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Baseline report test-at-scale phase

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IAP baseline report test-at-scale phase

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Commissioned

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

Acronyms

CLMRS	Child Labor Monitoring and Remediation Systems
CCT	Conditional cash transfer
CPI	Consumer Price Index
€	Euro
FAO	Food and Agriculture Organization of the United Nations
FCFA	West African Franc
GALS	Gender Action and Learning Systems Methodology
GAP	Good agricultural practices
IAP	Income Accelerator Program
ICI	International Cocoa Initiative
IGA	Income generating activity
KIT	Royal Tropical Institute
KPI	Key performance indicator
LI	Living Income
LICOP	Living Income Community of Practice
MEL	Monitoring, Evaluation, and Learning
NCP	Nestlé Cocoa Plan
PPI	Poverty Probability Index
RCI	Resilience Capacity Index
RIMA	Resilience Index Measurement and Analysis
RSM	Resilience Structure Matrix
SIDD	Simpson Index of Dietary Diversity
TLU	Tropical Livestock Unit
US\$	United States Dollar
VSLA	Village Savings and Loan Association
WEI	Women Empowerment Index

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Executive summary

Executive summary

The Income Accelerator Program (IAP) aims to tackle key issues facing farm households in the cocoa sector – such as Living Income (LI) gap, child labor, and lack of women empowerment – by enhancing cocoa productivity, increasing additional income sources, improving gender equality, creating a professional labor force, and improving access to loans and savings.

This baseline report shows that the farm households eligible to take part in the IAP are typical of those in Côte d'Ivoire's cocoa sector. They earn approximately half an LI and are mainly dependent on cocoa sales, but earn additional income from three to four other activities. Almost two third of the women are considered disempowered and overall lack access to savings, while households have low resilience levels. The application of good agricultural practices (GAPs) can improve and the use of professional labor is low. About 20% of children do not go to school, and the risk of child labor is significant. KIT Royal Tropical Institute will report on midline progress at the end of 2023.

To explore how these issues can best be tackled, this report provides a wide array of information on the characteristics of 1,500 cocoa farming households located in the districts of Comoé, Gôh-Djiboua, and Lacs. Baseline data were collected via a household survey conducted in July/August 2022, with insights including household demographics, cocoa production, income diversification, poverty indicators like Poverty Probability Index (PPI), women empowerment, resilience, financial access, child labor prevalence, and the LI gap. A summary table of all characteristics can be found in Figure 1.

This graph also offers an overview of the most important performance indicators at output, outcome, and impact levels. Data on pruning adoption were collected during the same time period – however, pruning conducted by professional labor groups had already taken place, meaning these data are not real baseline values. The same holds for access to Mobile Money, as the program was already supporting participants setting up Mobile Money accounts.

The following key messages can be distilled from the baseline data presented in this report:

- **Household demographics**
As the IAP aims to support cocoa farming households and activities and does not only target the (registered) producer (i.e., LI and child labor prevalence are household issues), demographics are presented at household and household head level. Households have, on average, more than seven members. Half are adults, half are children. The dependency ratio (ratio dependents/working age) is almost 1 to 1. Elderly (65+) persons form a very small proportion (4%) of total household members.

Half of the household heads are illiterate, although, on average, household heads had received more than four years of formal education. This level of illiteracy can pose challenges when drafting household development plans or following farm business training(s). Female household heads are less educated, with an average of around two years of formal education – and 75% are illiterate.

Eight percent of cocoa farming households are headed by women. Most female household heads are older than male heads (difference of eight years), and most are not married. This suggests they often take over the role of household head when their spouse passes away.

- **Cocoa production**

On average, households have engaged in cocoa farming for 21 years. Cocoa is produced on 4.3 ha of land on average, of which 4 ha are considered productive. Households produce an average of 2 metric tons (mt) of cocoa, leading to yields of 575 kg/ha. Thirteen percent of farm households produce 1 mt/ha or more. Per ha, households spend an average of US\$71, mostly on materials, inputs, and tools (US\$55). The average annual cocoa profit (i.e., revenue minus production costs) is US\$2,433, equating to US\$677 per ha of cocoa land.

Cocoa yield and cocoa production costs per ha correlate negatively with the total areas used for cocoa production. This demonstrates that it remains difficult for smallholders to maintain larger cocoa plantations with limited resources – including materials, inputs, and labor – leading to lower productivity levels with each hectare added to the plantation.

- **GAPs adoption**

An objective assessment of GAP adoption (pruning, shade management, pest management, weeding management, harvest management) was conducted by Rainforest Alliance through independent observations on cocoa plots. Their data were collected after the period where pruning was completed by subsidized pruning groups, and reveal that, for 78% of cocoa plots, pruning was done according to the quality standard set by Rainforest Alliance. However, pruning related to removing secondary branches close to the trunk and the rounding of the crown at appropriate height can be improved, especially in the south-western region. In the comparison group (i.e., located in areas where subsidized pruning groups did not help farm households with pruning), 50% of households pruned their trees according to Rainforest Alliance's standard of good pruning.

The current level of shade provided by mature shade trees was insufficient for 94% of cocoa plots visited, although 62% of households are considered to have sufficiently adopted shade management by planting new shade tree seedlings (prior to IAP). On average, farms have almost nine mature shade trees and 14 newly-planted shade trees per ha. The assessment further reveals that 61% of households adopt four out of the five core GAPs (pruning, shade management, weeding management, pest management, post-harvest management), which is a key standard used by Rainforest Alliance to indicate that households implement GAPs sufficiently.¹

A quarter of households replant cocoa using their own cocoa seedlings, and this proportion is higher in the south-western region (34%) compared to the eastern (9%). Together with higher GAP adoption levels, production volumes, yield levels, and cocoa

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¹ The five GAPs include pruning, shade management, pest management, weeding management, and harvest management

production costs, this regional difference suggests that households located in the former region are more invested in cocoa farming.

- **Diversified incomes**

Data suggest that households diversify their income sources – with, on average, almost four income generating activities (IGA) per household. Households located in the eastern region have, on average, one IGA more; but, in terms of household size, they also have almost one more adult household member.

The most popular non-cocoa crops sold are food crops including cassava, plantain, peppers, and eggplant. More households in the eastern region sell non-cocoa crops, and cash crops like rubber and coffee are more important to them. Around 27% of the sample rely entirely on cocoa for income. However, households depend on the sale of cocoa for, on average, 73% of their income. This percentage is higher in the south-western region than in the eastern. Further, 20% of household income comes from the sale of non-cocoa crops, implying that income from non-agricultural, off-farm activities is limited. Therefore, 93% income is derived from crop sales – indicating that households are diversified when it comes to crop cultivation, but less so in other sources, such as having or working in a business.

- **Women empowerment**

Women empowerment is measured through a Women Empowerment Index (WEI). On average, 62% of women are considered 'disempowered', i.e., they lack capacity in at least one of the three following dimensions: 1) access to economic resources; 2) participation into decision-making; and 3) group membership and training. A larger proportion of women in the eastern region are involved in IGAs, which corroborates with more diversified incomes in the region. Yet, this does not lead to higher empowerment.

- **Resilience and food security**

Households have limited resilience, with an average Resilience Capacity Index (RCI) of 29 out of 100. Households in the eastern region are slightly better off than those in the south-western, and this is also reflected in food security levels, such as monthly food expenditures and diet diversity scores.

- **Access to finance**

Financial inclusion has many benefits, including increased savings, female empowerment, consumption, and productive investments, and is often defined as the access to formal (bank account, insurance, loan at bank or financial institute) and informal financial services (VSLA savings account, mobile money account, informal saving group, informal loan). Eight percent of households have access to formal financial services, while almost three-quarters of households rely on access to informal services. In terms of women's access to finance, 2% of women have access to formal services and 55% rely on informal financial services. Twenty-nine percent of women have a Mobile Money account. Meanwhile, 26% of women are members of a Village Savings and Loan Association (VSLA) and, in the last 12 months, an average of US\$106 was saved per member through VSLAs. Five percent of women took out a loan with their VSLAs, amounting to US\$129. VSLA membership correlates positively with women's empowerment score, and the number of IGAs women are involved in and have control over, demonstrating their potential as modality to support women.

- **Child labor prevalence**

Child labor is measured with the support of the International Cocoa Initiative (ICI). With an average prevalence of 40%, child labor risk remains a persistent issue among cocoa producing households. Although child labor risk prevalence is mainly driven by excessive working hours, 13% of children are involved in hazardous work. Boys are more likely to be involved in hazardous work, while girls are more likely to work excessive hours. The combination of a higher poverty probability, lower resilience scores, and higher dependence on cocoa with less diversified income levels, seems to contribute to a significantly higher prevalence of child labor risks in the south-western region compared to the eastern.

- **Poverty, income and LI gap**






























According to the Poverty Probability Index (PPI), households have a 38% likelihood of living below the national poverty line of Côte d'Ivoire. The PPI computes the likelihood that households are living below the poverty line on the base of household characteristics and asset ownership, and is a measure of (deprived) well-being.

Income refers to (the lack of) monetary resources, and the average household income levels amount to US\$3,654 per year. The median is substantially lower at US\$2,731. With the adjusted LI benchmark set at US\$7,451, the average LI gap is US\$3,673; while the median LI gap is higher at US\$3,750. Moreover, the median LI gap is larger among households in the eastern region than in the south-western region. Twelve percent of cocoa farming households earn an income above the LI benchmark. On average, cocoa farming households earn 55% of their household size adjusted LI benchmark (i.e., their income as proportion of their LI benchmark).

Income diversification and sustainable intensification of cocoa production are both considered pathways toward closing the LI gap. Analyses in this report show the LI gap is positively correlated with households' dependence on cocoa for income, meaning that less diversified households (i.e., a greater proportion of income comes from cocoa sales) have larger gaps to the LI benchmark. This is corroborated by the finding that households with more income sources have a smaller LI gap. Furthermore, cocoa yields correlate negatively with the LI gap, implying that households with higher cocoa productivity levels have smaller LI gaps. This is supported by the finding that 32% of the households which, on average, produce at least 1 mt of cocoa per ha earn an LI; while this is only the case for 9% households that produce, on average, less than 1 mt per ha. These results suggest that interventions addressing (the adoption of) sustainable practices to promote diversified incomes and intensified production can contribute towards closing the LI gap of cocoa farming households.



Figure 1. Summary table of key performance indicators (KPI)

OUTPUT	OUTCOME		IMPACT
<div><div>8.7 </div><div>mature shade trees per ha</div></div> <div><div>14 </div><div>new shade trees per ha</div></div> <div><div>78% </div><div>adoption of (quality) pruning*</div></div> <div><div>50% </div><div>women involved in IGAs</div></div> <div><div>23h </div><div>per week spent on IGA by women</div></div> <div><div>26% </div><div>women with VSLA membership</div></div> <div><div>80% </div><div>of children are in school</div></div> <div><div>57% </div><div>of the household (heads) have a mobile money account</div></div> <div><div>29% </div><div>of women have a mobile money account</div></div>	<div><div>678us\$ </div><div>net cocoa income per ha</div></div> <div><div>73% </div><div>income comes from cocoa sales</div></div> <div><div>34% </div><div>annual household expenditures spent on child's education (for all children)</div></div> <div><div>8% </div><div>annual household expenditures spent on child's health (for all children)</div></div> <div><div>38% </div><div>women classified as empowered</div></div> <div><div>3.6 </div><div>IGA per household</div></div> <div><div>471us\$ </div><div>woman's annual IGA income</div></div>	<div><div>106us\$ </div><div>saved per woman in VSLA</div></div> <div><div>524kg/ha </div><div>average cocoa yield</div></div> <div><div>13% </div><div>households have at least 1m/t yield per ha</div></div> <div><div>61% </div><div>sufficient GAP adoption</div></div> <div><div>71us\$ </div><div>invested in cocoa production per ha</div></div> <div><div>0.89 </div><div>average Food Diversity Index</div></div>	<div><div>3,673us\$ </div><div>Living Income Gap</div></div> <div><div>3,654us\$ </div><div>household net income</div></div> <div><div>12% </div><div>households earn an LI</div></div> <div><div>38% </div><div>average Poverty Probability Index (National Poverty Line)</div></div> <div><div>29 </div><div>average Resilience Capacity Index</div></div> <div><div>40% </div><div>child labor prevalence</div></div> <div><div>13% </div><div>hazardous work prevalence among children</div></div>

*Pruning data do not represent a baseline as they were collected after pruning was done by subsidized pruning groups

1 Introduction

Summary

- The Income Accelerator Program (IAP) aims to tackle child labor risks in Nestlé's cocoa supply chain by increasing cocoa farming households' incomes.
- Cash transfers are used to incentivize households in four areas: school enrolment, good agricultural practices (GAPs), agroforestry activities, and diversified incomes.
- This report assesses key performance indicators (KPIs) at baseline, and provides insight on cocoa farming households' characteristics, cocoa production, poverty indicators, Living Income (LI) gap, income diversification, women empowerment and child labor prevalence.

The test-at-scale phase of the Income Accelerator Program (IAP) is a two-year initiative supported by Nestlé and implemented by six of its tier-1 suppliers (Cargill, Ofi, Barry Callebaut, Sobgreen, Ecom, and ETG-Beyond Beans Foundation) in Côte d'Ivoire. Additional partners assisting with project implementation are the International Cocoa Initiative (ICI), Sustainable Trade Initiative (IDH), and Rainforest Alliance; while KIT Royal Tropical Institute is responsible for the Monitoring, Evaluation, and Learning (MEL) component.

The IAP aims to tackle child labor risks in Nestlé's cocoa supply chain by increasing the incomes of cocoa farming households towards a Living Income (LI). This is done through conditional cash transfers (CCT), incentivizing sustainable practices across four key areas:

- School enrolment of children
- Good agricultural practices (GAPs), specifically pruning adoption
- Agro-forestry activities through the planting of shade and fruit trees
- Diversified incomes

Launched in January 2022 as an extension of the pilot that began in early 2021, the current phase of the IAP, labeled 'test-at-scale', is essential for assessing the initiative's overall impact. This phase will also help provide evidence-based recommendations for a complete roll-out in 2024 to all cocoa farming households that are part of Nestlé's cocoa supply chain in Côte d'Ivoire and Ghana. The current IAP phase is implemented in 16 cooperatives and covers 10,000 cocoa farming households in the areas around Abengourou, Gagnoa, and Divo.

There are four key areas to the IAP. The first is centered on incentivizing households to send children aged 6-16 years to school to directly reduce child labor risks. The second and third areas are focused on advancing cocoa tree productivity via quality pruning and improved regenerative potential of the farms through agroforestry and adoption of GAPs. The final area

1 Introduction

The current IAP phase is implemented in 16 cooperatives and covers 10,000 cocoa farming households in the areas around Abengourou, Gagnoa, and Divo.

revolves around increasing income from non-cocoa activities, with households starting/ expanding alternative income-generating activities (IGA) outside of cocoa.

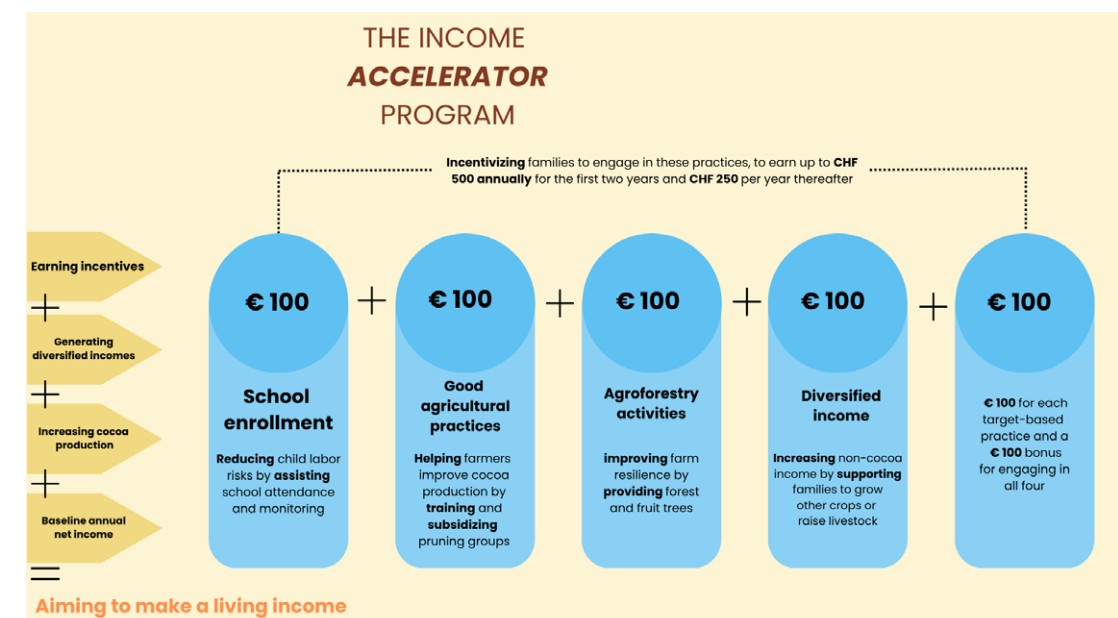
As a sustainability program, IAP's holistic stance is innovative in the fact that it takes a household approach, rather than focusing on individual farmers. Half of the incentive is paid to the spouse of the registered farmer. The male receives the incentive for pruning and agroforestry, the female for school attendance and additional incomes, and the bonus is split between them. Making women direct participants in the program as equal recipients of cash transfers is also projected to encourage gender equality. In the case of the registered farmer being a women with a male partner, the incentive is still split between the two. In the case of single headed households, the whole incentive goes to this person.

As program partner, KIT Royal Tropical Institute is responsible for MEL. Specific activities include an online quarterly monitoring system on implementation progress, robust evaluation of the program's impact on farming households' livelihoods, and sharing learnings 'ex-durante' (i.e. during program implementation) to implementing partners.

This baseline report aims to: 1) establish quantitative values for the IAP key performance indicators (KPIs) before the start of project activities, and 2) establish baseline values for measures needed to assess project outcomes during the final impact evaluation. This introduction continues with a brief description of the methods and Theory of Change (ToC), after which the report presents demographics of eligible cocoa farming households. The subsequent chapters focus on cocoa production, income diversification, additional poverty indicators, and the LI gap.



Figure 2. Overview IAP



1.1 Program background and Theory of Change

The IAP test-at-scale phase aims to embed sustainable practices in four key areas, and offers a range of support to 10,000 cocoa farming households while incentivizing sustainable practices. The latter is achieved through four annual conditional cash transfers of €100 in the first two years of the program, while a fifth bonus transfer of €100 is offered to households that meet all four criteria. Gender equality is promoted through equal transfer of the financial incentive to both spouses: two CCTs are directed to the main cocoa farmer and two to their spouse.

The first incentive revolves around children's education. Each household with children aged 6-16 years old is eligible to receive €100 in total if their children attend school. The financial transfer is made to the female spouse or female household head, as studies have shown that women usually invest more in nutrition and human capital (e.g., schooling or healthcare for their children).² To help pay for schooling, uniform, and stationary, this cash transfer is split into two instalments: €50 is paid upon the promise to send all children aged 6-16 years to school (*ex-ante*), while the remaining €50 is transferred once the children's school enrolment has been verified (*ex-post*).

The second incentive covers the application of GAPs, in particular, quality pruning of cocoa trees. If done properly, this practice is anticipated to increase cocoa yields by up to 1 mt per ha. The IAP forms, trains, equips, and subsidizes pruning groups to visit farmers' cocoa plots and prune 1 ha of their productive cocoa land per year. To incentivize farmers to adopt pruning activities, two cash incentives are offered: one for the promise to prune (€50 *ex-ante*), and one after pruning has taken place (€50 *ex-post*). This incentive is transferred to the registered farmer.

² See, for example, De Hoop, J., Premand, P., Rosati, F., and Vakis, R. (2017) Women's Economic Capacity and Children's Human Capital Accumulation. Institute of Labor Economics. IZA DP No. 10501. <https://docs.iza.org/dp10501.pdf>

If done properly, this practice (pruning) is anticipated to increase cocoa yields by up to 1 mt per ha.

The third incentive relates to agro-forestry. Shade and fruit (i.e., multipurpose) tree seedlings are distributed to farmers with the aim that they be planted on the cocoa plot, preferably within the hectare of cocoa land that was pruned. Once fully grown, these trees will provide shade to the cocoa trees and improve soil quality, which is anticipated to increase farm productivity and improve biodiversity while simultaneously providing fruits (for consumption or to sell) or timber to households (as saving or insurance). Nestlé has established several local nurseries to provide each eligible farm household with a minimum of 10 seedlings. Pruning groups can assist farmers with seedling planting, and a transfer of €100 is made to the registered farmer once the planting of trees has been verified.

The last incentive concerns generating diversified incomes so households become less dependent on cocoa sales alone. To encourage households to explore additional IGAs or expand existing ones, the program offers €100 to the female spouse or female household head upon joining a Village Savings and Loan Association (VSLA), for undertaking Gender Action Learning System Methodology (GALS) training, and developing an action plan during entrepreneurship training. The trainings are expected to generate more economic freedom for women while reinforcing their ability to increase their decision-making power within the household, particularly regarding children's well-being.

As previously mentioned, households that meet all four criteria receive an extra transfer of €100, leading to a total annual cash transfer of €500. As this report will demonstrate, this amount is anticipated to represent approximately 15% of the current annual net income of cocoa farming households in rural Côte d'Ivoire.

In addition to the direct contribution of cash transfers, the IAP aims to sustainably increase household income levels through higher cocoa productivity and off-farm activities. Child labor risks are expected to be reduced from increased income levels, but also through improved awareness of child labor dangers (Child Labor Monitoring and Remediation Systems (CLMRS)

Once fully grown, these trees will provide shade to the cocoa trees and improve soil quality, which is anticipated to increase farm productivity and improve biodiversity while simultaneously providing fruits (for consumption or to sell) or timber to households (as saving or insurance).

The income diversification trainings are expected to generate more economic freedom for women while reinforcing their ability to increase their decision-making power within the household, particularly regarding children's well-being.

is deployed by ICI in IAP communities), sensitization to the benefits of schooling, distribution of school kits, and subsidies to school canteens.

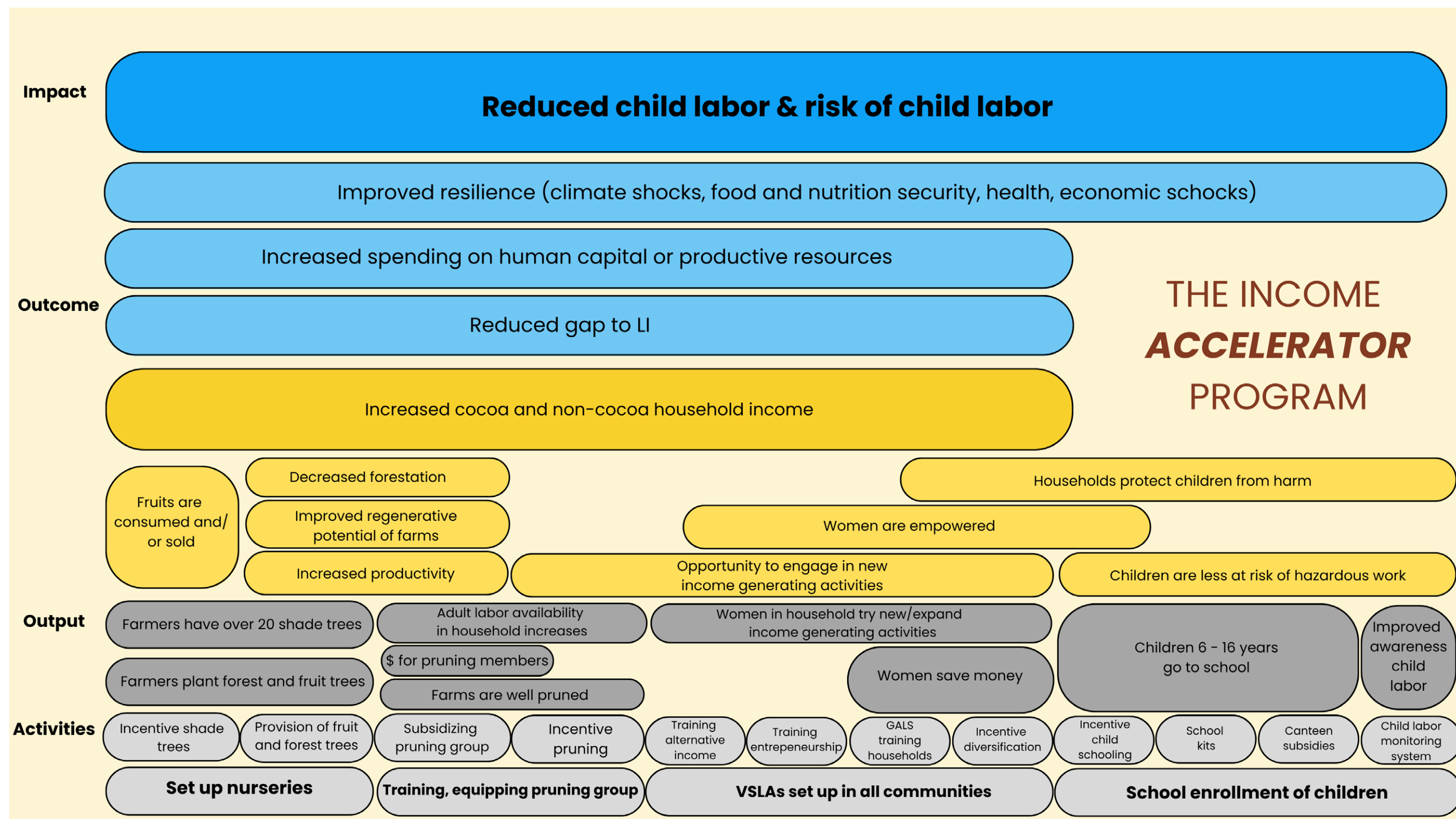
The Theory of Change (ToC) is illustrated in Figure 3 and shows how each impact pathway per key area is expected to lead to higher household income and reduced child labor risks. The ToC links program activities with expected impacts through intermediate outputs and program outcomes. The width of the boxes indicate the relationships between the different program steps and components. KPIs are reported on top of the ToC. If needed, the ToC will be adjusted during the implementation of the program.

In terms of eligibility, 16 cooperatives take part in the test-at-scale phase of the IAP.³ Each farmer (and their household) registered with the selected cooperatives is eligible to participate in the program, regardless of land size, production, or other characteristics. This means that no selection criteria target specific groups of cocoa farmers or households.



³ An additional two cooperatives already participate in IAP as they were selected for the pilot phase, setting the total number of included cooperatives to 18.

Figure 3. Theory of Change



1.2 Methodology

This baseline report uses quantitative data collected through a household survey conducted in July and August 2022 among 1,500 cocoa farming households in Côte d'Ivoire. All households are participants in the Nestlé Cocoa Plan (NCP) and are eligible to participate in the IAP. To capture impact beyond the main cocoa producer, the survey included questions for the farmer, their female spouse (if the farmer is male and has a spouse), and, where possible, up to two children. The questionnaire included modules on household characteristics and composition, cocoa production, revenue and costs, IGAs, women empowerment, financial inclusion, poverty status, resilience, food security, and child labor prevalence. To ensure production data are true baseline values, all cocoa production-related questions addressed the cocoa season covering the main crop campaign of September 2021 to January 2022 and the mid-crop campaign of February to June 2022.

The questionnaire was converted to Open Data Kit (ODK) and deployed on Android tablets to ensure quality checks during data entry. A team of 24 enumerators conducted interviews, and data collection was planned so it coincided with Rainforest Alliance's data collection on GAP adoption. The Rainforest Alliance team primarily visited the cocoa plot and did not interview household members other than the main farmer.

As the baseline survey is also instrumental in estimating program impact, cocoa farming households from non-IAP cooperatives were interviewed to construct a so-called 'counterfactual' situation (i.e., a situation that indicates what would have happened if the program were not implemented). As households' involvement in the IAP might not be random (i.e., most CCT are offered *ex-post*, after eligible households have met conditions), the issue of self-selection needs to be addressed. Self-selection can bias the estimation of program impact, and a matched Difference-in-Difference as quasi-experimental design will be needed to eliminate such bias. For that reason, the same group of cocoa-producing households will be invited to participate in next year's survey to construct a panel dataset.⁴

To compute the minimal sample size required for the baseline survey, existing data on income levels of cocoa farming households was used to extract the expected mean value and standard deviation. Given the right-skewed distribution of income levels (i.e., a few farm households with much higher income levels than the vast majority of the cocoa farming population), we assume a mean-standard deviation ratio of 1 to 1. This results in a sample size of 1,500 respondents for precision sampling with a margin error of 5%.⁵

The sampling strategy involved interviewing 1,500 IAP participating households (on which the current baseline report is based) and 500 comparison households. To ensure comparability between treatment and comparison groups, only farming households from cooperatives showing similarities with IAP participants were selected. Similarity was based on supplier type, pruning and shade trees support, location, and certification status. In addition, all treatment and comparison cooperatives engage in the NCP.

4 Stuart, E.A., Huskamp, H.A., Duckworth, K., Simmons, J., Song, Z., Chernew, M. and Barry, C.L. (2014) Using propensity scores in difference-in-differences models to estimate the effects of a policy change. *Health Services and Outcomes Research Methodology*. 14(4):166-182. doi: 10.1007/s10742-014-0123-z

5 For hypothesis testing (e.g., differences between groups), a sample of 1,000 households (500 treatment and 500 comparison) allows for detecting an effect size of 15%.

Household selection was conducted through a two-stage random sampling procedure. A fixed number of villages (four or five) within each cooperative was selected, after which a fixed number of households (minimum of eight) in each village was sampled. To allow for possible replacements (due to absence, illness, refusal to participate, etc.), additional villages and households were also sampled.

Sampling a fixed number of villages and households per cooperative means that households from lower-populated villages and smaller cooperatives with few(er) villages are over-represented. To increase the external validity of the baseline values, the analyses include sampling design weights to correct for this heterogeneous probability of selection among respondents. Sampling weights are calculated as the inverse of the probability of selection in the sample at both village and household level.⁶

1.3 Data

The full baseline survey covers 2,050 randomly sampled cocoa farming households. Of these, 1,538 are part of IAP (treatment group), while 512 households are members of Nestlé Cocoa Plan cooperatives outside of IAP (comparison group).

Table 1 shows that the vast majority of targeted farm households are located in Comoé or Gôh-Djiboua, two districts known to be among the main cocoa producing areas in Côte d'Ivoire. Around 5% of the sample is also located in the district Lacs, while some comparison farm households are located in the district of Bas-Sassandra.

Although no treatment households are located in Bas-Sassandra, Figure 4 shows that they are relatively close to households in Gôh-Djiboua. Furthermore, the map reveals the households are largely clustered into two regions, which we will label eastern (N=817) and south-western (N=1,233). In the remainder of this report we will disaggregate results by region, as some districts (Lacs and Bas-Sassandra) have a relatively low number of observations. Moreover, we will present descriptive statistics on the treatment group only in the remainder of this baseline report.

Table 1. Respondents per district

District	Region	Total	Comparison group	Treatment group
Comoé	Eastern	705	96	609
Lacs	Eastern	112	48	64
Gôh-Djiboua	South-western	1,193	328	865
Bas-Sassandra	South-western	40	40	0
Total		2,050	512	1,538

6 Mansournia, M.A. and Altman, D.G. (2016) Inverse probability weighting. *BMJ*, 352. <https://www.bmj.com/content/bmj/352/bmj.i189.full.pdf>

The map displays the distribution of Control (blue) and Treatment (yellow) groups across Côte d'Ivoire. The regions shown include DALOA, YAMOUSSOUKRO, AGBOVILLE, ABIDJAN, and SOUBRE. Numerous locations are marked with blue and yellow dots, indicating the presence of the respective groups. An inset map shows the location of Côte d'Ivoire within West Africa.



2 Household demographics

2 Household demographics

Summary

- The majority of household heads are men, although there are more women household heads in the eastern region compared to the south-western region.
- Almost half of the household heads are literate, although a similar amount did not complete any formal education. Male household heads are better educated than women.
- Two-thirds of interviewed households comprised 4-8 members, with households in the eastern region generally having more members.
- On average, half the members in each household are children under the age of 15.

As LI and child labor prevalence are household issues, this chapter presents cocoa farming household demographics. Instead of focusing only on the cocoa farmer, the household head characteristics are presented, including sex, age, and education levels, following which descriptive statistics on household composition are provided.

In the survey, the concept of 'household' was defined as: *"All members who live in the same house under the same roof and who usually eat together from the same pot and who recognize the authority of the same head of household. Time wise, the definition only includes those living in the household for the past six months. Dependent children in boarding school are also counted as household members".*⁷

2.1 Characteristics of the household head

The household head is defined as *"one of the members of the household recognized as the head of the unit by the other members of the household unit or by himself (or herself) if living alone"*. Eight percent of cocoa farming households are female-headed, and other studies on cocoa farming in Côte d'Ivoire reveal a similar proportion, ranging from 4% to 10%.^{8 9 10} In the

7 In the questionnaire, the household was defined to the respondent as: Le "ménage" = les membres qui vivent dans la même maison et qui mangent habituellement ensemble et qui reconnaissent l'autorité d'un même chef de famille. Veuillez inclure uniquement les personnes vivant au sein du ménage depuis 6 mois au moins ainsi que les enfants à charge dans un pensionnat.

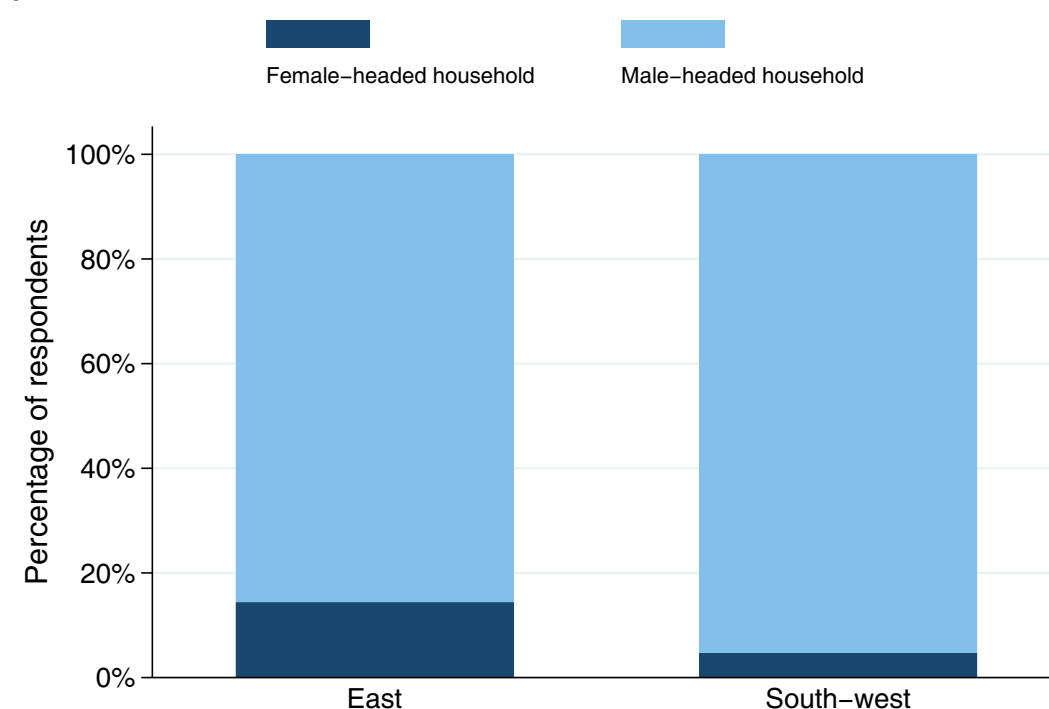
8 Bymolt, R., Laven, A. and Tyszler, M. (2018) Demystifying the Cocoa Sector in Ghana and Côte d'Ivoire. KIT Royal Tropical Institute. <https://kit2018.wpenginepowered.com/wp-content/uploads/2020/05/Demystifying-complete-file.pdf>

9 IDH (2020) New Insights on Reaching Living Income. A baseline analysis from farmer field books of cocoa farmers in Côte d'Ivoire. The Sustainable Trade Initiative (IDH).

10 Sadhu, S., Kysia, K., Onyango, L., Zinnes, C., Lord, S., Monnard, A. and Arellano, I. (2020a) Assessing Progress in Reducing Child Labor in Cocoa Production in Cocoa Growing Areas of Côte d'Ivoire and Ghana. Technical report. NORC. https://www.norc.org/PDFs/Cocoa%20Report/NORC%202020%20Cocoa%20Report_English.pdf

The relatively limited number of female household heads stresses the importance of including the often unregistered female spouse in the IAP via cash incentives for income diversification and schooling of children to ultimately also improve gender equality.

Figure 5. Sex of the household head



eastern region, 14% of households are female-headed, although in the south-western region, only 5% of households are female-headed (Figure 5). Most male household heads are married (95%), while this percentage is much lower for female household heads, at 18%.

The relatively limited number of female household heads stresses the importance of including the often unregistered female spouse in the IAP via cash incentives for income diversification and schooling of children to ultimately also improve gender equality.

The average age of the household head is 49 years old. Only 3% are below the age of 30, indicating that very few youngsters are the household head and engage in cocoa farming. A regional difference is found in age, as farmers in the eastern region are, on average, three years older than farmers in the south-western region.

Furthermore, a large gender difference is found in the age of the household head, with female household heads, on average, almost eight years older (57 years old vs. 49 years

Figure 6. Age of the household head

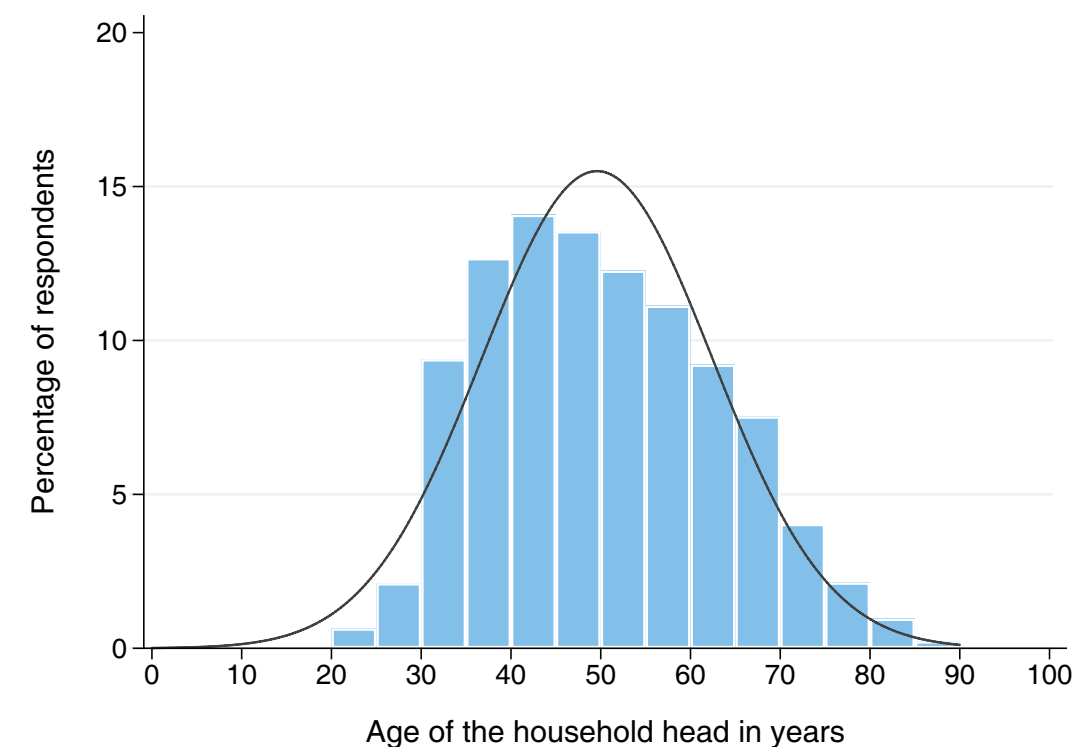


Table 2. Age of the household head

Age of household head	Total	Eastern region	South-western region	sig.
Age household head (in years)	49	51	48	***
Under 30 years old	3%	3%	2%	
30 – 39 years old	21%	17%	23%	
40 – 49 years old	31%	29%	32%	***
50 – 60 years old	24%	24%	24%	
60+ years old	21%	27%	18%	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

old). This finding, in addition to the unmarried status of most female household heads, suggests they most likely took over the role after divorce or death of a spouse.

On average, household heads had slightly more than four years of formal education (as shown in Table 3), although half of the interviewed household heads did not complete any formal level of education. Forty-seven percent of household heads report to be literate.¹¹ In

¹¹ World Bank Open Data indicate that 90% of the entire population in Côte d'Ivoire was literate in 2019. World Bank (2022b) Literacy rate, adult total (% people ages 15 and above) – Côte d'Ivoire. World Bank, [online]. <https://data.worldbank.org/indicator/SE.ADT.LITR.ZS?end=2019&locations=Ci&start=1988&view=chart>

the eastern region, the household head received, on average, an additional year of formal education compared to those in the south-western region, which also translates into a higher proportion of literate household heads.

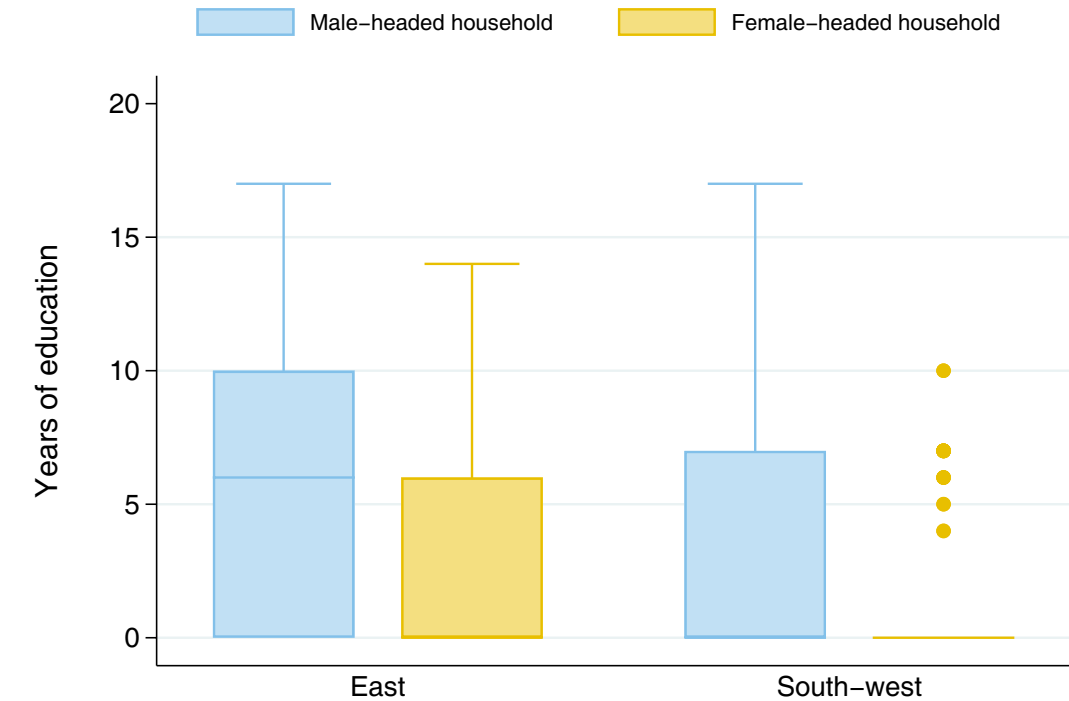
In addition, male household heads are better educated, with 2.4 years of education more than female household heads. Only 24% of female household heads are literate. Especially in the south-western region, female household heads have low levels of education, with an average of one year's formal education. Few women have undertaken formal education (Figure 7). Overall, illiteracy remains a key-obstacle for business and farm-development, creating challenges when drafting household development plans, keeping farm records, or following business training.

Table 3. Education level of household head

Education level of household head	Total	Eastern region	South-western region	sig.
Household head: years of education	4.39	5.14	3.92	**
Household head is literate	47%	51%	44%	**
Household head: no formal education completed	49%	40%	55%	
Household head: primary school completed	27%	32%	23%	***
Household head: secondary school completed	22%	25%	20%	
Household head: tertiary school completed	2%	3%	2%	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

Figure 7. Years of education by region and sex of the household head



2.2 Household size and composition

As shown in Figure 8, around 65% of interviewed households consist of four to eight members. The average household consists of more than seven members (a median household has six), of which slightly over half are adults (Table 4). Households in the eastern region are significantly larger than households in the south-western region. A higher number of adult members is the main cause of this difference, rather than there being more children.

Figure 8. Household size

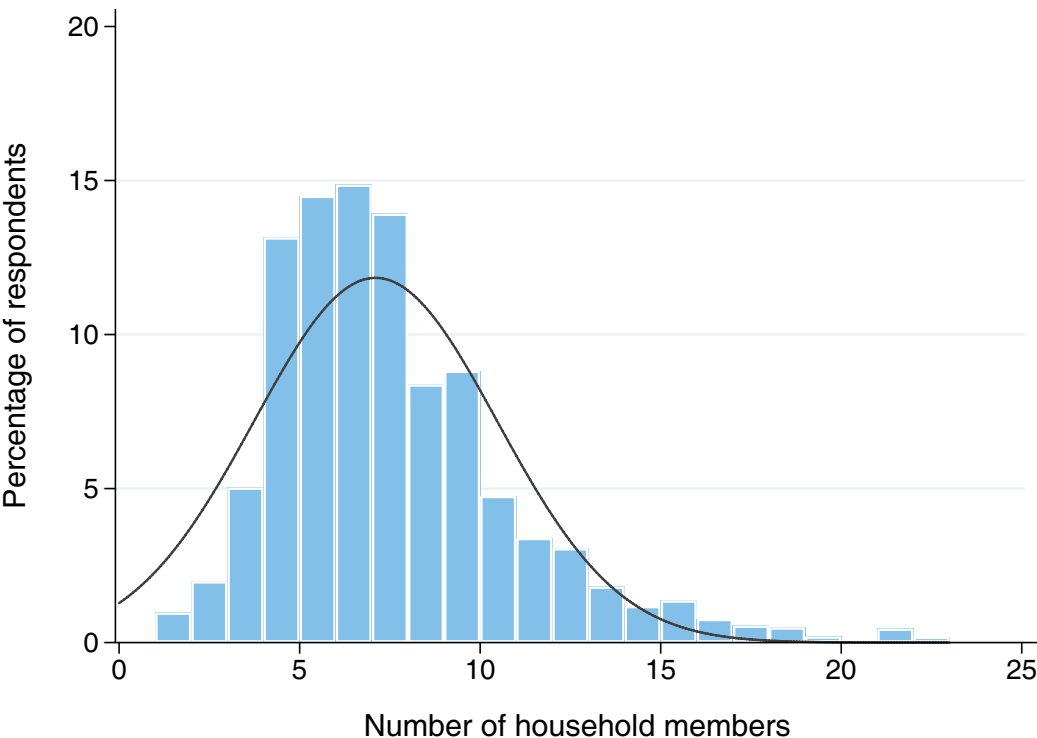


Table 4 presents the dependency ratio, which calculates the pressure put on working age (15–64) household members. The number of dependent members (under 15 and above 65) is divided by the number of working age members. A low dependency ratio is considered more desirable, as it decreases the pressure on those who work. The average dependency ratio among cocoa farming households is 98%. This means that, on average, the ratio of dependent members and working age members is almost 1 to 1. The dependency ratio in the south-western region is significantly higher than in the eastern region, with a ratio of 102% – implying that the number of dependents in the household is higher than the number of working age members.

In an average household, around half of members are children below the age of 15, while only a small percentage (4%) are 65 years old or older. This aligns with the life expectancy as recorded by the World Bank (2020), which is estimated at 59 years old in Côte d'Ivoire.¹²

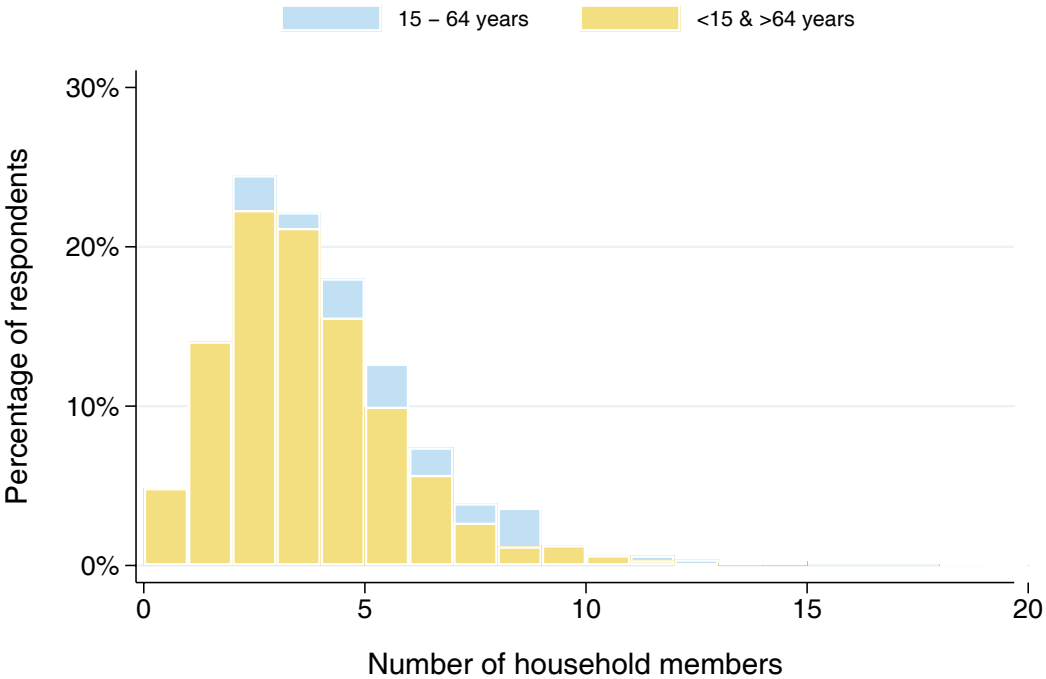
¹² World Bank (2022a) Life expectancy at birth, total (years) – Côte d'Ivoire. World Bank, [online] 2022. <https://data.worldbank.org/indicator/SP.DYN.LE00.IN?locations=CI>

Table 4. Composition of household

Household composition	Total	Eastern region	South-western region	sig.
Number of household members	7.1	7.5	6.9	***
Number of adults in household (18+)	3.7	4.1	3.4	***
Number of children in household (<18)	3.5	3.4	3.5	
Dependency ratio	98.4	92.5	102.2	**
Working-age members (15–65 years old)	3.9	4.3	3.7	***
Elderly (65+)	0.3	0.4	0.2	***
Dependents (<15 & 65+)	3.2	3.2	3.2	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

Figure 9. Working-age vs. dependent members of the household



The blue bars on the right side of Figure 9 highlight the composition of dependent and providing household members. They show that, on average, there are slightly more members in the working age category (15–64 years), as suggested by the dependency ratio.

3 Cocoa production and farm economics

Summary

- The average farm household cultivates 4 ha of productive land, and those who have cultivated for longer have larger plots.
- Farm households produce an average of 2 mt cocoa annually and have average yields of 575 kg/ha. Those in the south-western region, along with households with more adult members, produce larger amounts.
- GAPs are evident: over 75% of farm households prune trees sufficiently well, pesticide use is very high, and more than half use fertilizers – but there is room for improvement in other areas.
- Average annual revenue from cocoa is over US\$2,700 – and revenue and profit per ha decrease with land size.

This chapter provides descriptive statistics on cocoa production. It specifically discusses the land on which cocoa is produced, cocoa production, and the yield in the cocoa season 2021 (main) to 2022 (mid-crop). This section also presents cocoa production costs based on labor hired and materials, inputs and tools acquired, and ends with a discussion on the cocoa revenues and profits.

3.1 Cocoa land, production, and yield

Cocoa farm households cultivate cocoa for almost 21 years on average. As shown in Table 5, the average farm household cultivates cocoa on 4.3 ha of land, of which almost 4 ha are considered productive (e.g., land on which cocoa was harvested).¹³ ¹⁴ Households who cultivate cocoa longer also have larger cocoa plots (Figure 10). In the eastern region, areas used for cocoa production and with productive cocoa trees are statistically larger than in the south-western region – with, on average, half a hectare more. For the entire sample, the 0.3 ha difference between cultivated and productive land is statistically different.¹⁵ This difference can stem from several causes, from having (planted) younger cocoa trees or having older plantations that are no longer maintained, to the effects of pests like cocoa swollen shoot virus disease (CSSVD).

Three-quarters of farm households cultivate cocoa on less than 6 ha of land, while 50% grow cocoa on less than 3.5 ha of land. As demonstrated in Figure 11, around 7% of farm households

¹³ Outliers in land, production, and yield are removed using a method that defines observations as outliers when their scores are three times the Interquartile range (IQR) outside Q1 and Q3.

¹⁴ Due to farm households not knowing exactly the age of their cocoa trees (22% of households), productive cocoa land is considered the land on which cocoa is harvested. However, when computing productive land with a subsample (N=1,136) on the base of the age of trees, we find a minimal difference of 0.02 ha in means.

¹⁵ Results from a household-level fixed effects regression.

3 Farm economics

Figure 10. Cocoa land by years of farming of the household

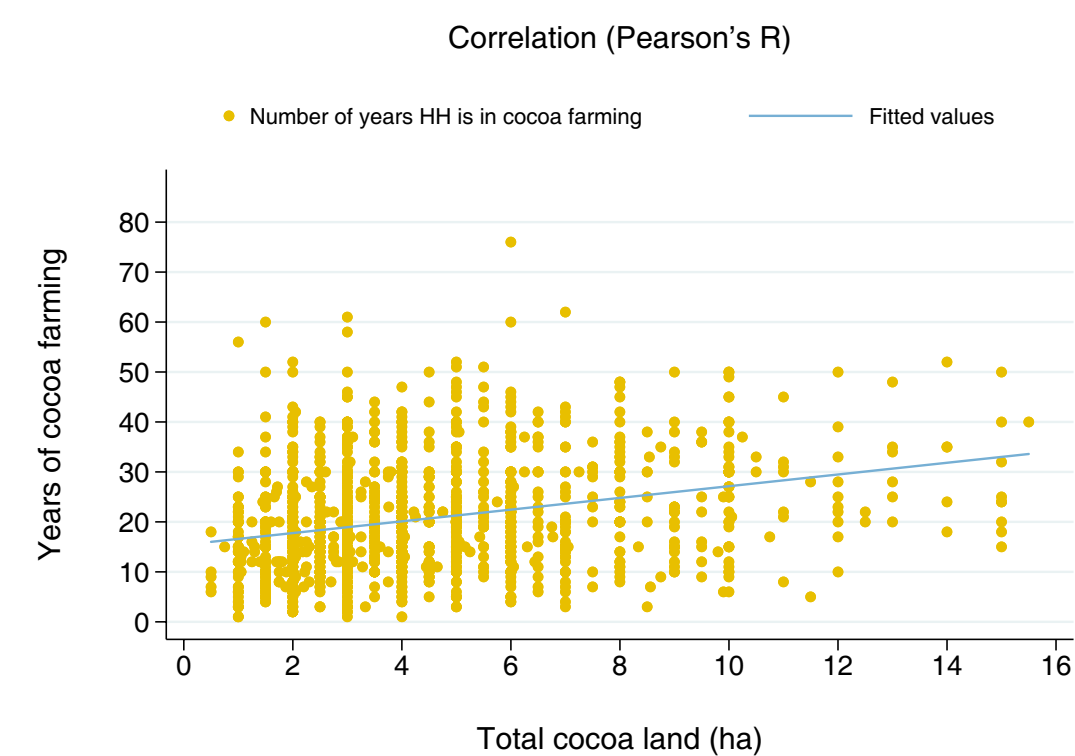
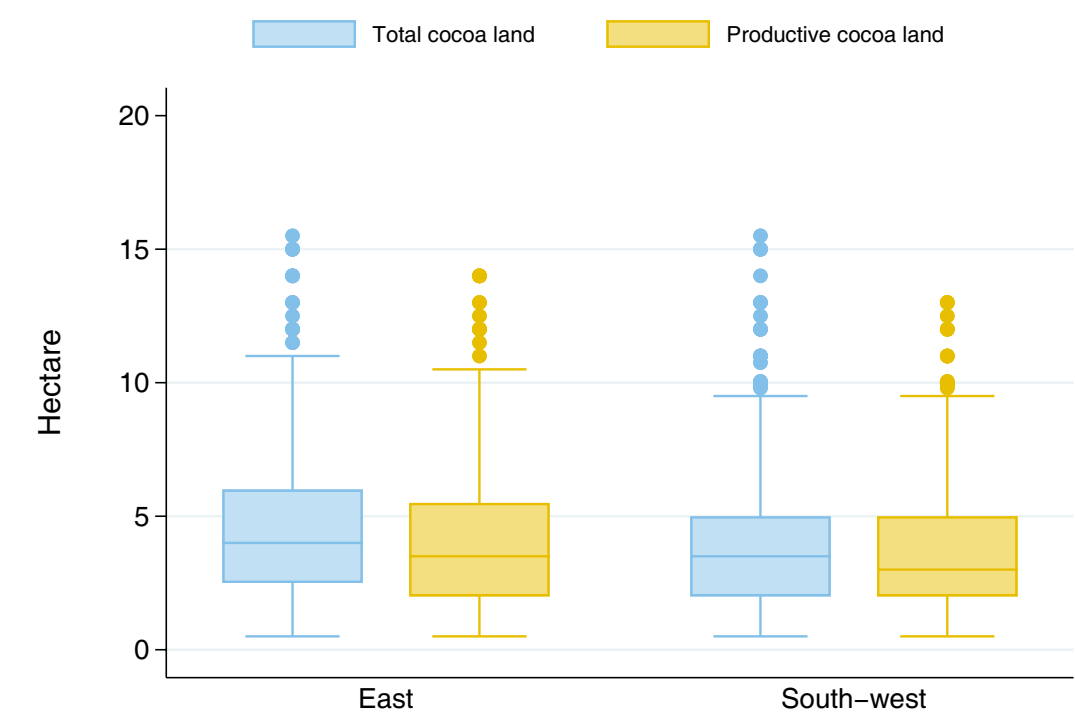


Figure 11. Cocoa land (in ha)



have relatively larger plantations, exceeding 10 ha; while 1% have farms equal or larger than 15 ha. Sixty-nine percent of cocoa land is planted with trees in the age range of 5-25 years.

On average, farm households produce more than 2 mt of cocoa.¹⁶ Despite harvesting cocoa on more hectares of land, farm households in the eastern region produce, on average, less cocoa compared to those in the south-western region. We also find that female-headed households produce around 427 kg of cocoa less than male-headed households. Households with more adults (18+) produce, on average, 107 kg of cocoa more per additional household member. Moreover, the cumulative share of cocoa production is somewhat skewed (Figure 12), and 50% of farm households produce 1,500 kg of cocoa or less per year.

Table 5 reports that cocoa yields are, on average, 575 kg/ha, while a median household produces around 500 kg/ha. Given that the eastern region produces cocoa on more land but has a lower production, regional differences are also found in yield levels. In the eastern region, farm households have average yields of 459 kg/ha, while households in the south-western region have average yields of 643 kg/ha. The difference in proportion of households producing at least 1,000 kg/ha is 12 percentage points, with more households in the south-western region producing at least 1,000 kg/ha. In terms of gender differences, female-headed households produce, on average, 118 kg/ha less.

Previous studies have shown that (productive) cocoa yield correlates negatively with cocoa land, and Figure 14 confirms this.¹⁷ The baseline data reveal that each additional hectare of productive land is correlated with a 29 kg/ha decline in cocoa yield. Several reasons are reported to cause this negative relationship, but first and foremost is that large plantations remain more difficult to maintain with regards to distributing limited labor and inputs over a larger area.

Table 5. Cocoa land, production, and yield

Cocoa land, production, and yield	Total	Eastern region	South-western region	sig.
Years households are in cocoa farming	21	21	20	
% of cocoa land with trees <5 years old	11%	11%	10%	
% of cocoa land with trees 5-25 years old	69%	67%	71%	
% of cocoa land with trees >25 years old	20%	21%	19%	
Total cocoa land used (ha)	4.3	4.7	4.1	***
Productive cocoa land (ha)	4.0	4.4	3.8	***
Cocoa production (kg)	2,082	1,876	2,205	***
Cocoa yield (kg per ha) ^a	575	459	643	***
Farm households with 1 t/ha cocoa yield	13%	6%	18%	***

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied. ^a Yield levels might deviate from dividing the cocoa production values by productive land values presented in the table, as for some households land or production values were missing.

¹⁶ Post-harvest losses are not deducted. These losses will be deducted when computing cocoa revenue and cocoa profit.

¹⁷ Byrnolt, R., Laven, A., Tyszler, M. (2018) Demystifying the Cocoa Sector in Ghana and Côte d'Ivoire. KIT Royal Tropical Institute. <https://kit2018.wordpress.com/wp-content/uploads/2020/05/Demystifying-complete-file.pdf>

Figure 12. Cumulative share cocoa production

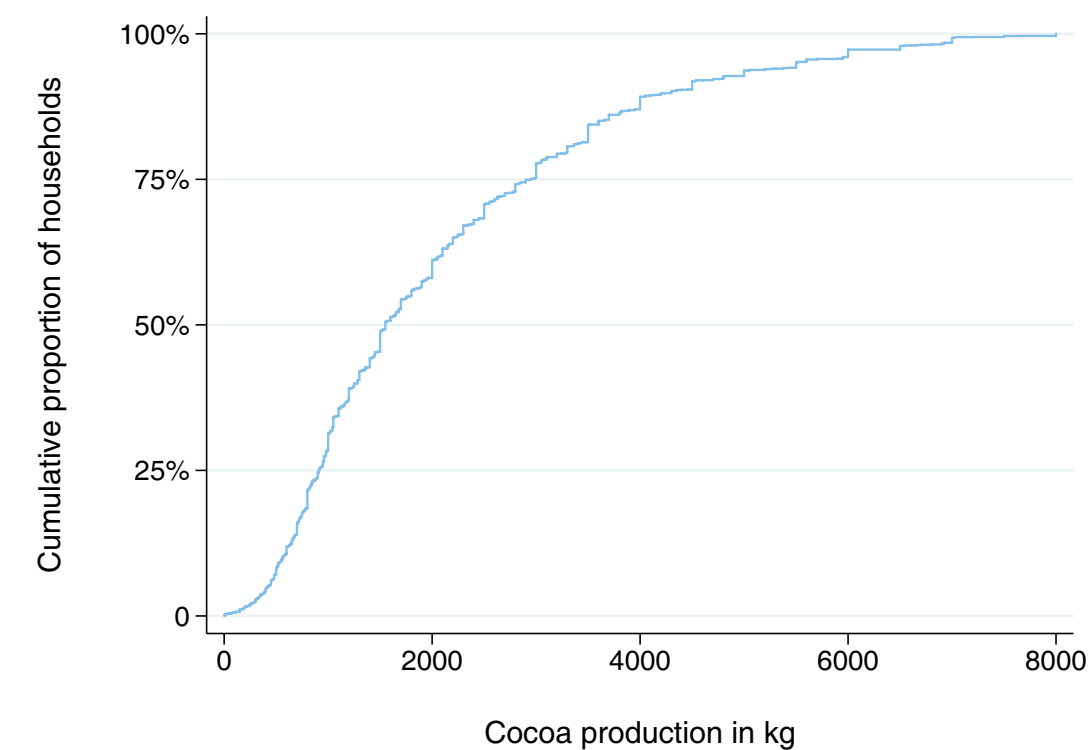


Figure 13. Cocoa yield

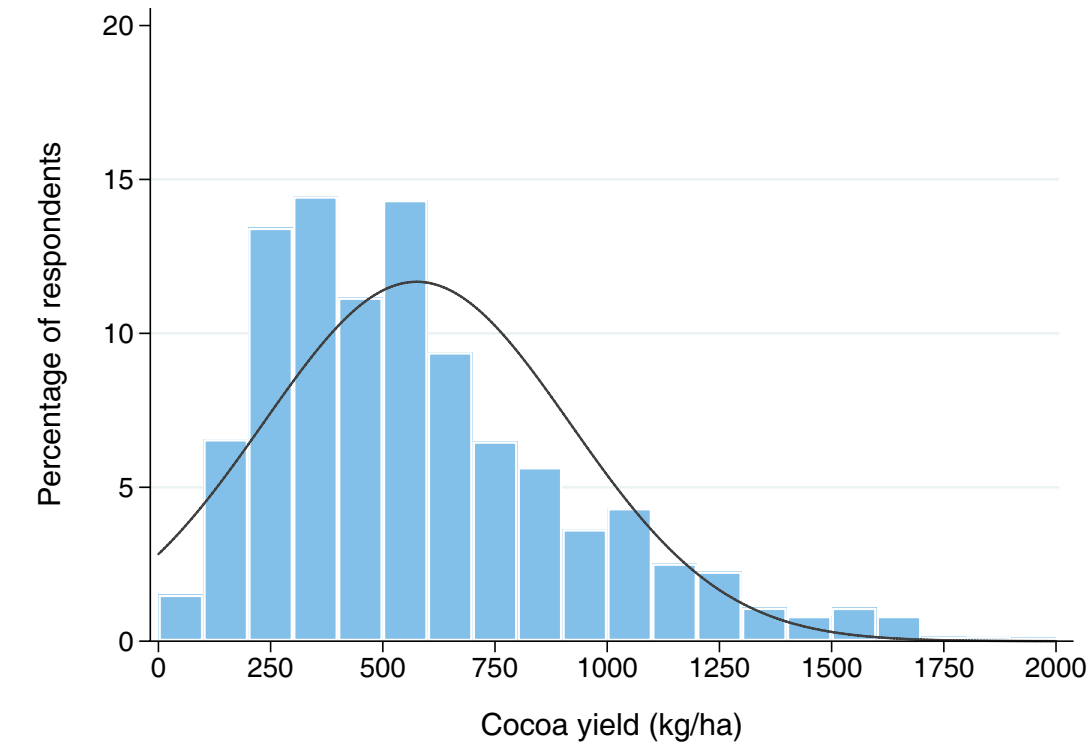
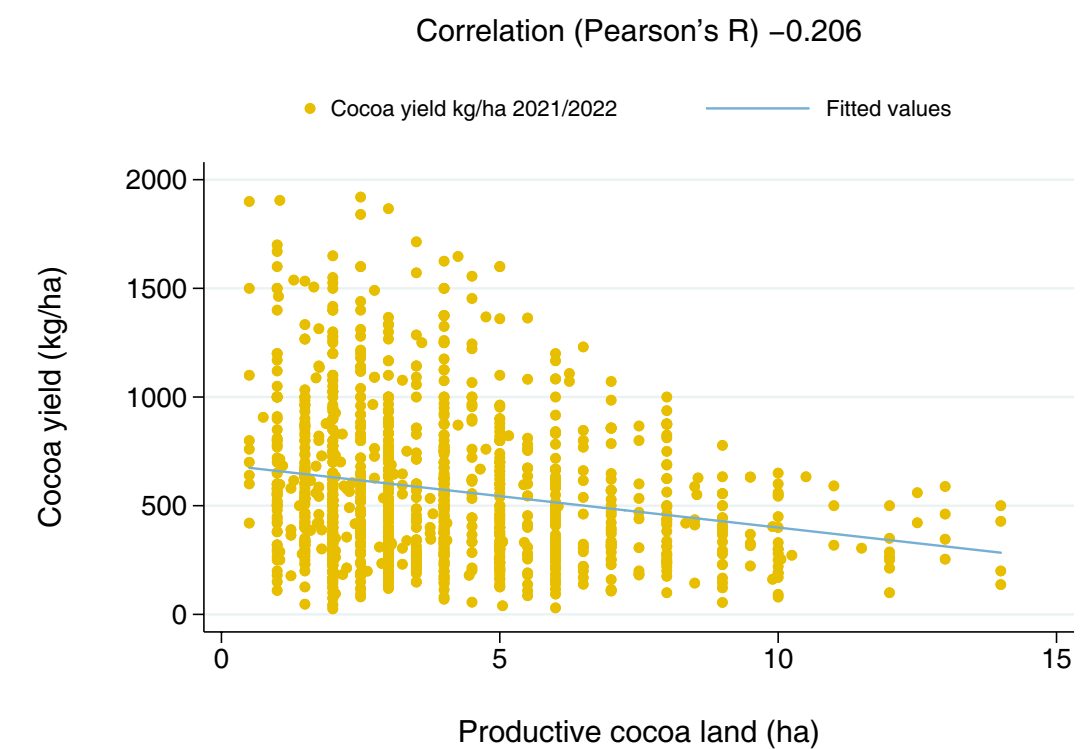


Figure 14. Cocoa yield by cocoa land



3.2 Good agricultural practices

Simultaneous to KIT's data collection on farm economics, poverty indicators, and child labor prevalence, Rainforest Alliance collected data on agricultural practices – including the adoption of 1) pruning, 2) pest and disease management, 3) weed management, 4) shade management, and 5) harvest management – by visiting one cocoa plot per cocoa farm household.¹⁸ On each cocoa plot, the enumerator randomly selected three observation points. Data on practices were recorded per observation point, leading to a total adoption score per agricultural practice. Each adoption score is compared against a respective threshold to compute a final binary adoption variable (no=0, yes=1). The methodology is described in more detail in Figure 16. As collecting GAPs data is time intensive, and because data will be used for evaluating IAP's impact, information was only collected on cocoa plots of 500 IAP eligible households and 500 comparison households. Table 6 presents the average adoption levels for IAP eligible households only.

Table 6 presents data for the cocoa plots of households eligible to participate in the IAP. It shows that 25% have planted home-grown cocoa seedlings in the last 12 months, with an average of more than 500 cocoa seedlings per farm (if indicated that the household planted seedlings). Large regional differences are found, with more farm households planting home-grown cocoa seedlings in the south-western region than in the eastern region.

¹⁸ As IAP pruning activities kicked-off two to three months before Rainforest Alliance's survey on GAP adoption, the data on pruning do not represent true baseline values (i.e., pruning levels before the start of IAP).



Table 6. Adoption of GAPs

Agricultural practices	Total	Eastern region	South-western region	sig.
Planting home-grown cocoa seedlings	25%	9%	34%	***
Fertilizer use	61%	49%	68%	***
Commercial fertilizer use	39%	35%	42%	
Organic fertilizer use	31%	25%	35%	**
Assessed adoption of quality pruning	78%	77%	79%	
Trunk: single stem and appropriate height	84%	78%	87%	**
No chupons (i.e., low branches)	84%	79%	87%	*
No dead branches	78%	62%	86%	***
No secondary branches inward/drooping/close to trunk	63%	63%	64%	
Crown is rounded and appropriate height	69%	90%	57%	***
Assessed adoption of pest and disease management	89%	78%	95%	***
Pesticide use	86%	76%	92%	***
Assessed adoption of weed management	72%	67%	74%	
Times weeded	2.5	2.3	2.6	***
Weeding method: herbicides	0%	0%	0%	
Weeding method: herbicides & manually	11%	4%	15%	***
Weeding method: manually	89%	96%	85%	
Assessed adoption of shade management	62%	52%	68%	***
Shade sufficient and good quality (18-20 shade trees/ha)	3%	3%	3%	
High shade (>20 trees/ha) but no new planting	3%	1%	5%	
Insufficient shade (6-17 trees/ha) but new trees planted in last 12 months	40%	40%	40%	
No shade (<6/ha) but new trees planted in last 12 months	54%	56%	52%	
Number of old shade trees per ha	8.7	6.3	10.2	*
Number of new shade trees per ha	14.0	5.5	18.9	***
Number of different species of shade trees on cocoa plot	5.8	5.0	6.3	***
Assessed adoption of harvesting practices	80%	83%	79%	
Total GAP adoption is considered sufficient (4 out of 5)	61%	58%	63%	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied. Data collected on a subsample of 500 cocoa farm plots.

Figure 15. Prevalent pests and diseases

Five most prevalent **pests** and **diseases** observed on the cocoa plot:

- Mirids (62%)
- Black pod (54%)
- Mistletoe (50%)
- Stem borer (47%)
- CSSVD (19%)

For seventy-eight percent of farm households, cocoa trees were pruned sufficiently well, but it should be noted that professional pruning groups subsidized by IAP had already visited almost all farms. In the comparison group, where no pruning groups had visited as part of IAP, pruning adoption rate is 50%. On the individual elements of pruning, farms in the south-western region perform better in terms of having single stems at the appropriate height, no chupons, and no dead branches; while farms in the east perform better on having the crowns of the cocoa trees rounded at the appropriate height.

Ninety-four percent of sampled cocoa farming households have insufficient shade or no shade on their cocoa plots. On average, a hectare of cocoa land has almost nine mature shade trees, while, on average, 14 new shade trees are planted recently. Around six different shade tree species are found on the cocoa plot, on average. In terms of shade categorization, the cocoa plots in the south-western region perform similarly to the eastern region – but plots in this region have more mature shade trees and a lot more shade trees are planted per ha.

More than half the farm households use fertilizer, either commercial (chemical) fertilizer (39%) or organic fertilizer (31%); but there is limited overlap in the use of both types (only 10% use both). A larger proportion of households in the south-west use fertilizer. The most popular organic fertilizers are cocoa pods (65%) and manure (53%).

A notable observation in Table 6 is that weeding to reduce cocoa trees' competition for water and nutrients is mainly done manually or mechanically with cutting tools, without the use of herbicides. Only 11% of farm households report using (approved) herbicides to prevent

Overall, when assessing the (quality of) adoption of the five GAPs (including pruning), 61% of farm households apply them sufficiently. Sufficiently is defined as applying at least four of five of the practices.

Figure 16. Rainforest Alliance for measuring GAP adoption

Rainforest Alliance uses individual elements to determine whether a GAP is objectively considered as adopted. They assess the adoption of five key agricultural practices: pruning, pest management, weed management, shade management, and harvest management. Data on each practice are collected through enumerator surveillance of three randomly selected observation points on the cocoa plot.

Per practice, key areas are scored using ordinal categories: 1 (good), 2 (medium), and 3 (bad). All scores of the three observations points are then summed up per practice, per cocoa plot, after which the total score per practice is compared to the highest score in the sample (a higher score implies worse performance). This creates a relative evaluation score, which is then compared to a respective threshold set for the agricultural practice. A score below that threshold suggests the practice is considered as adopted.

Per practice, the following key areas are assessed:

Pruning:

- Trunk: single stem and appropriate height
- No chupons (i.e., low branches)
- No dead branches
- No secondary branches that are inward, drooping, or close to main trunk
- Crown is rounded and appropriate height

Pest management:

- Extent to which plot is affected by pests
- Pesticide use

Weeding:

- Quality of weeding

Shade trees:

- Number of mature shade trees per ha
- Shade trees planted in the last 12 months

Harvest practices:

- No forgotten pods (overripe)
- Scars on trees/pods from machete



and remove weeds. Households weed, on average, more than twice per cocoa campaign. Farm households who use herbicides weed significantly less frequently (0.3 times less) than households who only weed manually.

Pesticide use is high at 86%, and adoption of pest management is set at 89%. Figure 15 presents a list of the five most prevalent pests and diseases on cocoa farms. Farm households that experience mistletoe, mirids, and/or black pod disease are statistically significantly more likely to use pesticides.

Overall, when assessing the (quality of) adoption of the five GAPs (including pruning), 61% of farm households apply them sufficiently. Sufficiently is defined as applying at least four of five of the practices. No statistical regional differences are found.

3.3 Costs of cocoa production

Cocoa production costs correlate positively with GAPs adoption, specifically pest management, and can be considered as on-farm investments to increase cocoa productivity: applying GAPs requires labor and inputs.¹⁹ Cocoa production costs cover multiple areas, including (hiring) materials like inputs and tools, and employment costs relate to the hire of permanent, temporary, and cooperative workers (e.g., for transportation of cocoa).²⁰ On average, cocoa production costs amount to US\$287, which translates into US\$71 per ha of

¹⁹ The cocoa production costs of farm households who adopt at least four out of five GAPs are, on average, US\$17 per ha higher compared to the cocoa production costs of households whose adoption of GAPs is considered 'insufficient'.

²⁰ Unpaid household labor is not included as labor cost.

On average, cocoa production costs amount to US\$287, which translates into US\$71 per ha of cocoa land used. Cocoa production costs per ha represent 12% of cocoa revenue per ha.

cocoa land used.²¹ Cocoa production costs per ha represent 12% of cocoa revenue per ha. No gender differences are found in production costs per ha, but cocoa production costs per ha are negatively correlated with the number of adult household members: households with more adult members spend less on inputs, materials, tools, and labor per ha.

The biggest share of production costs (US\$223) is taken up by inputs and tools. Labor costs are lower at US\$63. The results in Table 7 show that material costs are substantially higher in the south-western region, but labor costs are surprisingly higher in the eastern region (difference of US\$26). Consequently, the difference in total cocoa farming costs between the two regions is minimal and only marginally significant. However, when standardized per ha, the findings show that households in the south-western region spend, on average, US\$19 more on cocoa production per ha than those in the eastern region. This aligns with Rainforest Alliance's findings on GAP adoption, where the proportion of households in the south-west applying GAPs is higher.

Similar to the negative relationship between cocoa land used and cocoa yield, a negative relationship is also found between cocoa land and cocoa production costs (Figure 17). With each additional hectare of cocoa land used (regardless of whether the land is productive or unproductive), cocoa production costs per ha decrease by US\$4. Production costs are also correlated with higher productivity (Figure 18).

Table 7. Cocoa production costs

Cocoa income	Total	Eastern region	South-western region	sig.
Material cost (US\$)	223	183	249	***
Labor cost (US\$)	63	80	53	***
Total farming cost (US\$)	287	262	302	*
Material cost (US\$/ha)	55	39	66	***
Labor cost (US\$/ha)	16	21	13	***
Total farming cost (US\$/ha)	71	59	79	***

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

²¹ Exchange rate used: FCFA626.047 = US\$1 (1st of July 2022: <https://www.xe.com/currencycharts/?from=USD&to=XOF&view=2Y>)

Figure 17. Cocoa production costs by cocoa land used

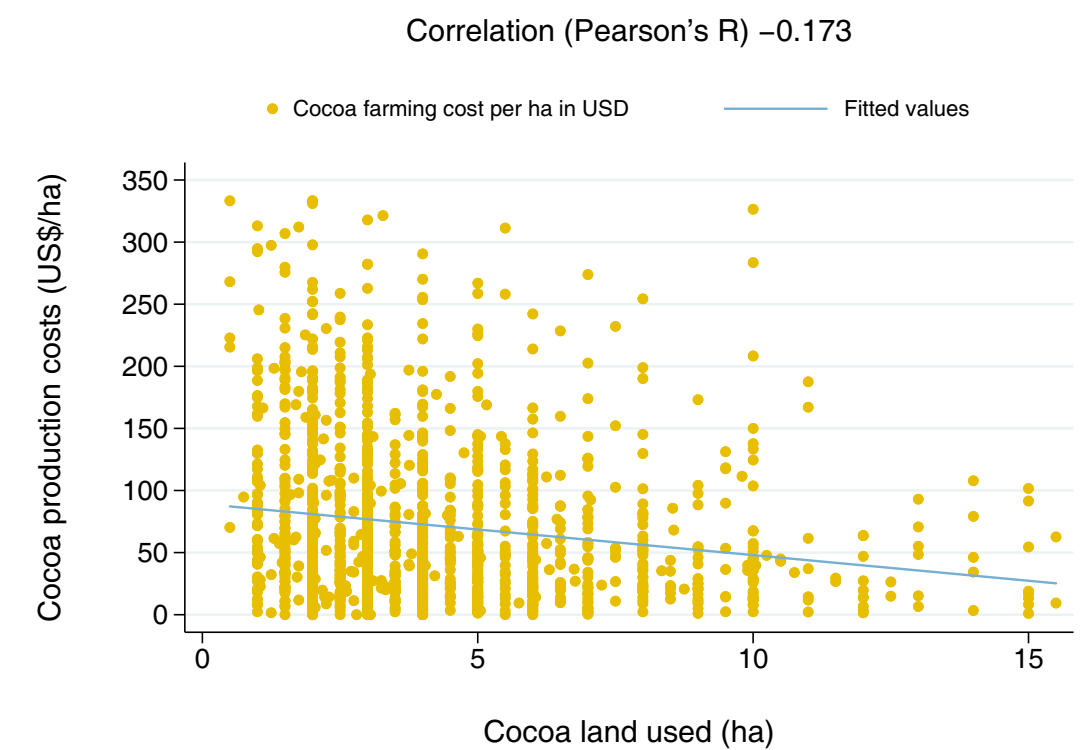
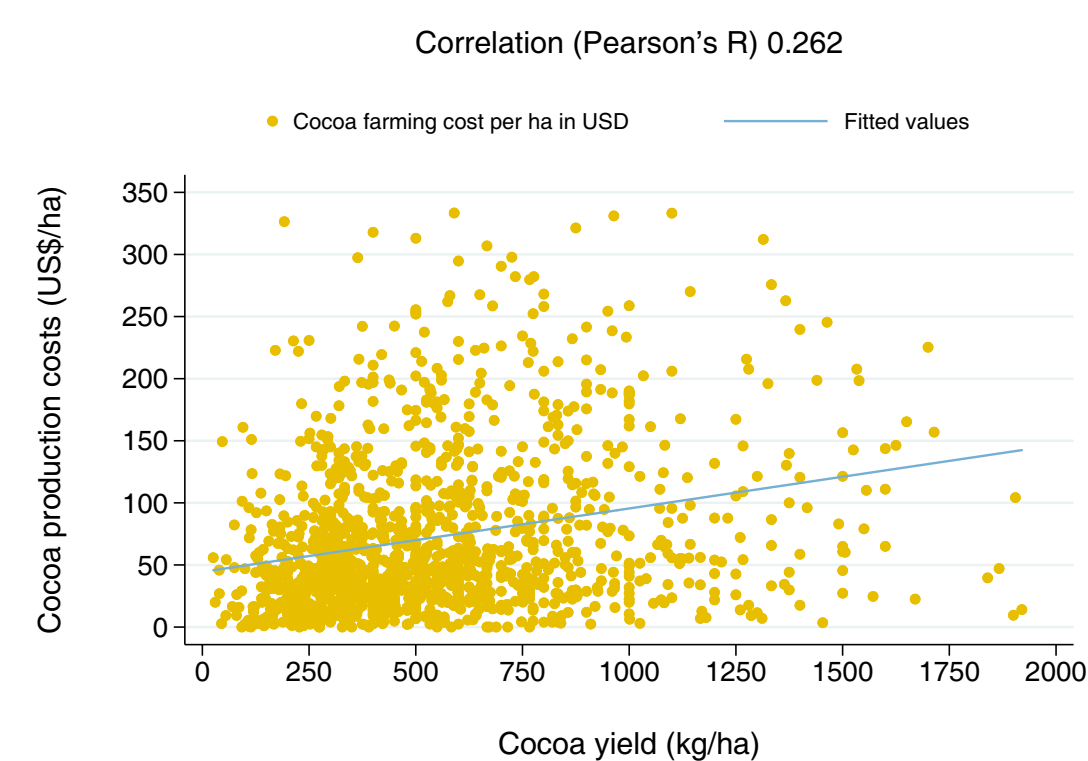


Figure 18. Cocoa production costs by cocoa yield



3.4 Cocoa income

Cocoa production of approximately 2 mt on average per household, minus post-harvest losses, amounts to an average cocoa revenue of over US\$2,700 (Table 8). Households in the south-western region produce more on average, resulting in higher cocoa revenues. Standardized to hectare, cocoa revenues amount to approximately US\$763.²² As yields are higher in the south-western region, they also have higher cocoa revenues per ha. The same applies for male-headed households – who, with higher yield levels, also have higher cocoa revenues per ha (US\$166 difference to female-headed households).

When deducting cocoa production costs from cocoa revenues, the average profit is over US\$2,400.²³ When standardized per ha, the average profit amounts to US\$677. However, Figure 19 and the last four rows of Table 8 illustrate the skewed distribution of cocoa profit – and show that a few households on the right-hand side of the graph have much higher net income levels than most other households. This is mainly the result of having substantially larger cocoa plantations and, consequently, higher production levels. They increase the mean profit from cocoa sales substantially, and a median value of US\$1,886 cocoa profit reveals that 50% of households earn less than this amount. Furthermore, Figure 20 shows that cocoa revenue, costs, and profit reduce with increasing land size.

Table 8. Cocoa income

Cocoa income	Total	Eastern region	South-western region	sig.
Mean values				
Cocoa revenue (US\$)	2,766	2,427	2,967	***
Cocoa net income (US\$)	2,433	2,114	2,619	***
Cocoa revenue (US\$/ha)	763	593	863	***
Cocoa net income (US\$/ha)	677	515	771	***
Median values				
Cocoa revenue (US\$)	2,102	1,716	2,336	***
Cocoa profit (US\$)	1,886	1,450	2,075	***
Cocoa revenue (US\$/ha)	675	499	770	***
Cocoa profit(US\$/ha)	580	436	673	***

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

.....
22 Revenues are based on actual cocoa prices received (as reported by farmers). Post-harvest losses are deducted from production volumes to compute real income levels.
23 Local taxes, interest on loans, and depreciation of assets are not deducted from the cocoa gross revenue to compute cocoa profit.

Figure 19. Cocoa net income in US\$

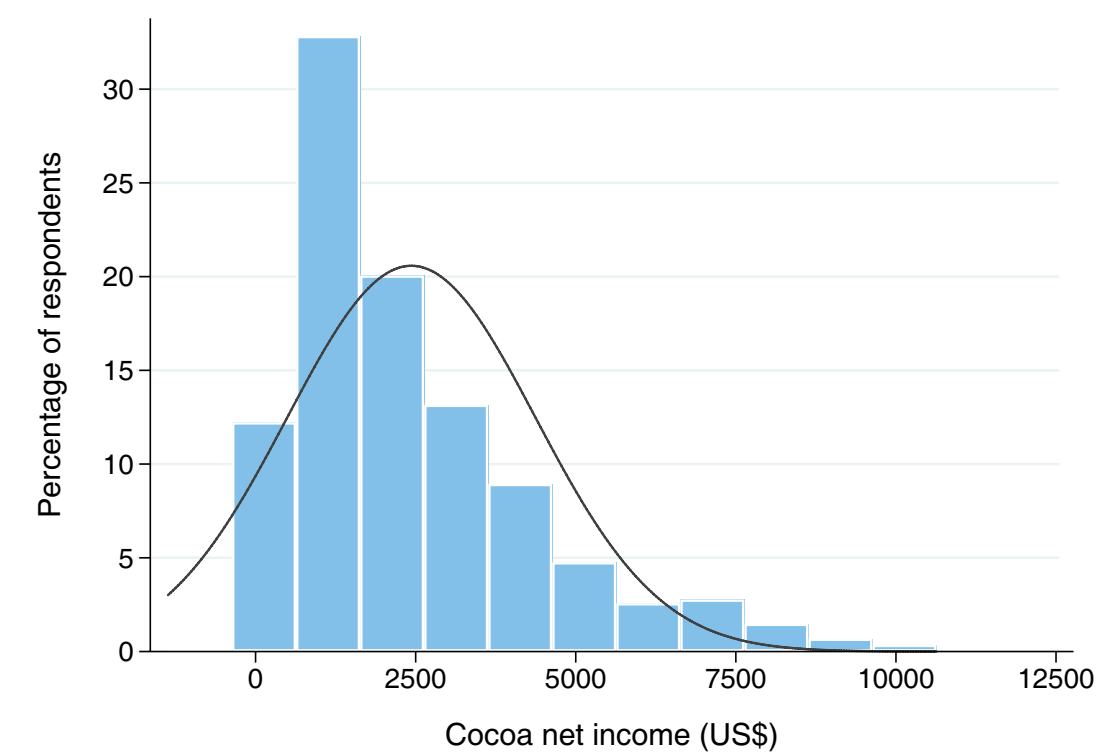
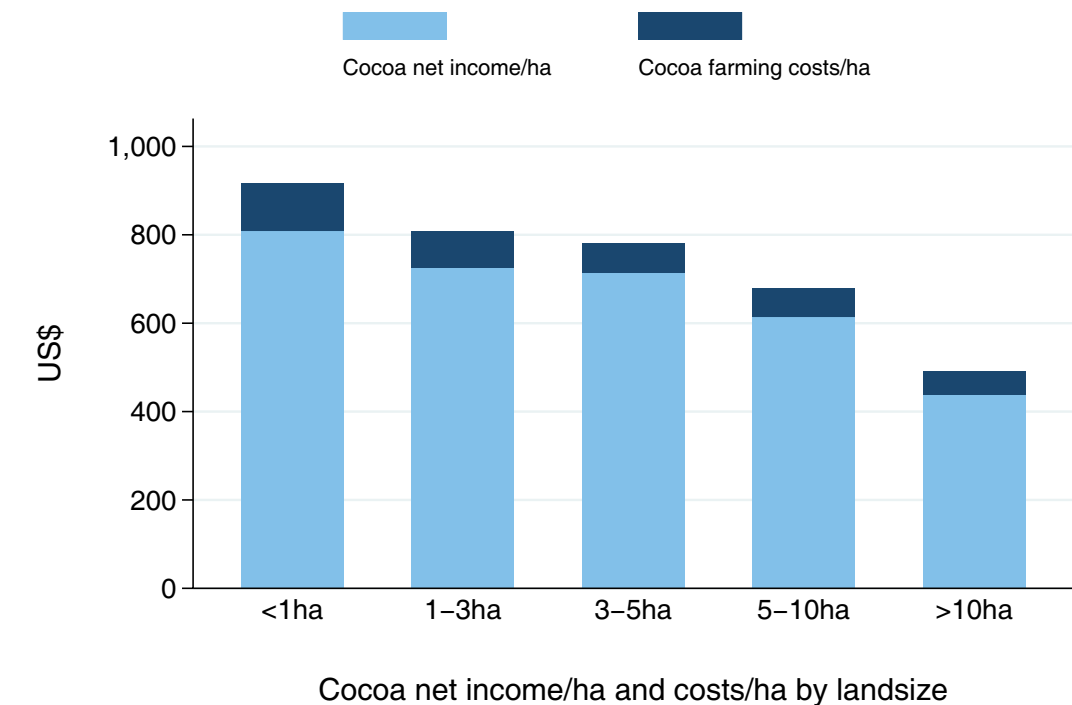


Figure 20. Cocoa income in US\$ per ha





4 Income diversification

Summary

- Almost one-quarter of farming households rely solely on cocoa for income, although households in the eastern region are less reliant on the crop.
- Most households grow at least one other crop, with rubber, groundnuts, cassava, and plantain all popular choices.
- Livestock ownership is important for diversification, but one-quarter of farming households do not own animals. Of those reared, chicken, ducks, sheep, and goats are most popular.
- On average, households engage in 3.6 different income generating activities, but most income is generated on-farm.

This chapter presents the income diversification levels of cocoa farming households, honing in on the dependence on cocoa sales for their income, the sale and importance of non-cocoa crops, livestock ownership, and the number of household income sources.

4.1 Dependence on cocoa sales

Through diversified incomes, households can increase resilience to unexpected events like disease, price volatility, drought, or floods by shifting partially to another income source.²⁴ On average, households rely on cocoa sales for 73% of their total income, which is in line with most other study findings.^{25 26} Figure 21 highlights the importance of cocoa sales to households. Approximately 23% of interviewed households indicate that 100% of their income comes solely from cocoa sales. For 12% of interviewed households, cocoa sales contribute less than 50% to household income. Households in the eastern region rely less on cocoa (64% of their income comes from cocoa sales) compared to households in the south-western region, where, on average, 79% of their income comes from cocoa sales.

Interestingly, households that rely more on cocoa sales for income also have significantly higher cocoa yields. This could signify that, on one hand, these households are more specialized in cocoa, producing higher volumes. Yet, on the other hand, higher volumes automatically increase the share of cocoa sales in total household income.

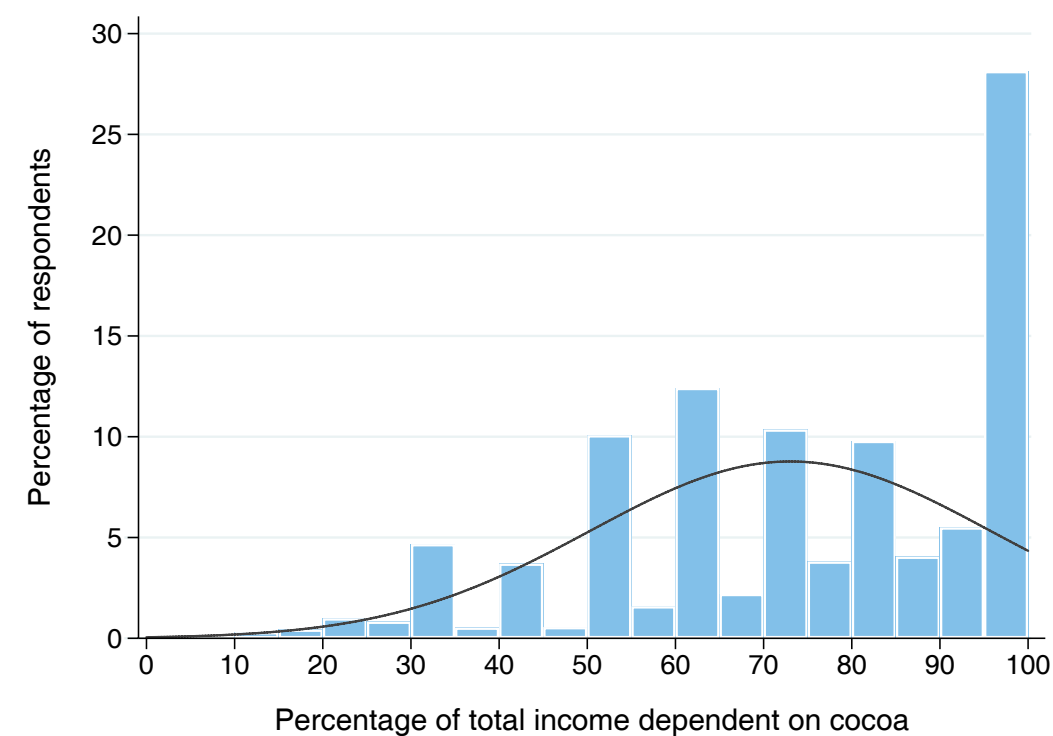
²⁴ FAO. (2016) Rima-II Resilience index measurement and analysis – II. FAO. <https://www.fao.org/3/i5665e/i5665e.pdf>; Aneani, F., Anchirinah, V.M., Owusu-Ansah, F. and Asamoah, M. (2011) *An analysis of the extent and determinants of crop diversification by cocoa (Theobroma cacao) farmers in Ghana*. African Journal of Agricultural Research, 6(18): 4277-4287

²⁵ Impact Institute (2021) Cocoa farmer income. The household income of cocoa farmers in Côte d'Ivoire and strategies for improvement. Fairtrade International. <https://www.fairtrade.net/library/cocoa-farmer-income-the-household-income-of-cocoa-farmers-in-cote-divoire-and-strategies-for-improvement>

²⁶ Bymolt, R., Laven, A., Tyszler, M. (2018) Demystifying the Cocoa Sector in Ghana and Côte d'Ivoire. KIT Royal Tropical Institute. <https://kit2018.wpenegpowered.com/wp-content/uploads/2020/05/Demystifying-complete-file.pdf>

4 Income diversification

Figure 21. Dependence on cocoa sales for income



Households that rely more on cocoa sales for income also have significantly higher cocoa yields. This could signify that, on one hand, these households are more specialized in cocoa, producing higher volumes. Yet, on the other hand, higher volumes automatically increase the share of cocoa sales in total household income.

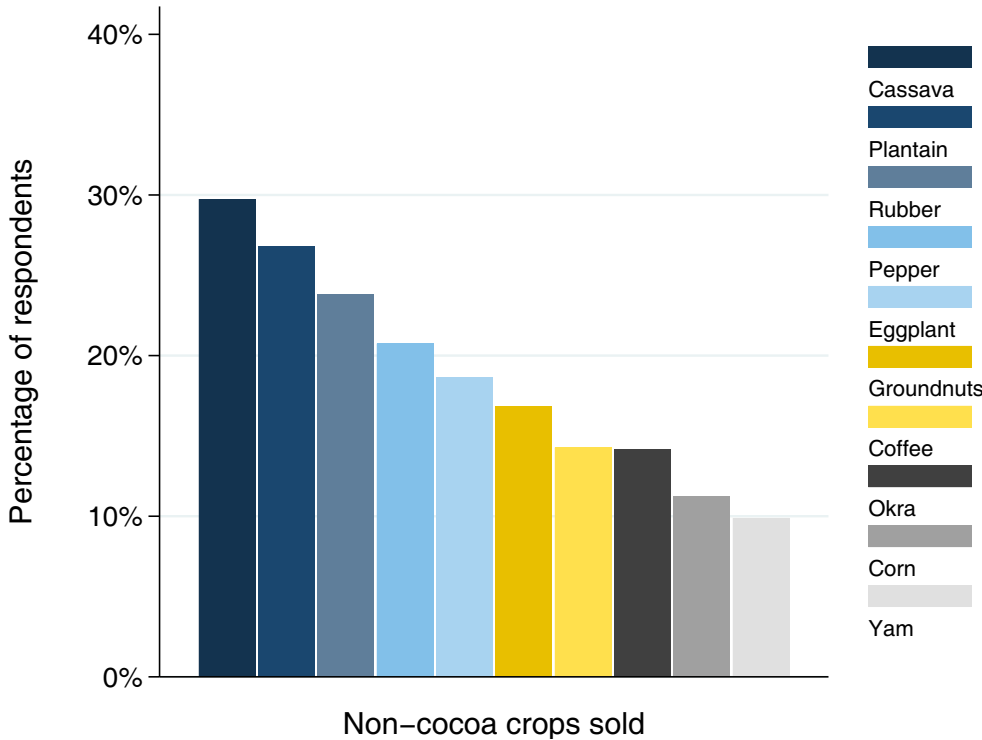
4.2 Non-cocoa crops

Most households grow other crops besides cocoa. Figure 22 shows the 10 non-cocoa crops most often sold. The most popular are food crops like cassava (30%), plantain (27%), and pepper (21%). Of the 10 listed, only rubber (24%), groundnuts (17%), and coffee (14%) are considered cash-crops and, except for rubber, few households sell them. Although obvious, households which also sell one of the 10 non-cocoa crops are less dependent on cocoa sales for their income. This ranges from a 24 percentage point decrease for households selling rubber to a six percentage point decrease for those selling groundnuts.

Selling rubber is more popular among households in the eastern region (42%) than in the south-western region (12%). The same applies for coffee (27% vs. 5%), groundnuts (24% vs. 13%),

Most households grow other crops besides cocoa. The most popular are food crops like cassava, plantain, and pepper.

Figure 22. Ten most sold non-cocoa crops

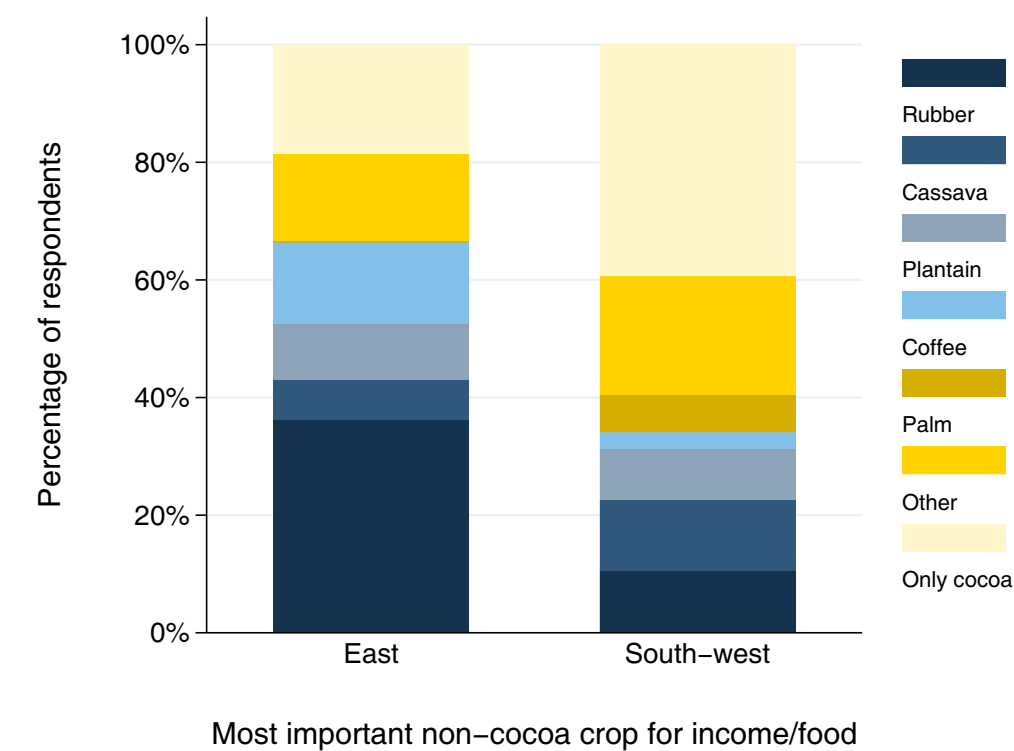


eggplant (25% vs. 14%), peppers (27% vs. 17%), and plantain (39% vs. 19%). This demonstrates that households in the eastern region are less reliant on cocoa sales for income (note that they also produce smaller cocoa volumes, as shown in the previous chapter) and are more involved in selling other crops.

Whether or not an alternative crop is sold does not reveal any volumes or price – and therefore its importance as an income source. Figure 23 lists the importance of non-cocoa crops by region.²⁷ What stands out is that, in the south-western region, 39% of households do not have any other important crop besides cocoa. In the eastern region, this applies to only 19% of households. Moreover, in the eastern region, rubber is the most important non-cocoa crop for 36% of households, while in the south-western region, rubber only bears importance to 11% of households. In the eastern region, 14% of households report coffee as most important, while in the south-western region, coffee is the most important non-cocoa crop for only 3% of households. Interestingly, palm is reported as important in the south-western region (6%), but not in the eastern region (0%).

²⁷ Cocoa is only included in the graph if no other crops are sold.

Figure 23. Most important non-cocoa crop for income



4.3 Livestock ownership

Next to non-cocoa crop cultivation, rearing livestock is another form of on-farm income diversification. However, almost a quarter of households do not own any form of livestock – with lack of ownership being more common in the eastern region. As shown in Table 9, chickens are the most common type of livestock to rear (67% of households), followed by sheep and goats (36%). A limited number of households own a cow or bull (4%).

Owning livestock is important for a household’s resilience thanks to the diversity and substance that various types of livestock offer. The Food and Agriculture Organization of the United Nations (FAO) measures this through the so-called Tropical Livestock Units (TLU) Index.²⁸ This Index assigns scores to different types of livestock based on their weight.²⁹ Figure 24 shows the distribution of TLU across households. The positive skew of the graphs and the few markers outside the top whiskers of the boxplots make clear that very few farm households own many livestock units. The average Index score also shows that the number of livestock units owned is very limited.³⁰ The number is slightly higher in the eastern region as more weight is assigned to cows/bulls, and households in this region have higher ownership of this livestock type.

Table 9. Livestock ownership

Livestock ownership	Total	Eastern region	South-western region	sig.
Owens livestock	77%	73%	80%	**
Owens cows/bulls	4%	6%	2%	***
Owens sheep/goats	36%	38%	35%	
Owens pigs	5%	3%	7%	***
Owens chickens/ducks	67%	63%	70%	**
Owens pigeons/guinea fowls/turkeys	3%	4%	2%	*
Owens rabbits	1%	0%	1%*	***
Owens other rodents	1%	0%	1%	
Tropical Livestock Unit (TLU) Index	0.69	0.84	0.59	*

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

28 Jahnke, H.E. (1982) Livestock Production Systems and Livestock Development in Tropical Africa. https://pdf.usaid.gov/pdf_docs/pnaan484.pdf (accessed December 21, 2018)

29 For weights per type of livestock, see: Njuki, J., Poole, J., Johnson, N., Baltenweck, I., Pali, P., Lokman, Z. and Mburu, S. (2011) Gender, Livestock and Livelihood Indicators. ILRI. <https://cgspace.cgiar.org/bitstream/handle/10568/3036/Gender%20Livestock%20and%20Livelihood%20Indicators.pdf>

30 For example, see: Ojango, J., Audho, J., Oyieng, E., Recha, J., Okeyo, A., Kinyangi, J. and Muigai, A. (2016) System characteristics and management practices for small ruminant production in “Climate Smart Villages” of Kenya. *Animal Genetic Resources*, 58:101–110. doi: 10.1017/S2078633615000417; Ayamga, M., Yeboah, R.W.N. and Ayambila, S.N. (2016) An analysis of household farm investment decisions under varying land tenure arrangements in Ghana. *Journal of Agriculture and Rural Development in the Tropics and Subtropics (JARTS)*, 117(1): 21–34

Figure 24. TLU Index



4.4 Number of income generating activities

When assessing IGAs next to cocoa production, the other main source of income is the sale of non-cocoa crops. As shown previously, households in the eastern region generate more income from non-cocoa crop sales than households in the south-western region. Only a small percentage (3%) of total household income comes from business and trade, while all other sources of income amount to only 3% of household income (see Table 10). Although households have, on average, more than three different income sources, 93% of cocoa farming households' income comes from on-farm activities, in particular crop cultivation. This signifies that all other types of on-farm activities (besides crop cultivation) and off-farm activities (still) contribute little to household income.

Table 10 shows that the average household is engaged in 3.6 different activities. Activities can include growing cocoa; sales of non-cocoa crops (two max.), livestock, fish, bush meat, and land; having a business/trade (including food processing); holding a governmental job;

Although households have, on average, more than three different income sources, 93% of cocoa farming households' income comes from on-farm activities, in particular crop cultivation.

or partaking in any other form of formal employment or paid labor. Households in the eastern region are, on average, engaged in one activity more than households in the south-western region (4.1 vs. 3.2) but, as shown in the demographics chapter, they also have more adult household members to potentially provide more labor. For 23% of interviewed households (also confirmed in the left bar of Figure 25), cocoa is their only source of income, which corroborates the earlier finding of Figure 21 on the proportion of households with 100% cocoa dependence for their incomes.

Figure 25. Number of income sources

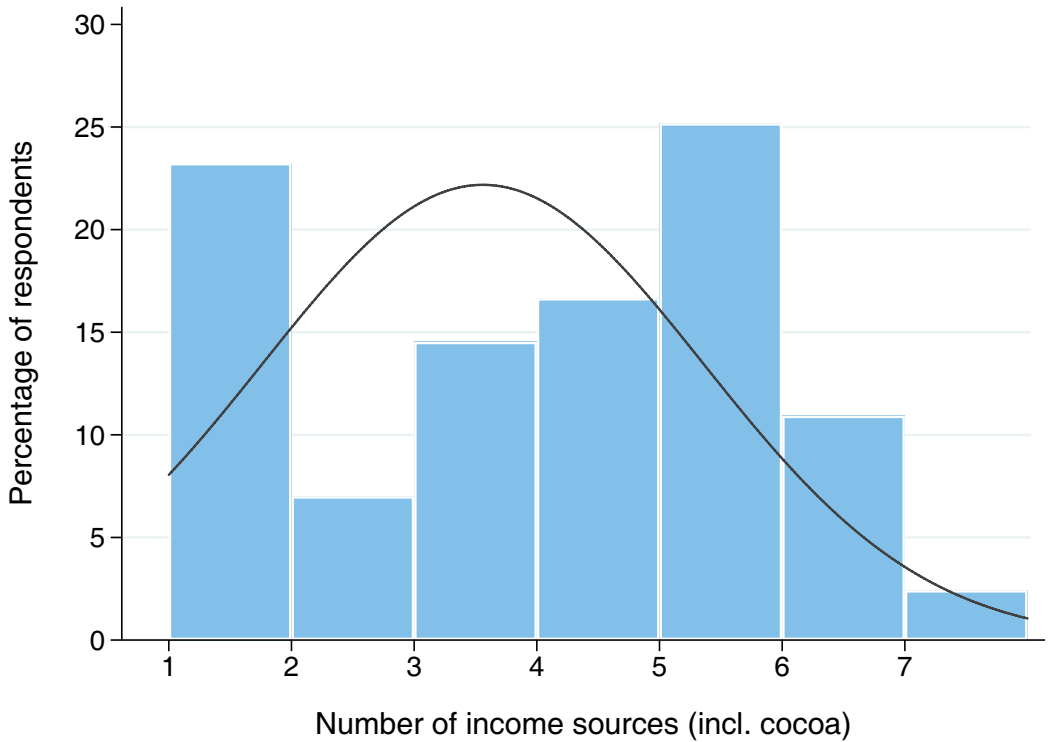


Table 10. Income diversification

Income diversification	Total	Eastern region	South-western region	sig.
Number of income sources	3.6	4.1	3.2	***
Proportion of income from cocoa	73%	64%	79%	***
Proportion of income from business/trade	3%	4%	3%	**
Proportion of income from non-cocoa crops	20%	28%	16%	***
Proportion of income from other sources	3%	4%	3%	**
Cocoa as only source of income	23%	10%	32%	***

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights were applied.



5 Women empowerment, food security, resilience and financial access

5 Women empowerment, food security, resilience and financial access

Summary

- Women can be empowered through higher involvement in income generating activities (IGA) and training. Among the female spouses of male cocoa farmers, 87% of the women involved in at least one activity also declared themselves responsible for this.
- Two-thirds of respondents believe they are resilient to shocks, although objective assessment would suggest the reality is much lower.
- Food security is strongly linked to resilience – and nearly half of farm households reported experiencing at least one month with food shortages in the past 12 months.
- Access to formal financial services is low, while access to informal financial services is high (averaging 72% of households). Households with greater access are more diversified.

This chapter presents socio-economic indicators including female empowerment, resilience, diet diversity and food security, access to formal and informal financial services, and household expenditures.

5.1 Women empowerment

Compared to their male counterparts, female farmers face numerous constraints. The African Development Bank has classified five overall problems: 1) lack of asset ownership; 2) lack of access to financing; 3) limited training; 4) government policies; and 5) time constraints. Many of these are interwoven and likely result in a vicious circle. Lack of access to finance, for example, is partly because women do not have equal access to land or other assets, which in many cases is used as collateral for loans. Moreover, unequal access to training is often a result of time constraints due to excessive working hours both on the land and in the household. In Côte d'Ivoire, women make up 68% of the cocoa labor force, but only earn 21% of the income.³¹

In the IAP, the key area of diversified incomes primarily focuses on women in the household. By expanding existing IGAs or adding new and more profitable ones in combination with GALS training and entrepreneurship training, women's economic empowerment is expected to increase – while diversified incomes are aimed at increasing households' income levels and resilience.

³¹ African Development Bank. (2015) Economic Empowerment of African Women Through Equitable Participation in Agricultural Value Chains. African Development Bank.

Many of these issues faced by women are interwoven and likely result in a vicious circle. Lack of access to finance, for example, is partly because women do not have equal access to land or other assets, which in many cases is used as collateral for loans.

For this baseline survey, 1,477 women were interviewed, of which 1,241 identify as spouses of (male) cocoa farmers. The other interviewed women were either female cocoa producers or female household members in charge of food preparation. In this subsection, we present first the spouses involvement in IGAs, their income levels derived from these activities and time spent on them.³² Then, for all interviewed women, we investigate their participation in decision-making processes, and their overall level of empowerment, as measured through an index.

Half of the interviewed women (50%) from households with more than one income source (i.e., more than cocoa) reported being involved in at least one income generating activity, as shown in Table 11.³³ They participate in almost two activities on average. Cultivating alternative food crops and involvement in business or trade (including food processing) are the most common activities. Among the female spouses involved in at least one activity, 87% also declared themselves responsible for this. Significant regional differences are observed, with a considerable proportion of female spouses involved in – and responsible for – IGAs in the eastern region where, as shown in subsection 4.4, households have more diversified income sources. Female spouses report earning US\$471 on average, on an annual basis.

For programs aimed at promoting diversified incomes, it is important to take note of the time women already spend on IGAs and other (unpaid) household activities. Women dedicate a lot of time to unpaid labor, such as assisting on the farm or with family care-

Among the female spouses involved in at least one activity, 87% also declared themselves responsible for this.

³² The variables on participation in IGAs are limited to only female spouses of male farmers as female cocoa producers are considered a different group of respondents. Moreover, income from IGAs and time spent on activities are only calculated for female spouses responsible for the IGA.

³³ If the primary respondent indicated that cocoa was the only source of income for the household, female respondents (as second respondent) were not asked about their participation in other IGAs.

Table 11. Women's annual economic activity

Women's annual economic activity	Total	Eastern region	South-western region	sig.
Participation in at least one IGA	50%	61%	44%	***
Participation in number of IGA ^a	1.9	1.8	2.0	
Responsible for at least one IGA	44%	51%	39%	***
Number of responsible IGA ^a	1.6	1.5	1.7	**
Annual net income from IGA (US\$) ^b	471	518	433	
Hours per week spent on activities ^b	23	20	24	*

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied. IGA = Income generating activity. Sample is limited to female spouses in households with more than cocoa as IGA. ^a Only for those who are involved in an IGA. ^b Only for those responsible for at least 1 IGA.

taking activities, which might result in 'time poverty'.³⁴ This refers to a situation where women work excessive hours to keep up with their responsibilities. When assessing time spent on IGAs including cocoa, female spouses dedicate an average of 23 hours per week to these activities. Women in the south-western region spend four hours per week more on IGAs compared to women in the eastern region. It is important to emphasize that IGAs do not include unpaid care-taking activities, such as domestic-chores, fetching water, collecting firewood, or caring for family members.

Beyond women's involvement in IGAs, the IAP is also aimed at increasing women empowerment levels by providing GALS and entrepreneurship trainings and setting up VSLAs – with the aim of stimulating female participation in household decision-making



³⁴ Evidence shows that increasing women's decision-making power within the household influences the household's investments more towards care-taking, such as educational and health investments, which then protects children from harm. For example, see: Abdourahman, O.I. (2010) Time Poverty: A Contributor to Women's Poverty? *Journal statistique africain*, 11: 16-37. <https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Time%20Poverty%20A%20Contributor%20to%20Womens%20Poverty.pdf>

Figure 26. Constructing the WEI score^{35 36}

The WEI used in this report follows the Alkire-Foster method, which has also been used to construct the Multidimensional Poverty Index; an index that measures multidimensional poverty in two stages. First, individual item-responses are scored with a 0 (=no) or 1 (=yes), which are then aggregated and averaged in a deprivation score. A higher score indicates a higher deprivation of indicators (i.e., more severely poor). Then, a respondent will be classified as 'multi-dimensionally poor' if this deprivation score is equal to, or higher than, 0.34; suggesting that a respondent cannot be deprived in more than a third of the index's indicators to be considered empowered. This way, prevalence as well as severity are measured. The WEI follows an identical approach, and questions touch upon the following three, equally weighted dimensions:

- **Economic resources**, which include asset ownership (e.g., land, house), access to financial services, and obtaining revenues from IGA.
- **Participation in decision-making** processes, evaluated using the approach of Maiorano and al. (2021), who consider not only actual involvement in the process but also how much women value their participation and their belief about whether their behavior is the norm in their community. Following the ToC, the method focuses on decisions related to investment and use of revenues from agricultural and non-agricultural activities, household's small and big expenditures, children's schooling, and health.
- **The enabling environment** is measured through group memberships and access to training(s) in the last 12 months.

Table 12. Women empowerment

Women empowerment	Total	Eastern region	South-western region	sig.
Deprivation severity	0.44	0.44	0.43	
Proportion of women empowered	38%	41%	37%	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

35 Alkire, S. and Foster, J. (2011) Counting and multidimensional poverty measurement. *Journal of Public Economics*, 95(7-8): 476-487. <https://doi.org/10.1016/j.jpubeco.2010.11.006>

36 Maiorano, D., Shrimankar, D., Thapar-Björkert, S. and Blomkvist, H. (2021) Measuring empowerment: Choices, values and norms. *World Development*, 138, 105220

processes. To elicit women empowerment, an index is constructed that covers (access to) economic resources, decision-making, and enabling environment factors, like social networks and training. This index is computed for all interviewed women. Figure 26 describes how the index is constructed.

The index score (which depicts a deprivation or disempowerment score) ranges from 0 to 1, and the average index score for the women interviewed is equal to 0.44 – which is above the threshold of the 0.34 'disempowered' classification. No significant regional differences are found in women's empowerment between the eastern and south-western region. According to the used methodology, a little above a third of (38%) the women are classified as empowered in the sample (Table 12).

5.2 Resilience

Resilience is defined as 'capacity that ensures adverse stressors and shocks do not have long-lasting adverse development consequences' (Resilience Measurement Technical Working Group, 2014).³⁷ The baseline survey elicits this capacity with both subjective (self-perceived resilience) and objective (quantitatively computed index) measures.

When asked how they would score their ability to cope with shocks (answers are elicited using a four-point Likert scale, ranging from low to very high), two-thirds of respondents (i.e., the household head) who indicated experiencing at least one shock in the last 12 months declared they could handle all or most shocks. Figure 27 shows the distribution of answers by region, with a higher proportion of respondents in the south-western region reporting a lower ability to cope (41% vs 24% in the eastern region). Amongst other reasons, this result might be related to the lower level of income diversification in the south-western region, as households with fewer income sources can be more vulnerable.³⁸

The following shocks are reported as most impactful among households that experienced at least one shock: death of a household member (40%), severe injury or illness (27%), death of a person who financially supported the household (16%), and drought (5%). To cope with these, households resort to using their own savings (78%), calling on their family and friends for help (22%), or taking out a loan (15%).

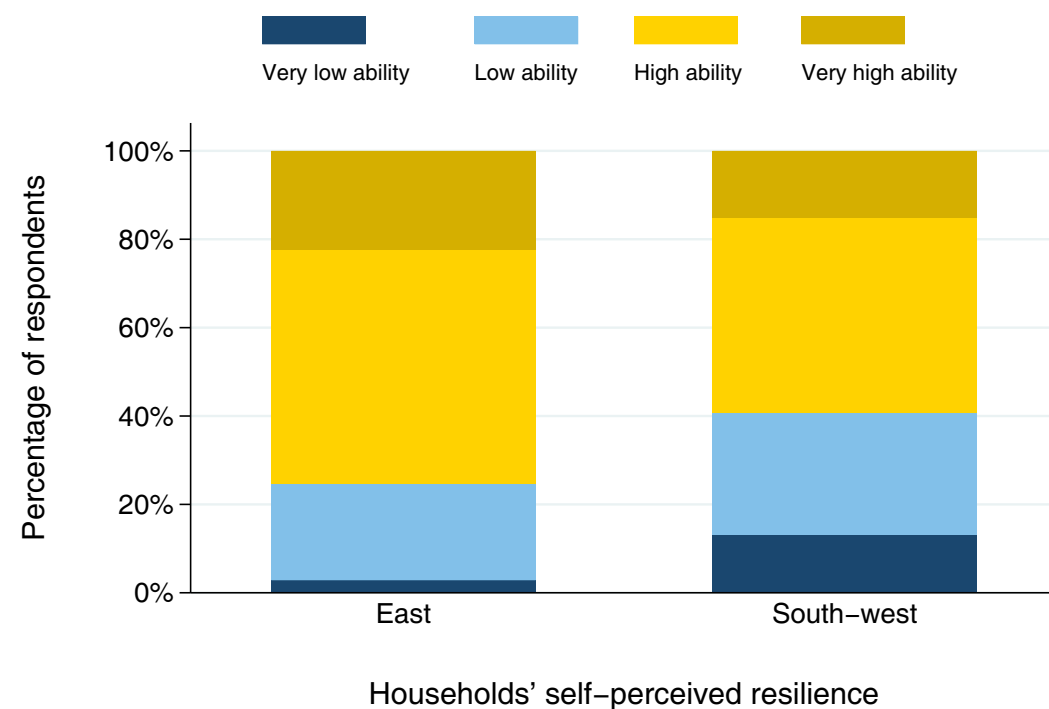
Resilience is defined as 'capacity that ensures adverse stressors and shocks do not have long-lasting adverse development consequences'.

37 Constan, M., Frankenberger, T. and Hoddinott, J. (2014) Resilience Measurement Principles: Toward an Agenda for Measurement Design. Resilience Measurement Technical Working Group, Technical Series 1. Food Security Information Network. <https://reliefweb.int/report/world/resilience-measurement-principles-toward-agenda-measurement-design>

38 The result from an ordered logistic regression reveal that households that rely more on cocoa sales for income are less likely to consider themselves able to cope with shocks. The effect, however, is non-linear (i.e., the quadratic term of cocoa dependence is statistically significant).



Figure 27. Self-perceived resilience



For an objective assessment of household resilience, FAO's Resilience Index Measurement and Analysis (RIMA-II) approach is used.³⁹ This allows for proper quantification of each household's resilience capacity, while also establishing a causal relationship with this and its critical determinants, as well as linking it to food security. Figure 28 summarizes how the Resilience Capacity Index (RCI) is constructed.

39 FAO. (2016) Rima-II Resilience index measurement and analysis – II. FAO. <https://www.fao.org/3/i5665e/i5665e.pdf>

Figure 28. Construction of the RCI

The four components of RIMA-II are constructed using Factor Analysis as statistical method:

- **Access to basic services** indicates a household's ability to access basic services such as schools, hospitals, markets, public transport, etc. Access is elicited as distance to services. The pillar also includes households' improved access to water and sanitation.
- **Assets** is measured through an assets ownership index based on households' ownership of agricultural land, livestock (through the TLU index per household member), and ownership of items like cars, phones, machetes, etc.
- **Social safety nets** describes the social networks available to the household. Included are the receipt of (in)formal transfers (including meals received at school by children), group membership, number of supporting family members, and friend networks.
- **Adaptive capacity** estimates the ability of a household to cope with unexpected events. To construct this factor, several items are included, such as formal and informal levels of education (of the household head and of other household members), income diversification, and household composition (i.e., dependency ratio).

All four components are used to estimate the RCI through a Multiple Indicators Multiple Causes model linking resilience and food security. This last dimension is constructed using a monetary value (monthly food expenditure per capita) and a dietary diversity index (i.e., Simpson Dietary Diversity Index).

Per household, the RCI value ranges from 0 to 100, with higher values indicating higher resilience. The average RCI value in the baseline sample is 29 – and Figure 29 shows that although the distribution of the RCI values seems normal, most households are located on the left side of the index scale. Five percent of the sample has RCI values above 40. Overall, this indicates homogeneity across households within the sample in terms of low resilience capacity.

A significant difference in the RCI value is found between regions. Households in the eastern region score almost five index points higher than those in the south-western region, with 32 and 27 points, respectively. This indicates that, albeit on the lower side, households in the eastern region have a better resilience capacity, which is in line with earlier-presented findings that eastern households have a lower probability of living below the national poverty line (see section 5.1). Interestingly, Figure 30 demonstrates that reliance on cocoa sales for income correlates negatively with RCI score, suggesting that households with more diversified incomes (i.e., less reliant on cocoa sales) are more resilient.

Figure 29. Distribution of RCI

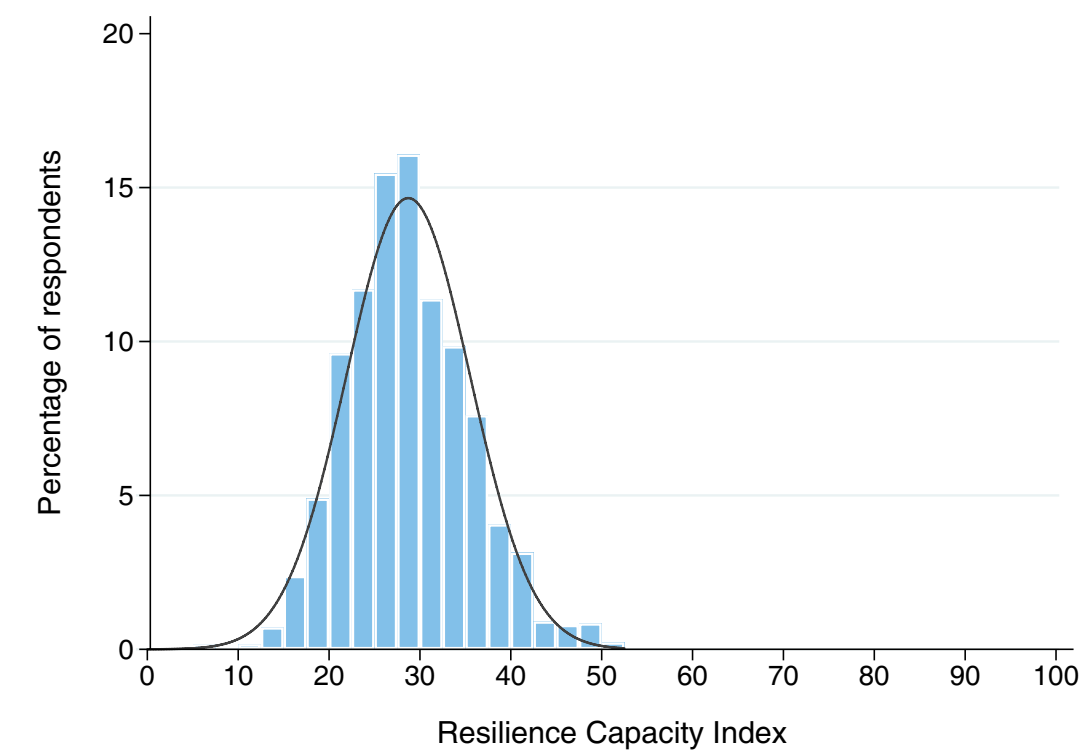
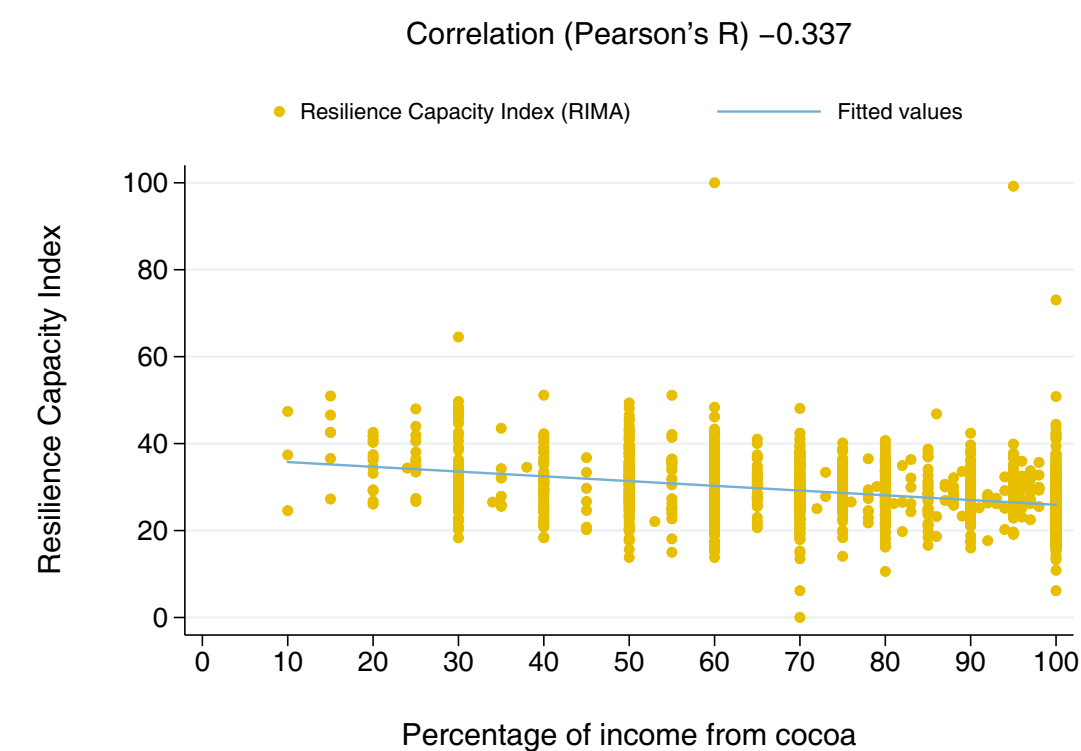


Figure 30. Correlation between RCI and cocoa dependence



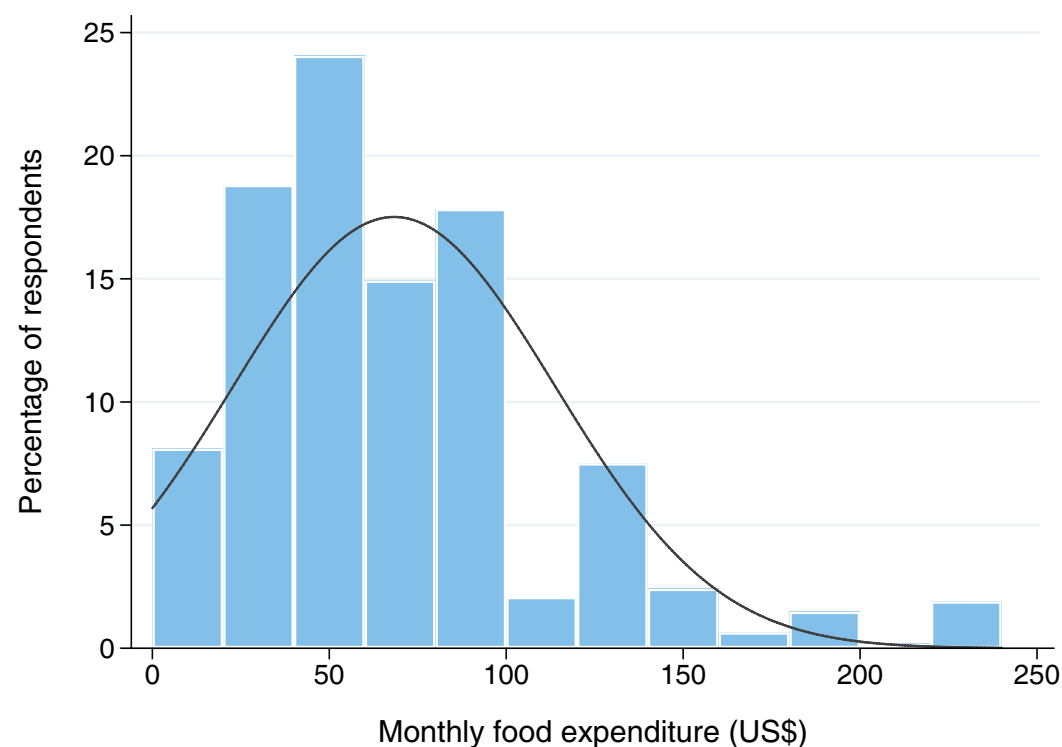
Reliance on cocoa sales for income correlates negatively with RCI score, suggesting that households with more diversified incomes (i.e., less reliant on cocoa sales) are more resilient.

When looking at the individual index component loadings that make up the RCI score, the Resilience Structure Matrix (i.e. part of factor analysis as statistical method) shows that households' resilience capacity is primarily determined by access to basic services (measured in distances in minutes) and asset ownership, with respective contributions of 40% and 32% to the RCI score. The third component is defined as adaptive capacity (determined by the education level of both the household head and other adult household members) and contributes 27% to RCI scores. Finally, the contribution of social safety nets as a fourth component is very minimal (1%) and determined by group membership.

5.3 Food security and dietary diversity

Household resilience levels are closely linked to food security and dietary diversity. Moreover, food security and diversity are demonstrated to stimulate children's growth and lead to better health outcomes, amongst other positive effects. Food security and diversity indicators are quantified as having had at least one month of food inadequacy, and the monthly amount spent by households on food consumption and dietary diversity, as measured through a Simson Index of Dietary Diversity (SIDD). The latter compares the frequency of consumption of 16 food groups vis-à-vis total household consumption. The SIDD takes a value between 0 and 1, with higher values indicating better dietary diversity.⁴⁰

Figure 31. Distribution of monthly food expenditure (US\$)



⁴⁰ Parappurathu, S., Kumar, A., Bantilan, M.C.S. and Joshi, P.K. (2015) Food consumption patterns and dietary diversity in eastern India: evidence from village level studies (VLS). *Food Security*, 7: 1031-1042

Households that experienced at least one month of food shortage have statistically significantly less diversified diets and lower resilience scores (30 vs. 28).

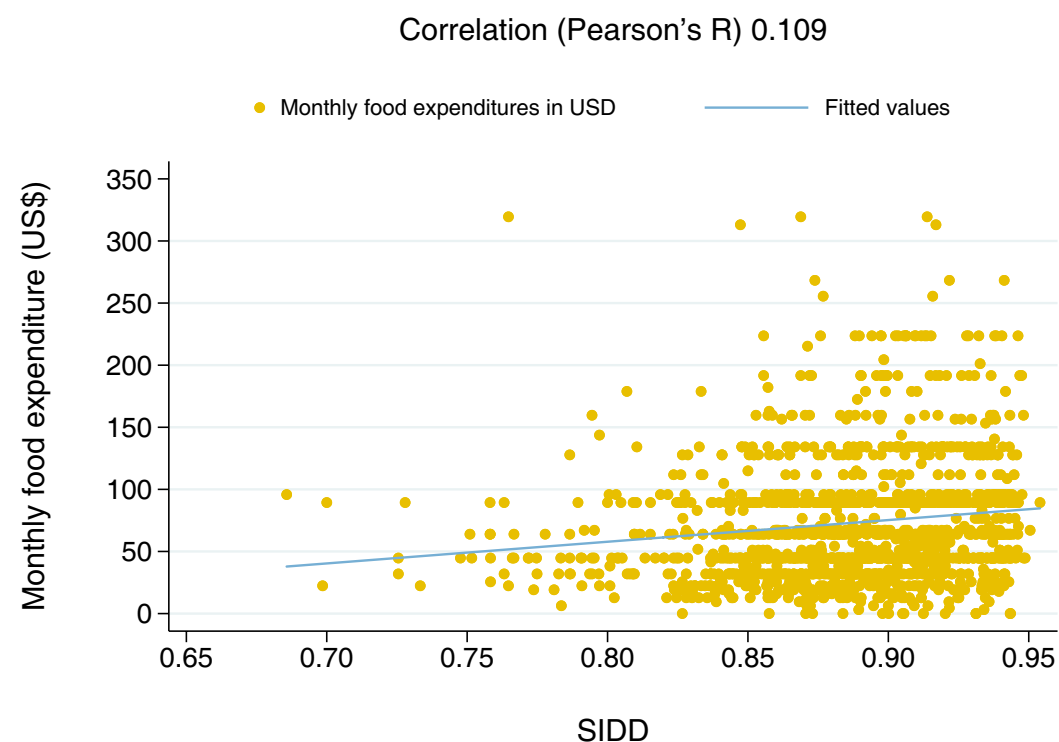
Overall, households' diets are diverse, with index values from 0.68 to 0.96 – indicating that households in our sample consume 68% to 98% of the 16 foods groups weekly. The average score for the sample is 0.89, with households in the eastern region obtaining a significantly higher dietary diversity score.

On average, households spend US\$73 per month on food, and 44% of households experienced at least one month of food shortage in the 12 months prior to interview. Interestingly, that proportion is slightly higher in the eastern region compared to the south-western region (49% vs. 41%, respectively), although households in the eastern region spend, on average, US\$13 more on food per month. Households that experienced at least one month of food shortage have statistically significantly less diversified diets and lower resilience scores (30 vs. 28).

Figure 31 presents the distribution of monthly food expenditures and reveals that most households (82%) spent less than US\$100 per month on food. In fact, the median household spent US\$58 on food. A positive correlation is found between food expenditures and diet diversity scores, as shown in Figure 32. Spending – or being able to spend – more on food correlates with a more diversified diet, although the size of the coefficient indicates this correlation is weak.



Figure 32. Correlation between food expenditures and dietary diversity (SIDD)



Access to (formal) financial services is linked to empowerment, consumption, and the opportunity to invest in IGAs.

5.4 Access to financial services

Access to (formal) financial services is linked to empowerment, consumption, and the opportunity to invest in IGAs. In this section, the households' level of financial access is presented, based on the main respondent's answers, which, in most cases, is a male (as household head). To capture financial access for women, specific questions were asked to the registered female farmer, the spouse of the male farmer, or, in the absence of both, a female household member who is responsible for food preparation. Discrepancies can occur (e.g., higher proportion of women who are VSLA members compared to whether the household is a member of a VSLA in general), as we cannot assume that both spouses are fully aware of other's memberships (i.e., information asymmetry between spouses). Moreover, a woman was not interviewed in every household.

Formal financial services are classified as owning a bank account, having access to a micro-finance institute, or having insurance. These institutions must adhere to certain

Financial inclusion has many benefits, like increasing savings, female empowerment, and consumption and productive investments.

regulations, such as those set by the government or a central bank.⁴¹ Financial inclusion has many benefits, like increasing savings, female empowerment, and consumption and productive investments.⁴² The results in Table 13 show that 8% of households have access to formal financial services.

Informal financial services are developed by non-governmental organizations, development programs, or local informal support groups. They are believed to provide similar benefits as formal financial services, but the informal arrangement relies more on establishing personal relations.⁴³ In this study, informal financial services include VSLAs, informal loaning institutions, mobile money accounts, and informal savings accounts.

Seventy-two percent of households have access to an informal finance source. The proportion of farm households with access to these is statistically significantly higher in the south-western region. This difference is primarily caused by higher membership rates to VSLAs and mobile money accounts. In the south-western region, 75% of households have a mobile money account, while in the eastern region, this proportion is only 28%. More than a quarter of households (27%) do not have access to any financial services, while 6% have access to informal and formal financial services.

When comparing households with formal financial access to those without access, the results show that households with access are more diversified: on average, they have one more income-generating source than those without access, and are, on average, 16 percentage points less likely to depend on cocoa sales for income. They also have more

Slightly over half the women (55%) have access to informal finance sources. The most popular are mobile money accounts (29%) and VSLA savings (25%).

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- 41 Wiyani, W. and Prihantono, E.Y. (2016) Financing the poor: Between Formal and Informal Financial Institutions. *Journal of Economics and Sustainable Development*. 7(6): 59-64.
- 42 Allen, F., Demirguc-Kunt, A., Klapper, L. and Martinez Peria, M.S. (2012) The Foundations of Financial Inclusion: Understanding ownership and use of formal accounts (English). Policy Research working paper; no. WPS 6290. World Bank. <http://documents.worldbank.org/curated/en/348241468329061640/The-foundations-of-financial-inclusion-understanding-ownership-and-use-of-formal-accounts>
- 43 Aliber, M. (2015) The Importance of Informal Finance in Promoting Decent Work Among Informal Operators: A comparative study of Uganda and India. Social Finance Working Paper, 66. International Labour Office (ILO).

diverse diets and higher resilience levels, and a lower likelihood of living below the national poverty line. In contrast, households that resort to informal financial access or have no access to financial services have less income sources, rely more on cocoa sales, have lower resilience levels, and are more likely to fall below the national poverty line.

Table 13. Households' access to financial services

Financial access of household	Total	Eastern region	South-western region	sig.
Access to formal financial services	8%	9%	7%	
Bank account	7%	9%	6%	
Loan with formal institution	1%	0%	1%	
Insurance	0%	0%	0%	
Access to informal financial services	72%	56%	81%	***
VSLA member	14%	11%	17%	**
Savings informal group (e.g., tontine)	3%	1%	5%	***
Mobile money account	57%	28%	75%	***
Loan via VSLA	2%	2%	2%	
Loan via informal group/organization	9%	12%	7%	**

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

Table 14. Female access to financial services

Financial access of women	Total	Eastern region	South-western region	sig.
Access to formal financial services	2%	4%	0%	**
Bank account	1%	2%	1%	
Loan with formal institution	0%	1%	0%	**
Insurance	0%	0%	0%	
Access to informal financial services	55%	51%	58%	**
VSLA member	25%	22%	26%	
Savings informal group (e.g., tontine)	6%	3%	8%	***
Mobile money account	29%	19%	35%	***
Loan via VSLA	5%	8%	3%	***
Loan via informal group/organization	2%	3%	2%	
Membership of VSLA (in months)	12.3	9.8	13.6	**
Amount saved in VSLA in past 12 months (US\$)	106	126	96	
Amount loaned from VSLA in past 12 months (US\$)	129	177	96	**

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

In terms of female access to financial services, the results in Table 14 show that self-reported rates are low. In the south-western region, almost no women have access to formal financial services, while in the eastern region, 2% have access to a bank account (the most popular formal finance modality).

Slightly over half the women (55%) have access to informal finance sources. The most popular are mobile money accounts (29%) and VSLA savings (25%).⁴⁴ Women VSLA members, on average, joined the scheme 12 months previously, and women in the south-western region have been members of VSLAs for longer. Women indicate that they individually saved an average of US\$106 in the past 12 months. VSLA membership correlates positively with the number of IGAs a woman is involved in and has responsibility over. Moreover, women who are members of a VSLA have lower deprivation severity scores, meaning they are more empowered.

Only a minor proportion of women (5%) have taken out a loan with their VSLA,⁴⁵ with the average loan amount being US\$129. This figure is higher compared to what women saved on average, but not all women VSLA members took out a loan. Women who take out a loan save, on average, US\$25 more than women who did not; but the difference is not statistically significant. Moreover, the amount loaned is higher in the eastern than the south-western region.

5.5 Household expenditures

In addition to monthly food expenditures as proxy for food security, the questionnaire also included a section on a variety of expenditures classified into short, medium, and long-term. Such expenditures capture human capital investments and investments in productive means. The first set of expenditures captures weekly costs related to food, beverages, and alcohol/tobacco.⁴⁶ The second comprises monthly expenses such as rent/bills, health, maintenance products, personal hygiene, and transport. The last category includes investment-like expenditures (e.g., children's health and education, household goods) and annual taxes, contributions, and credit repayment.⁴⁷

Table 15 shows that weekly expenditures on food, beverages, and alcohol/tobacco are US\$19, on average (cf. food expenditures excluding alcohol/tobacco for resilience measurement, converted to around US\$18 per week). Monthly expenditures like rent, health, and transport amount to US\$82, while annual expenditures like children's education and household goods average US\$797. In terms of human capital expenditures, particularly

44 The financial inclusion databank of the World Bank reveals that, in 2021, 36% of the rural population in Côte d'Ivoire had a mobile money account, while 30% of all women in Côte d'Ivoire had access to a mobile money account. World Bank (2021) Global Financial Inclusion DataBank. *World Bank* [online]. <https://databank.worldbank.org/source/global-financial-inclusion>

45 The financial inclusion databank of the World Bank shows that 41% of women in Côte d'Ivoire borrowed money. Although that percentage is higher than the proportions reported in this report, the World Bank's definition includes all kinds of loans, whereas the overview here is limited to only VSLAs, financial institutions, and informal groups.

46 These expenditures are made more frequently and therefore measured on a weekly basis to facilitate respondents to comprehend and remember.

47 Outliers in expenditures are removed using a method that defines observations as outliers when their scores are three times the interquartile range (IQR) outside Q1 and Q3.

Table 15. Household expenditures per week, month, and year

Household expenditures (US\$)	Total	Eastern region	South-western region	sig.
Past week's expenditures (7 days)	19	21	18	***
Past month's expenditures (30 days)	82	98	72	***
Past year's expenditures (12 months)	797	795	798	
Household's annual school expenditures	248	262	239	
Household's annual health expenditures	44	45	43	
Household's annual school expenditures (%)	34%	37%	33%	***
Household's annual health expenditures (%)	8%	8%	8%	
Annual school expenditures per child	73	77	70	
Annual health expenditures per child	13	13	13	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

for children's education and health purposes, the results show that households spent, on average, US\$248 on children's schooling; while for children's health, the average spend is US\$44. These amounts represent 34% and 8% of the estimated annual expenses respectively, signifying that school expenditures make up a substantial proportion of households' annual expenditures.⁴⁸ When looking at human capital investments per child in the household, results show the households spent an average of US\$13 on health and US\$73 on schooling.

Similar to the results on monthly food expenditures in section 5.3, households in the eastern region spent more in the past week and month compared to households in the south-western region. However, when considering bigger annual expenditures, the difference is not significant between the two regions. When converting all expenditures to an annual amount, the average household spends approximately US\$2,735⁴⁹ on all the listed cost categories.

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⁴⁸ The averages presented in Table 15 are based on different sample sizes due to missing values on other cost items, so percentages presented might deviate from dividing school/health expenditures by the annual 12 month expenditures.

⁴⁹ This annual expenditure is a rough estimate, assuming that weekly and monthly amounts are representative throughout the year. We therefore calculate it as follows: (52*Weekly expenditures) + (12*Monthly expenditures) + annual expenditures.





6 Child labor prevalence

Summary

- Over 80% of interviewed children currently attend school, with no difference between genders. Of those currently not enrolled in school, over three-quarters have never attended at all.
- Twelve percent of interviewed children engage in light work. However, 40% of all children are involved in child labor – primarily driven by excessive working hours. Those aged 13–14 are more likely to be affected.
- Children who attend school are less likely to be involved in child labor and/or perform hazardous tasks. Those in households which rely more on cocoa for income are also more likely to engage in hazardous labor.

This chapter presents indicators of child labor prevalence among 2,604 children and the type of work they performed.⁵⁰ In each household that participated in the baseline survey, all children aged five to 17 were registered, and a maximum of two children were randomly selected for interview. Ninety-one households did not have any eligible children to interview. In 290 households, only one eligible child could be interviewed, while in the remaining 1,157 households, two eligible children were interviewed.

6.1 Child characteristics

Almost half the children interviewed were girls, with a significantly higher proportion interviewed in the east. On average, the children were almost 11 years old, with no statistical difference between the eastern and south-western region. Eighty-two percent attended school between October 2021 and June 2022. This is in line with the study (2020) conducted by NORC–University of Chicago on school enrolment of children in cocoa-producing households (80%).⁵¹ In each of the three age categories (5–12, 13–14, and 15–17), the same proportion of boys and girls are enrolled in school. Of those not currently enrolled, three-quarters have never attended school. This proportion is 10 percentage points higher in the south-western than in the eastern region. While Table 16 also shows that a vast majority of children (73%) live with both their parents, a considerable proportion of children in the eastern region (21%) live without any parents.

⁵⁰ In total, 3,535 children were interviewed during the baseline survey, but 931 of them were located in the comparison communities. They are not included in the analyses of this report.

⁵¹ Sadhu, S., Kysia, K., Onyango, L., Zinnes, C., Lord, S., Monnard, A. and Arellano, I. (2020a) Assessing Progress in Reducing Child Labor in Cocoa Production in Cocoa Growing Areas of Côte d'Ivoire and Ghana. Technical report. NORC. https://www.norc.org/PDFs/Cocoa%20Report/NORC%202020%20Cocoa%20Report_English.pdf

6

Child labor prevalence

Table 16. Age and living conditions of children

Child characteristics	Total	Eastern region	South-western region	sig.
Age (in years)	11	11	11	
Aged 5-12	68%	68%	68%	
Aged 13-14	14%	15%	14%	
Aged 15-17	18%	17%	19%	
Girl child	49%	52%	47%	**
School enrolment	80%	82%	79%	
School enrolment: aged 5-12 years	80%	82%	79%	
School enrolment: aged 13-14 years	89%	90%	87%	
School enrolment: aged 15-17 years	75%	75%	75%	
Living with both parents	73%	63%	73%	
Living with mother only	8%	10%	8%	***
Living with father only	5%	6%	5%	
Living without any parent(s)	14%	21%	14%	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

6.2 Prevalence of child labor

To assess child labor prevalence, ICI guidelines are followed, based on recommendations from the Côte d'Ivoire Government. In this context, a child is involved in child labor if, during the past seven days, they performed hazardous work or any work for more than the maximum number of hours allowed for their age:

- More than one hour until the age of 12 years old;
- More than 10 hours if aged 13-15 years old;
- More than 40 hours if 16-17 years old.

Work is considered hazardous under legislation in Côte d'Ivoire⁵² if it involves any prohibited task (e.g., manipulating sharp tools, fire, carrying heavy loads, using chemicals products, etc.),⁵³ or if it is done in dangerous circumstances (e.g., for more than 40 hours per week, at night).

For children 13-15 years old, working up to 10 hours per week on non-hazardous tasks is considered light work. The same holds for children aged 16-17, up to the threshold of 40 hours per week. This work could include domestic chores, helping a family business, producing or selling various items, or any other IGA. Light work is not considered child labor. Twelve

⁵² CIV Decree N°2017-016 and 017 MEPS/CAB (2017)

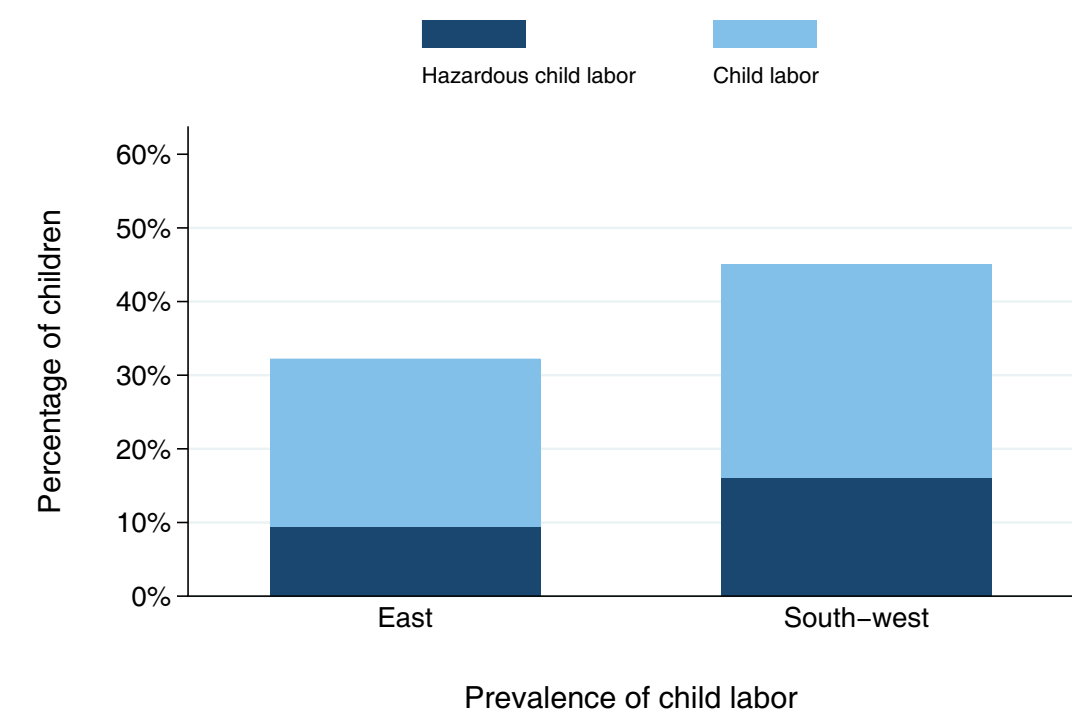
⁵³ International Cocoa Initiative. (2021b) Comparative Analysis of Child Labor Decrees in Cameroon, Côte d'Ivoire and Ghana. International Cocoa Initiative. https://www.cocoainitiative.org/sites/default/files/resources/Comparative-analysis-of-child-labour-decrees-GHA-CIV-CMR_26_05_21.pdf



A child is involved in child labor if, during the past seven days, they performed hazardous work or any work for more than the maximum number of hours allowed for their age:

- More than one hour until the age of 12 years old;
- More than 10 hours if aged 13-15 years old;
- More than 40 hours if aged 16-17 years old.

Figure 33. Prevalence of child labor and hazardous child labor



percent of children interviewed perform light work, with similar involvement among girls and boys (11% vs. 12%).

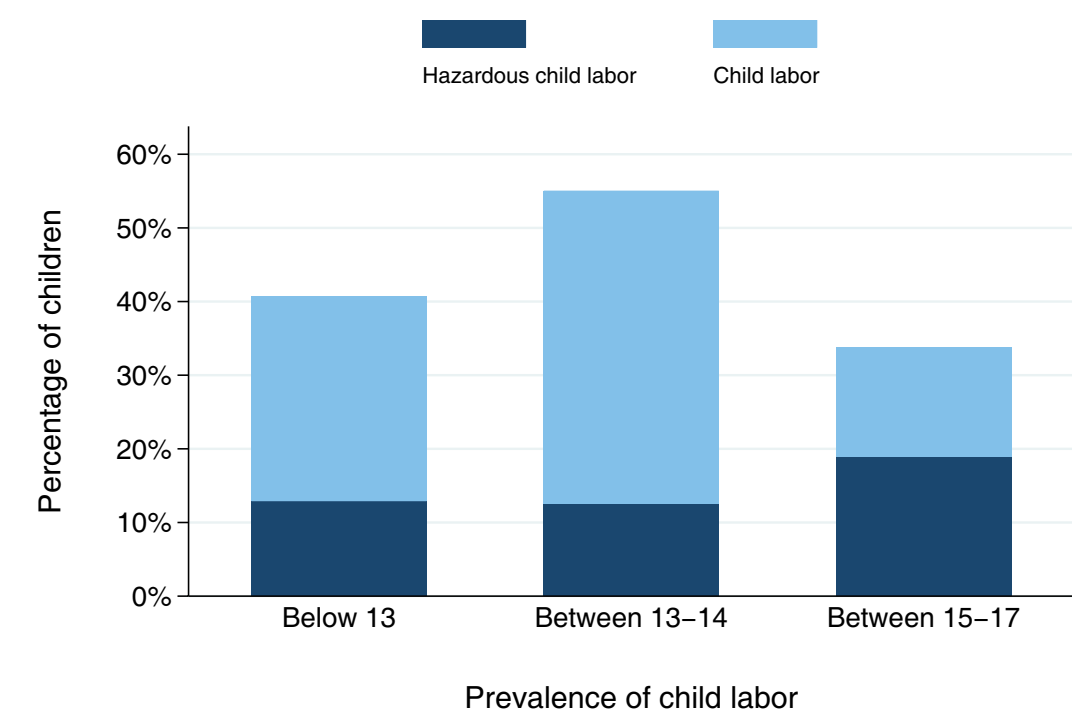
Figure 33 shows the prevalence of different forms of child labor and hazardous child labor. On average, 40% of children are involved in child labor. This is mostly driven by excessive working hours, as only 13% are involved in hazardous work (e.g., tasks in the cocoa field). A significantly larger proportion of boys (16%) perform hazardous work on the cocoa farm compared to girls (12%), while girls are more likely to work excessive hours (44% vs. 35 %). Figure 34, showing child labor per age category, reveals that children aged 13-14 are most likely to be in child labor, while those aged 15-17 are more likely to perform hazardous child labor.

In addition, when examining the relationship between child labor prevalence and school enrolment rate, a negative correlation is found.⁵⁴ This result signifies that school-going

A significantly larger proportion of boys perform hazardous work on the cocoa farm compared to girls, while girls are more likely to work excessive hours.

⁵⁴ Results from a probit regression with child’s age and age-square as control variables, as child’s age is correlated with child labor and school enrolment. Not controlling for age leads to a positive correlation between child labor and school enrolment, which is confounded by child’s age.

Figure 34. Child labor per age category



children are 12 percentage points less likely to perform child labor. Children in school are also four percentage points less likely to perform hazardous child labor.

Interestingly, the time that female spouses work on IGA(s) correlates positively with child labor prevalence, the proportion of children working extensive hours, and the hours that children work in general.⁵⁵ For children not in child labor, the interviewed female spouse (please note that interviewed women are not necessarily the primary care giver, although they are often the spouses of the household head or the household head themselves) work, on average, 23 hours per week on IGAs. For children in child labor, the interviewed female spouse from that household works, on average, almost 26 hours per week. There is no correlation between hours worked by women and children’s participation in hazardous work, which might suggest a substitution effect where work done by women is at least partly substituted by children.

School-going children are 12 percentage points less likely to perform child labor. Children in school are also four percentage points less likely to perform hazardous child labor.

⁵⁵ Sample limited to children from households where the woman interviewed spent time on an IGA.

Low levels of empowerment, IGA involvement, and income levels signify that providing women with support to generate their own income is greatly relevant and necessary.

Low levels of empowerment, IGA involvement, and income levels signify that providing women with support to generate their own income is greatly relevant and necessary. However, to avoid potential effects on children as a result of changing household labor allocation, such services should also offer labor-saving tools and processes. Moreover, programs should increasingly try to involve male household members in household tasks, for example via GALS training.

For hazardous work, a significant positive correlation is found with dependence on cocoa sales for income. Children performing hazardous work come from households that are, on average, six percentage points more reliant on cocoa sales for their income (71% vs 77%).

Significant differences in child labor prevalence are found across regions (Table 17), with child labor more prevalent in the south-western region. Higher poverty levels, lower resilience, and higher dependence on a single income source compared to the eastern region, combined with higher involvement in cocoa farming, may explain this.

Figure 35. Hours weekly worked on IGA by child labor prevalence

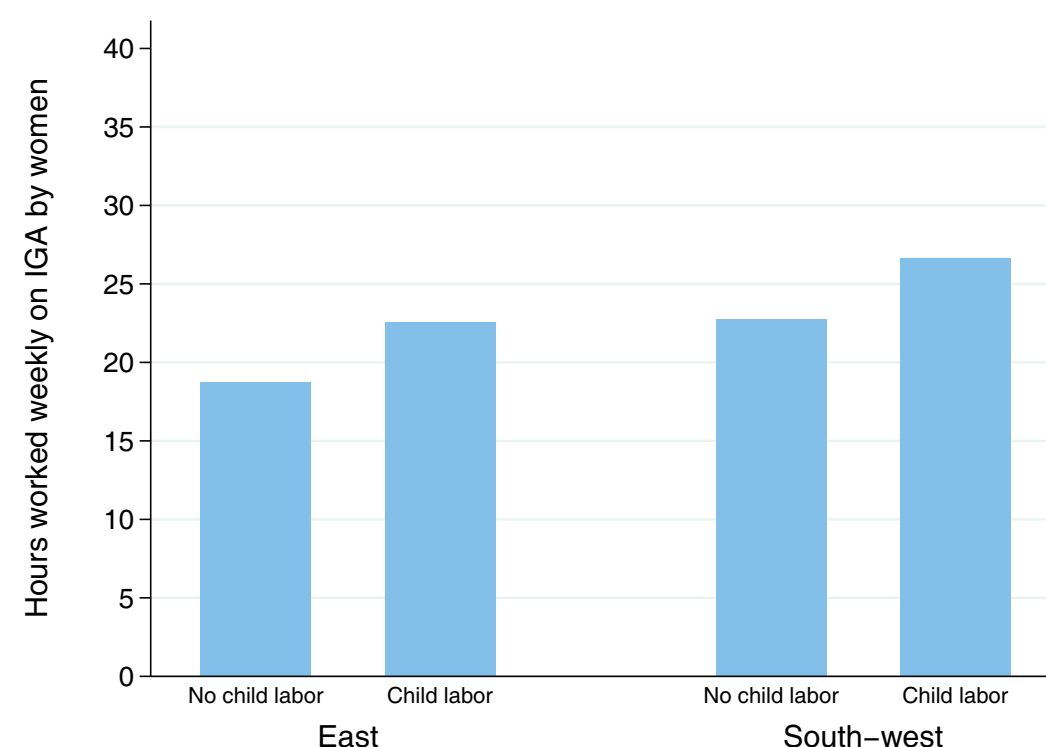


Table 17. Prevalence of different forms of child work by region

Child labor prevalence (%)	Total	Eastern region	South-western region	sig.
Child labor prevalence	40%	32%	45%	***
Hazardous child labor prevalence	13%	10%	16%	***

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

The child labor rate presented here is similar to that in the NORC study (2020), which found a child labor rate of 38%.⁵⁶ However, the 14% prevalence of hazardous work in this baseline survey is lower than the NORC study, which found a prevalence of 37% hazardous child labor for the 2018–2019 crop season in Côte d'Ivoire. Several differences in definition and methodology might explain this discrepancy.⁵⁷

- **High awareness of hazardous child labor in targeted cooperatives:** Since 2019, significant sensitization and education efforts have continued to be implemented in cooperatives in Côte d'Ivoire, through a mixture of government efforts, development programs, and industry sustainability schemes, including CLMRS. These systems were first implemented in the cocoa sector in 2012 and include activities aimed at raising awareness of and preventing, identifying, and addressing cases of child labor. In 2022, CLMRS were estimated to cover around 30% of cocoa-growing households in Côte d'Ivoire.⁵⁸ In the context of these interventions, awareness-raising and case identification are heavily focused around the dangers of hazardous child labor, but less so on work below the minimum working age. These interventions have been shown to have a more significant impact on reducing hazardous child labor than all forms of child labor.⁵⁹
- **Seasonal variations in labor needs:** Since the need for different types of labor varies in response to changing needs throughout the agricultural year.
- **The timing of child labor surveys** influences the prevalence rates found.⁶⁰ Data collection for the NORC study took place in Côte d'Ivoire from 9 February 2019 to 7 March 2019, covering the early mid-crop season. This baseline survey is mainly conducted in July and August, in between cocoa seasons.

56 Sadhu, S., Kysia, K., Onyango, L., Zinnes, C., Lord, S., Monnard, A. and Arellano, I. (2020a) Assessing Progress in Reducing Child Labor in Cocoa Production in Cocoa Growing Areas of Côte d'Ivoire and Ghana. Technical report. NORC. https://www.norc.org/PDFs/Cocoa%20Report/NORC%202020%20Cocoa%20Report_English.pdf

57 The NORC study uses a common child labor definition developed by the Tulane University in 2013 – 2014. In this baseline study, ICI's definition of child labor is used.

58 ICI (2021). Annual report. https://www.cocoainitiative.org/sites/default/files/resources/AW%209003%20ICI%20Annual%20Report%202021%20ENGLISH_FOR%20WEB.pdf

59 Sadhu, S., Kysia, K., Onyango, L., Zinnes, C., Lord, S., Monnard, A. and Arellano, I. (2020) Assessment of Effectiveness of Cocoa Industry Interventions in Reducing Child Labor in Cocoa Growing Areas of Côte d'Ivoire and Ghana. NORC. <https://www.cocoainitiative.org/knowledge-hub/resources/norc-assessment-effectiveness-cocoa-industry-interventions-reducing-child>

60 International Cocoa Initiative. (2021a). Annual Report. International Cocoa Initiative. https://www.cocoainitiative.org/sites/default/files/resources/AW%209003%20ICI%20Annual%20Report%202021%20ENGLISH_FOR%20WEB.pdf

7 Poverty, income and the living income gap

Summary

- Farming households have a 38% likelihood (on average) of living below the national poverty line. Poverty is more prevalent in the south-western region.
- Cocoa farming households earn an average of US\$3,654 per year – which is well below the LI benchmark. Households more reliant on cocoa face a larger LI gap.
- Income diversification and sustainable cocoa intensification can help households narrow their LI gap. Those who produce over 1 mt/ha cocoa are more likely to achieve an LI.
- Households that earn an LI are generally smaller in size, cultivate more cocoa land, produce more cocoa – also per ha – and rely less on cocoa for income.

This final chapter presents household poverty levels based on assets and household characteristics, household income levels and assesses the LI gap using a household size adjusted LI benchmark. It also presents the proportion of households earning an LI and dives deeper into characteristics correlated with the LI gap and earning an LI.

7.1 Poverty Probability Index

Poverty levels are measured using the Poverty Probability Index (PPI), which is built on the logic of poverty indices such as the wealth index proposed by the Demographic Health Surveys Program.⁶¹ Developed by Innovation for Poverty Action, this index uses 10 questions about household characteristics and asset ownership to determine a household's likelihood of living below the national poverty line of Côte d'Ivoire.⁶² As the PPI is based on household characteristics and asset ownership, it provides a measure of (deprived) well-being, while income levels refer to a lack of monetary resources.

When using the national poverty line of Côte d'Ivoire, we find an average likelihood of 38% that a household is living below the national poverty line. This is higher than a score found by another study, which saw an average likelihood of 29% in the more urban district of Abidjan.⁶³ A straightforward explanation for the difference is that this baseline study

⁶¹ Innovations for Poverty Action. (2018) Poverty Probability Index: Côte d'Ivoire. <https://www.povertyindex.org/country/c%3%B4te-d%E2%80%99ivoire>

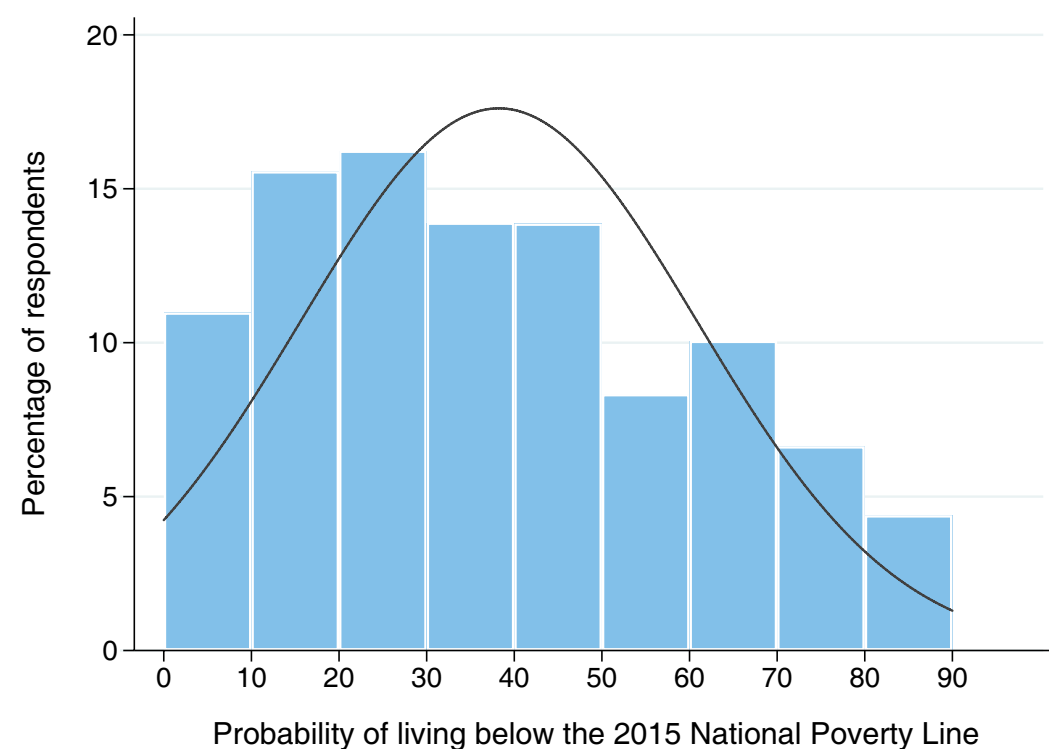
⁶² Although the PPI is an easy-to-use indicator, based on ten straightforward questions, the national poverty lines that are used as comparisons need updating. The most recent Côte d'Ivoire national poverty line was established on the basis of the last population census in 2015.

⁶³ Dupas, P., Fafchamps, M. and Houeix, D. (2022) Measuring Relative Poverty Through Rankings: Evidence from Côte d'Ivoire. Working Paper 29911. National Bureau of Economic Research. <http://www.nber.org/papers/w29911>

7 Poverty, income and the living income gap



Figure 36. Distribution of national PPI



includes households from rural areas exclusively. Figure 36 presents the distribution of the likelihood of living below the national poverty line.

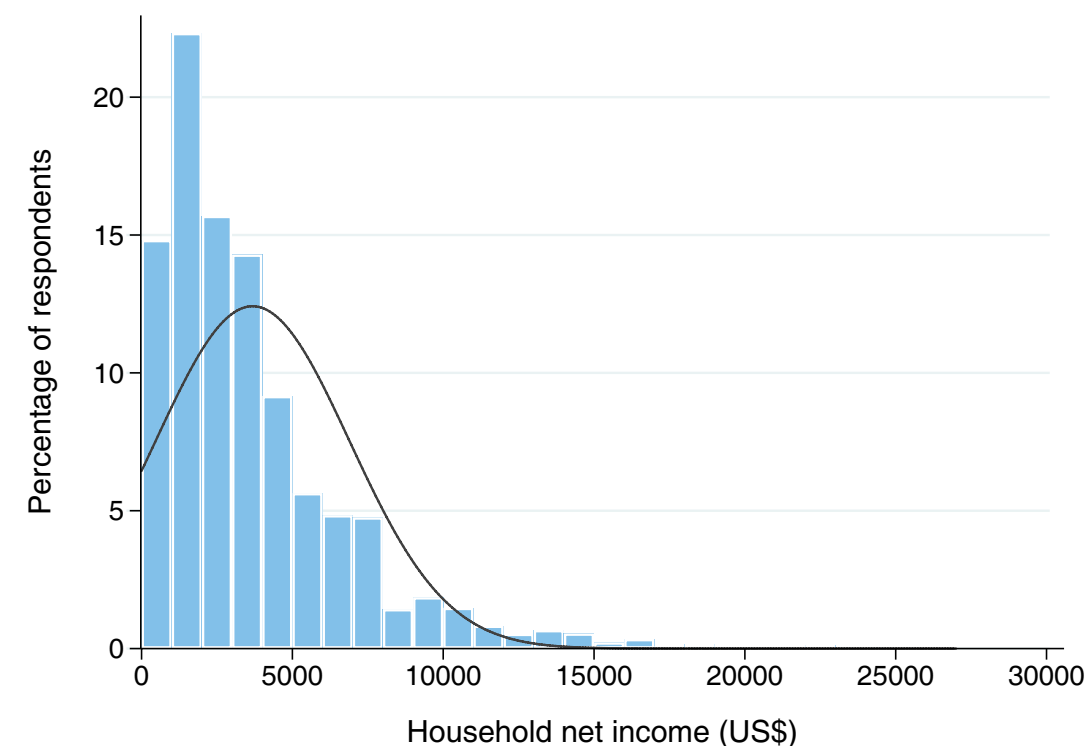
The poverty score is higher in the south-western region, with a likelihood of 46% compared to 26% in the eastern region. The 19 percentage point difference is statistically significant, indicating that cocoa farming households have a higher likelihood of living below the national poverty line when located in the south-western region.

Since the national poverty line is higher than the standard poverty line of US\$1.90 (as per the World Bank), it is unsurprising to find a lower proportion of poor households in the baseline sample when considering the US\$1.90 threshold. Indeed, 19% of households have a probability of living below the poverty line of US\$1.90 per day, which is lower than KIT's Demystifying the Cocoa Sector Study (2018) which found an average likelihood of 26%.⁶⁴ The likelihood of living below the poverty line of US\$1.90 remains higher in the south-western region, with an average probability of 24% compared to 12% in the eastern region.

7.2 Household income

On average, cocoa farming households earned US\$3,654 net in total (i.e., income not limited to cocoa income) in the cocoa campaign 2021–2022.⁶⁵ No differences are found in average income levels between the two regions. The median net household income is US\$2,731, which is almost US\$1,000 lower than the average. Figure 37 plots the net income distribution and reveals a long right-tail, suggesting that a few households have substantially higher income levels than others. The top 5% of farm households with the highest incomes have income levels above US\$10,000.

Figure 37. Distribution of annual net income



⁶⁴ Bymolt, R., Laven, A. and Tyszler, M. (2018) Demystifying the Cocoa Sector in Ghana and Côte d'Ivoire. KIT Royal Tropical Institute. <https://kit2018.wpenginepowered.com/wp-content/uploads/2020/05/Demystifying-complete-file.pdf>

⁶⁵ Total household income is based on real income from cocoa, extrapolated to total income based on the dependence on cocoa sales for total household income. Post-harvest losses are deducted from total production volumes to compute real cocoa income levels.

7.3 Living Income gap

To compute the household size adjusted LI benchmark, the methodology proposed by Tyszler and Rios (2020) is followed.⁶⁶ The Living Community of Practice (LICOP) set the LI benchmark for cocoa-growing areas in Côte d'Ivoire at FCFA298,983 per month in June 2022.⁶⁷ This raw benchmark is adjusted for household size using the Organization for Economic Cooperation and Development (OECD) equivalence scale.⁶⁸ Normally, the benchmark would need adjusting using the Consumer Price Index (CPI) provided by the International Monetary Fund to correct for inflation over time; but as the benchmark was updated one month before data collection commenced, no CPI correction was needed.⁶⁹ Using the exchange rate of FCFA626 .047 = US\$1, this amounts to an adjusted LI benchmark of **US\$7,451** for the current sample of farm households.⁷⁰ The benchmark in the east is higher than in the southwest, as households in the former region have more (adult) household members.

Table 18 presents the average and median LI gap. On average, households have a net annual income US\$3,673 below the LI benchmark. The median LI gap is larger and set at US\$3,750. The median net income and LI gap are statistically significantly smaller (larger) for households in the eastern region compared to in the south-west. Twelve percent of households earn an LI, and household income levels represent, on average, 55% of the total LI benchmark.

Table 18. Household income and LI gap

LI gap	Total	Eastern region	South-western region	sig.
Household net income (US\$) – mean	3,654	3,831	3,551	
Household net income (US\$) – median	2,731	2,681	2,744	***
LI gap (US\$) – mean	3,673	3,954	3,508	
LI gap (US\$) – median	3,750	4,084	3,576	***
Proportion of households earning an LI	12%	12%	12%	
Household net income as % of LI benchmark	55%	56%	54%	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

66 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.

67 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

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

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

70 The exchange rate for 1st of July 2022, when baseline household survey commenced: <https://www.xe.com/currencycharts/?from=USD&to=XOF&view=2Y>. The LICOP uses an exchange rate of FCFA 628.12 for their benchmark presented in June 2022.

7.4 Living Income gap, diversified incomes, and productivity

Both income diversification (less reliant on cocoa for income, more income sources) and sustainable cocoa intensification (i.e., higher production from the same amount of land) are believed to be among the key areas of intervention to support households in closing the LI gap. Figure 39 shows that households which are more reliant on cocoa sales for income have a larger LI gap. Although cocoa dependence is positively associated with higher cocoa yield levels, cocoa farming households that rely largely on cocoa also have smaller cocoa plots. Consequently, this means that highly cocoa dependent households are more productive but have smaller cocoa plots, and as a result their LI gap is larger.

To explore the association between sustainable cocoa intensification and income levels, cocoa yield is correlated with the LI gap. The results (Figure 40) signify a strong negative relationship between yield levels and LI gap. This means that farm households with higher productivity levels have smaller gaps to the LI benchmark. Moreover, households with a cocoa yield of 1 mt or more per ha have, on average, a smaller LI gap of US\$1,305 (with a difference of US\$2,691 to households who do not produce 1 mt/ha). They are also more

Both income diversification and sustainable cocoa intensification are believed to be among the key areas of intervention to support households in closing the LI gap.

Figure 38 LI gap by region

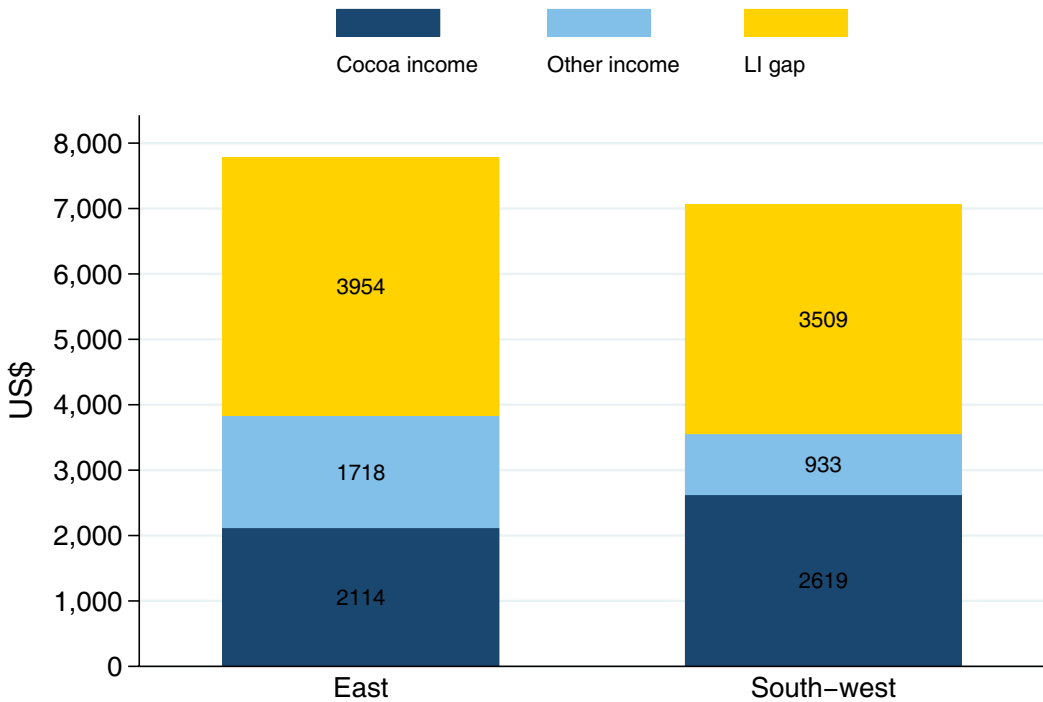
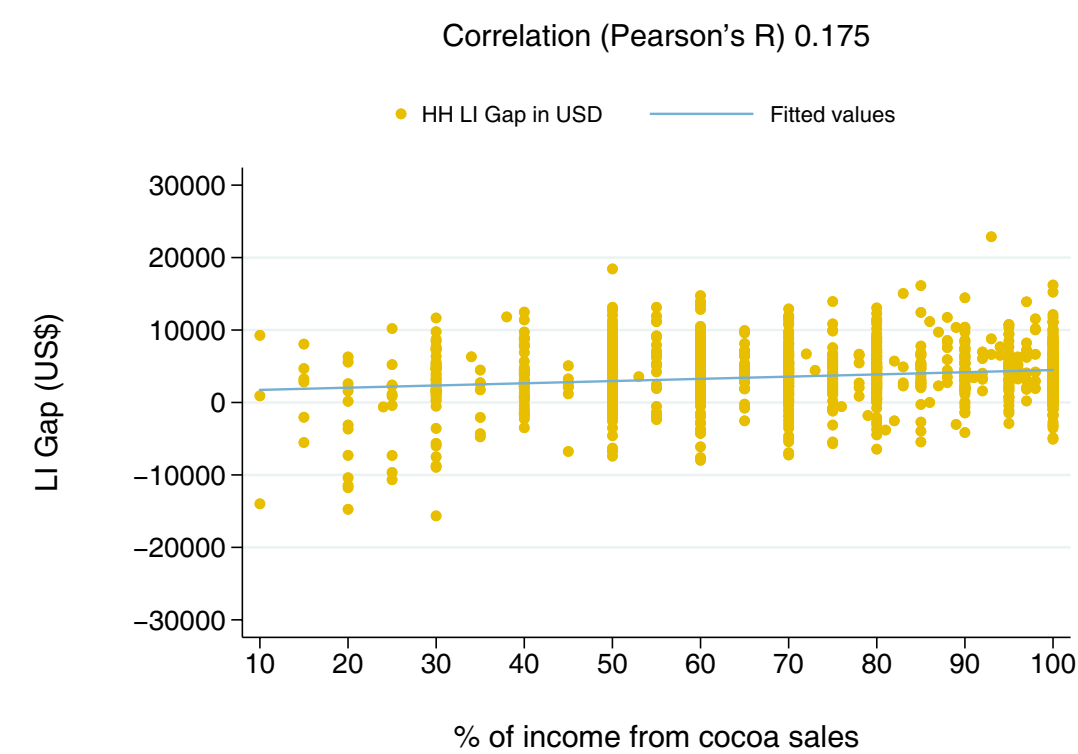


Figure 39. LI gap by cocoa dependence



likely to earn an LI: 9% of households that do not produce 1 mt/ha earn an LI, while 32% of the households that do produce 1 mt/ha earn an LI.

To further understand the determinants of earning an LI, households that earn an LI and the ones that do not are compared on a set of household and farm indicators.⁷¹ The results are presented in Table 19, and three key findings stand out. Firstly, households that earn an LI are smaller in terms of absolute size and members of working age. As household size correlates positively with the LI gap (i.e., it seems that the adjustment for each additional household member is larger than what that member can contribute to income), smaller households have lower LI benchmarks.

Secondly, households that earn an LI have more land on which they cultivate cocoa and produce more cocoa – but are also more productive, with higher yield levels compared to households that fall below the LI benchmark. They also have lower labor costs, which might be explained by the finding that they are more likely to work with sharecroppers (54% vs. 34%).

Lastly, households that are less dependent on cocoa sales for income are more likely to earn an LI. That said, the number of income sources is equal among both groups, suggesting that households that earn an LI do not do more or are more diversified. The fact that a larger proportion of households that earn an LI sell rubber might suggest they are engaged in more profitable alternative income sources.

⁷¹ Indicators that could be impacted as a result of earning an LI, like resilience and diet diversity, are not included in the comparison.

Figure 40. LI gap by cocoa yield

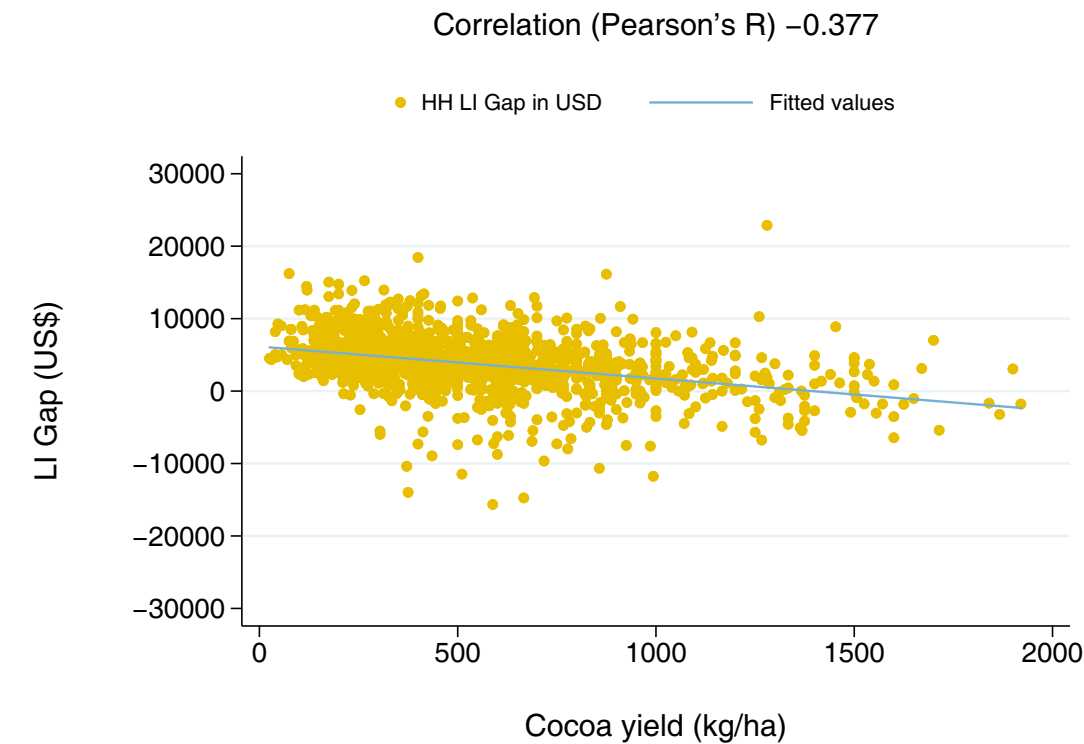


Table 19. Household characteristics below – and above – LI benchmark

Variable	Below LI benchmark (mean)	Above LI benchmark (mean)	sig.
Household head is female	8%	4%	
Age of household head	49	49	
Household size	7.2	5.3	***
Working age members in household	3.9	3.1	***
Years of education of household head	4.4	5.1	
Cocoa production (kg)	1,737	4,351	***
Cocoa yield (kg/ha)	524	881	***
Cocoa land (ha)	4.0	6.1	***
Cocoa farming experience (in years)	20.3	21.8	
Total cocoa labor costs (US\$/ha)	17	11	**
Total cocoa material costs (US\$/ha)	57	61	
Selling rubber (%)	21%	41%	***
Selling coffee (%)	15%	17%	
Dependence on cocoa sales for income (%)	75%	64%	***
Number of income sources	3.5	3.8	

Notes. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For continuous variables, an Adjusted Wald test is used to test for statistical differences. For categorical variables, a Pearson chi-squared test is used. Sampling weights applied.

8 Looking forward

This report presents baseline data on 1,500 cocoa farming households in Côte d'Ivoire. It provides a wide array of information on cocoa production, income diversification, poverty indicators, women empowerment, resilience, financial access, child labor prevalence, and the LI gap. The findings highlight the relevance of the IAP and the need for promoting the four sustainable practices. The following observations are made to help identify potential risks and to improve the implementation of key IAP areas:

- For promoting sustainable practices in the area of diversified incomes, it is important to note that income diversification already occurs – but mostly through on-farm activities. Promoting another, new IGA when households do not want to let go of their current activities (which can be risky) could add to the workload of cocoa-producing households and lead to higher child labor prevalence as labor demands grow. Children might potentially take over responsibility of the new, additional IGA or substituting a caregiver's role around the household, as results suggest. Alternative IGAs promoted should bear strong potential to be more profitable for farm households to invest (timewise and financially) in them. Moreover, when providing GALS and entrepreneurship trainings, it is important to add an element of child labor sensitization that goes beyond a focus on hazardous work as the results in this report show that child labor prevalence is mostly driven by children working excessive hours.
- Eighty percent of children go to school, but this rate is lowest among those aged 5–11. Therefore, verification of the promise to send children to school might be most relevant for this age group. Child labor risks are the most prevalent (66%) among the age group 12–14, but more in-depth findings show that children in school are less likely to perform child labor and hazardous child labor, suggesting that (promoting and incentivizing) school enrolment can be considered an effective instrument to reduce child labor.
- Cocoa plots have, on average, almost nine mature shade trees per ha, and shade from mature shade trees is insufficient on the cocoa plots of 94% of households. Although households have already planted new shade tree seedlings (14 per ha, on average), and weather conditions play a significant role in tree seedling survival, the IAP can support the survival of newly distributed seedlings (20) by helping households to plant seedlings correctly through subsidized labor (pruning) groups. Tree survival can also be improved by keeping the transportation time between nursery and farms limited.
- The set-up of many subsidized and trained pruning groups has significantly assisted farmers with the pruning of their cocoa trees at a large scale. Rainforest Alliance's independent, observational data on pruning quality was collected after the pruning groups completed activities as part of the IAP in March–June 2022. The results are highly promising (on 78% of the visited plots, pruning was done to the highest standard and marked as 'adopted') although substantial differences exist among tier-1 suppliers in pruning quality.

8 Looking forward

- As cash incentives will be transferred via mobile money to ensure transparency, efforts need to be put in setting up and verifying MoMo accounts as access is limited, especially for women. Only 25% of women indicate having an account (which might not be officially verified with an ID card). Moreover, women's VSLA membership and access to a MoMo account correlate positively with the number of IGAs they are involved in and the number of IGAs they have control over. Women who are members of a VSLA and/or have a MoMo account also have lower deprivation severity scores. All this shows the great potential of promoting MoMo accounts and setting up VSLAs to increase financial inclusion and empower women.





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