Swiss Platform for Sustainable Cocoa

Ghana Cocoa Board
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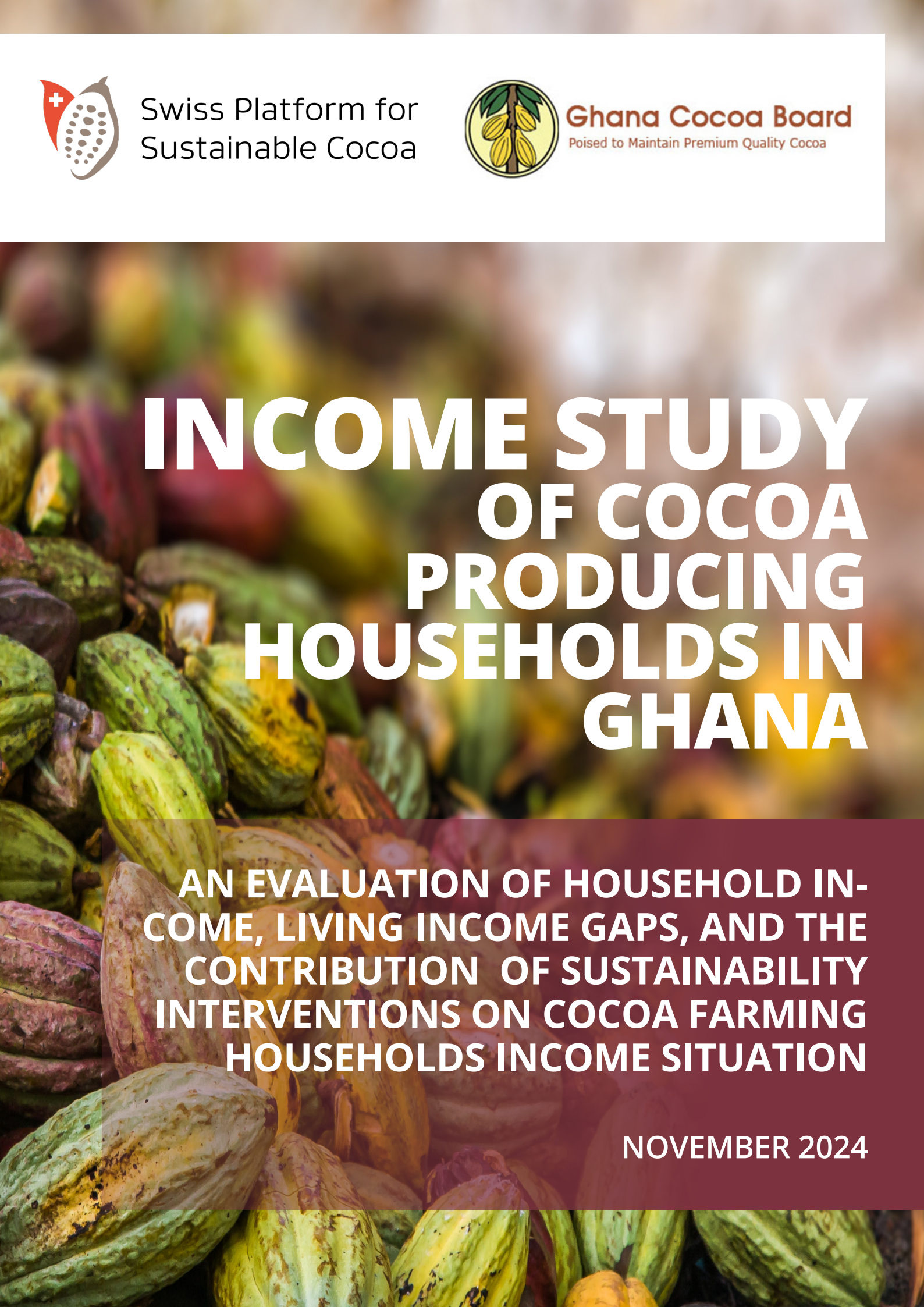

INCOME STUDY OF COCOA PRODUCING HOUSEHOLDS IN GHANA

AN EVALUATION OF HOUSEHOLD INCOME, LIVING INCOME GAPS, AND THE CONTRIBUTION OF SUSTAINABILITY INTERVENTIONS ON COCOA FARMING HOUSEHOLDS INCOME SITUATION

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This publication was prepared by Ghana COCOBOD, the Swiss Platform for Sustainble Cocoa (SWISSCO), and the Research Institute of Organic Agriculture (FiBL).

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ACRONYMS

CHIS	Cocoa Household Income Study
COCOBOD	Ghana Cocoa Board
CPI	Consumer Price Index
DAF	Dynamic Agroforestry
FiBL	Research Institute for Organic Agriculture, Department of Food System Sciences
FGD	Focus Group Discussions
GHS	Ghana Cedi
HAFL	School of Agricultural, Forest and Food Sciences HAFL
LIB	Living Income Benchmark
LICOP	Living Income Community of Practice
LID	Living Income Differential
LIRP	Living Income Reference Price
OECD	Organisation for Economic Co-operation and Development
SDG	Sustainable Development Goal
SWISSCO	Swiss Platform for Sustainable Cocoa
USD	US Dollar

EXECUTIVE SUMMARY

The Swiss Platform for Sustainable Cocoa (SWISSCO), in collaboration with the Ghana Cocoa Board (COCOBOD) and other partner institutions such as FiBL and HAFL, conducted a joint study to assess the current income situation of cocoa farming households in Ghana.

The study builds on the extensive lessons learned and guidance provided by the Living Income Community of Practice, as well as the recently published Cocoa Household Income Study approach (Van Der Haar et al., 2024), which offers a sector-wide framework for evaluating the living income status of households in the cocoa sector.

The specific objectives of the study were to:

1. estimate the average household income of cocoa farmers in Ghana;
2. quantify the living income gap among cocoa farmers in Ghana;
3. estimate the living income reference price at the farmgate level;
4. assess the determinants of household income for cocoa farmers in Ghana; and
5. evaluate how selected sustainability interventions supported by SWISSCO and its members affect the household income situation of cocoa producing households.

The study surveyed 600 farming households and did 22 focus group discussions in all Ghana cocoa-producing regions on their 2022/23 harvest.

The study found that cocoa farming households in Ghana earn an average annual income of GHS 24'814 (USD 2'021) with cocoa being the largest contributor to household income, accounting for an average of 55%.

The findings reveal that the majority of cocoa farmers, specifically 91% of those surveyed, earn an income below the adjusted Living Income Benchmark i.e. GHS 52'970 (USD 4'315), highlighting the significant economic challenges faced by cocoa farmers in Ghana. On average, households experience a living income gap of GHS 28,132 (USD 2,291) per year, representing 53% of the adjusted living income benchmark.

The estimated Living Income Reference Price (LIRP) at the farmgate level was GHS 51.29 per kilogram as of April 2024. At the time of the study, the actual farmgate price (FGP) was GHS 12.8, which was subsequently raised in April 2024 to GHS 33.12 per kilogram of cocoa by COCOBOD.

By April 2024, this increase means that the farmgate price would still need to rise by an additional 55% to meet the LIRP and achieve a living income under 2022/23 yield conditions.

With the farmgate price raised in September 2024 to GHS 48.00 per kilogram, it remains insufficient to reach the desired living income. To meet the adjusted LIRP, the farmgate price would need to be GHS 62.7 per kilogram (a 30% increase), based on the 2022/23 yield levels.

The analysis of determinants revealed that years of cocoa farming experience, use of improved cocoa varieties, and higher input and labor costs positively impact productivity.

Larger cocoa cultivation areas, however, are negatively correlated with both productivity and net income per hectare, suggesting that expanding land does not necessarily improve profitability.

On the positive side, income diversification and regional differences also influence net income and living income gaps, with diversification helping to reduce income gaps.

EXECUTIVE SUMMARY

The three SWISSCO sustainability interventions—KOA, Akwaaba, and Sankofa — showed varied contributions to the economic situation of households. The qualitative assessment of farmers' perceptions indicated positive effects not only on income but also on health, community well-being, and education.

The comparative analysis of the income survey revealed heterogeneous trends across various outcome variables, including production costs, cocoa income, and household income, as well as among the different interventions.

However, the relatively small sample size—approximately 50 farmers per intervention—limits the generalisation of the results, and no causal conclusions can be drawn, as neither experimental nor quasi-experimental designs were used.

Based on the study's findings, we strongly urge all stakeholders in the cocoa sector to take the following actions to improve the income situation of cocoa farming households in Ghana.

We recommend implementing a 30% increase in farm gate prices as of September 2024 to help farmers achieve a living income under the 2022/23 yield conditions and to make cocoa production more attractive, particularly to the youth, ensuring the long-term sustainability of the sector.

Productivity levels should be enhanced through improved farming practices, improved cocoa variety selection, and optimized input use. Strengthening producer organizations and promoting income diversification are key pathways to achieve these improvements.

Additionally, targeted support for female-headed households and strategies to reduce production costs, particularly labor, are essential.

INTRODUCTION

Enhancing the socio-economic well-being of cocoa-producing households has been a central objective for stakeholders across the cocoa value chain.

The concept of a Living Income for cocoa farming families is widely recognized as crucial for addressing various sustainability challenges that are closely linked to climate change, deforestation, child labor, nutrition, education, and health.

Ensuring that cocoa farmers receive a Living Income aligns with broader efforts to tackle interconnected issues that affect both the livelihoods of farmers and the sustainability goals of the cocoa industry.

To develop effective strategies for achieving a Living Income, it is essential for stakeholders from both cocoa-producing and consumer countries to share a common understanding of the context in which cocoa producers live.

This joint study between COCOBOD and SWISSCO aims to provide comprehensive insights into the actual household income and Living Income of cocoa farmers in Ghana.

The study is intended to inform regulators, key stakeholders, and partners in the cocoa value chain about the current economic situation of cocoa farmers and their household income status.

This report outlines the primary components of the research, offering a concise overview of the main research objectives, the methodology employed, the results, conclusions, and recommendations.

RESEARCH OBJECTIVES

The main objective of the study is to determine the household income of cocoa farmers in Ghana. Specifically, the study seeks to:

I. Estimate the average household income of cocoa farmers in Ghana

II. Estimate the Living Income gap of cocoa farmers in Ghana

III. Assess the determinants of cocoa productivity, net cocoa income and living income gap of cocoa farmers in Ghana.

IV. Estimate the Living Income reference price at farmgate level.

V. Evaluate the contribution of selected sustainability interventions supported by SWISSCO and its members to the household income of cocoa farmers.

Throughout the research process, a gender lens was applied given the pivotal role of gender dynamics in Living Income outcomes.

METHODOLOGY

This section briefly outlines the methods used to determine the household income of cocoa farmers in Ghana. It includes details on the research design, analytical framework, data collection methods, and ethical considerations.

RESEARCH DESIGN

The study employed a mixed-method approach, combining quantitative and qualitative tools to comprehensively address the research objectives. The methodology draws extensively on established frameworks, particularly the Living Income Community of Practice (LICOP) guidelines and the Cocoa Household Income Study (CHIS) approach (Van Der Haar et al., 2024).

By building on previous work, the study aimed to ensure a well-informed and refined investigation, leveraging lessons learned and established methodologies to estimate the income situation of cocoa farming households in Ghana.

ANALYTICAL FRAMEWORK

The Living Income narrative can be conceptualized as an equation, with income and costs considered on either side of a formula.

On one side,we find the Living Income Benchmark (LIB), which factors in living costs specifically, it estimates the cost of maintaining a decent standard of living for a household[1]. On the other side, there is actual income, encompassing all sources of income and associated costs for a household.

The difference between the LIB and the actual household income represents the income gap (see Figure 1).

Living Income Benchmark

A Living Income benchmark estimates the expenses for maintaining a basic and decent household standard. Given its household-centric nature, the benchmark considers costs pertinent to a typical household, factoring in size and composition.

Figure 1: Visualisation of Living Income Elements

Source: Adapted from LICOP

1 For a detailed understanding of the Living income methodology, see Smith & Sarpong, 2018a.

Importantly, living costs vary significantly by location. Thus, these benchmarks address geographical variations in the cost of living.

The LIB for cocoa regions in Ghana was initially calculated by (Smith & Sarpong, 2018b). They estimated a monthly Living Income of GHS 1,464 for a family of two adults and three children. This benchmark was updated in June 2022 (Anker & Anker, 2022) to account for inflation from 2018 to 2022, resulting in a new monthly Living Income estimate of GHS 2,464 for the same family size.

To compare our data to the LIB, we updated the benchmark by considering the variation in the Consumer Price Index (CPI[2]) from the first quarter of 2018 to the 2022/23 crop season. Following the approach outlined in the CHIS methodology (Van Der Haar et al., 2024), we apply the following formula:

$$\textit{LI Benchmark Q1,2022/2023} = \textit{Original LI Benchmark} * \frac{\textit{CPI Q1, 2022/23}}{\textit{CPI Q1, 2018}}$$

$$\textit{LI Benchmark Q1,2024 (GHS)} = 1'464 * \frac{254.84}{657.43}$$

$$\textit{LI Benchmark Q1,2022/23 (GHS)} = 3'777$$

As a result, the adjusted Living Income benchmark for the 2022/23 crop year is equal to GHS 3'777 per month for a family of two adults and three children.

The benchmark was adjusted based on the household size and composition. To do so, we use the method of the OECD Equivalence Scales. In the case of Ghana, the raw Living Income benchmark was computed for a reference family of five members of two adults and three children.

According to the OECD equivalence scale, this reference family is composed of 2.4 adult equivalent members. This number is obtained by assigning the value 1 to the first adult of the household (usually the head), a value 0.5 to all other adults and children from 14 years old, and a value of 0.3 to all children of 13 years and below.

Household income and Living Income Gap

The assessment of household income was largely aligned to the CHIS approach (Van Der Haar et al., 2024). The calculation of net farm income involves a comprehensive evaluation of various farming activities on the farm, extending beyond cocoa income exclusively. Additionally, production costs, encompassing input related expenses, hired labor and transportation were considered.

Off-farm income reflects earnings generated by household members through non-agricultural activities, encompassing both self-employment and wage employment. Furthermore, additional income sources, such as remittances or land rental income, are also considered.

2 To update the Living Income benchmark, we used CPI data from the International Financial Statistics (https://data.imf.org/regular.aspx?key=61545849). Since data for the first quarter of 2024 is not yet available, we used data from the last quarter of 2023, which is 657.43. The CPI for the first quarter of 2018, the period during which the original Living Income benchmark data was collected, was 254.8. This indicates a 61% increase in the cost of living.

Subsequently, with the estimated household income, the next step involves computing the income gap. This gap signifies the value that a household would need to earn, in addition to their existing income, to adequately meet the estimated LIB (see Figure 1).

Determinants of Income

Various socio-demographic and structural factors, such as education levels, household size, farm size, or access to inputs, impact household's attainment of a living income.

By integrating a comprehensive set of control variables (see Annex, Table A 4), we identified the primary drivers of cocoa productivity (Kg/Ha), net cocoa income per hectare (GHS/Ha), and the Living Income gap (GHS per household member) using an ordinary least squares regression model.

The dependent variables – cocoa productivity (Kg/Ha), net cocoa income per hectare (GHS/Ha), and the Living Income gap (GHS per Household Member) – were log-transformed to address issues related to skewed distributions.

Living Income Reference Price

The data gathered in this study were employed to estimate the Living Income Reference Price (LIRP) at the farmgate level and the Living Income price Differential (LID).

This calculation was conducted in accordance with the methodologies employed by Fairtrade International (Fairtrade, 2019a), which incorporates four key parameters: the cost of a decent standard of living (living income benchmark), sustainable yields (productivity benchmark), viable farm size (to fully employ available household labor), and the cost of sustainable production required to achieve these yields (see formula below).

$$\text{LIRP} = \textit{Cost of Decent Living} + \frac{\textit{Cost of Production}}{\textit{Yields}} * \textit{Productive Cocoa Area}$$

For our analysis, we used data from the household income survey to determine production costs and explored two yield scenarios: one based on actual yields, and another based on sustainable yields[3]. The production costs were left unchanged across the two scenarios.

DATA

The data collection for farmers' actual income involved face-to-face interviews with a sample of 600 cocoa producing households, utilizing a structured questionnaire developed in KoboToolBox.

Moreover, qualitative data were gathered through focus group discussions (FGDs) conducted in each of the seven (7) cocoa regions (see section "Focus Group Discussion" for details) using semi-structured guides.

Sampling Strategy

Our sampling strategy employed a two-level stratified approach. Cocoa farmers were sampled from the database of the Cocoa Management System (CMS).

The database includes data of about 800,000 cocoa farmers across Ghana. During the initial phase of stratification, the sample of farms was determined based on the number of registered farmers in each cocoa region. The approach adopted guaranteed a representative

3 These are determined based on feasible yields, obtained when implementing sustainable agricultural practices. The figure used in the study was taken by (Fairtrade, 2019b).

sample that accurately reflects the diverse characteristics of the cocoa landscape.

Next, within each region, we implemented a secondary stratification to ensure that at least 30% of the farmers included in our study are women. This approach was designed to enhance representation and address the common issue of underrepresentation of female farmers.

Within each stratum, farmers were randomly selected, ensuring that our sample is not biased and accurately represents the gender compositions within these regions. To allow for an evaluation of the SWISSCO interventions, a sample of intervention farmers (approximately 50 for each intervention) were selected randomly from the lists of intervention farmers provided by each of the three projects.

Using Slovin's formula, the sample size was calculated with a 5% margin of error. An additional 10% was added to account for contingencies. Overall, 450 farmers for non-intervention and 150 for intervention groups were surveyed. The data collection took place between February and April 2024, taking the crop season 2022/23 as a reference year.

Outlier Management

Income data exhibits considerable variability, largely due to measurement errors inherent in recording income in context where records are not available, or income comes from many different sources across household members.

To minimize the impact of outliers on our findings, we applied the winsorization technique. Specifically, we adjusted the data by trimming both tails of the distribution of certain key variables, replacing the lowest 2.5% and highest 2.5% of values with the 2.5^{th} and 97.5^{th} percentiles, respectively.

We applied this approach to several key variables: for cocoa income calculations, we winsorized the volume of cocoa produced on owned land, material input costs, and total labor costs.

For other farm-related income, we trimmed data related to income from other crops and livestock. Additionally, we winsorized variables such as total wage income, total self-employment income, and total farm income. This method helps reduce the influence of extreme outliers while preserving the dataset's overall integrity and improving the robustness of our statistical estimates.

Focus Group Discussions

A series of FGD's were conducted to acquire in-depth insights from cocoa farmers regarding their Living Income, standards of living, and perspectives on the most effective strategies for enhancing their overall well-being.

Special emphases were placed on addressing female-headed households, recognizing the unique dynamics and potential vulnerabilities of this specific group within the farming community. Targeted FGD were also carried out with farmers belonging to specific SWISSCO interventions.

The goal of these FGD was to gain insight into the implementation of the specific intervention. In all the producing regions, farmers were randomly selected for the focus group discussions with support from COCOBOD extension officers and project field officers, in the case of SWISSCO interventions. In some instances, two or three additional volunteer farmers who had not been sensitized about the FGD joined the meetings.

A total of 22 FGD across the seven cocoa-producing regions were undertaken (14 non-intervention FGD and 8 for the three SWISSCO

interventions) to gather insights that complement our quantitative data.

Within each region, two FGD were carried out with each male and female group ranging 6- 8 randomly sampled participants. Importantly, we do not have an exhaustive number of workshops to achieve saturation.

The FGD for non-intervention farmers primarily addressed three main topics: sources of income, challenges in improving income, and strategies for improving income. In each focus group, participants first identified and listed the main challenges to improving income and living standards.

They then prioritized these challenges by assigning one point to those with lesser impact and two points to those with the highest impact, with challenges receiving no points considered less relevant.

To streamline data analysis, related challenges were grouped into broader themes and categories. The points awarded to each specific challenge within these categories were summed across all focus groups.

The final presentation in the analysis reflects these themes and categories, with the total score for each category representing the cumulative scores of the individual challenges within it. This approach provides a ranked overview of which barrier categories were considered most pressing from the farmers' perspective for improving their financial situation. The same approach was used for the strategies.

In addition to analyzing the exercises. Qualitative content analysis was used to capture and describe the narratives that emerged during the focus group discussions. Notes were taken during the focus groups to capture the main points discussed and mentioned by the farmers, as well as certain quotes made by the farmers.

The notes were then analyzed to identify specific themes and topics discussed. The themes identified were grouped into categories representing broader themes or concepts that emerged from the notes taken during the focus groups.

The interpretation of these categories provided some background context and additional information to the listed challenges and strategies collected in the two exercises. The notes provided a way of contextualizing certain issues and were used to describe the challenges and strategies collected in more detail and with more context.

For the SWISSCO intervention focus groups, the FGD had a different focus. Participants were first asked to share their experiences since being part of the intervention to elaborate on its outputs. They were then asked to rate the impact of the intervention on the different dimensions of standard of living such as the level of income, sources of income, workload and health.

Finally, the farmers shared their ideas on how the interventions can be improved and further needs that are not addressed so far.

Ethical Considerations

Informed consent was obtained from all participants in both surveys and focus group discussions. For purposes of confidentiality, data were anonymized to protect the participants' identities.

First, we outline the results of the cluster analysis, conducted to categorize farmers into distinct groups based on similar characteristics.

This approach enables a more targeted analysis of income and related factors within each group. Subsequently, all following sections will discuss the results by analytical group, including an analysis of household income among cocoa farmers.

This analysis will detail income from cocoa, outline the overall income structure, compare actual household income to the Living Income Benchmark and identify key determinants of income variables.

This will be followed by a comprehensive section assessing how selected SWISSCO interventions have impacted the income situation of cocoa households, with results presented for each intervention individually.

CLUSTER ANALYSIS OF SOCIO-DEMOGRAPHIC CHARACTERISTICS

To provide a more accurate comparison of cocoa farming household incomes with the LIB and to account for the diverse compositions and livelihood approaches within households, it is advisable to group households.

Following the approach of the cocoa household income study of 2018 in Ghana (Tyszler et al., 2018), we clustered observations on the basis of the sex of the household head and the productive cocoa area[4].

As a result of the hierarchical clustering based on these two variables, we identified four analytical groups: male-headed small-scale (MH - Small), male-headed medium-scale (MH - Medium), female-headed small-scale (FH - Small), and female-headed medium-scale (FH - Medium). The results of the hierarchical clustering analysis[5] are showed in Table 1.

The distribution of the productive cocoa area shows that small-scale farms are less than 2 hectares, while the medium-scale group includes some observations that could be classified as large, as they have productive cocoa areas exceeding 5 hectares.

4 The productive area was reported by the farmers; no data on the age of the cocoa trees was collected.

5 For clustering the “complete linkage” method was used, which considers the maximum distance between clusters to determine their similarity.

Table 1: Cluster Analysis - Grouping characteristics

	All	MH - Small	FH - Small	MH -Medium	FH -Medium
Sample Size *	450	108	57	244	41
Sex of the household Head					
Share of Males	79%	100%	0	100%	0
Share of Females	21%	0	100%	0	100%
Productive Cocoa Land					
Min	0.08	0.08	0.40	2.02	2.02
1st quartile	1.62	0.87	0.81	2.63	2.83
Mean	3.44	1.21	1.10	4.84	4.21
Median	2.43	1.21	1.21	3.64	3.64
3rd quartile	4.45	1.62	1.62	5.67	4.86
Max	27	1.86	1.82	27.00	14.97

Source: Survey data, 2024.
* The cluster analysis was performed only across non-intervention farmers, here intended as farmers who do not participate in any of the SWISSCO co-financed interventions.

Table 2[6] offers a detailed overview of farmer and household characteristics, covering a sample of 450 households, with 21% headed by females. The average age of respondents is 53 years.

Regarding education, 15% have no formal education or only preschool experience, 14% have completed primary education, 49% have attended middle or junior secondary school (JSS/JHS), 18% have secondary or vocational training, and 4% hold higher education degrees.

Respondents average 22.5 years of cocoa farming experience. The average household size consists of 5.03 members[7], including 1.05 members of 13 years and below, 0.5 members aged 14 to 17 years, and 3.29 members aged 18 and above. Additionally, on average 9% of household members live away from home.

6 The data on farm areas is based on the declaration of farmers.

7 Household members are defined as a group of adults and children, regardless of their relationship, who contribute to or are dependent on a shared economic pot. This includes people living in the household for at least six months per year and dependent children who live elsewhere (e.g. in school) and excludes paid laborers who live with the household (CHIS).

Table 2: Descriptive Statistics of Analytical Groups

	All	MH - Small	FH - Small	MH -Medium	FH -Medium
Sample Size	450	108	57	244	41
Farmer and Household Characteristics					
Average Age of the respondent in years	53	51	55	53	58
Education Level: None/ Pre-school	15%	7%	30%	14%	17%
Education Level: Primary	14%	12%	23%	13%	20%
Education Level: Middle/JSS/JHS	49%	55%	44%	48%	41%
Education Level: Secondary/SSS/SHS or Vocational Training	18%	19%	2%	20%	20%
Education Level: Higher (Tertiary)	4%	6%	2%	5%	2%
Average Years of cocoa farming experience	22.5	18	21	23	26
Household Size and Composition					
Average household size (number of household members)	5.03	4.82	3.86	5.44	4.76
Household members aged 13 years and below	1.05	0.91	0.67	1.24	0.85
Household members between 14 and 17 years	0.50	0.55	0.37	0.55	0.34
Household members aged 18 and above	3.29	3.24	2.67	3.47	3.24
Share of People living away	9%	10%	10%	7%	13%
Share of People involved in agriculture	19%	19%	17%	21%	14%
Share of People contributing to the income	16%	20%	14%	15%	11%
Farm Areas					
Average Total farm Area (Ha)	5.25	2.99	1.84	6.92	6.02
Average Cocoa Farm Area (Ha)	4.27	2.21	1.42	5.80	4.59
Average Productive Cocoa area (Ha)	3.44	1.21	1.1	4.84	4.21
Number of Farms	3.25	2.67	2.09	3.83	2.93

	All	MH - Small	FH - Small	MH -Medium	FH -Medium
Farm Areas					
Average Total farm Area (Ha)	5.25	2.99	1.84	6.92	6.02
Average Cocoa Farm Area (Ha)	4.27	2.21	1.42	5.80	4.59
Average Productive Cocoa area (Ha)	3.44	1.21	1.1	4.84	4.21
Number of Farms	3.25	2.67	2.09	3.83	2.93
Share of farmers sharecropping-In	22%	18%	19%	25%	20%
Share of farmers Sharecropping-Out	7%	5%	5%	7%	12%

Source: Survey data, 2024.

On average, 19% of household members are involved in agriculture, and on average 16% of members within a household contribute to the household income.

Cocoa farmers in Ghana have an average productive cocoa area of 3.44 hectares of productive cocoa. In addition, cocoa farmers manage multiple farms, that is, about 3.5 farms with varied tenurial arrangements. About 25% of surveyed households sharecrop in[8] someone else's land, while 6% household sharecrop out[9] some of their land.

HOUSEHOLD INCOME

Net cocoa income

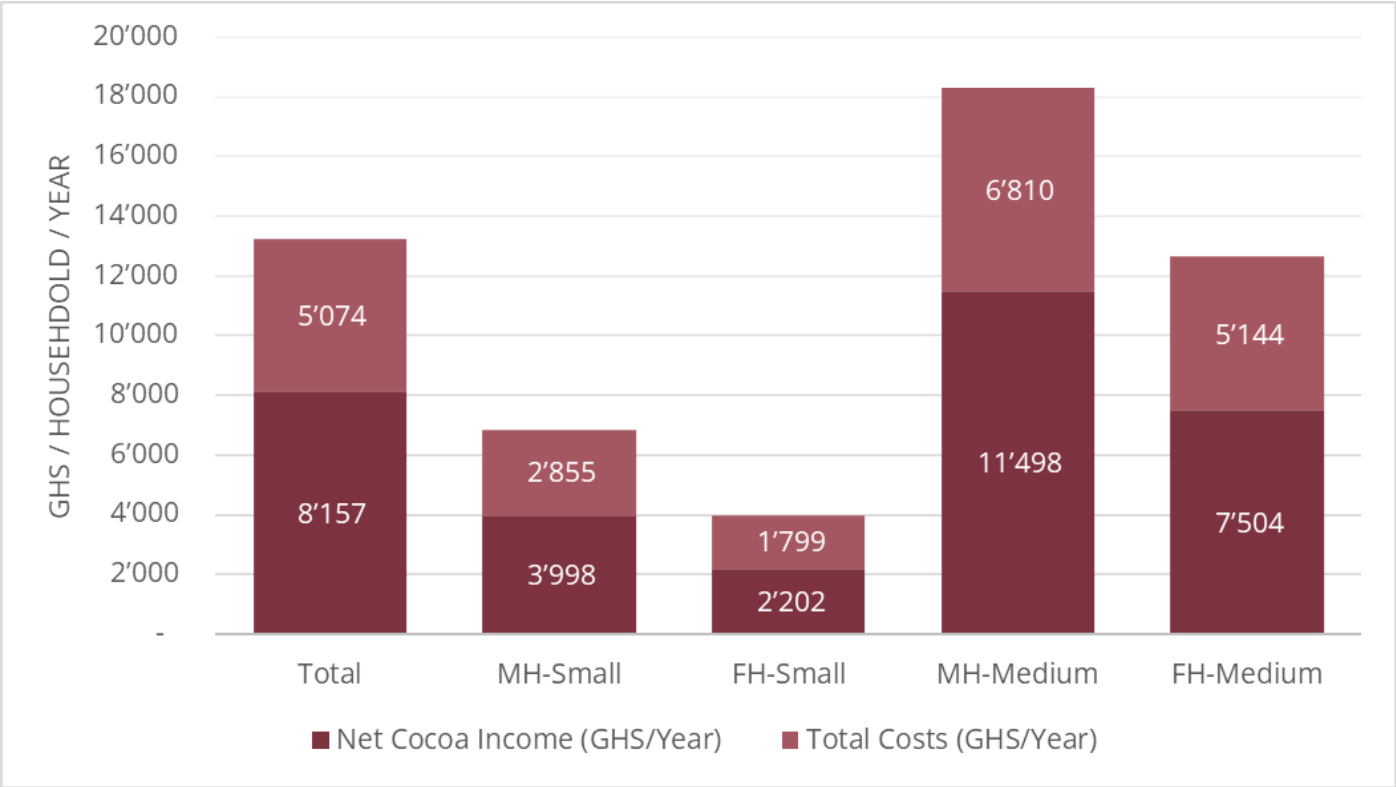
The study estimates the average annual net income from cocoa grown on owned land to be GHS 8'157 (USD 664) per household (see Annex, Table A 1 which provides an overview of the average values of the parameters used in this calculation for each analytical group).

Male-headed, medium-scale cocoa farmers have the highest average net cocoa income at GHS 11'498 (USD 937) per household per year, while female-headed, small-scale cocoa farmers have the lowest household income from cocoa farming at GHS 2'202 (USD 179) per household per year. On a per-hectare basis, male-headed small-scale farmers achieve the highest net cocoa income at GHS 3'845 (USD 272) per hectare.

8 Sharecropping in refers to the land that is owned by another household but cultivated by the respondents' household under a sharecropping arrangement.

9 Sharecropping out refers to the land that is owned by the respondents' household members but cultivated by another household under a sharecropping arrangement

Figure 2: Average Net Cocoa Income from Cocoa Grown on Own Land by Analytical Group



Source: Survey data, 2024.
Note: The figures in the graph do not account for the income from sharecropping arrangements as these apply only to a relatively small share of households in our dataset.

When accounting for cocoa from sharecropping arrangements, the average net cocoa income increases to GHS 11'316 (USD 922) per household per year, representing a 39% increase compared to the net income from owned land alone[10].

Total Value of Cocoa Production

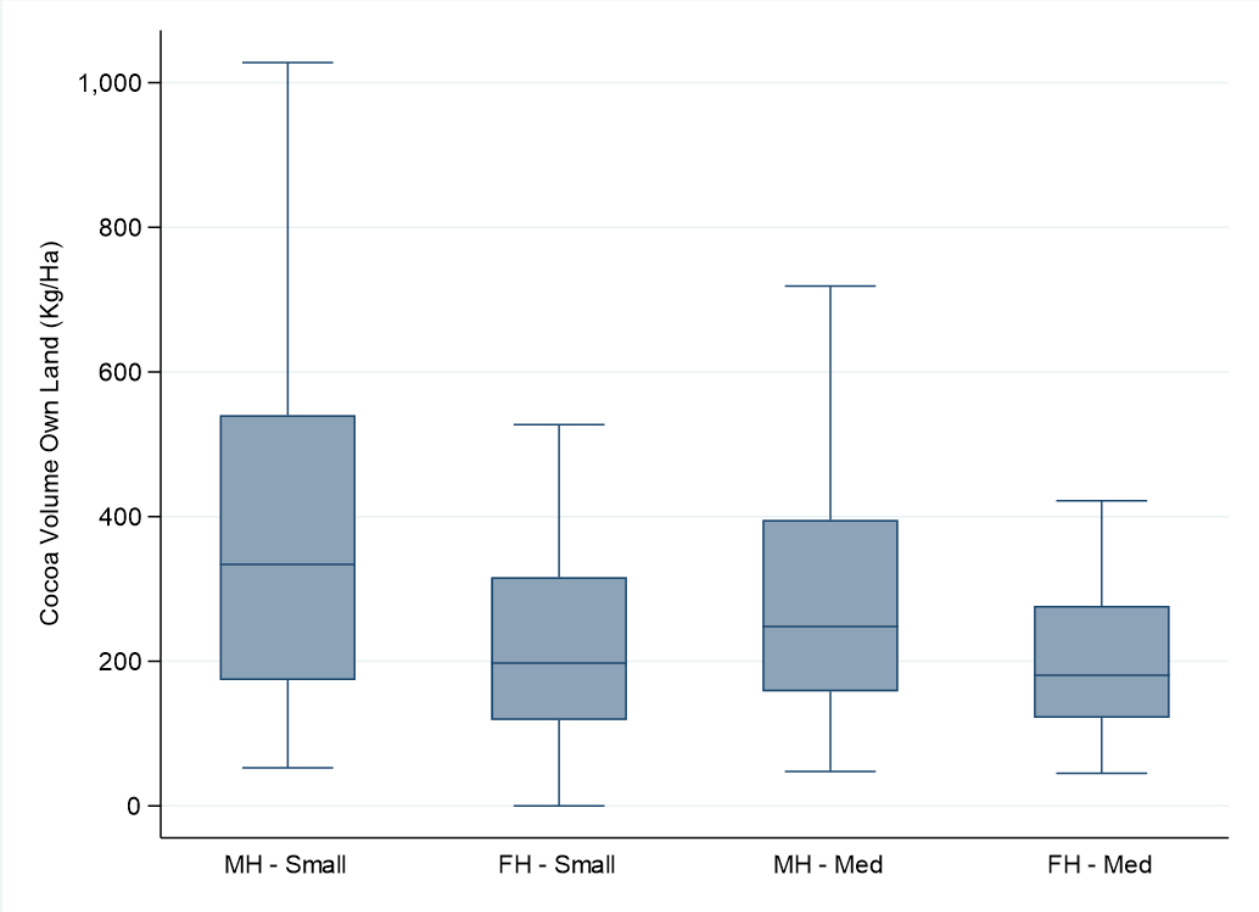
The study found that Ghanaian cocoa farmers have an average productive cocoa area of 3.44 hectares, with an average yield of 329 kilograms per hectare per year (see Figure 3 for productivity distribution across the different analytical groups). However, the overall median yield is lower at 237 kg/ha, highlighting the generally low yields observed within the landscape during the 2022/2023 season.

This decline in productivity is possibly attributed to prolonged droughts, pests, diseases, and other environmental factors. With a producer price of GHS 12.80 per kilogram, cocoa farmers earn, on average, a total revenue of GHS 13'231 from their cocoa farming activities.

Female-headed small-scale farmers have the lowest revenue at GHS 4,002, while male-headed medium-scale cocoa farmers

10 Income from sharecropping only benefits a small share of farmers in our sample as shown in the Annex in Table A 1. Net Cocoa Income.

Figure 3: Cocoa Productivity (Kg/Ha), Distribution by Analytical Group.



Source: Survey data, 2024.
Note: The line splitting the box into two represents the median value. The left edge of the box corresponds to the first quartile, while the right edge corresponds to the third quartile. The lines extending from the boxes depict outliers in the dataset

have the highest revenue at GHS 18'308.

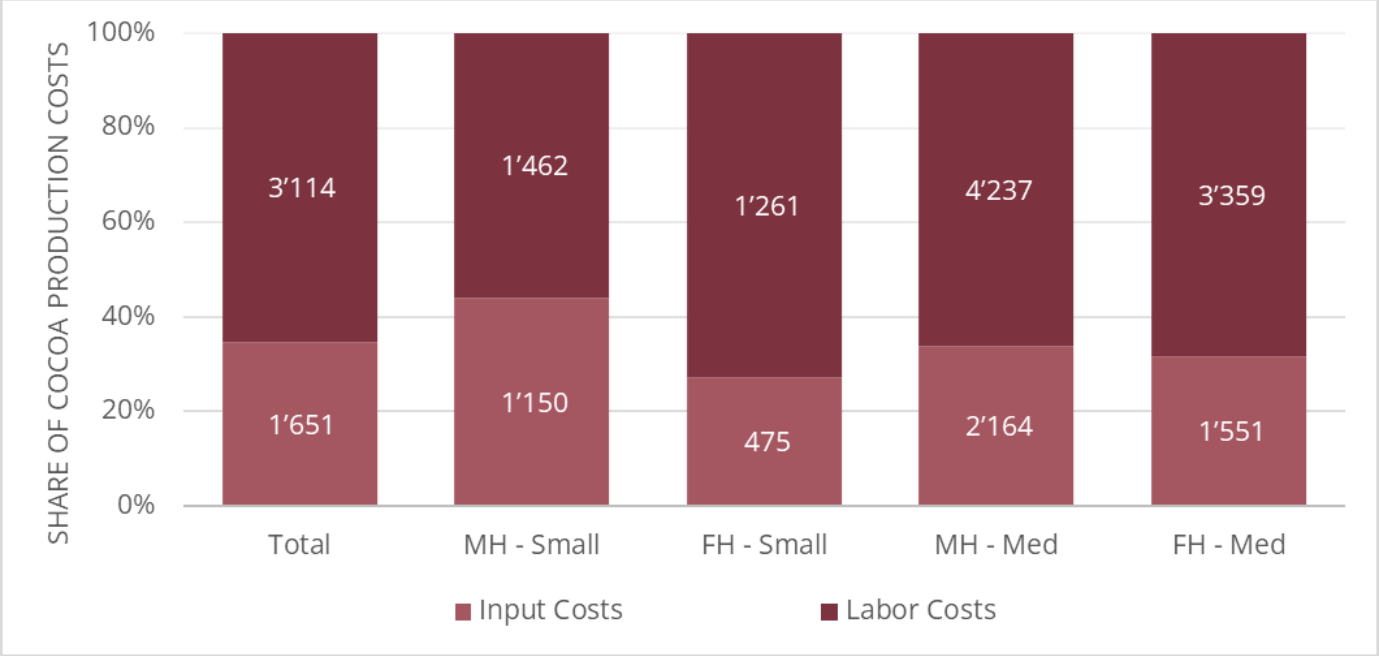
On a per-hectare basis, the data reveals significant variations in net cocoa income across the different analytical groups. On average, cocoa farmers in Ghana earn GHS 2'867 (USD 215) per hectare per year.

Male-headed small-scale farmers achieve the highest income per hectare at GHS 3'845 (USD 272), possibly indicating more efficient land use or better farm management practices within this group. In contrast, female-headed small-scale farmers earn the lowest per hectare income at GHS 2'192 (USD 168).

Male-headed medium-scale farmers earn GHS 2'728 (USD 209) per hectare, slightly below the national average, while female-headed medium-scale farmers have a lower income per hectare at GHS 2'063 (USD 161).

These figures underscore the disparities in productivity and income among different types of cocoa farmers, highlighting the particular challenges faced by female-headed households in maximizing income from their available land.

Figure 4: Production Costs - Average Input and Labour Costs (GHS) by Analytical Group



Source: Survey data, 2024.

Total Costs of Production

Cocoa producing households incur an average production cost[11] of GHS 5'074 to cultivate a 3.44-hectare productive cocoa area, which includes average material costs of GHS 1'651 and average labor costs of GHS 3'114 (see Figure 4). Across all analytical groups, mean production costs are consistently higher than the median (see Annex Table A 1), indicating that the data is right-skewed, with some farms incurring significantly higher costs.

This skewness suggests that while most farms have lower costs (as indicated by the median), a minority incur much higher expenses, which drives up the overall average.

On a per-hectare basis, average material input costs amount to approximately GHS 480, while labor costs are about GHS 906.

As shown in Figure 4, labor constitutes the highest portion of cocoa production expenses in all analytical groups.

In terms of input use (see Figure 5), considering fertilizers and various groups of pesticides, we observe that fertilizers are used by only 15 % of households, depending on the analytical group. In contrast, pesticides are more commonly used, with usage rates ranging from 47% to 70%, depending on the group. However, these figures may be underestimated, as they do not account for fertilizers or pesticides received free of charge[12].

11 This average value also includes the value of generic production costs, such as membership fees to producer organisations, training fees and interests on loans.

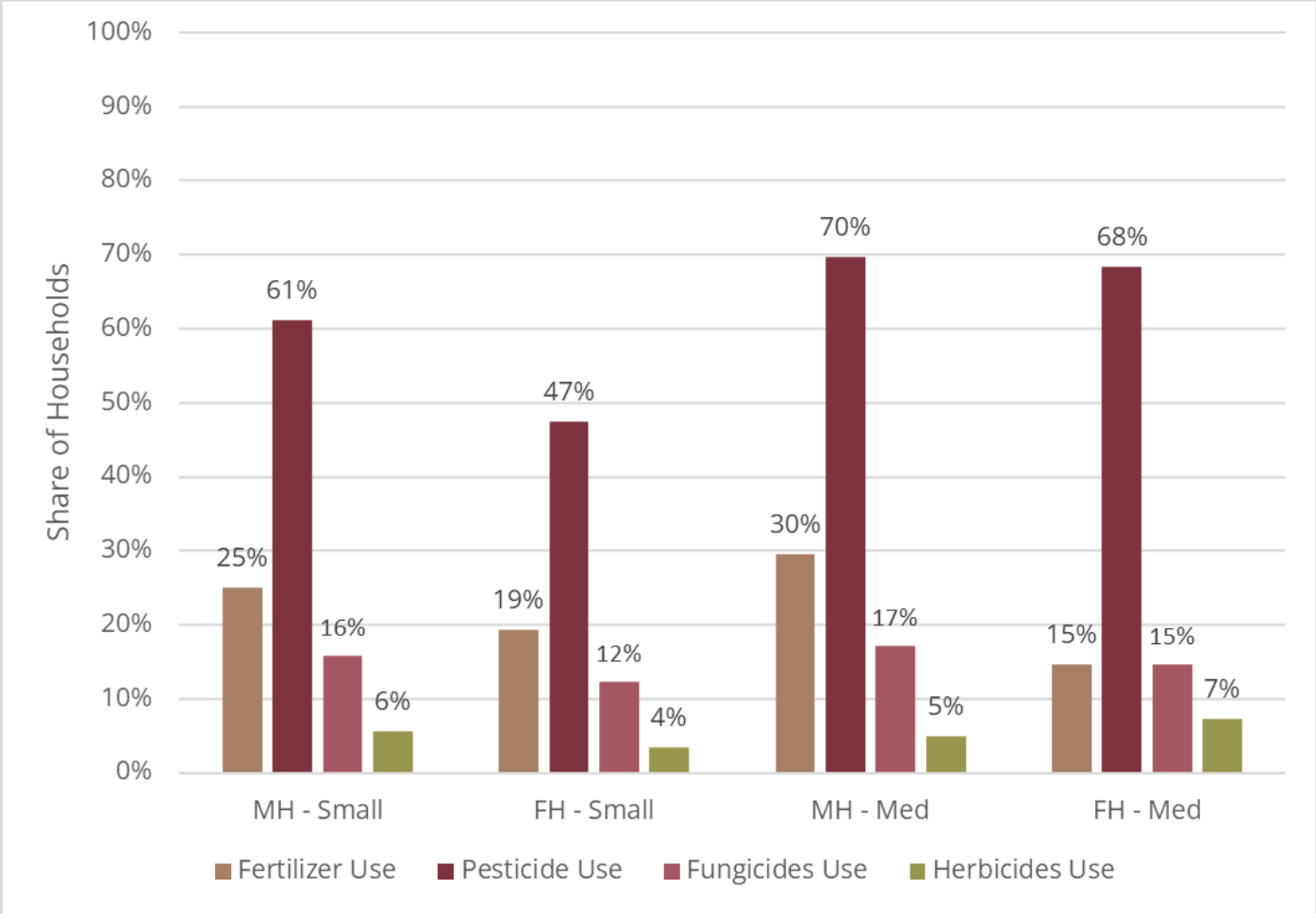
12 64.2% of farmers received some sort of inputs free of charge. The value of these inputs, even though captured in the survey, was not accounted for when computing the cost of production.

Total Household Annual Income

Cocoa farming households in Ghana earn an average income of GHS 24’814 (USD 2’021) per year (see Table 3). Among these households, male-headed medium-scale cocoa farmers have the highest average annual income at GHS 30’498 (USD 2’484), followed by female-headed medium-scale farmers, with an average annual income of GHS 22’611 (USD 1’842).

This data shows that medium-scale farmers generally have higher incomes than small-scale farmers, suggesting that the scale of farming is positively correlated with the wealth of the household. Female-headed small-scale farmers have the lowest household income, averaging GHS 13’378 (USD 1’090).

Figure 5: Use of Mineral Fertilizers and Pesticides by Analytical Group



Source: Survey data, 2024.

Table 3: Total Household Income – Average Values by Analytical Group

	All	MH - Small	FH - Small	MH -Medium	FH -Medium
Average Net Income from Cocoa [A] (GHS/ year/household)	11'316	5'237	3'089	16'059	10'540
Average Total Income[B] (GHS /year/household)	24'814	18'847	13'378	30'498	22'611
Average Total Income[B] (USD /year/household)	2'021	1'535	1'090	2'484	1'842
Total Household income (USD /year/household)					
Min	-135	69	42	-135	36
1st quartile	775	726	417	1,017	778
Median	2'021	1'535	1'090	2'484	1'842
Mean	1'372	1'118	692	1'763	1'226
3rd quartile	2'681	2'183	1'240	3'312	2'256
Max	23'427	8'732	5'579	23'427	8'135

Source: Survey data, 2024.
Note: 1 USD = GHS 12.28 at the time of reporting.
[A] The net cocoa income values here reported include the income from cocoa from own land and other land tenure arrangements. [B] The average total household income includes the monetary value of food produced for own consumption. This value was computed by multiplying the estimated value of food for own consumption (estimated to account for around 8% of the living income benchmark) by the household adjusted living income benchmark and then added to the total household net income.

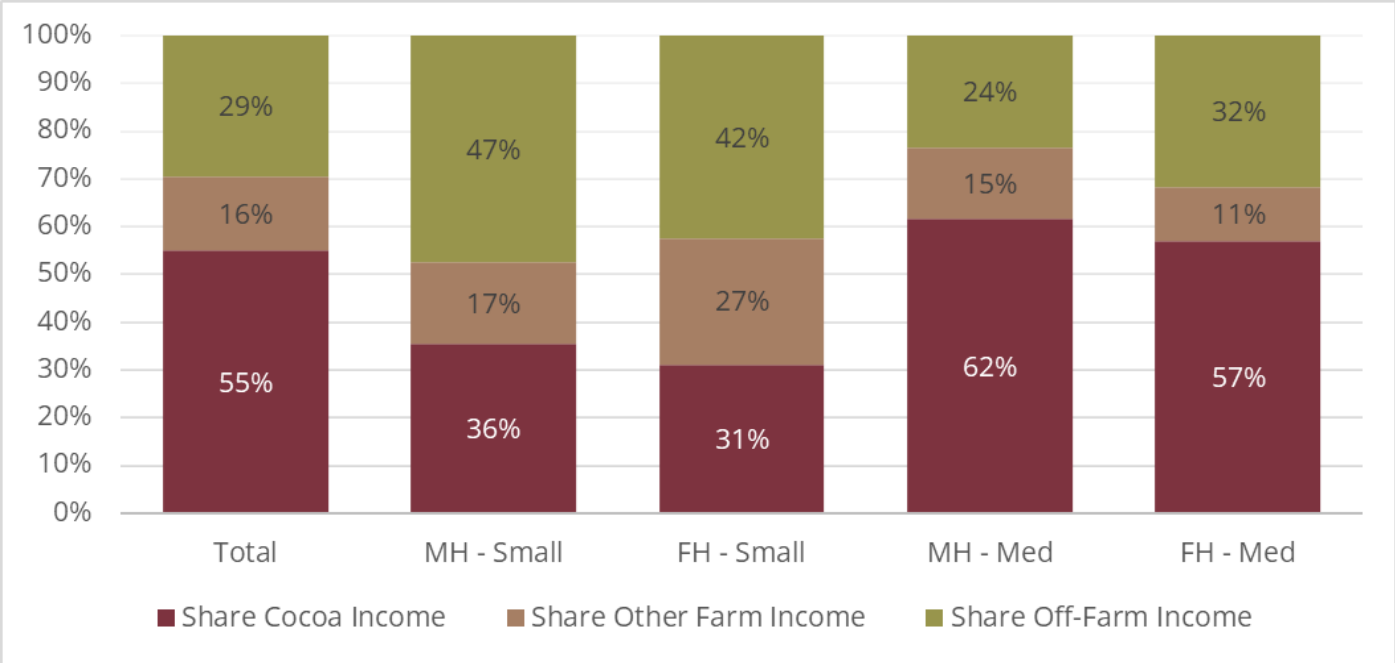
Income structure

Across the entire sample, cocoa remains the most significant contributor to household income, with an overall average share of 55%. This is followed by income from off-farm activities, contributing 29%, and income from other crops and livestock, which accounts for 16% of total household income.

The importance of cocoa income is particularly pronounced among male-headed medium-scale farmers, where it constitutes 62% of their total household income. In contrast, for male-headed small-scale farmer households, cocoa contributes only 36% of their total income, with off-farm income playing a larger role, contributing 47%.

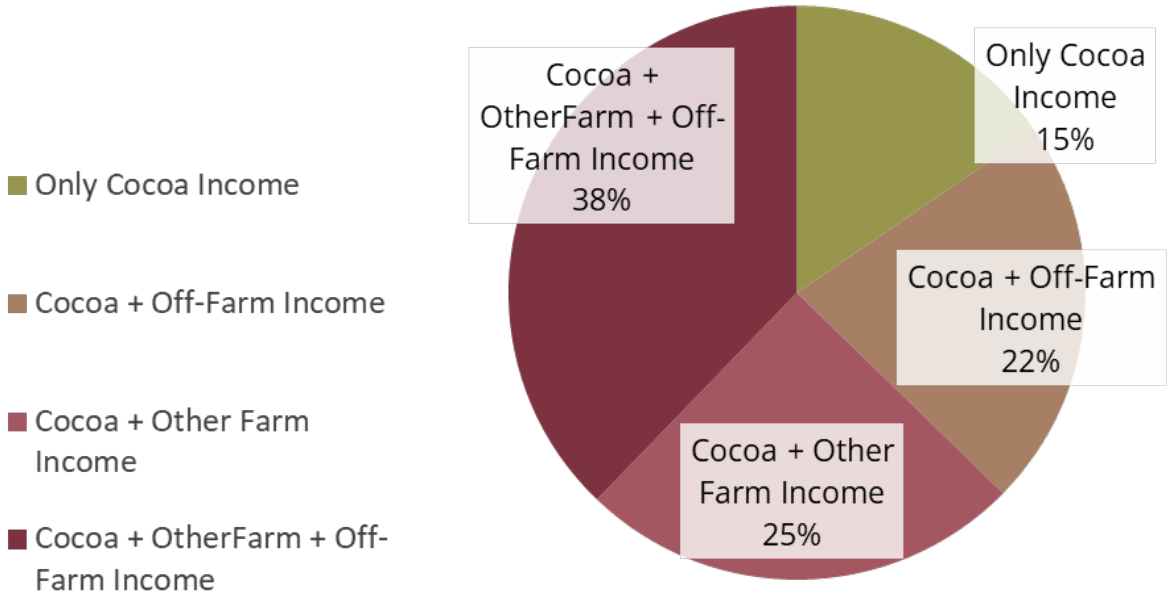
This highlights the reliance on diverse income sources among smaller-scale farmers compared to their medium-scale counterparts.

Figure 6: Income Diversification - Average Share of Income by Primary Income Source Categories



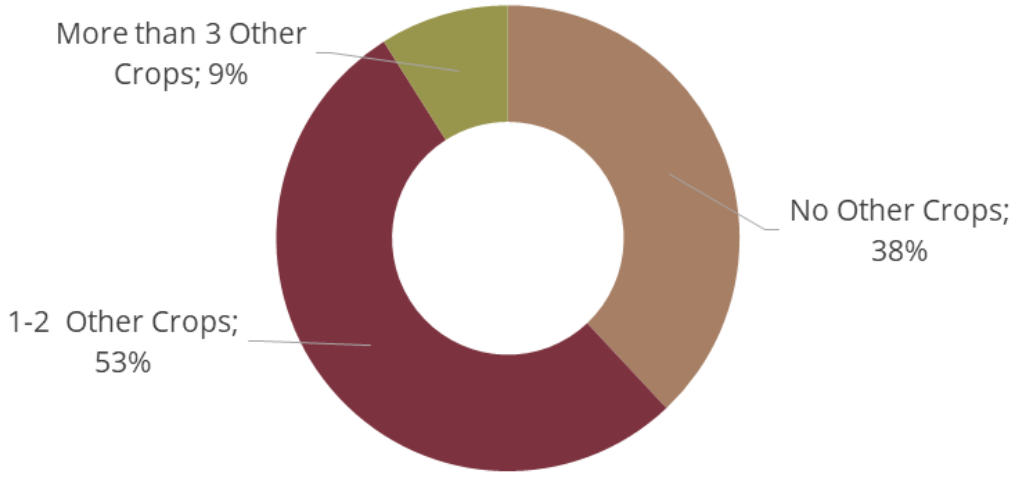
Source: Survey data, 2024.
Note: Other Farm Income includes the income from other crops as well as the income from livestock activities. Off-farm income includes income from wage employment, from self-employment and other income across all household members.

Figure 7: Income Diversification - Share of Households by Level of Income Diversification



Source: Survey data, 2024.

Figure 8: Other Farm Income – Share of Households by Number of Crops



Source: Survey data, 2024.

In terms of income sources (see Figure 7), the majority of households earn income from at least one additional source beyond cocoa. Only 15% of the surveyed households rely exclusively on cocoa for their income. Most households, 38%, have income from three primary income sources: cocoa, other farm-related activities, and off-farm income.

Other Farm Income

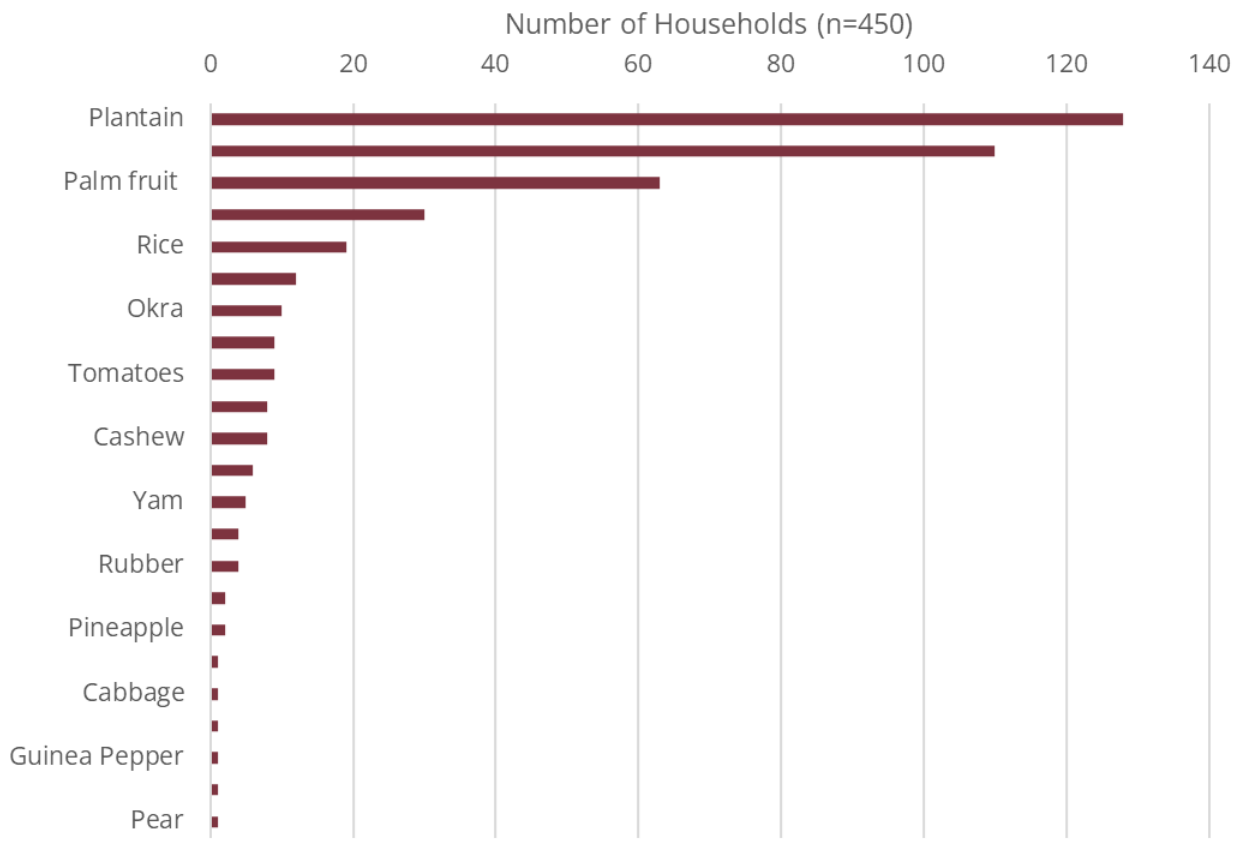
An analysis of farm-level diversification reveals that the majority of households generate income from at least one or two additional crops (see Figure 8).

In contrast, only a relatively very small proportion of farmers exhibit a higher degree of diversification in their crop production. As illustrated in Figure 9, plantain, cassava, and palm fruit are the most prevalent crops[13].

Livestock production is uncommon among cocoa farming households, with only 19.78% of the surveyed households reporting any livestock. Goat rearing and poultry farming are the most common livestock activities (see Figure 10).

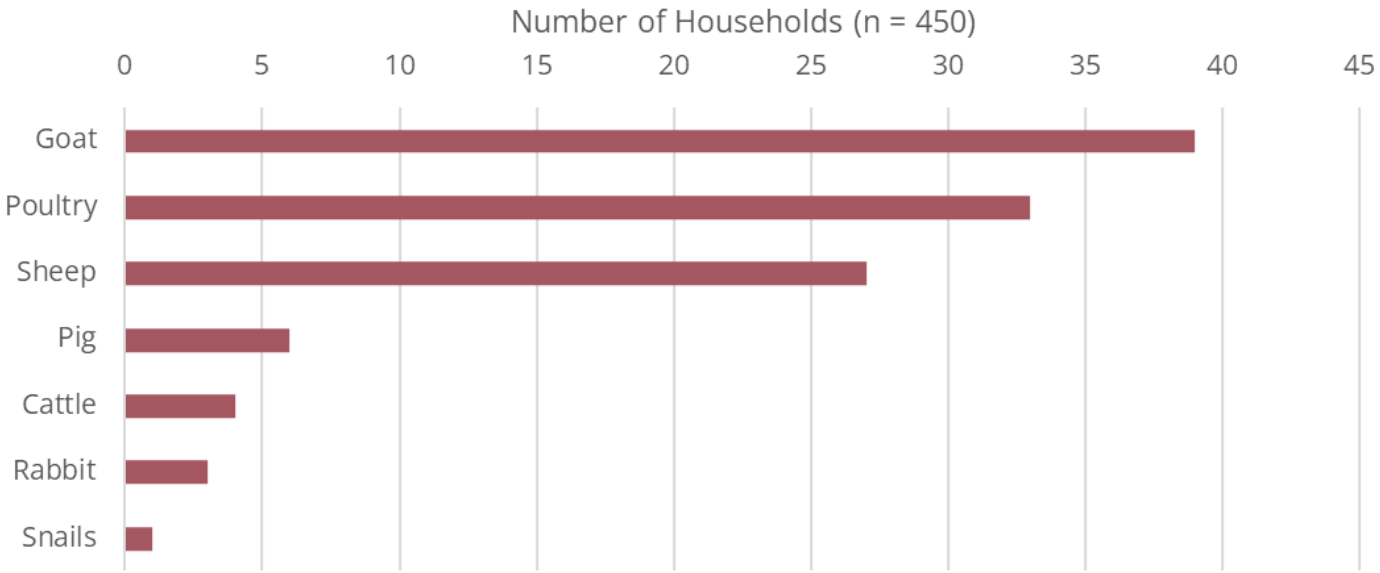
13 Households were asked besides cocoa how many other crops they cultivate and to provide data in terms of production costs and revenues for the two most economically relevant crops. The count presented in Figure 9 reflect these top two crops.

Figure 9: Other Farm Income - Most Commonly Grown Crops



Source: Survey data, 2024.

Figure 10: Other Farm Income - Most Common Livestock Activities



Source: Survey data, 2024.

Off-Farm Income

Among off-farm income sources, self-employment is the most common, followed by wage employment. Further details on the most common sources are provided in the Annex (Annex, Figure A 1, A 2).

COMPARISON OF LIVING INCOME BENCHMARK WITH ACTUAL INCOME

Adjusting the Benchmark based on Household Size and Composition

Adjusting the LIB for household size and composition shows that overall cocoa producing households need GHS 52'970 annually to maintain a basic but decent standard of living. This amount equates to USD 4'315 per year or USD 11.82 per day.

To achieve a decent standard of living, male-headed small-scale cocoa farmers require GHS 51'610, while female-headed small-scale cocoa farmers need GHS 43'358 due to the different household size and composition.

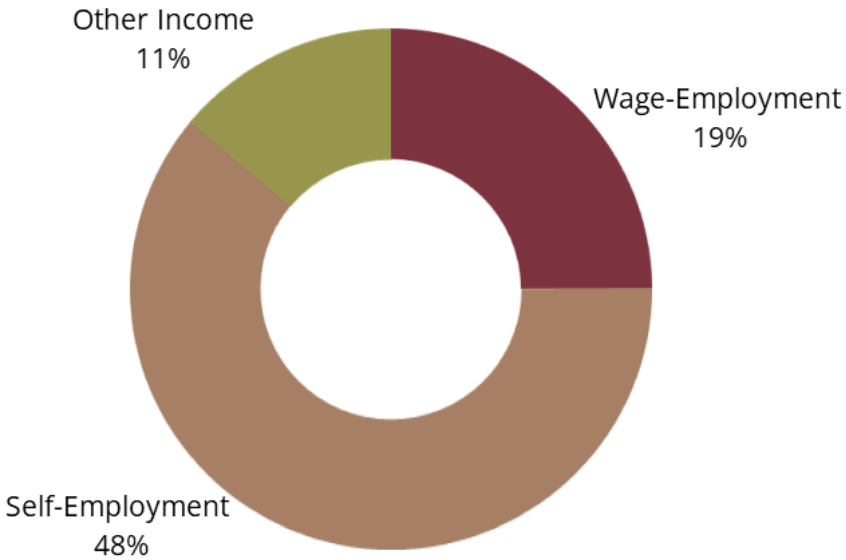
Male-headed medium-scale cocoa farmers require GHS 50'309 annually, and female-headed medium-scale farmers need GHS 47'682.

This indicates that the income required for male-headed households to achieve a decent living standard is generally higher than that for female-headed households, as shown in Table 4.

Comparison of Estimated Incomes to the Benchmark

Figure 12 illustrates the distribution of the total annual net household income for all cocoa farming households in comparison to the LIB. The results show that the vast majority of cocoa farmers, specifically 91% of those surveyed, earn an income below the benchmark.

Figure 11: Off-Farm Income - Most Common Primary Sources



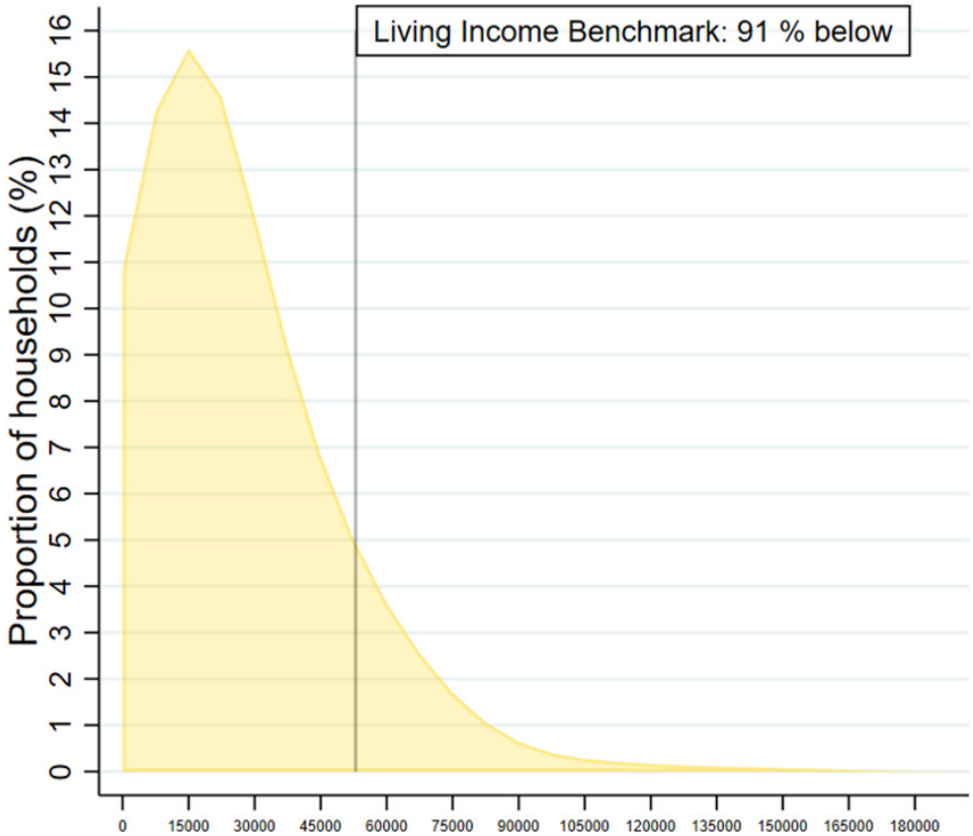
Source: Survey data, 2024.

Table 4: Adjusting the Benchmark Based on Household Size and Composition

	All	MH - Small	FH - Small	MH -Me-dium	FH -Me-dium
Adjusted household composition					
Household size (number of persons)	5.03	4.82	3.86	5.44	4.76
Below 13 years old	1.05	0.91	0.67	1.24	0.85
Adults, 13 till 17 years old	0.5	0.55	0.37	0.55	0.34
Adults, 18 + years old	3.29	3.24	2.67	3.47	3.24
Adjusted LI Benchmark by Cluster					
GHS/year/household	52'970	51'610	43'358	56'123	51'081
USD/year/household	4'314	4'204	3'532	4'571	4'161

Source: Survey data, 2024.

Figure 12: Distribution of Total Annual Household Income to Living Income Benchmarks



Size of the Living Income Gap

As shown in Figure 13, on average, households face a living income gap of GHS 28'132 (USD 2'291) per year, representing 53% of the LIB (see Table A 3). Male-headed small-scale households experience the largest relative gap, with a shortfall of 63% of their living income benchmark, equating to GHS 32'763 (USD 2'668) annually.

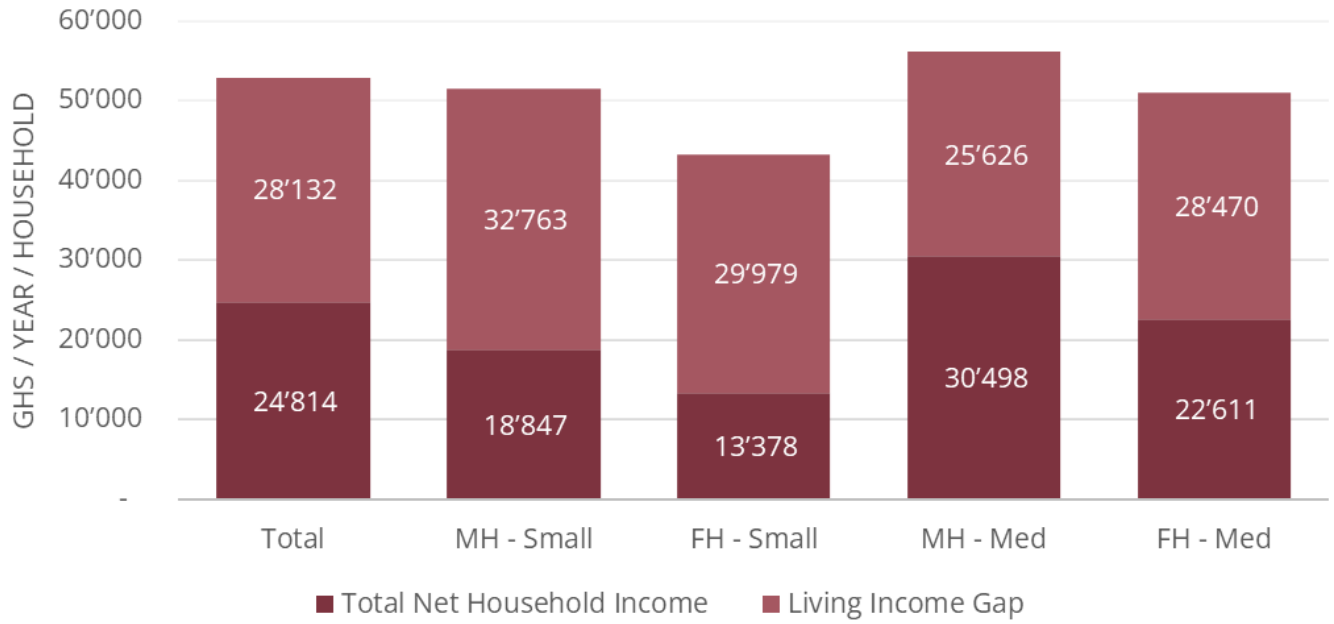
Female-headed small-scale households have an even higher relative gap of 69%, though the absolute value of the gap is slightly lower at GHS 29'979 (USD 2'441). Male-headed medium-scale households have the smallest living income gap both in relative and absolute terms, with a gap of 46% of the LIB, amounting to GHS 25'626 (USD 2'087) per year. This data highlights the persistent challenge that cocoa farming households face in meeting living income benchmarks, with smaller-scale farmers particularly disadvantaged.

Figure 14 shows the distribution of households according to the size of the living income gap. Notably, a significant proportion of households face relatively large income gaps.

Cocoa farming households earn 45% to 70% less than the benchmark amount needed to cover a basic, acceptable standard of living (see Table 4). This substantial living income gap emphasizes a significant economic challenge, as their earnings fall far short of what is needed for a basic standard of living.

To account for the most current market conditions, two scenarios have been constructed based on producer prices for the 2022/2023 and 2023/2024 periods. As shown before, with a producer price of 12.8 GHS/kg for cocoa beans, 9% of the surveyed cocoa farmers exceed the benchmark value (see Figure 12).

Figure 13: Size of the Living Income Average Gap by Analytical Group



Source: Survey data, 2024.

Figure 14: Income Gap - Households Distribution According to the Size of the Income Gap, by Analytical Group

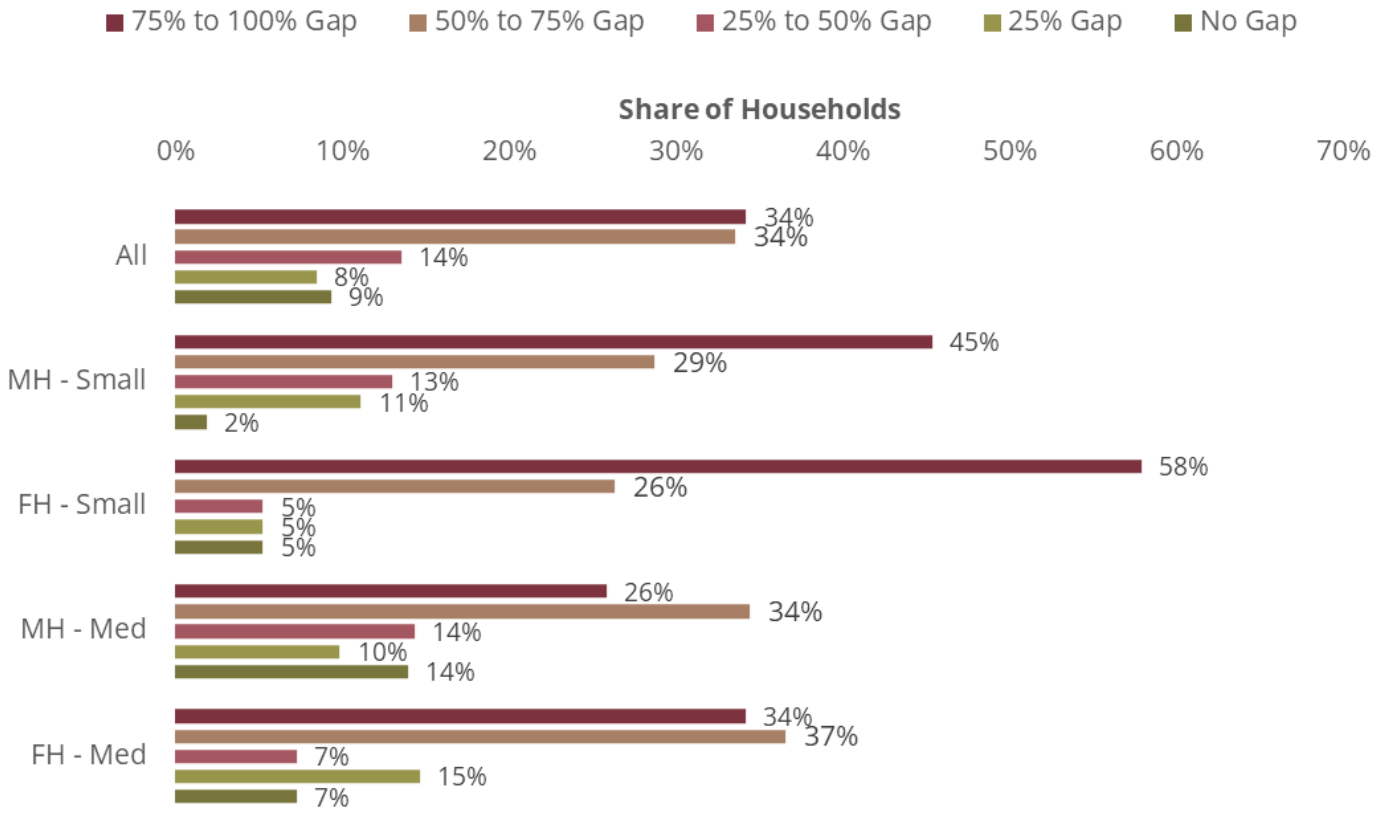
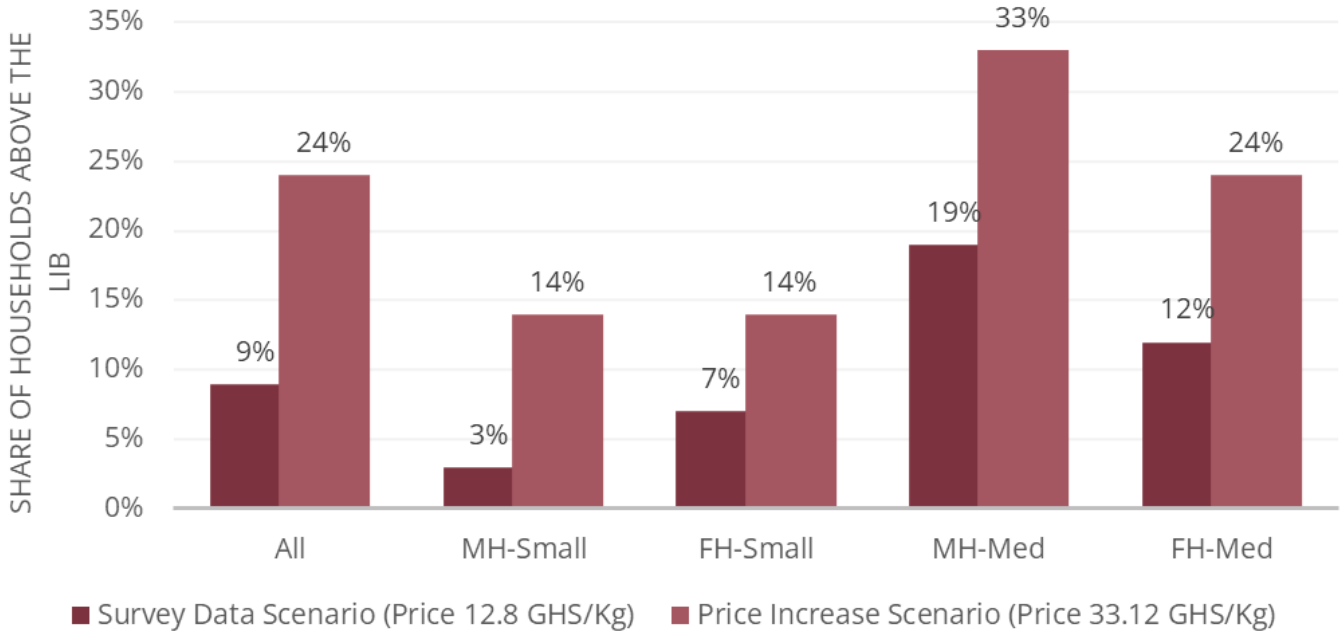


Figure 15: Share of Households Achieving a Living Income According to Price Scenarios



Source: Survey data, 2024.

Under the 2023/2024 price scenario of 33.12 GHS/kg, the percentage of farmers meeting or exceeding the benchmark rises to 24%, marking a 15% increase[14]. The most significant improvement is observed among male-headed medium-scale farmers, whose percentage of those exceeding the benchmark nearly doubles from 19% to 33%.

DETERMINANTS OF HOUSEHOLD INCOME

We analyzed the determinants of cocoa productivity (Kg/Ha), net cocoa income per hectare (GHS/Ha), and the Living Income gap (GHS per Household) using a simple regression model[15] including a wide range of covariates[16] (see Table A 3 for description). The results are represented in Table 5.

The regression analysis of cocoa productivity shows that households headed by women are associated with significantly lower yields. This finding is supported by focus group discussions in which women expressed their challenges related to the aging of cocoa trees and the resulting decline in productivity, as well as losses due to diseases like black pod and swollen shoot virus.

The focus groups also highlighted the difficulties female farmers face in managing diseases and pests. Female participants highlighted that accessing the spraying machines and pruning equipment provided by COCOBOD is particularly challenging for them. Additionally, females frequently mentioned the lack of access to labor as a major obstacle. Many are widows or have absent husbands, which makes it difficult for them to find support for physically demanding tasks.

Moreover, interestingly, a larger area of productive cocoa is negatively correlated with overall productivity. In contrast, more years of cocoa farming experience are positively associated with higher productivity. The use of improved cocoa varieties, particularly hybrid varieties, also has a positive impact on productivity.

However, the focus group discussions revealed differing preferences for various cocoa types. Some farmers favored the traditional Amelonado variety, believing it to be more disease-resistant, while others preferred hybrids for their drought tolerance.

Furthermore, higher input and labor costs significantly contribute to increased productivity. Lastly, membership in a producer organization is positively related to cocoa productivity. This could be explained by the fact, described at least in one focus group, that some cooperatives and producer organizations bring the free inputs provided by COCOBOD to their village.

Others, who are not members of a producer organization, sometimes find it more difficult to access the free inputs, as they would have to collect them in a common area, which can

14 The figure is influenced by the very low yields recorded in the crop year of the study.

15 The dependent variables— cocoa productivity (Kg/Ha), net cocoa income per hectare (GHS/Ha), and the Living Income gap (GHS per Household Member) —are log-transformed to address issues related to skewed distributions. This implies that the coefficients must be interpreted as the percentage change in the dependent variable for a one-unit change in the covariate holding other variables constant.

16 To address potential issues of multicollinearity among covariates, we carefully selected the variables included in the regression models. We conducted variance inflation factor (VIF) analyses and other diagnostic tests to ensure that the predictors are not excessively correlated.

Table 5: Determinants of Land Productivity, Net Cocoa Income and of the Living Income Gap

	(1) Cocoa Productivity (Kg/Ha)	(2) Net Cocoa Income (GHS/Ha)	(3) Living Income Gap (GHS per Household Member)
Sex of the Household Head (binary)	-0.268***	-0.234	0.099
	(0.076)	(0.127)	(0.073)
Education Level of respondent (categorical)	0.022	0.013	0.009
	(0.024)	(0.039)	(0.024)
Years of Cocoa Farming Experience of respondent	0.008*	0.002	0.001
	(0.003)	(0.005)	(0.003)
Household Size	-0.026	-0.018	-0.010
	(0.017)	(0.029)	(0.017)
Productive Cocoa Area (Hectares)	-0.042***	-0.059***	-0.060***
	(0.010)	(0.016)	(0.010)
Cocoa Variety (categorical)	0.112**	0.176**	-0.008
	(0.041)	(0.067)	(0.040)
Rejuvenated Cocoa Area (binary)	0.075	0.118	-0.008
	(0.072)	(0.115)	(0.068)
Rehabilitated Cocoa Area (binary)	-0.011	-0.045	-0.008
	(0.106)	(0.167)	(0.105)
Inputs Costs (GHS/Ha)	0.000***		
	(0.000)		
Labor Cost (GHS/Ha)	0.000***		
	(0.000)		
Income Diversification (categorical)	-0.049	-0.142	-0.202***
	(0.047)	(0.076)	(0.046)
Number of Household Income Earners	0.082*	0.065	-0.027
	(0.035)	(0.056)	(0.034)
Producer Organization (binary)	0.173**	0.114	-0.138*
	(0.066)	(0.109)	(0.064)
Training participation (binary)	-0.005	0.015	-0.003
	(0.096)	(0.156)	(0.093)
Advisory Services (binary)	-0.139	-0.252	0.111
	(0.085)	(0.136)	(0.082)
Access to Loan (binary)	0.082	0.303	-0.092
	(0.094)	(0.161)	(0.094)
Region (categorical)	0.082***	0.106***	-0.056***
	(0.015)	(0.024)	(0.015)
N	448	393	421

Note: Rehabilitated cocoa areas focus on improving the productivity of existing trees through pruning, while rejuvenated areas involve more intensive methods like cutting back to stimulate new growth.
Standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001

Table 6: Calculation of the Living Income Reference Price

	GHS		USD	
	Actual Yields. 2022/23	Sustainable Yields, 2022/23	Actual Yields. 2022/23	Sustainable Yields, 2022/23
Household Size	5	5	5	5
Average Productive Cocoa Area (Ha)	3.44	3.44	3.44	3.44
Average Yields (Kg/Ha)	329	800	329	800
Total cocoa yields (Kg)	1'132	2'752	92	224
Average Total Input Costs	1'651	1'651	134	134
Average Hired Labor Costs	3'114	3'114	254	253
Other Fixed Farm Costs	-	-	-	-
Average Total Costs	5'074	5'074	413	413
Living Income (per person per day)	24	24	2	1.97
Living Income Costs (household/year)	52'970	52'970	4'314	4'313
LIRP (farmgate' per kg)	**51.29**	**21.09**	**4.18**	**1.72**
Regulated farmgate price	33.12	33.12	2.70	2.70
LIRP Differential	**18.17**	**-12.03**	**1.48**	**-0.98**
Percentage Price Increase required	55%	-36%	55%	-36%

Note: The calculations do not account for the fact that farmers earn income other than cocoa.
1 USD = GHS 12.28 at the time of reporting. Source: Survey data' 2024

be inconvenient to reach, and some farmers sometimes do not even bother to go, as they find it too expensive to pay for the transport.

The regression analysis on net cocoa income shows that a larger productive cocoa area is significantly associated with lower net cocoa income. This suggests that expanding the area under cocoa cultivation does not necessarily translate into higher income per hectare and may actually reduce profitability.

On the positive side, the use of certain cocoa varieties is significantly associated with higher net cocoa income. Additionally, regional differences are also significant, indicating that households in certain regions earn higher net cocoa income[17].

17 This is driven by the differences in yields across regions. See Annex Figure A 3. Regional yield variations (Kg/Ha).

The regression analysis on the living income gap per household member highlights several significant factors.

A larger productive cocoa area is significantly associated with a decreased living income gap, suggesting that increasing cocoa cultivation is associated with a reduction in income disparities. Additionally, income diversification shows a significant negative impact on the living income gap, implying that a broader range of income sources helps to close the income gap among household members.

LIVING INCOME REFERENCE PRICE

The estimated Living Income Reference Price (LIRP) at the farmgate level is GHS 51.29 per kilogram, significantly higher than the regulated farmgate price of GHS 33.12 (as of April 2024) per kilogram.

This represents a required price increase of 55% to achieve a living income under the 2022/2023 yield conditions.

However, when considering potentially achievable sustainable yields of 800 kg/ha, the estimated LIRP drops to GHS 21.09 per kilogram, which is notably lower than the regulated price, indicating a differential of -36%.

This comparison underscores the substantial difference between the two scenarios: under current yields, a significant price increase is required to meet living income standards, while under potentially achievable sustainable yields, the current regulated price exceeds the calculated LIRP.

However, it is important to note that these calculations do not account for the potential increase in input costs associated with achieving sustainable yields nor with the market supply effects associated with a wide-scale increase in productivity.

Moreover, our estimates of production costs are likely underestimated because they do not account for the value of inputs received free of charge, the opportunity cost of labor, or fixed costs.

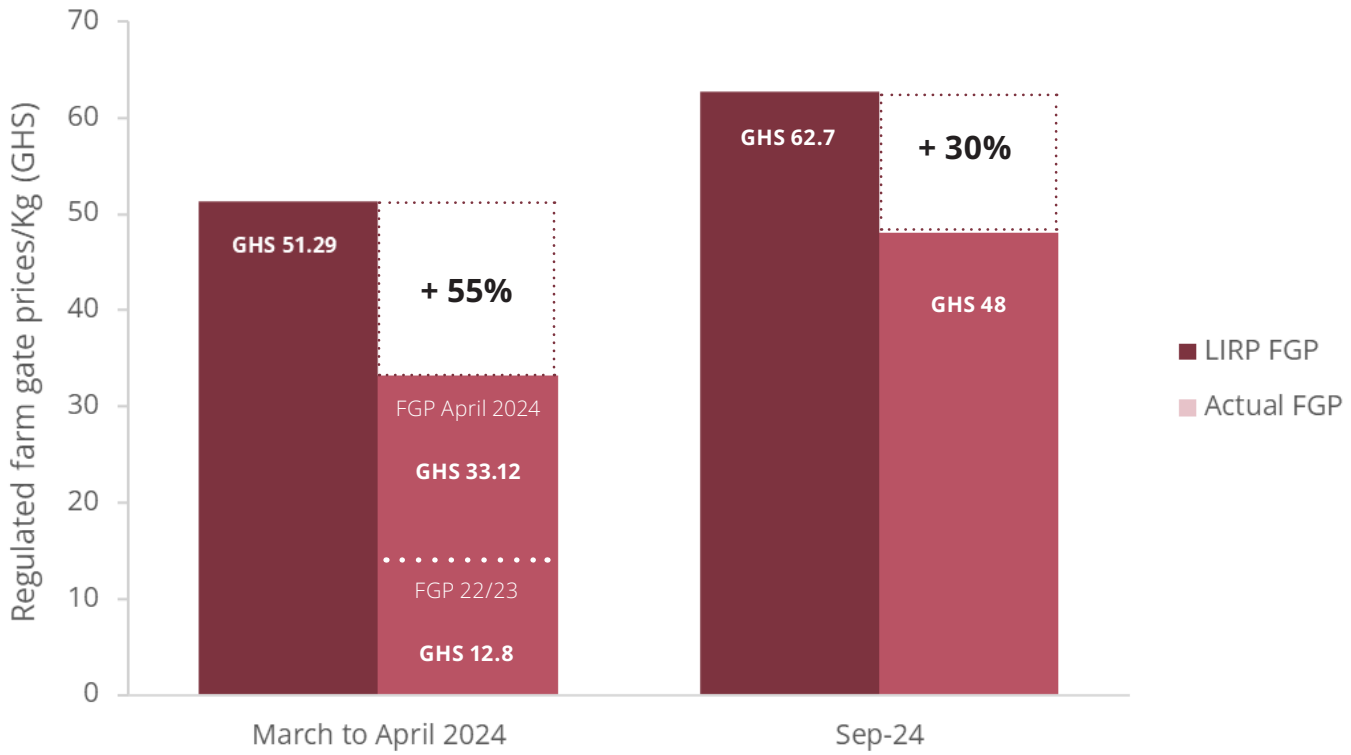
Figure 16 shows that the estimated Living Income Reference Price (LIRP) at the farmgate level was GHS 51.29 per kilogram as of April 2024. At the time of the study, the actual farmgate price (FGP) was GHS 12.8, which was subsequently raised in April 2024 to GHS 33.12 per kilogram of cocoa by COCOBOD.

By April 2024, this increase means that the farmgate price would still need to rise by an additional 55% to meet the LIRP and achieve a living income under 2022/23 yield conditions.

The columns to the right show the updated LIRP as of September 2024, adjusted for inflation*. Although the farmgate price was raised again in September to GHS 48.00 per kilogram, it remains insufficient to reach the desired living income.

To meet the adjusted LIRP, the farmgate price would need to be GHS 62.7 per kilogram (a 30% increase), based on the 2022/23 yield levels.

Figure 16: Farm Gate Price viz Living Income Reference Price



Notes: 1 USD = GHS 12.28 at the time of reporting; Yield is 329Kg/Ha; Average cocoa productive area 3.44 Ha; Living income benchmark value GHS 52,970;
*Adjusted by inflation of 22% (Ghana Statistical Service, 2024)

CHALLENGES AND STRATEGIES TO IMPROVE INCOME

To gain a deeper understanding of the economic challenges faced by farmers and to identify potential strategies for improving their livelihoods' we conducted a series of focus group discussions along with a gender-disaggregated thematic analysis.

This analysis explores how challenges and strategies differ between male-headed and female-headed households. Figures 17 and 18 present a comprehensive list of issues and strategies raised by participants during the focus group discussions.

Female-headed households identified the following three main challenges (see Figure 17):

I. **Cocoa cultivation:** This category was identified as the most critical challenge' primarily due to issues such as dying cocoa trees and low yields.

II. **Cocoa inputs:** The second most significant category, interrelated with the first, involved challenges related to the lack of access to essential inputs for cocoa farming' particularly spraying machines. High costs of inputs' especially fertilizers also contributed to this issue' making it difficult for farmers to maintain healthy crops and maximize yields. With regard to the spraying machines' one farmer raised the following concerns: "The spraying machines are typically managed and organized by men. As a female farmer' I often feel excluded' and we face more

Figure 17: Challenges in Improving Financial Situation – Gender Disaggregated Analysis

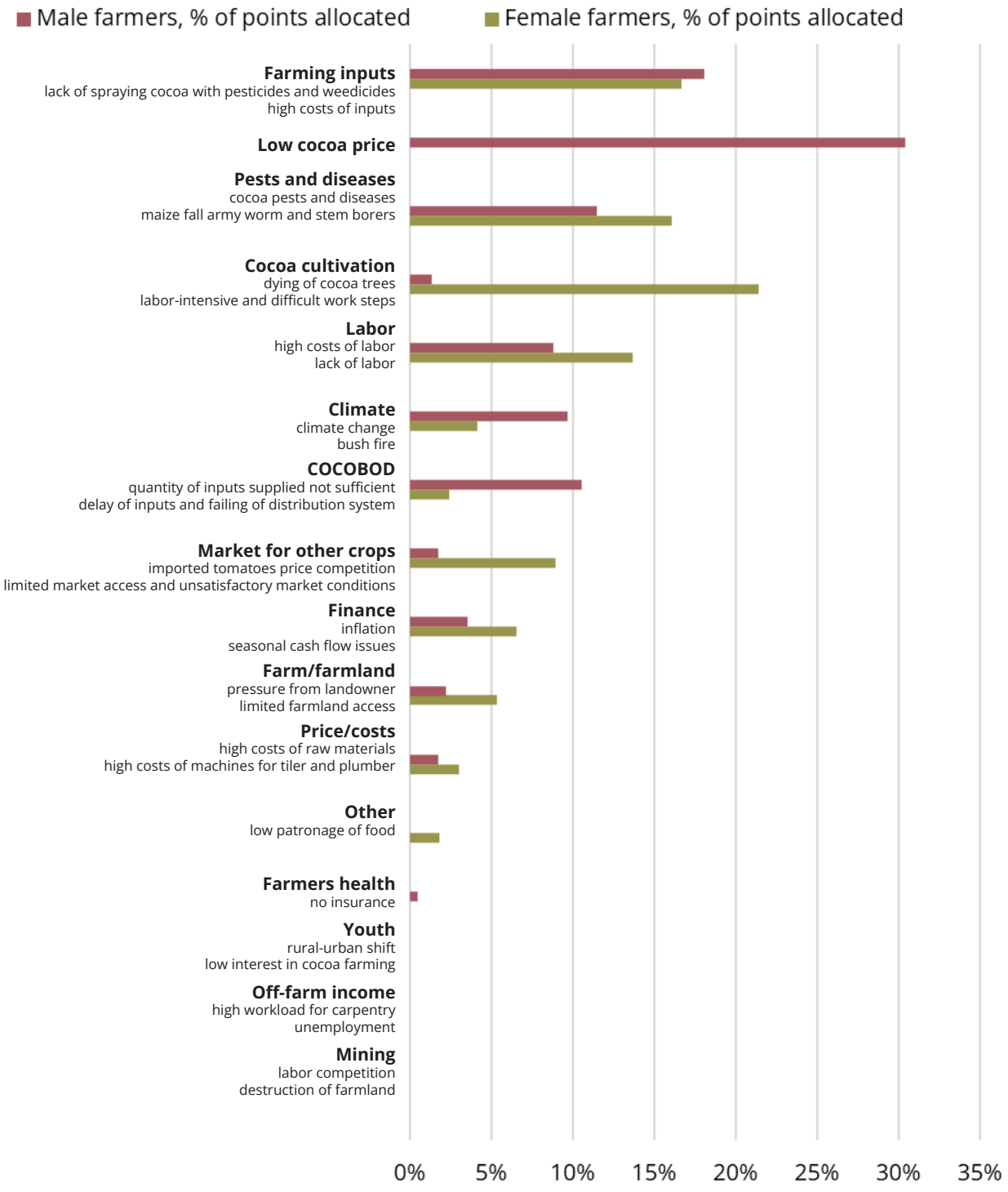
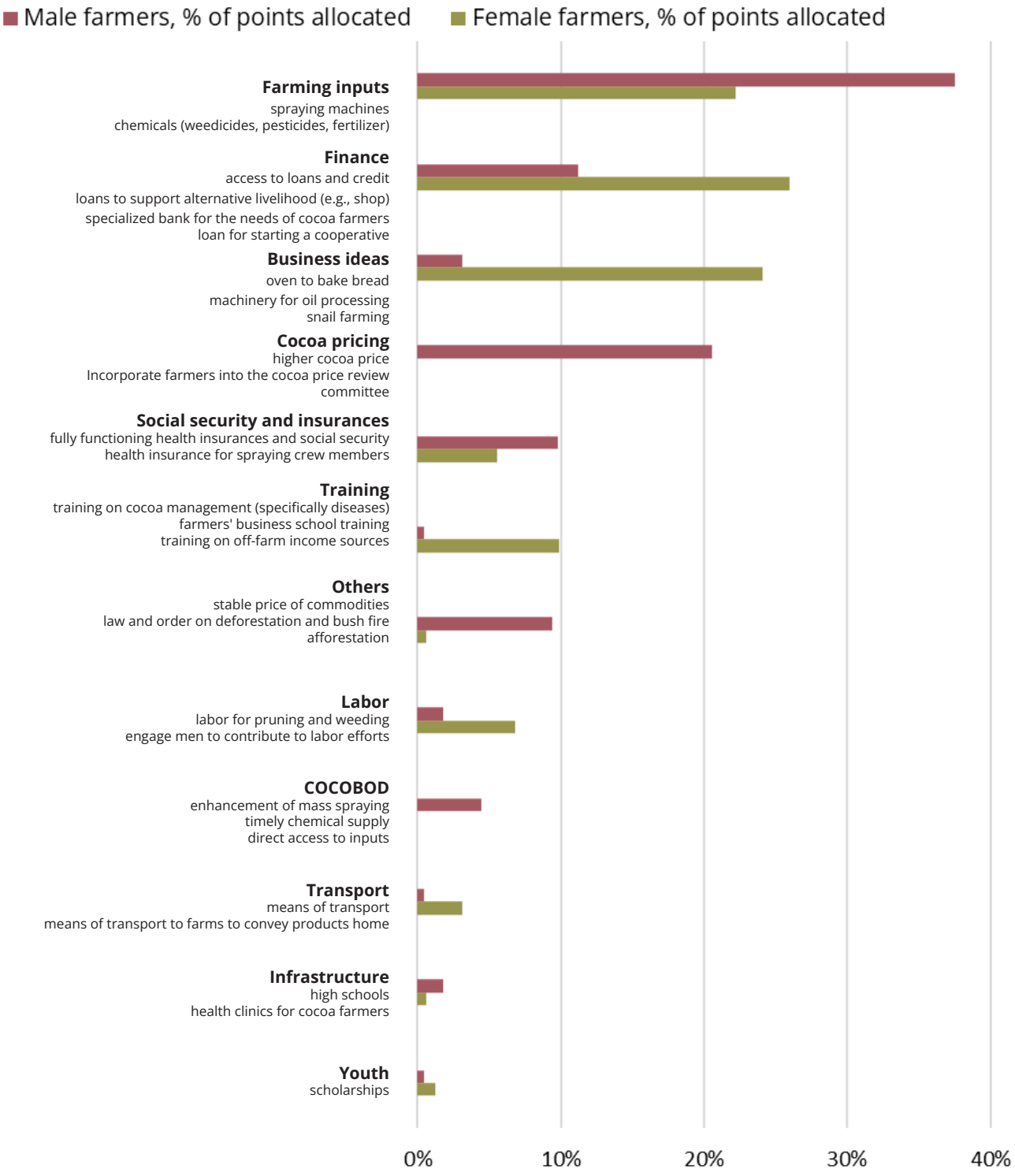


Figure 18: Strategies for Improving the Financial Situation – Gender Disaggregated Analysis



difficulties in accessing spraying machines compared to male farmers."

III. **Pests and diseases:** This category emerged as a major challenge with substantial impacts on cocoa productivity. Key concerns included the prevalence of diseases such as the swollen shoot virus and black pod disease' along with pests like aphids. These factors severely threaten crop health and productivity' leading to substantial financial losses for the farmers.

On the other hand, males identified the following three challenges (See Figure 17):

I. **Cocoa price:** The most critical challenge identified was the low price of cocoa. Farmers highlighted this issue as a major barrier to their financial growth' emphasizing its impact on their overall income.

   One farmer described it as follows: "How can I convince my son to get into cocoa farming when I've been farming cocoa for 30 years and haven't managed to build even one house' yet he's been mining for 3 years and has already built two houses?"

II. **Inputs:** The second most significant challenge category included issues related to farming inputs. Within this category' the highest number of points was allocated to the high costs of inputs' particularly fertilizers. Another major concern was the lack of access to spraying machines. These factors make it difficult for farmers to maintain healthy crops and maximize yields.

III. **Pest and diseases:** This category emerged as a major challenge with significant effects on crop health and productivity. The primary concerns within this category are the impact of pests and diseases on cocoa' including issues like the swollen shoot virus and black pod disease' as well as the severe threat posed by the maize fall armyworm.

Regarding the strategies they use to improve their incomes' female farmers identified the following three strategies (See Figure 18):

I. **Access to financing:** Finance emerged as the most emphasized category' reflecting a strong need for access to low-interest loans and credit facilities.

II. **Business ideas:** The category of business ideas was the second most emphasized' highlighting a significant need for entrepreneurial support. Female farmers stressed the importance of both seed capital and training on specific business ideas to successfully create new income sources.

   This category includes various opportunities mentioned by farmers' such as livestock (primarily poultry and snail farming)' crop production' agricultural processing (e.g.' oil extraction and bread production)' and the development of new markets for existing products.

   A farmer expressed it this way: "I have countless business ideas to diversify my income' like snail farming or producing gari[18]. But to bring these ideas to life' I need funding to get started and proper training to do it right. That way' I can create an alternative source of income beyond cocoa farming."

III. **Farming inputs:** Farming inputs were also seen as an important means of improving the financial situation. Within this category' 56% of the points were allocated to spraying machines' underscoring the

18 Is a granular flour made from Cassava.

demand for better access to these tools. Additionally, the provision of other inputs and chemicals was highlighted as essential for enhancing financial outcomes.

On the other hand, males identified the following three strategies (See Figure 18):

I. **Farming inputs:** This category was identified as the most crucial for increasing income' primarily due to the need for fertilizers' spraying machines and chemicals. While other inputs such as personal protective equipment (PPE) irrigation systems and general farming supplies were also noted' they were considered less critical for financial improvement.

II. **Cocoa Pricing:** This category emerged as a key factor for enhancing income' reflecting the importance of better pricing for cocoa. Farmers stressed not only the need for improved cocoa prices but also the necessity for the cocoa price review committee to include farmer representation' ensuring that their interests are adequately considered. One farmer expressed his concern: "We as farmers feel completely ignored' and our concerns never seem to reach those in power."

III. **Finance:** Access to finance remains a top priority' particularly in terms of obtaining loans and credit facilities.

EFFECTS OF SWISSCO INTERVENTIONS

Another approach to helping cocoa farming households achieve a Living Income involves implementing interventions that reduce household costs and generate alternative income streams.

This report evaluates three such interventions funded by SWISSCO and the State Secretariat for Economic Affairs (SECO) which are briefly described in the following sections. To assess the contribution of the intervention to the income situation of farmers' a comparative analysis was conducted using data from the Household Income Survey' comparing farmers who received these interventions with those in the same region who did not.

To ensure comparability between the two groups' a Coarsened Exact Matching[19] approach was applied, using household size. productive cocoa area. and the number of income earners as matching variables.

However, it is important to note that the relatively small sample size—approximately 50 farms per intervention—limits the generalizability of the results, and no causal conclusions can be drawn, as neither experimental nor quasi-experimental research designs were employed.

To provide additional context and insights, FGD's were conducted for each intervention (2 each for KOA & Akwaaba, 4 for Sankofa) to better understand their perspectives on how these interventions have impacted their livelihoods. The groups were equally split by male and female farmers.

AKWAABA

Description of Akwaaba Intervention

The Akwaaba project aims to provide financial access to healthcare for 1'600 cocoa farmers and their families in Ghana's Eastern Region, alleviating health-related financial burdens and improving overall health outcomes.

The farmers benefiting from this program are part of the Yayra Glover organic cooperative, allowing them to take advantage of this healthcare intervention alongside their participation in organic farming initiatives.

By enhancing access to healthcare, the project aims to promote farmers' well-being, driving social impact and ensuring compliance. Reducing healthcare costs for families positively affects their income and financial stability. Figure 19 illustrates the theory of change for the Akwaaba intervention[20].

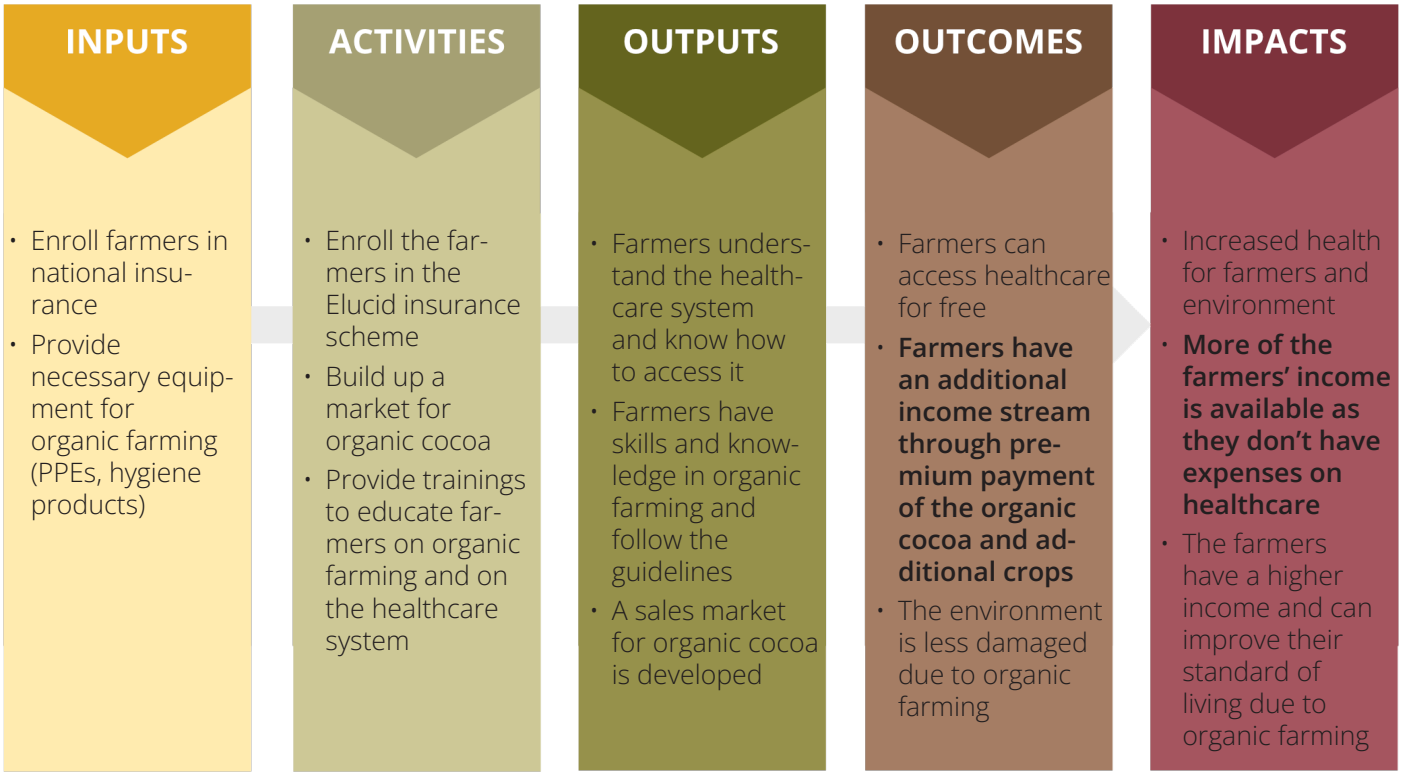
Implemented between 2022 and 2024, the project provides health coverage through national insurance as well as additional coverage through the Elucid Essential and Emergency Coverage.

The key activities include enrolling farmers in the national health insurance scheme, enrolling farmers on the Elucid healthcare platform making them eligible to receiving care free of charge at partnering facilities and conduct-

19 The Coarsened Exact Matching (CEM) approach offers several benefits for improving the validity of observational studies. By temporarily coarsening continuous and categorical variables, CEM allows for better alignment of intervention and comparison groups on these variables, enhancing comparability. This method reduces model dependence, improves balance between groups, and minimizes bias, making the subsequent analysis more robust and reliable even in the absence of a randomized experimental design.

20 Although the Akwaaba intervention focuses exclusively on healthcare, it specifically targets farmers from Yayra who practice organic farming. As a result, the theory of change incorporates elements related to organic practices.

Figure 19: Akwaaba Intervention - Theory of Change



ing community health education sessions on essential practices and risks like malaria. The expected outcomes of the project included immediate access to healthcare, reduced financial burden of health expenses in the short-term, improved health outcomes, increased farmer productivity, promoted gender equality, and reduced child labour and deforestation in the long term.

Results for the Akwaaba Intervention

Net Cocoa Income

Akwaaba farmers have a higher net cocoa income per hectare compared to the comparison group, primarily due to lower production costs, as the yields and income per hectare are quite similar between the two groups.

Notably, while Akwaaba farmers produce slightly less cocoa (268 kg/ha) compared to the comparison group (296 kg/ha), and their cocoa income per hectare is marginally lower at GHS 3'495 versus GHS 3'851, these differences are not substantial.

Given that Akwaaba farmers follow organic farming practices, which often result in lower yields to a large extent, the fact that their production volume is nearly the same as the comparison group is particularly noteworthy.

This suggests that the reduction in costs is the main factor driving the higher net income for Akwaaba farmers. Specifically, Akwaaba farmers incur lower material input costs, averaging just GHS 47 compared to GHS 424 in the comparison group.

Labor costs are also markedly lower, with Akwaaba farmers spending an average of GHS 603 compared to GHS 1'375 in the comparison group. As a result, the total production

Table 7: Akwaaba Intervention - Net Cocoa Income per hectare, mean values

	Comparison Group (n=42)	Akwaaba (n=50)	Difference
Household Size	4.59	3.76	-0.83
Productive Cocoa Area (Ha)	4.36	2.74	-1.62
Volume of Cocoa from Own Land (Kg/Ha)	293	268	-26
Cocoa Income (GHS/Ha)	3'820	3'575	-245
Material inputs costs (GHS/Ha)	411	47	-364
Labor Costs (GHS/Ha)	1'408	603	-805
Total Costs of Production (GHS/Ha)	1'974	666	-1'308
Net Cocoa Income (GHS/Ha)	2'000	2'925	924
Net Cocoa Income (USD/Ha)	150	237	87

Source: Survey data 2024
Note: 1 USD = GHS 12.28 at the time of reporting

Table 8: Akwaaba Intervention - Total Household Income

	Comparison Group (n=42)	Akwaaba (n=50)	Difference
Household Size	4.60	3.76	-0.84
Total Net Household Income (GHS)	27'429	12'956	-14'473
Household Adjusted Benchmark	51'346	42'753	-8'593
Size of the income gap (GHS)	24'018	29'797	5'779
Size of the income gap (USD)	1'956	2'427	471

Source: Survey data 2024
Note: 1 USD = GHS 12.28 at the time of reporting

costs for Akwaaba farmers are significantly reduced, amounting to GHS 666 compared to GHS 1'974 in the comparison group.

Total Household Annual Income

Akwaaba households show lower total net household income compared to the comparison group. Specifically, Akwaaba households have an average total net income of GHS 12'956, which is substantially less than the GHS 27'429 reported for the comparison group.

Additionally, the size of the income gap is larger for the Akwaaba group' with an average gap of GHS 29'797, compared to GHS 24'018 for the comparison group. Even though the intervention group faces a lower overall household income and a larger income gap, the effects of potentially reduced health expenditures might not be fully captured by this comparative analysis focused on living income.

Assessing such effects might require a more targeted impact evaluation to accurately reflect the intervention's benefits. In fact, the results from the focus group discussions revealed that the adoption of organic farming has resulted in higher gross income, with increased premium payments in addition to reduced health expenses thanks to the Akwaaba project.

This suggests that there may be inherent differences between the intervention and comparison groups that were not fully accounted for by the matching approach used, which could explain the results of the comparative analysis.

Share of households living below the Living Income

On average, about 4% of Akwaaba households live above the LIB, while about 12% of households in the comparison group are reported to live above the benchmark.

The share of households with a 75% to 100% gap to the Living Income Benchmark is 26% for the comparison group and 60% for the intervention group (see Table 9).

This discrepancy calls for further studies to understand the underlying reasons for the larger income gap reported for the Akwaaba households or to investigate what the comparison group might be doing differently.

Table 9: Akwaaba Intervention - Share of Households below the LIB

	Comparison Group	Akwaaba
Share of households above the LIB	12 %	4 %
Share of households with a gap of Less than 25% to the LIB	12 %	2 %
Share of households with a 25 to 50 Gap to LIB	24 %	6 %
Share of households with a 50 to 75 Gap to LIB	26 %	28 %
Share of households with a 75 to 100 Gap to LIB	26 %	60 %

Source: Survey data 2024

Perceived impact of the Akwaaba intervention on farmers standard of living

Our goal was to identify the impacts the intervention had on the farmers' standard of living. Therefore' during the FGD' farmers were asked to rank the impact of the intervention on several livelihood dimensions. The impact could be positive' neutral' or negative. Below we outline the perceived impacts of the farmers:

- **Level of income:** Farmers reported increased income since participating in the Akwaaba project and collaborating with Yayra Glover[21]. This boost is linked to organic farming practices and reduced health-related expenses from insurance.

  According to the farmers, the adoption of organic farming has led to higher gross income, with premium payments for organic cocoa and increased yields. Despite literature suggesting lower yields from organic farming, farmers stated they experienced gains due to access to organic fertilizers previously unavailable.

  Additionally, training in earlier harvesting has improved yields. Regarding insurance, farmers have experienced financial relief. Reduced medical expenses allow for better allocation of resources. Previously, medical issues caused significant financial strain, often requiring loans or out-of-pocket payments.

  Akwaaba insurance provides comprehensive coverage, easing this burden. Those previously uninsured now find the enrolment cost manageable, and the use of organic inputs has further improved health and reduced hospital visits.

- **Sources of income:** Farmers noted that they now have additional income sources from their mixed-cropping system, made possible by their transition to organic farming. Previously, the use of pesticides with spraying machines would kill other plants, such as banana trees, and limit crop diversity.

  With organic farming, this method has been abandoned, allowing other plants to thrive alongside the cocoa. As a result, farmers can either sell these additional crops or use them for personal consumption.

- **Workload**: All farmers agreed that the workload is higher since transitioning to organic farming. Nevertheless, the farmers reported that the additional work pays off.

- **Farmers' health:** The farmers noted improvements in their health, attributing this not only to insurance coverage and access to healthcare but also to the adoption of organic farming practices. One male farmer reported that he used to experience skin irritations from using harmful chemicals, which diminished after switching to organic inputs.

  Other farmers, both male and female, emphasized the health benefits of consuming organic food, linking organic farming practices to reduced health-related expenses and fewer hospital visits. Additionally, a male farmer proudly shared that his two daughters were able to welcome their newborns without financial burden, thanks to the support from Akwaaba.

- **Education level:** All farmers reported that their education level has risen because of the trainings they receive being in the Akwaaba project.

21 Is an Organic Producers Cooperative.

- **Overall happiness:** In general, the farmers are very happy to collaborate with YG, practicing organic farming and being part of the Akwaaba project. One farmer said he is happy with organic farming but even happier with the insurance.

Potential Improvements on the Akwaaba intervention

The Focus group discussions with farmers involved in the intervention highlighted several areas for improvement from the farmers, perspective:

- **Extension of insurance coverage to all household members:** The female farmers suggested extending insurance coverage to more than six household members, as many households are larger.

  They inferred that this limitation might create an ethical dilemma when deciding who to insure. To address this, they recommended increasing coverage to up to ten household members. Additionally, both male and female farmers proposed expanding insurance coverage to a national level, as it is currently limited to specific districts.

- **Others:** The female farmers also advocated for scholarships for children and the provision of Personal Protective Equipment (PPEs). On the other hand, the male farmers recommended transitioning premium payments to mobile money rather than cash to facilitate savings.

  Furthermore, a labor worker from one of the male farmers suggested that Yayra Glover should hire youth workers for farm labor. This approach could help reduce urban migration among youth and provide additional support to farmers.

KOA

Description of KOA intervention

Koa upcycles cocoa fruit pulp from the traditionally discarded cocoa fruit pulp, creating new products and revenue streams for cocoa farming communities in rural Ghana.

This initiative is intended to increase farmers, income, generate employment, and stimulate local economies in the districts of Assin Foso and Achiase in the Central and Eastern regions of Ghana.

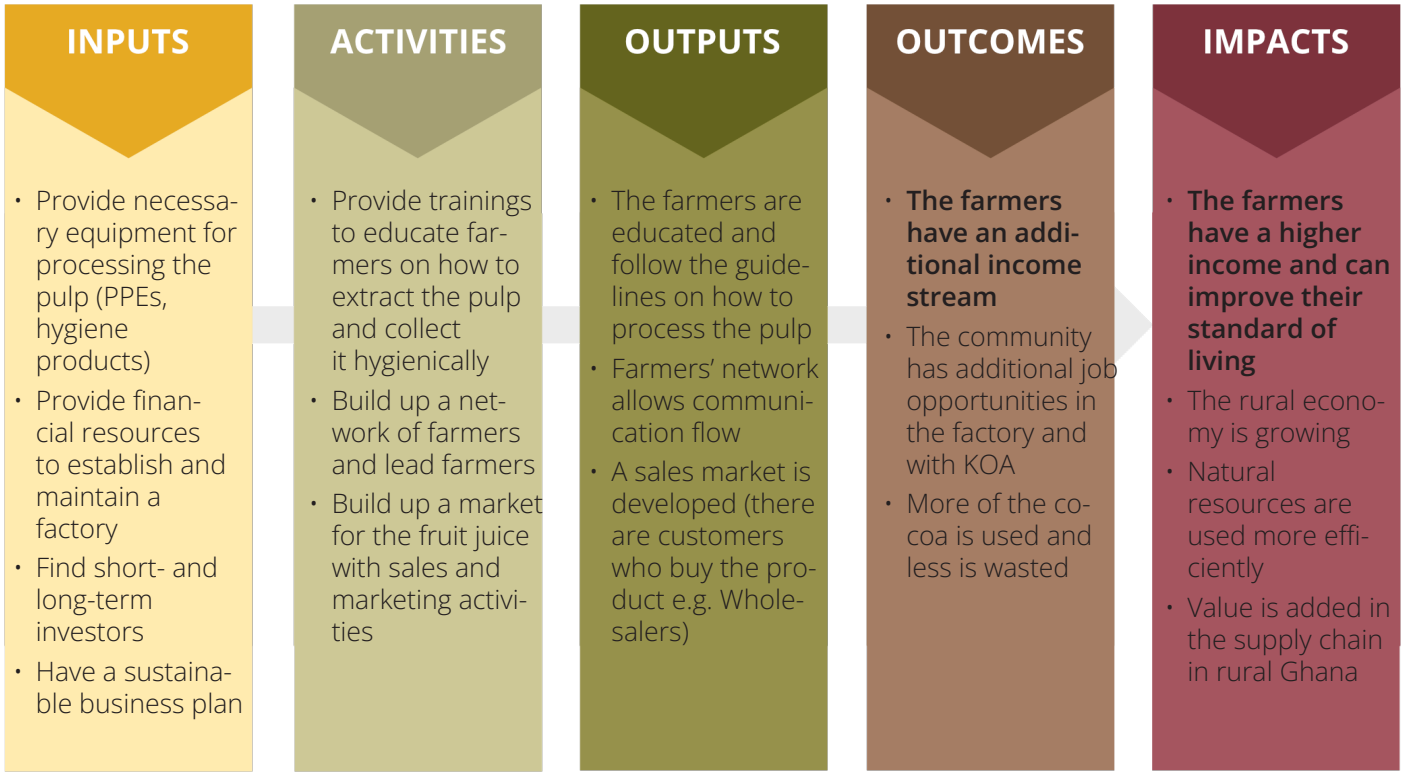
The primary beneficiaries are cocoa farmers in rural Ghana, while the secondary beneficiaries are local communities that benefit from employment opportunities and economic growth.

The implementation of the upcycling of cocoa pulp began in 2017. This involves the extraction and processing of cocoa pulp, direct trade, and mobile money payments to farmers. Additionally, the Biochar production from cocoa pod husks (Follow-up Project) began in 2023 with the objective of processing cocoa pod husks into biochar for soil enhancement.

The expected outcomes include increased farmer income by providing additional revenue streams from the sale of cocoa pulp and biochar. Employment opportunities are created in the processing and upcycling of cocoa by-products.

This also stimulates local economies through increased economic activities, reduces food waste, and improves soil fertility, leading to increased future yields. Furthermore, it ensures an efficient and transparent payment process through direct trade and mobile money, ensuring fair compensation for farmers. Figure 20 shows the theory of change for the KOA intervention.

Figure 20: KOA Intervention - Theory of Change



Results for KOA intervention

Net Cocoa Income

KOA farmers exhibit a slightly higher net cocoa income per hectare compared to the comparison group. When examining the variables that influence net cocoa income, no large differences were found between the two groups.

Notably, the yields are quite similar between KOA and the comparison group, indicating that the intervention did not markedly impact productivity.

In terms of production costs, KOA farmers incur slightly higher material input costs per hectare, averaging GHS 741 per hectare compared to GHS 646 for non-intervention farmers. This increase in costs could be attributed to the interventions efforts to encourage the use of inputs through sensitization programs. However, this increase is not substantial.

On the other hand, KOA farmers benefit from lower labor costs, spending an average of GHS 1'445 compared to GHS 1'629 in the comparison group. This reduction in labor costs may be due to the provision of free transportation as part of the intervention.

Overall, the total production costs between the two groups are nearly identical, suggesting that the KOA intervention does not significantly impact overall operational expenses.

While KOA farmers do earn a slightly higher net cocoa income, the effects of this increased income are not particularly pronounced based on the results of the income survey. Nevertheless, farmers mentioned higher incomes thanks to income diversifica-

tion and lower production expenses at two major perceived impacts of the intervention.

Total Household Annual Income

The KOA intervention group exhibits a lower total net household income compared to the comparison group, with an average of GHS 15'871 versus GHS 20'984. Additionally, the size of the income gap is larger for the KOA group, averaging GHS 38'215 compared to GHS 31'168 in the comparison group.

Share of households living below the Living Income

On average, about 13% of households in the comparison group live above the LIB, while no households in the KOA intervention group exceed this benchmark.

Interestingly, 43% of households in the comparison group and 46% in the KOA intervention group have a 75% to 100% gap to the LIB, suggesting that the KOA intervention has not been particularly effective in reducing severe income gaps.

Perceived impact of the KOA intervention on farmers' standard of living

Our goal was to identify the impacts of the intervention on households' standard of living based on their perceptions. Therefore, during the FGD, participants were asked to rank the impact of the intervention on several livelihood dimensions. The impact could be positive, neutral, or negative. Below we outline the perceived impacts of the farmers:

- **Level of income:** Although no significant quantitative difference was observed between the comparison group and KOA beneficiaries, nearly all male and female

Table 10: KOA Intervention - Net Cocoa Income per hectare, mean values

	Comparison Group (n=47)	KOA (n=39)	Difference
Household Size	4.80	5.05	0.25
Productive Cocoa Area (Ha)	2.65	3.80	1.14
Volume of Cocoa from Own Land (Kg/Ha)	258	271	12.29
Cocoa Income (GHS/Ha)	3'382	3'583	200
Material inputs costs (GHS/Ha)	559	729	170
Labor Costs (GHS/Ha)	1'645	1'200	-444
Total Costs of Production (GHS/Ha)	2'539	2'305	-233
Net Cocoa Income (GHS/Ha)	1'179	1'654	475
Net Cocoa Income (USD/Ha)	69	104	35

Source: Survey data 2024
Note: 1 USD = GHS 12.28 at the time of reporting

farmers in the focus group discussions, except for one, agreed that their income had increased since partnering with KOA.

This increase is due to the additional income from selling previously wasted pulp. The one farmer who indicated a neutral effect on income cited increased labor costs from having to separate pods, which offset his additional income from the pulp.

KOA's facilitation of transportation also benefits farmers by covering the costs of transporting filled buckets from the farm to the factory and back, saving them previous transportation expenses. Some farmers reported reduced post-harvest loss due to KOA's training on harvesting slightly earlier than usual, positively impacting their overall yield.

Farmers also noted that the beans dry faster after pulp extraction and seem to weigh more. This is likely because KOA sorts of out low-quality beans, leaving higher-quality beans that are heavier, although this does not affect overall income.

- **Workload:** All farmers agreed that their workload has increased since partnering with KOA. This additional work involves separating pods, filling buckets, and transporting them to the factory. The waiting times at the factory can be lengthy, resulting in lost time.

  Farmers also mentioned that KOA expects a neat and tidy environment, which requires more frequent weeding. Despite this, the farmers, particularly men, believe the extra work is worthwhile due to the higher returns they receive.

- **Farmers' health:** Farmers, particularly female farmers, reported improved basic health due to better hygienic standards. The hygiene training they receive has positively impacted both their work environment and their general knowledge of hygiene, which they now apply in their daily lives.

  Practices such as washing hands with soap, cleaning equipment before processing pods, and wearing personal protection equipment like face masks, gloves, and hats are seen as beneficial. However, they

Table 11: KOA Intervention - Total Household Income

	Comparison Group (n=47)	KOA (n=39)	Difference
Household Size	4.77	5.05	0.29
Total Net Household Income (GHS)	20'984	15'871	-5'114
Household Adjusted Benchmark	52'152	54'086	1'934
Size of the income gap (GHS)	31'168	38'215	7'047
Size of the income gap (USD)	2'539	3'113	574

Source: Survey data 2024
Note: 1 USD = GHS 12.28 at the time of reporting

Table 12: KOA Intervention - Share of households living below the LIB

	Comparison Group	KOA
Share of households above the LIB	13 %	0 %
Share of households with a gap of Less than 25% to the LIB	4 %	3 %
Share of households with a 25 to 50 Gap to LIB	15 %	21 %
Share of households with a 50 to 75 Gap to LIB	26 %	26 %
Share of households with a 75 to 100 Gap to LIB	43 %	46 %

Source: Survey data 2024

also noted that wearing all the PPE can be "stressful," likely due to the hot weather conditions.

- **Education level:** All farmers reported an increase in their education level since collaborating with KOA. They highlighted gaining valuable knowledge on managing cocoa trees and hygiene practices, which they had previously mentioned in their initial training activities.

  Some farmers noted that they were unable to attend all the training sessions due to personal reasons, other commitments, or misunderstandings about scheduling. Despite these challenges affecting a few farmers, the overall impact of the training remains positive.

- **Infrastructure:** The farmers were very pleased with KOA providing them with a tricycle for transportation. Previously, they either had to pay for tricycle services out of pocket or transport the pods on foot.

  However, they noted occasional delays with the KOA tricycle, which sometimes result in the pulp fermenting on the plot and becoming unusable. In such cases, KOA fully compensates the farmers for the loss and the work done. While minor delays are common, significant delays have been reported only in a few instances.

- **Impacts on community:** KOA's use of its own tricycles and hiring of riders from outside the community has put local drivers in a difficult situation. One farmer noted that local tricycle drivers are negatively affected by KOA's operations, as they now receive fewer orders and face the risk of unemployment.

  On the positive side, farmers appreciated the direct payment process. Receiving payments on-site and on the same day allows them to pay their laborers immediately, which enhances their reputation and encourages hired laborers to continue working on their farms.

- **Environment:** While farmers did not explicitly mention environmental benefits, their comments suggest positive effects. They expressed satisfaction with the processing of pulp that was previously discarded as waste.

Additionally, improved harvesting knowledge has reduced post-harvest loss, and KOA's emphasis on maintaining a clean farm contributes to better environmental practices, as farmers are more diligent about not leaving waste behind.

- **Overall happiness:** Overall, the farmers are very pleased with their collaboration with KOA. They noted that the careful handling of the entire process, including the use of PPEs, enhances the professionalism of cocoa production. This attention to detail gives farmers a greater sense of seriousness and professionalism in their work.

Potential Improvements on the KOA intervention

The Focus group discussions with farmers involved in the intervention highlighted several areas for improvement from the farmers perspective:

- **Increase the number of tricycle riders:** Farmers noted that the current ratio of tricycle riders is rather limited, causing occasional transportation delays. They have suggested hiring additional riders to improve efficiency.

  Male farmers proposed hiring local community members or farmers who own tricycles to alleviate transportation bottlenecks. Female farmers suggested assigning tricycle riders to specific regions to reduce travel distances and ensure timely delivery of cocoa beans, which they believe would enhance productivity and profitability.

- **Reduce waiting times at the factory:** Farmers expressed concern over long waiting times at the factory. Since the factory operates only on specific days, all farmers deliver their cocoa beans at once, leading to factory bottlenecks. They recommended either increasing the frequency of production days or implementing a scheduling system to manage the influx of deliveries and improve coordination.

- **Pruning assistance:** Both male and female farmers requested more support with pruning. Male farmers asked for labor assistance, while female farmers suggested the deployment of KOA-trained laborers to help with pruning tasks.

- **Training on organic farming methods:** One male farmer specifically requested training on processing empty cocoa pods into organic fertilizer. While he currently uses the pods for mulching, he expressed a need for more comprehensive training on organic farming and pod utilization. Given that the project to convert pod husks into biochar was only in its early stages during the interviews, this initiative could potentially address this need.

SANKOFA

Description of Sankofa intervention

The objective of the project is to improve the livelihoods of cocoa farmers through income diversification, climate resilience, and biodiversity conservation using dynamic agroforestry. This approach aims to increase farmers, incomes via fair trade strategies, addressing poverty (SDG 1) and hunger (SDG 2), and contributing to economic growth (SDG 8).

The primary beneficiaries are cocoa farmers in the Ahafo and Western North regions of Ghana who are members of the Kuapa Kokoo Farmers Union (KKFU). The implementation involved an initial pilot of Dynamic Agroforestry (DAF) between 2019 and 2022. This is now being upscaled with more farmers.

Key activities include combining crops and tree species with different life cycles, promoting premium-quality associated crops (yam, maize, cassava, plantains), and providing extensive training on DAF practices. Figure 21 shows the theory of change for the Sankofa intervention.

Results for the Sankofa intervention

Net Cocoa Income

The Sankofa intervention appears to have a substantial positive impact on net cocoa income. Farmers in the Sankofa group earn higher net cocoa income per hectare, averaging GHS 3,433 compared to GHS 2,316 in the comparison group.

This difference is largely driven by higher yields per hectare, with Sankofa farmers producing 317 kg/ha compared to 257 kg/ha in the comparison group. The increased yields may be attributed to the training provided to farmers as part of the intervention.

Additionally, the revenue boost is likely supported by the payment of the living income differential, which enhances overall income. Interestingly, despite expectations from focus group discussions where farmers anticipated higher production costs, the quantitative data shows that Sankofa farmers actually incur slightly lower production costs.

They spend an average of GHS 970 on production per hectare compared to GHS 1,188 in the comparison group. This reduction in costs, coupled with higher yields and revenue, results in a significantly higher net cocoa income per hectare for Sankofa farmers.

Figure 21: Sankofa Intervention - Theory of Change

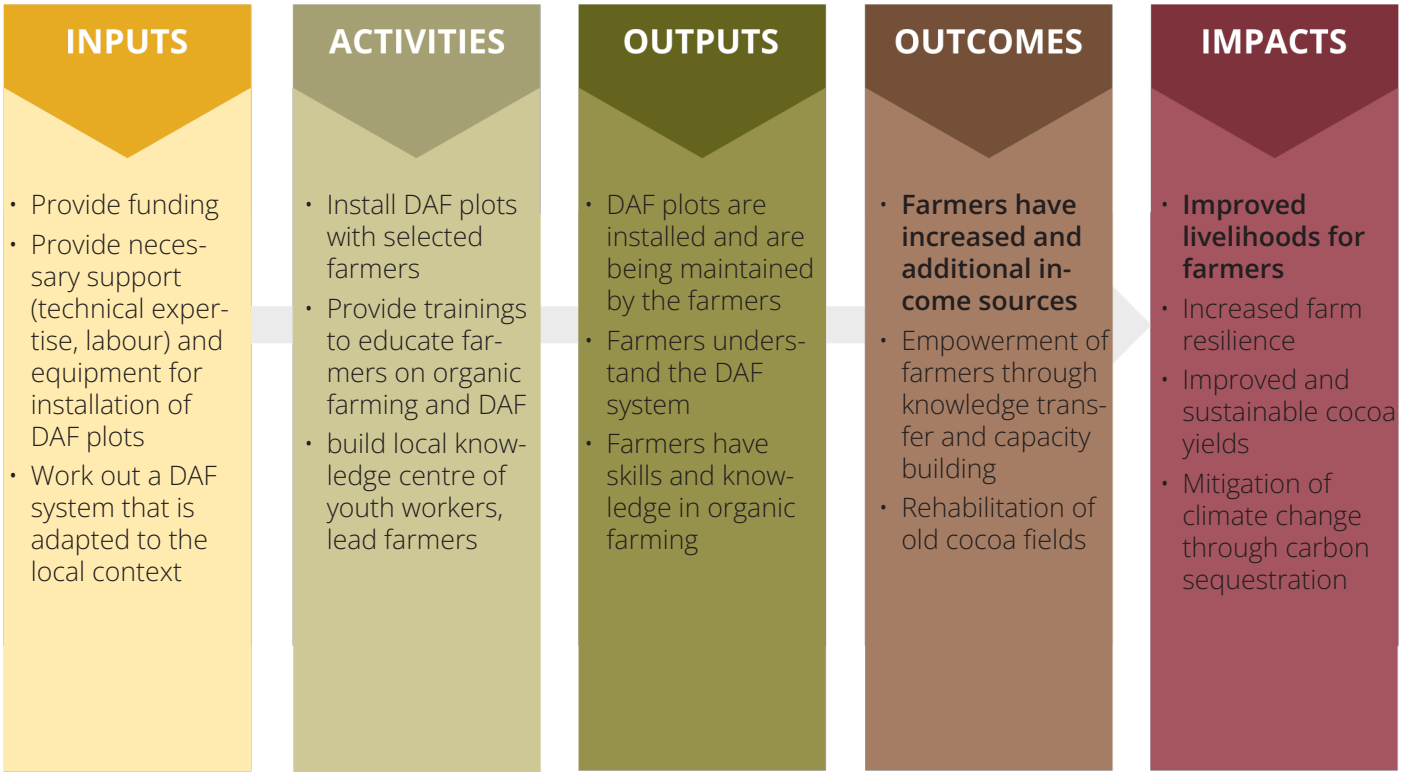


Table 13: Sankofa Intervention - Net Cocoa Income per Hectare, Mean Values

	Comparison Group (n=86)	Sankofa (n=46)	Difference
Household Size	5.73	5.80	0.07
Productive Cocoa Area (Ha)	4.54	4.05	-0.49
Volume of Cocoa from Own Land (Kg/Ha)	258	317	58
Cocoa Income (GHS/Ha)	3'384	4'272	888
Material inputs costs (GHS/Ha)	305	217	-89
Labor Costs (GHS/Ha)	763	622	-140
Total Costs of Production (GHS/Ha)	1'188	970	-219
Net Cocoa Income (GHS/Ha)	2'316	3'433	1'117
Net Cocoa Income (USD/Ha)	179	269	90

Source: Survey data 2024
Note: 1 USD = GHS 12.28 at the time of reporting

Total Household Annual Income

The overall household income for Sankofa households is higher' at GHS 25'076' compared to GHS 18'787 for the comparison group. While the income gap for the Sankofa group is smaller' at GHS 33'300 (USD 2'712)' compared to GHS 40'835 (USD 3'326) for the comparison group' this difference is not statistically significant.

Although the Sankofa intervention is associated with a higher total household income and a reduced income gap' a relatively large income still remains. Moreover' it is important to note that' based on this analysis' we cannot establish a causal relationship between the intervention and these outcomes.

Share of households living below the Living Income

On average' approximately 9% of households in the Sankofa intervention group live above the Living Income benchmark' compared to 4% in the comparison group. Notably, 47% of households in the comparison group and 33% in the Sankofa intervention group fall within the 75% to 100% gap to the Living Income benchmark. This indicates that the Sankofa intervention may be narrowing severe income gaps (see Table 15).

Perceived impact of the Sankofa intervention on farmers, standard of living

Our goal was to identify the impact the inter-

Table 14: Sankofa Intervention - Total Household Income

	Comparison Group (n=89)	Sankofa (n=46)	Difference
Household Size	5.78	5.80	0.03
Total Net Household Income (GHS)	18'787	25'076	6'289
Household Adjusted Benchmark	59'622	58'376	-1'246
Size of the income gap (GHS)	40'835	33'300	-7'536
Size of the income gap (USD)	3'326	2'712	-614

Source: Survey data 2024
Note: 1 USD = GHS 12.28 at the time of reporting

Table 15: Sankofa Intervention - Share of Households Living Below the LIB

	Comparison Group	Sankofa
Share of households above the LIB	4%	9%
Share of households with a gap of Less than 25% to the LIB	2%	13%
Share of households with a 25 to 50 Gap to LIB	10%	9%
Share of households with a 50 to 75 Gap to LIB	34%	37%
Share of households with a 75 to 100 Gap to LIB	47%	33%

Source: Survey data 2024

vention had on the farmers, standard of living. Therefore, during the FGD, farmers were asked to rank the interventions impact on several livelihood dimensions.

The impact could be positive, neutral, or negative. Additionally, farmers were asked how the intervention could be improved. Below we outline the perceived impacts of the farmers:

- **Level of income:** Most farmers reported an increase in income since partnering with Sankofa (see Figure 13), with female farmers noting this trend slightly more frequently than male farmers. However, some farmers stated that their income has remained unchanged.

A significant factor boosting farmers, income within the Sankofa project is the additional revenue from cultivating other crops, which plays a crucial role in overall income enhancement. This aspect will be discussed further in the next section.

Additionally, the diversification of income sources, including those during the dry season, has made farmers, income more stable and reduced seasonal gaps.

Another key contributor to income improvement under the Sankofa project is the Living Income Differential provided by Halba, as well as the Fairtrade premium payment on their DAF cocoa (so far only farmers from the pilot program harvest DAF cocoa).

- **Sources of income:** Farmers generally agree that their income has diversified and increased since joining the Sankofa project, though a minority reported that their income sources have remained unchanged.

  Income growth is largely attributed to mixed cropping, where cocoa is grown alongside other crops such as yam, cassava, plantain, beans, and mango. These additional crops either enhance personal consumption or are sold to boost income.

  However, some crops, such as Canavalia and Pigeon Pea, lack local market demand. To address this, Sankofa, through Kuapa Kokoo, buys and exports these beans, providing farmers with a guaranteed income. Farmers who reported a neutral impact often had already engaged in multiple cropping before joining Sankofa. This is common, as many farmers manage several plots and diverse crops.

  The provision of seedlings for additional crops by Sankofa has facilitated income diversification for some farmers who previously lacked access to these resources.

- **Workload:** The discussion on workload among the farmers revealed diverse opinions, highlighting the difficulty of reducing such a complex issue to a straightforward question.

  Nevertheless, the goal was to provide farmers with the opportunity to share their perspectives on workload within the DAF farming system, without being able to conduct an in-depth comparison between DAF and non-DAF farming or verify the farmers, statements.

  While the majority concurred that the workload has increased, there were also voices that asserted that it remained neutral or had even decreased. These farmers were relating to specific tasks such as weeding, which can be reduced in frequency after a while. But in general, the consensus was that the farmers perceive the workload to be higher due to the complexity of the system.

  Farmers reported that the initial workload is substantial, with land preparation and installation of DAF plots being particularly labor-intensive and costly.

- **Farmers' health:** All the farmers expressed that their health has improved since joining the Sankofa project, except for one female farmer who reported a neutral impact. This positive change was attributed to the cessation of harmful chemical use.

  Specific examples included experiencing fewer body pains, headaches, and decreased waist pain. According to the farmers, these symptoms were previously caused by the use of spraying machines. They also credited their improved health to nutritional diversification and reduced chemical residues in the crops they consume, as they no longer use chemical inputs.

- **Education level:** All farmers noted an improvement in their education level since participating in the Sankofa project, except for two male farmers who reported a neutral impact. The farmers expressed enhanced capacity in terms of training and knowledge.

  However, there was a strong emphasis on the need for additional training. Specifically, the farmer who raised concerns about termite pests highlighted the necessity for further education on organic pest control measures.

- **Environment:** Even without specifically asking the farmers about the project's environmental impact, farmers voiced positive effects. Since the farmers are educated not to burn the soil prior to new cultivation, they noted its preservation of soil microbes and fertility.

  Moreover, farmers noted improved crop diversity enhances microclimates, facilitating better growth for various crops. Additionally, the farmers see the lining and pegging techniques to optimize land productivity by utilizing space to its fullest. But on the other side, there was criticism voiced towards this cultivation method, since some farmers perceive it to be less resilient to drought and harmattan, leading to cocoa trees dying in the early stage of cultivation.

- **Overall happiness:** In general, the farmers are very happy about the collaboration with Sankofa and communicated that they know of other farmers who also would like to join the project.

Potential Improvements on the Sankofa Intervention

The Focus group discussions with farmers involved in the intervention highlighted several areas for improvement from the farmers, perspective:

- **Resilience of the DAF systems:** In order to enhance the resilience of the DAF systems the farmers, recommendation involves reverting to the traditional method of planting multiple cocoa seedlings rather than relying on a single one and thin out in a later stage if multiple plants start to grow.

  Furthermore, several farmers advocate for the adoption of Amazonia cocoa, which aligns better with the local climate compared to hybrids.

- **Additional training:** Farmers stressed the importance of additional education on organic pest control, especially for termites, to avoid reliance on chemical inputs.

- **Others:** Farmers suggested several improvements for the Sankofa project:

  - Expand to other districts and increase farmer participation.
  - Provide PPEs such as boots, and raincoats.
  - Offer additional labor support for farm management due to the high workload.
  - Integrate oil palm into the DAF system.
  - Improving the current market center for Sankofa food products.
  - Implement a reward system for hard work.

RECOMMENDATIONS

Based on the key findings of the study, the following recommendations are made. Although COCOBOD, development partners and other stakeholders can collaborate on these recommendations, specific roles are outlined below.

For COCOBOD, the following are recommended:

- Implement a 30% increase in farmgate prices to help cocoa farmers achieve a living income under the 2022/23 yield conditions (as of September 2024) and base future increases on production costs and inflation.
- Enhance productivity through the intensification of farms (from 329 kg to 800 kg per hectare), improving cocoa variety selection, optimizing input use and pruning.
- Encourage and support the formation and strengthening of producer organizations, as membership significantly influences cocoa productivity and income.
- Explore and implement strategies to reduce production costs, particularly labour costs, through mechanization, cooperative labour arrangements, or access to affordable inputs.
- Sensitize the youth to engage in cocoa farming to ensure the long-term sustainability of the cocoa sector since the average age is 53 years.

For development partners and other stakeholders, the following are recommended:

- Develop and support strategies for the reduction of household expenses (both production specific and other expenses)
- Develop and support income diversification programs for cocoa farming households (e.g. non-cocoa related activities or off-farm activities).
- Implement targeted programs to support female-headed households, which typically earn less income compared to male-headed households.

METHODOLOGICAL REFLECTIONS

We offer some reflections on the key tasks involved in conducting a living income study, organized into four categories: data collection (for both quantitative and qualitative data), analysis and evaluation of interventions.

Reflections on Collecting the Income Survey Data

- **Income is a sensitive topic:** To encourage farmers to share this information comfortably, conduct interviews in an appropriate setting (e.g. ensuring privacy by avoiding external listeners).

  Moreover, pre-informing farmers about the surveys (e.g., through community sensitization workshops) may help ease the work of enumerators, who would otherwise need to repeatedly explain the purpose of the exercise to make farmers feel at ease or to clarify that no monetary compensation is foreseen.

- **Optimal timing:** Data collection should ideally take place at the end of the main cocoa season to improve recall accuracy and optimize data collection efforts.

- **Random sampling:** Presents logistical challenges, particularly in coordinating field activities, as locating farmers can be time-consuming.

- **Having a well-trained, experienced team** is critical for ensuring data quality. Enumerators familiar with agriculture, particularly cocoa production, can facilitate both training and data collection processes.

- **Survey Length:** There is a trade-off between shortening the survey and maintaining the quality of estimates. A committed team of enumerators is necessary to handle longer surveys—consider providing incentives to maintain motivation and ensure data quality.

- **Survey Design:** we recommend improving data recall and accuracy by prompting respondents to list household members as memory aids.

  Additionally, including triangulation possibilities within the questionnaire can help validate the information collected, both during the interview as well as at a later stage in the data cleaning.

Reflections on Carrying out the Focus Group Discussions

- **Clarifying the Purpose:** Participants often use these workshops as an opportunity to express personal needs.

  Therefore, it is essential to clearly communicate the purpose of the workshops at the outset to ensure a smooth process, explicitly stating that the focus is not on individual concerns or needs.

- **Managing Group Size:** Keeping groups small can be difficult, as the workshops tend to attract significant interest in the community, often leading to more participants than initially planned.

- **Limitations of FGD Results:** While we carried out a limited number of FGD's in each region, our results may not reach full data saturation. Nevertheless, they still provide valuable insights into the main challenges and strategies identified by farmers across the country.

- **Gender-Specific Workshops:** We recommend conducting gender-disaggregated workshops, as they encourage more open communication among participants. Addi-

tionally, the results highlight gender-based differences.

- **Interactive Exercises:** Interactive activities require clear and detailed explanations to ensure full understanding and engagement from participants.

Reflections on the Data Analysis of the Income Survey

- **Household Clustering:** Following the approach proposed by Tyszler et al. (2018), we clustered households based on two variables: the sex of the household head and the size of the productive cocoa area.

  This resulted in four clusters, some of which—particularly those headed by females—have relatively small sample sizes, which affects the generalizability of the findings. Therefore, we suggest taking appropriate measures before the study to ensure statistically relevant samples within the subgroups.

- **Data Variability:** With a relatively small sample size, outliers can significantly influence the data, complicating the interpretation of mean values.

  Therefore, we recommend to carefully examine distribution parameters for key outcome variables such as productivity and net cocoa income to ensure a better understanding and interpretation of the data.

- **Productivity Indicators:** Beyond cocoa, we were unable to calculate the profitability of the other two major crops due to missing data on acreage. This information could provide valuable insights into farmers and production choices. Additionally, labor productivity could not be assessed, as the available data included only labor expenditures without any information on the actual amount of labor used.

- **Input Costs:** A large proportion of farmers receive subsidized inputs, which are not accounted for in our production costs calculations, likely leading to an underestimation of actual production costs.

- **Opportunity cost of labor:** Our calculations of net cocoa income do not include a) the value of in-kind compensation and b) the opportunity cost of unpaid household labor, suggesting an understatement of production costs.

  Similarly, the living income reference price does not account for these factors. Further methodological guidance on incorporating these aspects, at least for scenario analysis, would be beneficial.

- **Hidden incomes:** As noted earlier, income reporting can be sensitive, particularly when it involves illegal activities (e.g., mining) or poses risks to respondents (e.g., income from child labor below age 13).

- **Value of food produced:** In line with the CHIS methodology, we adopt a pragmatic approach, assuming the monetary value of food produced at home for own consumption accounts for at least 8% of the overall living income benchmark in Ghana.

  However, this percentage was not verified during the study, and further in-depth analysis is recommended for more accurate estimates.

- **Living income benchmark:** We updated the benchmark to account for inflation,

followed by adjustments based on household size and composition within each cluster. However, we did not modify the benchmark to reflect regional variations in the cost of living.

- **Household income distribution dynamics:** This study did not explore how income is managed, distributed or benefits individual household members, despite its potential impact on the well-being of cocoa farming households.

Reflections on the Evaluation of the SWISSCO Interventions:

- **Income Measures:** The current income indicators, computed using the CHIS methodology, may not be sufficiently detailed to fully capture the effects of certain interventions.

  For example, by focusing solely on the additional income from the two main crops may overlook detailed information on other crops, which is often the case in projects where agroforestry systems are promoted. Therefore, we recommend including additional questions to more comprehensively capture the relevant outputs or impacts of specific interventions

- **Impact Pathways:** Income is often not the only potential impact pathway of an intervention; other effects should also be considered to gain a complete understanding of the intervention's outcomes

- **Evaluating the effects:** Due to the limited sample sizes for each intervention, we conducted a simple comparative analysis by comparing intervention farms with a matched group of non-intervention farms, identified through coarsened exact matching. To strengthen attribution, we recommend implementing more rigorous quasi-experimental designs with larger samples.

REFERENCES

Anker' R.' & Anker' M. (2022). Living Income Benchmark' June 2022 Update.

Fairtrade. (2019a). Fairtrade Living Income Reference Price model.

Fairtrade. (2019b). Fairtrade Living Income Reference Price model

Smith' S.' & Sarpong' D. (2018a). Living Income Report: Rural Ghana Cocoa growing areas of Ashanti' Central' Eastern' and Western Regions.

Smith' S.' & Sarpong' D. (2018b). Living Income Report: Rural Ghana Cocoa growing areas of Ashanti' Central' Eastern' and Western Regions.

Tyszler' M.' Bymolt' & Laven' A. (2018). Analysis of the income gap of cocoa producing households in Ghana Comparison of actual incomes with the Living Income Benchmark.

Van Der Haar' S.' Janssen' V. C. J.' Diallo' O.' Boza' F. B.' Diarra' I.' Ingram' V.' Kouadio' K. A. S.' Laven' A.' N'dri' A. N.' N'guessan' A.' & Waarts' Y. (2024). Cocoa household income study approach: A sector-wide approach to assessing the living income status of households in the cocoa sector. Wageningen Economic Research. https://doi.org/10.18174/652510

ANNEX

Table A 1: Average Net Cocoa Income

	All	MH - Small	FH - Small	MH -Medium	FH -Medium
Average Total Value of Cocoa Production					
Productive Cocoa Area (Ha)	3.44	1.21	1.10	4.84	4.21
Land Productivity (Kg/ha)	329	433	277	308	250
Price per Kg (GHS/Kg)	12.8	12.8	12.8	12.8	12.8
Value of Production (GHS)	13’231	6’853	4’002	18’308	12’648
Value of Production (USD)	1’078	558	326	1’491	1’030
Average Production Costs					
Input Costs (GHS)	1’651	1’150	475	2’164	1’551
Total Labor Costs (GHS)	3’114	1’462	1’261	4’237	3’359
Total Costs (GHS)	5’074	2’855	1’799	6’810	5’144
Total Costs (USD)	413	233	147	555	419
Average Net Cocoa Income (from Own Production)					
GHS/Year/Household	8’157	3’998	2’202	11’498	7’504
USD/Year/Household	664	326	179	937	611
GHS/Year/Household/Ha	2’867	3’845	2’192	2’728	2’063
USD/Year/Household/Ha	215	272	168	209	161
Average Net Cocoa Income (including income from sharecropping arrangements)					
GHS/Year/Household	11’316	5’237	3’089	16’059	10’540
USD/Year/Household	922	427	252	1’308	858

Source: Survey data 2024
Note: 1 USD = GHS 12.28 at the time of reporting

ANNEX

Table A 2: Difference Between Mean and Median Production Cost Values

	Mean Value	Median Value	Difference (Median - Mean)	Percentage Difference
Input Costs (GHS)	1’651	740	-911	55%
Input Costs (GHS/Ha)	453	243	-210	46%
Total Labor Costs (GHS)	3’114	1’435	-1’679	54%
Total Labor Costs (GHS/ha)	1’040	590	-450	43%
Total Production Costs (GHS/Ha)	5’074	2’655	-2’419	48%
Total Production Costs (GHS/Ha)	1’726	1’064	-662	38%

Figure A 1: Off-Farm Income - Most Common Sources of Wage-Employment

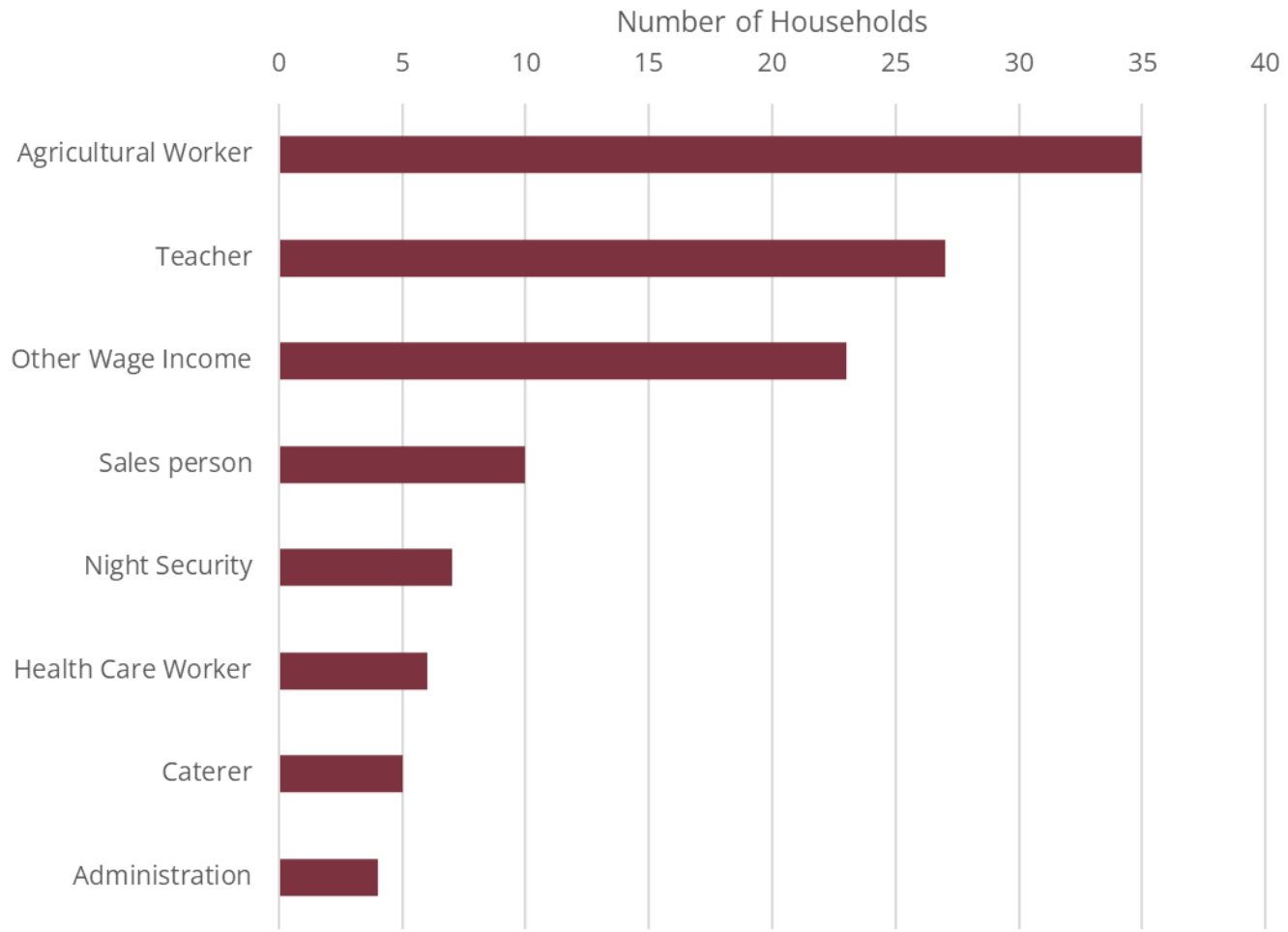


Figure A 2: Off-Farm Income - Most Common Sources of Self-Employment

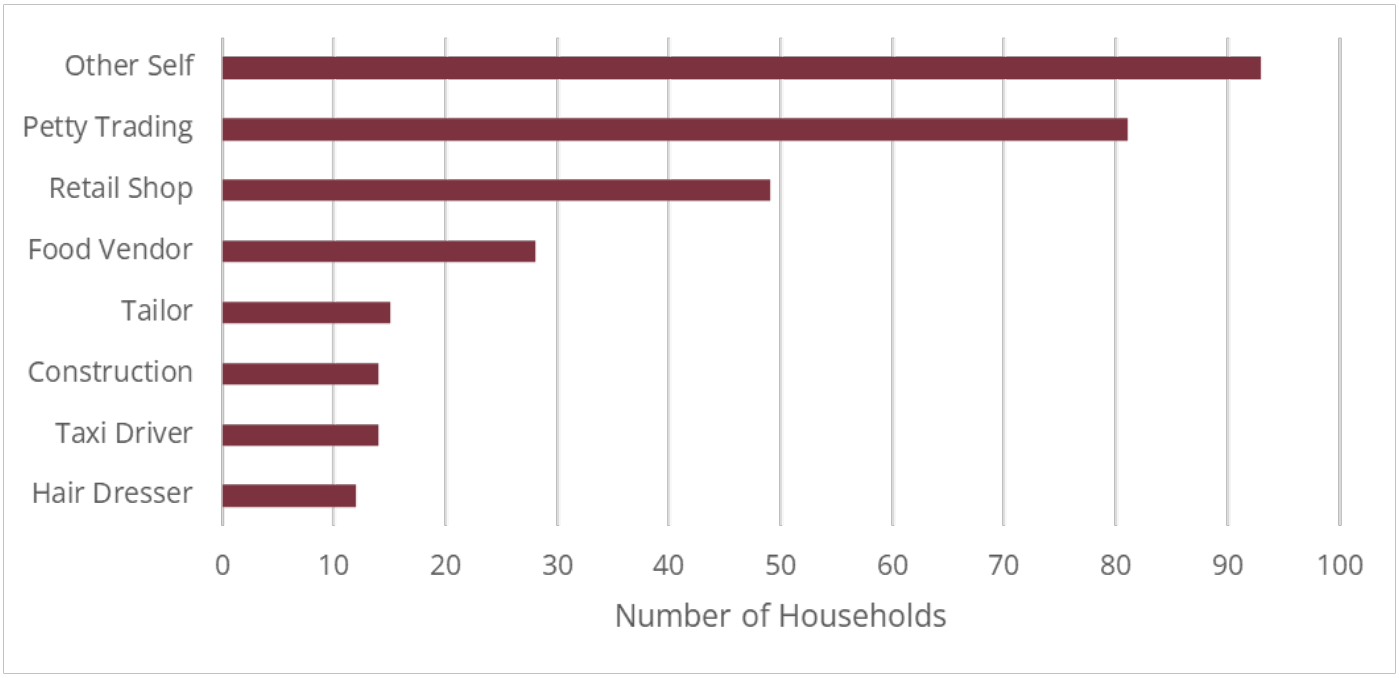
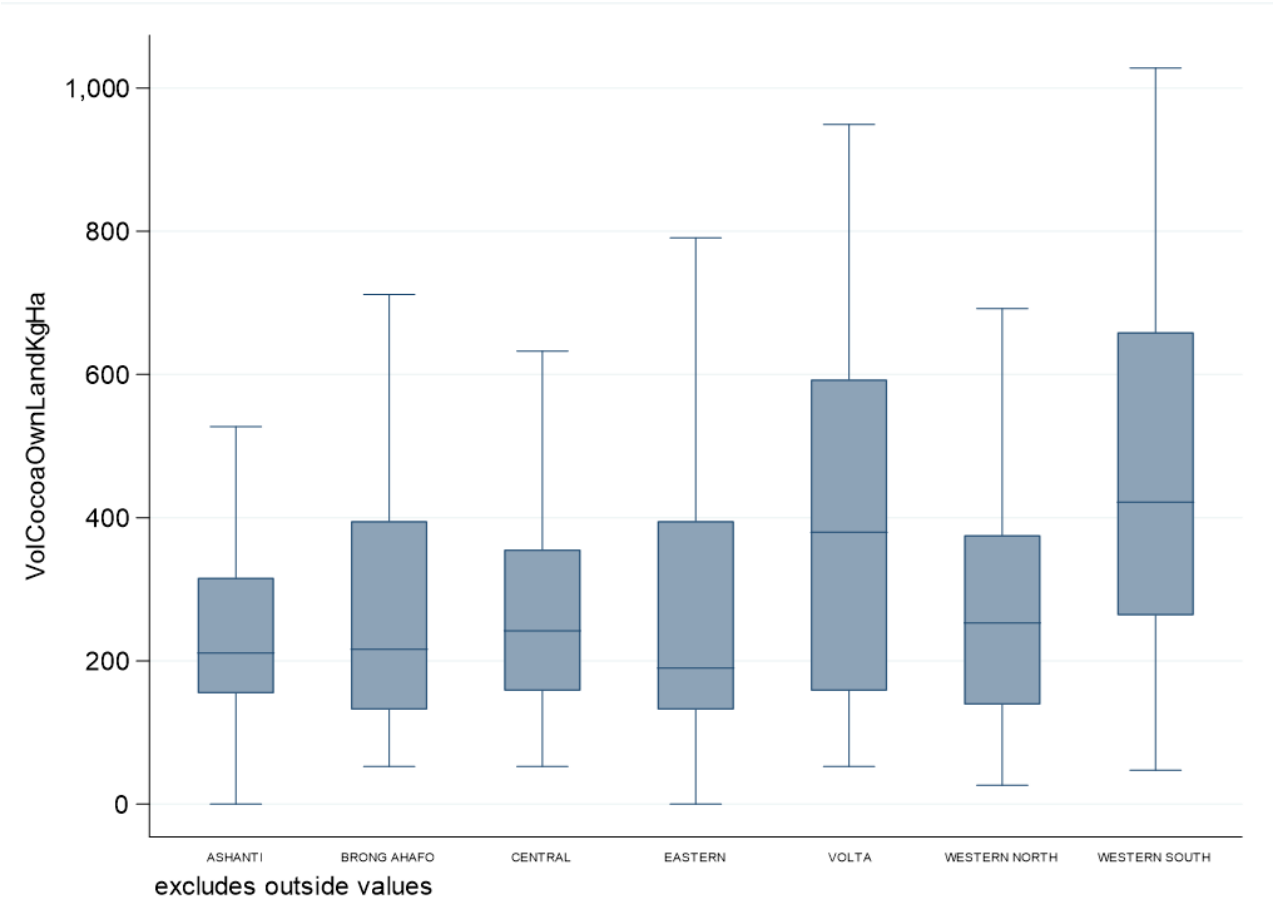


Figure A 3: Regional Yield Variations (Kg/Ha)



ANNEX

Table A 3: Income Gap - Average Values Across Analytical Groups

	All	MH - Small	FH - Small	MH -Me-dium	FH - Me-dium
Average Yearly Adjusted Benchmark (GHS/household/year)	52’970	51’610	43’358	56’123	51’081
Total Household Income (GHS/household/year)	24’814	18’847	13’378	30’498	22’611
Average Size of the Living Income Gap (GHS/household/year)	28’132	32’763	29’979	25’626	28’470
Average Size of the Living Income Gap (USD/household/year)	2’291	2’668	2’441	2’087	2’318
Average Size of the Living Income Gap (% of LIB)	53%	63%	69%	46%	56%

Source: Survey data 2024
Note: 1 USD = GHS 12.28 at the time of reporting

Table A 4: Description of Covariates

Covariate	Description
Sex of the Household Head (binary)	Indicates whether the household head is male or female (0 = male’ 1 = female).
Education Level of respondent (categorical)	Measures the level of education attained by the respondent (e.g.’ no formal education’ primary’ secondary’ tertiary).
Years of Cocoa Farming Experience of respondent	The total number of years the respondent has been engaged in cocoa farming’ reflecting their experience level.
Household Size	The total number of individuals sharing the household budget.
Productive Cocoa Area (Hectares)	The size of the household's cocoa-producing land in hectares.
Cocoa Variety (categorical)	The type of cocoa variety planted by the household (Hybrid’ Amazon’ Amelonado)’ which can impact productivity and income.
Rejuvenated Cocoa Area (binary)	Indicates whether the household has replanted old or unproductive cocoa trees (1 = yes’ 0 = no)’ which affects the farm's potential output.
Rehabilitated Cocoa Area (binary)	Shows whether the household has rehabilitated (pruned) existing cocoa farms (1 = yes’ 0 = no)’ improving productivity on existing land.

Inputs Costs (GHS/Ha)	The total cost of inputs (e.g.' fertilizer' pesticides) used per hectare of cocoa land' influencing overall production costs.
Labor Cost (GHS/Ha)	The total labor costs per hectare' covering hired labor for tasks such as pruning' harvesting' and farm maintenance.
Income Diversification (categorical)	Describes the variety of income sources available to the household (e.g.' cocoa only' cocoa + other crops' off-farm income)' reflecting economic resilience.
Number of Household Income Earners	The number of individuals within the household who contribute to its overall income' which impacts household economic stability.
Producer Organization (binary)	Indicates whether the household is a member of a cocoa producer organization or cooperative (1 = yes' 0 = no)' which can affect access to resources and markets.
Training participation (binary)	Reflects whether the respondent has participated in any agricultural or cocoa-specific training (1 = yes' 0 = no)' which may influence farming practices.
Advisory Services (binary)	Shows whether the household received advisory services from agricultural experts (1 = yes' 0 = no)' potentially improving farm productivity and income.
Access to Loan (binary)	Indicates if the household has accessed a formal loan for farming purposes (1 = yes' 0 = no)' affecting their ability to invest in farm improvements.
Region (categorical)	The geographical region where the household is located (e.g.' Eastern' Western' Ashanti)' which can influence climate conditions' access to markets' and infrastructure