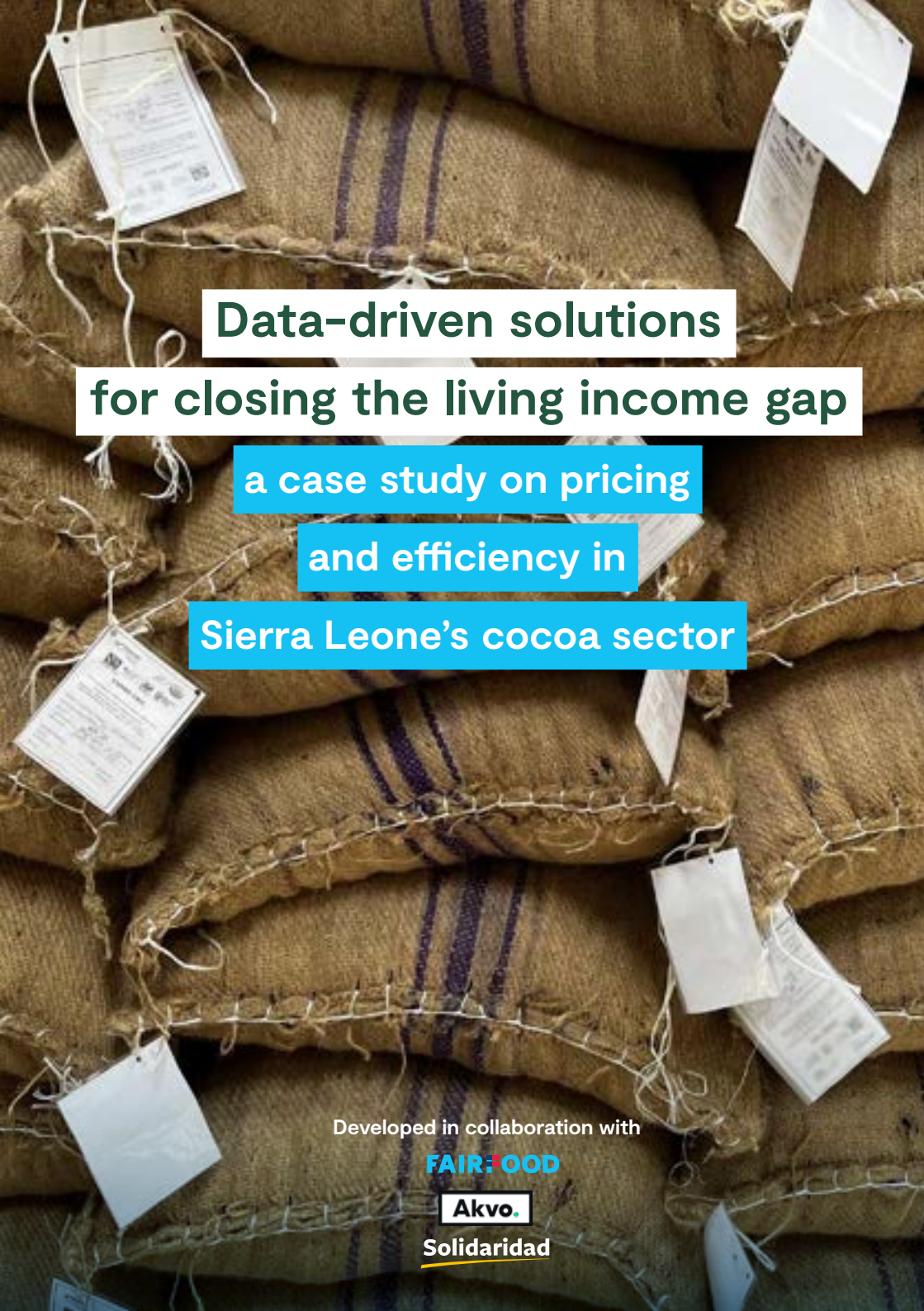


Data-driven solutions for closing the living income gap

a case study on pricing and efficiency in Sierra Leone's cocoa sector

Developed in collaboration with

FAIRFOOD

Akvo.

Solidaridad

authors

Mariana Broitman (Fairfood)

Sandra Fudorová (Akvo)

Hammond Mensah (Solidaridaridad West Africa)

reviewed by

Lotje Kaak (Fairfood), Andrew Morrison & Lahai Tucker (Solidaridaridad West Africa)

This is a derivative work of the Commodity Living Income Strategy White Paper, co-authored by Fairfood International and Heifer International. This case-study was commissioned by the Fair Value Distribution Thematic Learning Group, part of the RECLAIM Sustainability! Programme implemented in strategic partnership with the Dutch Ministry of Foreign Affairs..

Table of contents

Definitions 4
Executive Summary 7
1. Introduction 8
1.1 Introduction: Why farmer segmentation matters for closing the living income gap 8
1.2 Context: Why this approach matters in Sierra Leone's cocoa sector 9
1.3 A Blueprint for action: from data to targeted interventions 10
1.4 A tool for evidence-based decision-making 12
2. Methodology 14
2.1 Living Income Price (LIP) 14
2.2 Cost-Yield Efficiency (CYE) 15
2.3 Data collection and sampling 15
2.4 Data quality and cleaning 16
2.5 Informed consent 16
2.6 Limitations 17
3. Data analysis and findings 20
3.1 Sample snapshot 20
3.2 Production costs and labour realities 22
3.3 Productivity patterns 24
3.4 The LIP Gap: how far farmers are from a Living Income 26
3.5 Farmer typologies and key patterns: a cost-yield efficiency assessment 29
3.6 What if farmers were paid a Living Income Price? 31
4. Intervention modelling 34
4.1 Income diversification 35
4.2 Productivity gains 36
4.3 Cost reduction 36
4.4 Cross-cutting insights & takeaways from the intervention modelling 37
5. Conclusion key insights and recommendations 40
5.1 Regional differentiation is essential 40
5.2 Productivity is the main lever 41
5.3 Cost-efficiency, not cost-cutting 41
5.4 Diversification strengthens resilience, but must be context specific 41
5.5 Certification as a proxy for bundled services 42
5.6 Youth as a service and innovation driver 42
5.7 Literacy and data reliability as prerequisites: making compliance possible 42
5.8 Agroforestry and carbon-linked opportunities 43
5.9 Private sector co-investment and shared responsibility 43

Definitions

Cost-Yield Efficiency (CYE)
A methodology that evaluates and categorises the production and operational activities within commodity value chains. It delivers a nuanced assessment, identifying key areas for productivity and cost optimizations.

Living Income Price (LIP)
A data-driven pricing mechanism designed to calculate the minimum price required for smallholder farmers to achieve a living income, accounting for production costs, yields, and a decent living margin.

Living Income Benchmark
A location-specific measure of the net annual income needed for a household to secure a decent standard of living, including costs for food, housing, healthcare, education, and unexpected expenses.

Farmgate Price
The price received by farmers for their commodity when it leaves the farm, excluding transportation and post-harvest handling costs.

Median LIP
The midpoint value in the calculated Living Income Price data, representing the price at which half of the farmers would earn a living income based on their production conditions.

Cost Drivers
Key factors that influence the cost of production, including labour, fertilisers, and equipment. Understanding cost drivers helps identify areas where efficiencies can be improved.

Efficiency Segments
Categories of farmers grouped based on their cost-to-yield ratios, enabling comparative analysis of productivity and efficiency levels.

Income Diversification
The process of generating income from multiple sources, such as alternative crops or non-agricultural activities, to reduce dependency on a single commodity and mitigate risks.

Gender Disaggregation
The analysis of data by gender to identify disparities in productivity, costs, and income levels between male and female farmers.

Farm Depreciation
The annualised cost of establishing a farm, spread over its productive lifespan to calculate accurate production costs. In this study, cocoa farm establishment costs were divided across the number of productive years, using a fixed value derived from secondary sources.

Implicit Labour Costs
The value of unpaid family labour, often excluded from production cost calculations, but critical for understanding the true cost of farming.

Living Income Gap
The difference between the actual income earned by farmers and the income required to meet the Living Income Benchmark.

Sample Screening
The process of refining data by excluding outliers and ensuring that sample characteristics align with the local agricultural context.

Regional Productivity Benchmark
A reference yield level used to assess the productivity of farmers in a specific region against expected standards.

Farmer-Centric Data Governance
A framework that prioritises farmer participation and ownership in data collection and analysis, ensuring transparency and trust in decision-making processes.

Open-Source Toolkit
A collection of resources, including tools for data collection, analysis, and reporting, designed to facilitate the implementation of LIP and CYE methodologies across supply chains.

Executive Summary

This case study presents the first farmer-level analysis combining income and productivity data across five key cocoa-producing districts in Sierra Leone. Using a methodology developed by Fairfood and Heifer International to define the **Living Income Price (LIP)** and assess **Cost-Yield Efficiency (CYE)**, it reveals a sector marked by low-cost, low-yield production, wide disparities, and persistent barriers to living incomes.

Conducted under the RECLAIM Sustainability! programme, the study aims to leave a data legacy in Sierra Leone, where earlier traceability efforts faced challenges due to limited infrastructure and data availability. It seeks to inform government, private sector, and development actors as they design future interventions and investments that build a more inclusive and sustainable cocoa sector.

Purpose of the study

- Profile farmer realities across cost, yield, and income.
- Identify segment-specific barriers to achieving a living income.
- Provide practical guidance for policymakers, cooperatives, NGOs, and buyers.

Key findings

- **Certification matters**: Certified farmers achieve higher yields and efficiency with similar input costs.
- **Productivity is decisive**: Low yields—not high costs—are the main barrier to living incomes.
- **Costs already minimal**: Further cost-cutting risks underinvestment.
- **Diversification builds resilience**: Especially critical for high-cost, low-yield farmers.
- **Segment-specific gaps**: Even with a universal LIP, land and household size will keep some farmers below living income thresholds.
- **Sector potential**: Growing government and private sector interest, combined with farmers' low-input, climate-resilient systems, offers a strong foundation for sustainable cocoa production.

Practical Guidance

- **Combine interventions**: Fair pricing must be paired with productivity, efficiency, and diversification support.
- **Tailor by segment**: Recognise structural differences in yield, land size, and efficiency — one-size-fits-all strategies won't work.
- **Engage farmers locally**: Regional, gender, and generational differences should shape programme design.
- **Build enablers**: Strengthen recordkeeping, financial literacy, and data infrastructure for sustained impact.
- **Adopt and scale the methodology**: Reapplying CYE and LIP analysis enables progress tracking, smarter investments, and fairer pricing over time.

1. Introduction

1.1 Introduction

Why farmer segmentation matters for closing the living income gap

If you were restructuring one of your company's departments, you wouldn't roll out a blanket "capacity building" plan without first understanding your team's different skills, capabilities, and knowledge gaps. You would identify who needs strategic training, who needs operational tools, and where resources will have the biggest impact.

Yet in the sustainability space, this fundamental step — segmentation *before* intervention — is often skipped. Farmers are too often treated as a single, uniform group, and "one-size-fits-all" programmes end up being deployed across entire regions. The result? Well-intentioned investments in capacity building, programme design, research, or on-the-ground interventions that fail to deliver the living income improvements they promise.

Under the 5-year RECLAIM Sustainability! programme, implemented in strategic partnership with the Dutch Ministry of Foreign Affairs, the consortium, formed by **Solidaridad, Fairfood, Business Watch Indonesia and Trust Africa,** set out to address exactly this issue. The work focused on identifying and breaking the barriers that prevent farmers from receiving a fair share of the value created along supply chains. Building on earlier research *Grounds For Sharing*, developed by Le Basic[1], which highlighted the crucial role of production costs in strengthening supply chain resilience, the consortium advanced this agenda by testing practical tools and models to make value distribution more equitable.

Together with Heifer International, and with support from Akvo, Fairfood has developed the **Living Income Commodity Strategy**, designed to turn farmer-level data into targeted interventions, procurement strategies, and investment decisions, ensuring that actions are based on actual farmer realities rather than averages or assumptions. At the core of this strategy are two complementary methodologies — the Living Income Price (LIP) and the Cost–Yield Efficiency (CYE) frameworks — which together form its backbone. The LIP identifies the price farmers need to earn a living income, while the CYE pinpoints the efficiency gaps that prevent them from reaching it, even when prices increase. In the context of Sierra Leone, a key country within the RECLAIM Sustainability! Programme, this approach also addresses one of the core pillars of national cocoa policy: the need for reliable, segmented data to guide planning, regulation, and investment.

This case study marks the first time the **Living Income Price (LIP)** and **Cost–Yield Efficiency (CYE)** frameworks have been used in Sierra Leone's cocoa sector, a market that is attracting renewed private-sector interest, but lacks the farmer-level data needed to design effective interventions.

The aim of this Living Income Commodity Strategy is simple but transformative:

- Understand the *real* production costs, yields, and income gaps of the farmers you are sourcing from.
- Classify and segment farmers with similar risk profiles, just as companies segment their teams, suppliers, or customer bases.
- Develop targeted interventions that respond to each group's specific needs and assets.

By segmenting farmers *before* designing interventions, companies can:

- Develop strategies with a greater chance of success.
- Monitor progress more meaningfully.
- Protect and enhance previous investments made to increase resilience, sustainability, and, in some cases, the continuity of supply flows.
- Meet compliance requirements (e.g. EUDR, CSDDD) with stronger, evidence-based claims.

1.2 Context

Why this approach matters in Sierra Leone's cocoa sector

Sierra Leone's cocoa sector is at a turning point. Once neglected during years of conflict and overshadowed by mining, cocoa is now recognised by the Government as a driver of rural development, economic growth, and climate-smart agriculture. Global demand for sustainable cocoa is growing rapidly, but so too are the expectations from new regulations such as the **EU Deforestation Regulation (EUDR)** and the **Corporate Sustainability Due Diligence Directive (CSDDD)** for full traceability and evidence to strengthen the integrity and credibility of sustainability claims.

For companies sourcing from West Africa, Sierra Leone's cocoa sector presents both opportunities and risks. On one hand, the country is already the leading organic cocoa producer in the region[2], offering potential for rural development, economic growth, and climate-smart agriculture. On the other hand, cocoa expansion carries potential risks, particularly in the context of new regulations. Key cocoa-producing districts, including Kenema, Kailahun, and Pujehun, are adjacent to or overlap with rainforest areas such as the Gola Forest. While land conversion for new cocoa farms could contribute to forest loss, affecting biodiversity, ecosystem services, and climate, forest-friendly approaches such as shade-grown or agroforestry cocoa provide opportunities to sustain production while supporting conservation objectives.

1 Bureau d'analyse sociétale d'intérêt collectif (BASIC), (2024): The Grounds for Sharing - A study of value distribution in the coffee industry.

2 In 2020, about 56% of global organic cocoa production took place in Africa, followed by 43% in Latin America. The main suppliers of organic cocoa beans to the EU in 2020 were the Dominican Republic (37%), Sierra Leone (24%) and Peru (13%). - Entering the European market for organic cocoa, CBI (2022).

Unlocking this potential depends on addressing the systemic barriers that constrain the sector. These challenges include agricultural practices — such as aging farms, limited replanting, low yields, and poor bean quality resulting from low adoption of good practices — as well as weak infrastructure, fragmented and informal trade systems, and persistent inequalities in land access, capital, and market opportunities, particularly for women and youth.

Understanding these barriers and risks highlights the importance of reliable data and statistics to guide planning, regulation, and investment. The current lack of trustworthy, detailed data on farmer holdings, yields, income, production costs, and land use is a major constraint. This case study addresses that gap by providing:

- Farmer-level cost and income data across **5 key districts**.
- Segmented analysis that identifies **4 different types of farmers** and their respective challenges.
- **2 analysis tools (LIP and CYE)** to link farm economics to national development goals.

In simple terms: this study helps paint a much clearer picture of what's happening on the ground: what farmers earn, what they spend , and what needs to change.

This aligns closely with the Ministry of Agriculture's plans to develop better data systems to support planning, decision-making, and compliance with the evolving regulatory requirements of key buyers of Sierra Leonean cocoa.

Significant investments have already been made in resilience, sustainability, and continuity of supply. But without understanding the distinct profiles, capacities, and constraints of the farmers supplying the chocolate sector, these investments risk being misaligned, inefficient, or unsustainable.

This is where LIP and CYE provide a breakthrough. They enable companies and policymakers to move beyond averages and identify distinct farmer segments, understand the cost, yield, and income dynamics shaping each segment, and pinpoint where targeted interventions can create the greatest impact.

1.3 A Blueprint for action
from data to targeted interventions

This approach previously tested in Honduras[3] and Uganda is already **replicable, field-ready, and actionable**. This study's aim is to invite peers — in cocoa and other tropical commodity sectors — to plug this methodology into their own programmes, test it against their current approaches, and co-design refinements to make it even more effective.

Developed through the combined expertise of organisations that have been active in the living income space for more than a decade, these tools are designed to turn farmer-level data into targeted interventions, procurement strategies, and investment decisions, ensuring actions reflect actual farmer realities rather than averages or assumptions.

The changing regulatory landscape demands this shift. We are no longer simply asked to report risk. Instead, we are expected to understand the realities we report and *act* on them. Transparency is now a non-negotiable requirement, dependent on high-quality, verifiable data that exposes where unfairness and inefficiency persist.

The **Fairfood–Heifer LIP and CYE methodologies** are not a parallel reporting system. It is a practical exercise for field teams, cooperatives, exporters, and buyers. It identifies gaps and maps the levers — yield, cost structure, quality premiums — so local actors can decide on the most relevant next step. Think of it as a service manual for building profitable, resilient farm businesses, not an extra spreadsheet to fill in or a box ticking activity.

By aligning all actors in the supply chain around the same set of facts, this work shifts the conversation from: *"Who is to blame for the gap?"* to *"How do we prioritize and*

Behind this study

This initiative is a collaborative partnership between **Fairfood International**, **Solidaridad West Africa** and **Akvo**, combining their expertise to address systemic barriers faced by smallholder farmers and create a scalable, replicable model.

Fairfood International
The Dutch NGO works to develop innovative sustainable models that are replicable across the agri-food sector. During the RECLAIM Sustainability!, Fairfood has coordinated the Thematic Learning Group on Fair Value initiative, providing open-source traceability and analytics tools, translating impact monitoring into actionable business insights.

Akvo
Established in 2007, Akvo is a non-profit organisation working to bring data and digitalisation to the forefront of the development sector. Akvo conducted data collection, cleaning, and analysis, ensuring integrity and delivering robust insights into cost drivers, efficiency segments, and income disparities.

Solidaridad West Africa
The partner with boots-on-the-ground, with longstanding expertise in efficiency analysis, diversification strategies, and sustainable development. Solidaridad coordinated the sampling process, was trained by Akvo, and carried out data collection in the field as part of the 5-year programme and implementation of mapped interventions.

3 The Honduras example was the first use case of a series under development: Molinos de Honduras' Living Income Commodity Strategy: a blueprint for sustainable sourcing (2025)

address cost drivers?"

In Sierra Leone, Fairfood and Solidaridad West Africa, supported by Akvo, applied the two methodologies to develop a model that guides both private and public sectors action, demonstrating that profitability and genuine sustainability are not at odds. By the end of this case study, agricultural officers, exporters, and European procurement and sustainability teams will have actionable insights to adopt and scale these methodologies within their own supply chains.

1.4 A tool for evidence-based decision-making

The Living Income Price (LIP) and Cost–Yield Efficiency (CYE) frameworks translate farmer-level data into actionable insights for three strategic areas: productivity and profitability, compliance and market positioning, and financing models.

Supporting productivity and profitability goals

They make visible the diversity of farmer realities, from efficient high-yield producers to those trapped in low-cost, low-yield cycles that keep them below the living income threshold. The LIP and CYE analysis make these differences visible and actionable. They help answer critical questions like:

- **Who needs better access to inputs?**
- **Where should extension services focus?**
- **Which farmers are best positioned for scale or certification?**

Think of it as a diagnostic tool: it shows who is thriving, who is struggling, and what kind of support each group needs.

This supports multiple strategic activities to strengthen Sierra Leone's potential as a cocoa powerhouse. For example, data can inform:

- Extension services – by identifying training needs across farmer segments
- Input distribution systems – by highlighting cost constraints and efficiency gaps
- Climate-smart replanting – by showing where low productivity may be linked to aging farms
- Promotion of cocoa farming as a business for the new generation – by providing the kind of information producer organisations and youth initiatives need to turn cocoa into a viable business

Enabling compliance and market differentiation

The LIP methodology also supports the Government's goal to brand and market Sierra Leonean cocoa ("Salone Cocoa") as a traceable, and high-quality cocoa that meets trade requirements. Understanding the true cost of sustainable and dignified cocoa production enables:

- **More transparent value chains that meet EUDR requirements**
- **Stronger claims around fair pricing and ethical sourcing**
- **Differentiation in global markets, especially for organic or specialty cocoa**

Put differently: if Sierra Leone wants to be seen as a source of sustainable cocoa, it needs to prove that farmers are being fairly remunerated for their level of effort. This study helps provide that proof.

Informing financing models

Finally, the study provides a clear case for the kinds of financing that would support long-term sector transformation. By modelling the income gap and identifying which interventions could close it (e.g. productivity gains, diversification, cost reductions), it helps:

- Build the evidence base for setting up a **national replanting** fund where needed
- Inform the design of **e-credit** schemes for farmer investments
- Prioritise public and donor spending based on where the income gap is most severe

Findings can support resources going where they are most needed and most likely to generate impact.

Disclaimer
While this case study provides new insights into farmer costs, yields, and income gaps in Sierra Leone, it does not claim to represent all regional differences or provide a comprehensive national picture. Rather, it should be seen as a starting point: a practical demonstration of the methodologies and a direction for more detailed, regionally representative research.

2. Methodology

This study applies the **Living Income Price (LIP)** and **Cost–Yield Efficiency (CYE)** methodologies to analyse farmer-level income gaps, cost structures, and productivity patterns in Sierra Leone's cocoa sector.

The sections below explain each methodology in detail, along with the data collection process, quality controls, and study limitations. To understand the rationale for analysing the interplay between production costs, yields, and sustainable pricing, read the Living Income Commodity Strategy White Paper[4], or read the Frequently Asked Questions about the methodology.

2.1 Living Income Price (LIP)

The Living Income Price (LIP) is a farmer-level price floor that represents the minimum farmgate price required for a household to earn a living income from cocoa. The LIP methodology takes into account both the production realities and household needs of farmers. It is composed of the following components:

$$\text{Farmgate LIP} = \frac{(\text{Living income benchmark} \times \text{Diversification ratio}) + \text{Production cost} + \text{Depreciation cost}}{\text{Yield} \times \text{Production farm size}}$$

- **Living Income Benchmark**: A national or regional figure that estimates the annual income needed for a decent standard of living, adjusted for household size and inflation.
- **Diversification ratio**: The share of household income that comes from cocoa. A higher ratio indicates greater dependency on cocoa to meet household needs.
- **Cost of production**: Actual costs incurred by the farmer in producing cocoa, including inputs, labour, and depreciation (see Glossary).
- **Yield and farm size**: The quantity of cocoa harvested per hectare, and the size of land used for cocoa production.
- **Depreciation**: The annualised value of investments such as tools or farm establishment costs.

The LIP provides a transparent and data-driven benchmark for sustainable procurement and can be calculated at farmgate, cooperative, or FOB levels. In this study, the focus is on the **farmgate LIP**.

4 Marie, A., Gilman, C., Miralles, I., (2024): The Commodity Living Income Strategy White Paper.

2.2 Cost-Yield Efficiency (CYE)

The CYE framework segments farmers based on two key indicators:

- the **cost of producing one kilogram of cocoa (USD/kg)**, and
- their **yield per hectare (kg/ha/year)**.

Following previous applications of this metrology, farmers are categorised into four groups based on their cost-productivity ratio. As a new addition to this study, this data was also segregated by the 5 researched regions.

This segmentation provides a more nuanced view of farming dynamics and helps identify which groups can benefit from specific interventions – such as training, input subsidies, or pricing mechanisms. It also enabled the calculation of segment and region-specific income and living income price gaps, making income gaps and cost drivers visible, supporting more precise interventions.

2.3 Data collection and sampling

Primary data was collected from 489 cocoa farmers in five districts: Kailahun, Kenema, Kono, Bo, and Pujehun. Data collection took place in March and April 2025, with fieldwork conducted by Solidaridad West Africa and supported by Fairfood's analytical framework.

- Each district contributed 100 farmer interviews, except Kenema, where 89 farmers were included due to incomplete surveys.
- Sampling aimed to reflect diversity across certification status, age groups, and cooperative membership.

Where are the farmers located?

This map of Sierra Leone highlights the five districts where data collection took place: **Ko**, **Kenema**, **Kailahun**, **Pujehun** and **Bo**.

Sampling realities in the Sierra Leone context

The sampling plan for this study targeted 30% women and 50% certified farmers, based on the fragmented farmer lists available. While the target for women was met, only 22.4% of the sample was certified. This outcome illustrates the difficulty of conducting purposeful sampling when farmer records are incomplete or inconsistent. It also highlights a broader challenge for future studies: in contexts where farmer-level information and documentation are limited, achieving representative samples across key characteristics is difficult. This not only affects the accuracy of baseline data but can also limit the precision of segmentation and intervention design.

2.4 Data quality and cleaning

Data quality was monitored using a real-time tracking dashboard that provided supervisors with key insights, including GPS locations, survey durations, and the volume of data collected by each enumerator. Standardised data-cleaning procedures were applied to identify and remove outliers. Additional thresholds were agreed with Solidaridad to ensure local validity, and farmers with implausible production costs or revenues (as validated against local benchmarks) were excluded.

Visualisations, such as plots comparing cocoa farm size to kilograms produced, helped to highlight outliers and flag potential issues. Data collection supervisors could then contact enumerators directly to clarify or resolve unusual entries, ensuring accuracy and consistency.

The overall data quality was reasonable, though several issues emerged. Limitations around labour cost reporting and off-farm income were noted and are addressed in the discussion section.

To ensure reliability and relevance, the dataset was filtered according to two criteria:

1. only farmers with complete income and harvest data for the previous season were included
2. farms had to be geolocated with GPS coordinates.

2.5 Informed consent

Ensuring that farmers consent to data collection and understand how their data will be used is a core principle of this approach. Prior to each interview, participants (or the household's primary decision-maker) were read a statement explaining the purpose of the study and its intended use. After hearing the explanation, farmers could decide whether they wished to proceed. Informed consent was recorded only if they agreed, and no data was collected if they opted out.

The principles guiding ethical data management and farmer trust can be consulted here.

2.6 Limitations

While the dataset provides strong insights, several limitations are acknowledged:

- **Temporary labour costs** were inconsistently reported, likely due to farmers inability to recall and limited record-keeping.
- **Proof of land ownership** was not used as a selection criterion, though we recommend including it in future research. The absence of this proof limited our ability to assess security of tenure, which may influence long-term investment decisions.
- **Off-farm income** and **remittances** were likely underreported, leading to an incomplete picture of household income diversification.
- **Household labour costs** (e.g., family labour) were excluded, potentially underestimating total costs.
  - The cost of household labour is commonly excluded from Living Income studies, as the profit from selling cocoa is considered both a return on investment and payment for labour. Including household labour would therefore risk double counting. Consequently, the cost of cocoa production presented here does not include the value of all labour used.
- **Literacy and data comprehension** varied across the sample, limiting the depth of some responses and potentially affecting the accuracy of self-reported figures.
- **Gender and youth segmentation** was constrained by both sample size and the incompleteness of farmer lists.

For example, records suggested that 50% of farmers were certified, yet the actual proportion was 22.4%. Women were also underrepresented in farmer lists, which limits the reach and accuracy of gender-specific analysis.

Despite these limitations, the data was confirmed as robust and defensible by local experts from Solidaridad West Africa, the Sierra Leonean Produce Monitoring Board and experts from the Ministry of Agriculture[5].

5 All mentioned entities were involved in peer-reviewing this study ahead of publication, between July and September 2025.

3. Data analysis and findings

Behind every data point in this chapter is a farmer: someone tending a few acres of cocoa in the humid green of Sierra Leone, often with ageing trees, worn tools, and little capital to invest. Many work mostly by hand, relying on family labour, and face seasonal shortages of paid workers. Women and youth remain underrepresented in leadership and certification, while most farmers lack formal land titles.

This chapter lays the foundation for the intervention modelling in Chapter 4. The analysis is based on farmer-level cost, yield, and income data collected in five cocoa-producing districts namely **Kailahun, Kenema, Kono, Bo, and Pujehun**. It also flags Sierra Leone–specific operational realities that shaped both data collection and interpretation, critical for anyone sourcing from, or planning investments in, the country's cocoa sector.

Research goals guiding this analysis:

- **Estimate the price gap** between current farmgate prices and the Living Income Price (LIP), disaggregated by district and key demographic variables.
- **Identify groups of farmers** with similar productivity and cost-efficiency patterns, to support tailored intervention design.
- **Model interventions** such as yield improvements, cost reductions, and diversification could close the living income gap (Chapter 4).

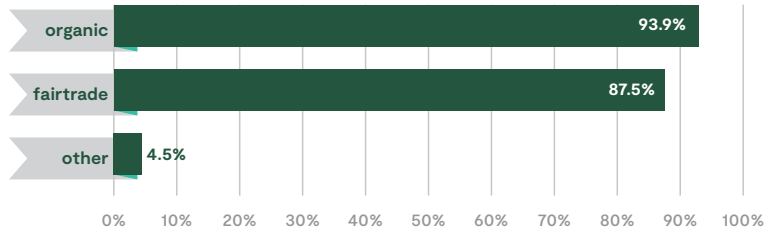
By moving beyond averages to profile distinct farmer 'personas', this chapter equips procurement teams, sustainability managers, cooperatives, and policymakers with a clear, evidence-based picture of who farmers are the farmers, what they produce, what it costs them, and where there is room to act.

3.1 Sample snapshot

- **Gender balance:** 31.2% of respondents were women, (meeting the target but still below desired parity for representation in lists and leadership roles).
- **Certification**: 22.4% of farmers were certified (mostly with both Fairtrade and Organic)
  - The country is currently the leading producer of organic cocoa production in West Africa
- **Age**: Majority over 45 years, underlining generational challenges in the sector. Only 22.5% were youth (aged 35 or younger)
- Nearly 50% were cooperative members (99% unpaid, median fee for others: 150 SLE)
- **Land tenure:** Most report owning their land, but formal documentation is rare.

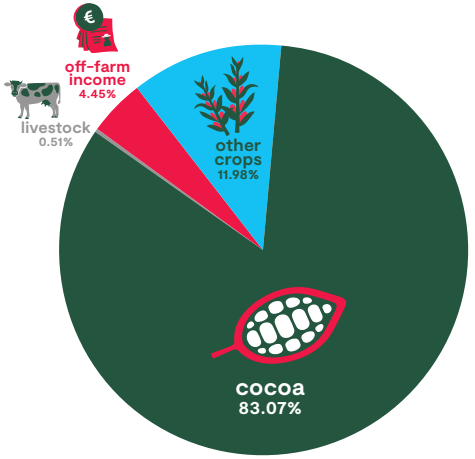
Which certifications are most common among farmers?

Organic and **fairtrade** certifications are the most common within the sample. Out of the 112 certified farmers, 95 hold both a fairtrade and organic certification.



Crop diversification and income sources

- Cocoa is the primary cash crop for most farmers, but **diversification is common**.
  - **Cocoa = 83% of income**[6]
  - Over 80% grow and sell other crops, mainly banana, palm, cola, followed by cassava and rice, mostly produced for own consumption.
- **Off-farm income sources** account for only 5%, and include petty trade, artisanal mining, transport services, and remittances from family members.
- **Cocoa dependency** ranges from below 40% (diversified households) to above 80% (specialised cocoa farmers).



Although income diversification remains limited, the diversity of crops plays a strategic role from a food security perspective.

From what sources do farmers earn money?

This graph presents the main categories, from which farmers earn an income.

6 Cocoa Varieties: Most farmers cultivate Ghana Hybrid cocoa, followed by other hybrid types such as Amelonado, Amazon, and Native varieties. Less common varieties include Mercedes and Cameroon Hybrid.

3.2 Production costs and labour realities

- Median production cost: **USD 0.31/kg – among the lowest observed in West Africa**.
- **District variation**: lowest costs in Kenema and Kailahun, highest in Kono.

Main cost drivers:

- **Labour:** largest single expense. Permanent labour is rare; most hire temporary workers during harvest at high seasonal rates.
  - Crop maintenance (56.2%), pruning (52.8%), harvesting (45.6%)
- **Inputs:** use is low due to cost and access barriers. Fertiliser, pesticides, and seedlings are reported as too expensive (22.6%), unavailable (~10%), or low quality (7.6%)[7].
- **Tools:** depreciation of short-lived machetes and axes adds hidden costs.
- **Transport:** high for remote farmers due to poor roads.

Labour challenges:

- Limited mechanisation means most work is manual, increasing labour needs during harvest.
- Temporary labour cost reporting inconsistent due to recall issues and lack of written records.
- Household (family) labour excluded from calculations (in line with living income studies best practice), but this likely underestimates true production costs.

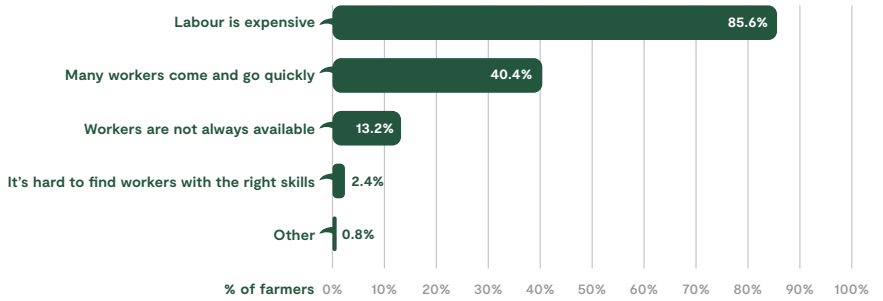
These constraints not only affect production costs but can also delay or limit yield-improving practices, which has implications for intervention design discussed in Chapter 4.

What are the most common drivers of cost of production?

This graph presents an overview of different components of the cost of production. Only costs which are reported by over 10% of farmers are included.

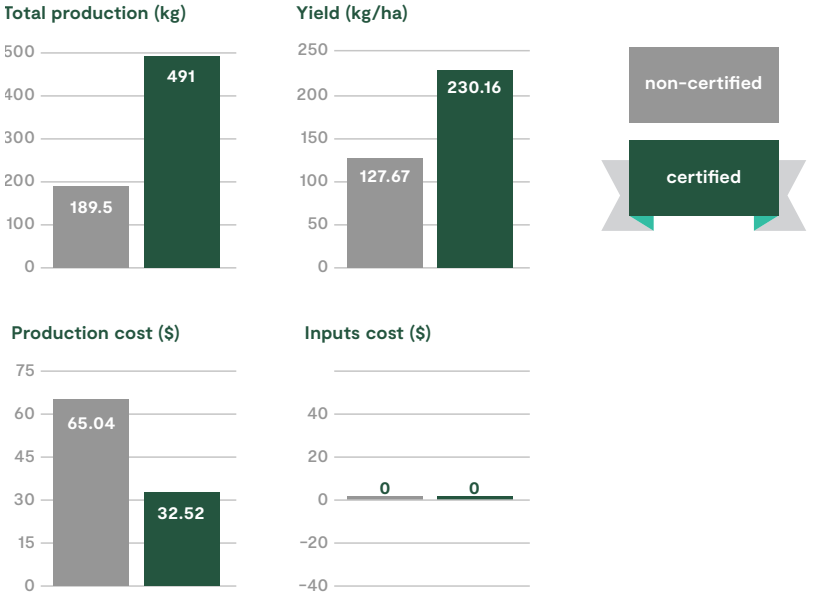
7 Main constraints for accessing input reported were: High price of inputs (22.6% of farmers); Lack of access to desired inputs (~10%); Low quality of inputs (7.6%) and Occasional unavailability or lack of information on where to buy them.

What are the main challenges farmers face when hiring labour?



Certification effect: Certified farmers consistently report lower costs per kg and higher yields, pointing to efficiency gains from bundled training and input support.

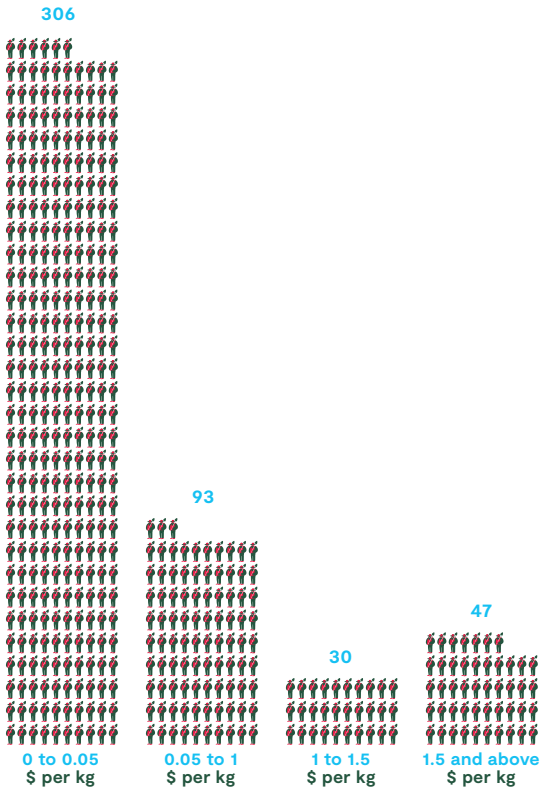
Large cost differences between certified and non-certified farmers



3.3 Productivity patterns

Median yield is 144 kg/ha: low but with significant district variation.

Certification effect: Farmers were analysed per segment and district, with certified farmers consistently outperforming non-certified peers in both yields and efficiency. They achieve higher productivity with lower overall costs.



How many farmers belong to each cost range?

Segment cost profiles

- **Certification:** certified farmers achieve ~100 kg/ha more than non-certified, often falling into the lowest cost brackets, with 96% of farmers producing a kilogram of cocoa for less than one dollar.
  - **Nearly 60% of certified farmers produce cocoa for less than $0.50/kg**.

Meanwhile, non-certified farmers are overrepresented in the highest cost bracket, with 12% falling into this range.

Certified farmers spend less on producing cocoa, with the median non-certified farmer spending **twice as much**.

- **Gender:** women slightly outperform men on yield; age differences negligible.
- **Youth:** more likely to produce cocoa at **less than $1/kg**, but typically farm smaller plots.

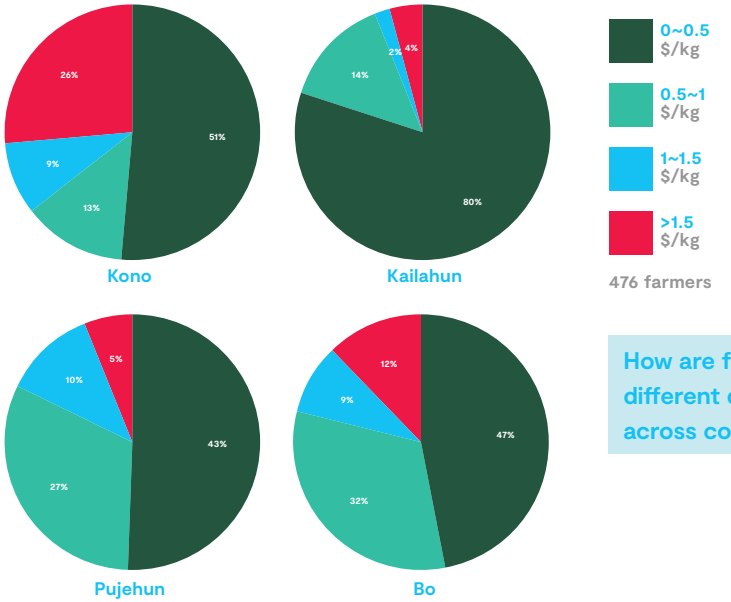
*A key finding from this analysis is that certified cocoa farmers consistently **outperform** their non-certified counterparts.*

Overall, certified farmers consistently outperform non-certified peers in both yields and efficiency. Input costs are similar across groups, but certified farmers convert investment into productivity more effectively.

District-level cost profiles

- **Kono**: highest concentration of high-cost producers
- **Bo & Pujehun**: mid- and low-cost segments dominate
- **Kailahun & Kenema**: skewed toward the lowest cost segment

In **Kenema**, **higher cost ranges are absent**

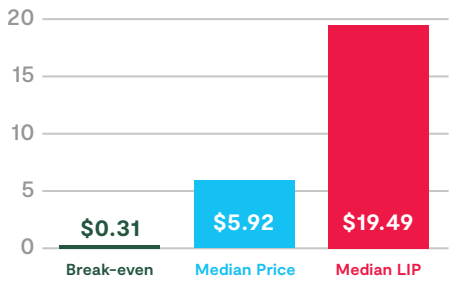


How are farmers in different districts divided across cost ranges?

3.4 The LIP Gap: how far farmers are from a Living Income

The Living Income Price (LIP) provides a concrete benchmark for the minimum price farmers need to receive at the farmgate to earn a living income from cocoa, based on their actual costs and yields. Rather than relying on generic reference prices, this approach encourages further efforts to connect price setting directly to the farmer's reality: how much land they have, how productive it is, how much they spend, and what a decent standard of living costs in Sierra Leone.

What is the median received price and LIP for cocoa farmers?



→ **Median farmgate Living Income Price (LIP):** USD 19.49/kg - almost **4× higher** than the reported May 2025 price of USD 5.92/kg.

Regional variation:

→ **Pujehun**: Highest LIP (USD 35.30/kg): small plots, low yields.

→ **Kailahun**: Lowest LIP (USD 13.57/kg): larger plots, higher yields.

The LIP in this study was calculated combining the **Living Income Benchmark** of 9,803 New Leone per month (USD 426), adjusted for each household's size[8] with farmer-level data from the surveys, including the **Diversification Ratio**, or the share of total household income from cocoa (average: **83%** across the sample), cost of production that included reported cash expenses (e.g. inputs, labour, tools)[9] and **land area** under cocoa cultivation.

In simple terms: we calculate how much money a farmer needs per year, then divide that by how much cocoa they produce. That gives us the minimum price per kilo they would need.

8 The Study from KIT Institute indicated that a reference household of seven members in the Eastern Province of Sierra Leone, comprising four adults and three children, needs to earn NLe 9,803 per month (equivalent to 4261 USD) or 117,636 NLe annually (equivalent to 5,112 USD), to achieve a basic but decent standard of living. (Living Income Benchmark for the Eastern Province and Living Income Reference Price for the cocoa sector in Sierra Leone (2024).

9 The depreciation of non-mechanised tools and farm investments was not quantified, as local stakeholders consultations showed that a lot of the tools are freely provided by cooperatives.

The graph shows the minimum price farmers need to earn to cover the cost of production per kg of cocoa (**break even point**). The discrepancy between these three prices mirror the context of Sierra Leone: **one of low cost but also low yields.**

This reinforces a critical insight: low costs alone do not ensure decent incomes. Once farmers produce less, they need to earn more per kg to reach the benchmark, which causes the LIP to increase. **Without productivity improvements, even the most frugal farmer will struggle to reach a living income.**

Segment differences:

→ **Women** have higher LIPs than men (USD 21.12 vs. 19.31) despite slightly higher yields: smaller land sizes are the main driver.

This points to structural inequality in land access, not farm performance, as the key issue affecting women's income potential.

→ **Certified farmers** have the lowest LIP gap due to higher yields, larger plots, and cost efficiency. On average:

- They yield almost a 100 kg/ha more than non-certified farmers
- They cultivate 1 hectare more of cocoa
- They have lower total costs per kg due to better production efficiency

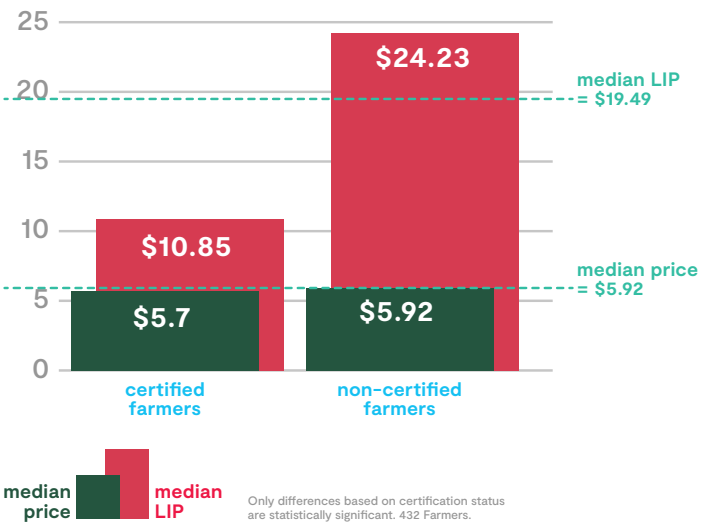
This indicates that certification is associated not only with better market access, but also with higher yields and improved cost-efficiency.

→ **Age** has minimal effect; youth and non-youth have similar LIPs, though youth tend to farm smaller plots.

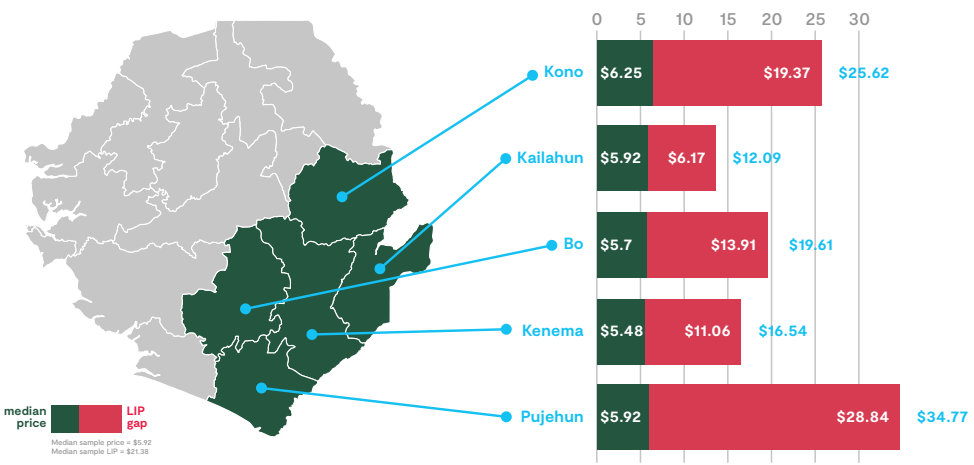
- Though yield differences are negligible, youth farmers typically manage smaller plots, and may lack capital or family support to scale production.

This suggests that age-based interventions should focus on enabling youth to scale operations sustainably.

What is the median received price and LIP for cocoa farmers?



What is the median price and median LIP for different farmer segments?



Zooming into the Regional disaggregation of LIP

The LIP varies widely across Sierra Leone's cocoa-growing districts due to differences in yield, land size, and cost structures.

Pujehun – Highest LIP: $35.3/kg

- Farmers have the **smallest cocoa plots** (median land size: 0.81 ha, half the sample median)
- Low yields and small farms drive the LIP dramatically higher
- Even with low costs, the **volume of cocoa is insufficient** to meet income needs

Kailahun – Lowest LIP: $13.57/kg

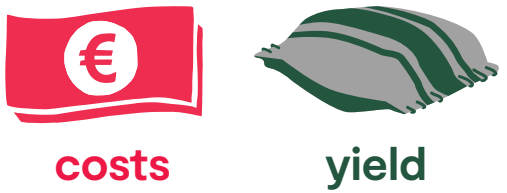
- Farmers in Kailahun report the **highest yields** across all regions
- They also have larger average landholdings
- The combination of **higher productivity** and **larger scale** significantly reduces the price required to meet a living income

This gap analysis reinforces the importance of designing **regionally tailored strategies** for price, production support, and farmer services. Even in the most productive districts, current prices are far from sufficient to meet living income needs, and in the most constrained areas like Pujehun, the shortfall is severe.

3.5 Farmer typologies and key patterns: a cost-yield efficiency assessment

Using CYE analysis, farmers were grouped into four profiles based on cost per kg and yield, revealing a highly diverse set of realities among farmers in Sierra Leone.

We categorised farmers into four broad segments - call it personas - based on their productivity and cost-efficiency. This segmentation reveals a striking pattern: while **costs are generally low**, there is **wide variation in yield**, leading to different levels of efficiency and risk.



1. Excluded survivors: (Low cost / Low Yield) High risk
78 farmers, 1 earning a LIP

- These farmers produce very little cocoa — all below 144 kg per hectare — and spend almost nothing on inputs or farm labour. Many are stuck in survival mode, managing aging farms with no means to invest or replant.
- Often older, rely on family labour, limited access to capital, support, or replanting opportunities.

These farmers are not inefficient: they are effectively excluded from the tools they need to farm better.

2. Struggling farmers (High cost / Low Yield) Very high risk
154 farmers, o farmers earning a LIP

- **Highest LIP, sometimes 3x higher than efficient farmers:** These farmers are investing in inputs or paid labour, but not seeing results in terms of yield.
- High input or labour investment, but low returns due to degraded land, aging trees, or incorrect use of inputs. This group faces a real risk of falling deeper into poverty.

This group is trying, but failing, to break out of poverty as they spend more than they earn from cocoa.

3. Emerging professionals (High Cost / High Yield) Medium risk
74 farmers, 3 earning a LIP

- These farmers achieve good yields — often above 400 kg/ha — and spend significantly more on labour, inputs, and equipment.
- They often belong to cooperatives, are younger, and may have received training or support through certification programmes. Despite higher costs, their efficiency is better: they turn investments into income.

This group points to the potential of cocoa farming as a viable business if the right support is in place.

4. Efficient performers (Low cost /High Yield) Low risk
Majority group: 160, 17 earning above the threshold earning a LIP

- **Lowest LIP, often below the sample median:** This group concentrates the biggest numbers of farmers either earning a LIP or close to it; Price is around 6$/kg and the median LIP for this segment is ~11$/kg which simply means this is the only segment where farmers earn more than they miss to reach a Living Income. **Yet, half of the farmers out of the 160 still need at least double the price they are currently receiving.**

Represents the model for productivity and efficiency; interventions here must focus on sustaining and scaling performance.

What does this tell us? Key observations across typologies:

- Certified farmers dominate high-efficiency segments, converting inputs into productivity effectively.
- High-cost, low-yield farmers are not overspending arbitrarily; they are investing without returns due to structural or knowledge constraints.
- Low-yield segments (regardless of cost) remain the most vulnerable and require combined interventions (price support, training, replanting).

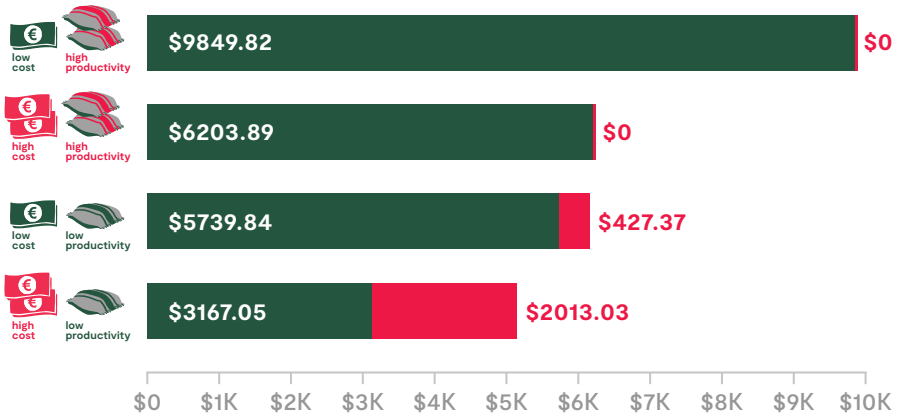
These patterns suggest that **poor performers are not just spending more**: they are also achieving less with that investment.

3.6 What if farmers were paid a Living Income Price?

Using the same formula described above, we modelled the effect of paying farmers the **median LIP** of USD 19.49/kg. The results showed:

- **High productivity farmers** (Low Cost / High Yield & High Cost / High Yield) would close the income gap entirely.
- **Low productivity farmers** would still fall short:
  - Low Cost / Low Productivity: gap would shrink to **7.4%** of current income.
  - High Cost / Low Productivity: gap would remain at **63.5%**.

This confirms that a universal LIP, while helpful, cannot fully address structural differences in **yield, land size, and cost-efficiency**.



Applying **segment-specific LIPs**, which adjust price floors according to each group's yields, costs, and income dependency, would allow all four segments to reach a living income. However, this approach is more complex at scale, requiring granular farmer-level data and tailored price agreements.

These findings reinforce two points that shape the next section:

- **Price alone is insufficient.** Although a key part of the solution, even a significant increase would not enable *all* farmers to reach a living income without improvements in yield, cost-efficiency, or both.
- **Segment-specific interventions are essential.** Different groups require different solutions, as some need price support, others need training, inputs, or replanting schemes.
- **Farmer realities must guide strategy.** Current market prices, and even well-intended universal "fair prices," often ignore the true cost of producing cocoa sustainably, keeping farmers trapped in poverty, especially in low-performing segments.

Anchoring decisions in real farmer-level data shifts the conversation from ideology to evidence, enabling more effective, targeted interventions.

Chapter 4 models how yield gains, cost efficiency, and diversification strategies perform across these segments, revealing where impact is achievable, and where it's not.

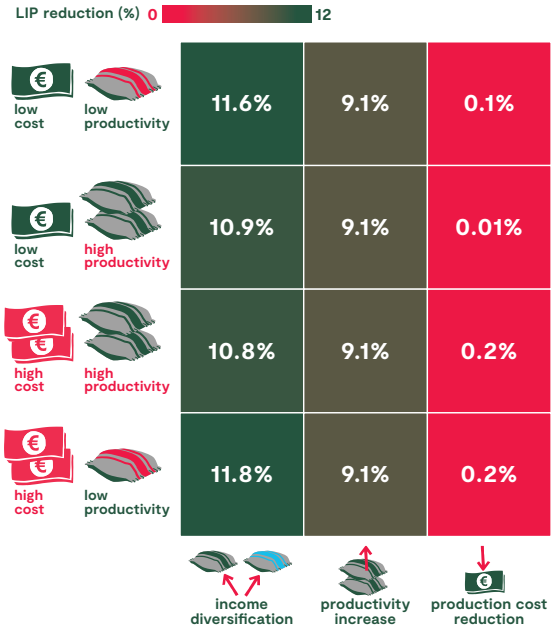
4. Intervention modelling

Segmenting farmers *before* designing investments is not just an academic exercise. It is a way to ensure resources reach the right people, in the right way, at the right time. The profiles from Chapter 3 show that Sierra Leone's cocoa farmers face vastly different realities, which means a single "best practice" will inevitably fail some groups.

The disparities identified by the Cost-Yield Efficiency (CYE) analysis reinforced that cocoa farmers here are not a homogenous group. Strategies that work for efficient, high-performing farmers will fail those who are resource-constrained or structurally disadvantaged. To illustrate, three interventions were modelled across the dataset to assess their effect on the Living Income Price (LIP):

1. **A 10% increase in income diversification**
2. **A 10% increase in productivity (kg/ha)**
3. **A 10% reduction in production cost (USD/kg)**

These interventions were chosen for their potential relevance in Sierra Leone's context, where limited capital, low-input farming, and climatic variability constrain traditional agronomic recommendations. To strengthen the analysis and ensure local relevance, the modelling was complemented by consultations with local experts from Solidaridad West Africa, who helped contextualise the data and validate the assumptions underpinning the scenarios.



4.1 Income diversification

Mechanism of impact: It reduces the proportion of total household income that must come from cocoa, lowering the diversification ratio used in the LIP formula. When cocoa is no longer the sole income stream, the pressure on its price diminishes. In the model, a 10% increase in non-cocoa income consistently reduces the LIP across all segments, with the greatest relative effect in the most vulnerable groups.

Segment impact

- **High Cost, Low Yield** farmers benefit most, with an **11.8% reduction** in LIP, demonstrating that income smoothing may be a lifeline when productivity is low and costs are high.
- For **LCLY** farmers, the reduction is nearly as high at **8.9%**, suggesting that even low-investment households can meaningfully benefit from diversification.
- **LCHY** and **HCHY** also experience notable reductions (9.6% and 2.8% respectively), though to a lesser degree, reflecting that these segments are already approaching economic viability.

Considerations for implementation

While the concept is promising, effective income diversification strategies must be region-specific and risk-aware. Government concerns about food insecurity add a layer of complexity, as farmers moving into alternative crops may risk undermining food production.

Existing diversification pathways in Sierra Leone include:

- **Intercropping with rice, plantain, or cassava** (especially on newer or rehabilitated farms)
- Local stakeholders flagged the importance of including **small livestock**, particularly poultry and goats, as well as **petty trade or artisanal mining activities**

To be effective, diversification interventions should:

- **Maintain or enhance cocoa productivity**, avoiding negative impacts on the main cash crop
- **Build resilience**, including drought-tolerant or fast-growing food crops, while closing gaps in household livelihood assets to make new income sources feasible
- Align with **market access opportunities** and local food security plans
- **Be commercially viable,** delivering at least equivalent value to cocoa, and not subject to the same climate or market risks

Local stakeholder consultation flagged community engagement and knowledge as essential. Farmer sensemaking sessions and community consultation are recommended, particularly with youth and women. It will help identify what diversification looks like in practice, ensure interventions are feasible, and prevent the creation of new dependencies or unintended risks.

4.2 Productivity gains

Mechanism of impact: Increasing productivity (kg/ha) directly reduces the LIP by spreading fixed costs over higher output. A 10% yield increase lowers the LIP by 9.1% mathematically, but real-world effects differ by farmer segment.

Segment impact

- For **HCLY** farmers, the absolute LIP reduction is substantial—nearly **$3.10/kg**—suggesting a strong return on yield-enhancing interventions.
- Even for **LCHY** and **HCHY** segments, which are already efficient, a productivity bump yields financial flexibility and reduces reliance on price premiums.
- For **LCLY** farmers, where input use is minimal and output is low, even a modest increase in productivity could mark the difference between chronic underperformance and viable cocoa production.

Barriers and priorities

Increasing productivity in Sierra Leone's cocoa sector is neither straightforward nor purely technical. The most cited causes of low yields are:

- **Inadequate farm maintenance** (infrequent pruning, limited pest management)
- **Poor shade management**
- **Use of old, low-yielding varieties**
- **Soil degradation**
- **Ageing cocoa trees and insufficient rehabilitation**
- **Climate-related diseases**, with limited local knowledge for prevention or treatment

Local stakeholder consultation revealed that **certification schemes** and **NGO programmes** in Kailahun and Kenema have succeeded in raising yields—suggesting that with long-term support and investment, productivity gains are feasible. Key areas for intervention include:

- Access to **resistant seedlings** and **improved planting materials**
- **Training in pruning, shade management, composting, and soil fertility practices**
- **Youth engagement** in farm renovation and maintenance
- **Leveraging agroforestry programmes** to increase yields and generate secondary income

Sustained support and investment, alongside extension services and community engagement, are key to translating technical interventions into meaningful yield gains.

4.3 Cost reduction

Mechanism of impact: Reducing production costs by 10% has limited effect, particularly for low-cost producers. This is expected: if you're already spending very little, there is simply less room to cut.

Segment impact

- **HCHY** farmers benefit the most (5.2% LIP reduction), given their larger baseline costs.
- **HCLY** sees a **2.9% drop**, though not enough to make a meaningful dent in the gap.
- **LCHY** and **LCHY** see **minimal impact** (0.8% and 0.2%, respectively).

Barriers and priorities

- **Labour, tools, and seedlings are the dominant cost drivers**, not fertilisers or chemicals.
- **Cutting costs further may risk productivity** if farmers underinvest in maintenance or inputs.
- Paid labour shortages during peak harvest remain a major constraint.

The data shows that **labour, tools, and seedling costs** are the dominant cost drivers, not fertiliser or chemicals. Labour is particularly costly in High Cost segments, with high turnover, reliance on paid labourers and shortages during peak periods as frequent risks. Tools (especially non-mechanised equipment like machetes and axes) are also a major expense due to **inferior quality on the market** and **frequent replacement needs**

Opportunities for efficiency gains

- **Subsidise or facilitate access to durable, high-quality tools**
- **Support youth labour brigades to reduce costs while creating employment**
- **Improve farmer literacy and recordkeeping for better financial decision-making**

In the long run, **cost savings alone will not close the gap**, but smarter spending and better decision-making can increase cost-effectiveness.

4.4 Cross-cutting insights & takeaways from the intervention modelling

The study uncovered social patterns that influence intervention success:

- **Youth** tended to have slightly higher productivity and lower costs, often because they farmed smaller plots and had more physical capacity to manage their land.

Older farmers, by contrast, had larger farms but much lower yields, and often lacked the labour or resources to maintain them.

- **Women** were underrepresented in paid labour data, despite contributing significantly to farm work, highlighting persistent gender biases in how value is attributed within the household.

Understanding these dynamics is essential for designing/tailoiring inclusive procurement programmes for different segments credit schemes and policies that do not leave the most vulnerable behind.

Key takeaways

- **Income diversification** stands out as the **most impactful and equitable intervention**, especially for vulnerable segments.
- **Productivity gains** offer consistent benefits, but require long-term investments in knowledge, seedlings, and soil health .
- **Cost reductions** yield marginal benefits and are only meaningful where initial costs are high. Cost-efficiency—rather than absolute cost reduction—should be the priority.

The modelling confirms that **a one-size-fits-all approach will fail**. Instead, **segment-based intervention packages**, tailored to real farmer conditions, offer the clearest path to impact.

5. Conclusion
key insights and recommendations

This case study provides one the most comprehensive farmer-level analyses of Sierra Leone's cocoa sector to date. It unveils a sector marked by low-cost, low-yield production, wide regional and demographic disparities, and multiple intersecting barriers to achieving a living income. Some farmers—particularly certified, higher-productivity ones—are closer to economic viability, but most remain trapped in cycles of underperformance and under-compensation.

Different from the other Cost-Yield Efficiency (CYE) and LIP assessments conducted for private sector partners seeking targeted interventions in Uganda and Honduras, this study supports RECLAIM Sustainability! programme efforts to test traceability models in Sierra Leone. Those efforts struggled due to limited data and infrastructure. As a programme legacy, this study aims to contribute to the living income conversation, providing evidence to inform public and private sector stakeholders and highlight areas where further research and interventions could generate measurable impact.

The central message is clear: closing the living income gap requires **segment-specific interventions** combining **fairer prices, targeted productivity improvements, diversification, and capacity-building** — co-designed with farmers, cooperatives, government, and the private sector.

Below, key discussion points are synthesised and translated into **practical, stakeholder-informed recommendations**.

5.1 Regional differentiation is essential

Regional differences in productivity, cost structures, and LIP values are significant and must be taken into considerations ahead of project and program design. **National-level averages mask critical sub-national disparities**, and a regional approach is not only recommended but necessary. Certain district-level differences can only be understood thanks to local stakeholders consultation. For example:

- **Kailahun and Kenema** exhibit higher productivity and lower LIPs, a result likely linked to sustained NGO support and the earlier introduction of certification schemes.
- **Pujehun**, by contrast, shows the **highest LIP**, primarily due to small average land sizes and limited yield.

For example, a bundled intervention that works in Kenema may fail in Bo or Pujehun unless it's adapted to local agro-ecological conditions, farm sizes, and economic activities.

Recommendations:

- **Programme design:** Cluster districts with similar profiles and co-design interventions with local authorities and cooperatives. Integrate local stakeholder insights on market access, staple crops, and agro-ecological conditions.
- **Monitoring:** Disaggregate analysis by district to ensure interventions remain relevant and responsive.

5.2 Productivity is the main lever

Low input use keeps production costs down, but results in yields too low to close income gaps. Productivity gains consistently have the largest impact on reducing the LIP, especially for high-cost, low-productivity farmers.

Recommendations:

- **NGOs and extension services:** Focus on yield-enhancing practices validated by local stakeholders, such as pruning, soil health restoration, shade management, improved planting material.
- **Youth programmes:** Create service models (e.g. pruning teams, compost production) to support older farmers and generate rural jobs.
- **Cooperatives and buyers:** Combine training with input provision and link productivity gains to traceable premiums.

5.3 Cost-efficiency, not cost-cutting

Most farmers already operate with minimal costs; further cuts bring little benefit and may harm productivity. The priority should be improving cost-effectiveness and decision-making.

Recommendations:

- **Donors and NGOs:** Support access to durable tools and shared labour services.
- Cooperatives: Train farmers in recordkeeping and cost tracking to improve financial literacy.
- **Government:** Regulate tool and input markets to improve quality and pricing consistency.

5.4 Diversification strengthens resilience, but must be context specific

Diversification reduces dependence on cocoa and helps smooth income, particularly for vulnerable segments. Stakeholders noted the importance of district-specific companion crops, livestock, and petty trade, while ensuring cocoa productivity and food security are maintained.

Recommendations:

- **NGOs:** Promote district-appropriate companion crops and livestock programmes, and always engage communities to understand local needs and risks before implementation.
- **Government:** Issue district-level guidance to balance diversification with staple crop needs.
- **Youth initiatives:** Support rural enterprises in service provision, processing, small livestock, or input production.

5.5 Certification as a proxy for bundled services

Certified farmers generally have higher yields, lower costs, and lower LIP gaps, thanks to bundled training, inputs, and technical support. These benefits can be extended to non-certified farmers through cooperatives and service centres.

Recommendations:

- **NGOs and buyers:** Offer certification-adjacent services to farmers based on the needs of each segment.
- **Certification bodies:** Further integrate living income metrics and segment-specific needs into standards, setting an example for the industry.

5.6 Youth as a service and innovation driver

Youth often have lower costs, higher productivity, and openness to new practices but face land access constraints. Their mobility and tech adoption make them ideal for scaling digital tools and service provision.

Recommendations:

- **Government and donors:** Expand youth investment models linking land access with service provision.
- **Buyers:** Engage youth in data collection, traceability, and agroforestry monitoring.

5.7 Literacy and data reliability as prerequisites: making compliance possible

Low financial literacy and poor recordkeeping undermine both interventions and compliance with EUDR or CSDDD requirements. **Financial and farming management literacy is not optional: it's foundational**. In both Fairfood and Solidaridad's previous experiences, low financial literacy and poor recordkeeping have consistently limited both the uptake of interventions and the ability to measure their impact. As a result, intervention design usually takes these constraints into account when working with target farmers.

Recommendations:

- **NGOs and cooperatives:** Integrate basic literacy and numeracy training into all farmer programmes.
- **Exporters and buyers:** Combine simplified, visual materials with low-tech solutions (NFC-based tools, for example) to support illiterate farmers and first-mile digitisation.

5.8 Agroforestry and carbon-linked opportunities

Agroforestry can provide secondary income streams and carbon finance opportunities. Previous Solidaridad's projects in West Africa have linked these opportunities to youth employment, fertiliser production, and bio-inputs.

Recommendations:

- **Government:** Strengthen land and tree rights and formalisation will form the foundation to frameworks for smallholder participation in carbon markets.
- **NGOs, cooperatives and certification bodies:** Bundle agroforestry with carbon finance, fertiliser, biochar production, and youth employment.
- **Buyers:** Invest in jointly monitoring environmental (climate-smart), social (jobs), and economic (income) impacts

5.9 Private sector co-investment and shared responsibility

Finally, international exporters are prioritising quality and productivity but still rely heavily on certification as a proxy for impact. Dynamic, farmer-level data is needed to drive pricing, investment, and risk management.

Recommendations:

- **International exporters and local buyers:** Co-invest in farmer-facing interventions and share data on costs, quality, and premiums.
- **Government**: Provide clear guidance to ensure future interventions create commercial viability, resilience, and alignment with food security goals.
- **NGOs and certification bodies:** Facilitate pre-competitive data-sharing frameworks.
- **Policy officers:** Use EUDR and CSDDD leverage to promote long-term buying commitments.

Final call to action

Modelling and stakeholder input both indicate that price alone cannot close the living income gap. With growing global demand for sustainably sourced cocoa, Sierra Leone has an opportunity to put the data infrastructure in place for its cocoa sector to grow and reflect the success of the billion-dollar chocolate industry.

Meaningful impact comes from combining pricing interventions with yield improvements, cost-efficiency support, and diversification strategies. The methodologies presented in this study equip stakeholders to better understand where interventions are most needed, track progress, and contribute to a thriving sector. By continuously applying these approaches, it becomes possible to:

- Identify underperforming segments and target productivity improvements, recognising that farm size and household composition may limit maximum gains.
- Strengthen resilience through cost-efficiency and complementary diversification strategies.
- Build the literacy, data systems, and market linkages needed to sustain impact.

With these elements in place, we can all contribute to a cocoa sector that is resilient, inclusive, and fully aligned with the ambitions of the global chocolate industry.