High-Level analysis of recent and current yield in the West African cocoa sector

Trends, possible causes and recommendations for interventions

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Despite being the world's leading cocoa producers, the sectors in Ghana and Côte d'Ivoire face persistent challenges that threaten their long-term sustainability. While production has steadily increased, the majority of cocoa farming households continue to struggle with low productivity, low incomes, and limited access to essential services among others. Systematic issues, compounded by the effects of climate change, continue to undermine cocoa sector productivity and profitability. The 2023/2024 season, marked by unprecedented price volatility and severe weather conditions, further highlighted the fragility of the sector. Immediate financial and input support can help to address the reported 2023/24 revenue losses, while systematic reforms have a potential to work towards improved wider sector resilience.

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Acknowledgements

Despite being the world's leading cocoa producing countries, the cocoa sectors in Ghana and Côte d'Ivoire face persistent challenges that could undermine their long-term sustainability. The uncertainty surrounding the effects of climate change in the region, particularly regarding cocoa's suitability, threatens to exacerbate existing challenges in the sector. This shifting reality is driving debates toward enhancing the resilience of cocoa producers in the face of increasingly severe weather conditions and climate shocks. This study provides an overview of cocoa production and productivity trends in these two countries, with a particular focus on the 2023/24 season and the potential impact of climate change on productivity. We hope the findings will offer valuable insights into the broader cocoa sector and reveal the potential effects of climate shocks on cocoa farming households. We believe that the suggested list of mitigation strategies in this report will guide current and future interventions towards more sustainable cocoa production.

We would like to thank Tony's Open Chain for commissioning this study and thinking with us along the way. We are also very grateful to our interviewees for sharing their time and invaluable insights. And lastly, we extend our thanks to our colleagues Verina Ingram and Marieke Sassen for their expert guidance and support.

Executive summary

West Africa produces the highest volumes of cocoa globally, but smallholder farmers face poverty and challenges in improving income and productivity.

West Africa remains the leading global cocoa producing region, with production steadily increasing since the 1960s and reaching 3.66 million tonnes in the 2022-23 season. This cocoa is cultivated by approximately two million smallholder families using traditional methods. Despite the growth in production, many cocoa farming households in the region face significant challenges, with only a small percentage earning a living income and many living below the poverty line. Limited income from cocoa farming restricts investments in necessary agricultural inputs (the costs of which are also increasing) and practices, while access to essential services remains a major issue. Although there have been some productivity improvements under favourable conditions, the sector has struggled to achieve substantial and sustained productivity gains. Barriers include poor access to credit, technical assistance, and infrastructure, as well as the widespread presence of aging cocoa trees. Additionally, cocoa-dependent households are highly dependent on cocoa production for their household income.

Rising temperatures pose a risk to sustainability and productivity of cocoa farming in the region.

There is growing concern about the future of the cocoa sector in the face of changing climatic conditions. Although predictions about climate evolution in the region vary, there is a widespread consensus both within the region and globally about the increase in temperatures. These forecasts indicate an overall drying trend, which lead to less favorable conditions for cocoa in the region. In response to these environmental challenges, there are calls to curb further agricultural expansion. While Good Agricultural Practices (GAP) are a potential solution to some of the challenges, their effective implementation must focus on overcoming key barriers—such as inadequate access to inputs and finance—for GAP to fully realise their potential in boosting productivity and reducing environmental degradation.

Low incomes and systemic issues continue to undermine cocoa sector productivity and profitability.

Low incomes for cocoa farmers are central to the sector's challenges. Although production has increased since the late 20th century, productivity has not kept pace. Temporary improvements have occurred with favourable prices and GAP, but these gains have been short-lived. Persistent low productivity highlights the need for systemic reforms, including aligning GAP with Good Governance Practices and Good Purchasing Practices. Farmers, often under-supported, require greater assistance to make cocoa farming more profitable, especially in the context of climate change and environmental issues.

Price volatility and weather-induced shocks in the 2023/24 season intensified cocoa sector instability and challenge long-term sustainability.

The unprecedented surge in cocoa prices during the 2023/2024 season, reaching USD 10.97 per kg of cocoa by mid-April 2024, underscores the fragility of the sector amidst persistent challenges. Climate-induced disruptions, mainly erratic rainfall and strong winds, but also droughts, and higher temperatures from El Niño, have exacerbated pest and disease pressures, and caused physical damage to cocoa flowers and cherelles, all of which significantly reduced yields. There are different estimations of the changes in production. However, reported and estimated declines triggered market instability and speculative trading that drove prices to record highs.

Interviewees indicate that TOC farmers suffered greatly from the 2023/24 season's adverse weather conditions.

Among the seven TOC partner cooperatives in Côte d'Ivoire, ECAM farmers have the largest farms and highest total production per household, ranking second in productivity. ECAM also has the highest proportion of farmers earning a living income. However, the average decline in production and productivity from the 2022/23 to the 2023/24 season was notably severe, attributed to

unprecedented weather conditions. All farmers, regardless of their farm management practices, were impacted. Interviews suggest that those implementing GAP fared better against these weather-induced shocks. Approximately 10-20% of ECAM producers do not use GAP due to factors like age, scepticism about profitability, and a declining interest in farming among youth. Differences in productivity losses align with the perceived benefits of GAP in resilience. Despite the increase in farm-gate prices, revenue losses from the 2023/24 production decline may not be fully offset. Farmers remain concerned about unpredictable weather and the spread of the swollen shoot virus.

Immediate financial and input support can help to address the reported 2023/24 revenue losses.

To counteract the reported revenue losses from the 2023/24 season, increasing incomes and helping farmers access cocoa production inputs is essential to prevent further declines in the upcoming season. Supporting cocoa production recovery requires a focus on improving productivity and maintaining input support. Enhancing resilience to shocks can be achieved through customised development approaches and strengthening cooperatives. While boosting farmer incomes through increased prices or cash transfers is very important, addressing broader systemic challenges is also vital for ensuring long-term sector resilience and sustainable livelihoods. TOC's five sourcing principles, which aim to promote a fair and sustainable cocoa supply chain, are well-aligned with these strategies. Still, additional actions are recommended primarily for recovering lost revenue and actors beyond the direct supply chain (e.g. governments) also have important roles to play in achieving long-term resilience.

Abbreviations

CIV	Côte d'Ivoire
CCC	Conseil du Café-Cacao
COCOBOD	Ghana Cocoa Board
ECAM	Entreprise Coopérative des Agriculteurs de Méagui
ECOJAD	Entreprise Coopérative des Jeunes Agriculteurs de Daloa
GAP	Good Agricultural Practices
LIRP	Living Income Reference Price
TOC	Tony's Open Chain
WA	West Africa

1 Introduction

The study aims to assess cocoa production trends in Ghana and Côte d'Ivoire and explore the potential impact of climate change on productivity, with a focus on the 2023/24 season.

Climate change has frequently been cited as a key factor driving low cocoa productivity, with worsening climate conditions placing even greater pressure on cocoa production. This issue has gained further attention following the 2023/24 price spike, which was attributed to supply shortages. However, robust data on production losses and the extent to which farmers' incomes might have been effected was scarce. In response, Tony's Open Chain (TOC) commissioned Wageningen University & Research to conduct a high-level assessment of productivity trends, overall production, and the potential effect of climate change on these trends in Ghana and Côte d'Ivoire, the two main cocoa-producing countries in West Africa. The study focuses on socio-economic implications rather than a detailed environmental analysis. Witnessing the unprecedented rise in international cocoa market prices between 2023 and 2024, the aim of the study was to unpack the causes behind this spike and to provide TOC with set of mitigation strategies to support cocoa producers in their supply chain.

Together with TOC, the following set of research questions was defined:

1. High-level overview of literature capturing trends in cocoa production in West Africa, zooming in on the 2023/24 season:
   1.1. What are general trends in cocoa production across West Africa? (Chapter 2.1.1)
   1.2. To what extent has climate change been driving changes in cocoa production in these geographies, including the significant yield drop in the 2023/24 season? (Chapter 2.1.2)
   1.3. What impact can the production shocks be expected to have on household income? (Chapter 2.1.3)
   1.4. To what extent do we observe such trends in TOC supply chain? (Chapter 2.1.4)
2. Overview of literature to assess potential for shock recovery:
   2.1. How are yields predicted to evolve in the 2024/25 season? (Chapter 2.3)
   2.2. What are the expected effects of climate shocks on the income of cocoa farming households in the 2024/25 season? (Chapter 2.4)
3. Overview of mitigation strategies to enhance the resilience of cocoa farmer households (Chapter 3)
   3.1. What measures can be taken to effectively mitigate the expected income shocks related to adverse climate conditions?
   3.2. How do the 5 sourcing principles of TOC relate to the recommended strategies?

This study consists of a review of scientific and grey literature complemented with insights from key informant interviews and data from TOC partner cooperatives.

To address the research questions, we have identified and reviewed relevant academic and credible non-academic sources to analyse trends in cocoa production, productivity and any information sources addressing the 2023/24 season. Altogether, approximately 60 academic and grey literature sources were reviewed for this study. To contextualise and triangulate evidence from our literature review, we have zoomed in on the trends in the supply chain of TOC by obtaining information from 4 respondents related to the ECAM cooperative and 1 staff member from the ECOJAD cooperative. More information on the interviewees can be found in Appendix 1 of this report. We have also reviewed statistical data from TOC partner cooperatives to complement our results. This data included summary tables containing information on total production, productivity levels, and other relevant metrics for all farmers supplying the cooperatives. The tables also provided average values for groups of farmers categorized by productivity quartiles and farm size. Given the research questions about recent and current developments, it is highly challenging to find peer reviewed or even just published information. Therefore, we needed to rely

on the small number of sources that is available, as well as data and key informants provided by us by TOC, which does not provide a representative sample of the cocoa sector as a whole. The research team aimed to present an analysis of the recent and current developments as objectively as possible.

The report provides a high-level assessment and mitigation strategies.
The report consists of two main chapters. The high-level assessment chapter looks into trends in cocoa production and cocoa productivity and explores the contribution of climate change to these trends in Ghana and Côte d'Ivoire. The following two subsections include the 2023/24 season analysis and assessment of TOC's supply chain. The second main chapter consists of an overview of mitigation strategies, reflects on alignment between these strategies and TOC's 5 sourcing principles and concludes with recommendations for TOC.

2 High-level assessment

2.1 General trends in cocoa production and cocoa productivity in West Africa

2.1.1 Evolution of cocoa production and cocoa productivity in West Africa

West Africa remains the dominant region in global cocoa production.
Global cocoa production is expected to reach 4.5 million tonnes in the 2023/2024 season. Of this global amount, between 70%-80% of the world's production comes from Africa. Main exporters of cocoa are found in West Africa (WA), where Côte d'Ivoire produces around half of that, accounting for 1.8 million tonnes, followed by Ghana with 580,000 tonnes (ICCO, 2024). As depicted in Figure 2.1, the global cocoa industry greatly depends on WA's cocoa belt production. This is not only because of the volume of cocoa but also due to its high-quality bulk cocoa (Schroth et al., 2016).

Cocoa production in West Africa has steadily grown since the 1960s, reaching 3.66 million tonnes in the 2022/23 season. This cocoa is produced by an estimated two million smallholder families who rely on traditional farming methods.
Cocoa production in West Africa has steadily grown since the 1960s, driven by traditional farming methods practiced by an estimated two million smallholder families. After reaching nearly 4 million tonnes at the beginning of the 2020s, output in the 2022/23 season stood at 3.66 million tonnes, reflecting slight fluctuations but maintaining overall growth. Cocoa bean production in WA saw significant increases, particularly since the 2000s, when it rose from around 2 million tonnes to 3 million tonnes by the mid-2010s (Ritchie, Rosado, and Roser, 2023; ICCO, 2024a). Cocoa production in the region is characterised by smallholder farmers who follow traditional planting techniques under thinned forest canopies. The average farm size ranges from three to five hectares, with many of the farms having aging cocoa trees (Kalischek et al., 2023; Wongnaa and Babu, 2020). This low-input cultivation system relies heavily on the fertility of forest soils and the shade provided by trees. By 2015, this traditional system had expanded to cover more than six million hectares of land (Wessel and Quist-Wessel, 2015).

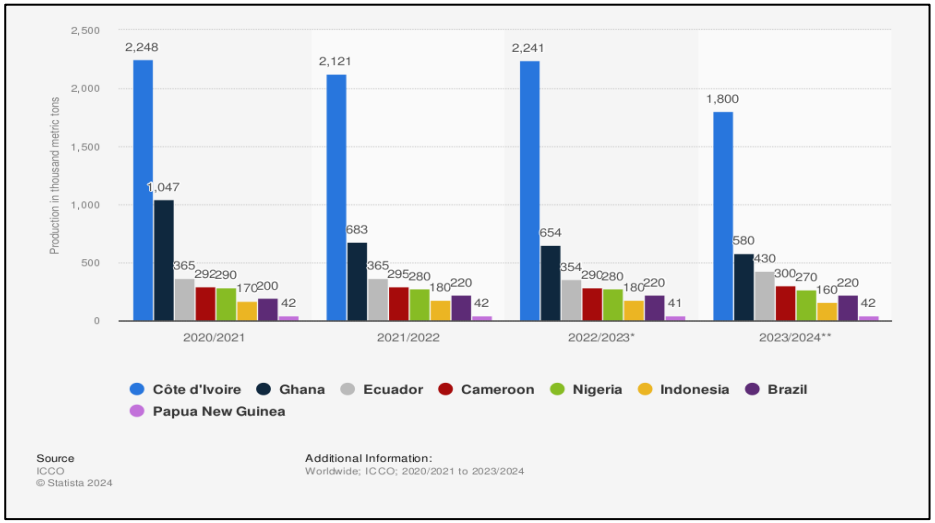

Figure 2.1 *Global cocoa bean production from 2020/21 to 2023/24, by country (in 1,000 tonnes)*
Source: https://www.statista.com/statistics/263855/cocoa-bean-production-worldwide-by-region/

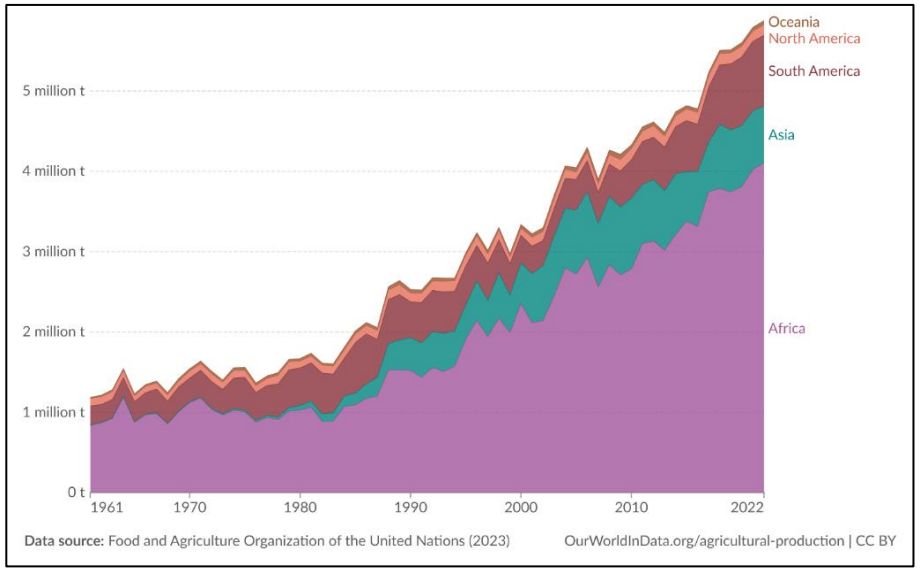

Figure 2.2 *Cocoa bean production by region, 1961 to 2022 (tonnes per year)*
Source: https://ourworldindata.org/grapher/cocoa-beans-production-by-region

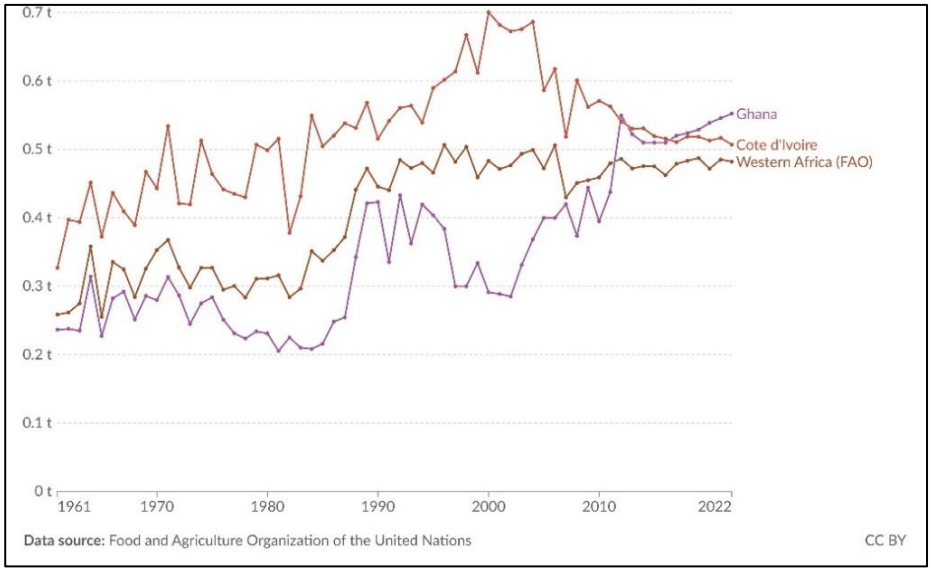

Figure 2.3 *Cocoa productivity by region, 1961-2022 (tonnes per ha)*
Source: https://ourworldindata.org/crop-yields

Historical improvements in productivity were driven by price fixation and subsidised input provision. Since 2022, however, cocoa productivity has remained stagnant and low in both countries.

Looking at the two main regional producers in Figure 2.3, Côte d'Ivoire showed improved performance from the 1990s until the early 2000s. However, a sharp decline after 2004/5 brought the country back to 1970s levels. According to Van Vliet (2021), the improvement in the last two decades of the 20th century can be attributed to positive effects of the Ivorian government's price fixation relative to international market prices during that period. Nevertheless, the lack of input investment eventually led to a decline in productivity and increased production costs for farmers. In the case of Ghana, by the mid-2000s, the country broke a two-decade period of stagnation in cocoa productivity, showing improvement until the early 2010s. Increased productivity, accompanied by periods of poverty reduction, benefitted from the incorporation of improved varieties, subsidised fertiliser, free pest and disease control, and the establishment of a uniform price across Ghana's different regions, all within the context of high world market prices (van Vliet et al., 2021; Vigneri and Kolavalli, 2018). However, a declining trend that started in 2012 left 2022 yields at the same level as a decade earlier. With an average yield production of 250 kg/ha in the beginning of the 1960s, the cocoa sector in WA found its peak in 1996 with an average production of 510 kg/ha. Since then, cocoa yields have remained stagnant accounting 480 kg/ha in 2022 in the two countries as reported by FAO (2024), while the productivity potential amounts to 1,000 kg/ha and 1,900 kg/ha in both countries (Bymolt et al., 2018). This means that the expansion of cultivated land has primarily driven increased production in past decade.

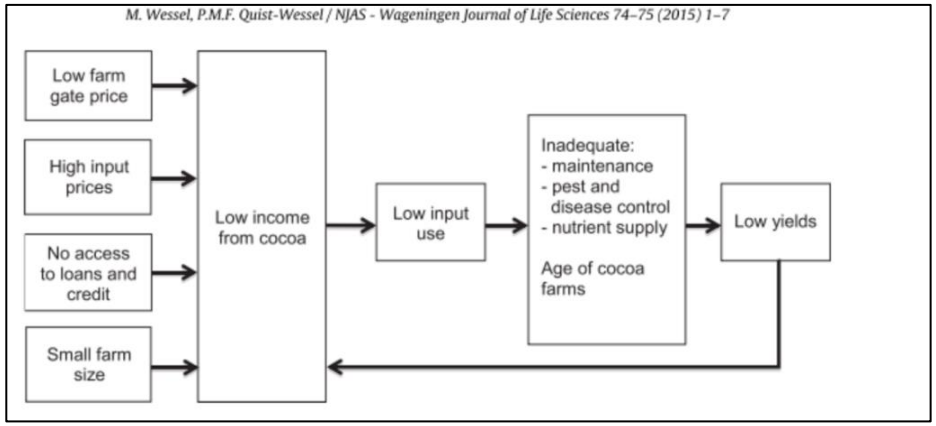

Figure 2.4 *Causes of low yield in West Africa*
Source: Wessel, M., & Quist-Wessel, P.M.F. (2015). Cocoa production in West Africa, a review and analysis of recent developments. NJAS: Wageningen Journal of Life Sciences, 74–75(1), pp.1–7. https://doi.org/10.1016/j.njas.2015.09.001.

Currently, cocoa farming households in both countries continue to face significant challenges, with less than a third earning a living income and many living below the poverty line.[1]

Despite the significance of cocoa production to the local economies of West African countries and attempts to improve yields per ha, most farmers do not earn a living income. For example, it has been estimated that in both Côte d'Ivoire and Ghana between 73-90% of the farmers do not earn a living income, many of which still live in a situation of severe poverty (van Vliet et al., 2021; Waarts et al., 2024). A more recent study reporting results on a Living Income Learning project estimated that 82% of surveyed farmers in Ghana and Côte d'Ivoire did not earn a living income (Fairtrade, 2023a). Several factors influence how much cocoa farming households earn. A main determinant of household income is farm size. Farmers who are more likely to earn a living income are either those with large farms but average levels of cocoa productivity, or those with medium-sized plots but very high land use efficiency (Waarts and Kiewisch, 2021)[2]. Even in these two groups, however, not all households earn enough to secure decent living standards. For some farmers, their cocoa plots do not meet the viable farm size[3] requirement. This implies that even if the living income reference price and productivity benchmark are met, such households would likely not earn a living income (Fairtrade, 2019).

Insufficient income from cocoa farming hampers investments in necessary agricultural inputs and practices, making it unlikely that productivity will increase.

Insufficient income from cocoa production hinders the farmer's ability to invest in necessary inputs such as mineral fertilisers, technical assistance, proper maintenance, pest and disease control, and shade management (Wessel and Quist-Wessel, 2015; Schroth et al., 2016). For larger farms, low income may result in an inability to hire labour during peak harvest seasons, while smaller farms may struggle to afford key investments in fertilisers and other inputs (Waarts and Kiewisch, 2021). Moreover, the widespread presence of aging trees producing suboptimal yields exacerbates the problem (Wessel and Quist-Wessel, 2015). These challenges make households highly vulnerable, potentially trapping them in a cycle of poverty where each season of underinvestment further diminishes total household income (Waarts and Kiewisch, 2021). A certain level of income is therefore crucial for farmers to make the necessary investments to maintain or increase productivity and avoid falling into the poverty trap.

Apart from challenges related to lack of material resources, the majority of cocoa farming households struggle with access to other essential services.

While the issue of sufficient and adequate income for cocoa farmers forms the cornerstone for required transformation in the sector, other factors influence

[1] As explained in Waarts and Kiewisch (2021), estimations per study and country vary, in Ghana the range of proportion of farmers earning a living income is between 17-24%, in Côte d'Ivoire 10-26%. A more recent report by Fairtrade International (2023a), shows that 18% of the households surveyed in Ghana and Côte d'Ivoire earned a living income.

[2] In a study by Waarts and Kiewisch (2021) in Ghana, farmers earning or nearing a living income with larger farms (median cocoa farm size of 5.3 ha) had an average cocoa productivity of 379 kg/ha. For farmers in the same income category but with smaller farms (median cocoa farm size of 2.4 ha), average cocoa productivity was 991 kg/ha. In this study, the average cocoa farm size for farmers earning a living income was ~9 ha in Côte d'Ivoire and ~4 ha in Ghana.

[3] A viable farm size is a 'farm that is big enough to fully absorb the available household labour, should generate a living income' (pg. 4 in Fairtrade, 2019).

their ability to escape poverty through increased productivity. Provision of services such as access to credit and loans, and production inputs are lacking (Waarts et al., 2021; Boeckx et al., 2020; Bymolt et al., 2018). Together with this, poor infrastructure, complex land tenure systems, and low quality education, to name a few, further hinder efforts to improve farmers' incomes and build resilience (Boeckx et al., 2020; Bymolt et al., 2018).

Most of the farmers continue to be highly dependent on earnings from cocoa sales as diversification is challenging.

Despite stagnant productivity and low incomes, many of the farmers continue to be highly dependent on income from cocoa production (Ingram et al., 2018; Waarts et al., 2021; Bymolt et al., 2018). The ranges of dependency on cocoa income vary between 79-90% in Ghana and 69-80% in Côte d'Ivoire (Waarts et al., 2021; Bymolt et al., 2018). Others declared that there are regional differences, since in some areas farmers cannot sustain a living solely from cocoa farming due to drier, lower-yielding conditions (Abdulai et al., 2018). Nonetheless, even in these studies at least 50% of annual income came from cocoa sales. This is due to limited opportunities for diversification off-farm. On-farm diversification is nearly impossible for farmers with small plots. Overall diversification requires investments that some farmers simply cannot make, or perceive as too risky (Waarts and Kiewisch, 2021).

2.1.2 The role of climate change

Climatic variability in West Africa makes predictions on cocoa suitability challenging. There is nevertheless a scientific consensus that temperatures will continue to rise.

From 1990 to 2015, climate predictions for the West African rainforest have remained highly uncertain, due to its status as one of the most climate-variable regions on earth (Brown and Crawford, 2008). A clear example of this are the large cocoa-producing areas in Côte d'Ivoire's eastern forest belt, which were suitable in the 1960s but had become unsuitable by the 1990s. However, this rapid climatic decline appeared to slow, and even reverse, during the period from 2005 to 2015 (Schroth et al., 2016). Although predictions about climate evolution in the region vary, there is a widespread consensus both within the region and globally about the increase in temperatures that higher emissions scenarios will bring. Figure 2.5 shows the rising temperature scenario outlined by Schroth (2016).

Some authors forecasted reduced climatic suitability for cocoa production West Africa.

Under current conditions, it is assumed that the cocoa tree is more sensitive to drought than to temperatures, as it is currently successfully grown in warmer geographies (Schroth et al., 2016). Therefore, the threat posed by rising temperatures in the West African region is not linked to increased direct drought stress but rather caused by higher rates of plant evapotranspiration leading to less water availability to the crop (Läderach et al., 2013). Cocoa drought sensitivity has been demonstrated by the severe negative effect over production during El Niño years (Ruf et al., 2015). Therefore, in a region that already shows a drier season compared to other cocoa growing regions, this seems to be the centre of the concerns around changing climatic behaviour. While Läderach et al. (2013) revised their earlier (2011) more pessimistic predictions for cocoa climatic suitability in West Africa, forecasts still indicate an overall drying trend, leading to less favorable conditions for cocoa in the region. The authors caution that these changes are expected to occur over a 40-year period, manifesting as more frequent or severe droughts, potentially resulting in events such as bushfires, rather than a gradual transformation of the average climate.

However, a more recent study suggests that climatic suitability may remain unchanged, highlighting the ongoing lack of clear consensus on future predictions.

A more recent study by Black et al. (2021)[4] challenged Läderach et al.'s assumptions, presenting contrasting evidence that even under higher emissions scenarios consistent with climate change predictions, cocoa suitability in the region might remain unchanged. This is because increased CO_2 concentrations could offset the effects of rising temperatures. This highlights that, although scientific knowledge about how cocoa plants respond to different climate scenarios is expanding, it remains limited. Consequently, two key factors must be considered when analysing climate predictions for the region: the inherent

[4] A thesis published in 2023 concluded "more positive effects of warming on suitability"(Asante), drawing similar conclusions to Black et al. (2020).

climatic variability of the area and the variability among climate prediction models, which are based on differing assumptions.

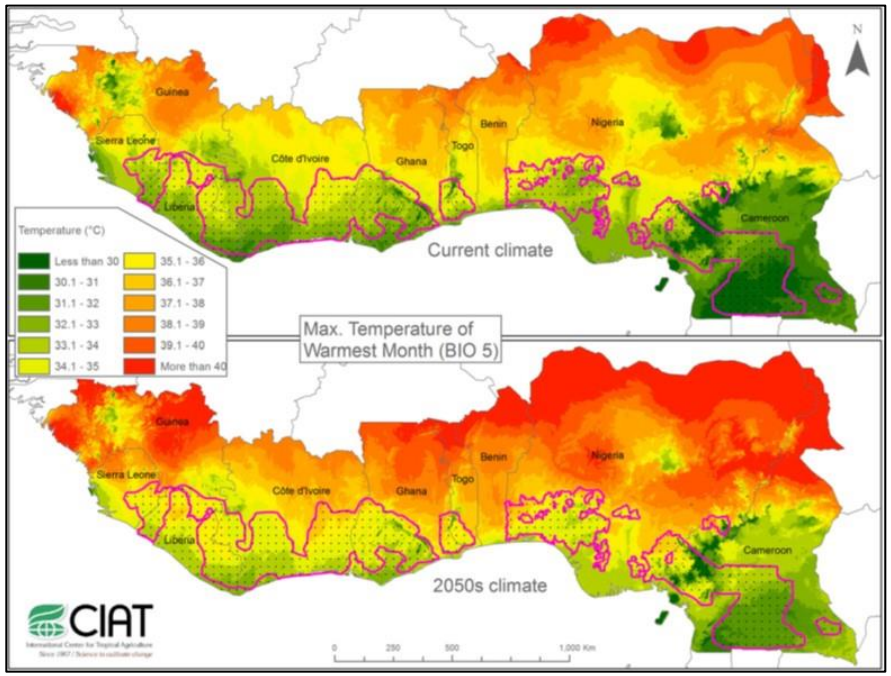

Figure 2.5 *Prediction of trends in temperature changes in West Africa Adapted from: https://www.sciencedirect.com/science/article/pii/S0048969716304508*

Climate change was defined by the 2022 Cocoa Barometer as the second major environmental concern, following the impact of the region's deforestation trends over the last decades.

Expanding the agricultural frontier has resulted in biodiversity loss, releasing pathogens harmful to humans, and undermining forests' roles as carbon sinks and rain producers. This, in turn, has affected the region's rainfall patterns (Fountain and Hütz-Adams, 2020; Boeckx et al., 2020). Consequently, cocoa-driven deforestation contributes to climate change, which, in turn, exacerbates worsening climatic conditions for cocoa in a negative self-reinforcing cycle (Fountain and Hütz-Adams, 2022). Growing local and global awareness of the environmental impact of land clearing for cocoa production has called for a halt to further expansion of the agricultural frontier. This has largely been driven by growing concern among major consumers of cocoa-based products, particularly in Europe, and the introduction of environmental certifications as a condition for market access.

Good Agricultural Practices (GAP) can help address low yields per hectare and reduce deforestation, but their successful implementation requires overcoming underlying barriers.

Since the mid-2000s, various sustainability programmes took off with one of the main focus area being training and coaching on good agricultural practices (GAPs). Correct implementation of GAPs bore the promise of increased productivity and incomes, and thus reduced environmental degradation (Kalischek et al., 2023). However, Ingram et al. (2018) found the impact of these programmes on cocoa productivity, income, and environmental outcomes to be 'mixed and modest'. The study highlighted that factors such as access to free inputs and improved access to loans and credit play a crucial role in overcoming barriers to GAP implementation, particularly by addressing uncertainty around return on investment (Ingram et al., 2018). These results suggest that GAPs can be effective in improving economic and environmental outcomes, provided that key structural challenges preventing smallholders from investing in their farms are addressed.

2.1.3 Expected effect of shocks on farmers' income

High vulnerability of the households coupled with structural challenges show that cocoa farming households are unlikely to withstand or absorb potentially occurring shocks.

There are expectations that unpredictable weather conditions and further increase in temperatures will take place in the region. Despite inconclusive evidence on the extent to which yields will be impacted, climate change will likely have an influence on cocoa production (Asante et al., 2021). Cocoa producing households characterised by high vulnerability and low resilience are unlikely to withstand and recover from shocks if they occur, and this more so in the short and medium term (Thompson et al., 2022). Important to note is that these do not concern weather-induced shocks only but any other shocks, such

as market shocks or the presence of politically volatile situations. While it cannot be confidently estimated how farmer's income will be affected, heavy reliance on cocoa income combined with low resilience suggests that any significant shock could severely impact household incomes.

2.2 Zooming-in on the 2023/24 cocoa season in West Africa

International cocoa market prices[5] started to slowly rise in the beginning of 2023, spiking towards the beginning of 2024 and reaching an all-time high in March 2024.

Global cocoa market prices changed dramatically over the 2023/24 season starting in the last quarter of 2023 and hitting a record high of USD 10.97 per kg of cocoa by mid-April 2024 as shown in Figure 2.6 (Tabe-Ojong et al., 2024). Numerous reasons seem to be behind this season's unexpected developments. As described in the previous section, the cocoa sector in WA is generally fragile because of long-standing sector challenges such as insufficient farmer income, and now seems to be threatened by the proximity of the sector's ecological ceiling (Ruf and Schroth, 2015; Sanial, 2018; Maguire-Rajpaul et al., 2022).

Set against the delicate situation of the sector, this season's international cocoa market price spike was triggered by climate-induced shocks that reduced yields.

Erratic rainfall, droughts, and higher temperatures, driven by the El Niño phenomenon, contributed to the proliferation of cocoa tree pests and diseases such as black pod and cocoa swollen shoot virus disease (Ritchie, 2024; Tabe-Ojong et al., 2024). A particular impact was said to be caused by unusually heavy rainfalls accompanied by strong winds in the months of June and July,[6] which caused flowers and cherelles to fall but could have also provoked physiological responses of the trees such as intense leaf flushing (Carr and Lockwood, 2011). As a result, the main crop season's harvest was significantly affected, with some of the losses being irrecoverable. In Ghana, expansion of gold mining, both illegal and legal, was said to be affecting cocoa production as well. Farmers renting out land to increase income were said to have smaller production due to the smaller plot on which cocoa was produced (Ritchie, 2024; Tristanbayly, 2024).

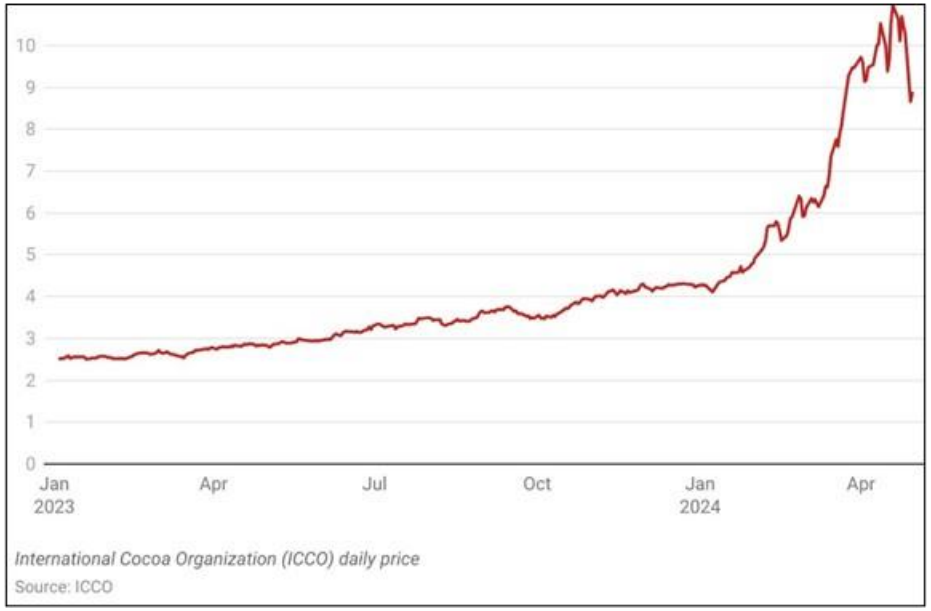

Figure 2.6 *Daily cocoa prices January 2023-April 2024 (USD/kg)*
Source: https://www.ifpri.org/blog/soaring-cocoa-prices-diverse-impacts-and-implications-key-west-african-producers/

Production declines in key cocoa producers, Ghana and Côte d'Ivoire, coupled with market uncertainties have intensified price volatility and financial speculation in the global cocoa market.

According to ICCO estimates, 2023/2024 production decreased by 20% in Côte d'Ivoire (CIV) and 11% in Ghana, with around 25% less cocoa exported from

[5] International or global cocoa market prices refer to the ICCO reference price.
[6] As reported in https://www.reuters.com/markets/commodities/ivory-coast-halts-cocoa-forward-sales-rains-hit-production-2023-07-13/; https://www.reuters.com/markets/commodities/heavy-rain-ivory-coast-raises-cocoa-disease-fears-farmers-say-2023-06-05/; https://phys.org/news/2023-11-ivory-coast-cocoa-output.html

both countries (Glauber and Mamun, 2024). First findings on production and productivity changes in Ghana and Cameroon suggest that unlike what ICCO estimated based on export volumes, total production and productivity slightly increased between 2022/23 and 2023/24 season (Agri-Logic, 2024a; Agri-Logic, 2024b). Meanwhile, data from TOC partner cooperative in Côte d'Ivoire indicate a decline in productivity and production volumes during this period (ECAM, 2024). To more broadly assess potential production losses in the region requires more data. Nevertheless, the succession of events that saw global cocoa market prices peak and led to financial speculations seems to be triggered by this partial disruption of short-term production in the two largest cocoa producers in the world, Ghana and Côte d'Ivoire.

Rising farm-gate prices in Côte d'Ivoire and Ghana have intensified market uncertainty and raised concerns about liquidity in the cocoa futures market.

Amid rapidly rising cocoa prices on the international market, the Ivorian government introduced higher farm-gate price in September 2023 and again in April 2024 for the mid-crop season.[7] Ghana implemented farm-gate price increases shortly thereafter.[8] The governments' farm-gate price increases triggered growing fears among traders during the contract delivery period. A lack of confidence in both governments' ability to cover the price difference further fuelled a wave of uncertainty around liquidity in futures markets (The Economist, 2024).

Despite some price correction, elevated international cocoa market prices and anticipated volatility are likely to persist due to ongoing crop diseases and market uncertainties.

While some price correction occurred in May after April's peak, international cocoa market prices are still triple the level of last season and more volatility is expected (The Economist, 2024). While reports of improved weather offer some optimism for the upcoming season, ongoing crop diseases, particularly swollen shoot, combined with uncertainty about future conditions and reduced future trade positions of traders due to increased risks in the market, suggest that international prices are likely to stay elevated and volatile (ICCO, 2024b; Adombila, 2024).

2.3 Tony's Open Chain's supply chain findings from the 2023/24 season

Out of the eight TOC partner cooperatives in Côte d'Ivoire, ECAM farmers have the largest farms, the highest total production per household, and rank second in productivity. ECAM has the highest proportion of farmers earning a living income.

TOC sources cocoa from eight cooperatives in Côte d'Ivoire and three in Ghana.[9] In Côte d'Ivoire, TOC has worked the longest with three cooperatives: ECAM, ECOJAD, and KAPATCHIVA. Among them, ECAM member farmers have on average the largest farm sizes and the highest mean cocoa production per household as reported in the 2021/22 and 2022/23 seasons. However, ECAM farmers produced between 531 and 535 kg of cocoa per hectare on average in these seasons respectively, placing them second in cocoa productivity among the three cooperatives. When assessing evolution of yields per ha between these three cooperatives, we observe that KAPATCHIVA member farmers generally improved their land use efficiency, while both ECAM and ECOJAD saw productivity declines between 2021/22 and 2022/23 (TOC, 2024a). Despite this, almost twice as many ECAM farmers as in ECOJAD or KAPATCHIVA earn a living income. Such findings show that ECAM member farmers, although not the most productive, are comparatively better off than those in the other cooperatives.

[7] Farm gate price is regulated by the CCC in Côte d'Ivoire. It is adjusted based on the international market movements in October (beginning of the main season) of each year. It can also be changed at the beginning of the mid-crop season. In October 2023, CCC announced a farm gate price increase from CFA 900 to 1,000 per kg of cocoa. Many called this raise insufficient as global prices had already increased (https://www.reuters.com/markets/commodities/ivory-coast-cocoa-sector-predicts-more-smuggling-farmgate-price-disappoints-2023-10-02/)

[8] In Ghana, farm gate prices are centrally regulated by COCOBOD. In September 2023, Ghana announced a 63% farm gate price increase from GHS 12,800 to GHS 20,928. For the mid-crop season, the price in Ghana was further raised to GHS 33,120.

[9] More information on Tony's supply chain can be found here: https://online.flippingbook.com/view/371809889/36/

The average decline in production and productivity from 2022/23 to 2023/24 was greater than in previous seasons, and was attributed to the unprecedented weather conditions of 2023. All farmers were said to be affected independently of their farm management practices.

According to data from TOC, there has been a downward trend in cocoa productivity among farmers supplying the ECAM cooperative since the 2021/22 season. Over the three seasons from 2021/22 to 2023/24, average cocoa productivity decreased by 16%, resulting in a corresponding reduction in the total volume delivered. Productivity dropped by 6.7% on average from 2021/22 to 2022/23, followed by a larger decline of 10% in 2023/24 compared to 2022/23. This indicates that there might have been a shock to production causing more severe production declines than in previous seasons. ECAM data further shows that farmers delivered 543,311 kg less cocoa than in the 2022/23 season. While not all farmers experienced losses, nearly 60% of those who delivered cocoa in both seasons produced on average less in 2023/24 than in 2022/23. This data includes a cumulation of volumes delivered in both the main and mid-crop deliveries of the two seasons (ECAM, 2024). Unpredictable and adverse weather conditions are not unusual;[10] however, the extremely heavy rains, particularly between June and July, appear to have played a crucial role in the significant production losses of the 2023/24 season. The impact of the intense rainfall was twofold: first, the increased humidity led to a greater spread of pests and diseases, black pod in particular. Second, the rains caused some of the cocoa flowers and cherelles to fall from the trees and might have provoked physiological responses of the trees, whereby some of the fruits died off. Furthermore, spread of swollen shoot virus was reported to be another complicating issue. All of these reactions caused production losses that could not be recovered. These effects were felt by all producers regardless of their farm management or production practices. None of the interviewees could recall a similar phenomenon in the past.

Average farm size in 2023
4.9 ha

Average yield/ha in 2022/23 season
535 kg/ha

Total cocoa production in 2022/23 season
5,370 tonnes

The Entreprise Coopérative des Agriculteurs de Méagui (ECAM) is located in the Méagui department in the southwest of Côte d'Ivoire. Established in 2014, the cooperative currently has a membership of 3,062 cocoa producers with 546 female members. ECAM focuses on both improved sustainability in production and farm management practices as well as enhancing socio-economic situation of its member farmers. To achieve these goals, the cooperative provides coaching on Good Agricultural Practices, input subsidies, and carries out various livelihood improvement activities, such as diversification activities, supporting education of farmers' children, and assisting with improved housing, among others.

Since 2016, ECAM has become a partner cooperative for TOC marking one of the longest standing cooperative partnerships TOC has. During the 2022/23 season, ECAM delivered the highest volumes of cocoa to TOC in Côte d'Ivoire. In addition to the premium paid by TOC, which bridges the gap between the farm-gate price and the Fairtrade premium up to the Living Income Reference Price, TOC also pays a cooperative fee to 'cover programme costs, invest in independence, and ensure premiums reach farmers' (TOC, 2024b, p. 58). Furthermore, TOC has an ongoing programme with ECAM aimed at increasing the productivity of member farmers. More recently, Individual Farm Development Plans were created based on farm diagnostics of individual producers to provide customised support (TOC, 2024b).

[10] For instance, Waarts and Kiewisch (2021) in their study report that almost half of surveyed farmers report yields being affected by poor weather conditions; a study by Afriyie-Kraft et al. (2020) found that cocoa farmers report unexpected and rains, droughts and more frequent extreme temperature occurring in Ghana in the past 20 years.

Interview data suggest that farmers implementing GAPs were better able to withstand the weather induced shocks.

Stakeholders interviewed strongly believe that implementation of GAPs is associated with higher productivity and improved resilience to weather shocks. Improved management practices, and several climate smart and resilient practices such as increased shade tree cover and soil water conservation have been found to improve cocoa yields in the main growing regions of West Africa (Wongnaa and Babu, 2020; Asante et al., 2021; Asare et al., 2017; Amfo et al., 2021). It has been asserted that between 80-90% of the farmers delivering to the ECAM cooperative implement GAPs such as shade tree planting, use of herbicides and organic fertilisers, pruning and weeding, and farm rejuvenation. This finding is not aligned with data on productivity, which places ECAM on the second position in terms of productivity out of the three long-term partner cooperatives. Apart from GAP implementation, the age of the farm plays a role in terms of resilience to weather induced shocks. Both interviews and existing literature indicate that younger trees are more resistant to pests, diseases, and climate shocks compared to older trees (Abdulai et al., 2020).

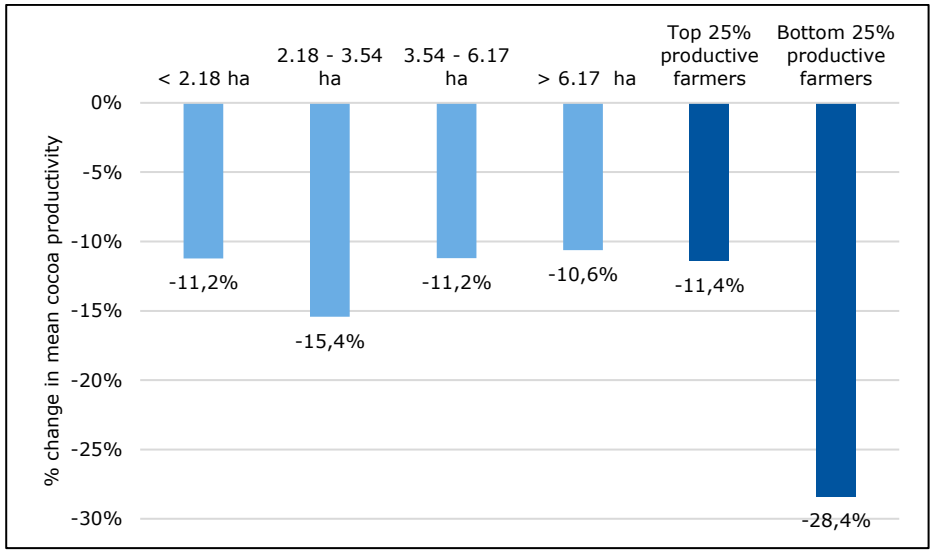

Figure 2.7 *Decline in productivity between 2022/23 - 2023/24 season per size of cocoa farm & top and bottom productive farmers*
Source: ECAM Yield Overview 2022/23-2023/24.

'For the 23/24 campaign, it was a total cataclysm, a national phenomenon. I think it affected everyone, but it was better tolerated by producers who are used to practice good agricultural practices. Everyone knows that production has fallen, for some it has fallen sharply for others less. Nevertheless, it's been like that everywhere.'

Cooperative staff member

Between 10-20% of ECAM producers were reported to not implement GAP practices, due to factors such as the farmer's age, skepticism about GAP profitability, and declining interest from youth in farming.

The interviewees attributed the difference in GAP implementation among farmers to the age of the farmer and not the with size of the cocoa farmland. Older farmers often have less energy for the manual labour required to implement GAPs, face a shortage of manpower, and lack successors, as youth are increasingly less interested in cocoa farming (Abdulai et al., 2020; Afriyie-Kraft et al., 2020).

Between 2022/23 and 2023/24 seasons, productivity losses among the least productive farmers were higher than those of the most productive farmers.

A notable difference in terms of productivity decline was observed between the top 25% and bottom 25% productive farmers. While average productivity decreased in both groups, the bottom-performing group saw a 28.4% decline,

whereas the top-performing group experienced a milder 11.4% reduction in yields between the two seasons. Explaining the difference between the top productive and bottom productive groups has proved rather challenging. For instance, when looking at the possible correlation with farm size,[11] changes in cocoa productivity between the two seasons studied appear largely the same except for those producers who have a farm size between 2.18 ha and 3.54 ha (Figure 2.7). There is no group based on cocoa farm size categories where a smaller decline can be observed. However, there are many other reasons, such as farm level characteristics or exogenous factors that might explain the difference, which is beyond the scope of this study.

Farmers were said to suffer a revenue loss due to production decline of the 2023/24 season.

Respondents agree that on average, farmers revenue decreased as a result of poor harvest. This has implications for households to meet their needs given that dependency on cocoa revenue is high (Waarts et al., 2021). The extent of revenue loss is not known but likely varies per household, depending on individual household income diversification and the extent to which production volumes were affected. As a result, farmers have reportedly been driven to take out loans to cover basic needs such as education fees, healthcare costs, food, and other essentials. Other issues include input costs, especially the price of fertiliser, which spiked since the offset of the Ukrainian war. Despite some stabilisation over the past two years, fertiliser prices remain high compared to pre-2022 (Cargill and Simmons, 2023; Afreximbank, 2024).

The farm-gate price increase may not offset 2023/24 revenue losses. Farmers remain concerned about unpredictable weather and the continued spread of the swollen shoot virus.

The farm-gate price for the main season harvest has been adjusted by the Conseil du Café-Cacao (CCC) in October 2023 by 11% from 900 to 1000 CFA per kg of cocoa. Such increase was perceived insufficient in light of already spiking global prices (Aboa, 2023a). In April 2024, the Conseil du Café-Cacao (CCC) increased the farm-gate price again. This time, by 50% to CFA 1,500 per kg of cacao in response to a price spike on the international market (Mayers, 2024). Important to note is that this farm-gate price applies to cocoa sales of the mid-crop season only (April to September).[12] Mid-crop season is characterised by a small harvest and accounts for about 20-25% of total production in a given season. Hence, the biggest share of revenue is earned through sales of cocoa from the main season (October-March) (Bymolt et al., 2018). A higher price paid for the mid-crop harvest is therefore unlikely to make up for the loss of the main season. Even though field observations of the cooperative staff indicated that the mid-crop season appears to go relatively well in terms of production, the swollen shoot virus remains an issue and full production recovery is not expected. This implies continued decline in revenues and more pressure on household incomes of cocoa producers. Respondents expressed their worries that the situation might worsen with another wave of unpredictable weather in the upcoming season and further pest attacks.

A new productivity enhancement programme developed in collaboration between ECAM and TOC focuses on providing customised assistance to the farmers.

TOC has maintained a long-standing partnership with ECAM, with an ongoing programme focused on enhancing productivity. Recently, a new support plan was developed in collaboration with TOC, featuring farm-level health diagnostics to create customised approaches for effectively increasing the productivity of member farmers (TOC, 2024). Some of the activities foreseen in this plan include coaching on GAPs with a regular follow-up, as well as assisting older farmers by connecting them with self-help groups established through the cooperative.

Apart from the productivity programme, ECAM provides support to its farmers such as agronomy training, community development, and free input provision. Collaboration with TOC enables financing of some of these activities as well.

In addition to the recent productivity support plan, ECAM has been providing assistance, including regular training on GAPs, setting up income diversification

[11] Farm size has been identified as a strong predictor of household income and cocoa productivity, especially so in Côte d'Ivoire in several studies, such as Waarts and Kiewisch (2021), Bellini Motovska et al. (2024)

[12] Farm-gate price is regulated by the CCC in Côte d'Ivoire. It is adjusted based on the international market movements in October (beginning of the main season) of each year. It can also be changed at the beginning of the mid-crop season. In October 2023, CCC announced a farm-gate price increase from CFA 900 to 1,000 per kg of cocoa. Many called this raise insufficient as global prices had already increased (https://www.reuters.com/markets/commodities/ivory-coast-cocoa-sector-predicts-more-smuggling-farmgate-price-disappoints-2023-10-02/)

activities, distribution of improved seedlings and fertilisers, and subsidies for plantation maintenance. The cooperative also engages in various community enhancement activities, such as supporting children's education, constructing water pumps, providing food donations during lean seasons, and implementing social housing projects. According to interviews, financing through the collaboration with TOC—comprising TOC's investments in establishment of joint programmes and cooperative fee intended to cover programme implementation—enables ECAM to pursue these support activities. Interviews highlighted that ECAM's provision of free inputs to farmers, a critical investment for ensuring robust production, is made possible through this financial support.

2.4 Predictions for the 2024/25 season

The upcoming season's outcome is uncertain due to unpredictable weather, with no reliable forecasts on production volumes.

Weather conditions are expected to play a major role in how the upcoming season unfolds. However, there is no consensus on whether weather conditions will improve (Glauber and Mamun, 2024) or if poor weather will persist (Ritchie, 2024) in the short to medium term. No credible predictions can therefore be made regarding volumes or potential changes in production between October 2024 and September 2025. While observations from the mid-crop season suggest a more optimistic outlook, production has likely not yet returned to pre-2023/24 levels. It is also unclear whether the 2023/24 phenomenon was a unique event caused by El Niño coinciding with heavy rainfall and winds, or whether such events will become more frequent due to climate change. Considering the evidence on future cocoa productivity predictions described in Section 2.1.2 of this report, it remains uncertain to what extent climate affects productivity and within what time frame.

Reliable predictions on farmer incomes for the upcoming season are not feasible. There is a risk that revenue losses from the 2023/24 season could cause underinvestment in cocoa farms, potentially leading to more farmers trapped in a situation of severe poverty.

Currently, there is no reliable data on the extent of revenue losses experienced by cocoa farmers in West Africa. However, both grey literature and interview evidence confirm that farmers have suffered financial setbacks, and the increase in farm-gate prices does not sufficiently compensate for the revenue losses caused by the production shortfall in the 2023/24 main season. Concerns have been raised regarding farmers' ability to reinvest in their farms (Morgan, 2024; Ritchie, 2024). The fact that all stakeholders interviewed for this study did not express this concern might be explained by the particular situation of ECAM, where the distribution of free inputs is facilitated by financing provided through their partnership with TOC. Therefore, the risk of farm underinvestment still holds for cocoa producers, which could lead to lower productivity and further supply shortages in the region even if weather conditions improve. Without both short- and long-term interventions, there is a real risk that the effects of the 2023/24 season could have lasting impacts on the livelihoods of cocoa farming households, potentially trapping more farmers in the situation of severe poverty.

3 Mitigation strategies

3.1 Mitigation strategies to enhance resilience of cocoa farming households in the short, medium and long term

We identified four categories of intervention strategies (see Table 3.1) that vary in scope, expected outcomes, and responsible actor for implementation. Immediate revenue loss recovery measures are critical for compensating the 2023/24 season's losses and preparing farmers for the next season. These short-term strategies are complemented by interventions aiming at boosting productivity and addressing systemic challenges to ensure long-term sector resilience. For each of these intervention categories, collaboration with farmers is essential to ensure that the strategies are tailored to their needs.

Category 1: Revenue and production loss recovery

To mitigate for the revenue loss of the 2023/24 season, immediate financial and cocoa production input assistance can prevent further production losses in the upcoming season.

These strategies include financial support through premiums or cash transfers and input subsidies. While both premiums and cash transfers enhance household liquidity, cash transfers are more inclusive, as they are not tied to sales. Furthermore, cash transfers can be considered a viable mid- to long-term strategy as they have been associated with improved income diversification, farm rejuvenation and increased expenditure on child health (Habraken and Diallo, 2023). Input support, especially fertiliser, is recommended to prevent production losses in the upcoming season. Fertiliser application has been found to play a key role in yields per ha (Bymolt et al., 2018; van Vliet et al., 2021b). Additionally, interviews indicated that some farmers most affected by revenue loss have had to take out loans. In such cases, debt relief through payment restructuring could be a crucial strategy to prevent severe indebtedness.

Category 2: Cocoa productivity improvements

Cocoa production recovery can best be supported through focus on productivity improvements and continued input support.

Training on improved farm management, mainly fertiliser and its correct application as well as some climate change adaptation strategies—have been shown to increase cocoa productivity and were associated with improved farmer incomes (Ingram et al., 2018; Wongnaa and Babu, 2020). Effective implementation requires access to necessary inputs, such as fertilisers, seedlings, and affordable labour (Fountain and Hütz-Adams, 2020).

Category 3: Improved resilience to exogenous shocks in the medium term

Resilience to shocks can be improved through tailor-made development approaches and strengthening cooperatives.

Even though little empirical evidence exists on effectiveness of tailor-made interventions, various studies identified distinct segments of farmers for which different intervention pathways appear to be the most suitable. For instance, while producers with medium-sized plots may gain from productivity increases, the most vulnerable smallholders might require liquidity support or links to alternative income sources (Waarts et al., 2024; Bellini Motovska et al., 2024; van Vliet et al., 2021). Identifying such segments and designing tailor-made pathways for them can increase effectiveness of such interventions. Additionally, independent well-governed cooperatives can also play a key role in assisting farmers on a day-to-day basis through service provision such as training and coaching, information sharing, and resource mobilisation, which all build resilience (Löhr et al., 2021). This is reflected in cooperative

membership association with higher incomes of cocoa farmers through higher prices paid, improved health of farmers and general well-being (Löhr et al., 2021; van Vliet et al., 2021).

Addressing the increasing threat of heavy rains and flooding stress requires a comprehensive approach, balancing protective measures like tree cover and pruning with improved drainage systems to mitigate harvest loss, plant damage and disease spread.

Evidence on how to mitigate flooding stress or physical consequences of heavy rains is scarce. Tree cover could serve as protection against the physical impacts of heavy rainfall but can also increase humidity around the tree and thus facilitate the spread of diseases. There is evidence showing that in areas prone to heavy rain, regular pruning and more shade trees can mitigate the spread of black pod disease (Asitoakor, 2022). Another study shows that waterlogging caused by intense flooding can affect plant growth and contribute to spread of diseases causing further production losses (Saravia-Castillo, 2022). However, there is little evidence on how to cope with waterlogging. A potentially effective solution can be the introduction of drainage systems[13] but additional research is needed to determine whether drainage systems are applicable in cocoa production in West Africa.

Category 4: Long-term sector resilience

Boosting farmers income and addressing broader systemic challenges are crucial for long-term sector resilience and sustainable livelihoods.

Increasing prices is a direct way to boost farmers' incomes, allowing them to invest in better farming practices and meet the basic needs of their families. One way to do this can be by raising farm-gate prices or paying premiums (Waarts and Kiewisch, 2021).[14] The extent of increase can be informed by a living income reference price (LIRP). It is important to note that LIRP might be downward biased due to high productivity and farm size assumptions used in LIRP calculation. For instance, LIRP method assumes 800 kg/ha sustainable yield and 5.3 ha cocoa farm size for Côte d'Ivoire (Fairtrade, 2023b). However, we report on lower productivity and farm size levels than those assumed in the LIRP calculations.[15] This implies that a recalculation of LIRP should be considered to adapt to the realities of cocoa farmers in the two countries. LIRP remains a useful tool to understand what price levels should be considered. Nonetheless, to ensure long-term sector resilience, addressing broader systematic challenges is necessary (Boeckx et al., 2020; van Vliet et al., 2021). These consider policy efforts on better land governance, employment creation, infrastructural developments, access to education and health care, and social assistance programmes among others. These should be government-led activities, however, all sector level actors (NGOs, cocoa buyers and exporters, traders and others) play a role in achieving desired outcomes through co-designing effective policies, coordinating activities between different actors and exploring joint funding opportunities (Waarts et al., 2024; van Vliet et al., 2021).

3.2 Recommendations to Tony's Open Chain

TOC's *5 sourcing principles* aim to ensure a fair and sustainable cocoa supply chain.

TOC's *5 sourcing principles* focus on creating a fairer and sustainable cocoa supply chain. These principles include using only traceable cocoa beans, paying higher prices to ensure farmers earn a living income, investing in strong farmer cooperatives, committing to long-term relationships, and emphasising quality and productivity. By applying all five principles together, TOC aims to drive systemic change in the chocolate industry and promote ethical practices across the sector.[16]

[13] Such a solution was also suggested during one of the interviewees with successful examples given in case of cocoa grown in Nicaragua. No concrete evidence was found on effectiveness of drainage systems in this context.

[14] Please note that raising farm-gate prices can only be done through regulatory agencies in both countries (CCC and COCOBOD). Buyers can influence price levels through premium payments.

[15] Such indicated in Kalischek et al., and FAO (2024) productivity estimates.

[16] More information on the 5 sourcing principles can be found on their website https://tonyschocolonely.com/nl/en/our-mission/serious-statements/tonys-5-sourcing-principles

TOC's *5 sourcing principles* are well-aligned with the identified strategies. Additional actions are recommended mainly for the revenue loss recovery.

The *5 sourcing principles* are well aligned with the strategies identified in Table 1:

- They are aligned with cocoa productivity improvements through provision of fees to partner cooperatives that allow for cooperative development and provide more resources to train farmers on good agricultural practices and input provision to the farmers
- Additionally, financial contributions through TOC partner cooperative fee and fostering long-term partnerships with partner cooperatives support overall cooperative development
- TOC's premium ensures that farmers are paid a living income referential price per kg of cocoa
- Traceability plays an important role in improved intervention designs and the effectiveness of their implementation through access to information on cocoa producers and their landscape realities. In that sense, rather than a strategy in itself, traceability is understood as an important precondition for improved intervention design as well as effective implementation. Sharing of such data in an anonymous and GDPR-compliant way between actors has the potential to increase collaboration and enable better informed decision-making at larger scale (Tuttleman et al., 2024).

In addition to the *5 sourcing principles* and in light of the emergent evidence on the consequences of the 2023/24 season on cocoa producers in both Ghana and Côte d'Ivoire, we recommend the following:

- Provide financial assistance to cocoa producers through partner cooperatives by either paying a larger premium or through cash transfers for the upcoming season. Since premiums are dependent on sales, farmers who deliver fewer cocoa might not benefit equally from this measure. Since many farmers likely suffered losses as indicated in the partner cooperative data, cash transfers would be a more effective measure equally benefitting all farmers.
- Continue supporting cooperatives with financial assistance. This measure is proving essential not only with regards to the upcoming season as evidenced through the interviews, but is crucial with any new season requiring farm investments.
- In case of large indebtedness of farmers, consider partnering with financial institutions or supporting partner cooperatives in renegotiating terms of the loans to increase liquidity of the most vulnerable households
- TOC has identified that their support strategy now emphasises segmenting farmers into groups to determine the most effective ways to help them achieve a living income through cocoa production (TOC, 2024). Such a strategy can be concretely implemented by supporting research activities to better understand the needs of individual households and conducting segmentation analyses. This can be done through indirect channels – supporting cooperatives in such collaborations, or through directly funding research projects.
- Actively engage in wider policy debates to better coordinate cross-actor intervention. These focus on improving long-term resilience of the wider cocoa sector by strengthening the governance to enable improved access to essential services such as financial services, education, alternative employment opportunities, social security and healthcare.

Table 3.1 *Mitigation strategies for the cocoa sector*

Category	Mitigation measures		Responsible actor
Short-term effects	**Revenue and production loss recovery** Curb revenue losses of 2023/24 season and prevent further productivity losses in the upcoming season	Emergency financial assistance either in form of premium payments or cash transfers to (partly) compensate for revenue losses and ensure farmers can make essential investments on their farms. In current situation, cash transfers are a more viable option as they are not dependent on sales.	Private sector actors such as cocoa buyers, local traders, export companies or cooperatives
		Input subsidies through subsidised input provision to farmers. Financial support to cooperatives can enable the delivery of subsidised inputs faster. Other options include bundling inputs with contract agreements, or partnering with financial institutions to offer farmers immediate low-interest emergency relief loans. Such loans can be provided through cooperatives as well if cooperative disposes of sufficient resources.	
		Debt relief by partnering with financial institutions for the most vulnerable segment of farmers who already took out loans and might be unable to repay in time.	
Medium-term effects	**Cocoa productivity improvements** Working with producers towards improved productivity levels	Continued input support with a larger range of options such as seeds, fertilisers but also facilitating affordable seasonal labour through organised labour groups.	Private sector actors such as cocoa buyers, local traders, export companies or cooperatives, relevant government bodies
		Accessible and intensive coaching on climate smart and good agricultural practices with regular follow-ups.	Cooperatives, government agencies providing extension services, NGOs & research institutes
	Improved resilience to exogenous shocks in the medium term Supporting farmers in becoming more resilient to potential climate or market shocks in the medium term.	Mapping of household specific needs to develop tailor-made package of strategies. For instance targeted income diversification strategies based on farm size, or productivity improvement measures based on farmers capacity to make sufficient on-farm investments.	Research institutions in collaboration with private sector (data and funding provision) and cooperatives
		Research to generate more insights on how to cope with heavy rains and winds, and waterlogging as currently little evidence exists on this topic.	Research institutions
		Cooperative development to enable well-governed and independent cooperatives. This can be achieved through capacity building, provision of financial resources, technology or others to improve day-to-day operations and establishment of long-term partnerships.	Coordinated effort of the public and private sector
Long-term effects	**Long-term sector resilience** Centrally-led coordinated efforts that strive to remove systematic challenges affecting resilience of cocoa households	Price paid to the farmers raise either through farm-gate price and/or premium increases	Regulatory agencies and buyers
		Social assistance programmes, and policies towards better land governance, employment creation to allow for income diversification, infrastructural developments, and access to education and health care.	Government-led efforts that should be centrally-coordinated but include all relevant actors present in the sector-production landscape

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Appendix 1 List of key informants

Interview number	Position of the interviewee a)
Interview 1	Cocoa producer (ECAM)
Interview 2	Farmer coach & chairman (ECAM)
Interview 3	Community facilitator for child labour cases (ECAM)
Interview 4	Managing director (ECAM)
Interview 5	Managing director (ECOJAD)

a) For reasons of anonymity, we do not disclose names of the stakeholders.

To explore the potential of nature to improve the quality of life

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 7,600 employees (6,700 fte) and 13,100 students and over 150,000 participants to WUR's Life Long Learning, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.