfully planted all the trees provided. Data on tree survival were not provided.
- Of the 1,030 eligible households, 952 have children of school age (6-16 years old), and nearly all expressed their intention to send their children to school. In total, 2,837 children were registered, and commitments were made to enroll 2,782 of them in school in 2022. For approximately 50 children no commitment from parents could be recorded. The verification process confirmed that the same number of children were indeed enrolled in school. In addition, three schools were rehabilitated or built, either by ICI or by the cooperatives involved. 452 birth certificates were also provided to children, which helps them enroll in school at a later age.
- Regarding the key area of income diversification, the cooperatives' data show that 86% of the households have at least one member enrolled in VSLAs. In terms of training participation, 47% of participating households received GALS training, while 51% had either attended a (communal) demonstration plot and/or received (individual) technical training on IGAs. Table 3 presents the various demonstrations and IGA training

Table 3. Income diversification training

Income generating activity	Sections	Households participating	Form
Breeding of pigs	2	184	Communal demo
Breeding of poultry	2	118	Communal demo
Breeding of rabbits	3	181	Communal demo
Breeding of goats	1	53	Communal demo
Beekeeping	4	210	Communal demo & individual training
Maize cultivation	19	125	Communal demo
Turmeric (processing)	7	37	Individual training
Groundnut (processing)	7	66	Individual training
Cocoa butter	8	66	Individual training
Soap making	8	41	Individual training

Notes. Since the start of the pilot Accelerator.



offered in the two cooperatives of the pilot. Approximately 80% of households reported being already involved in at least one IGA with 74% of them engaging in a second one. 174 households obtained a loan from a VSLA to finance the extension or set up a new IGA.

- Regarding the disbursement of incentives, the first half of the cash incentive for the promise to prune was transferred to all participants, but only 90% received the remaining half after verification in 2022: around 10% of households did not meet the required pruning standards. For the other key areas, the following payment rates were observed: 96% for agroforestry, 94% for the promise of school enrollment (which represents half of the schooling incentive), and 45% for income diversification (including VSLA enrollment, GALS training, and action plan development). No bonus transfer of EUR100 have yet been issued for meeting all four criteria due to the delay in payments.

## Participants' perspectives

In this section, we present the results obtained from the KIT household survey regarding participants' views of the Accelerator and their involvement in the activities, as well as their perceived applicability and usefulness. The use of incentives is also reported. These data are self-reported by a sub-sample of 250 households randomly selected among all participating households. Consequently, the results on participation might deviate from the monitoring data provided by the implementing cooperatives as reported in the previous subsection. We summarize the survey findings as follows:

- Currently, 93% of farms have undergone pruning. During the final round of data collection in 2023, 96% of the pruning work was exclusively carried out by professional pruning groups that were subsidized by the program. Additionally, approximately half of the farms that were pruned in 2021 also received maintenance pruning in 2022.
- Among the households who had their farms pruned in 2022, 94% expressed satisfaction with the work performed by the pruning groups on their cocoa plots. Only 3% of respondents expressed discontent, while the remaining respondents had a neutral opinion.
- According to the respondents in the KIT survey, 55% of households participated in some form of training during 2022/2023. The most popular topics included good agricultural practices (GAPs) in cocoa production (83%), child labor sensitization (57%), financial management (39%), and gender relationships (25%). These sessions were not specifically offered within the Accelerator pilot but are part of the wider NCP. Anecdotal responses revealed that farm households believe that the entire training offering is part of the NCP or a cooperative program.
- In 75% of cases, the main respondents themselves participated in these training sessions, while the remaining respondents were other members of the households. All of them held a favorable opinion of the training received, and 98% of them expressed a high likelihood of applying what they had learned. However, 66% of the respondents indicate that they lack the financial means to translate what they had learned into concrete actions.
- When specifically asking women, 47% of them participated in some form of training. The popular curricula were similar to those of the main respondents, but it was noted that women also benefited from training on non-agricultural businesses (14%) and

## Box 1. Farmers' journey to pruning

All 10 farmers interviewed were rather skeptical about the pruning offered in the program. Some of them recognized "cutting a few branches here and there" before the program but were unaware of the rationale behind pruning. Some of them like Rémy, Guillaume, Aboubacar, Mamadou and Yobissiwa decided to join the one-day demonstration training offered by Nestlé's staff to understand the process. They learned that "more space and sunlight can increase the production of cocoa while reducing the number of insects and small animals that can harm the trees." To date, Aboubacar, Mamadou, and Yobissiwa have joined a pruning group in their community. They benefit from refresher training sessions about skilled pruning every year and offer their services to other farmers.

For Djelika, Antoinette, and Kaboré, it was witnessing the results of pruned plots in combination with the intensive communication of the cooperative's delegates and coaches about increased productivity that convinced them to join the program. Antoinette declares that pruned farms were "good-looking" while Kaboré, said, "It is only after seeing the increased number of cocoa pods on the trees that were pruned first in the village that I decided to give it a try." Djelika even mentioned being "quite scared after the first round of pruning done by the groups."

At the date of the interviews, Rosalie and Aboubacar had received three visits from the pruning groups with one hectare of cocoa treated each year. Djelika, Kouamé, and Yobissiwa had all their cocoa plantation pruned (one to 1.5 hectares) in the first year and have now received one or two rounds of maintenance pruning. Kaboré had also had one hectare pruned each year and maintenance completed in 2022 for the area pruned in 2021.

Rémy, Guillaume, and Antoinette received two visits with one hectare pruned each time, but the area pruned in 2021 was not re-pruned for maintenance in 2022. Guillaume had had only half of his cocoa field pruned by the pruning groups (he is doing the other half himself). Antoinette's sharecropper is doing the maintenance on her pruned area but she is due to receive the third visit of the pruning group in the coming weeks for maintenance of the two hectares previously treated and pruning of the last hectare.

As a leader of a pruning group, Mamadou had all his six hectares of cocoa pruned during the first two years of the program. In the first year, his father's plot was done, and his own plot was done in the second year. In 2023, the focus will be on maintaining the first pruned plot.

All ten farmers noticed the difference between the pruned section and the rest of the farm ("The harvest on the pruned plot was a lot better compared to last year" – Rosalie). They also declared that the pruning groups were "doing a much better job than the self-pruning they used to practice" and they are therefore satisfied with the work done by these groups.

In terms of results, alongside increased cocoa production, farmers also noticed that the pruned area is "less affected by diseases and invaded by small animals and insects as there is much more light." They also declared that pruning "facilitates farm maintenance ("even harvesting becomes a nice activity" – Yobissiwa), increases the quality of cocoa pods, and reduces the rotting of pods." According to Guillaume, "pruning is the most important component of the Accelerator program."





A primary school built as part of the program

livestock management (11%). Once again, satisfaction and the likelihood of adopting the practices were high, with 99% of positive responses for both questions. However, 84% of the trained women indicated that they lacked the financial capacity to implement what they had learned.

- 91% of households participating in the KIT survey had received at least one cash transfer since the start of the pilot. 60% of households report to having received a cash transfer in 2021, and 83% of households reported to having received a cash transfer in 2022. The most common transfer was for pruning (66% of households participating in the pilot received at least one transfer), followed by agroforestry (44%). Due to delays in the verification of schooling and the implementation of diversification activities, only 130 (26%) and 47 (10%) cash transfers were reported for these key areas, respectively. Detailed information on the use of incentives is presented in Table 4.
- Households struggled to report the exact amount of cash received due to the multitude of annual transfers (e.g., six per year: promise to prune transfer, verification of pruning transfer, agroforestry transfer, income diversification transfer, promise to send children to school transfer, verification to send children to school transfer),<sup>7</sup> but they reported to have received a cumulative amount of US\$70 on average in the first year, and US\$141 in the second year. Among those households who reported to having received a cash transfer, these numbers are US\$117 and US\$169 respectively. It is important to note that the subsidy for the pruning group (approximately FCFA25,000) was deducted from the pruning incentive, and transfers regarding income diversification and schooling were not yet fully made as activities were not yet completed or verified. The issue with transferring the incentive for schooling was mainly due to challenges with verifying whether all children enrolled in the Accelerator pilot attended school. Nonetheless, these average amounts received are lower than intended (i.e., EUR500), and various studies show that cash transfers only impact the livelihoods of recipients if they are frequent and considerable in size.<sup>8</sup>

<sup>7</sup> In addition, some farmers also receive the premium via MoMo.

<sup>8</sup> See Bastagli et al. (2016) for a systematic literature review on the effects of cash transfers.

- Based on self-reported use, the primary use of incentives is to pay for schooling fees, followed by healthcare costs. Investment in cocoa production remains limited, whether related to hiring temporary workers or purchasing inputs. Additionally, diversification incentives are mainly utilized to initiate new IGAs or expand existing ones.

Table 4. Reported use of Accelerator cash transfers

Declared use/Incentive received	Pruning	Agroforestry	Schooling	Diversification
Housing	12%	11%	4%	2%
Schooling fees	<b>21%</b>	<b>22%</b>	<b>76%</b>	11%
Healthcare costs	18%	21%	3%	11%
Start new IGA	4%	2%	1%	<b>23%</b>
Expand existing IGA	8%	6%	7%	21%
Pay cocoa workers	8%	9%	2%	–
Purchase cocoa inputs	11%	6%	1%	2%
Invest in non-cocoa agricultural activities	3%	5%	1%	4%
Repay debts	0%	1%	1%	2%
Transfer to family/friends	2%	4%	1%	13%
Other	13%	13%	3%	11%
% of households received the incentive (both years combined)	66%	44%	26%	10%

Notes. Both survey rounds combined. Based on self-reported receipt and use in KIT surveys.

## Box 2. Farmers and spouses' participation in training

In addition to their training on pruning, Aboubacar and Mamadou also participated in training on GAPs for cocoa production. Mamadou has already participated in many other training sessions (GAPs for non-cocoa crops, financial management, agro-processing, livestock management, business and trade, and child labor) as he believes this can help him change his life by updating his knowledge, improving his practices, and increasing his agricultural yields. Also, he can serve as a role model in the community by introducing new practices such as beekeeping. Mamadou is in charge of the beekeeping activity set by the program in his community. He was trained to set up and maintain the beehives, and harvest the honey that will, once sold, provide a common pot from which the households in the community can borrow money to finance their own IGAs.

In many cases, it is the women who followed various training courses offered as part of their VSLA membership, whether they were female farmers such as Djelika and Yobissiwa or male farmer's spouses. For example, Aboubacar's first wife, as vice president of one of the VSLAs in the community (32 members), benefited from GALS and entrepreneurship training. These sessions provided many insightful learning points in the daily activities of women giving



them more confidence to start IGAs such as hairdressing or trading cassava. Kouamé's wife followed entrepreneurship training through the VSLA she joined seven months ago. She learned how to run a business, trade, manage, calculate and plan finances, and save money. Kaboré's first wife followed the GALS and literacy training sessions delivered by ICI to the members of her VSLA. It was a joint decision between Kaboré and his two wives to have the first wife join the program, but the second wife is also planning to join the existing VSLA in her village.

Yobissiwa, as secretary of the VSLA set up in her community (31 members including two men of which one is Yobissiwa's partner), is involved in the training delivered at the community level for producing honey-infused soap, cocoa butter, and peanut butter. These training sessions were offered to two groups of women who are all members of the VSLA. They are currently completing the last training session before getting the products ready to take to the market. All these activities require Yobissiwa to adapt her schedule, but she gives priority to the training. Her 18-year-old niece (still in school) can help with the business and household chores and her partner takes on the cocoa work if she needs to attend a training session.

Djelika also benefited from training on child labor, entrepreneurship, and GALS through her VSLA membership. Although it requires a considerable time commitment, she recalls learning a lot about how to set up a profitable IGA.

Nonetheless, some farmers and/or their spouses noticed certain limitations to the training activities offered within the Accelerator. Although aware of the training about IGAs like beekeeping offered in his community, Rémy did not join these initiatives. On the other hand, his wife attended the entrepreneurship training offered within the VSLA she joined 24 months ago. Guillaume's wife was involved in a one-day training course about the basic process of a VSLA, but she regrets that no financial literacy component was involved. She is now relying on her brother-in-law, who has a secondary education level, to explain the details of the savings and interest repayment as well as the mechanisms of revenues and profits in her trading activity. She also missed the one-day GALS training as she was away from the village the day it was given to her group. Rosalie and Antoinette did not attend any training sessions because of their age and because services (VSLA and training) were not offered in the vicinity of the camp where Antoinette lives. She also frequently travels to Abidjan for health-related issues.





During the past 12 months, Antoinette received two payments of FCFA65,000 on her MoMo account but she is unsure for which component of the program she received the transfers. She also does not remember receiving money in 2021. She used this money to pay healthcare costs, improve her housing and pay for food during the difficult period of September to November 2022 when her household experienced a food shortage.

Mamadou received four transfers (two for him and two for his father). He confused the transfers with the cocoa premiums that were also paid on his MoMo account and is not quite clear on which amount was received for what. His wife, despite having a MoMo account, has not yet received a transfer as she is not a VSLA member. He also recalls that they received some transfers in 2021 but is unsure of the amount or the reason. The money was mostly used to pay for temporary cocoa workers (for weeding and harvesting).

Djelika received three payments but she is unclear about the amounts or for what reason a certain transfer was made. She decides with her husband on the use, priority is put on healthcare and schooling costs. They also pay for food if needed and children's clothes.

Kaboré received two payments in 2022 (FCFA40,000 for pruning and FCFA18,000 for agroforestry) but nothing in 2021. His first wife also received an incentive for the children's schooling, but he is unsure about the amount. He used the money to buy cocoa inputs and food for the household and shared the information about the receipt of incentives from the program with his two wives.

Yobissiwa's household received four payments each year of the program on the three registered farmers' MoMo accounts. Since she has a perfect understanding of the program and its four key areas, she was able to distinguish between the different payments received. Therefore, she declared that the pruning incentive was used to pay for the phytosanitary products and to hire temporary workers. The agroforestry one was used to purchase protective products for the seedlings (to avoid them being eaten by insects) and pay for children's stationery since the schooling incentive arrived after the start of the school year. Once that incentive arrived, Yobissiwa used it to restore the savings from which money had been taken to complete the schooling fees. The diversification incentive was invested in her business and food crop cultivation (they are starting horticulture).

Kouamé received two transfers from the program (FCFA64,000 for pruning and FCFA65,000 for agroforestry) and his wife also received two (FCFA32,000 for schooling and FCFA20,000 for diversification). The money was used to buy more stock for their shop (mostly dry groceries), a little contribution to the construction of the house, and children's health care.

Rémy received one cash transfer for the pruning and nothing for the agroforestry despite planting 20 trees. His spouse received a transfer for schooling on her MoMo account but nothing for the diversification component. They decided together to invest these transfers in the children's school fees which are quite expensive: "The college in Abidjan for the oldest child is FCFA500,000 per year. The schools in Toumodi of the second and third children are FCFA90,000 and FCFA60,000 per year."

Rosalie received only FCFA65,000 for the pruning on her son's MoMo account as she is "not comfortable in operating mobile phones." She used the transfer to pay for the funeral of a family member. Despite planting shade trees, joining the VSLA, and enrolling the children in school, the household received no other incentive.

Aboubacar received a total of FCFA95,000 for pruning and planting shade trees and his first wife also received FCFA32,000 for schooling and FCFA20,000 for diversification. The situation created some tension with the second wife not receiving anything and Aboubacar had to negotiate the use of the money so everyone could benefit from it (school fees, healthcare costs, investment in some agricultural activities, hiring temporary workers, and trade).

Guillaume received three transfers (FCFA32,000, FCFA65,000, and FCFA20,000) but is unsure for which component as there was no message explaining the purpose of the transfer. In addition, the cooperative also pays the premium for the certified cocoa on their MoMo account during the mid-crop season which adds to the confusion. Guillaume's wife also received FCFA32,000 on her MoMo account and she thinks it is related to the household's promise to send their children to school. Since ICI did an inspection last month to verify whether her children are indeed in school, she expects to receive the other half of the schooling incentive soon. After receiving the payment, Guillaume and his wife openly discussed how to spend the transfers on food, health care, schooling for the children and improving their housing.





## 4 Average program impact

This chapter presents the average program's effects at midline. The analysis compared two groups of households: those who are eligible to participate in the program (treatment group) and those who did not (control group). **The objective of this chapter is to assess the average impact of the program on the treatment group as a whole, regardless of their actual participation or number of cash transfers received** (referred to as the *intent-to-treat effect* or ITT). The results are presented in tables that display the estimated indicator values for the control and treatment groups during the first round and follow-up period. The coefficient in the so-called diff-in-diff column of the table is an estimate used to measure the average program impact. Proportions are used to report results for yes/no questions, making it easier to understand the findings.

### Agricultural practices

The assessment of agricultural practices in this study relies on self-reporting by the households themselves.<sup>9</sup> It is important to acknowledge that this approach may introduce bias, as households could potentially over- or under-report their usage of certain techniques. This bias can affect the accuracy of the estimates. However, the results can still provide a valuable indication of the impact of the pilot phase, and reveal the following effects:

- The previous chapter on implementation progress demonstrated that 93% of the farming households had at least one hectare of cocoa land pruned vs. 56% in the control group, indicating a successful impact of the program on the application of this practice.<sup>10</sup> The effects of (quality) pruning on productivity, farming costs, cocoa revenue, and profit are discussed in Chapter 5.
- The Accelerator demonstrates a statistically significant impact on fertilizer use, particularly the adoption of organic fertilizers such as manure and cocoa pods. This effect is also evident when examining the percentage of land where fertilizers are utilized. Although the general trend indicates a decline in fertilizer use (driven by worldwide increases in fertilizer prices), the decline is larger in the control group than among the participating households. Additionally, the program shows a positive effect on herbicide use, although absolute use is still higher in the control group. For both the treatment and intervention group, pesticide and fungicide use is declining.<sup>11</sup>
- A treatment effect is also found in the proportion of households planting home-grown cocoa seedlings on their cocoa land. This is mainly because of a large decline in the

<sup>9</sup> In the baseline report of the test-at-scale phase of the Accelerator, the indicators on agricultural practices are different and based on objective observations as data were collected by Rainforest Alliance. These data were not available for the pilot phase of the program.

<sup>10</sup> In KIT's Demystifying the Cocoa Sector in Ghana and Côte d'Ivoire (Bymolt, Laven, and Tyzler, 2018), 40% of the cocoa farmers in Côte d'Ivoire pruned their farm in 2018, indicating that the uptake of pruning is increasing.

<sup>11</sup> The joint study conducted by Barry Callebaut, IDH, Rainforest Alliance and Agri-Logic (2023) also shows low use of pesticides and fungicides, which can be problematic given the black pod disease.

# 4 Average program impact



control group, and the result suggests that households in the treatment group continue to invest in cocoa production.

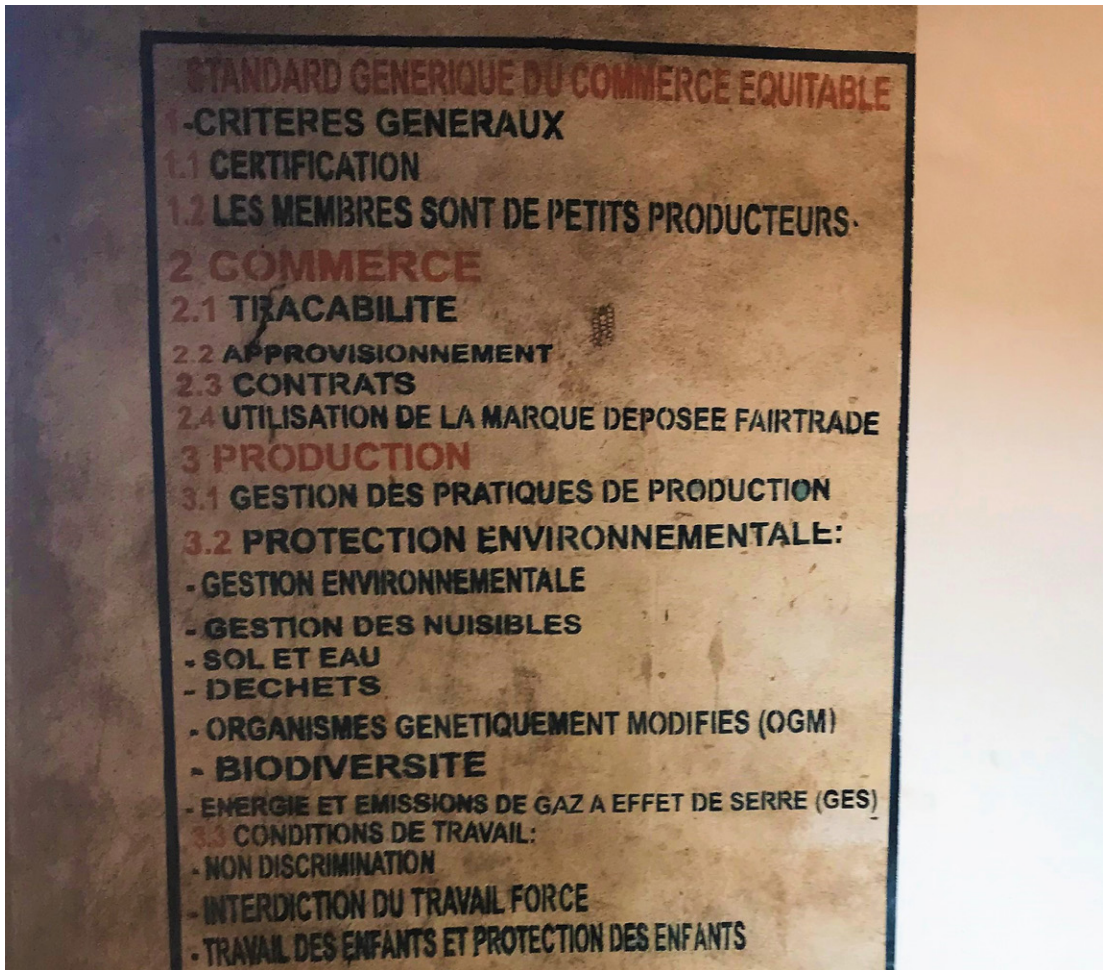
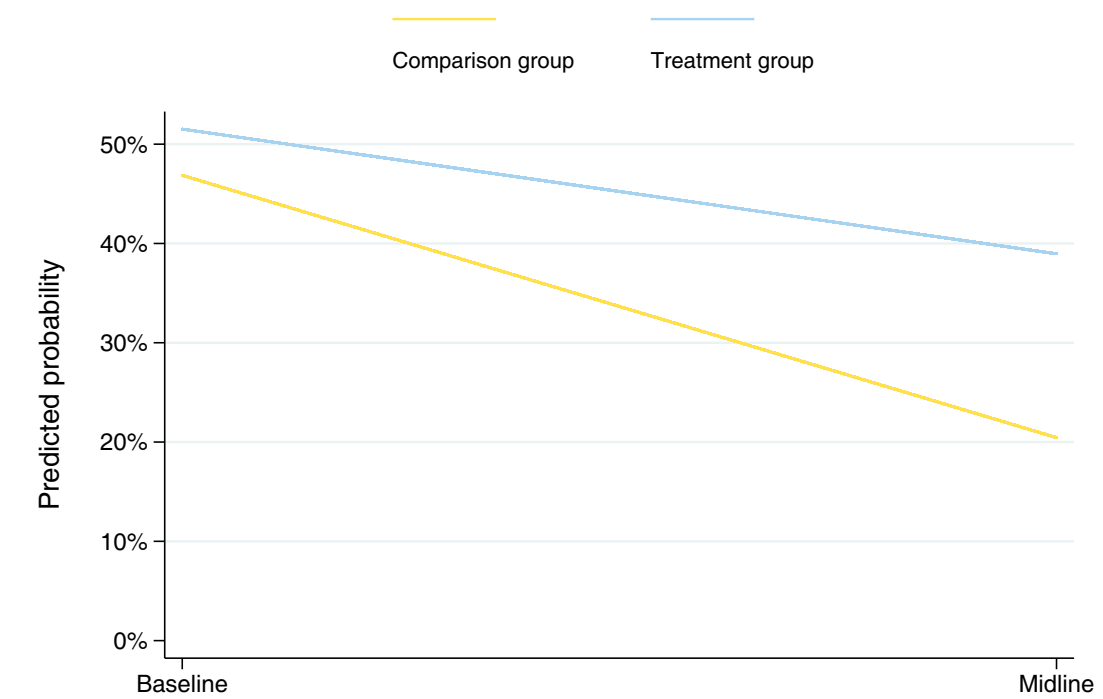
- Overall, a decline is observed in the proportion of households using inputs like fertilizer and phytosanitary products, both in the control and treatment groups. However, the program's effects on fertilizer use, herbicide use, and planting imply that households participating in the Accelerator display a higher level of engagement and commitment to cocoa farming as a result of the program. These findings are further supported by anecdotal evidence from the case studies in Box 4.

Table 5. Agricultural practices in cocoa production

Indicator	Comparison group		Treatment group		Treatment effect	
	Round 1	Round 2	Round 1	Round 2	Diff-in-diff	SE
<b>Applying practice (proportion of households adopting)</b>						
Planting home-grown cocoa seedlings	0.294	0.297	0.216	0.273	0.053	(0.066)
Fertilizer (all types)	0.469	0.204	0.515	0.390	0.139**	(0.069)
Granular fertilizer	0.239	0.057	0.398	0.229	0.014	(0.057)
Liquid fertilizer	0.169	0.138	0.165	0.165	0.031	(0.052)
Organic fertilizer (e.g., manure)	0.128	0.017	0.082	0.074	0.102***	(0.037)
Phytosanitary (pesticide/fungicide)	0.813	0.393	0.861	0.524	0.083	(0.063)
Pesticide	0.793	0.393	0.848	0.524	0.076	(0.066)
Fungicide	0.163	0.067	0.165	0.052	-0.017	(0.046)
Herbicide	0.189	0.109	0.091	0.139	0.127***	(0.049)
Weeding	0.971	0.930	0.957	0.931	0.015	(0.035)
<b>Intensity of applying practice (% of cocoa land on which practice is applied)</b>						
Planting home-grown cocoa seedlings	10.077	4.981	4.336	4.850	5.610**	(2.374)
Granular fertilizer	14.059	4.309	25.348	17.560	1.961	(4.478)
Liquid fertilizer	15.525	13.538	13.870	13.519	1.635	(5.004)
Organic fertilizer (e.g., pods, manure)	9.453	1.435	5.605	4.428	6.840**	(3.006)
Pesticide	75.605	37.600	79.077	48.707	7.635	(6.691)
Fungicide	13.612	5.980	14.698	4.660	-2.406	(4.314)
Herbicide	13.212	10.007	5.767	9.778	7.216*	(4.035)
Weeding	94.497	90.708	91.038	88.522	1.273	(3.856)

Notes. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Propensity scores weights used as sampling weights to reweigh regression analyses. Bootstrapped standard errors (2000 replications) are reported in parentheses in the SE column. Diff-in-diff = the difference in difference estimate indicates the average impact of the program, comparing changes in outcomes over time between the treatment group and the control group.

Figure 3. Fertilizer use



Fair trade standards on display in a cooperative warehouse



All 10 households interviewed actively participated in the pruning activities, with some of them even taking on leadership roles within pruning groups. Interestingly, they observed that pruning not only alleviated the burden of farm maintenance (See Box 1) but also served as an encouragement to invest further in their cocoa farms.

However, differing opinions emerged concerning the application of inputs, particularly fertilizers, on an annual basis. Some farmers believed that excessive use of fertilizers could be detrimental to cocoa trees and suggested a frequency of every two-three years for application (Djelika, Kaboré). Even among those inclined towards using fertilizers, the sharp increase in prices in recent years (“chemical fertilizers can cost up to FCFA200,000 per hectare” – Antoinette), make these inputs simply unaffordable, “even with the cooperative’s support” (Mamadou, Yobissiwa).

As an alternative, farmers have turned to organic fertilizers produced on their own farms by mixing cocoa pods, leaves, and other organic materials such as banana or papaya leaves and animal manure. Apart from being more economically viable, this type of input is also favored by some farmers who are keen on producing more “organically” either because they are “conscious of the environment” (Rémy) or think that the “the need for chemical products is reduced since the combination of pruning and organic fertilizer works well” (Aboubacar). Only Kaboré and Rosalie applied chemical fertilizers during the previous cocoa season but only by treating a third of the plot for the first one and with the support of the cooperative for the second one.

Cocoa production and farm economics

When analyzing effects on cocoa production and farm economics, it is important to recognize that one of the key activities of the program, namely pruning, also occurred in the control group, albeit to a lesser extent and with lower quality.<sup>12</sup> In addition, only a part of the farm was often pruned, while production, yield and farm economics are computed for the entire farm. In Chapter 5, we delve deeper into the impact of pruning on farm productivity, and findings reveal that the quality of pruning plays a significant role.

The following average program effects are reported in Table 6:

- Overall, there was an observed upward trend in the average cocoa production in both the control and treatment groups (See also Box 5). Average yield levels increased as well for the entire sample, with the treatment group producing more than 700kg per hectare on average in the season ‘22-23’.
- No significant differences were found in the changes in average cocoa yield and production between the treatment and control groups, thereby ignoring whether

<sup>12</sup> Alternatively, one could reason that pruning, albeit at lower quality, is simply part of a counterfactual situation.

households pruned and at what level. It is important to consider that average cocoa yield levels are measured based on the entire farm, encompassing not only the specific one or two hectares of cocoa land that underwent pruning during the two rounds of pruning in the Accelerator. Although specific questions were included in the questionnaire, respondents encountered difficulties in providing specific answers about cocoa yield from the pruned areas, resulting in low reliability of the obtained results. They are not included here.

- Furthermore, the analysis reveals a higher proportion of households in the treatment group successfully achieving the desired outcome of producing one metric ton of cocoa per hectare of land. However, the observed difference in change over time between the treatment and control groups in this respect did not reach statistical significance. Nevertheless, it is noteworthy that 22% of farm households in the participating communities, on average, attained the milestone of producing one metric ton of cocoa from each hectare of land. This marks a considerable improvement of nearly ten percentage points compared to their performance in 2021.

Table 6. Cocoa production

	Comparison group		Treatment group		Treatment effect	
	Round 1	Round 2	Round 1	Round 2	Diff-in-diff	SE
Cocoa production (kg)	1527.000	1617.228	1767.460	1886.464	28.777	(186.953)
Cocoa yield (kg/ha)	490.618	639.657	547.035	709.205	13.131	(55.312)
Cocoa yield 1 mt/ha (%)	0.076	0.175	0.107	0.224	0.018	(0.055)
Cocoa land used (ha)	3.827	3.533	3.937	3.629	-0.014	(0.409)

Notes. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Propensity scores weights used as sampling weights to reweigh regression analyses. Bootstrapped standard errors (2000 replications) are reported in parentheses in the SE column. Diff-in-diff = the difference in difference estimate indicates the average impact of the program, comparing changes in outcomes over time between the treatment group and the control group.

- Table 7 shows that the proportion of households in the treatment group that employ temporary workers has seen a noteworthy rise over time in comparison to the control group, albeit at the 10% significance level. Conversely, there has been a decrease in the utilization of sharecroppers in both groups. These findings, along with effects on the adoption of agricultural practices, suggest that cocoa farming households in the communities participating in the Accelerator are making more efforts to invest in their cocoa farms as a result of the program compared to the control group. Interestingly, these investments have not led to significantly higher production costs on average, as shown in Table 8.



All respondents shared a common observation: their cocoa production has seen a notable increase in the past two years. They attribute this improvement primarily to the pruning activities conducted during this period.

The extent of the changes varied among the interviewees, with some reporting a rise of 160 kg/ha (Antoinette: “We used to harvest around 10 bags, but now we can expect 13–15 bags”) and others experiencing a substantial boost of 470 kg/ha (Djelika: “Previously, I would get 18–20 bags from my 1.5-hectare plot, but now it’s around 30 bags”). The majority of farmers reported an average increase of approximately 130 to 200 kg/ha, equivalent to nearly two to three bags of 70 kg each.

It is worth noting that Djelika was already achieving a remarkable production of one metric ton per hectare before the pruning activities commenced, as her smaller plot was easier to maintain. Similarly, Aboubacar was also able to achieve one metric ton per hectare after experiencing an increase of 250 Kg/ha between the two rounds. This supports our estimate of a 20% likelihood of reaching this level of productivity when pruning is done at a rigorous level. Other farmers like Yobissiwa, Rémy, and Kouamé are close to the target of one metric ton per hectare with respective yields of 817, 900, and 975 kg/ha (Kouamé : “Before pruning, we used to have 0.5 ton/ha, now 1 ton/ha is possible”). Meanwhile, Antoinette, Mamadou, Kaboré, Guillaume and Rosalie have yields situated between 400 and 600 kg/ha.

Despite the positive trend in cocoa production, farmers also observed that their yields were affected by challenges such as the prevalence of CSSVD (Guillaume: “Last year, I harvested one ton for the entire season while in the years before, I could get up to 1.5 tons on my two hectares”), the age of their trees (Aboubacar has trees over 25 years old on 25% of his farm), restricted access to inputs and the impact of previous years’ drought (Rosalie: “Ten years ago, it used to rain almost every day from May, now we have several days/weeks without rainfall”). As possible solution, in addition to rejuvenating the cocoa plantation, Kouamé, for example, intercroops his cocoa with banana trees (“They contain a lot of water from which the young cocoa trees take advantage in dry periods”). Rémy would like to irrigate his cocoa field (which is technically possible as the village is situated next to a large river) since he thinks that “although pruning affects the yields positively, the availability of water is more important.” However, he lacks the financial means to implement his project at the moment.

Figure 4. Temporary workers

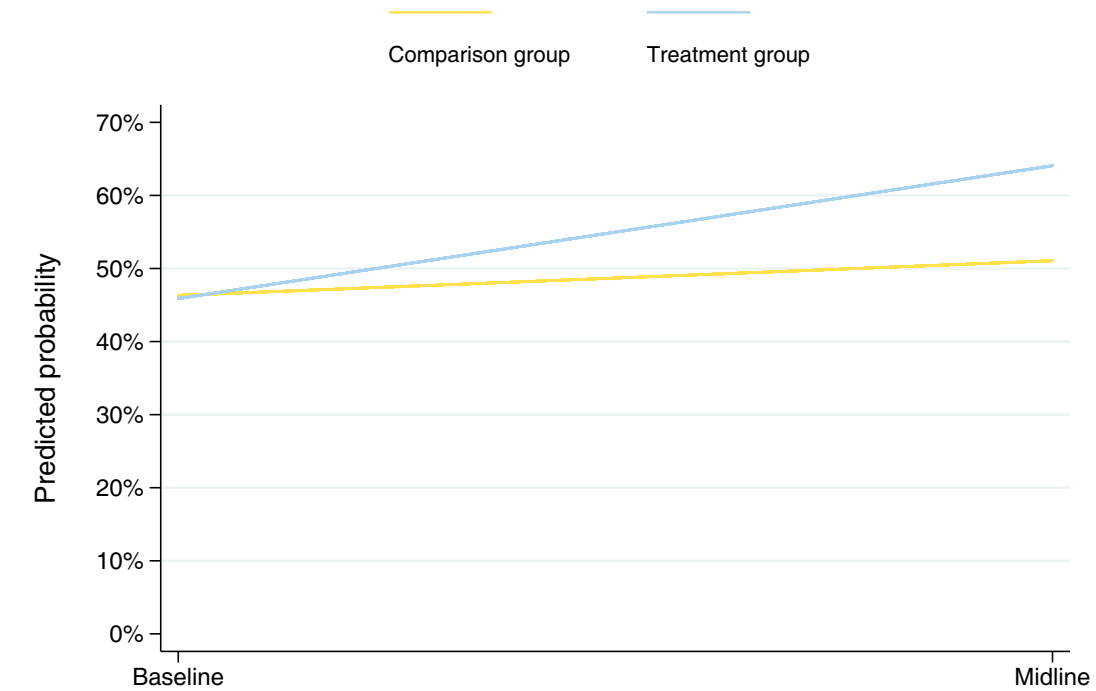


Table 7. Hired labor

	Comparison group		Treatment group		Treatment effect	
	Round 1	Round 2	Round 1	Round 2	Diff-in-diff	SE
Temporary workers hired	0.463	0.511	0.459	0.641	0.134*	(0.074)
Permanent workers hired	0.013	0.026	0.078	0.100	0.009	(0.031)
Sharecroppers on land	0.412	0.354	0.260	0.169	-0.033	(0.070)

Notes. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Propensity scores weights used as sampling weights to reweigh regression analyses. Bootstrapped standard errors (2000 replications) are reported in parentheses in the SE column. Diff-in-diff = the difference in difference estimate indicates the average impact of the program, comparing changes in outcomes over time between the treatment group and the control group.



Table 8 presents the average effects of the program on cocoa revenue, cocoa production costs, and cocoa profit:

- A positive trend in production as shown in Table 6 also leads to higher cocoa revenue in both the treatment group and the control, as indicated in Table 8.
- A declining trend in input use leads to lower farming costs in both groups, which are primarily caused by lower material / input costs. The trend over time depicts that labor costs are increasing substantially for both the control group and the treatment group.
- Although higher production has led to higher cocoa income in both the treatment and control groups, the difference in the change over time is not statistically significant. This is primarily due to the distribution of values, which results in a large standard error. The same conclusion applies to all other monetary variables associated with farming costs and cocoa profit. Despite the treatment group demonstrating higher values, the differences compared to the control group are not statistically significant over time.
- Increasing revenues lead to increasing profits per hectare. Both groups see an increase, with the average profits in treatment group amounting to approximately US\$815 per hectare in the season '22-23'.

Table 8. Farm economics

	Comparison group		Treatment group		Treatment effect	
	Round 1	Round 2	Round 1	Round 2	Diff-in-diff	SE
Cocoa revenue (US\$)	2041.945	2403.691	2299.490	2704.807	43.571	( 257.318)
Cocoa revenue per ha (US\$)	582.817	783.726	652.029	886.787	33.848	( 64.336)
Total farming cost (US\$)	155.039	107.448	222.613	183.268	8.246	(26.875)
Total farming cost per ha (US\$)	54.086	39.832	70.643	69.024	12.634	(8.803)
Material/input cost (US\$)	99.609	43.037	125.216	80.051	11.407	(15.345)
Material/input cost per ha (US\$)	32.155	14.892	43.695	25.732	-0.700	(4.851)
Labor cost (US\$)	36.135	40.893	46.120	53.715	2.838	(10.882)
Labor cost per ha (US\$)	12.012	19.512	16.881	28.204	3.822	(4.590)
Cocoa profit (US\$)	1881.601	2311.102	1981.413	2455.221	44.307	(249.749)
Cocoa profit per ha (US\$)	535.595	746.076	565.214	815.942	40.247	( 64.738)

Notes. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Propensity scores weights used as sampling weights to reweigh regression analyses. Bootstrapped standard errors (2000 replications) are reported in parentheses in the SE column. The predictive values of cocoa profit might not be the direct result of revenue minus production costs due to missing values in the latter two variables. The same holds for farm production costs, which is not precisely the sum of labor costs plus material costs. Moreover, each impact estimation is independent and re-weighted using propensity score weights. Diff-in-diff = the difference in difference estimate indicates the average impact of the program, comparing changes in outcomes over time between the treatment group and the control group.



**Le Conseil du Café-Cacao**

Le Conseil de Régulation, de Stabilisation et de Développement de la Filière Café-Cacao

# CAMPAGNE CACAO 2022-2023

PERIODE : OCTOBRE 2022 – MARS 2023

## PRIX MINIMUM GARANTI BORD CHAMP

Cacao bien fermenté, bien séché et bien trié

**900 FCFA/KG**

**AUCUNE RÉFACTION N'EST AUTORISÉE**  
**TOUT ACHAT EN-DESSOUS DE CE PRIX EST FORMELLEMENT INTERDIT**

**CONTACTS DES DELEGATIONS REGIONALES DU CONSEIL DU CAFÉ-CACAO**

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Official announcement of the minimum cocoa price



Antoinette and her husband cultivate 11 hectares of cocoa land. Unfortunately, her husband's illness has made it difficult for them to actively participate in the cocoa production process. As a result, they have resorted to hiring a sharecropper who receives half of the harvest in return for contributing to the purchase of inputs. He takes care of the farming activities with the help of the communal labor group he is a member of.

Kouamé visits his one-hectare field every day to care for the cocoa nursery, often assisted by his wife (in particular during harvesting and drying periods). They also hire temporary workers, mostly for weeding three times per year as this is key to deter insects and small animals from the plantation. Each worker is paid "FCFA2,500 per day without the food."

Yobissiwa, her partner, and her sister collectively own 12 hectares of productive cocoa fields. They employ a group of ten temporary workers for tasks such as weeding, "paying each individual FCFA2,000 for every round of weeding" (three rounds were completed last year). They also hire someone from their village to spray fungicides on the cocoa plants, "charging FCFA3,000 per box sprayed." Yobissiwa mentioned that they have not applied chemical fertilizers in the last five years due to rising prices.

Rémy is quite committed to the cultivation of his five hectares of productive cocoa as he stays overnight on his farm during the week. But during the main cocoa season in particular, he hires a group of 10–15 temporary workers ("young men from the villages") for weeding, applying phytosanitary products, harvesting, and pod breaking.

All five adult members of Rosalie's household work in the four-hectare cocoa field, in addition to the production of food crops (yams, bananas, cassava) cultivated mainly for their own consumption. Rosalie also uses the communal working group of young people set up by the cooperative in her village for intensive activities such as soil preparation, planting, and post-harvest activities.

Kaboré has two cocoa plots, one measuring two hectares and the other three hectares. He employs a sharecropper for one of the plots, with an arrangement where the sharecropper receives one-third of the harvest if Kaboré covers all the inputs' costs and half of the harvest if the sharecropper contributes to the input purchase. In addition to buying the inputs, Kaboré also pays temporary workers to apply these inputs. However, he treats only a portion of the farm each year, as he believes that inputs should be applied on a three–four year basis.

Mamadou manages the farm with the assistance of his brother and some communal labor for weeding, harvesting, and post-harvest activities. They used to employ a permanent worker, who was paid FCFA250,000 per year, but he resigned last year due to the low wages and opted to return to his home country, Togo. In addition to the cultivated land, the household also owns fallow land that was previously used for coffee plantations but has been abandoned due to the labor-intensive nature of coffee farming. Mamadou still faces challenges in hiring workers due to labor shortages.

Djelika works on her 1.5 hectares of cocoa with the support of her husband, brother-in-law, and temporary workers hired for weeding and applying phytosanitary products. They do not use fertilizers each year but on a three-year basis partly because of costs but also the belief that yearly application is harmful to the cocoa trees. They last applied fertilizers in 2021.

Aboubacar has four hectares of cocoa land and two other hectares where he planted young palm trees and his wives cultivate food crops. He usually helps them with heavy tasks such as land preparation and planting while they also assist in weeding the cocoa field, for example. Aboubacar also hires temporary workers to apply phytosanitary products and sometimes for weeding the cocoa field.

Guillaume cultivates two hectares of cocoa but does not work with his oldest children (between 21 and 27 years old) despite them being engaged in various agricultural activities in the village. Instead, he hires "a permanent worker for eight months per year (paid FCFA170,000)" to perform all the necessary tasks with him.

## Income diversification

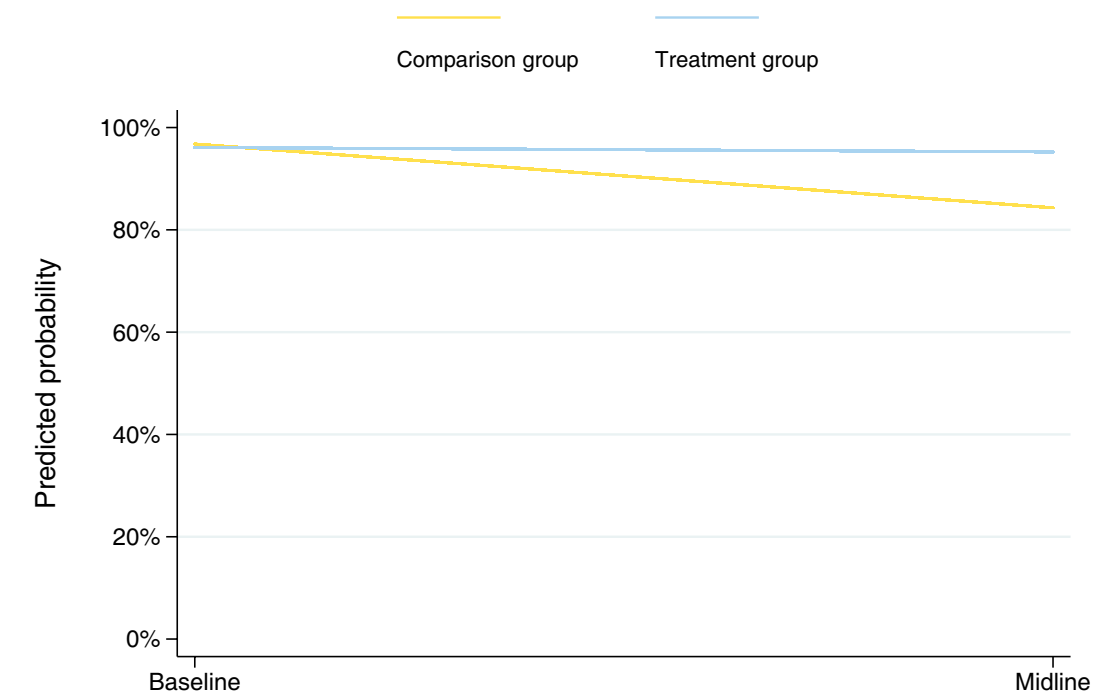
Table 9 presents the average treatment results for indicators on income diversification. The following effects are found:

- The results indicate that there is no significant difference between the treatment and control groups in terms of cocoa income as a percentage of total income. The predicted values for round one and round two show similar proportions of cocoa income for both groups, suggesting that the program did not significantly influence the relative contribution of cocoa to households' overall income. On average, cocoa is estimated to contribute for 70% and 74% to total household income in the control and treatment group in 2023, respectively.
- The analysis reveals a statistically significant treatment effect of 11.6 percentage points on cocoa as the most important income crop, indicating that the program had a positive impact on preserving cocoa as the primary income crop. The predicted values for round one show that 96% of households in the treatment group cited cocoa as their primary crop, compared to 97% in the control group. In round two, the treatment group had 95% of households citing cocoa as the most important crop, compared to 84% in the control group. This suggests that the program reinforced the significance of cocoa farming as the primary income source for a higher proportion of households in the treatment group. This largely aligns with the findings on agricultural practices, input use and hired labor.
- As regards the importance of rubber as primary crop, the results reveal a statistically significant treatment effect of almost -12 percentage points, indicating that a smaller proportion of households participating in the pilot cited rubber as the most important income crop. Although the importance of rubber remained more or less similar for the



households in the pilot, it became more important for a larger proportion of households in the comparison group. This suggests that the program – unintentionally – avoided rubber farming becoming the primary income source for a proportion of households in the treatment group.

Figure 5. Cocoa as most important crop



- The analysis shows a statistically significant treatment effect of -11 percentage points on the proportion of households relying solely on cocoa for income, indicating that fewer households participating in the pilot rely solely on cocoa for income compared to the control group. In round 1, the treatment group had 16% of households relying solely on cocoa, while the control group had 11%. In round 2, the treatment group had 10% of households relying solely on cocoa, compared to 15% in the control group. This suggests that the program encouraged households in the treatment group to diversify their income sources beyond cocoa farming.
- A statistically significant treatment effect of 0.6 is found on the number of income sources, indicating that the program had a positive impact on increasing the number of income sources for households. This suggests that the program interventions facilitated income diversification among households in the treatment group, enabling them to explore additional sources of revenue beyond cocoa farming. This finding is also in line with the previous result on cocoa as the only source of income.
- The analysis shows a treatment effect at the 10% significance level on livestock selling, suggesting a positive impact on the proportion of households engaged in selling livestock as an income source. This suggests that the program interventions may have

encouraged households in the treatment group to pursue livestock sales as a viable IGA. As shown in Chapter 3 on implementation progress, livestock rearing is set up in many of the communities. This also aligns with the finding that farm households in the treatment group were better able to keep using organic fertilizer (e.g., cocoa pods, branches, and manure from livestock) on their cocoa plots.

Table 9. Income diversification

	Comparison group		Treatment group		Treatment effect	
	Round 1	Round 2	Round 1	Round 2	Diff-in-diff	SE
Cocoa income as % of total income	72.466	69.913	72.805	74.152	3.900	( 3.087)
Cocoa as most important crop	0.968	0.843	0.961	0.952	0.116***	(0.039)
Rubber as most important crop	0.028	0.138	0.035	0.026	-0.119***	(0.036)
Cocoa as only income crop	0.107	0.154	0.160	0.095	-0.112**	(0.053)
Number of income sources	4.005	3.538	3.671	3.771	0.566**	(0.227)
Selling livestock	0.182	0.104	0.121	0.139	0.096*	(0.050)
Labor cost (US\$)	36.135	40.893	46.120	53.715	2.838	(10.882)
Labor cost per ha (US\$)	12.012	19.512	16.881	28.204	3.822	(4.590)
Cocoa profit (US\$)	1881.601	2311.102	1981.413	2455.221	44.307	(249.749)
Cocoa profit per ha (US\$)	535.595	746.076	565.214	815.942	40.247	( 64.738)

Notes. \*\*\*  $p<0.01$ , \*\*  $p<0.05$ , \*  $p<0.1$ . . Propensity scores weights used as sampling weights to reweigh regression analyses. Bootstrapped standard errors (2000 replications) are reported in parentheses in the SE column. Diff-in-diff = the difference in difference estimate indicates the average impact of the program, comparing changes in outcomes over time between the treatment group and the control group.



Rubber cultivation in Côte d'Ivoire's eastern region



All ten respondents consider cocoa the most important income source, with 80% being the most cited figure. Rosalie relies solely on cocoa and Djelika estimates that 90% of her household's income comes from cocoa although she has a limited oversight of the rubber activity managed by her husband. Mamadou (numerous mature cash crops) and Yobissiwa (successful business) have the lowest dependence on cocoa with only 60% of their income coming from cocoa sales. Kaboré considers cocoa as his primary source of income while in reality, income from rubber was more important on an annual basis. The discrepancy can be explained by the fact that the rubber income comes in all year round in small installments while cocoa/coffee are sold one to two times per year with bigger incoming cash flows at these times.

Next to cocoa and other cash crops (rubber, coffee, palm), all households mainly cultivate food crops (cassava, plantain, yam, maize, rice, bananas, eggplant, okra, pepper, and tomatoes) for their own consumption. It is usually the women of the households who manage the sales. Mamadou's wife and mother generate 10% of the household income from horticulture, Kaboré's first wife makes FCFA150,000 per year selling food various crops, and Rémy, Guillaume, and Aboubacar's wives can contribute up to 20% of the income by selling fruits, plantain, cassava, yam, and horticultural products in the market of Toumodi. The primary buyers are other women, visiting from the neighboring cities or even Abidjan, to buy products in bulk on a weekly basis at a negotiated price. The buyers usually arrange transportation to the final selling point and build their network of trusted female providers of food crops.

Regarding off-farm activities, women are also often in charge, regardless of whether they are cocoa farmers or spouses of male farmers. For example, Djelika started selling, on the market of the closest city (Noé), some palm oil she produces using a machine she bought with a loan obtained from her VSLA. She also rents this processing machine to other women in her village as an extra source of income.

Yobissiwa has a shop for children's clothing that she started with FCFA35,000. In the beginning, it was hard and she could earn a maximum of FCFA60,000 per month. Now she can make up to FCFA250 – 300,000 per month because she got a loan from her VSLA to expand the shop and add clothes and other small items to the shop. She is also involved in the training delivered to the members of her VSLA group for producing honey-infused soap, cocoa butter, and peanut butter. However, this activity has not yet started yielding income as women are still learning the production process.

Kouamé's wife operates a shop (opened ten years ago) in a part of their house where she sells dry groceries she gets from the city as well as some products from the village (bananas, yam). Although their product range is not large and there is competition in the area ("We don't have enough merchandise and there is a bigger shop down the street"), they manage to earn approximately FCFA500,000 per year from it. She recently started selling 'attiéké' after joining the VSLA and earns an additional FCFA2,000 a week from this activity.

Alongside cultivating three profitable cash crops, both Kaboré's wives have an IGA. The first wife sells food crops and earns an estimated profit of FCFA150 000 per year. The second wife has a

store where she sells different items (e.g., soap, dry groceries) and food. She can earn FCFA600,000 per year.

In addition to trading food crops, Rémy's wife runs a business selling cooled yogurt, ice, and fresh fruit juices. But the activity is too small-scale and dependent on power cuts to be profitable (she earns approximately FCFA43,000 per year). She plans to take out a loan from the VSLA to invest in a trading business of larger volumes of bananas, cereals, and cassava. Meanwhile, Rémy wants to invest in the production of palm as he thinks "it is more profitable than cocoa."

Guillaume's wife joined the women of her VSLA in setting up a communal garden to cultivate eggplant and okra. They got some quality seeds from an agro-dealer in Toumodi to create a horticultural nursery as there is a high demand for products such as eggplants or okra both in the village (to supply the school canteen), Toumodi and Abidjan. Despite some small arguments between the women, the activity is now well on track and Guillaume's wife is awaiting the final results before getting further involved in other income-generating training and activities.

Every Wednesday, Aboubacar's wife goes to the market in Toumodi by taxi to sell agricultural products purchased from other women in the village. This activity brings in some cash for the household and helps them cope with the shocks, especially during the mid-crop season (June–August) when money and food are both scarce. The entrepreneurship training followed through the VSLA helped the household increase the cultivation of cassava. This crop is interesting as "there is no season and no pressure to sell it since it can produce all year long and stays in the ground for one to two years before harvest." Therefore, Aboubacar and his wives dig up the cassava only when they have buyers who purchase it to produce attiéké and flour.

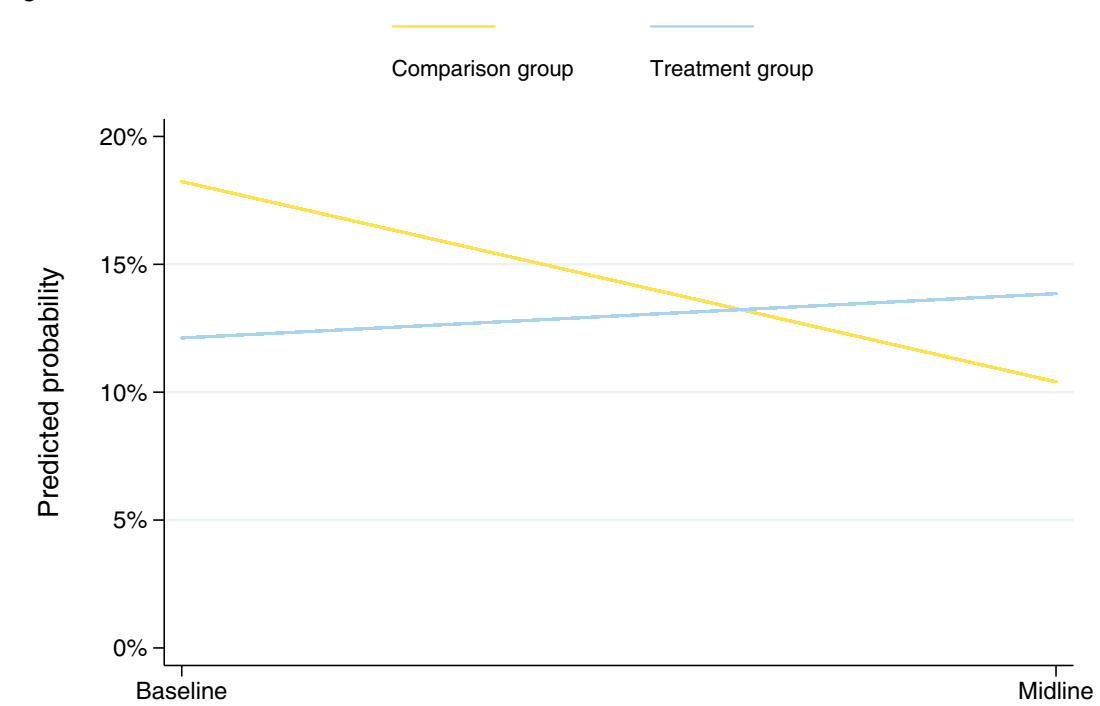
Rosalie's household declared no other IGA outside of cocoa. Given her age, she did not participate in the diversification training offered in her community like Antoinette who struggled with the distance between the camp where she lives and the main village where all the activities are organized. She is also limited by frequent travel to Abidjan to care for her sick husband. Therefore, she only manages to sell small portions of prepared food at the side of the road with limited income generating potential.

A new activity set up by the program is beekeeping. Mamadou received technical training to manage this activity in his community. He works in the evenings (from 6.30 PM) to harvest approximately 40 liters of honey every two months in addition to the weekly maintenance of the beehives. He does not get paid for this, although a small amount of money is set aside to cover his fuel expenses when he travels to the cooperative head branch or his regular clients to deliver the honey. There is high demand for the product (including Yobissiwa's VSLA, which wants to produce honey-infused soap) and many farmers in the community are interested in setting up beehives in their fields. Mamadou recently trained another person to help him out in this activity.

Other community-based demo plots have been set in different sections of the cooperatives (see Table 3). Participating households exhibit a genuine interest in these activities and livestock breeding programs are showing positive results. The next step is to organize the sales of the products to constitute a communal fund from which individuals can borrow money to finance their own IGA.



Figure 6. Livestock sold



Communal pig breeding in a participating community



Expenditures, food security, resilience and financial access

- The analysis in Table 10 demonstrates a significant rise in the number of cocoa farming households joining VSLAs. This indicates that the program has effectively promoted financial inclusion among these households, especially among women as the main participants in VSLAs, providing them with access to savings and credit services. The specific outcomes and benefits associated with VSLA membership in general will be discussed in Chapter 6.
- Although prevalence was already high, a statistical increase is found in MoMo accounts. This suggests that the program has effectively encouraged and facilitated the adoption of mobile financial services as the primary means for receiving the cash transfers, allowing households to have more accessible and convenient means of conducting financial transactions and managing their finances.<sup>13</sup>
- It is important to note that program participation is not associated with outcomes such as (self-reported) resilience and food security. The access to MoMo accounts and VSLAs, while showing promising results in terms of increased usage and adoption, combined with improved pruning services and disbursement of cash transfers may take time to generate tangible effects on important aspects of well-being. Therefore, it is crucial to consider the potential benefits of such programs in the longer-term. It is important to

Table 10. Financial access, resilience, food security, empowerment, and expenditures

	Comparison group		Treatment group		Treatment effect	
	Round 1	Round 2	Round 1	Round 2	Diff-in-diff	SE
Household VSLA membership	0.170	0.245	0.212	0.654	0.366***	(0.063)
Household took out loan	0.371	0.226	0.377	0.325	0.093	(0.069)
Household has MoMo account	0.884	0.865	0.840	0.961	0.140***	(0.047)
7 days expenditures US\$	17.882	23.435	21.593	26.371	-0.774	(3.014)
30 days expenditures US\$	92.715	86.095	93.005	93.983	7.599	(25.932)
12 months expenditures US\$	640.036	778.538	895.779	938.907	-95.373	(155.892)
Resilience: ability to deal with shocks <sup>a</sup>	2.400	2.778	2.136	2.627	0.113	(0.207)
Food security <sup>b</sup>	0.501	0.426	0.429	0.424	0.071	(0.075)

Notes. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Propensity scores weights used as sampling weights to reweigh regression analyses. Bootstrapped standard errors (2000 replications) are reported in parentheses in the SE column. Diff-in-diff = the difference in difference estimate indicates the average impact of the program, comparing changes in outcomes over time between the treatment group and the control group. Food insecurity relates to the 12 months prior to the interview. <sup>a</sup> Resilience is a self-reported, ordinal variable with a Likert-scale ranging from 1 (very low ability to deal with shocks) to 4 (very high ability to deal with shocks). <sup>b</sup> A household is considered food secure if it has not experienced any food shortages in the 12 months prior to the interview.

<sup>13</sup> Several studies show the advantage of using mobile money as payment mechanism for cash transfer programs. See, for example, Aker et al. (2016) on an unconditional cash transfer program in Niger.



note that on average, almost 60% of the households in both groups experience at least one month without adequate food provisioning.

- In terms of household expenditures, Table 10 demonstrates that the pilot has had no effect on short-term (7 days), mid-term (30 days) and long-term expenditures (12 months). This observation indicates that households engaged in the pilot program did not exhibit higher expenditure levels compared to households in the comparison group. This finding aligns with the subsequent analysis presented in the final section of this chapter, which demonstrates that the overall income levels of participating households did not experience a significant increase.

*Box 8. VSLA membership, saving money, coping with shocks and decision-making*

Access to MoMo accounts is 100% among all interviewed households, although Rosalie, who is 67 years old, uses her son's account to receive the transfers. Both registered farmers and their partners have an account and all female participants, except Antoinette who lives in a remote camp, are also members of a VSLA set up in their community.

Mamadou's mother is a VSLA member but his wife, who was ill last year, has been unable to join the VSLA or the training offered. She is expecting to do better this year and benefit from the opportunities offered by VSLA membership. She has opened her MoMo account although she has not yet received any payments.

Djelika has been a member of a VSLA for two years now. The 27 members meet every Sunday and each time, Djelika manages to save three times FCFA500 (one share is FCFA500 and members can put between one and three shares each round). She values her VSLA membership and acknowledges the loan obtained last year, which allowed her to expand her palm oil business.

Kouamé's wife joined the VSLA of the community seven months ago and has already saved FCFA35,000. She has not yet requested a loan but plans on doing so in the coming months to further invest in the shop expansion. The household invests in their shop as the revenues obtained from this activity is their main way of coping with shocks such as food and cash shortages ("If there is a serious problem with cocoa, we can always borrow from the shop to make ends meet"). They both have MoMo accounts but put together the resources and discuss how best to spend the money received (she declares that her husband is a "modern man").

Aboubacar's first wife is the vice president of one of the VSLAs in the community (32 members). There are five VSLAs in the village (three were already in place before the program) and a sixth group will be established soon to meet the increasing demand from women. In addition to saving and getting loans, the VSLA meetings every Sunday afternoon have become a social event for the women where they meet to discuss and exchange learning points which in turn gives them more confidence to start IGAs. Aboubacar acknowledges that "with the

variations experienced in cocoa production in recent years, it is quite difficult to predict the income and I would struggle to pay essential costs such as children's schooling fees without the help of my two wives."

Guillaume's wife decided to join the VSLA (30 members) a year ago to save and borrow money that she can then invest to expand her business further. The loan allowed her to buy larger volumes of products and she is now repaying it at a small interest rate. Both spouses have a MoMo account and after receiving a payment, Guillaume and his wife openly discussed how to spend the money for food, illness, schooling for the children, and household utilities such as improving the housing.

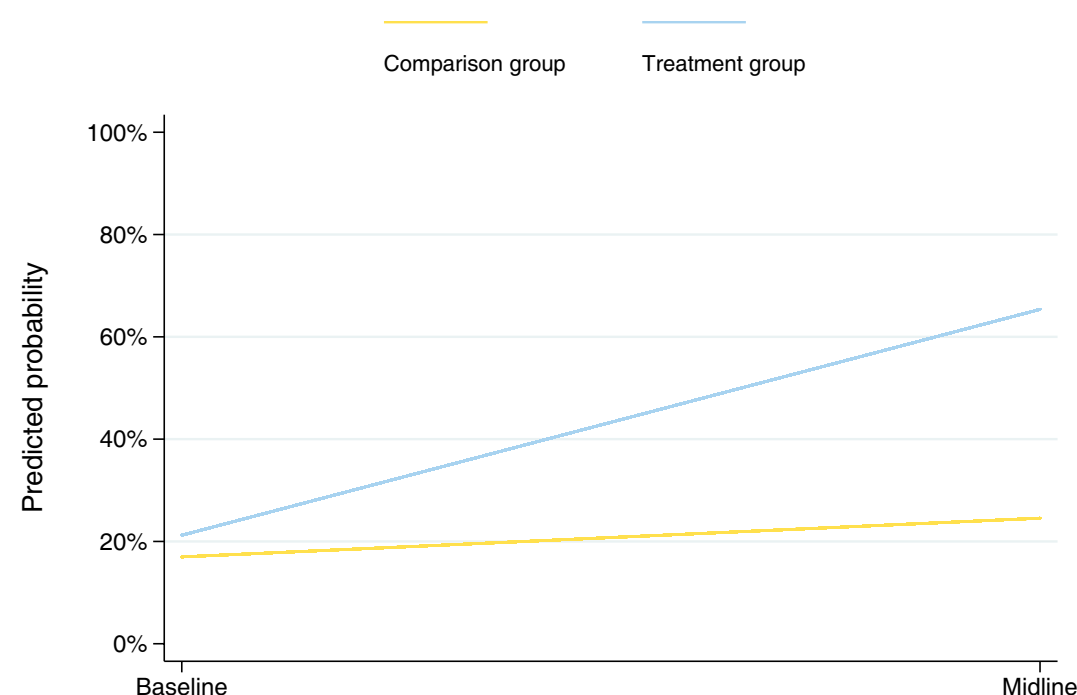
After a joint decision between Kaboré and his wives, the first spouse joined the VSLA last year and participated in the activities of the IAP. The second wife is also planning to join the existing VSLA of her community in the coming months. The three of them share information about the use of incentives from the program and although the revenue obtained from all activities is managed by Kaboré, he thinks it is important for women to have an IGA. He declared that "men spend most of their income as soon as they receive it while women are more prone to save and can help the family with schooling, healthcare, and food costs."

Yobissiwa always saves part of the income earned from cocoa and her business to prepare for the school year and cope with shocks such as unexpected deaths, funeral costs, or food shortages. This behavior was reinforced when she joined a VSLA two years ago. The 31 members (including Yobissiwa's sister and two men of which one is her partner) used to have a saving group, but the VSLA training really helped them understand the basis for saving and taking loans. In addition to saving FCFA50,000, Yobissiwa also took a FCFA300,000 loan in December 2022 to invest in her business. Furthermore, Yobissiwa acknowledges that establishing the VSLA in the community brought about many changes, especially around gender dynamics. "Men used to think that the women had to stay behind them and some even refused to allow their spouse to join the VSLA. After a couple of months, the dynamic changed, and women were encouraged to join. It created more social cohesion between women and men in the community." Now, Yobissiwa is even a member of a pruning group, as she thinks "having a woman in a group helps keep the members motivated and the work can be done more efficiently." It was even decided this year to set up a women-only pruning group to respond to the increased demand for pruning groups.

Rémy's wife has been a VSLA member for two years. Her savings amount to FCFA96,000 but she has not yet borrowed as she wants to access a subsequent amount to invest in a large volume trading business. Her current activities break-even but do not allow her to save or invest as much as her entrepreneurial mind would like to, especially given the high school fees of their children studying in the city. Last year's drought caused the household to experience a food shortage in the months of May/June/July as their food crops did not produce the usual amounts. The cooperative helped them cope with these shocks by lending them some money and assisting them in emergencies such as health issues.



Figure 7. VSLA membership



## Child labor prevalence and school enrollment

In both survey waves, ICI collected data on school enrollment and the prevalence of child labor through a separate survey designed specifically for interviewing children. A total of 815 children were located and re-interviewed to gather this information. However, after close inspection of data, one of the control cooperatives had to be excluded from further analyses, as their baseline values for child labor prevalence were unrealistically low (less than 5%). This means that the intervention cooperative in the same geographical area also needs to be excluded as they are paired together for analytical reasons. Therefore, the analysis on hazardous child labor is restricted to households (children from households which are either members of one intervention or of one control cooperative) in the south-western region of the country, a total of 378 children. For the analysis on school enrollment, the entire sample is used. The findings regarding the effect of the pilot on school enrollment and child labor prevalence are presented in Table 11 and can be summarized as follows:

- When considering both survey waves together, it was found that four out of five children interviewed were attending school at the time of the survey. The Accelerator pilot program had a significant positive effect on school enrollment, increasing it by 12 percentage points. In the control group, there was a slight decrease of four percentage points, while households participating in the pilot program experienced an eight percentage point increase. The estimates are illustrated in Figure 9.
- Across both cooperatives (intervention and control), it was observed that 58% of all children were engaged in some form of child labor during the first survey wave. This percentage decreased to 51% in the second wave, regardless of treatment level. For hazardous child labor, the prevalence rate increased from 29% to 37%. Although child

labor takes place in a smallholder family context, and 86% of all children in child labor still attend school, these numbers indicate that child labor remains a significant issue among cocoa farming households in this region of Côte d'Ivoire.

- When examining hazardous child labor, an effect size of 19 percentage points was found in the estimation, which suggests that the pilot has mitigated the risk of increasing child labor levels among children in the intervention group: the control group was estimated to have experienced a notable increase in hazardous child labor prevalence, while the treatment group experienced a relatively small increase, as illustrated in Figure 8. It should be noted, however, that this estimate is based on data from households in only one control cooperative and one intervention cooperative, decreasing the robustness of the result.<sup>14</sup>
- Although a large difference in change over time between the treatment group and control group is found (see diff-in-diff estimation column in Table 11), the pilot program has not had a statistically significant impact on reducing overall child labor prevalence (including both hazardous and non-hazardous child labor). Also here, it should be noted, that this estimate is based on data from households in only one control cooperative and one intervention cooperative.
- Using a separate individual fixed effects regression model, we find that schooling is negatively correlated with hazardous child labor prevalence (school-going children are 23 percentage points less likely to perform hazardous work), indicating that schooling can be an effective way to reduce the probability that children perform hazardous tasks.<sup>15</sup>
- Despite their limited external validity, these findings highlight the ongoing challenge of child labor in cocoa farming households. However, they also demonstrate the potential

Table 11. Child labor prevalence

	Comparison group		Treatment group		Treatment effect	
	Round 1	Round 2	Round 1	Round 2	Diff-in-diff	SE
Child in school	0.851	0.816	0.751	0.832	0.117**	(0.050)
Child in hazardous child labor <sup>a</sup>	0.234	0.482	0.293	0.354	-0.188**	(0.093)
Child in child labor <sup>a</sup>	0.440	0.518	0.606	0.545	-0.139	(0.099)

Notes. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Propensity scores weights used as sampling weights to reweigh regression analyses. Bootstrapped standard errors (2000 replications) are reported in parentheses in the SE column. Diff-in-diff = the difference in difference estimate indicates the average impact of the program, comparing changes in outcomes over time between the treatment group and the control group. <sup>a</sup> The analyses on (hazardous) child labor are restricted to the cooperatives located in the south-west.

<sup>14</sup> Despite the limited robustness of the result, cash transfers have proven to reduce child labor prevalence. For example, a study conducted by ICI in 2022 highlights the impact of an unconditional cash transfer program on hazardous child labor in Ghana, revealing a reduction of 9.3 percentage points.

<sup>15</sup> In the individual fixed effects regression model, we control for the age of the child, the survey round, and household size.



of the Accelerator pilot program in reducing hazardous child labor and improving school enrollment rates. The program's positive impact underscores the importance of targeted interventions and initiatives to address child labor issues and promote access to education for children in cocoa-producing communities.

Figure 8. Hazardous child labor

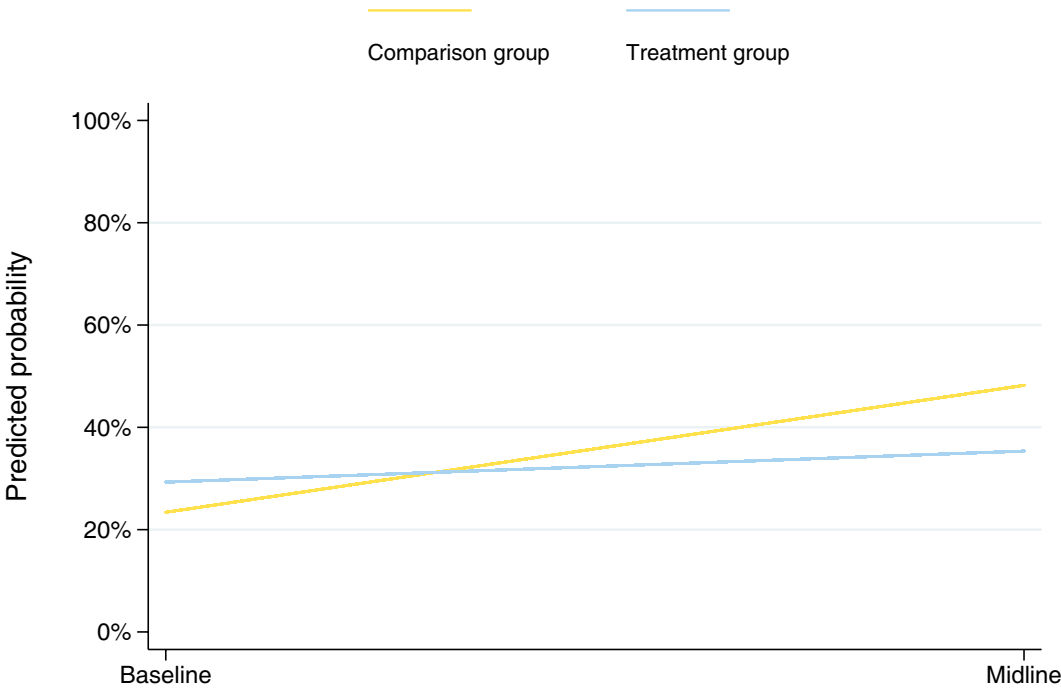
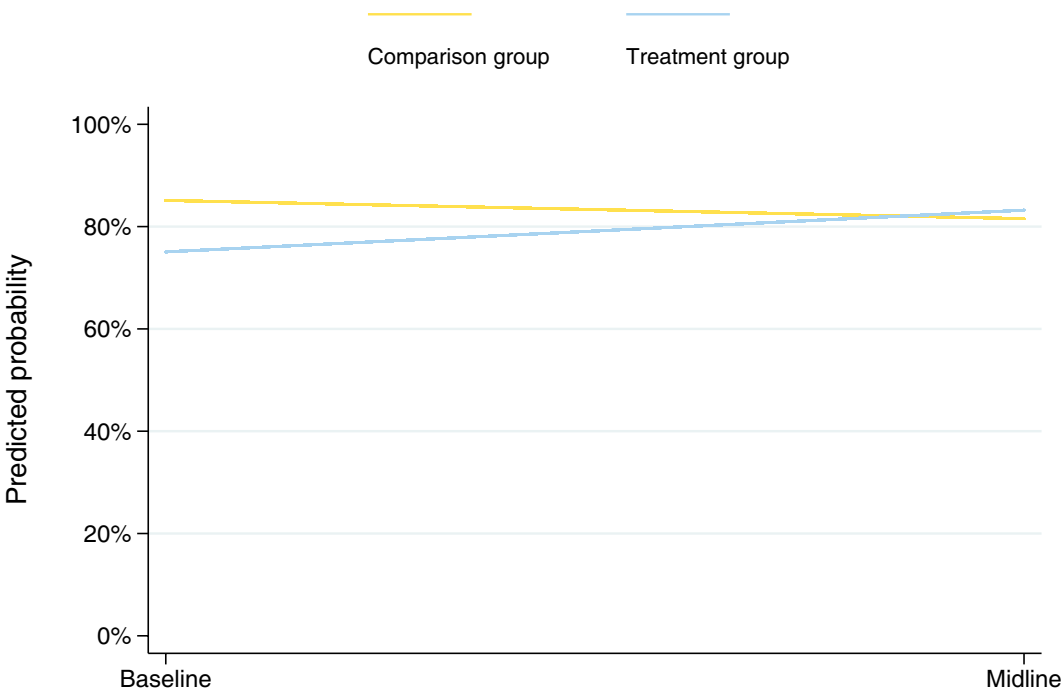


Figure 9. School enrollment



Box 9. Motivation for enrolling children in school and barriers to education

Antoinette has three grandchildren (17, 10, and 3), the oldest of whom go to school (the 17-year-old does not live at home). This year, for the first time, she received a visit about school enrollment but has not yet received any payments. She was unaware that schooling was a component of the program and is looking forward to receiving some help to pay the school fees.

Mamadou sends all his three children to school because “as someone who did not attend formal school, he knows the importance of being literate.” His wife is also committed to this, and since he is quite often away from home, she is the one who ensures that the children do indeed go to school. The household receives frequent visits from ICI but has not yet received any incentives related to the schooling component of the program. This money could help them with the school fees, as for the past two years, they experienced difficulties enrolling all the household’s children in school (Mamadou also supports some nieces and cousins living with him). The money earned by Mamadou as a pruning group member has been a great help to the household.

Of Djelika’s six children, four are of school age and are all currently enrolled in school (the oldest is living elsewhere for secondary school). As someone without formal education, she struggles to read and speak French and therefore understands the importance of literacy and schooling. Since the cooperative helped set up a primary school in her community, the children now only have to walk 2–3km to go to school, whereas before, the nearest school was in Noé. However, in the absence of a canteen, Djelika and other parents have to bring food to the children for their lunch. In addition, the school does not have running water, which is problematic for drinking and hygiene.

Kaboré has eight children, with the oldest four living in Burkina Faso, where they attend school. The younger ones are from his second wife, three of whom are of school age and currently attend school in the village where they live with their mother. Kaboré explains the motivation behind sending his children to school as a means to give them more opportunities to find work in the future. He manages to pay for the fees with the help of his wives, but it is still a challenge to pay for everything. The incentive received helped them cover the fees, but it remains limited.

Yobissiwa’s household has eight children of school age. The younger ones go to the communal primary school close to their village (2–3km), while the older ones go to the secondary school in Maféré. She decided to enroll all eight children in school because “as someone who went to school, she knows that it is important to be educated.” Her partner is also involved in the children’s education, as he goes at least 1–2 times per month to school to check if they are really attending. Despite the significant costs, Yobissiwa, her partner, and her sister manage to cover the fees by pooling their resources and saving money before the start of the school year. Since the beginning of the program, the incentives received have helped them in this. The problem is that they are in a remote area and the communal primary school was set up only two years ago. Before that, all the children had to go to Maféré, which is a long distance for young children.



Kouamé's children (one and three years old) are too young for school at the moment, but he is already planning on enrolling them in Toumodi, as he wants them to get paid jobs such as public servants in the future. His plans to expand his cocoa field to two hectares for higher productivity and to add more merchandise to the shop are partly motivated by the desire to cover future schooling fees. Although Kouamé wants his children to continue the family tradition of cocoa farming, he would prefer them to go to school and get stable, better-paid jobs and then hire workers to maintain the cocoa farm.

This view is shared by Rosalie, who declares that she sends her grandchildren to school (with the support of the cooperative to pay the fees) because she wants them to get educated sufficiently to access public servant positions in the city instead of becoming cocoa producers (*"Stable future employment enables the children to send money to their parents when they are old"*). Aboubacar and Guillaume also have similar opinions about schooling but with different reasoning. For them, the motivation to push children toward education and jobs outside of cocoa is guided by the fact that *"cocoa production in the village is hard and difficult work that is simply too risky to get a decent income, especially if we consider the variations in the amount harvested in recent years."*

Rémy and his wife also chose to invest in the education of their six children by enrolling the oldest three in expensive secondary and tertiary schools in Abidjan and Toumodi, and sending the youngest three to the village primary school. Although the incentives received helped them cover the fees, they think *"the amount is relatively small compared to the costs incurred."* They also acknowledge that *"children studying in the city will probably not return to cocoa farming in the future."*

## Poverty and Living Income

Cocoa farming in Côte d'Ivoire is of great significance for households' income and poverty levels. Given the heavy reliance on cocoa production for income, the volume of cocoa produced and the resulting income from it greatly influence households' economic conditions.

Efforts to diversify income sources have resulted in the expansion of various activities. However, qualitative insights show that these diversification efforts have not yet translated into higher income levels for everyone (see Box 7). It is essential to consider that establishing and generating additional income from these activities requires time, and this midline evaluation might be too early to observe the tangible benefits of these initiatives.

Household income is assessed by considering various components. The household survey captures key aspects such as cocoa production (for both main and mid-crop seasons), post-harvest losses, prices, the proportion of cocoa sold as certified, and the premium received, which are used to calculate the gross income from cocoa. Deducting production costs (e.g., materials, tools, inputs, labor) incurred at each stage of the production process results in the cocoa profit. Additionally, profits derived from other sources, including trade, business activities, other crops (both for food and cash), fishing, and labor, amongst others, are added to the cocoa profit to determine the overall household income level. Figure 10 provides an illustration of these income components by round and shows that both the LI benchmark and the LI gap increased in the second survey round.<sup>16</sup>

To determine the LI benchmark adjusted for household size and inflation, this analysis adopts the method proposed by Tyszler and Rios (2020).<sup>17</sup> The Living Community of Practice (LICOP) established the LI benchmark for cocoa-growing regions in Côte d'Ivoire as FCFA265,384 per month in August 2020.<sup>18</sup> Following an update, the benchmark was revised to FCFA298,983 per month in June 2022, which corresponds to the second survey round.<sup>19</sup> The raw benchmark values are adjusted to account for household size using the Organization for Economic Cooperation and Development (OECD) equivalence scale.<sup>20</sup> Additionally, the benchmarks are adjusted to correct for inflation over time by utilizing the Consumer Price Index (CPI) provided by the International Monetary Fund (IMF).<sup>21</sup> With an exchange rate of FCFA622.143 = US\$1 for the first survey round and FCFA602.55 = US\$1 for the second survey round, this results in an adjusted LI benchmark of **US\$6762** for the first round and **US\$7660** for the second round.<sup>22</sup>

<sup>16</sup> Based on observed data.

<sup>17</sup> Tyszler, M., Rios, C. (2020) Guidance Manual on Calculating and Visualizing Income Gap to a Living Income Benchmark. Prepared for the Living Income Community of Practice.

<sup>18</sup> Living Income Community of Practice (2020) Living Income Benchmark, August 2020 Update, Côte d'Ivoire, Rural cocoa growing areas. Anker Research Institute. [https://c69aa8ac-6965-42b2-abb7-0f0b86c23d2e.filesusr.com/ugd/0c5ab3\\_a3830a35e23c4e77adc642fba454a93e.pdf](https://c69aa8ac-6965-42b2-abb7-0f0b86c23d2e.filesusr.com/ugd/0c5ab3_a3830a35e23c4e77adc642fba454a93e.pdf)

<sup>19</sup> Living Income Community of Practice (2022) Living Income Benchmark, June 2022 Update, Côte d'Ivoire, Rural cocoa growing areas. Anker Research Institute. [https://www.living-income.com/\\_files/ugd/0c5ab3\\_9aef39b2ef654ab6a8f7bc4dd2bdb026.pdf](https://www.living-income.com/_files/ugd/0c5ab3_9aef39b2ef654ab6a8f7bc4dd2bdb026.pdf)

<sup>20</sup> OECD. (n.d.) Adjusting Household Incomes: equivalence scales. OECD. <https://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf>

<sup>21</sup> IMF. (2022) Prices, Production and Labor Selected Indicators. <https://data.imf.org/regular.aspx?key=61545849>

<sup>22</sup> The exchange rates hold for 1<sup>st</sup> of May 2022 (survey round 1) and for 1<sup>st</sup> of April 2023 (survey round 2), when the household surveys commenced: <https://www.xe.com/currencycharts/?from=USD&to=XOF&view=2Y>. The LICOP uses an exchange rate of FCFA 561.017 for the benchmark of August 2020 and FCFA 628.12 for their benchmark of June 2022.



Drawings on cooperative buildings to raise awareness about child labor and schooling



Figure 10. Computing household income and LI Gap

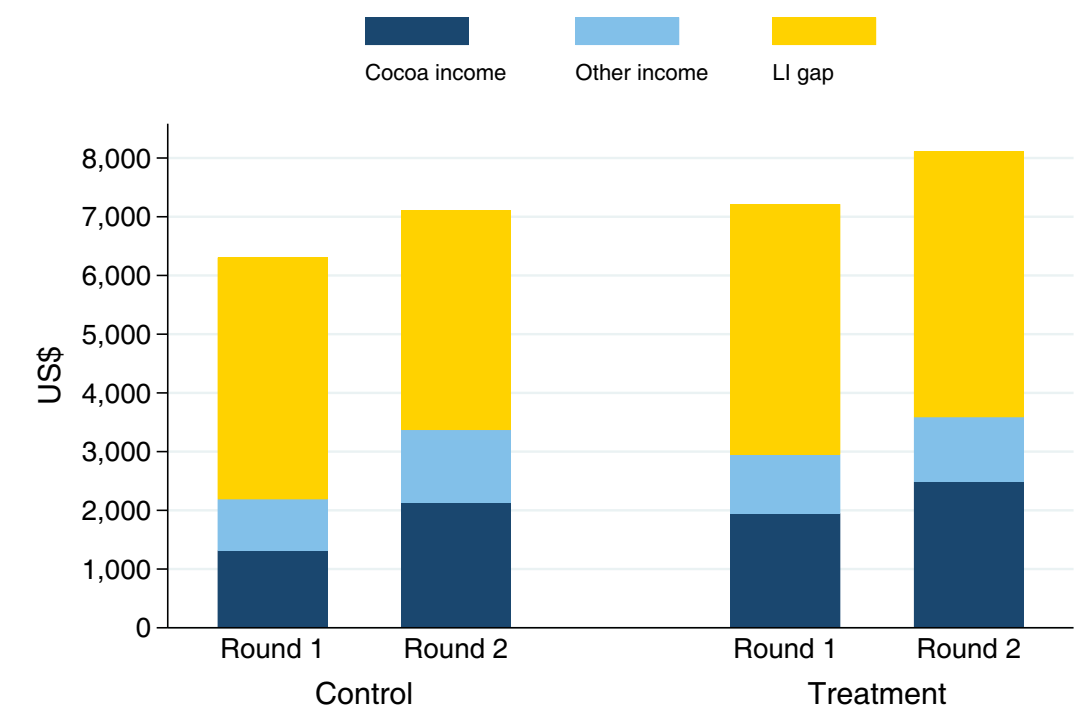


Table 12 presents the average program results for indicators of poverty, household income, and LI gap. While no statistically significant treatment effect was found overall on these variables, several observations are made:

- The LI benchmark for the second survey round notably increased in both the treatment and control groups as a result of the LICOP benchmark update, indicating a rise in the cost of maintaining a decent standard of living in rural Côte d'Ivoire due to inflation. The increment observed in the treatment group is approximately US\$1,000, while the control group experienced a smaller increase of around US\$800. This discrepancy can be primarily attributed to a reduction in the number of children within the households in the control group, which is statistically significantly different from change within the treatment group. Although hypothetical, this could signify that in the intervention group children might be less likely to migrate (e.g., younger children are not sent to other families, while older children are less likely to search economic and educational opportunities outside their communities) because of hardship and lack of opportunities, but the actual causes for the observed differences in the number of children would require further analysis.
- Both the treatment and control groups saw a higher proportion of households earning a Living Income, with a sharper increase observed in the treatment group (five percentage points increase compared to a two percentage point increase in the control group). Overall, 14% of all households enrolled in the pilot now earn a Living Income.
- Household net income showed an upward trend in both the treatment and control groups, but the increase was more marked in the control group. The upward trend

in income can be attributed to increased cocoa production volumes and increased cocoa prices, from FCFA825 for the main season in 2022 to FCFA900 for the main season in 2023. In addition, although speculative, the greater increase in the control group could be partly attributed to the control group's lower dependence on cocoa for their incomes and higher investment in other cash crops. According to Table 9, for the comparison group, rubber became more important, and for a substantial number of households in that group (more than 10%), rubber was estimated to have surpassed cocoa as their main source of income. Meanwhile, for households participating in the pilot, rubber lost importance and the treatment group was actively exploring additional income sources, as shown by the number of income sources in Table 9. Yet, these new activities might take some time to translate into positive net income (see Box 7 and Box 8).

- The LI gap declined slightly in the control group, indicating a narrowing gap between their income and the LI benchmark. However, in the treatment group, the LI gap slightly increased. Two key factors are anticipated to lie at the core of this: firstly, the number of children in the household decreased in the control group but not in the treatment group, which lowers their LI benchmark. Secondly, the previous result revealed that household income increased slightly more in the control group, although the difference is not statistically significant.
- Consequently, the likelihood of falling below the national poverty line, as measured by the Poverty Probability Index (PPI), showed a small but almost negligible increase in the treatment group, while it remained almost unchanged in the control communities.

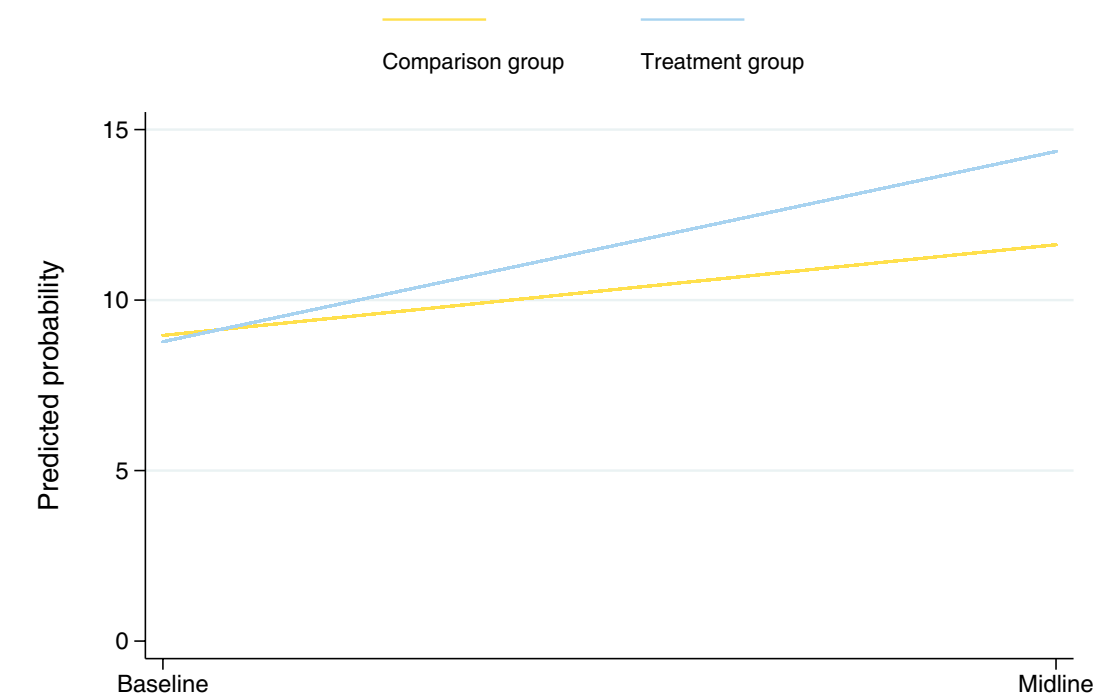
Table 12. Poverty and Living Income

	Comparison group		Treatment group		Treatment effect	
	Round 1	Round 2	Round 1	Round 2	Diff-in-diff	SE
Poverty Probability Index (PPI) <sup>a</sup>	35.504	35.745	34.238	36.163	1.684	1.800
Household net income (US\$)	2662.282	3503.774	2912.153	3513.964	-239.680	422.387
LI Benchmark (US\$) <sup>b</sup>	6355.830	7144.585	7163.412	8174.858	n.a.	n.a.
LI gap (US\$) <sup>c</sup>	4465.486	4234.693	4046.465	4369.589	553.918	610.994
Proportion earning an LI	0.096	0.120	0.092	0.143	0.028	0.057

Notes. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Propensity scores weights used as sampling weights to reweigh regression analyses. Bootstrapped standard errors (2000 replications) are reported in parentheses in the SE column. Diff-in-diff = the difference in difference estimate indicates the average impact of the program, comparing changes in outcomes over time between the treatment group and the control group. <sup>a</sup> National poverty line of Côte d'Ivoire. <sup>b</sup> These numbers are based on observational data and are therefore not estimates from a matched diff-in-diff estimation. <sup>c</sup> These values are estimates, and consequently they don't fully resemble the equivalent of deducting household income from the LI benchmark.



Figure 11. Earning an LI



Mamadou cultivates multiple cash crops with the assistance of his brother, but his activity is limited by labor shortages, input costs, and lack of resources to hire skilled workers. His father’s illness has expanded his household size and his spouse was also unable to participate in the program’s activities due to health issues. His involvement in different training sessions has given him the skills to work efficiently on his farm and also conduct other activities such as beekeeping, but this has not yet translated into income as he does not get paid to carry out diversification activities within the community.

Kaboré notices an overall improvement in the work on the cocoa farm and the expansion of their skill set outside of cocoa (for example, training on rabbit breeding in his village). Although his high level of income diversification would allow him to apply the learning points and participate in the payment of pruning groups if no longer subsidized by the program, he also acknowledges that financial limitations are often the main obstacle preventing him from adopting all the good agricultural practices recommended and training received.

In the South-western region, farmers are mostly concerned with swollen shoot disease (Rémy: “My field is not affected but I know about a few cases in the area. I am very cautious and I know that my equipment (machete) must be cleaned well if I have been to another cocoa field”) and climate change (Kouamé: “The weather pays us”) that are reducing the yields of both cocoa trees and food crops. This creates food and cash shortages, especially during June–August. The cooperative provides assistance by paying the cocoa premium for certified cocoa during these months and also providing short-term loans in cash or in kind (bags of rice for example). The idea is that farmers repay the loan during the main cocoa harvest (September/October) either in cash or through deductions from cocoa sales. However, some of them still struggle to repay these loans, limiting the cooperative’s financing capacity.

Box 10. Poverty and support mechanisms

Overall, all farmers have a positive opinion about the program and its different components but they also all identify different barriers preventing them from reaching their maximum potential. For example, Djelika said the program allowed her to get some cash through incentives, save money via the VSLA and learn how to successfully set up her palm oil processing and selling activity. Also, the cooperative has been helping them access the cocoa inputs and a school was set up in the community. But all these activities require time and not all learning points are always applicable for her. Yobissiwa also mentioned that she has to juggle all her other activities alongside the training, but she gives it priority as she wants to “ensure cocoa productivity stays high and all the diversification activities continue.” However, this requires her 18-year-old niece (still in school) to help with the business and household chores and her partner to take on the cocoa work if she needs to attend a training session.

Antoinette’s household, although having 11 hectares of cocoa land, is limited by the age and health status of the adult members. Furthermore, the sharecroppers working on their cocoa plantations take half of the harvest as remuneration. Also, frequent travel to Abidjan to seek healthcare, combined with the remoteness of her house, affect her capacity to be fully involved in the program’s activities. Her primary request is for financial support to access cocoa inputs and expand her food-selling activity.



House and boutique shop under construction





## 5 The effect of pruning

A crucial component of the Accelerator involves the setting up of subsidized and trained pruning groups, typically comprised of young individuals and cocoa farmers. These groups are equipped with appropriate tools and protective gear and subsidized by the program to prune at least one hectare of cocoa land per registered cocoa farmer or participant per year.

As mentioned in the previous chapter, to evaluate the impact of this specific activity on productivity, and therefore also farming costs, cocoa revenue and profit, it is essential to consider that pruning also occurs in the control group, albeit potentially at a different standard (i.e., not ‘architectural’ pruning’ done by trained pruning groups). Such an analysis also ignores the relative area of the farm pruned, and only assesses the effect on the average yield computed based on the entire farm. Consequently, by solely comparing the treatment and control group, no discernible impact on cocoa yield, production and profit was observed in the *intent-to-treat* analysis in Chapter 4. In this section, we perform a different analysis using the relative area pruned (as a percentage of the total cocoa land) as a treatment variable instead of the variable indicating simply whether the farm was pruned or not. The analysis is done using a household-level fixed effects regression model to capture the effect of pruning a certain portion of cocoa land on productivity, cocoa farming costs, cocoa revenue and profit per hectare.<sup>23</sup>

To assess the potential influence of pruning quality, assuming that pruning in the treatment group adhered to higher standards compared to the control group, a second econometric specification interacts the pruning variable (expressed as a percentage of cocoa land pruned) with the treatment variable.<sup>24</sup>

To account for relevant factors that might affect the results, we add the following control variables to the household-level fixed effects regression: productive cocoa land, the survey round to control for the time effect, number of adult members and children in the household as the pool of labor, age of the main registered farmer, use of sharecroppers on the land, dependence on cocoa for income, farmers’ internal and external locus of control scores,<sup>25</sup> access to formal financial services and cocoa farming costs. The latter is only included for the analysis on productivity to capture investments in inputs and labor which might correlate with pruning uptake but also with yield levels.

# 5

## The effect of pruning

<sup>23</sup> This specification is chosen as the area pruned is continuous, time-variant, and ‘treatment’ also happens in the control group.

<sup>24</sup> Pruning groups that are part of the program are subsidized, trained, and equipped with the necessary tools. In combination with more rigorous pruning, this is expected to lead to a higher standard of pruning quality.

<sup>25</sup> Farmers with a high internal locus of control tend to believe that their efforts and actions directly impact their farm productivity while farmers with a high external locus of control may attribute their farm productivity to external factors beyond their control, such as weather conditions.



The findings from the analysis of the effects of pruning can be summarized as follows:

- Both rounds combined, almost 56% in the control group indicates to having pruned in the months preceding the cocoa seasons. In the treatment group, this percentage is 93%. However, 31% of the households in the control group who pruned used pruning groups, while in the treatment group, this proportion was 83% on average. Among the households in the control group that pruned, pruning was mainly done by household members (46%) and by sharecroppers (29%).<sup>26</sup>
- Confirming the ‘intent-to-treat’ result from Table 6, the first specification that ignores the (possible) difference in pruning quality between the control group and treatment group, does not show a statistically significant impact of pruning on productivity or the likelihood of a household producing one metric ton of cocoa per hectare.
- However, a statistically significant effect of pruning on cocoa yield (albeit at the 10% significance level) is observed when differentiating the effect of pruning between the comparison group and the treatment group, suggesting that the quality of pruning plays a role in increasing productivity. In the control group, pruning does not have an effect on yield, whereas in the treatment group, pruning a full hectare of cocoa land results in an increase of approximately 120kg/ha to 130kg/ha in yield levels versus a non-pruned hectare in the treatment group and a fully pruned hectare in the control group. This is an increase of almost 20% compared to average yields from non-pruned cocoa fields.<sup>27</sup>
- It is important to note that as cocoa land increases, average yield levels decrease as maintaining larger plots becomes more challenging (i.e. the same amount of resources and labor cannot be put into each additional hectare).<sup>28</sup> For a fully pruned cocoa farm of one hectare, the estimated yield level is 755kg/ha in the treatment group versus 626kg/ha in the control group (see Figure 12). Meanwhile, after pruning four hectares of land the average yield level is lower and estimated at 649kg/ha for the treatment group.
- Pruning increases the probability of a participating household achieving a target production of one metric ton per hectare by 13 percentage points (also at the 10% significance level). For cocoa farming households participating in the program with one hectare of land, the likelihood of achieving this target with the entire hectare pruned is estimated at 29% (see Figure 13). For participating households with four hectares of cocoa land, this likelihood is 21% (versus 8% in the control group).
- Utilizing a household-level fixed effects regression helps address bias arising from time-invariant characteristics such as location of the households, which could affect the quality of pruning and yield levels. However, it is important to acknowledge that factors including drought and precipitation, input use, diseases like CSSVD, and availability of

<sup>26</sup> KIT’s Demystifying the Cocoa Sector in Ghana and Côte d’Ivoire (Bymolt, Laven, and Tyzler, 2018) revealed that in 2018, pruning in Côte d’Ivoire was largely done by the household (88%), followed by hired labor (18%) and communal labor (5%).

<sup>27</sup> Other studies have also found correlations between pruning and yield levels. See, for example, IDH (2021) and Tosto et al. (2022).

<sup>28</sup> A household-level fixed effects regression using both rounds of survey data and only productive land as the explanatory variable reveals that each additional hectare of productive cocoa land leads to a statistically significant decrease of 45kg/ha in average cocoa yield.

professional and skilled labor also affect yield levels alongside pruning. These factors are difficult to add or control for in an econometric specification. Anecdotal evidence reveals that despite the high-quality pruning done, which farm households highly value, drought, high input prices, labor fees (and, consequently, low application of GAPs), and CSSVD are all reported to affect yield levels substantially. See Box 6 for farmer experiences.

Figure 12. Effect of pruning on cocoa yield

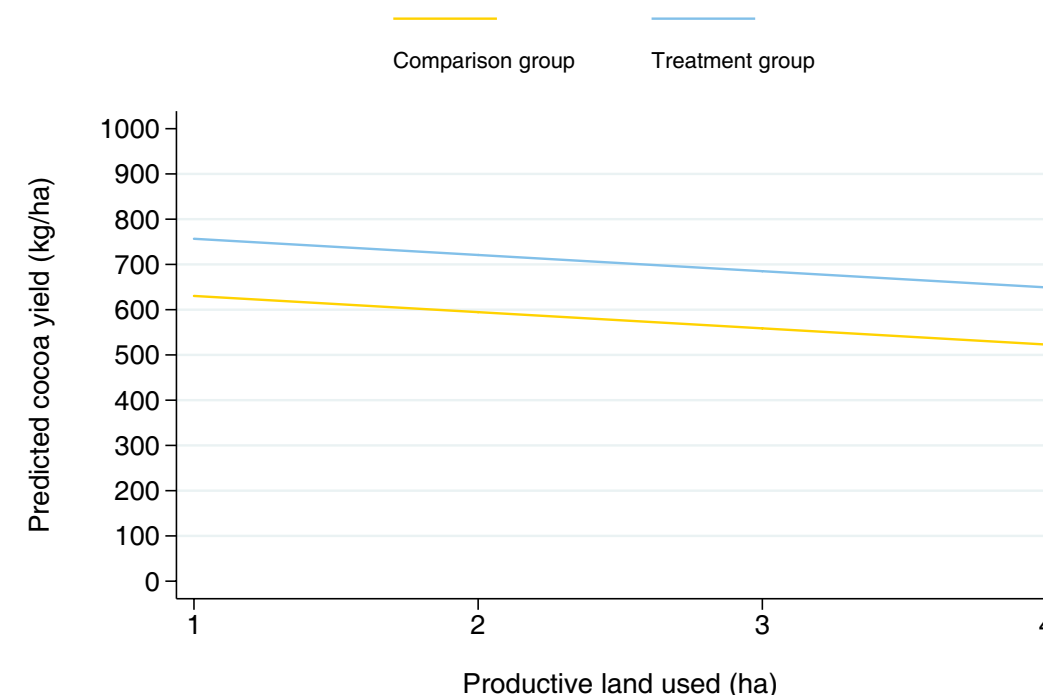
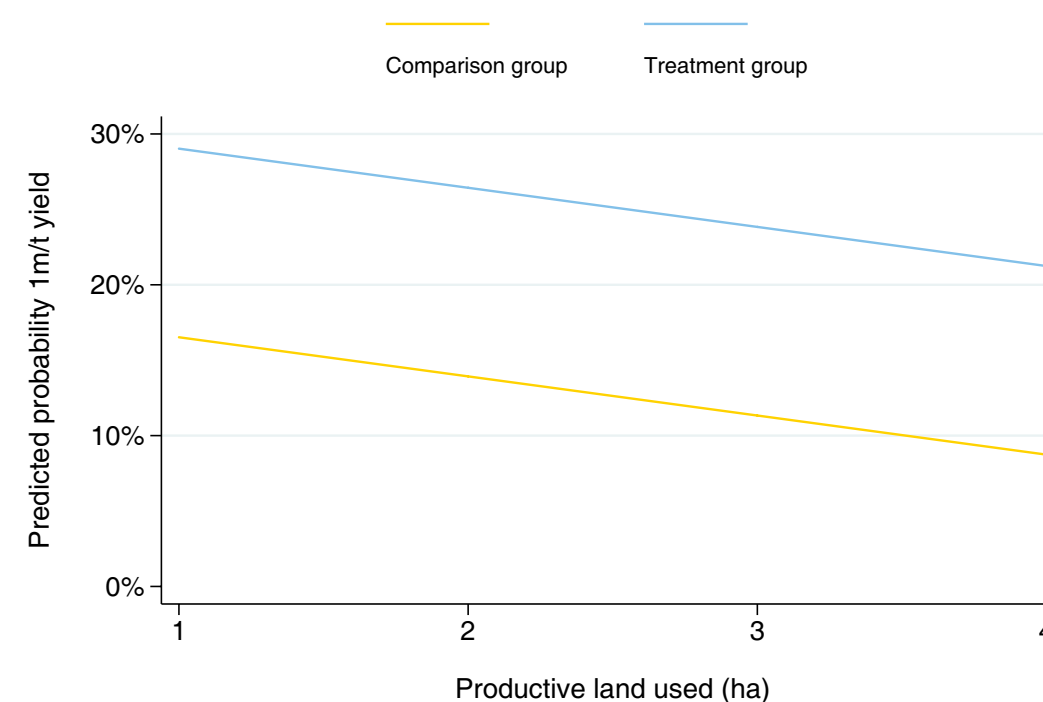


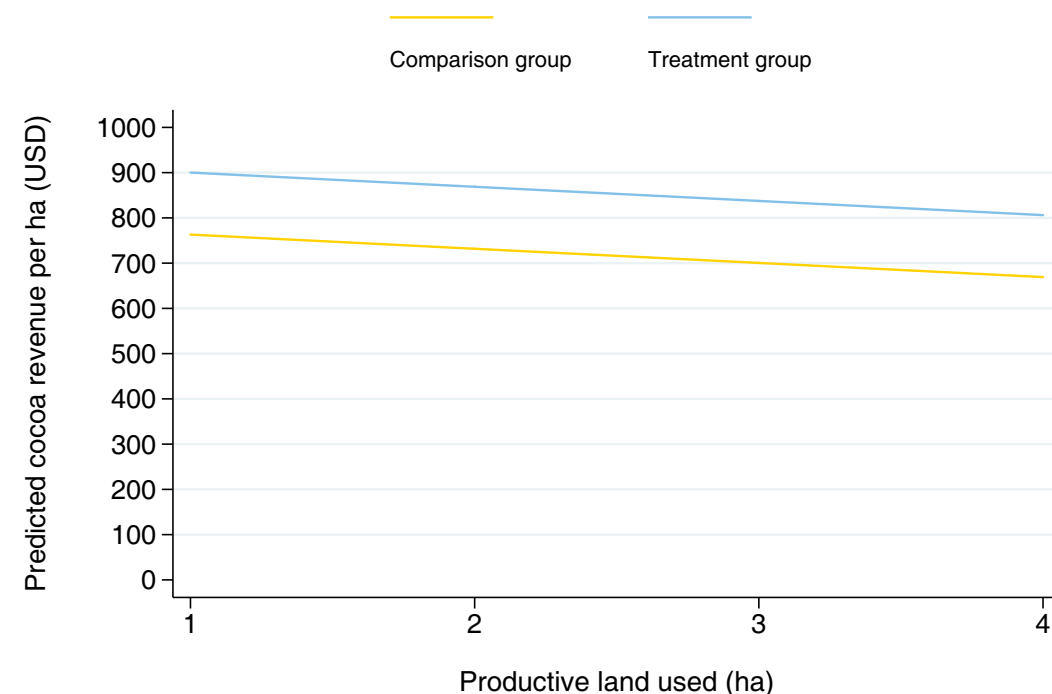
Figure 13. Effect of pruning on likelihood of producing 1 mt/ha





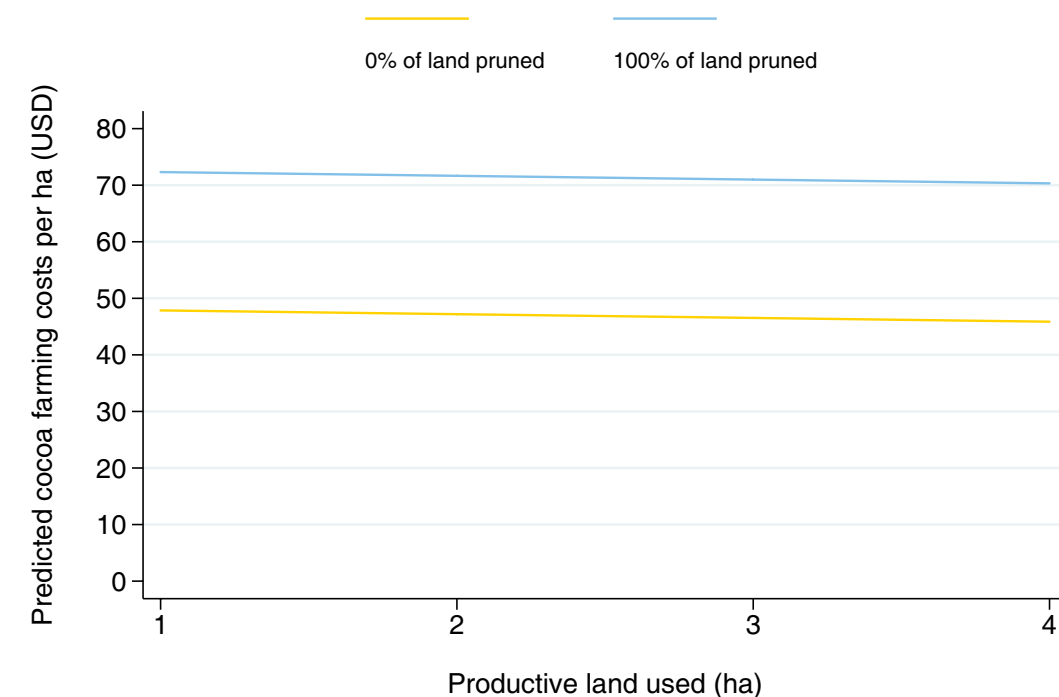
- As a result of higher yield levels, the impact of pruning on annual cocoa revenue per hectare is primarily observed in the treatment group. Fully pruning a farm (regardless of size) in the treatment group is estimated to generate an average annual cocoa revenue of US\$828, whereas the control group with full pruning yields an annual cocoa revenue of US\$691. Comparatively, not conducting pruning in the treatment group leads to an estimated cocoa revenue of US\$656 per hectare, which is US\$172 lower than the revenue generated by pruning the entire hectare. It is important to note that revenue decreases with each additional hectare of cocoa land due to decreasing yield levels – see Figure 13.
- Pruning has a positive impact on farm investments (US\$25 per pruned hectare more on average), specifically measured as cocoa farm production costs. However, we do not find a statistical difference in investment levels between the treatment group and the control group. This suggests that pruning is positively associated with farm investments regardless of the quality of pruning.<sup>29</sup> The correlation between pruning and farm investments is supported by anecdotal evidence from interviewees, who commonly expressed that a well-maintained farm is more conducive to making investments and engaging in work (see Box 9). On non-pruned farms (regardless of size), an average annual investment of US\$46 is made per hectare, whereas on pruned hectares, the average annual investment increases to US\$71 per hectare.
- Looking at cocoa profit per hectare, we find a statistical effect of pruning. However, we do not observe any statistical difference in cocoa profit based on the quality of pruning.

Figure 14. Effect of pruning on cocoa revenue per ha



<sup>29</sup> It might also suggest that farmers that invest in their farms are more likely to prune, but those in the control group do not have access to well-trained pruning groups.

Figure 15. Effect of pruning on farming costs per ha



When no cocoa land is pruned, the average annual cocoa profit is estimated to be US\$610 per hectare. On the other hand, pruning the entire farm (regardless of size) is associated with an average annual cocoa profit of US\$689 per hectare. No effects are found on total household income and the LI gap, but they are largely determined by total farm size and crop production volumes.

- Overall, the analysis on the effects of pruning underscores the significance of skilled, architectural pruning, as it demonstrates a notable impact on cocoa yield levels, the likelihood of achieving higher production targets, and higher revenues. Nonetheless, it is crucial to recognize that various other factors influence yield levels apart from pruning, including climatic conditions, input usage, and labor availability.
- A limitation of this analysis is that households who prune a higher percentage of their cocoa land seem to also invest more per hectare and consequently have higher revenue and profit. These results could potentially signal a selection bias. In the context of our analysis, selection bias could arise if farm households who are more inclined to invest in their cocoa farms are also more likely to engage in (more) pruning. This means that the observed relationship between pruning percentage and investment per hectare may be driven by unobserved characteristics or preferences of households (e.g., motivation, financial capabilities, improved access to better resources) rather than the direct effect of pruning on investment. We tried to reduce the bias from such characteristics with our set of control variables.<sup>30</sup>

<sup>30</sup> Balancing on round 1 characteristics using a matching approach is not possible due to the changing and continuous nature of the treatment variable (i.e., proportion of farm pruned differs across farm households and survey rounds).





## 6 The effect of VSLA membership

Alongside schooling facilities and pruning support, VSLAs, GALS training and alternative income generation training sessions are all expected to directly influence the livelihoods of participating households, and women in particular. To comprehensively evaluate the impact of VSLAs within the context of the Accelerator, we conduct an in-depth analysis using a household-level fixed effects regression model exploiting the variance within the target group.<sup>31</sup> It is worth noting that VSLAs were also established and operating in the control communities, allowing us to compare the effects of VSLA membership across different groups in a second specification.

In order to select appropriate dependent variables for the analysis, we engaged in discussions with cocoa farming households who were actively involved in VSLAs as members. These discussions provided valuable insights into the areas where VSLA membership had proven most beneficial. Consequently, we focus on resilience, food security, income diversification, and household decision-making as dependent variables.<sup>32</sup>

The findings can be summarized as follows:

- VSLA membership has a positive and significant effect on income diversification. Cocoa farm households that are members of VSLAs were more likely to engage in additional IGAs beyond their primary agricultural pursuits, with an average difference of 0.4 income sources compared to households without VSLA membership (3.5 sources versus 3.9 sources). Furthermore, VSLA membership also led to an increased likelihood of selling livestock (11 percentage points difference) and starting/owning a business or shop (13 percentage points difference). Moreover, the proportion of income that comes from non-agricultural activities is significantly higher for households with VSLA membership (2% vs. 5%), although the absolute contribution of non-agricultural activities to total household income remains low.
- No effect of VSLA membership is found on household income or the LI gap. One explanation for this could be that many of the income diversification activities were set up at the community level, but most of the produce is not sold yet. For example, in one community, the pig farming initiative led to a rapid increase in the number of piglets and the communal farm as a whole, but none of them has been sold yet.
- VSLA membership is positively associated with female involvement in household decision-making concerning large expenditures, indicating increased agency and involvement in allocating financial resources within the household.<sup>33</sup> Membership

<sup>31</sup> Fixed effects at the household level. This specification is chosen as membership is time variant. Households in the control group are excluded from these analyses.

<sup>32</sup> To control for potential factors that could affect VSLA membership and the outcome variables, biasing estimates, we add the following set of control variables: survey round, land size, number of adults and children in the household, age of the household head, dependence on cocoa, internal and external locus of control of the household head, and access to formal finance.

<sup>33</sup> In the cooperative in the eastern region, women were often not available for an interview in the first survey round. Therefore, this analysis is limited to the treatment cooperative in the south-west.

## 6 The effect of VSLA membership



in VSLA is correlated with a 26 percentage points increase in the likelihood that the woman is involved in such decisions.

- No significant effects were observed on food security or resilience as a result of VSLA membership. This suggests that while VSLAs contribute to other dimensions of rural development, they have not directly influenced household food security or resilience levels at the midline of the Accelerator pilot phase.
- When adding the control group to the regression model and interacting VSLA membership with the treatment variable, we find no heterogeneous effects of VSLA membership across the two groups. This suggests that VSLAs that are part of the Accelerator pilot and VSLAs in other NCP communities have similar effects.



Remy's spouse selling juice and frozen yogurt

Figure 16. Effects of VSLA membership on diversification







## 7 The effect of cash transfers

In the second round of data collection, it was reported that 85% of households participating in the Accelerator received a payment in the 12 months prior to the interview (based on self-reporting of survey respondents). Taking into account the financial incentives received in earlier periods, a total of 93% of households indicated that they had received at least one cash transfer. Although the vast majority of households received a transfer since the start of the program, the amounts received are lower than intended due to delayed implementation and verification. Households reported to have received a cumulative amount of US\$70 in the first year, and US\$141 in the second year. Among those households who reported to having received a cash transfer, these numbers are US\$117 and US\$169 respectively. This suggests that the effects that can be expected from receiving cash transfers are moderate at best, and are confounded by the conditions (i.e., activities) attached to them.<sup>34</sup>

To examine the intermediate effects associated with receiving a cash transfer, we exploit the variation in the number of cash transfers (and the amount) received annually in the treatment group and use that as a variable to define treatment in the analysis. Due to the substantial proportion of households having received a cash transfer, comparing households that have received at least one cash transfer with the control group would provide limited additional insights.<sup>35</sup> To isolate the specific effect of receiving cash transfers, we employ a household-level fixed effects regression model, using the number of cash transfers received as the explanatory variable. Furthermore, to ensure a focused analysis on the impact of the cash transfers, the sample is restricted solely to the treatment group.

The dependent variables used in the analysis are based on respondents' survey reports on how they used the cash transfers and information gathered from the qualitative interviews. These variables include food security, resilience, cocoa farming costs, income diversification, input use and agricultural practices, cocoa farm productivity, household decision-making, and the LI gap.

The results from the analysis are summarized as follows:

- Receiving cash transfers has a strong positive effect on income diversification, specifically on the number of income sources (0.2 income sources more per cash transfer received) and operating a business (four percentage points increase in the probability of operating a business per cash transfer received, albeit at the 10%

<sup>34</sup> The effectiveness of receiving a conditional cash transfer is intricately linked to the conditions imposed on participants. Since all four cash transfers are contingent upon meeting specific requirements, it becomes challenging to isolate the impact of the cash transfer itself. For instance, the observed effect of receiving the cash transfer for activities such as pruning and income diversification is confounded by other conditions participants must fulfill, such as pruning one hectare of cocoa land and participating in training programs related to IGAs, GALS, and so on. This confounding effect complicates the attribution of the program's impact solely to the cash transfer component, as the conditions play an integral role in shaping the outcomes.

<sup>35</sup> As almost all households received at least one transfer, we would be replicating the ITT analysis of Chapter 4 when comparing recipients in the treatment group with the control group. Therefore, we aim to exploit the variance in the number of cash transfers received within the intervention group.

# 7 The effect of cash transfers



significance level). This suggests that the utilization of incentives may play a role in determining the diversification of income sources. These results remain robust when using the total annual amount of cash received instead of the number of transfers.<sup>36</sup> Our findings are in line with other studies that found that cash transfers positively influenced income diversification among households.<sup>37</sup> These studies collectively suggest that cash transfers have the potential to enhance income diversification in rural areas by providing households with the means to invest in alternative economic activities. No other effects on agricultural practices are found.

- A positive effect of receiving cash transfers is also found on restoring old, abandoned plantations, albeit at the 10% statistical significance level.<sup>38</sup> This finding suggests that cash transfers play a role in incentivizing and supporting cocoa farming households to invest in rehabilitating and revitalizing unproductive or neglected plantations. That said, no effect of receiving cash transfers is found on planting new cocoa seedlings. This result also confirms earlier conclusions that it seems that the program makes farm households invest more in cocoa farming. Nonetheless, restoring old, abandoned plantations might be considered as an unintended consequence that could continue increase the risk of deforestation, which needs to be taken into account in the future implementation of the Accelerator.
- When examining short-term (7 days), mid-term (30 days) and long-term (12 months) household expenditures, no significant effect is found from the cash transfers. However, a significant positive effect is observed on expenditures related to children's health when focusing specifically on that category. Each US\$100 received is associated with an increase of US\$5 in children's health spending (per child). Although reported as the main item on which the cash transfers were spent on in Chapter 3, no effect is found on school fee expenditures. However, this might potentially be due to a substitution effect. The amount that households would normally spend on schooling is substituted with the cash from the financial incentives (note that most children already attended school, so school fees are often partly budgeted for), and the remaining financial resources are then used for additional costs like (extra) healthcare, especially for children. This also corroborates findings in Chapter 3 that healthcare was a cost item for which the transfers were used. No effect is found on savings or loans taken out.
- The number of cash transfers received is negatively associated with female involvement in household decision-making concerning large expenditures.<sup>39</sup> Each cash transfer received is correlated with a 14 percentage points decrease in the likelihood that the woman is involved. Although hypothetically, most of the transfers made up-until-now went to the male (i.e., for pruning and agro-forestry activities, which were organized

.....  
36 Each US\$100 received is associated with a six percentage points' increase in the probability that a household starts/runs a business.

37 See, for example, Macours, Premand, and Vakis (2012) on how cash transfers increase income diversification, which in turn makes households better protected against shocks.

38 Receiving US\$100 is correlated with an increased probability that the household rehabilitates land (for cocoa cultivation) with seven percentage points.

39 In the cooperative in the eastern region, many women were often not available for an interview in the first survey round. Therefore, this analysis is limited to the women (N=102) located in the area of the treatment cooperative in the south-west.

first), which could have reaffirmed his position as main decision-maker in the household. This result, however, holds only for the women in the treatment cooperative in the south-western region and is no longer statistically significant when replacing the number of transfers with the amount received.

- The analysis does not show any significant effect on cocoa yield, revenue and profit, annual household net income, or the LI gap. It should be noted that households self-reported to have received an average cumulative cash transfer of approximately US\$70 in the first year and US\$141 in the second year. The latter represents on average 4% of total household income (US\$3,500 on average in the second survey round).
- No significant effect of the number of cash transfers is found on household food security and self-perceived resilience. This finding aligns with the results obtained from the analyses on the overall program impact (ITT) and the effect of VSLA membership.
- Similar to pruning and VSLA membership, it is important to recognize that the inclusion of household-level fixed effects in the regression models helps control for time-invariant unobservable characteristics that vary across households but remain constant over time. This approach effectively addresses potential selection biases arising from such time-invariant unobserved factors. However, the regression specification used here does not account for time-variant unobservable characteristics. These time-variant factors, which may change over the course of the two survey rounds included, could potentially influence both the receipt of cash transfers and the outcome variables under investigation. Although a set of control variables is added, not explicitly controlling for these time-variant unobserved characteristics can lead to biased estimates.

Figure 17. Effect of receiving cash transfers on income sources

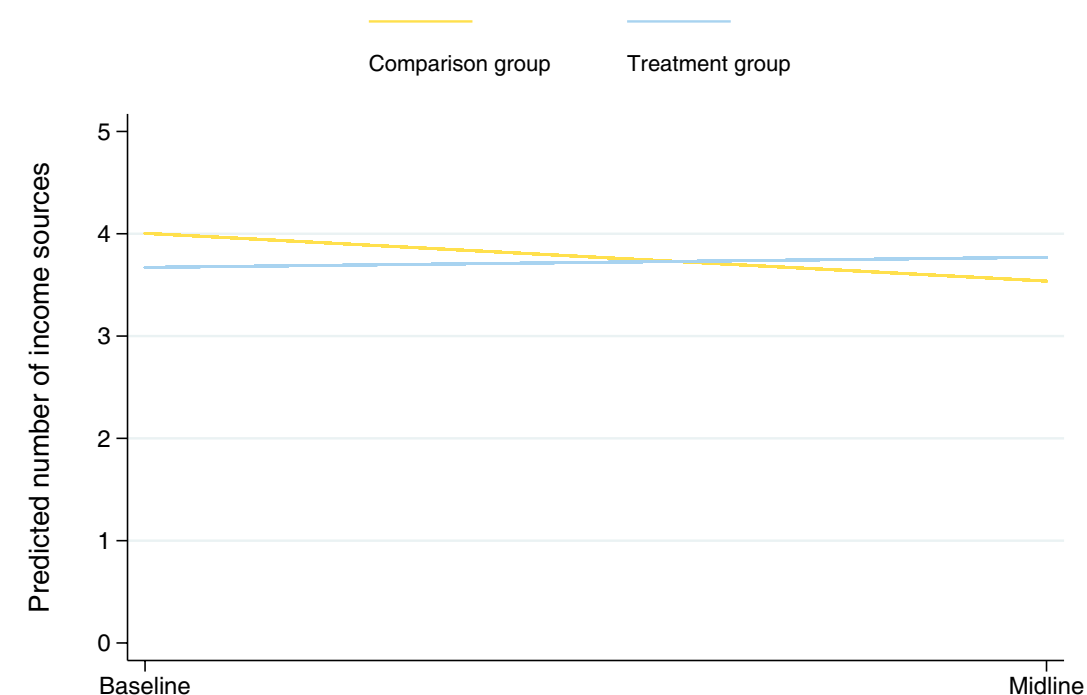




Figure 18. Effect of receiving cash transfers on restoring old plantations

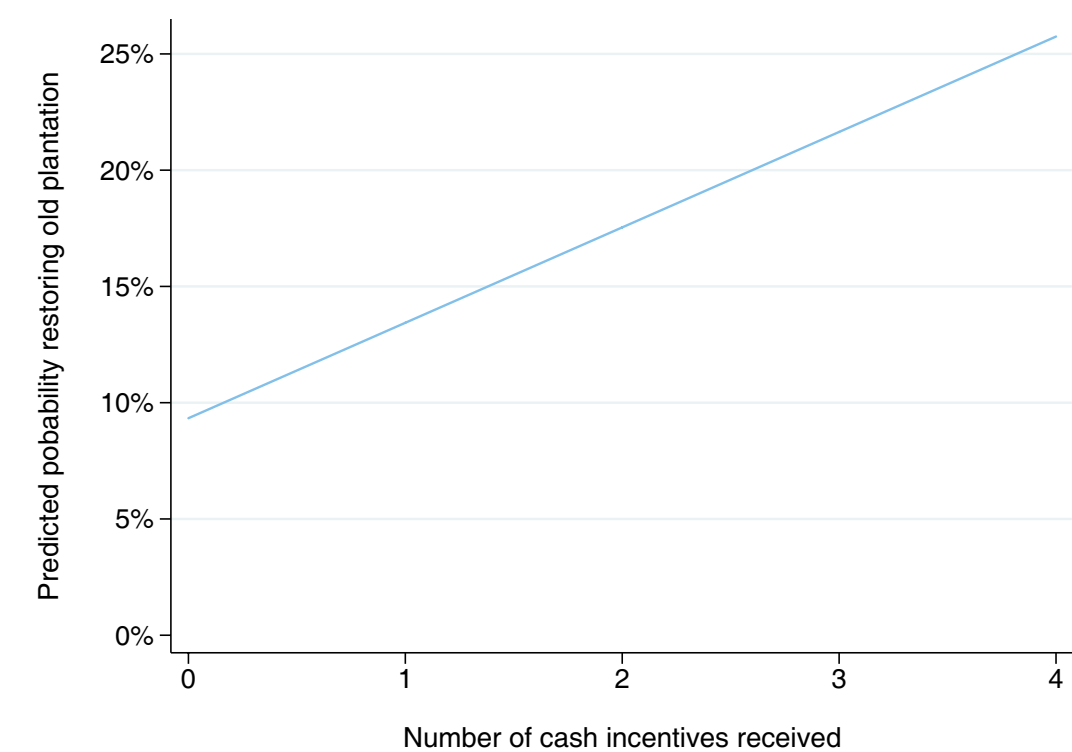
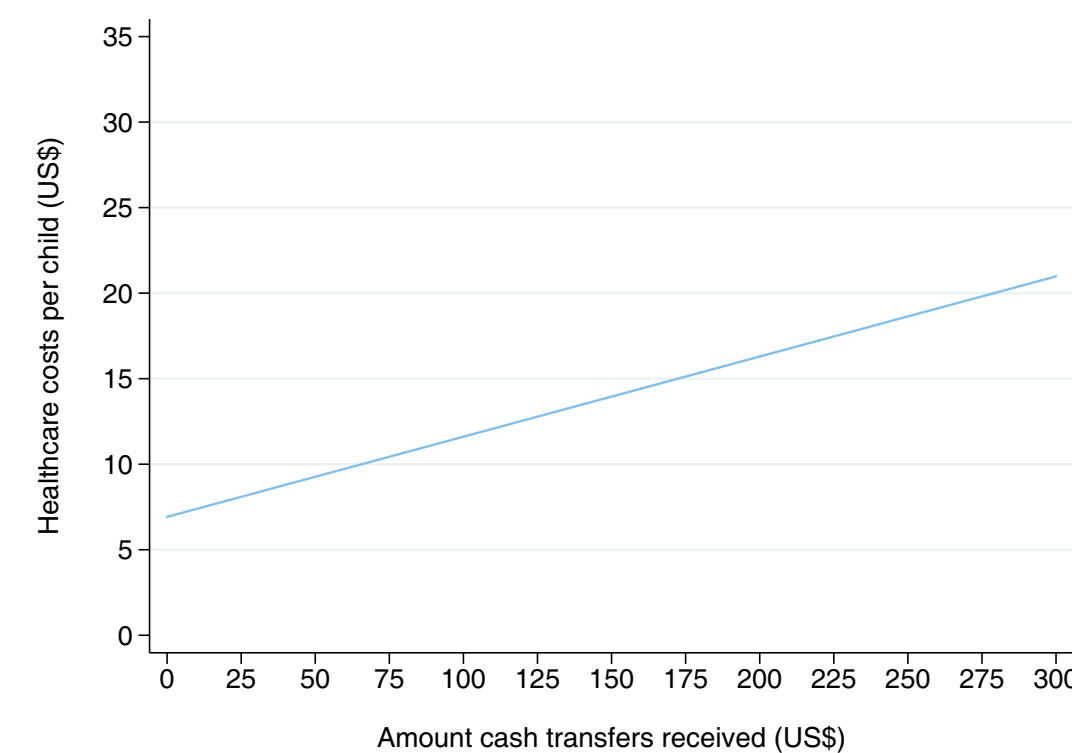


Figure 19. Effect of amount of cash transfers on healthcare costs per child







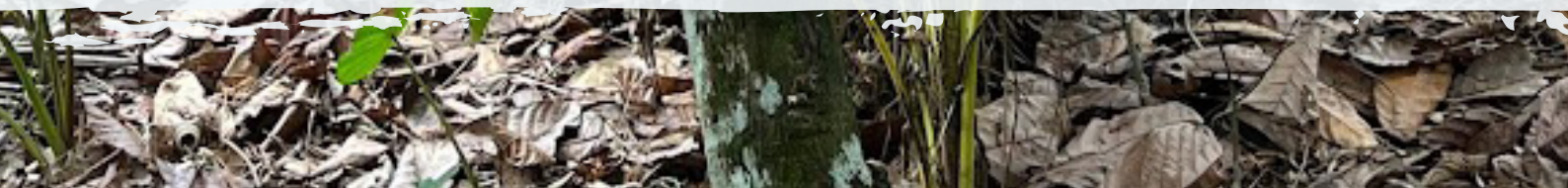
## 8 Conclusions and learning points

Based on the findings presented in this report, the following main conclusions and learning points can be drawn regarding the impact and implementation of the pilot:

### Conclusions

- The program and its specific subcomponents, such as pruning and VSLA membership, have had a significant effect on cocoa input use/practices, farm productivity, revenue, and income diversification in the IAP communities compared to the control group, which is partially shifting towards alternative cash crops like rubber. The treatment group has managed to diversify their income sources to a greater extent, although it has not yet translated into higher household income levels or reduced LI gaps. Especially for income generating activities set up at community level (animal breeding, beekeeping, production of soap and butter, etc.), training have been rolled-out and households have been participating but most products have not been sold yet.
- Receiving cash transfers primarily impacts income diversification, although cumulative, annual cash transfer amounts have been lower than intended. Nonetheless, the effect on income diversification suggests that the availability of additional financial resources through cash transfers serves as a catalyst for households to explore new IGAs beyond traditional agricultural practices.
- Despite the increasing diversified income sources, findings indicate that the treatment group remains predominantly engaged in cocoa farming as their main source of income, while households in the counterfactual scenario have begun shifting towards an alternative income-generating source like rubber. These results reveal that the program generates expectations among participating households, highlighting the importance of the Accelerator to also live up to these expectations.
- While the pilot program has had a positive impact on income diversification, 84% of the trained women express that they lack the financial capacity to implement the knowledge and skills they have acquired. Focusing on this during the training, disbursing cash transfers timely, and continuing with setting up VSLAs might tackle some of these concerns.
- The program has exhibited an effect on hazardous child labor prevalence rates (although results only holds for one intervention cooperative) and increased school enrollment rates.
- The findings of this study have limitations in terms of their external validity. The control group, which serves as the counterfactual, comes from different villages and belongs to different NCP cooperatives compared to the households in the pilot. Additionally, the groups were selected from specific areas in Côte d'Ivoire. These differences can introduce biases and affect the robustness of the impact estimation. It is important to be cautious when interpreting the study results and avoid making broad conclusions or generalizations about the overall impact of the pilot.

## 8 Conclusions and learning points





## Learning points

- Both the project implementers and cocoa farming households have recognized the benefits of transferring cash digitally through MoMo accounts, which enhances transparency and security in payment transactions. However, not all households effectively utilize or monitor their accounts, leading to confusion regarding payment status and timing. Additionally, women often face challenges in accessing mobile phones and may lack the necessary identification cards to verify their accounts. In the scale-up phase including 10,000 households, the program has started making additional efforts to enabling women's access to these accounts, but inclusion needs to remain a priority.
- Cash transfer delays were observed due to the verification process of conditions and MoMo accounts. It is important to highlight that delays in transferring the financial incentives weaken the connection between the incentive and the desired behavior, such as adopting sustainable practices. Moreover, these delays can discourage households from continued participation in the program. Therefore, timely payment are crucial for the effectiveness of the program.
- Furthermore, to optimize the impact of cash transfers on participating households (e.g., providing additional financial means), it is imperative to ensure a substantial, annual amount is transferred. As the current transfers fall short of the intended annual amount of EUR500, their impact remains moderate, primarily stimulating income diversification activities.
- Monitoring and confirming the receipt of payments by participating households play an important role. This ensures that the Accelerator pilot not only influences sustainable behavioral change but also directly impacts households through the cash transfers. By maintaining a robust monitoring system at the cooperative and supplier level, the program can strengthen its effectiveness in achieving its goals and ensure that households receive the intended benefits.
- These learning points underscore the importance of effective use of MoMo accounts, timely payment disbursements, and diligent monitoring to maximize the impact of the Accelerator program. By addressing challenges related to account use, payment delays, and payment confirmation, the program can enhance transparency, strengthen the link between incentives and behavior change, and provide direct support to participating households, ultimately fostering sustainable cocoa farming practices and improving livelihoods in the target areas.
- Although many interviewees were aware of the possibility of receiving four cash transfers, each amounting to approximately EUR100, the exact conditions associated with these transfers were not clear to them. During the interviews, respondents were unable to list the conditions accurately. To promote sustainable practices effectively, improved communication with participants is crucial. This requires clear communication channels from Nestlé to suppliers and cooperatives, as well as effective communication between cooperatives, delegates, coaches, and participating households. It is essential to provide participants with a clear understanding of the conditions tied to the cash transfers, including the timing of the transfers and follow-up on receipt.

- Additionally, the focus of communication with participating households should go beyond emphasizing the cash receipts alone. It should shift towards highlighting the importance of sustainable practices and the reasons behind these conditions. The cash transfers are intended to incentivize the application of sustainable practices, and by clearly explaining the relevance of these conditions, the practices can be sustained even after the cash transfers cease.

### Box 11. Perception of the program and recommendations

Overall, all ten interviewed farmers and their spouses recognized improvements brought by the Accelerator pilot. Beyond the increased productivity generated by pruning, Rémy, for example, mentions *"the opportunities provided by training about new activities such as beekeeping and increased awareness of shade tree planting and children's schooling."* Furthermore, Aboubacar declares that the rehabilitation of the school building in his village (*"Before, the roof was in a bad condition and children could not stay inside"*) has offered a meeting point for both parents and children, leading to increased social cohesion within the community. Also, ICI has sent books and materials, and the teacher is paid by the government, contributing to making the school more active and able to provide better education. Kouamé's wife also views the program, and in particular the VSLA, as a powerful tool to achieve better social cohesion in the community. *"We meet every Sunday afternoon, and all the members participate to save money, exchange ideas and provide each other with advice on how to do business."* This gives women more confidence to start IGAs, such as hairdressing, trading cassava, etc. Djelika and Yobissiwa both value the opening of a primary school in their respective communities, since this reduces the travel distance for young children.

When asked about improvement points, all households comment on the receipt of payments and communication around the incentives offered by the program. Rosalie said she received only one payment for pruning while knowing that in other villages, people have received up to four payments in addition to training about IGAs. In her village, she has not yet benefited from such services and thinks that *"people are disappointed by promises not being kept within the program; some even stopped the pruning."*

Guillaume and his wife said better communication around the program with a clear explanation of incentives paid (*"a message indicating which payment is made for what, especially as the cooperative also pays the premium for cocoa on our MoMo account"*) and payment delays would be helpful. Also, a follow-up on the actual receipt of the money would be appreciated since technical problems can arise, such as the mobile network preventing farmers from receiving the notification and/or withdrawing the money. Rémy makes a similar point (*"a phone call would be nice"*) especially as high expectations are placed on cocoa farming households to increase their production and start IGAs.

As a possible solution, Yobissiwa proposes changing the communication around the incentives as *"promising farmers that they will receive money in exchange for certain actions creates tension with the cooperative workers (coaches, delegates) when there are delays. It should be more about the benefits expected from the activities; the transfers can always be made afterwards, with the cooperative then explaining that the money is aimed to incentivize this action or the other."*





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