

**COCOA VALUE CHAIN CIRCULARITY:
CONSUMER PERCEPTION OF IVORIAN FARMERS'
LIVING INCOME**

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Cocoa Value Chain Circularity: Consumer Perception of Ivorian Farmers' Living Income

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Abstract

Purpose: the research aims to derive solutions from new data to improve the cocoa business model. Value chain transparency and circularity are tested as concepts that could be used to enable farmers to maintain a living income. A living income is defined as the amount needed for a household to afford a decent standard of living.

Methodology: a qualitative approach is used to elicit consumer perception of Ivorian farmers' living income through the lens of value chain circularity. The primary dataset includes a farmer questionnaire (n=215), consumer questionnaire (n=212), and semi-structured interviews with 12 stakeholders. The research is guided by consumption theory, drawing on Keynes, Friedman, and Modigliani.

Findings: while over 50% of consumers hold undergraduate degrees, more than 54% of farmers are illiterate. Over 80% of farmers reported transport issues, lack of banking access, and low income as major constraints. Farmers may perceive that no matter how much they adopt circular practices, the benefits are likely to be minimal without structural changes in the value chain that address inequalities. However, consumers spread across six countries increased the share paid to farmers by 7.41% after viewing an informational video. The Cronbach's Alpha value of 0.79 indicates acceptable reliability. Even among lower-income consumers, raising awareness of the challenges faced by cocoa farmers can result in greater support for farmers receiving a fairer share of the consumer price. Interviewees suggest that while circularity may reduce waste, the concept does not guarantee poverty alleviation. This presents an opportunity for entrepreneurial circular business models to explicitly address income distribution.

Originality: entrepreneurial circular business models could be leveraged by incorporating a new conceptual tool, the Fair Score Framework, which measures value chain fairness, using the UN SDGs, Nutri-Score label and OECD circularity scoreboard as reference points.

Keywords: cocoa; living income; transparency; circularity; consumer.

Author's declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas. Any views expressed in the thesis are those of the author and in no way represent those of the University.

Signed

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1. Introduction

Côte d'Ivoire is a world leading cocoa producer, and yet, it appears that most Ivorian cocoa farmers fail to earn a living income (Gboko et al., 2021; van Vliet et al., 2021). One way of studying the causes of the living income problem is through data collection on and around farms, as undertaken in this study. However, beyond analysing the agricultural segment of the value chain, it is also considered valuable to analyse the consumer perspective on farmers' living income challenges. If Ivorian cocoa farmers indeed struggle to earn a living income, examining consumer perception could provide additional insights into the factors contributing to the issue. More importantly, such an approach may help find new and effective solutions.

To explore this issue, the research begins with two broad aims. The first is to elicit consumer opinion on the relationship between improved value chain transparency and the living income of cocoa farmers in Côte d'Ivoire. The second is to explore the potential impact circularity could have in enabling farmers to maintain a living income. An in-depth explanation of the research objectives is provided in the methodology chapter. At this stage, Figure 1 illustrates the connections between the concepts covered in the thesis and their relation to the central issue: the living income of Ivorian cocoa farmers.

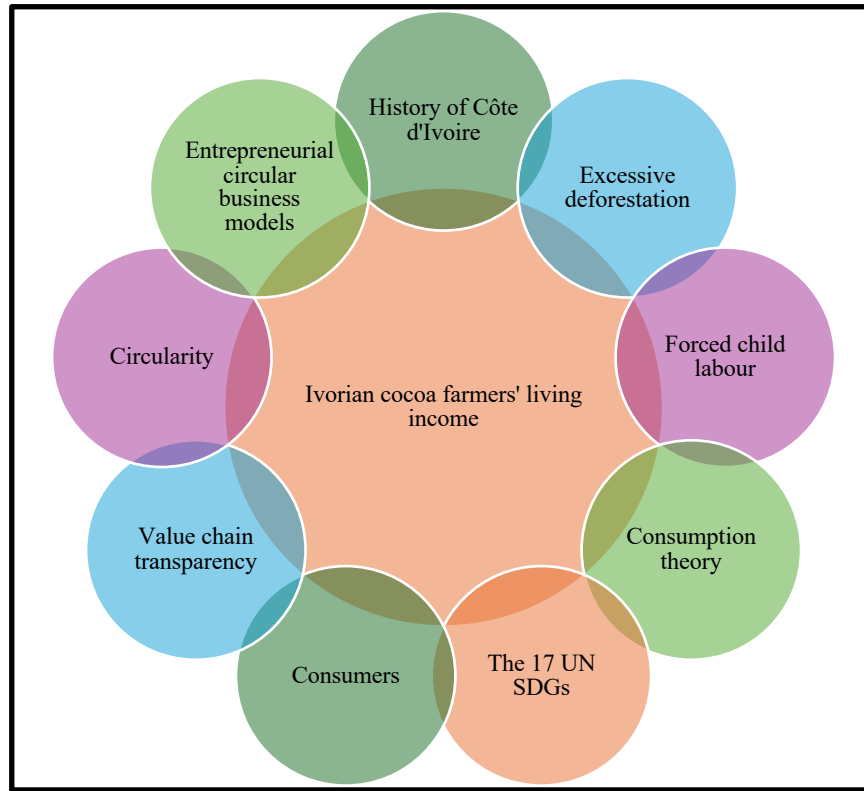


Figure 1 Connections between concepts covered in the research

To summarize Figure 1, the purpose of the research is to elicit consumer perception of Ivorian cocoa farmers' living income through the lens of cocoa value chain circularity. A qualitative approach is used to examine the perception of consumers in high-income nations. The primary dataset comprises a farmer questionnaire (n=215), consumer questionnaire (n=212), and semi-structured interviews with selected value chain stakeholders (n=12). The development of the questionnaires and semi-structured interviews has been informed by the research questions. These, in turn, are underpinned by consumption theory, a foundational framework of economics (Friedman, 2020; Keynes, 2018; Smith, 2008).

According to the Anker Methodology (Anker & Anker, 2017), a living income is defined as “the net annual income required for a household in a particular place and time to afford a decent standard of living for all members of that household” (Andersen et al., 2022, p.7). Value chain transparency and the circular economy are tested as concepts that could be used to achieve a more sustainable cocoa economy; one through which farmers can maintain a living income.

The definition of value chain transparency (VCT) varies in the literature and there can be some terminological confusion. A generally accepted version describes VCT as a tool that firms can use to gain visibility into their supply chain and disclose relevant information to consumers, while also considering competitive advantage (Ko et al., 2023; Montecchi et al., 2021; Kraft et al., 2022; Nyamah et al., 2022; Porter, 2008). Although differences of opinion still exist, there appears to be some agreement as to the definition of the circular economy (or circularity). Namely, circularity is a concept aimed at reducing the waste of resources in all its forms (Kirchherr et al., 2017, 2023; Morsetto, 2020; Shevchenko et al., 2023). Value chain transparency and circularity are mutually reinforcing. While VCT ensures the provision of necessary data, circularity helps to reduce waste. Together, they contribute to a more sustainable value chain that functions symbiotically with the environment and optimizes resource efficiency.

The concept of a living income is deeply intertwined with the issue of inequality along the cocoa value chain. Here, inequality refers to the unequal distribution of income, power and resources among the different stakeholders involved in the production, processing and sale of products made using cocoa beans (Laven, 2010; Neilson et al., 2020). Crucially, inequality is a form of market failure, which can impede fairness in society (Almås et al., 2024; Ferreira et al., 2022). Market failure is the situation where goods and services are inefficiently distributed in a free market (Endörfer & Larue, 2024; Rapp et al., 2024). When markets fail, consumers (or firms) evaluate incentives and make rational decisions for themselves, but those prove to be sub-optimal decisions for the group (or the market) (Horne & Heath, 2022). Market failure in the cocoa sector occurs when some value chain actors earn a living income while others (in this case farmers) fail to do so.

Adapting the cocoa value chain such that farmers can earn a living income is justified for two main reasons. Firstly, farmers deserve a living income for their labour (Canning, 2023; Gröne et al., 2023). Secondly, improving farmers' economic stability reduces the likelihood of social unrest (Bedasa & Deksis, 2024; Nguyen et al., 2023).

1.1. Côte d'Ivoire's cocoa sector

Côte d'Ivoire is a leading global supplier of cocoa, providing approximately 40% of the world's cocoa beans. The country's history, from colonial rule to post-independence political and economic shifts, has shaped its current socio-economic landscape. Despite periods of instability and recession, cocoa continues to play a significant role in the Ivorian economy, contributing up to 10.2% of Real Gross Domestic Product¹ (see Table 1). However, this sector also reveals stark contrasts: while the nation benefits from significant export revenues, cocoa farmers face persistent poverty. This highlights the need for deeper exploration into the cocoa value chain and potential pathways to improve farmers' livelihoods.

1.1.1. History

A brief study of the social, economic, and political history of Côte d'Ivoire is conducted to gain contextual understanding. Integrating historical insights allows for a more nuanced analysis of the value chain. This should help to identify the root causes of constraints and address them more effectively.

Conflict over land, labour, and capital has been ripe in Côte d'Ivoire before, during, and after the arrival of European explorers and colonisers (Craven, 2015; Romeiras et al., 2018). The 1871 Franco-Prussian War caused France to restructure its holdings in Côte d'Ivoire (Evans, 2004). Because of the large-scale introduction of cash crops between World War I and II, a wealthy class of African planters emerged (Traoré & Dzifa Torvikey, 2022). Following France's occupation during World War II and the alignment of many West Africans with the Free French, the political influence of the indigenous peoples increased (Ginio, 2006).

Houphouët-Boigny emerged as a prominent national figure, wielding significant power through the Democratic Party of Côte d'Ivoire and the African Democratic Rally (Conroy,

¹ Real GDP is an inflation-adjusted measure of the total value of all goods and services produced by an economy in a given year (adapted from Abel et al., 2024, loc. 669; Blanchard et al., 2021, loc. 581).

2010). In a short period of time, Côte d'Ivoire became the wealthiest territory in French West Africa (Obi, 2007) and gained independence in 1960 (Traoré & Dzifa Torvikey, 2022).

However, in the years leading up to Houphouët-Boigny's death in 1993, Côte d'Ivoire experienced a seven-year economic recession. To stimulate recovery, creditor banks arranged financial interventions, and the CFA franc was devalued by 50%. These interventions made Ivorian exports such as cocoa more attractive to world buyers. Nevertheless, a sharp drop in world cocoa and coffee prices, combined with significant domestic political instability hampered the recovery (Britannica, 2023). A civil war broke out in 2002 and the unrest continued until 2010-2011 (Ballet et al., 2022; Mitchell, 2022; van Baalen, 2021, 2023). Côte d'Ivoire benefited from relatively strong economic growth in the 2010's but this growth was slowed in 2020 by the COVID-19 pandemic (Britannica, 2023).

1.1.2. Côte d'Ivoire's leading role in global cocoa production and sales

Côte d'Ivoire supplies approximately 40% of the world's cocoa beans in terms of volume, making it a top cocoa producer (International Monetary Fund, 2022). The Observatory of Economic Complexity (2024) and the World Bank (2024a) confirm that Côte d'Ivoire was not only the world's largest exporter of cocoa beans in terms of volume but also in terms of trade value in US\$ between 2016-2022. Figure 2 shows Ivorian production of cocoa beans compared to other regions between 2016-2022.

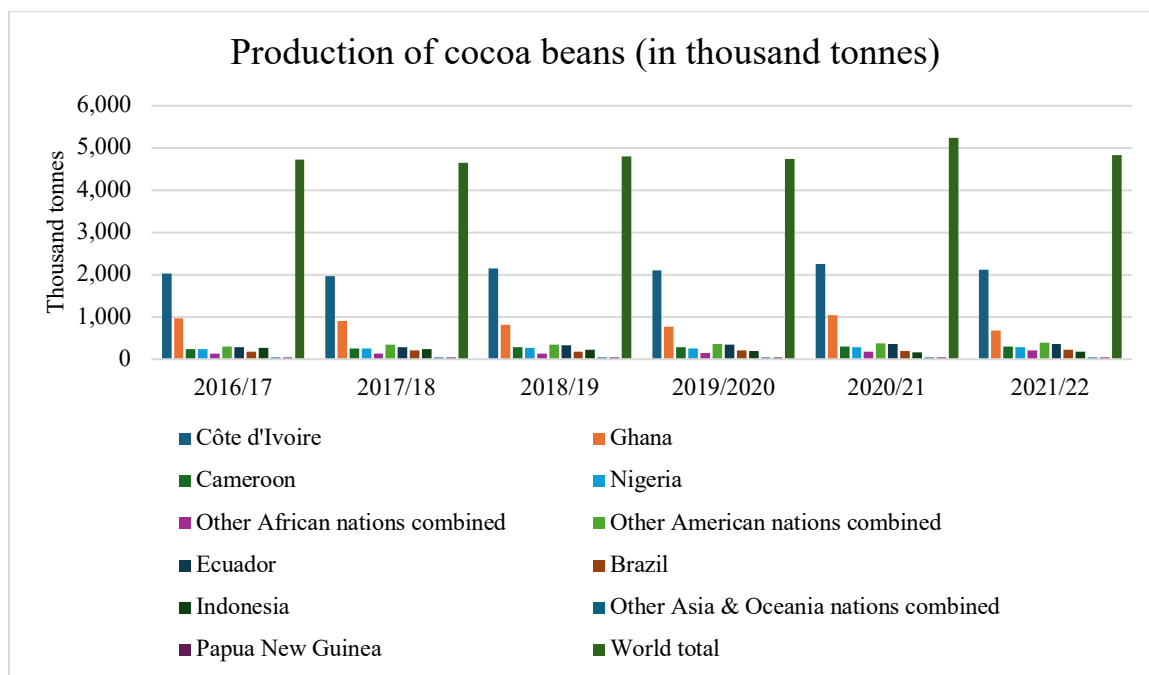


Figure 2 Production of cocoa beans (in thousand tonnes) (ICCO & International Cocoa Organization, 2024)

Figure 2 highlights Côte d'Ivoire as a key supplier to the global cocoa value chain. The data on cocoa production by Côte d'Ivoire between 2016-2022 provided by the International Cocoa Organization (2024) and the International Monetary Fund (2022) is supported by the statistical database of the Food and Agriculture Organization of the United Nations (2024).

1.1.3. Economic contribution of the Ivorian cocoa sector

Cocoa production accounted for between 7.1%-10.2% of Côte d'Ivoire's real GDP and for between 0.00529%-0.00664% of the world's real GDP, each Ivorian cocoa season from 2016/17 to 2021/22. It can be estimated that 480,000 to one million cocoa farmers worked in Côte d'Ivoire during this period (Bekoin, 2023; CIRAD, 2024a, 2024b; Kouassi et al., 2023). The contribution of the Ivorian cocoa sector in terms of revenue to the national and the global economy is calculated in Table 1.

*Table 1 Contribution of Ivorian-grown cocoa beans to the Ivorian and the world economy as a percentage of real GDP
(World Bank, 2024c; World Bank Data, 2024f)*

Year	Production of cocoa beans (thousand tonnes)	Real annual price (\$/kg)	Revenue (in million \$)	As a % of Ivorian RGDP	As a % of world RGDP
2016/17	2,020	2.59	5,232	10.2%	0.00664%
2017/18	1,964	2.17	4,262	7.6%	0.00523%
2018/19	2,154	2.3	4,954	8.4%	0.00591%
2019/2020	2,105	2.39	5,031	8.3%	0.00601%
2020/21	2,248	2.32	5,215	8.1%	0.00613%
2021/22	2,121	2.22	4,709	7.1%	0.00529%

In Table 1, the World Bank’s Pink Sheet of commodity prices is used to calculate the revenue generated during each Ivorian cocoa season from 2016/17 to 2021/22. The cocoa price for the 2016/17 season is determined by averaging the prices from 2016 and 2017, yielding a real annual cocoa price of \$2.59/kg. Revenue is then calculated as the product of cocoa production and price.

Real GDP (RGDP) is estimated using a similar approach. For example, the RGDP for 2016/17 is calculated by averaging the RGDP values from 2016 and 2017. GDP at constant 2015 US dollars is used to calculate world RGDP. To ensure accuracy, the values were cross-checked with IMF data; however, they could not be compared with the OECD database, as the latter reports figures in nominal terms.

1.1.4. Côte d’Ivoire’s real GDP and the role of cocoa

World Bank Data (2024a) shows growth of the Ivorian economy during the last decade. Real GDP increased from \$46.8 billion (B) in 2013 to \$70.2B in 2023, as shown in Figure 3.

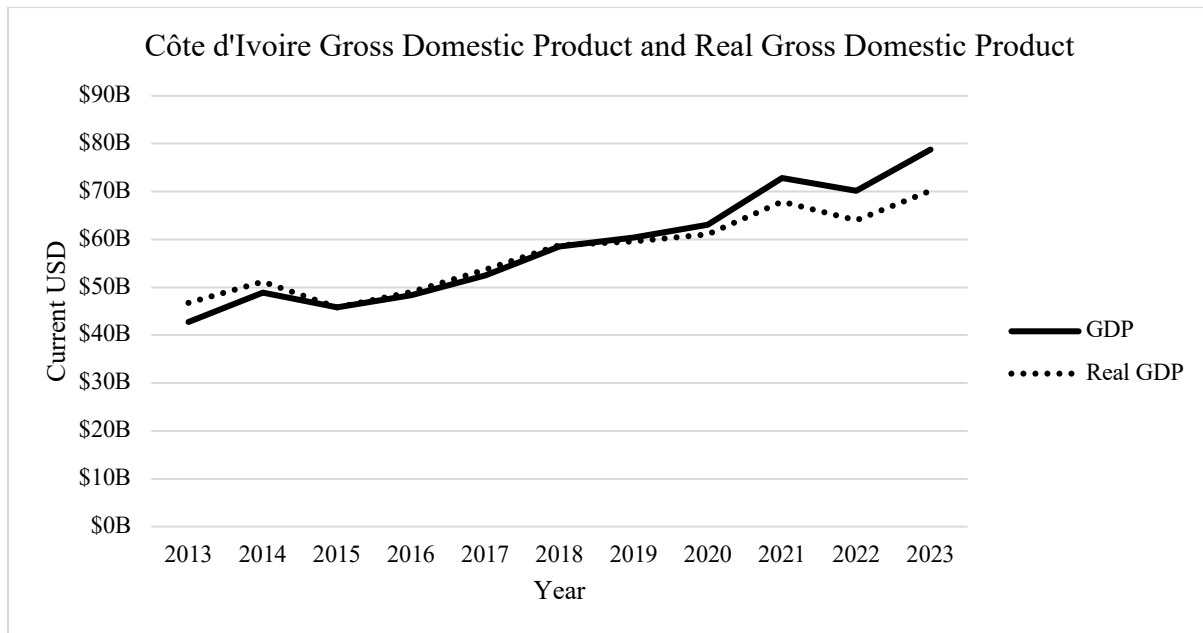


Figure 3 Côte d'Ivoire's GDP and real GDP from 2013 to 2023 using the GDP Deflators (World Bank Data, 2024a, 2024b)

In Figure 3, the slope of nominal GDP is steeper than the slope of real GDP. The most likely explanation is that higher inflation rates, which did occur between 2020-2022 (World Bank & World Bank Data, 2024), eroded some of the growth of the Ivorian economy. There are three other possible reasons. Firstly, if the CFA franc depreciated against the US dollar, which did occur (xe.com, 2024), the value of goods and services in US dollars could have risen without an actual increase in production, thus making nominal GDP grow faster than real GDP. Secondly, if there was a sharp increase in commodity prices, which did not occur for cocoa but did for oil (World Bank, 2024c), this would increase the nominal GDP while real GDP would not reflect such a steep rise since price changes have been adjusted for. Finally, if there was a large amount of government spending, which did occur (International Monetary Fund, 2023), and the inflated prices did not necessarily lead to proportionate increases in output, nominal GDP might have risen faster than real GDP.

1.1.5. Comparing Côte d'Ivoire's real GDP to other cocoa-consuming economies

Interestingly, World Bank Data (2024d, 2024c) shows the significant difference in real GDP between the Ivorian economy and the economies of other cocoa consuming nations between 2013-2023. For example, the Ivorian economy generated \$6,939 in terms of real GDP per

capita at purchasing power parity (PPP) in 2023, while other cocoa consuming countries generated between \$46,099 and \$89,580 for the same year. This is illustrated in Figure 4.

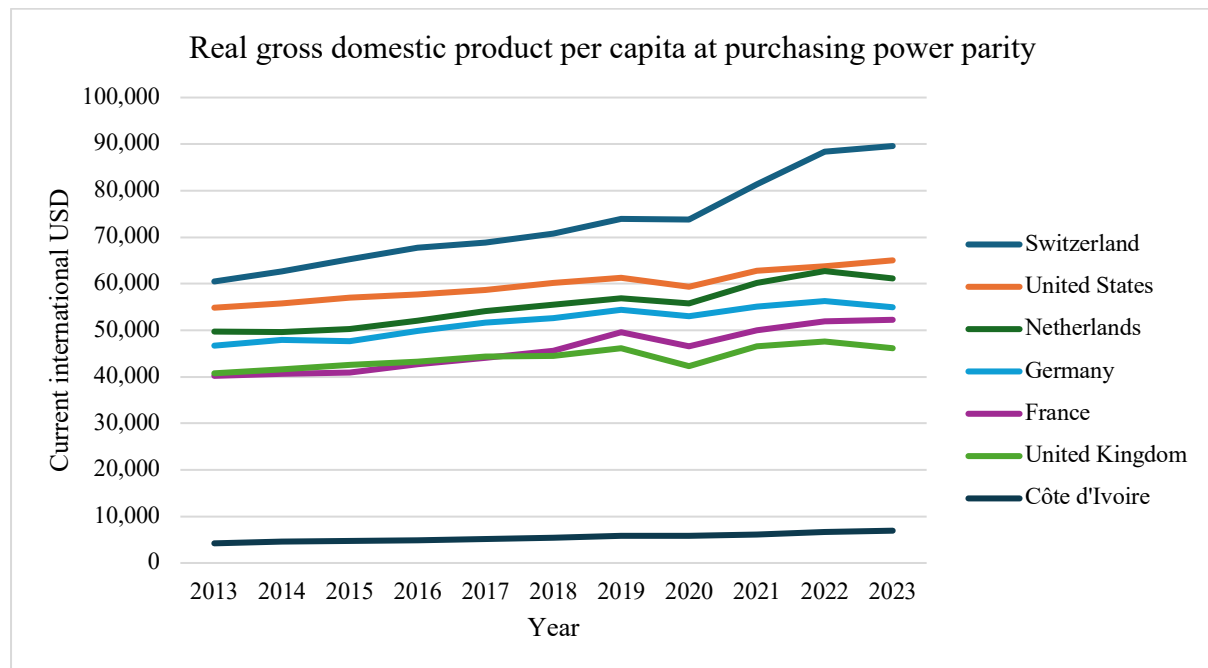


Figure 4 Real Gross Domestic Product per capita at Purchasing Power Parity for Côte d'Ivoire, UK, France, Germany, the Netherlands, USA, and Switzerland (World Bank Data, 2024c, 2024d)

The data in Figure 4 shows the significant difference between the real GDP of Côte d'Ivoire and that of selected cocoa consuming nations. This macroeconomic context stirs several initial questions. Firstly, do Ivorian cocoa farmers live in poverty? Secondly, what proportion of farmers in Côte d'Ivoire earn a living income? Finally, if Ivorian cocoa farmers are classed as poor, is this in absolute terms or only relative to wealthier cocoa consuming households located in high-income nations? Some of the answers to these questions will follow. Please note, the research focuses on enhancing the value chain rather than assigning responsibility to any stakeholders for any damages that may or may not have been caused.

1.2. Cocoa's role in global trade

This section examines the multi-faceted role of cocoa in global trade, beginning with an analysis of the cocoa value chain from a capitalist perspective. The section explores the mechanisms and processes of cocoa bean trade, highlighting how it operates within the context

of capitalist economic structures and commodity markets. It then provides insights into the natural origin of cocoa, tracing its cultivation from the cacao tree to the harvested beans. The development of cocoa-based products is discussed, focusing on the evolution from ceremonial beverages to modern chocolate products. Finally, the section addresses the structure of modern cocoa production systems, primarily driven by smallholder farms and the integration of agroforestry practices.

1.2.1. The global cocoa value chain: a capitalist perspective

For the most part, the world's cocoa value chain functions on the basis of capitalism (Jaganjac et al., 2024; Kano et al., 2020; Parra-Paitan et al., 2023). Capitalism is a widely adopted economic and political system in which industry is controlled by private owners for profit (Fenton III, 2020; Haas & Schenk-Hoppé, 2023). The production of goods and services in a capitalist system is determined by supply and demand in the market economy (Boateng et al., 2023; Panizzut et al., 2021). The alternative system is a command economy, where prices are set by the government (Grafström & Aasma, 2021; Wildeboer & Savini, 2022). The core principles of capitalism are private property, profit motive, and market competition (Hirsch, 2021; Radić et al., 2021). Pure capitalism functions best when private owners can trust that the wealth they create is kept safe in their own account – but this can be a controversial idea (Carnevali & Ystehede, 2023; Wade & Ellis, 2022).

1.2.2. Cocoa bean trade: mechanisms and processes

Cocoa beans are primarily bought and sold as a commodity through futures, forward, and options contracts on the New York Mercantile Exchange (NYMEX) and the London International Financial Futures and Options Exchange (LIFFE) (World Bank, 2024c), under the umbrella of the Intercontinental Exchange (ICE) (Staritz et al., 2023). Futures, forward, and options contracts are financial instruments that enable stakeholders in the financial services sector to manage risks associated with the volatility of prices (Campiglio et al., 2023). Currently, the world price of cocoa is mainly determined by market forces on commodity exchanges such as the NYMEX and the LIFFE. However, efforts are underway to increase the trading of cocoa futures contracts on African stock exchanges, closer to where most of the

world's cocoa beans are sourced (Ahene-Codjoe et al., 2022). In addition to futures markets, cocoa is traded in the physical or cash market, where actual cocoa beans are exchanged (Tröster & Gunter, 2023). Figure 5 shows cocoa beans being left to dry in the sun in Côte d'Ivoire.



Figure 5 Cocoa beans being dried under the sun in Côte d'Ivoire (Human & Fromm, 2021)

The trading of cocoa beans shares many characteristics with other commodity markets but also has its own unique aspects, as outlined in Table 2.

Table 2 Similarities and differences between cocoa beans and other commodities

Similarities	Differences
Similar to other commodities (e.g. coffee, sugar, oil, and gold), cocoa is bought and sold on major international exchanges such as the NYMEX and the LIFFE (World Bank, 2024c).	Compared to other commodities such as wheat or corn, which are produced in many countries worldwide (Langridge et al., 2022), cocoa production is highly concentrated, with about 70% originating from West African nations like Côte d'Ivoire and Ghana (ICCO & International Cocoa Organization, 2024). This geographic concentration makes cocoa particularly susceptible to regional disruptions such as political instability, disease outbreaks, and localized climate events, which can cause greater price volatility compared to other more widely produced commodities (Asante-Poku & van Huellen, 2021).
The prices of cocoa, like other commodities, are determined by global forces of supply and demand. Critical factors such as the weather, crop yields, geopolitical issues, and changes in consumer preferences affect prices across commodity markets (Anderson, 2023).	Cocoa is mainly grown by smallholder farmers, on farms less than 5 hectares in size (Giller, Delaune, Silva, Descheemaeker, et al., 2021). This differs from other commodities like wheat or soy, which are often grown on larger, industrial-scale farms (Jia et al., 2020). The small scale of cocoa production leads to unique challenges including lower yields, limited access to financing, and vulnerability to price fluctuations (Boeckx et al., 2020).
Like other agricultural commodity markets, cocoa futures contracts are used to hedge against price risks. Speculators also provide liquidity but can add to market volatility (Wimmer et al., 2021).	
Similar to other commodities (e.g. coffee and palm oil), cocoa has specific quality standards and certifications such as Fairtrade and Rainforest Alliance. These certifications promote sustainable practices and influence market access and pricing (Rathgens et al., 2020).	

Given the overview of how the cocoa value chain is based on capitalism and how cocoa beans are traded as a commodity, the next section considers the natural origin of cocoa (or cacao).

1.2.3. The cacao tree and its cultivation

Cocoa beans are the seeds of cacao trees, *Theobroma cacao* (Isaac et al., 2024; Kouassi et al., 2024). It takes about four years for a mature cacao tree to produce fruit in the shape of elongated pods that range in colour from bright yellow to deep purple (Jean-Marie et al., 2022; Nieves-Orduña et al., 2023). Figure 6 shows deep red cocoa pods on a cacao tree in Côte d'Ivoire.



Figure 6 A cocoa tree bearing deep red cocoa pods in Côte d'Ivoire (Human & Fromm, 2021)

Cultivation of the cacao tree is said to have South American origins dating back more than 3,000 years (Díaz-Valderrama et al., 2020). Maya, Toltec and Aztec peoples held the cacao tree as sacred (Lucero & Gonzalez Cruz, 2020; Pérez-Armendáriz & Cardoso-Ugarte, 2020). Cocoa beans were used to make a ceremonial beverage and were also used as currency (Díaz-Muñoz & De Vuyst, 2022).

1.2.4. Development of cocoa-based products

Europeans and South Americans met, and cocoa was brought to Europe (Gyamera et al., 2023). Sugar was mixed with the cocoa to produce delicacies that later became accessible to many nations (Capurso, 2024). New production methods emerged enabling the creation of ‘chocolate powder’ (Alasti et al., 2020) and ‘milk chocolate’ (Muhammad et al., 2021). Chocolate is made using the kernels of fermented and roasted cocoa beans (Putri et al., 2024). Figure 7 shows dried cocoa beans, cocoa nibs, cocoa butter, cocoa powder, and dark chocolate.



Figure 7 Cocoa beans, nibs, butter, powder, and chocolate (Human & Fromm, 2021)

Given the synopsis on the origins of cocoa and the development of cocoa-based products sold to consumers, the next section focusses on characterising modern cocoa production systems.

1.2.5. Modern cocoa production systems

Most of the world’s cocoa is grown on smallholder farms of about two to five hectares instead of large plantations; this is to prevent the spread of pests and disease (Jones, 2020; Kissi & Herzig, 2024). Other tree crops such as rubber, palm, and banana are often planted with the cacao for shade and wind protection (Gama-Rodrigues et al., 2021). Figure 8 shows rubber being sourced from a tree in Côte d’Ivoire. The rubber tree is one of many planted near cacao trees as part of an agroforestry system.



Figure 8 Rubber or “Hevea” being sourced from a tree in Côte d’Ivoire (Human & Fromm, 2021)

Given the summary of modern cocoa production systems, the following sections consider Côte d’Ivoire’s main exports, imports, trading partners, trade balance, and unemployment rate.

1.3. Côte d’Ivoire’s economy

Côte d’Ivoire’s economy is very much shaped by its international trade activities, with cocoa beans as a central export commodity. This section begins by analysing the country’s top five exports and imports, offering an understanding of its main trade commodities. Following this, an exploration of Côte d’Ivoire’s top five export and import partners provides insight into the relationships driving trade. The trade balance section highlights the country’s trade surplus or deficit over time. Lastly, the section considers Côte d’Ivoire’s unemployment rate, examining the impact of economic factors on its labour market.

1.3.1. Côte d’Ivoire’s top 5 exports and imports

According to the World Bank (2024b), Côte d’Ivoire’s most important export, measured by trade value in US\$ in 2022, was cocoa beans, whole or broken, raw or roasted (product code

180100) at approximately \$3.21B². The four most important exports after cocoa beans (product code 180100), using the same measure and for the same year, were petroleum oils, etc., (excl. crude); preparation (product code 271000), technically specified natural rubber (product code 400122), gold in unwrought forms (product code 710812), and cashew nuts, fresh or dried (product code 080130).

Côte d'Ivoire's top import, measured by trade value in US\$ in 2022, was petroleum from bitumen (product code 270900) at approximately \$2.40B. The four top imports after petroleum from bitumen (product code 270900), using the same measure and for the same year, were petroleum oils, etc., (excl. crude); preparation (product code 271000), semi-milled or wholly milled rice (product code 100630), floating or submersible drilling or production (product code 890520), and liquefied butanes (product code 271113). Table 3 shows Côte d'Ivoire's top 5 exports and imports in 2022.

² Please note: this value has been rounded to three significant figures. While this rounding improves readability and simplifies the presentation, it also reduces the precision of the value.

Table 3 Côte d'Ivoire's top 5 exports and imports in 2022 (adapted from World Bank, 2024b)

Ranking	Exports (in US\$)	Imports (in US\$)
1	Cocoa beans, whole or broken, raw or roasted (product code 180100) \$3.21B	Petroleum oils and oils obtained from bitumen (product code 270900) \$2.40B
2	Petroleum oils (excluding crude); preparation (product code 271000) \$2.03B	Petroleum oils (excluding crude); preparation (product code 271000) \$1.91B
3	Technically specified natural rubber (product code 400122) \$1.55B	Semi-milled or wholly milled rice (product code 100630) \$0.639B
4	Gold in unwrought forms, non-monetary (product code 710812) \$1.48B	Floating or submersible drilling or production (product code 890520) \$0.590B
5	Cashew nuts, fresh or dried (product code 080130) \$0.989B	Butanes, liquefied (product code 271113) \$0.487B

Table 3 shows that the top 5 most exported goods from Côte d'Ivoire between 2016-2022 were cocoa beans (product code 180100), gold (product code 710,812), cashew nuts (product code 080130), petroleum (product code 271000), rubber (product code 400122), petroleum from bitumen (product code 270900), and cocoa paste (product code 180310). The most exported good in thousands of US\$ was cocoa beans (product code 180100) in 2022, 2021, 2020, 2019, 2018, 2017, and 2016.

Côte d'Ivoire's top 5 most imported goods between 2016-2022 were petroleum from bitumen (product code 270900), petroleum (product code 271000), rice (product code 100630), drilling (product code 890520), medication (product code 300490), frozen fish (product code 030379),

liquified butanes (product code 271113), and automobiles (product code 870323). The most imported good in US\$ was petroleum from bitumen (product code 270900) in 2022, 2021, 2020, 2019, 2018, 2017, and 2016. For more data on this topic, please see Appendix One – Côte d'Ivoire's top 5 most exported and imported goods from 2016 to 2022 (World Bank, 2024b).

1.3.2. Côte d'Ivoire's top 5 export and import partners

According to data from the World Bank (2024b), the top 5 markets that Côte d'Ivoire exported to, including all goods and services, between 2016-2022 were the Netherlands, the United States, Vietnam, France, Belgium, Mali, Switzerland, Germany, Burkina Faso, and Malaysia. The top 5 markets that Côte d'Ivoire imported from, including all goods and services, between 2016-2022 were China, Nigeria, France, India, the United States, the Netherlands, and Spain. Table 4 shows the data regarding Côte d'Ivoire's top 5 export and import partners in 2022.

Table 4 Côte d'Ivoire's top 5 export and import partners in 2022 (adapted from World Bank, 2024b)

Top 5 export partners			Top 5 import partners		
Market	Trade (in US\$)	Partner share (%)	Exporter	Trade (in US\$)	Partner share (%)
Mali	\$1.46B	8.91	China	\$2.58B	14.40
Netherlands	\$1.43B	8.68	Nigeria	\$2.17B	12.12
Switzerland	\$1.33B	8.06	France	\$1.20B	6.68
United States	\$0.878B	5.34	India	\$0.932B	5.21
Burkina Faso	\$0.852B	5.19	United States	\$0.832B	4.65

Table 4 shows how Côte d'Ivoire's top 3 export partners in 2022 (Mali, the Netherlands, and Switzerland) accounted for 25.65% of total trade. The top 3 import partners for the same year (China, Nigeria, and France) accounted for 33.2% of total trade. For more data from previous years, please see Appendix Two - Côte d'Ivoire's top 5 export and import partners from 2016 to 2022 (World Bank, 2024b).

1.3.3. Côte d'Ivoire's trade balance

Côte d'Ivoire's trade balance was positive for most of 2016-2022. This indicates that Côte d'Ivoire sold more abroad than it bought foreign goods and services. Trade as a % of real GDP fluctuated between 42.45-57.34 (see Table 5). This is a slightly lower level compared to most of its top import partners - China 40.59%, France 80.06%, and India 82.79% - but significantly lower than its top export partners - Mali 141.23%, Netherlands 209.02%, Switzerland 141.45% (see Table 6).

Table 5 Côte d'Ivoire's trade balance from 2016 to 2022 (World Bank, 2024b; World Bank Data, 2024c)

Year	Total exports (FOB) in millions of current US\$	Total imports (CIF) in millions of current US\$	Trade Balance in millions of current US\$	Trade Balance (% of GDP)	Trade Balance (% of RGDP)	Trade (% of GDP)	Trade (% of RGDP)
2022	16,429	17,889	-1,854	-2.65	-2.90	52.34	57.34
2021	15,334	13,966	40	0.06	0.06	45.12	48.42
2020	12,454	10,527	572	0.91	0.94	41.11	42.45
2019	12,718	10,483	910	1.52	1.54	44.53	45.16
2018	11,821	10,970	-380	-0.65	-0.65	46.04	45.78
2017	12,446	9,614	1,226	2.34	2.29	48.66	47.58
2016	10,777	8,581	1,122	2.32	2.29	47.57	47.01

Table 6 Comparison of Côte d'Ivoire's trade balance with its top export and import partners in 2022 (World Bank, 2024b; World Bank Data, 2024c)

2022	Trade Balance in millions of current US\$	Trade Balance (% of GDP)	Nominal GDP (in millions of current US\$)	Real GDP (in millions of current US\$)	Trade Balance (% of RGDP)	Trade (% of GDP)	Trade (% of RGDP)
Côte d'Ivoire	-1,854	-2.65	69,962	63,858	-2.90%	52.34	57.34%
Mali	-2,015	-10.7	18,832	9,178	-21.95%	68.83	141.23%
Netherlands	93,411	9.42	991,624	834,241	11.20%	175.85	209.02%
Switzerland	99,168	12.28	807,557	785,988	12.62%	137.67	141.45%
China	576,651	3.21	17,964,206	16,880,587	3.42%	38.14	40.59%
France	-114,599	-4.12	2,781,529	2,506,332	-4.57%	72.14	80.06%
India	-151,456	-4.47	3,388,277	2,020,600	-7.50%	49.37	82.79%

The data from Table 5 and Table 6 indicates that, compared to the inflation-adjusted size of Côte d'Ivoire's economy, international trade plays a slightly smaller role than it does for its main import partners (China, France, and India) and a significantly smaller role than for its main export partners (Mali, the Netherlands, and Switzerland). To view more of the data used to compile Table 5 and Table 6, please see Appendix Three – Côte d'Ivoire GDP Deflators.

1.3.4. Côte d'Ivoire's unemployment rate and economic impacts

According to World Bank Data (2024e), Côte d'Ivoire's unemployment rate between 2016-2022 fluctuated between 1.896%-3.273%. This is illustrated in Figure 9.

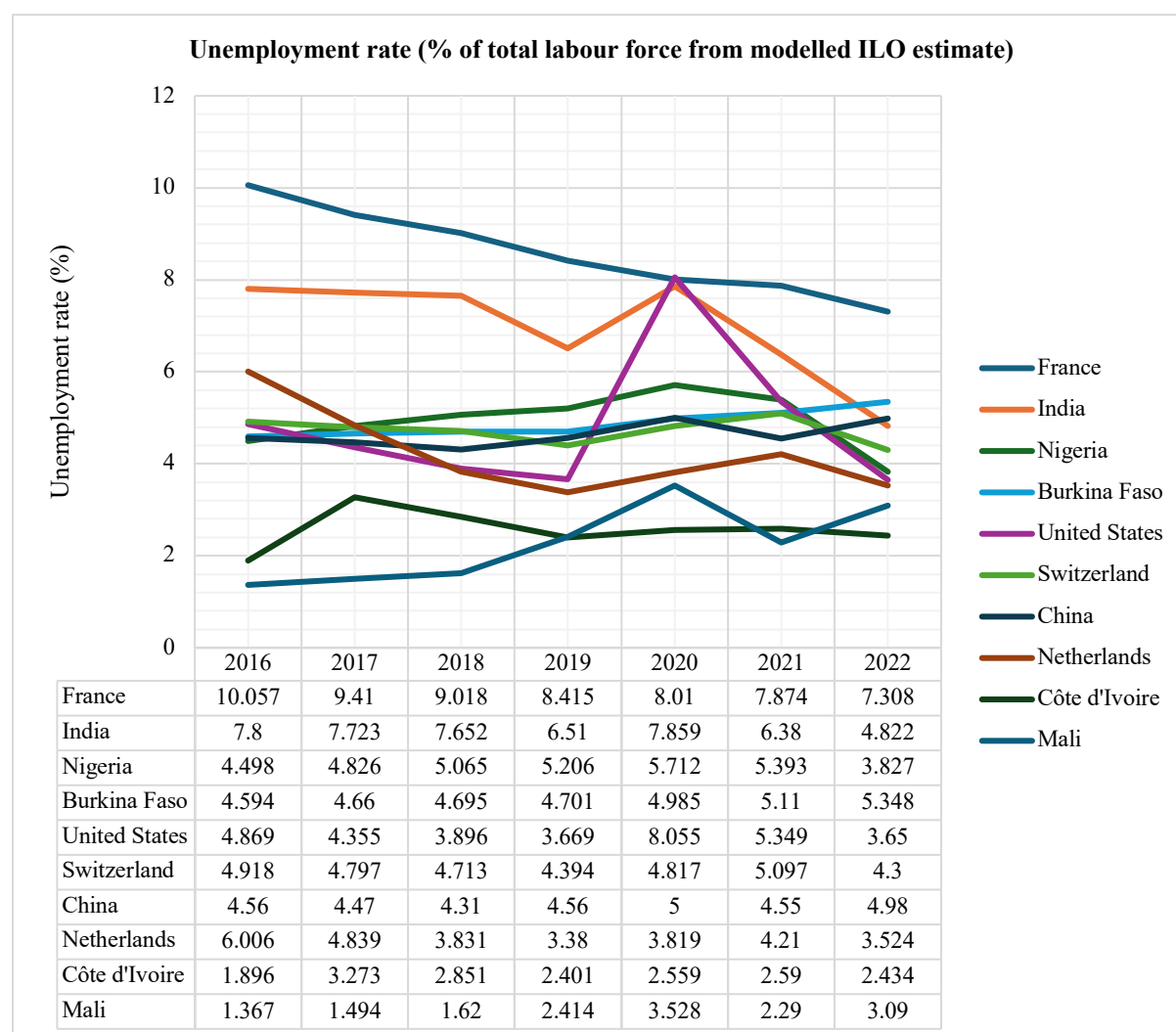


Figure 9 Unemployment rate from 2016 to 2022 for Côte d'Ivoire, Mali, the Netherlands, China, Switzerland, USA, Burkina Faso, Nigeria, India, and France (% of total labour force from modelled ILO estimate) (World Bank Data, 2024e)

Compared to its top export partners (Mali, Netherlands, Switzerland, United States and Burkina Faso) and import partners (China, Nigeria, France, India, and United States), Côte d'Ivoire had the second lowest average unemployment rate for the same period. This is shown in Table 7.

Table 7 Average unemployment rate from 2016 to 2022 (%) (adapted from World Bank Data, 2024e)

Country	Average unemployment rate during 2016-2022 (%)
France	8.6 ³
India	7.0
Nigeria	4.9
Burkina Faso	4.9
United States	4.8
Switzerland	4.7
China	4.6
Netherlands	4.2
Côte d'Ivoire	2.6
Mali	2.3

Table 7 presents Côte d'Ivoire's relatively low average unemployment rate compared to its top export and import partners. This may be due to stronger labour market resilience or more effective employment policies between 2016 and 2022. However, further analysis would be required to determine whether this low unemployment rate reflects genuine economic strength or is instead influenced by factors such as underemployment and labour market informality (Reynaud, 2017; Traoré & Dzifa Torvikey, 2022).

This concludes the context of the research, which has covered Côte d'Ivoire's cocoa sector, cocoa's role in global trade, and Côte d'Ivoire's economy. The following section offers personal reflections on the research.

³ Please note: the average unemployment values have been rounded to one decimal place. While this rounding improves readability, it also reduces the precision of the values, which may slightly affect comparisons.

1.4. Personal reflections on the research

I was born in one country, grew up in a second, have studied in a third, and have worked in a fourth. My upbringing has led me to appreciate the challenges and benefits of working and living as a ‘fourth culture individual’. While eating a bar of chocolate one day, I took a little bit more time to read the back of the packaging. It struck me that the chocolate had been sourced in one country, manufactured in a second, guaranteed in a third, and sold in a fourth. I suppose that, for a moment, I identified with the chocolate’s voyage as a ‘fourth culture product’. My curiosity spurred me on to research transport inefficiencies of the chocolate value chain for my Master’s thesis. As it turned out, the focus was on the transport of cocoa beans from farm gate to export harbour. After completing my Master’s research, I had further questions concerning the consumer’s role in the cocoa value chain for the sake of equitable farming. This is where my PhD research started.

This concludes the introduction and sets the scene for the literature review, which focuses on value chain transparency, the circular economy, and the living income of cocoa farmers in Côte d’Ivoire. This is followed by the methodology chapter, which outlines the research design and data collection methods. The data analysis chapter presents the findings, while the discussion chapter interprets these findings through the lens of the existing literature. Finally, the conclusion chapter provides a summary of the research, offering answers to the research questions, reflecting on the contributions to theory, addressing its limitations, and suggesting directions for future research.

2. Literature Review

The literature review is organized into three sections: the demand side (2.1), the supply side (2.2), and innovating the value chain (2.3). The first section, “the demand side,” examines consumption theories and hypotheses that seek to explain consumption patterns. This provides a theoretical framework to interpret consumer behaviour. The second section, “the supply side,” addresses critical challenges within the Ivorian cocoa sector, including issues such as forced child labour, excessive deforestation, and the ongoing struggle to ensure that cocoa farmers earn a living income. The final section, “innovating the value chain,” explores consumer perceptions of value chain transparency and the potential role of circularity in enabling farmers to maintain a living income.

The literature review identifies research gaps regarding the potential impact of transparency and circularity on the living income of cocoa farmers in Côte d’Ivoire. The research aims to address these gaps by formulating research questions (section 2.4) based on the literature and answering them with new data.

2.1. The demand side

Economic theory on consumption is generally linked to the demand side because it examines how consumers make decisions about spending, saving, and investing based on their income, wealth, and expectations of future income. The consumption decisions that consumers make impact aggregate demand in the economy. Consumption theory can also be used to better understand how households make decisions about products containing cocoa (Boegman et al., 2023; Grabs & Carodenuto, 2021; Rosca et al., 2022).

2.1.1. Consumption theory

In *An Inquiry into the Nature and Causes of the Wealth of Nations*, Adam Smith stresses the importance of free markets and the so-called ‘invisible hand’ guiding economic behaviour. He argues that consumers pursuing their own self-interest unintentionally contribute to the overall economic good of society. He writes:

“By preferring the support of domestick to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it. I have never known much good done by those who affected to trade for the publick good. It is an affectation, indeed, not very common among merchants, and very few words need be employed in dissuading them from it.” - (Smith, 2008, loc. 4,932)

Applied to the context of cocoa value chain circularity, Smith’s perspective suggests that farmers, working in their own self-interest, are led by an ‘invisible hand’ that works to promote farmers’ economic advancement as well as that of society at large. By pursuing his or her own interest, the farmer often supports society better than if they put society’s interests ahead of their own interests. Farmers need no persuasion to avoid doing trade for the sake of the public good.

Smith also emphasizes production (and not consumption) as the driver of a nation’s wealth. For Smith, wealth is created through increased productivity, the division of labour, and capital accumulation. He states, the *“division of labour, from which so many advantages are derived, is ... the necessary, though very slow and gradual consequence of a certain propensity in human nature”* (Smith, 2008, loc. 10,000). The implication here is that one should focus on improving productive efficiency along the cocoa value chain. This would involve, for example,

addressing supply-side bottlenecks and increasing the level of specialization at each stage of the value chain.

Smith's arguments are useful in the context of cocoa for several reasons. Firstly, Smith provides a foundational understanding of free-market principles, which can be used to analyse the existing constraints in the Ivorian cocoa value chain. Secondly, his concept of the 'invisible hand' allows for the exploration of how market forces of supply and demand could theoretically work in favour of farmers. However, Smith's framework lacks direct focus on transparency and sustainability, which may limit his theory's utility in addressing the modern consumer's demand for transparency and circularity.

In contrast to Smith, John Maynard Keynes argues that production improvements alone are not sufficient without enough consumer demand to absorb the increase in output. He states, "*the insufficiency of effective demand will inhibit the process of production in spite of the fact that the marginal product of labour still exceeds in value the marginal disutility of employment*" (Keynes, 2018, p.28). Here, Keynes underscores the importance of demand in driving economic growth. He highlights that simply having productive capacity is not sufficient to sustain an economy. Without sufficient consumer demand, production can stall, leading to unemployment and economic stagnation. The implication is that productivity improvements along the cocoa value chain need to be accompanied by increased effective demand for the products made. Keynes later emphasizes the need for government spending to stimulate demand in times of economic downturn. In times of recession, the cocoa sector may benefit from government intervention to boost demand.

The work of Keynes is useful in the context of cocoa in that his focus on demand management, and the concept of effective demand, provides insight into the cyclical nature of demand for commodities. His theory supports the argument that policy intervention might be necessary, especially in times of economic downturn, to maintain stable prices and the living income of farmers. However, Keynes's framework was developed in the context of domestic demand management within a national economy. For cocoa, prices are influenced by global markets and international trade, not just local factors. Therefore, while Keynesian interventions such as price floors or income support mechanisms are theoretically valuable, they require international cooperation to be effective.

Milton Friedman critiques Keynes, claiming that “Keynes took it for granted that current consumption expenditure is a highly dependable and stable function of current income” (Friedman, 2020, *loc. 183*). Friedman goes on to posit that consumption decisions are based on expectations of future income rather than present income. He does so through his Permanent Income Hypothesis, which can be defined by three equations:

Equation 1 Friedman’s Permanent Income Hypothesis

$$c_p = k(i, w, u) \times y_p$$

Where:

- c_p is permanent consumption – the long-term planned level of consumption based on a consumer’s permanent income. It reflects the consumption level a consumer aims to maintain over time, independent of short-term income fluctuations.
- $k(i, w, u)$ is the proportion of permanent income that is consumed, influenced by:
 - i : the interest rate (or sets of interest rates) at which the consumer can borrow or lend.
 - w : the ratio of nonhuman wealth to income. Nonhuman wealth includes financial assets (e.g. savings, stocks, and bonds), real estate, land, and any other forms of wealth not derived from labour. Income refers to the consumer’s total measured income, including labour income.
 - u : a composite (or “umbrella”) variable capturing consumer preferences, household size, age, and other factors determining consumer purchasing decisions.
- y_p is permanent income – the long-term average income the consumer expects to earn over time. It is a smoothed, forward-looking estimate that excludes temporary income shocks (e.g. bonuses, inheritances, or one-off job losses).

Equation 2 Friedman's Permanent Income Hypothesis

$$y = y_p + y_t$$

Where:

- y is observed (or actual) income – the total income received by an individual or household at a given point in time.
- y_p is permanent income – the long-term average income an individual expects to earn, based on their earning potential and life circumstances.
- y_t is transitory income – short-term deviations from permanent income, such as bonuses, inheritances, or temporary job loss.

Equation 3 Friedman's Permanent Income Hypothesis

$$c = c_p + c_t$$

Where:

- c is observed (total) consumption – the actual amount of consumption at a given point in time.
- c_p is expected permanent consumption – the part of consumption based on expected long-term (permanent) income.
- c_t is transitory consumption – short-term deviations in consumption due to temporary income fluctuations, as consumers adjust to maintain a stable consumption pattern over time.

Equation 1 illustrates that the ratio of permanent consumption to permanent income is a function of the interest rate (i), the wealth-to-income ratio (w), and the consumer's preferences and demographic characteristics (u).

Equation 2 and Equation 3 are identity relationships – they define observed income and consumption as the sum of their permanent and transitory components. While these identities

are not directly testable on their own, they provide the conceptual framework that links permanent and observed measures of income and consumption, forming the basis for empirical analysis in the Permanent Income Hypothesis.

The implication of Friedman's Permanent Income Hypothesis (PIH) is relevant to farmers who may be hesitant to invest in circular infrastructure if they do not have confidence in future market stability. If farmers expect future prices to be low or at best variable, they may choose to minimize investments now, further constraining their ability to improve the quality and sustainability of their output. Unlike Smith's argument that markets are self-correcting, Friedman's emphasis on consumer expectations indicates that market forces alone may not suffice to ensure a living income for farmers without stable income expectations.

Friedman's PIH is relevant to the cocoa sector since it provides a footing for exploring whether achieving circularity within the value chain could help ensure a living income for farmers. Friedman's views on increasing money supply, rather than government spending as per Keynes, also allows for a contrasting perspective on intervention. Namely, that stability might come from changes in monetary (i.e. money supply and interest rates) rather than fiscal (i.e. taxes and government spending) policy. However, Friedman's focus on individual choice may underestimate the challenges that small-scale cocoa farmers face, such as dependence on volatile global markets and lack of negotiating power against powerful multinational buyers. The notion that farmers can independently stabilize their consumption and savings, as per the PIH, may be unrealistic given these market dependencies and power imbalances. Furthermore, Friedman's framework does not directly address the role of consumer demand for ethical products. This could potentially lead to overlooking the potential of harnessing circularity to maintain farmer living income.

Thomas Piketty, in turn, focuses on income inequality and its systemic impact on economic structures. He writes that while a free-market economy has the potential of benefiting society through, for example, the transmission of knowledge and skills, it also has the capacity to threaten democracy and social justice. The most dangerous risk is caused by "*the fact that the private rate of return on capital, r , can be significantly higher for long periods of time than the rate of growth of income and output, g* " (Piketty, 2017, loc. 14,045). Piketty explains how the inequality $r > g$ implies that wealth accumulated in the past grows more quickly than output and wages. This presents a fundamental contradiction: capitalism produces more inequality.

The entrepreneur inevitably becomes a rentier, increasingly dominant over those who own nothing but their own labour.

Applying Piketty's argument to the Ivorian cocoa value chain, stakeholders who benefit from 'r' (mostly non-farmers) will always grow their wealth faster than those who only have 'g' (farmers, for the most part). Unlike Keynes, who focuses on demand-side policies, Piketty argues that systemic inequalities restrict effective demand by constraining the purchasing power of farmers.

Piketty's work is relevant to farmers because it provides a framework to understand why wealth concentration can perpetuate low incomes for farmers. In addition, his critique of wealth consolidation supports the need for systemic reforms to protect democracy and social justice. However, his proposed solutions, such as progressive taxation on wealth, may be less applicable for cocoa farmers in Côte d'Ivoire. Here, a form of wealth redistribution along the value chain might need to consider supply-side constraints specific to the cocoa value chain, none of which Piketty directly addresses.

2.1.1.1. Summary

To summarize this section, consumption theory provides a framework for understanding consumer decision-making that is relevant to the cocoa value chain. Within consumption theory, different economists have developed distinct hypotheses to explain consumption patterns. These hypotheses offer structured models that can be used help predict how income, expectations, and life-cycle stages influence spending and saving. The following section examines three key hypotheses: Keynes' Absolute Income Hypothesis, Friedman's Permanent Income Hypothesis, and Modigliani's Life-Cycle Hypothesis.

2.1.2. Hypotheses to explain consumption patterns

Keynes (1936), Friedman (1957), and Modigliani (2005) developed hypotheses to explain consumption patterns. An overview of Keynes's hypothesis introduces this discussion.

2.1.2.1. *Keynes's Absolute Income Hypothesis*

John Maynard Keynes conceptualised the so-called 'objective' and 'subjective' factors, which influence the propensity to consume (O'callaghan et al., 2022). Using these concepts, Keynes derived the consumption function, also known as the Absolute Income Hypothesis (Feng & Zhang, 2021; Keynes, 1936). Keynes's contribution to consumption theory influenced the evolution of monetary thought between the first and second world wars (Patinkin, 1975; Tavlas, 2023).

In his General Theory, Keynes (1936) calculates that a greater proportion of income is saved as real income increases. The simplified function is as follows (Hafner et al., 2020; Keynes, 1936):

Equation 4 Keynes's Consumption Function

$$C = A + (M \times D)$$

Where:

- C is consumer spending – the total amount households spend on goods and services.
- A is autonomous consumption – spending that occurs even when income is zero, typically financed through savings or borrowing (e.g. basic necessities like food or rent).
- M is the marginal propensity to consume (MPC) – the proportion of each additional unit of disposable income that is spent (where $0 < M < 1$). This can be applied in an example as the percentage of each extra £1 of a household's income that is consumed or spent. For instance, if the MPC is 0.7, this means that 70% of each additional £1 will be spent.
- D is real disposable income – income available after taxes and transfers (i.e. total income – taxes).

To illustrate:

£1,100 consumer spending each month

$$\begin{aligned} &= £400 \text{ autonomous consumption} \\ &+ (70\% \text{ marginal propensity to consume} \\ &\times £1,000 \text{ real disposable income}) \end{aligned}$$

Keynes's consumption function can be graphically represented as follows:

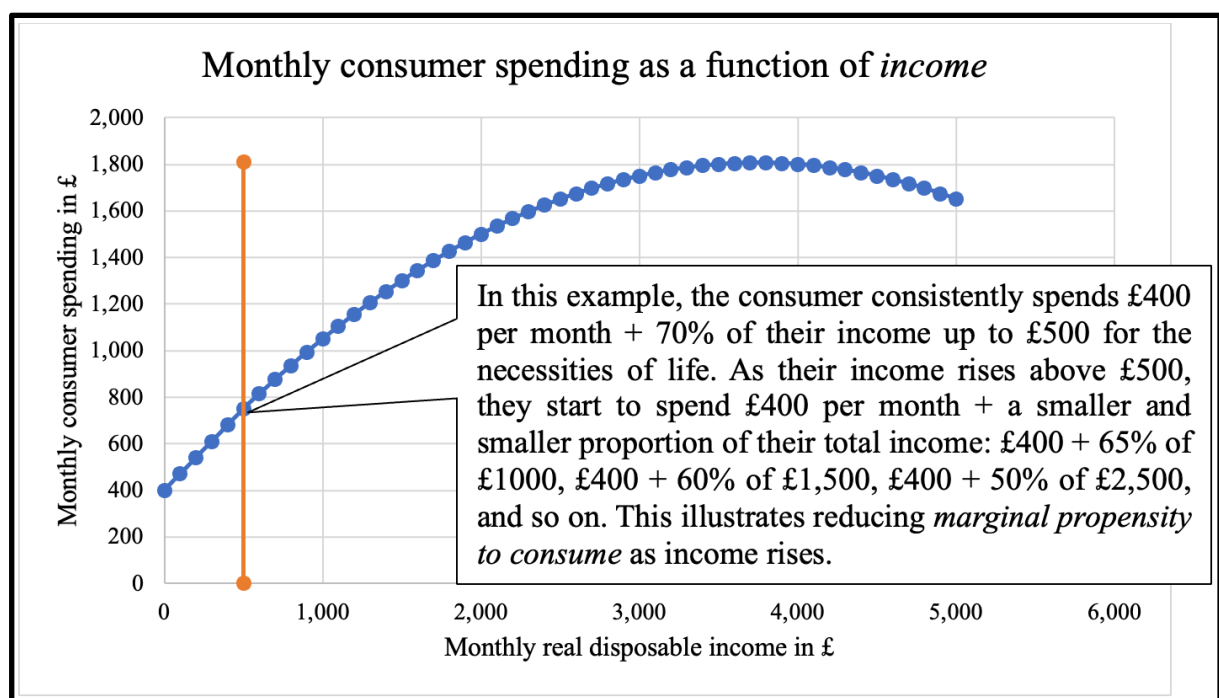


Figure 10 Keynes's consumption function (Keynes, 2018)

Figure 10 illustrates how changes in the marginal propensity to consume affect the line's slope. Consumers tend to spend a smaller percentage of their disposable income as it rises, creating a curved effect at higher income levels (Baselgia & Foellmi, 2022). Subsequently, as employment and hence aggregate income rise, not all the additional employment will be required to satisfy the needs of additional consumption (Keynes, 1936; O'callaghan et al., 2022).

Applying the Absolute Income Hypothesis (AIH) to the cocoa value chain, the following can be hypothesized: actors at every level of the cocoa value chain will tend to spend a smaller percentage of their disposable income as it rises. As employment and aggregate income rise, not all the additional employment is needed to meet the needs of additional consumption of products containing cocoa. The concept of opportunity cost is relevant here: farmers must weigh the potential benefits of investing in circular economy practices against the immediate needs of daily survival. The upfront costs of transitioning to more sustainable practices may be seen as too high, especially when the financial returns are long-term and uncertain. This creates a constraint on the total supply of sustainably produced cocoa, as many farmers are reluctant to make the necessary investments. On the demand side, the AIH suggests that higher-income consumers are more likely to demand ethically produced cocoa. However, this increase in demand is not proportional to their income growth. This means that even though wealthier consumers may purchase more sustainable cocoa, their increased demand is limited. Overall, the forces of total demand and total supply in the cocoa market are influenced by both the income levels of, and the opportunity costs faced by, farmers and consumers.

2.1.2.2. *Friedman's Permanent Income Hypothesis*

Milton Friedman is regarded as one of the leading voices belonging to the Monetarist school of thought (Bougrine & Rochon, 2022). Between 1936-1957, Friedman writes several theories on the subject of consumption to fill the supposedly unexplained gaps of knowledge left by Keynes's Absolute Income Hypothesis (Drakopoulos, 2021).

Friedman's Permanent Income Hypothesis explains how an individual's income and expectations of future income affect current spending (Yun et al., 2023). A consumer's level of spending is determined not by their current income but by what Friedman calls permanent income (Reis & Tenreiro, 2022). Permanent income is defined as what a consumer reasonably expects to earn on a consistent, ongoing basis (Friedman, 1957). According to Friedman's (1957) Permanent Income Hypothesis, an individual's mean income over time can be illustrated as follows:

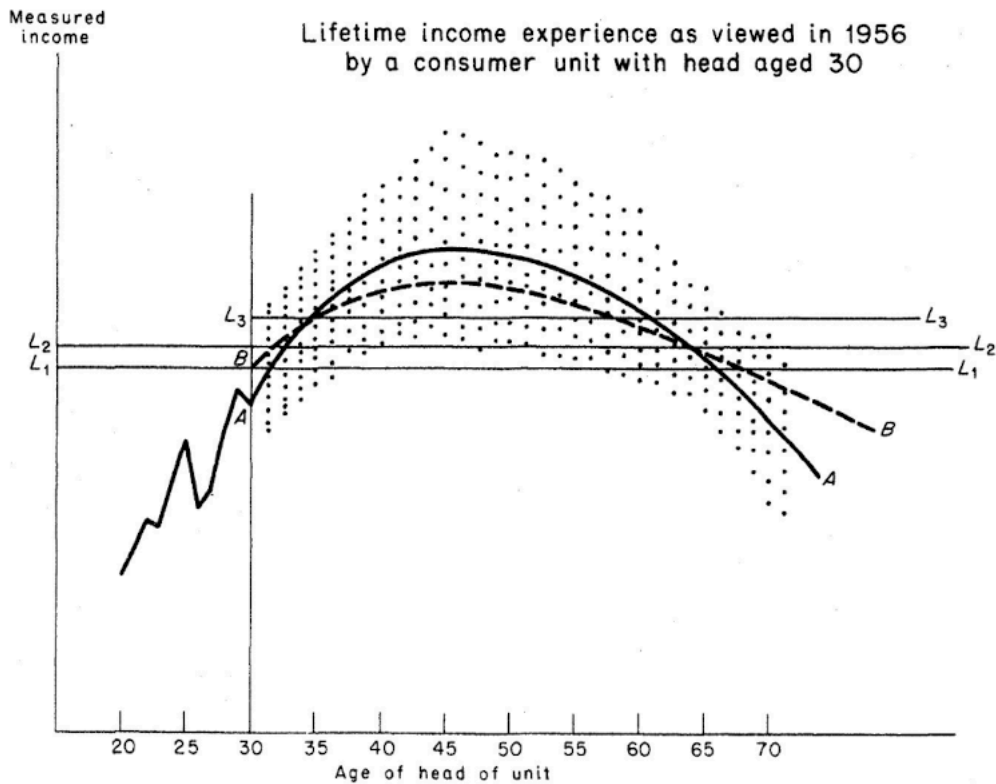


Figure 11 Illustration of alternative interpretations of permanent income (Friedman, 2020, p.43)

In Figure 11 the horizontal line L1 represents the mean lifetime income as anticipated at age 20. L2 represents the mean lifetime income as anticipated at age 30, considering realized experience from age 20 to 30. L3 represents the mean income anticipated at age 30 for the remaining lifetime of the household unit (Friedman, 1957).

Applying the Permanent Income Hypothesis (PIH) to the cocoa value chain, the following can be hypothesized: actors at every level make spending decisions based on their expected long-term income rather than their current earnings. The PIH suggests that consumers base their consumption on anticipated, consistent income. However, actual spending depends on access to financial resources, whether through current income or savings. In the cocoa value chain, farmers may wish to invest in circular practices but face difficulties due to high upfront costs and limited access to savings or credit. Similarly, consumers may want ethically produced cocoa but are limited by their immediate financial resources, even if they expect higher future income. Thus, both the total supply and total demand in the cocoa market are shaped by income expectations as well as the availability of financial resources.

2.1.2.3. Modigliani's Life-Cycle Hypothesis

With the help of Richard Brumberg, Franco Modigliani builds on Friedman's (1957) Permanent Income Hypothesis and on Keynes's (1936) Absolute Income Hypothesis by developing the Life-Cycle Hypothesis (Tavlas, 2023). Later, the Life-Cycle Hypothesis is empirically refined by Albert Ando (Ando & Modigliani, 1963; Lučić et al., 2023). The Life-Cycle Hypothesis expresses the "*current consumption of an individual as a function of their resources and the rate of return on capital with parameters depending on age*" (Ando & Modigliani, 1963, p.56). It is an economic theory that describes the spending and saving habits of consumers from cradle to grave (Horioka, 2021).

Figure 12 depicts the life cycle of consumption, income and saving of a consumer using two graphs. In the top graph, labelled 'a', income and consumption are drawn on the y-axis and the age of the consumer is shown on the x-axis. Income typically increases gradually over the course of a consumer's working life and peaks shortly before retirement. The consumer's preference for a stable consumption pattern results in consumption fluctuating less than income throughout the life cycle. Therefore, consumption here is constant. In the bottom graph, labelled 'b', the consumer's saving is drawn on the y-axis and the age of the consumer is shown on the x-axis. In this illustration, saving is the difference between income and consumption. At the start of a consumer's career, consumption exceeds income, leading to negative savings. In midlife, savings become positive as the surplus income is used to repay earlier debts and prepare for retirement. During retirement, consumers spend their savings (i.e. dissave).

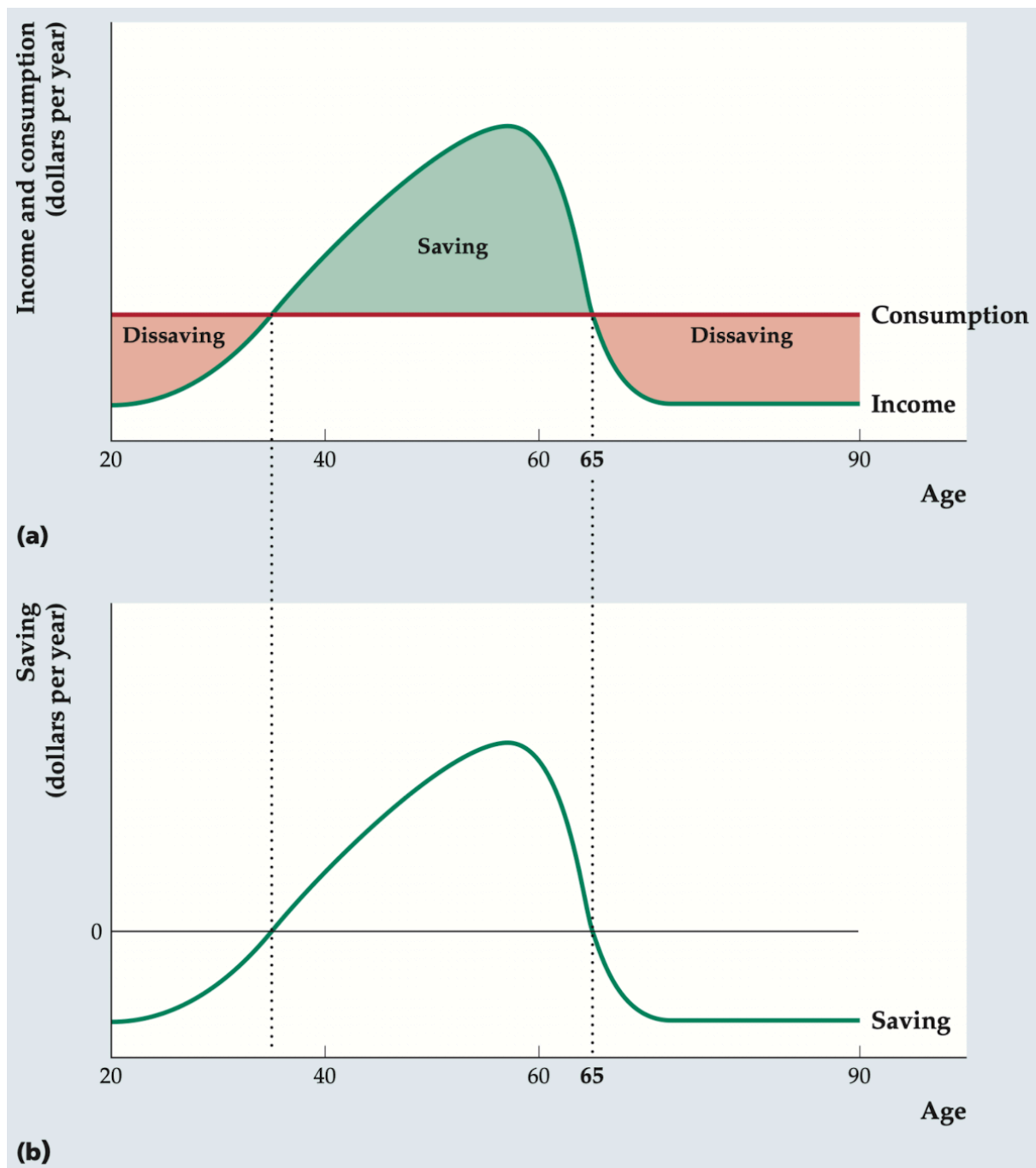


Figure 12 Modigliani's Life-Cycle Hypothesis (Abel et al., 2024, p.198)

Figure 12 illustrates how individuals tend to smooth out their consumption throughout their life by borrowing when their income is in a trough, and saving when their income is at a peak (Jantan, 2020). This planned consumption results in a curved-shape of savings that is low during youth and old age but high in middle age (Ando & Modigliani, 1963; Lučić et al., 2023). The resulting logic is that savings are neither preserved during a steward's life nor carefully

passed on to the next generation (Ando & Modigliani, 1963; Jantan, 2020; Lučić et al., 2023; Modigliani, 1988).

Applying the Life-Cycle Hypothesis to the cocoa value chain, the following can be hypothesized: actors at every level of the cocoa value chain will tend to smooth out their consumption throughout their life by borrowing when their income is in a trough (e.g. during periods of low cocoa prices), and saving when their income is at a peak (e.g. during harvest peaks or when prices rise). The savings of cocoa value chain actors are low during youth and old age but high during middle age. The savings are neither preserved during a steward's life nor passed on to the next generation.

2.1.2.4. *Summary*

To summarize this section, consumption theory can be used to explain consumer decisions at each level of the cocoa value chain. Applying Keynes's Absolute Income Hypothesis, actors at every level of the cocoa value chain will tend to spend a smaller percentage of their disposable income as it rises. As employment and aggregate income rise, not all the additional employment is needed to meet the needs of additional consumption of products containing cocoa. Overall, the forces of total demand and total supply in the cocoa market are influenced by both the income levels of, and the opportunity costs faced by, farmers and consumers. Applying Friedman's Permanent Income Hypothesis, actors at every level of the cocoa value chain make spending decisions based on their expected long-term income rather than their current income. Both the total supply and total demand in the cocoa market are shaped by income expectations as well as the availability of financial resources. Applying Modigliani's Life-Cycle Hypothesis, actors at every level of the cocoa value chain will tend to smooth out their consumption throughout their life by borrowing when their income is in a trough and saving when their income is at a peak. The savings of cocoa value chain actors are low during youth and old age but high during middle age. The savings are neither preserved during a steward's life nor passed on to the next generation.

This concludes the section on consumption theory and hypotheses of consumption, which explain how demand can both drive and constrain markets. Meeting this demand, however, requires an efficient supply-side component of the value chain. In the cocoa sector, various

constraints can limit the market's ability to meet consumer demand. Therefore, the focus of the review now shifts to identifying the supply-side constraints in the Ivorian cocoa value chain.

2.2. The supply side

Having explored the demand side of the cocoa value chain, this section now turns to the supply side, where various constraints can hinder the market's ability to effectively meet consumer demand. These supply-side constraints not only impact the overall efficiency of the cocoa value chain but also contribute to inequalities in the sector. This section examines three key themes identified in the literature as potential constraints: forced child labour, excessive deforestation, and farmers failing to achieve a living income. The selection of these particular constraints is based on their relevance to the Ivorian cocoa sector, drawing on existing research and conference materials (International Cocoa Organization, 2018; Lee & Park, 2023; Löhr et al., 2021; Perez et al., 2020; Vogel et al., 2020).

2.2.1. Forced child labour

This section reviews literature debating the topic of (forced) child labour in all its forms on cocoa farms in Côte d'Ivoire. It appears that the phenomenon of forced child labour is linked to civil conflict, child welfare, and child migration. However, literature also shows that the distinction should be made between children who are forced to work and children who willingly participate in their family's business. An interpretation based on the literature is made about how low cocoa prices may, at times, be creating the situation of unpaid labour.

According to Traoré & Dzifa Torvikey (2022), forced child labour remains common in today's cocoa economy in Côte d'Ivoire. The literature suggests that children often migrate independently, driven by poverty, to regions where they believe they can find work. Wayoro's (2023) research explains that children who grow up close to areas of conflict are adversely impacted in terms of their long term health. Their study shows the extent to which the protracted civil conflict in Côte d'Ivoire from 2002–2011 had significant negative effects on

child welfare. Han et al. (2022) also claim that forced child labour occurs frequently in the cocoa sector.

The academic debate about (forced) child labour in its various forms in the cocoa sector in Côte d'Ivoire has been running for more than a decade (Berlan, 2016; Bertrand & De Buhr, 2015; Canagarajah & Nielsen, 2001; Cogneau & Jedwab, 2012; DeLuca-Acconi, 2017; Ellenbogen, 2003; Jacquemin, 2004; Maffei et al., 2006; Nkamleu & Kielland, 2006). Sabates-Wheeler & Sumberg (2022) argue that the effort to establish a framework for protecting children from harm at work needs to be adapted to the economic realities and social contexts in which rural children and their families live.

Kouamé et al. (2022) emphasize that education remains the most effective tool for implementing a new model to address child labour. However, rather than striving for the complete eradication of child labour – an often unrealistic goal – future interventions should integrate rural children's work with basic formal schooling to create more practical and sustainable solutions (Yeboah et al., 2022). In fostering meaningful improvements in children's lives, it is vital to involve women in the design and implementation of child labour initiatives, as their perspectives and roles within households are central to children's wellbeing (Kouman et al., 2020). Furthermore, parenting extends beyond the immediate family unit and is deeply embedded in broader social and urban infrastructures, highlighting the need for community-based approaches to child welfare (Doherty, 2021).

While Kraft & Kellner (2022) examine West Africa as a whole rather than Côte d'Ivoire specifically, they argue that blockchain technology could be introduced into the cocoa sector due to its demonstrated success in other agri-food supply chains, such as coffee. Integrating blockchain into the cocoa value chain would enhance transparency in reporting child labour practices, thereby contributing to a reduction in the incidence of forced child labour (Bai et al., 2022; Kraft & Kellner, 2022; Senou et al., 2019).

One caveat to the claim that cocoa firms still benefit from forced child labour is that one must agree on what child labour is. Hepburn & Jackson (2022) argue that normative assumptions in labour historiography mistakenly overlook age and childhood as categories of analysis. However, their argument concerns the period of 1919-1940 and in a different geographical setting. Busquet et al. (2021) do consider the 21st century cocoa sector. They argue that when

child labour is examined from a multi-dimensional perspective, we achieve a more nuanced understanding that goes beyond Western models of childhood. Thévenon & Edmonds (2019) assert that one should distinguish between children who are forced to work and children who willingly participate in their family's business.

2.2.1.1. Summary

To summarize, forced child labour remains a constraint of today's cocoa value chain in Côte d'Ivoire. However, it is also evident that the way child labour is addressed has evolved in the past ten to twenty years. There is a call for new research on further adapting forced child labour interventions, most notably by drawing out the perspective of women who work in the cocoa value chain. Implementing blockchain technology throughout the cocoa value chain could improve the transparency of reporting, thereby reducing the incidence of forced child labour. Finally, the distinction should be made between children who are forced to work and children who willingly participate in their family's business.

Based on the literature, the following interpretation can be made. It is possible that low cocoa prices create economic pressures which oblige farming households to rely on all available labour, including that of children (Busquet et al., 2021). When prices are low, farmers struggle to afford paid labour and are unable to invest in better farming practices. As a result, children are expected to work without pay to help support the family's livelihood. This reliance on unpaid child labour contributes to a cycle of poverty, where children miss out on education and are trapped in low-income conditions (Boysen et al., 2023).

A gap in the literature is linking the idea of reduced forced child labour with the concept of circularity (i.e., the circular economy). This subject will be treated in the discussion of the circular economy. In the next section, literature that concerns a second constraint of the cocoa value chain in Côte d'Ivoire is examined. This second constraint is named by most scholars as (excessive) deforestation.

2.2.2. Excessive deforestation

This section reviews literature on the claim that cocoa farming is a major driver of (excessive) deforestation in Côte d'Ivoire. (Excessive) deforestation in Côte d'Ivoire has been a topic of academic debate for over a decade, with cocoa farming often cited as a significant contributing factor. While research confirms that cocoa farming has played a role in forest loss, studies also highlight other major drivers. The complex interplay of various factors has led to excessively high deforestation rates. Regardless of the extent to which cocoa farming contributes to deforestation, cocoa farming itself also presents opportunities for forest regeneration.

Renier et al. (2023, p.10) demonstrate how cocoa farming has caused the loss of nearly 50% of the “*undisturbed tropical moist forest*” between 2000 and 2019. This is calculated as a loss because the original forest is cut down to make way for a farm of cocoa trees. Yao et al. (2023) also reveal a downward trend of total forest land in Côte d'Ivoire between 1900 and the present day, which they claim has been partly caused by cocoa farming. According to Zanli et al. (2022), Côte d'Ivoire is predicted to lose the entirety of its national forest by 2034 if the current deforestation rate continues. They also see cocoa as a driver of deforestation in Côte d'Ivoire. Vervuurt et al. (2022) show that deforestation at the establishment of a cocoa farm is a large contributor to greenhouse gas emissions. Deforestation also changes habitat availability for local wildlife (Ahizi et al., 2021). There is significant economic loss because of the conflict between humans and wildlife, such as forest elephants (Kouakou et al., 2020) and duiker species (Diarrassouba et al., 2020), unless conservation measures are respected.

(Excessive) deforestation more generally and cocoa-driven deforestation in Côte d'Ivoire have been debated in academia for over a decade (Aubréville, 2015; Bitty et al., 2015; Carodenuto, 2019; Chatelain et al., 1996; Djezou, 2016; Ehui & Hertel, 1989; Jongkind, 2012; N'Gbala et al., 2017; Ongolo et al., 2018; Ruf et al., 2019; Sonwa et al., 2019; Tondoh et al., 2015; van der Ven et al., 2018). According to Ruf (2021), the cocoa sector in Côte d'Ivoire depends on deforestation to this day. Cocoa farms have trespassed into protected areas of forest despite policies aimed at preventing this (Abu et al., 2021).

Zu Ermgassen et al. (2022) argue that cocoa farming causes excessive deforestation when the sourcing is indirect as opposed to direct. Indirect in the sense that it cannot be traced and therefore managed, and vice versa. Cocoa supply chains are criticized for “*masking negative socioenvironmental impacts*” such as deforestation (Zu Ermgassen et al., 2022, p.1). Renier et al. (2023) might support Zu Ermgassen et al.’s (2022) identification of indirect sourcing as a problem in that Renier et al.’s (2023) findings show a majority of cocoa exports from Côte d’Ivoire as either untransparent - sourced via traders that do not disclose any information - or indirectly sourced, with the origin unknown.

Literature offers some solutions to the problem of deforestation. Kouassi et al. (2021) and Kouassi et al. (2021) suggest that transitioning to cocoa agroforestry will reap the benefits of agroecological intensification whilst maintaining sustainable livelihoods. Additionally, it is possible to restore secondary forests and thereby regenerate forest ecosystem services (Doua-Bi et al., 2021). In terms of prevention, Ouattara et al. (2021, 2022) prove that it is now possible to detect the first signs of deforestation early-on with the use of aerial drones. A positive by-product of this capability is that it deters illegal cocoa farmers from infiltrating protected forests (Ouattara et al., 2021, 2022).

Deforestation also takes place in Côte d’Ivoire for reasons other than cocoa farming. Wildfires, for example, play an important role in deforestation in Côte d’Ivoire. In a study conducted by Kouassi et al. (2022), the drivers of wildfires are identified according to phytogeographical regions. Their findings point to the significance of understanding fire ecology and management to curb wildfires throughout Côte d’Ivoire. However, it is worth noting that Kouassi et al. (2022, p.1221) themselves concede the country’s natural forest area has sharply declined in the last decades as a result of “*excessive cocoa and coffee cultivation and illegal logging*”. Berte et al. (2023) acknowledge the intense social pressure in Côte d’Ivoire to use forests as a natural resource for energy. It is not only the cocoa sector that contributes to deforestation but a great dependence by the population on fuelwood due to demographic factors and political instability. Armed conflict has also been a driver of deforestation (Kouassi et al., 2022), and deforestation has sparked land conflicts (Traoré & Dzifa Torvikey, 2022). Ousmane et al. (2020) claim that conflict allows for certain populations to illegally cultivate cocoa.

Research by Zu Ermgassen et al. (2022) supports the adoption of agroforestry. Irrespective of the achieved level of transparency, very little commodity-driven deforestation can be linked

with commodity supply chains with the data that is available today. A cocoa plantation will take approximately three years before the beans can be harvested. Thus, forest areas are cleared speculatively by ‘future farmers’. Furthermore, most of the expansion of cocoa farms in Côte d’Ivoire is associated with recent migrants (Barima et al., 2020), who may be left out by current corporate sustainability programmes and traceability schemes. A company’s position in the value chain influences the scale and scope of their commitment to zero-deforestation (Carodenuto & Buluran, 2021).

Different strategies are needed for future forests, from protecting the remaining forests, to prioritising areas for conservation where new agricultural developments are to begin, to supporting the stable or increased tree cover in existing cocoa farms (Sassen et al., 2022). One strategy is making use of wasted residues of cocoa pods. Zanli et al. (2022) show that, on average, 1 tonne of cocoa beans is equivalent to about 2 tonnes of cocoa pods. Dry cocoa pods form around 30% of the wet pod’s weight, which results in about 7 tonnes of wet pods for every tonne of beans. Côte d’Ivoire boasts around 4.4 million tonnes of dry pod residues (i.e., 15 million tonnes of wet pods) that can be recovered. This is estimated to yield an energy potential of 90,000 GWh (324 million GJ) per year. To put this into perspective, given that 1 Terawatt is equal to 1,000 Gigawatt, and given that the country of Germany consumed a net amount of “515 TWh” (Hecht et al., 2022, p.908) of power (i.e. approximately 515,000 GWh) in 2021, the energy potential of 90,000 GWh if cocoa pods were recovered in Côte d’Ivoire during one year amounts to just over 17% of the net amount of electrical power consumed in 2021 in Germany. Furthermore, there is a need for agroforestry training centres in Côte d’Ivoire so that farmers can acquire and hone their skills in this domain (Atangana et al., 2021). Finally, the future designs of protected forestland should firstly account for leakages (Ford et al., 2020) and secondly be a global conservation priority (Singh et al., 2022).

2.2.2.1. Summary

To summarise this section, while cocoa farming may well contribute to deforestation, several other factors such as wildfires, dependence on fuelwood, and armed conflict play equally significant, if not greater, roles. Nonetheless, deforestation rates remain excessively high, with projections suggesting that Côte d’Ivoire could lose all its forests by 2034. This environmental degradation also intensifies human-wildlife conflicts. Regardless of the extent to which cocoa

farming contributes to deforestation, it also holds potential as part of the solution for forest regeneration. A promising strategy is the large-scale adoption of cocoa agroforestry. This could be combined with using rather than wasting cocoa by-products, for example by transforming cocoa shells to generate energy.

The existing literature on deforestation reveals a gap: plans for achieving zero-deforestation in the cocoa sector have not been explicitly developed within the framework of the circular economy. This issue will be addressed later in the discussion.

The following section examines the third, and possibly most significant, supply-side constraint in the Ivorian cocoa value chain: the inability of cocoa farmers to maintain a living income. This constraint is particularly critical, as addressing it may help alleviate the other two major supply-side challenges – forced child labour and excessive deforestation – by reducing the economic pressures that contribute to them.

2.2.3. Farmers' living income

This section reviews literature on the challenges cocoa farmers face in achieving a living income. Existing research explores the impact of certification schemes and the Living Income Differential (LID), highlighting their role in improving farmers' earnings. Scholars advocate for devolving greater authority to cocoa farmers as a means of enhancing their economic conditions. However, literature also points to further challenges that will appear even after poverty is reduced.

Most cocoa producing households in Côte d'Ivoire do not achieve a living income (van Vliet et al., 2021). Certification schemes have improved living standards for some cocoa farmers but the majority still live in poverty (Gboko et al., 2021). The Living Income Differential (LID), which was designed to improve cocoa farmer livelihood, has resulted in questionable outcomes since cocoa farmers remain vulnerable to price fluctuations *between* seasons (Staritz et al., 2022). COVID-19 added further anxiety and stress to the lives of adolescents in Côte d'Ivoire (Banati et al., 2020). Significantly, poverty is identified as the root cause of forced child labour and excessive deforestation (Boysen et al., 2023).

The constraint of cocoa farmers failing to maintain a living income has been debated in academia for more than ten years (Benjamin & Deaton, 1993; Kouassi et al., 2019; Ruf et al., 2019; Schultz, 2003). Recent literature suggests that cocoa certification needs to be supplemented with additional farmer-concentrated interventions to diversify income streams and increase productivity levels (Alho et al., 2021). Policymakers are strongly encouraged to explore climate-smart agriculture as well as non-farming income sources (Kouassi et al., 2022a).

According to Diallo & Wouterse (2022), agriculture-driven investment is the best way to reduce poverty, eradicate hunger, and reduce inequality whilst simultaneously bolstering the resilience of rural households. Maguire-Rajpaul et al. (2022) argue that devolving greater authority to cocoa farmers might increase their chances of maintaining a living income. Obeng (2022) makes a similar point in that cocoa farmers currently have no role in policy-making with regards to EU importation, which restricts their sphere of influence in European markets.

The wellbeing of people living in poor settings is constrained by inefficient transport (Malhotra et al., 2021). According to Human & Fromm (2021), cocoa farmers do not benefit from suitable road networks. Furthermore, there is an important scarcity of banking branches close to the cocoa farms. The inefficiency of transport restricts school and hospital access, which causes lower literacy rates and poorer health outcomes. These factors not only contribute to lower productivity in the cocoa value chain but reduce chances to earn a livelihood regardless of the consumer or the household's profession (Human & Fromm, 2021).

Solutions to the constraint of cocoa farmers failing to maintain a living income are likely to have a combination of international and local implications. On the international front, the CFA Franc will remain pegged to the Euro unless France decides to relinquish some of its influence in *la Françafrique*, or Africa seeks greater independence (Pérez, 2022). Chinese Foreign Direct Investment in Côte d'Ivoire has impacted social welfare but not economic welfare because of a lack of investment in Ivorian agriculture (Allou et al., 2020). On the local front, Coulibaly-Ballet (2021) argue that consumers in Côte d'Ivoire should be provided with up to date information on why certified products are of a higher standard than non-certified products. Furthermore, the knowledge of local and indigenous communities is a rich and underused

resource (Amoutchi et al., 2023) that could be utilized to reduce the incidence of extreme poverty among farmers.

The good news is that a sustainable post-COVID recovery is achievable in Côte d'Ivoire (Napo, 2022). One example is the process of replacing chemical fertilizers with organic fertilizers, which should accelerate and generate a more integrated local economy. For the most part, cocoa farmers are at the origin of this shift and could therefore become the real designers of sustainable cocoa (Ruf, 2022). Finally, resolving the constraint of cocoa farmers failing to maintain a living income is a first obstacle but one should be prepared for the ensuing challenges. In a model developed by Swe et al. (2021), even if SDG 1 of ending poverty is achieved, it is unlikely that SDG 6 of universal access to safe water supply and sanitation will be met under current settings.

2.2.3.1. Summary

To summarise this section, cocoa farmers fail to maintain a living income despite efforts to reverse the situation. Certification and the Living Income Differential (LID) have had some beneficial impact, but much work is left to be done. Resolving the constraint of cocoa farmers failing to maintain a living income may reduce other important constraints such as forced child labour and excessive deforestation.

The gap in this section of the literature is that no link is made between farmers' living income and the concept of circularity.

While the previous sections focused on understanding the constraints within the cocoa value chain from the demand side (2.1) and the supply side (2.2), the next section explores how innovation can help address these challenges.

2.3. Innovating the value chain

This section reviews literature on innovating the cocoa value chain, including consumer opinion on value chain transparency, the definition and management of a living income, consumer opinion on achieving circularity, and leveraging entrepreneurial circular business models.

2.3.1. Consumer opinion on value chain transparency

Value chain transparency (VCT) involves making production processes visible to build trust and accountability. Unlike basic supply chain transparency, VCT incorporates ethical practices and competitive advantage (Porter, 2008). By disclosing information on aspects such as provenance, firms empower consumers to make informed decisions and strengthen their credibility. As consumer expectations for corporate accountability rise, VCT has become essential for building trust with consumers and demonstrating a firm's commitment to social responsibility.

Consumer opinion on VCT is closely tied to the interplay between transparency, visibility, and trust. Hobbs (2019) highlights two critical areas of trust in the agri-food sector: food safety (including novel technologies) and the reliability of quality claims. Breaches of the consumer's trust, such as the United Kingdom's bovine spongiform encephalopathy (BSE) crisis, illustrate how concerns over safety can erode consumer confidence in regulatory oversight (Wales et al., 2006). Through tying together the concepts of transparency, visibility, and trust, the link between the consumer's choice, the provenance of the cocoa bean, and the welfare of the farmer is shown. Value chain transparency could therefore be considered as a tool that companies use to build trust with their consumers.

Consumers have developed a more sophisticated understanding of companies' social responsibility communications. This has led to an increase in their scepticism of companies' social responsibility claims (Kraft et al., 2022). Montecchi et al. (2019) identify five types of risks consumers perceive when supply chain information is withheld: financial, psychological,

social, performance, and physical. These perceived risks can deter consumers from purchasing. Blockchain technology, by offering verifiable information about product provenance, can reduce these risks and ultimately increase consumers' willingness to pay.

While food industry consumers have traditionally prioritised safety, they are now demanding greater transparency beyond nutritional value (Carruba et al., 2022; Hau & Lange, 2023; Peters & Verhagen, 2022). Concerns about forced labour, working conditions and fair pay are increasingly shaping consumer expectations (Ko et al., 2023; Schouteten et al., 2021). Kendall et al. (2019) also find that consumers are sceptical about the information they receive on the food products that they purchase, and that they require improved transparency across the food system. It appears that transparent reporting of value chain fairness is in demand (Chandan et al., 2023; Gilbert, 2024; Lambin & Furumo, 2023).

A study by Mollenkopf et al. (2021) shows that consumers generally respond positively to improved supply chain transparency, though responses vary by environmental engagement. Environmentally involved consumers respond differently to one type of framing approach compared to less environmentally involved consumers. Thus, it is found that managers may need to adapt their method of sustainability disclosure to different consumer segments. Interestingly, it is found that some consumers care about companies' supply chain practices even when they (the non-consumers) do not directly benefit from the efforts made. In an earlier study, Duan & Aloysius (2019) find that when the sustainable supply chain message matches the original beliefs of the consumer, high environmentally involved consumers show higher willingness to pay a premium. In their study, Viciunaite & Alfnes (2020) furthermore find that consumers ranked attributes of sustainability related to business model elements of key resources, activities, partners, and channels *higher* than price. This shows that consumers are prepared to reward sustainable production methods.

Hofer et al. (2021) make two similar findings to Viciunaite & Alfnes (2020). Firstly, business elements traditionally remain invisible to the end consumer. Reaping the benefits of consumers' interest in sustainability requires making the business models more transparent. Secondly, consumer preferences for sustainability attributes are diverse. This highlights the need to carefully select the sustainability attributes of the value proposition marketed to different consumer segments.

2.3.1.1. *The difference between value chain transparency and social licence to operate*

Although VCT and social licence to operate (SLO) are closely related, they serve distinct purposes in building trust. VCT emphasizes the disclosure of production processes to help consumers evaluate a firm's adherence to social norms. This strategy promotes accountability and can confer competitive advantage (Porter, 2008). SLO, on the other hand, focuses on securing social approval by aligning business practices with community values and regulatory expectations. Dumbrell et al. (2020, p.5) contend that "*social licence concerns are underpinned by market and government failures,*" highlighting how SLO often functions as a societal response to gaps in formal regulatory frameworks and market operations.

While VCT directly enhances consumer trust, SLO ensures the firm's long-term operational stability through continued social acceptance. Both frameworks stress the importance of effective communication and public trust in sustaining a firm's reputation. Nichols et al. (2019) extend this idea by showing how consumer responses to negative news are driven by perceptions of transparency and integrity. They find that negative information about supply chain issues has a stronger impact on consumer trust than positive news, which underscores the significance of proactive disclosure in managing reputational risks. By effectively communicating transparency initiatives – whether under a framework of VCT or SLO – firms can mitigate the negative effects of supply chain issues and even rebuild trust after crises.

Mollenkopf et al. (2022) argue that, irrespective of the severity of a recall, a firm that makes an effort to disclose information on the sustainability of their supply chain will be positively evaluated by consumers. According to Hofer et al. (2021), consumers respond more positively in terms of attitude and purchase intention when a firm discloses that its supplier monitoring extends beyond first-tier suppliers to lower-tier suppliers. Consumers also respond positively when the firm discloses that it monitors its lower-tier suppliers directly rather than outsourcing this task to its first-tier suppliers or third parties. Thus, a company's supplier monitoring activities are essential to achieving supply chain transparency.

The findings of Mollenkopf et al. (2022) and Hofer et al. (2021) reveal the importance of transparency across a larger portion of the supply chain. To mitigate negative perceptions, firms

can shift from merely disclosing surface-level supply chain information to adopting a more comprehensive strategy that integrates value chain transparency. By selectively disclosing key aspects of their production processes – while safeguarding sensitive information – VCT enables firms to strike a balance between transparency and confidentiality. This strategy helps differentiate the firm and build lasting consumer loyalty without compromising competitive advantage.

2.3.1.2. *The difference between value – and supply – chain transparency*

Porter (2008) defines the value chain as the primary and support activities a firm manages to gain competitive advantage, while the global value chain emphasizes inter-company linkages (Gereffi et al., 2006). In contrast, supply chains typically focus on operational entities without prioritizing competitive advantage (Durach et al., 2021), though some studies link the two (Chen et al., 2022). The meaning of supply chain transparency varies across industries (Schäfer, 2022) and often excludes consumer perspectives. It generally involves disclosing information about resources and processes to build trust (Ko et al., 2023; Montecchi et al., 2021). In this context, it is useful to consider transparency with respect to visibility. *“To create transparency requires a company to both gain visibility into its supply chain and disclose information to consumers”* (Kraft et al., 2022, p.1). Unlike supply chain transparency, value chain transparency incorporates competitive advantage alongside visibility and disclosure (Nyamah et al., 2022; Porter, 2008).

There are several gaps in the literature covering consumer opinion on value chain transparency. Firstly, most articles focus on supply chain transparency and do not consider value chain transparency. Secondly, studies consider consumer opinion on supply chain transparency in sectors such as car-making, fashion, and food but none focus on the cocoa sector. An exception is the book chapter by Hämäläinen et al. (2021), which tests consumers’ valuations of transparency in the context of a Helsinki-based craft chocolate maker (Kraft & Zheng, 2021). Even so, this chapter covers supply chain transparency but omits the concept of value chain transparency. Finally, the article by Robson et al. (2021) relates to value chain transparency, with the focus being on food fraud as a concept, without highlighting consumer opinion. Thus, the importance of value chain transparency in food fraud is shown but the value of consumer opinion on food fraud is omitted. Although food fraud is out of scope for the research, studying

value chain transparency in terms of food fraud in the cocoa industry could be relevant for future research projects.

2.3.1.3. Summary

To summarize this section, the consumer's opinion on value chain transparency is proven to be vitally important. Consumers have become more sophisticated in how they interpret companies' value chain transparency communications. Food consumers have developed a concern that goes beyond food safety, extending to issues such as fair pay. Consumers are prepared to reward sustainable production methods. However, different consumer segments respond differently to different types of sustainability messages. If consumer confidence is lost, it can be won back if a company shows how they are rectifying their supply chain problems. However, literature does not reveal how consumer opinion on value chain transparency functions in the cocoa sector, presenting a gap in the literature. In the next section, literature pertaining to the definition and measurement of a living income is reviewed.

2.3.2. The definition and measurement of a living income

This section reviews literature on defining and measuring a living income. In examining these concepts, related terms such as a decent standard of living, a living wage, income, and income inequality are also considered. Literature pertaining to the cocoa value chain appears to focus on the concept of a living income rather than a living wage.

2.3.2.1. A living income vs. a living wage

A living income is defined as “*the net annual income required for a household in a particular place and time to afford a decent standard of living for all members of that household*” (Andersen et al., 2022, p.7). Boysen et al. (2023) assert that a living income is similar to a poverty line in that it is an absolute income threshold. However, a living income threshold extends beyond the basic needs met by a poverty line to include provisions for a decent standard of living. According to the Anker Methodology (Anker & Anker, 2017), a decent standard of living encompasses access to food, water, housing, education, healthcare, transport, clothing,

communication, household furnishings, recreation, and other essential needs, as well as provision for unexpected events. Although the Living Income Differential (LID) has been criticized for being ineffective (as mentioned in 2.2.3), it represents a first step toward ensuring a living income for farmers (Boysen et al., 2023).

In contrast, a living wage is defined as “*remuneration received for a standard work week by a worker in a particular place sufficient to afford a decent standard of living for the worker and her or his family*” (Andersen et al., 2022, p.7). The relationship between a living income and a living wage is described as follows: the net living wage is calculated by dividing the net annual income required (i.e. the living income) by the number of full-time equivalent workers in the family (Andersen et al., 2022). Pereirinha & Pereira (2023) highlight the distinction between a living wage and the national minimum wage in Portugal. While the living wage aims to provide sufficient income for the worker and their family, the national minimum wage primarily considers the worker’s income alone.

2.3.2.2. *Measuring a living income vs. measuring income inequality*

Measuring a living income is a complex process. When income is conceptualized at the individual level, it reflects a consumer’s earning ability. However, when income is conceptualized at the household level, it captures living standards (Shi et al., 2021). The Organisation for Economic Co-operation and Development (OECD) defines income as household disposable income in a given year (OECD, 2023). Income consists of earnings, self-employment and capital income, and public cash transfers, minus the deductions of income taxes and social security contributions paid by the household.

Income inequality reflects disparities in the distribution of income or wealth across a population and can be measured using several indicators. Although several indicators are used to measure income inequality, a detailed exploration of all available indicators is beyond the scope of the research. Instead, the discussion focuses on the Gini coefficient, the P90/P10 ratio, and the Palma ratio as an illustrative example, given their widespread acceptance. Table 8 presents data for these income inequality indicators for selected OECD countries.

Table 8 Income inequality indicators for selected OECD countries (OECD, 2025)

Indicator	Explanation	Examples	Interpretation
Gini coefficient (disposable income)	Measures income distribution from complete equality (0) to complete inequality (1).	Belgium (0.26), Netherlands (0.30), France (0.30), Switzerland (0.31), United Kingdom (0.35) (OECD, 2025).	Belgium's Gini of 0.26 indicates a more equal distribution than the UK's 0.35.
P90/P10 ratio (disposable income)	Compares the income of the richest 10% to the poorest 10%.	Belgium (3.1), France (3.5), Netherlands (3.4), Switzerland (3.8), United Kingdom (4.3) (OECD, 2025)	The top 10% in Belgium earn 3.1 times more than the bottom 10%, compared to 4.3 times in the UK, indicating lower inequality in Belgium.
Palma ratio (disposable income)	Compares the income share of the richest 10% to the income share of the poorest 40%.	Belgium (0.9), Netherlands (1.1), France (1.1), Switzerland (1.2), United Kingdom (1.5) (OECD, 2025)	Belgium's Palma ratio of 0.9 indicates a more equitable distribution compared to the UK's 1.5.

Comparing income inequality data between OECD countries (e.g. Belgium, Netherlands, United Kingdom) and non-OECD countries (e.g. Côte d'Ivoire, Ghana, Guinea) is challenging due to differences in the availability of comparable datasets. For example, the reputable source (OECD, 2025) used to gather data for Table 8 does not have information for the same indicators for Côte d'Ivoire. This could be explained by the fact that standardized practices are not necessarily adhered to across both OECD and non-OECD countries. Additionally, there may be varying definitions of income, which further complicates cross-country comparisons.

Although comparable datasets between OECD and non-OECD countries, such as Côte d'Ivoire, are not consistently available, alternative, reputable, sources still offer valuable insights. For example, Gini coefficients calculated in 2021 were 0.49 for Guinea, 0.55 for Liberia, 0.60 for Côte d'Ivoire, and 0.61 for Ghana (Andersson & Andersson, 2019; World Inequality Database, 2023). This data highlights comparatively higher income inequality within the region, offering context for understanding the socio-economic challenges that may hinder cocoa farmers from achieving a living income.

2.3.2.3. *Socio-economic challenges in Côte d'Ivoire*

Studies on socio-economic challenges and the living income problem in Côte d'Ivoire can be traced back to 1986, with early research conducted by Ainsworth & Munoz (1986), Bassett (1988), Haddad & Hoddinott (1994), Hoddinott & Haddad (1995), López (1998), and Weekes-Vagliani (1990). More recently, Clément et al. (2022) identify a pattern of bipolarization between a more affluent, stable middle class and a new, more vulnerable one. Their findings suggest that middle-class consumers in Côte d'Ivoire (among other nations) appear to be more individualist and less politically engaged, challenging the assumption that they are consistent agents of political change. The potential implication is that, in a climate of political stalemate, there may be reduced political momentum to address socio-economic issues such as farmers' living income.

Healthcare access remains a significant challenge. Sackou-Kouakou et al. (2021) examine the renunciation of medical care for financial reasons among women in a peri-urban region of Abidjan, Côte d'Ivoire. They find that low income, along with factors such as low education levels, young age, and a higher number of dependents, significantly contribute to women foregoing medical care. A World Bank discussion paper by Duran et al. (2020) highlights that, although Côte d'Ivoire introduced a universal health care coverage programme in 2014, significant challenges remain, including limited access to services and financial barriers, which contribute to the renunciation of medical care. Sackou-Kouakou et al. (2021) propose that empowering women through literacy programmes, health education, and improved access to the universal health coverage programme could help alleviate these financial barriers.

Finally, there is ongoing debate regarding the advantages and disadvantages of pegging Côte d'Ivoire's currency, the CFA franc, to the euro. A particularly contentious issue is that the international value of the CFA franc is determined in France, while cocoa farmers' incomes are paid domestically in Côte d'Ivoire. Pigeaud & Sylla (2020) argue that this monetary arrangement limits Côte d'Ivoire's financial autonomy and exposes Ivorians' earnings to fluctuations caused by external economic policies, thereby increasing Ivorians' economic vulnerability. In contrast, Martínez-Zarzoso (2019) identifies sectoral trade benefits, particularly increased exports to certain Eurozone countries, that Côte d'Ivoire gains from this monetary arrangement.

2.3.2.4. *Summary*

In summary, this section examined the definition and measurement of a living income. The distinction was made between a living income and a living wage. Measurement complexities were explored, with the Gini coefficient, P90/P10 ratio, and Palma ratio used as key indicators of income inequality, though cross-country comparisons remain challenging between OECD and non-OECD members. Insights into income inequality help contextualize socio-economic challenges in Côte d'Ivoire, including the political engagement of the Ivorian population, healthcare access and currency policy issues potentially affecting cocoa farmers' income stability.

A key gap in the literature is defining and measuring a living income within the context of the circular economy. The next section reviews literature on consumer opinion regarding circularity and its potential impact on cocoa farmers' ability to maintain a living income.

2.3.3. Consumer opinion on achieving circularity

This section reviews consumer opinion on achieving circularity. The aim is to determine the extent to which consumers believe that achieving circularity will impact the probability of cocoa farmers maintaining a living income. First, circularity and the circular economy are defined. Second, consumer opinion on achieving circularity in various sectors is reviewed. Third, consumer opinion on the potential impact of achieving circularity on the probability of cocoa farmers maintaining a living income is considered.

2.3.3.1. *Definition of the circular economy and circularity*

The essence of the circular economy was first introduced by Kenneth Ewart Boulding (1966, pp.7-8) with the assertion that in “*the closed economy of the future... man must find his place*

in a cyclical ecological system”. Using more recent literature, the circular economy can be defined as:

“A consumer-driven socio-economic business eco-system that efficiently uses materials through the optimisation of waste and disposal, which enables sustainable development using business models and innovation” (adapted from Blomsma & Brennan, 2017; Kirchherr et al., 2017; Korhonen et al., 2017, 2018; Merli et al., 2018; Moraga et al., 2019; Morsetto, 2020; Shevchenko et al., 2023; Stahel, 2016; Ying & Li-jun, 2012).

In this context, ‘circular’ and ‘circularity’ are terms that denote something as belonging to the circular economy (Corona et al., 2019; Harris et al., 2021; Kirchherr, 2022; Mehrotra & Jaladi, 2022). In the literature, circularity and the circular economy are often discussed in conjunction with concepts such as traceability (Santana & Ribeiro, 2022; Yu et al., 2022), transparency (Opferkuch et al., 2021; Walden et al., 2021), and trust (Halog et al., 2021; Rejeb et al., 2022).

This concludes literature defining the circular economy and circularity. Next, literature covering consumer opinion on achieving circularity in sectors other than cocoa is considered.

2.3.3.2. *Consumer opinion on achieving circularity*

Suchek et al. (2021) claim that if consumers show interest in the circular economy, the transition towards circularity will accelerate and solidify. Conversely, if consumers show a lack of interest in the circular economy, the transition towards circularity will decelerate and weaken (Suchek et al., 2021). Testa et al. (2020) underline the importance of consumers seeking information to align their consumption choices with the circular economy. Transitioning towards a circular economy requires consumer engagement in more environmentally conscious purchases (Testa et al., 2020).

There are at least four examples where consumers either directly or indirectly demand circularity. First, in a study by Ki et al. (2021) on achieving circularity in the fashion industry, it is found that consumers consider it morally desirable for both the supply and demand sides of the fashion sector to be circular. The study provides empirical evidence that consumers

project a moral stance in the context of circular economy principles in the fashion sector (Ki et al., 2021). Circularity is linked to sustainability, which is linked to traceability (Santana & Ribeiro, 2022; Schenten et al., 2019; Superti et al., 2021). Second, in a study by Anastasiadis et al. (2021) on sustainable tomato supply chains, it was found that consumers' acceptance rate of a traceability system is dependent on factors of health, trust, quality, nutrition, and safety-related values. Third, the Nutri-Score framework, a front-of-pack labelling system for nutritional information, which helps consumers make better informed choices about the food they buy (Public Health France, 2024; Ter Borg et al., 2021). Finally, the OECD Scoreboard on the Governance of the circular economy, which is a comprehensive tool to assist decision-making and determine the level of advancement towards circularity (OECD, 2020, 2022).

Several variables, such as consumer expertise, age, and gender, affect the extent to which a consumer applies circularity in their behaviour (do Canto et al., 2021; Gomes et al., 2022; Otto et al., 2021). Yuan et al. (2020) have found that consumer expertise moderates the effect of a food traceability system on the consumer's perceived value of the product. According to Gallo et al. (2023), age and gender are significant variables when determining whether consumers who declare themselves environmentally aware adopt sustainable behaviour. In their study conducted in Italy, it was found that women are more responsible in adopting sustainable behaviour, unlike young men (Gallo et al., 2023).

Circularity involves certification (Colombo et al., 2023; Sopha et al., 2022; Tsanakas et al., 2019). According to Meemken et al. (2021), certification (e.g. fairtrade) typically involves an extra cost that is paid for by a combination of three stakeholder groups. These groups are consumers (who pay a premium for certified products), taxpayers (in countries that subsidize certification), and third-party entities (such as NGOs) (Meemken et al., 2021).

Circularity may also involve blockchain (Agrawal et al., 2023; Hassoun et al., 2022; Kwan & Wang, 2022), but consumer trust in this relatively new technology varies. Treiblmaier & Garaus (2023) assert that while a consumers' view of a product's quality increases when blockchain-based traceability information is provided for less familiar brands, this does not occur in the case of more familiar brands. The same study points to a gap in the literature on examining consumer opinion on the impact of traceability (Treiblmaier & Garaus, 2023).

Finally, Visco et al. (2022, p.12) claim that consumers show a “*growing interest*” in production chain sustainability. Arekrans et al. (2023) extend this notion with the argument that circularity is gaining interest among industrial firms. This is true despite critiques against the circular economy, for example that the implementation methods for circularity are unclear (Corvellec et al., 2022).

2.3.3.3. *Summary*

In summary, this section explored consumer opinion on circularity, focusing on how these perceptions may influence cocoa farmers’ ability to regularly earn a living income. Although definitions vary, the circular economy can be defined as a socio-economic system that optimizes resource use through sustainable business models, emphasizing traceability, transparency, and trust. Consumer engagement is essential for advancing circularity. Consumer interest accelerates the transition, while a lack of interest impedes it. Empirical evidence highlights the ethical expectations consumers place on circularity in sectors not limited to cocoa, including fashion, tomatoes, and food traceability more generally. Existing frameworks such as Nutri-Score and the OECD Circular Economy Scoreboard further inform consumer decisions.

Factors such as expertise, age, and gender also shape consumer adoption of circular behaviour. For instance, consumer expertise enhances product value perceptions in traceable food systems, and a study conducted in Italy found that women tend to adopt sustainable practices more readily than young men. Certification schemes such as Fairtrade often involve higher costs borne by consumers, taxpayers, and NGOs, which can limit adoption. Blockchain technology is also emerging as a tool for circularity, though consumer trust varies based on brand familiarity. Finally, consumer interest in sustainable production chains is rising, and industrial firms are showing increased interest in circularity, despite critiques regarding the ambiguous implementation of circular economy principles.

This discussion provides a foundation for understanding consumer opinion on how achieving circularity could impact cocoa farmers’ ability to maintain a living income.

2.3.3.4. *Consumer opinion on how achieving circularity could impact cocoa farmers' ability to maintain a living income*

Giller (2020) writes that farming households in sub-Saharan Africa (SSA) fail to maintain a living income. Rural households are often led by “*reluctant*” farmers (Giller, 2020, p.2), in need of economic incentives to invest in the improvement of agriculture. Harnessing circularity could help cocoa farmers achieve such improvements in agriculture (Chapman et al., 2022; Chávez-Dulanto et al., 2021; Lindsey et al., 2022). However, Erhun et al. (2021) emphasize that a circular supply chain requires commitment from consumers to the circular economy.

Circularity, if backed by consumers, could contribute towards reducing the negative impact of constraints such as forced child labour (Castellani et al., 2022; Ladu & Morone, 2021). The backing of consumers is achievable (Luckstead et al., 2021). In the example of forced child labour, Luckstead et al. (2021) find that consumers are willing to pay a premium when there is a clear explanation accompanying a forced child-labour free logo.

According to Giller et al. (2021a), the prices paid to farmers are following a downward trend in real terms (i.e., when adjusted for inflation). The direct method to counter this phenomenon is investment in smallholder agriculture. An example of such an investment is implementing circularity because this has the potential to both attract consumers and enable cocoa farmers in maintaining a living income (Silvestri et al., 2022).

Searle & McWha-Hermann (2021) state that living wage research needs to adopt a more person-centric perspective on work and wages. Such a lens extends the focus past mere wage rates, towards a clearer understanding of the context in which decent work is completed (Searle & McWha-Hermann, 2021). Results from a survey conducted by Wurster & Reis (2022) in Germany show that consumers are particularly concerned about workers' needs. Consumers need information about the circularity of chocolate, amongst several other product categories (Wurster & Reis, 2022).

The problem, according to Giller et al. (2021b), is that only a small percentage of the rural population would maintain a living income from farming alone. Given that agriculture fails to provide a living income in current markets, parallel development of off-farm employment is

required (Giller et al., 2021a). The provision of a universal basic income is one example of a further social safety net needed if cocoa farmers are to maintain a living income (Banerjee & Duflo, 2019). Such measures need not be limited to benefiting cocoa farmers alone but could extend to agricultural workers across other sectors.

Finally, a study by Puchol-Miquel et al. (2022) concludes that a significant number of consumers around the world are willing to pay extra money for cocoa and chocolate manufactured following ethical principles. Consumers are willing to pay more for chocolate with sustainability labels (e.g. Fairtrade, Rainforest Alliance, Organic Cocoa, etc.) on the packaging (Puchol-Miquel et al., 2022). In a meta-analysis of 80 articles covering food products such as chocolate, coffee, tomatoes, and almonds, Li & Kallas (2021) find that consumers are, on average, willing to pay 29.5% extra for sustainable (i.e. circular) food products.

2.3.3.5. Summary

To summarize this section, cocoa farmers in sub-Saharan Africa (SSA) often fail to achieve a living income, with many households led by ‘reluctant’ farmers who need economic incentives to improve agricultural practices. Incorporating circularity into agriculture has the potential to support cocoa farmers in improving their livelihoods. However, consumer commitment to circularity is essential for these benefits to materialize. One area where circularity could reduce negative practices is forced child labour. Consumers are more likely to pay a premium for products certified as free from forced child labour if such certification is accompanied by clear explanations. This willingness to pay demonstrates the potential for consumer-driven support for ethical production practices. Declining real-term prices paid to farmers further exacerbate challenges to maintaining a living income. Investing in smallholder agriculture, including through circular practices, could help mitigate this trend by enhancing product appeal and farmer incomes.

There is a call in the literature for person-centric research on living wages, emphasizing the need to go beyond wage rates and to better understand working conditions. A German consumer survey revealed strong concern for worker welfare, underscoring the importance of consumer access to information on the circularity and sustainability of several products,

including cocoa-based categories. Given that farming alone often cannot provide a sustainable living income for rural populations, off-farm employment opportunities and additional social safety nets such as universal basic income, are critical. Such measures could extend beyond cocoa farmers to support other agricultural workers. Finally, consumer demand for ethically produced cocoa is growing. A significant portion of consumers are willing to pay more for chocolate with sustainability labels such as Fairtrade and Rainforest Alliance. On average, consumers are willing to pay a 29.5% premium for circular or sustainable food products, according to a meta-analysis of 80 studies covering chocolate, coffee, tomatoes, and almonds, among other foods.

These findings highlight that consumer commitment to circularity and ethical purchasing has the potential to improve the likelihood of cocoa farmers maintaining a living income. The following section explores how entrepreneurial circular business models (ECBMs) can be leveraged to help cocoa farmers in Côte d'Ivoire achieve circularity and maintain a living income.

2.3.4. Leveraging entrepreneurial circular business models

This section reviews literature on entrepreneurial circular business models (ECBMs), providing an understanding of their principles and application in the context of cocoa farmers in Côte d'Ivoire. The discussion progresses through six stages: defining entrepreneurship, defining circular business models, contrasting the circular economy with circular business models, comparing circular and linear business models, defining ECBMs, and exploring how ECBMs can support cocoa farmers in achieving circularity and maintaining a living income.

2.3.4.1. *Definition of entrepreneurship*

Entrepreneurship is often defined as a “*skill*” (Abel et al., 2024, loc. 269), where an individual with an idea takes the risk of disrupting the market with a new service or product (McGrath & MacMillan, 2000; O'Reilly & Binns, 2019). In economic theory, entrepreneurship is also a recognised factor of production, alongside labour, land, capital, and the state of technology (Erken et al., 2018). These five factors can be defined as follows:

- Labour (L) refers to the workers who put in human effort – both physical and intellectual – to create goods and services. Labour is considered a “*mobile*” factor that can be used in the production of multiple types of goods (Krugman et al., 2023, loc. 79).
- Land (T for terrain) encompasses natural resources essential for production. Along with capital, land is considered a “*specific*” factor that can be used only in the production of one good in the short-run (Krugman et al., 2023, loc. 79).
- Capital (K) denotes man-made tools and infrastructure that enhance production efficiency, including “*factories, machines, software, and intellectual property*” (Abel et al., 2024, loc. 94).
- The state of technology refers to the way advancements in technology can improve productivity by influencing “*the amount of output that can be produced from given amounts of capital and labour at any time*” (Blanchard et al., 2021, loc. 272).
- “*Entrepreneurship*” (Blanchard et al., 2021, loc. 279) is the initiative to combine these factors in innovative ways to generate “*new*” (Krugman et al., 2023, loc. 278) goods or services while assuming the associated risks.

From a management perspective, entrepreneurship is often described as a mindset that is opportunity obsessed (Ratten, 2023), holistic in approach (Theodoraki et al., 2022), and rooted in balanced leadership (Pauceanu et al., 2021). This perspective moves beyond traditional economic theories to highlight entrepreneurship as a dynamic process of recognising opportunities and leveraging resources to create new markets or disrupt existing ones. Entrepreneurial ventures often start as small firms with a long-term mission to generate profit and gain market share with an innovative idea (Bhidé, 1994; Rosário et al., 2022). Entrepreneurs act as agents who coordinate resources and spur economic growth (Espinosa et al., 2021).

The concept of entrepreneurship has been interpreted and classified in diverse ways across economic literature. While a comprehensive exploration of this evolution falls beyond the scope of the research, a brief overview is provided. Published posthumously in 1755, Richard Cantillon described the entrepreneur as an arbitrageur or speculator who coordinates resources and takes on risk (Parker, 2009). However, entrepreneurship was not initially recognised as a

distinct factor of production. Since the latter part of the 19th century (i.e. in neoclassical economics), entrepreneurial activity was often categorised under labour or capital without clear differentiation (Baumol, 1968). Modern perspectives increasingly distinguish entrepreneurship as an independent factor of production that contributes to: starting a new business, scaling for profit, and creating business capital (Bischoff et al., 2020; Unger et al., 2009).

2.3.4.2. *Definition of a circular business model*

A circular business model (CBM) enables a firm to fulfil its mission whilst minimizing environmental and social costs (Kravchenko et al., 2019; Sinkovics et al., 2021). CBMs contribute to a circular economy by: designing out waste and pollution, keeping products and materials in use, and regenerating natural systems (Mhatre et al., 2021). These principles guide firms in creating long-term value by promoting resource efficiency and waste reduction (Lahti et al., 2018).

2.3.4.3. *Circular economy vs. circular business models*

While the circular economy is a macroeconomic model aimed at reshaping resource flows to eliminate waste, CBMs are the firm-level mechanisms that implement these principles within individual businesses. Understanding the relationship between the broader circular economy and individual circular business models requires familiarity with value chains. Firms within a value chain collectively form either a linear or circular configuration (Eisenreich et al., 2022). A single firm cannot independently establish a circular economy (Puntillo et al., 2021). Rather, firms are like points along a circle, forming a network between suppliers and consumers called a value chain (González-Sánchez et al., 2020). This network can either be configured as a straight line between natural resources and landfills (linear economy), or as a circle, creating a continuous cycle of value with zero waste (circular economy) (Lüdeke-Freund et al., 2018; Winterstetter et al., 2021).

2.3.4.4. *Circular vs. linear business models*

The fundamental difference between circular and linear business models lies in resource flow. Linear models follow a take-make-dispose approach, extracting resources to produce goods that eventually become waste (Tan et al., 2022). In contrast, circular business models (CBMs) aim to decouple economic growth from resource depletion. CBMs prioritize resource conservation, product longevity, and waste minimization (Bigliardi & Filippelli, 2021). According to Lüdeke-Freund et al. (2018), CBMs also focus on closed-loop systems, where waste becomes input for new production cycles, thereby minimizing landfill contributions.

CBMs are often driven by technological innovations and collaborative ecosystems. Digital technologies – such as Blockchain and the Internet of Things (IoT) – can help monitor resource use, enhance traceability, and optimize recycling networks (Chauhan et al., 2022; Kayikci et al., 2023). Furthermore, CBMs require shifts in business strategies, with firms adopting service-based models like product-as-a-service and performance-based contracting (Bocken et al., 2016).

2.3.4.5. *Definition of an entrepreneurial circular business model*

An entrepreneurial circular business model (ECBM) integrates the core principles of entrepreneurship (outlined in section 2.3.4.1) with those of circular business models (outlined in section 2.3.4.2). ECBMs are characterized by their adaptability. Firms that implement ECBMs often rethink product life cycles, designing for reuse, and creating business strategies that emphasize long-term value creation over short-term profits (Toth-Peter et al., 2023). ECBMs satisfy a growing need in society for waste reduction. ECBMs allow firms to be competitive *because* they are environmentally responsible (Cullen et al., 2021; Poponi et al., 2020; Suchek et al., 2022). Blockchain technology has emerged as a potential enabler for enhancing the effectiveness of ECBMs (Kayikci et al., 2023).

2.3.4.6. *Leveraging ECBMs for cocoa farmers in Côte d'Ivoire*

Cocoa farmers in Côte d'Ivoire often struggle to maintain a living income, which traps them in cycles of economic poverty (Boysen et al., 2021, 2023; van Vliet et al., 2021). This poverty arguably leads to the waste of their full human potential (Derrer-Merk et al., 2022; Halkos & Aslanidis, 2023; Maslow, 1943). The increased inequality between the rich and the poor causes political instability (McKnight, 2019; Oualy, 2021) and armed conflict (Buhaug & Von Uexkull, 2021; Ismail & Olonisakin, 2021).

The circular economy aims to reduce waste (Kirchherr et al., 2023). Since economic poverty leads to the waste of an individual's full human potential, the circular economy is designed to reduce economic poverty (Erdiaw-Kwasie, 2023). ECBMs, as a subset of the circular economy (Awan & Sroufe, 2022), offer cocoa farmers opportunities to achieve and maintain a living income (Brenner, 2018).

Since cocoa production plays a central role in Côte d'Ivoire's social and economic development (Coulibaly & Erbao, 2019), helping farmers maintain a living income could have wide-ranging benefits. Agricultural exports also contribute significantly to the region's balance of payments (Giller, 2020). However, challenges in implementing circular practices within the cocoa value chain remain (Traoré & Dzifa Torvikey, 2022).

2.3.4.7. *Criticisms of CBMs and the circular economy*

Although CBMs and the broader circular economy offer potential advantages, they also present challenges. Conceptually, the circular economy has been criticized for its 'vague narrative' (Niskanen et al., 2020), lacking a consistent definition and actionable framework for both firms and policymakers. This lack of clarity can hinder efforts to develop coherent strategies and measurable goals.

In addition to definitional challenges, the practical implementation of the circular economy remains unclear (Corvellec et al., 2022). Operationalising CBMs is complicated by the absence of clear strategies for transitioning from linear to circular models. This leaves firms uncertain

about how best to align their operations with circular principles. Additionally, Försterling et al. (2023) confirm that CBMs require significant upfront investments, regulatory support, and consumer behavioural changes to fully replace traditional linear models. These financial and behavioural barriers make it difficult for firms to initiate and sustain circular business transformations. Successfully addressing these conceptual and implementation challenges is vital to realizing the potential of CBMs across diverse sectors.

2.3.4.8. *Policy implications and monitoring progress*

The goal of achieving “*a decent income for cocoa farming families*” (Waarts & Kiewisch, 2021, p.56) is shared by several European countries, including Belgium, the Netherlands, Switzerland, and Germany. Policy interventions play a critical role in supporting cocoa farmers’ transitions to circular practices. The German Federal Ministry for Economic Cooperation (2021) highlights the importance of monitoring progress to assess the effectiveness of interventions. It recommends minimizing the burden of data collection on producers while ensuring that collected data is actionable and useful for programme improvement.

2.3.4.9. *Summary*

In summary, this section explored entrepreneurial circular business models (ECBMs) and their potential application to cocoa farmers in Côte d’Ivoire. The section began by defining entrepreneurship, emphasizing its role in economic growth, and touched on the evolution of this concept in economic literature. The section then defined circular business models (CBMs), which aim to reduce waste and promote resource efficiency, and contrasted them with linear models, which follow a take-make-dispose strategy. The relationship between circular economies and individual business models was also examined, with an emphasis on the role of technology and collaborative ecosystems in facilitating circular practices.

An entrepreneurial circular business model (ECBM) integrates the core principles of entrepreneurship with the sustainability-focused strategies typical of circular business models. ECBMs offer cocoa farmers in Côte d’Ivoire the opportunity to achieve and maintain a living income. The section also referred to criticisms of CBMs and circularity with regard to their

alleged vagueness, the challenges in operationalising circular practices, and the need for significant investment and behavioural changes. Finally, the section discussed policy implications for supporting cocoa farmers' transition to circular practices. It was noted that effective monitoring of progress involves minimizing the burden of data collection on producers and ensuring that the data collected is both actionable and useful.

Building on these insights, the next section identifies key research questions to guide the thesis. These questions will explore value chain constraints, consumer perceptions, and the role of ECBMs in achieving circularity.

2.4. From literature review to research thesis

This section reveals how the literature review informs the research by identifying key research questions that emerge from the review. These questions help frame the research's objectives and provide a foundation for addressing the identified gaps in the literature.

To contribute to the literature, the following central research question was asked: "to what extent do consumers believe that value chain transparency and circularity would enable Ivorian cocoa farmers to maintain a living income?" The research questions arising from the literature review are:

1. What are the existing constraints of the Ivorian cocoa value chain?
2. How do consumers perceive value chain transparency?
3. To what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d'Ivoire?
4. How could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d'Ivoire achieve circularity and maintain a living income?

Answering these questions will help bridge the identified knowledge gaps and contribute to developing a new conceptual model applicable in industry. This will be explored in section 4.6 of the data analysis chapter and in section 5.5 of the discussion chapter.

This iteration of the research questions concludes the literature review and calls for a description of the research methodology, which follows in the next chapter.

3. Methodology

This chapter contains a discussion of the methodology for the research in terms of the narrative review of literature, the aims and approach, the research design, population identification, sampling method, and quality of the research. The chapter concludes with a summary of the methodology.

3.1. Narrative review

The literature was reviewed using the narrative review method (Snyder, 2019), a method often used in qualitative studies, as will be discussed in section 3.2.2. In the research, conducting a narrative literature review involved choosing adapted keywords at three distinct phases to find relevant articles. The ‘diverge, converge, emerge’ process was inspired by creative problem-solving methodologies used in design thinking (Liedtka, 2018). Table 9 shows how the keywords were formulated to ensure logical progression.

Table 9 Logical progression of keywords

Phase	Keywords	Approximate number of articles included
1. Diverge	Circular agri-food; cocoa by-products; consumption theory; cocoa growing regions Côte d'Ivoire; value chain analysis; cocoa and covid-19; living income vs. living wage; gender equality; research ethics; container shipping; theory of planned behaviour; Nash equilibrium	n = 208
2. Converge	Provenance; sustainability; customer engagement; corporate social responsibility; global value chains; transparency	n = 183
3. Emerge	Constraints; value chain transparency; circularity; business models	n = 102
	Total	n = 493

Table 9 presents keywords relating to the total of approximately 493 articles that were included in the review. The development of the research questions was grounded in a critical evaluation of the literature, sourced from several databases, including the RAU library, Google Scholar, EBSCOhost, Web of Science, and Wiley, among others. Filters such as ‘*peer-reviewed*’ and ‘*2019 onwards*’ were applied to ensure currency, relevance, authority, accuracy, and purpose (Martiniuk et al., 2022). Each piece of literature was critically assessed for its utility, rather than accepted at face value, to avoid biases that could result from ‘cherry-picking’ the literature.

The literature review informed the development of the research questions, ensuring they addressed gaps in existing knowledge. This early connection between theory and research questions helped guide the research’s direction. Further, it allowed for a seamless connection between the theory and the data. Similarly, the design of the questionnaire and semi-structured interview questions was influenced by the insights gained from the literature. The questionnaires were structured to capture data aligned with key themes in the literature, while

the semi-structured interview questions were designed to facilitate deeper exploration of these themes. This will be made evident in Table 11. By linking theory to the research questions and to the data collection, the study increases both methodological coherence and academic rigour (Nowell & Albrecht, 2019; Sovacool et al., 2018).

In the research, the ‘cocoa value chain in Côte d’Ivoire’ is understood as starting from cocoa farms in Côte d’Ivoire and ending with consumers of cocoa-containing products within the country. In contrast, the broader Ivorian cocoa value chain spans from cocoa farms in Côte d’Ivoire to consumers of cocoa products globally. While the geographic focus of the research is on cocoa farms in Côte d’Ivoire, farms in other locations are also considered (Bjornlund et al., 2022; Jellason et al., 2021; Nguimkeu & Okou, 2021).

3.2. Aims and approach

This section outlines the aims and approach of the research. The two broad aims are described and the reasons for the choice of approach are discussed.

3.2.1. Research aims

The research has two broad aims. The first is to elicit consumer opinion on the relationship between improved value chain transparency and the living income of cocoa farmers in Côte d’Ivoire. The second is to explore the potential impact circularity could have in enabling farmers to maintain a living income.

The central problem addressed in the research is the following: Ivorian cocoa farmers fail to maintain a living income (Giller, 2020; van Vliet et al., 2021; Waarts & Kiewisch, 2021). Although interventions such as Fairtrade certification and the Living Income Differential have partially resolved the problem of cocoa farmers failing to maintain a living income, the literature shows that further improvements are needed (Boysen et al., 2021, 2023; Gboko et al., 2021; Staritz et al., 2022).

To contribute to the literature, the following central research question was asked: “to what extent do consumers believe that value chain transparency and circularity would enable Ivorian cocoa farmers to maintain a living income?”

The research questions that arose from the literature review are the following:

1. What are the existing constraints of the Ivorian cocoa value chain?
2. How do consumers perceive value chain transparency?
3. To what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d’Ivoire?
4. How could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d’Ivoire achieve circularity and maintain a living income?

Having provided a description of the aims of the study and their context within the literature, the next step was to develop a research plan that could be used to answer the research questions.

3.2.2. Research plan

To answer the research questions effectively, the research was guided by a ‘research plan’. The research plan is composed of a framework of aims, objectives, research questions, methodologies (philosophies), and methods (tools), as illustrated in Table 10:

Table 10 Research plan

Aim	Objective	Question	Methodology (Philosophy)	Method (Tool)
A1. Analyse the cocoa value chain from Ivorian cocoa farmers to UK chocolate consumers.	O1. Analyse the Ivorian cocoa value chain using aspects of the literature on value chain analysis, transparency, trust, living income, entrepreneurship, consumption theory, circular business models, and the circular economy.	RQ1. What are the existing constraints of the Ivorian cocoa value chain?	A constructionist ontology and an interpretivist epistemology as part of a qualitative approach.	Qualitative analysis of primary data, which were collected using questionnaires and semi-structured interviews.
A2. Determine how consumers perceive value chain transparency.	O2. Determine how stakeholders including chocolate consumers perceive value chain transparency.	RQ2. How do consumers perceive value chain transparency?		
A3. Determine the extent to which consumers believe that achieving circularity would impact the living income of Ivorian cocoa farmers.	O3. Determine the extent to which consumers believe that achieving circularity would enable Ivorian cocoa farmers to maintain a living income.	RQ3. To what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d'Ivoire?		
A4. Using the contributions of consumers, explore how Ivorian cocoa farmers could achieve circularity and maintain a living income, in line with global standards (see United Nations SDGs).	O4. Evaluate entrepreneurial circular business models which may be leveraged in the cocoa value chain so that Ivorian cocoa farmers can achieve circularity and maintain a living income.	RQ4. How could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d'Ivoire achieve circularity and maintain a living income?		

The aims in the research plan served as sub-aims of the broader aims stated in section 3.2.1, which were: firstly, to elicit consumer opinion on the relationship between improved value chain transparency and the living income of cocoa farmers in Côte d'Ivoire. And secondly, to explore the potential impact circularity could have in enabling farmers to maintain a living income.

In the research plan, the objectives were developed as specific statements that outlined the actions needed to achieve the aims, the research questions were re-iterations of the research questions that arose from the literature review, the methodology was the philosophical justification for the method used (Bleiker et al., 2019; Creswell & Creswell, 2018; Gray, 2018; Madden, 2022), and the method was the tool used to collect data (Favourate & Sebele-Mpofu, 2020; Gray, 2018; Li et al., 2019; Vindrola-Padros & Johnson, 2020).

In the next section, the choice of research approach is presented. This choice was motivated by the goals of achieving the research aims and answering the research questions. To re-iterate, the research questions were determined in accordance with the gaps identified in the literature review.

3.2.2.1. *Choice of research approach*

The first broad aim of the research was to elicit consumer opinion on the relationship between improved value chain transparency and the living income of cocoa farmers in Côte d'Ivoire. Given the subjective nature of consumer opinion, a qualitative approach was deemed suitable for the research. Qualitative studies excel at interpreting and understanding subjective experiences (Neubauer et al., 2019; Shipp & Jansen, 2021; Villa et al., 2021). This approach allowed for an exploration of consumer perceptions concerning the living income of Ivorian cocoa farmers. Additionally, qualitative methods facilitate a deeper understanding of ideas, experiences, beliefs, and cultures (Knott et al., 2022; Peters et al., 2022). To frame these interpretations, consumption theory (Ando & Modigliani, 1963; Friedman, 1957; Keynes, 1936) served as the study's theoretical framework.

Although the research primarily used qualitative methods, quantitative methods were employed in certain aspects. For example, a paired samples *t*-test was conducted to assess

changes in consumer opinion about cocoa stakeholders' income after watching an informational video⁴. This test allowed for objective measurements and hypothesis testing (Bell et al., 2019; Bleiker et al., 2019; Bouwman et al., 2019; Delic & Eyers, 2020). It is not uncommon for qualitative research to incorporate quantitative methods (Abbott et al., 2019; MacQueen et al., 2005; Poucher et al., 2020; Woods-Hill et al., 2022).

The second broad aim of the research was to explore the potential impact circularity could have in enabling farmers to maintain a living income. This aim aligned with another strength of qualitative research: its ability to provide a thorough account of a specific context (Hennink & Kaiser, 2022; Lefèvre et al., 2019). Here, qualitative methods enabled a detailed presentation of consumer opinion on circularity's potential role in supporting farmers' living income. Furthermore, the research leveraged qualitative methods to better understand the ideas, experiences, beliefs, and cultures (Knott et al., 2022; Peters et al., 2022) expressed by consumers in this context.

The research does not meet the criteria of a purely quantitative approach for two main reasons. First, the findings are not generalizable to a larger population due to the smaller sample size and the research's focus on a specific context. This limits external validity, which is typically a strength of quantitative research (Degtiar & Rose, 2023; Findley et al., 2021). The literature confirms that qualitative research often faces this limitation due to its narrower scope and context-specific focus (Harry & Lipsky, 2014; Lam, 2014; Thomson, 2011).

Second, the design of the research required direct engagement with respondents. The researcher sought opinions through questionnaires and semi-structured interviews⁵. This level of engagement contrasts with many quantitative designs, which emphasize researcher detachment to promote objectivity (Gray, 2018). While quantitative researchers may view detachment as a strength, qualitative researchers argue that it can prevent the discovery of respondents' social and cultural realities (Guba & Lincoln, 1994; Silverman, 2000). By adopting a qualitative approach, the research minimized the risk of forcing qualitative data into numerical categories

⁴ Permission was obtained from the author (van de Velde, 2018, 2021) of the video, and the link (<https://vimeo.com/139873232>) was shared with respondents, who were requested to watch from **9:10 to 9:52**.

⁵ Please see the questions used to collect the primary data in Appendix Four – Farmer questionnaire, Appendix Five – Consumer questionnaire, and Appendix Six – Semi-structured interview questions.

– an inherent limitation of some quantitative studies (Bell et al., 2019; Didier, 2022; Uher, 2021).

Additionally, the central research question and four research questions were qualitative in nature. The central research question asked: “to what extent do consumers believe that value chain transparency and circularity would enable Ivorian cocoa farmers to maintain a living income?” The four research questions that arose from the literature review were:

1. What are the existing constraints of the Ivorian cocoa value chain?
2. How do consumers perceive value chain transparency?
3. To what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d’Ivoire?
4. How could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d’Ivoire achieve circularity and maintain a living income?

The fact that the central research question and the four research questions sought to describe, and were framed as “what” and “how” questions, aligns with the characteristics of qualitative research questions in other studies, as presented by Onwuegbuzie & Leech (2006):

“Qualitative research questions typically describe, rather than relate variables or compare groups, avoiding the use of words such as ‘affect’, ‘influence’, ‘compare’, and ‘relate’. More specifically, qualitative research questions tend to address ‘what’ and ‘how’ questions” (Onwuegbuzie & Leech, 2006, p.482).

There are several examples of qualitative studies involving research questions that fit the above description, in sectors including but not limited to wind energy (Karakislak et al., 2023), children’s rights (Sun et al., 2023), refugees (Saleh et al., 2023), and end-of-life care (Flemming et al., 2019).

Thus, a qualitative approach was chosen to address the research aims and questions. However, three limitations of the qualitative approach should be acknowledged. First, qualitative findings are often difficult to generalize to larger populations because of the smaller sample sizes and the focus on specific contexts (Harry & Lipsky, 2014; Lam, 2014; Thomson, 2011). Second, qualitative studies are susceptible to researcher bias, which may influence data interpretation

(Feddersen et al., 2021; Haven & van Grootel, 2019; Taquette & Borges da Matta Souza, 2022). Finally, qualitative research is almost impossible to replicate because it is relatively unstructured and reliant upon the researcher's ingenuity (Bryman, 1994 as cited in Bell et al., 2019).

This concludes the discussion of the research aims and approach. The next section will outline the research design.

3.3. Research design

This section explains the research design regarding how the literature review related to the data and to the research questions. The explanation begins with Figure 13.

Literature review			
Primary data: farmer questionnaire, consumer questionnaire, and semi-structured interviews.			
Answer to research question 1	Answer to research question 2	Answer to research question 3	Answer to research question 4

Figure 13 Overview of the research design

In Figure 13, at the top, is the literature review, which informed the entire study including the answers to all four research questions. In the middle is the primary data⁶. The primary data was collected using a farmer questionnaire, consumer questionnaire, and semi-structured interviews. At the bottom are the four research questions. Both the literature review and the primary data were used to answer the research questions. The next section explains how the grouping technique was used to more effectively answer the research questions that arose from the literature review.

3.3.1.1. *Grouping*

Grouping is a research technique that involves categorizing data based on specific characteristics (Bahr et al., 2020; Hennink & Kaiser, 2022; Payrovnaziri et al., 2020). In qualitative research, grouping can be used to organize data thematically (Chai et al., 2021; Guha et al., 2021; Long et al., 2019). The process of grouping adds structure to a study, which makes it easier for the researcher to draw meaningful conclusions and insights from the research findings (Cloutier & Ravasi, 2021; Grodal et al., 2021; Harley & Cornelissen, 2020). Thus, each of the research questions can be answered more effectively. In Table 11, the four research questions that arose from the literature review are grouped with the relevant literature and the questions asked in both the questionnaires and semi-structured interviews (Please see the questions used to collect primary data in Appendix Four – Farmer questionnaire, Appendix Five – Consumer questionnaire, and Appendix Six – Semi-structured interview questions).

⁶ Secondary data is not collected by the researcher (Großschädl et al., 2023; Hosang et al., 2023; Hussain et al., 2023) whereas primary data is (Charef et al., 2019; Lynch et al., 2023; Ochieng et al., 2022).

Table 11 Grouping the research questions with the relevant data

Research question	Relevant data
1. What are the existing constraints of the Ivorian cocoa value chain?	This research question is answered using the literature review, farmer questionnaire questions 18 and 19, consumer questionnaire questions 19-60, and the semi-structured interviews.
2. How do consumers perceive value chain transparency?	This research question is answered using the literature review, farmer questionnaire questions 20-22, consumer questionnaire questions 1-32, 36-49, 51-52, 54-56, and 59-60, and the semi-structured interviews.
3. To what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d'Ivoire?	This research question is answered using the literature review, farmer questionnaire questions 23-24, consumer questionnaire questions 20, 22-25, 29-31, 33-36, 40, and 50-60, and the semi-structured interviews.
4. How could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d'Ivoire achieve circularity and maintain a living income?	This research question is answered using the literature review, farmer questionnaire question 26, consumer questionnaire questions 20, 22-25, 29-31, 35, 40, 51-56, and 59-60, and the semi-structured interviews.

Table 11 shows how the research questions are answered using the literature review and data collected from the farmer questionnaire, consumer questionnaire, and semi-structured interviews. The answers to the four research questions are used to answer the central research question, which asks: “to what extent do consumers believe that value chain transparency and circularity would enable Ivorian cocoa farmers to maintain a living income?”

3.3.1.2. *Using the data to answer research question 1*

Research question 1 (RQ1) asks, “what are the existing constraints of the Ivorian cocoa value chain?” A preliminary understanding of the constraints is constructed with the help of literature by Wayoro (2023), Renier et al. (2023), and Maguire-Rajpaul et al. (2022) to name a few from section 2.2 of the literature review. Subsequently, the data from the farmer questionnaire served to validate and build upon the answer. For example, questions 18 and 19 of the farmer questionnaire provide specific insights into the existing constraints from the perspective of the farmers themselves. The research question is then answered using consumer questionnaire questions 19-60 and data drawn from the semi-structured interviews. The analysis is presented in section 4.2 of the data analysis chapter.

This concludes a brief explanation of how data is used to answer research question 1. In the next section, examples are provided showing how data is used to answer research question 2.

3.3.1.3. *Using the data to answer research question 2*

Research question 2 (RQ2) asks, “how do consumers perceive value chain transparency?” Although RQ 2 focuses on eliciting the consumer’s perspective, insights were drawn from farmers as well. Farmers play a fundamental role in the value chain (Ingram et al., 2018), and their inclusion as primary data respondents in the research is essential for capturing ground-level insights into the challenges they currently face. Farmers’ input also validates consumer beliefs about the potential impact of improved value chain transparency. The relevant farmer questionnaire questions are 20-22. This will become evident in section 4.3. The relevant consumer questionnaire questions are 1-32, 36-49, 51-52, 54-56, and 59-60.

Research question 2 can be broken down into two parts. Firstly, who are the consumers in this research? Secondly, how do these consumers perceive the concept of value chain transparency? The first part is addressed by consumer questionnaire questions 1 to 18, which serve to provide demographic information about the respondents. For example, question 4 asks “what is your age in years?”, question 5 asks “what is your highest completed level of education?”, question

11 asks “what is your gender?”, and question 17 asks “how many children (including dependants) do you have?” The purpose of these questions is to determine whether variables such as age, gender, and education level affect the consumer’s perception of value chain transparency. At a later stager (i.e. in answering the next two research questions), it should be possible to determine whether these variables, as well as others such as consumer expertise (Yuan et al., 2020), affect the extent to which consumers apply circularity in their behaviour (do Canto et al., 2021; Gomes et al., 2022; Otto et al., 2021). For instance, it could be guaged whether women are more responsible in adopting sustainable behaviour than young men, as found by Gallo et al. (2023).

The second part of research question 2 – how consumers perceive the concept of value chain transparency – is addressed by several questionnaire questions (as listed in Table 11). One example is question 26, which asks the respondent “what does value chain transparency mean to you?” This is an open-ended question that allows the respondent to express their opinion without a pre-determined definition of the concept of value chain transparency. The purpose of this question is twofold. Firstly, to determine whether respondents’ answers align with Hobbs’ (2019) and Wales et al.’s (2006) findings: that trust, visibility, and transparency connect the consumer’s choice, the provenance of the cocoa bean, and the welfare of the cocoa farmer. Secondly, to evaluate whether value chain transparency could therefore be considered as a tool that companies use to build trust with their consumers.

Another example of how the consumer questionnaire is used to answer research question 2 is question number 27, which asks, “on a scale of 1-10, to what extent do you believe that improved value chain transparency would have an effect on the living income of cocoa farmers around the world? (1=no effect; 10=large effect)”. The purpose of this question is to collect quantitative data expressing the consumer’s perception of the concept of value chain transparency. A higher answer out of 10 indicates that the consumer sees a stronger connection between improved value chain transparency and cocoa farmers’ living income.

If the consumer in the research sees a stronger connection, it expands on the finding of Kendall et al. (2019): that consumers are sceptical about the information they receive on the food products that they purchase and consume, and that they require improved transparency across the food system. Furthermore, it provides evidence that consumers are increasingly concerned

with issues that go beyond just safety of the food supply chain, to matters such as forced labour, working conditions, and fair pay (Ko et al., 2023; Schouteten et al., 2021).

If the consumer indicates a low answer out of 10, this indicates that they see a weak connection between improved value chain transparency and the living income of cocoa farmers. Such data would compel stakeholders attempting to affect cocoa farmers' living income to test a different concept than improved value chain transparency. One alternative would be the concept of circularity (Corona et al., 2019; Harris et al., 2021; Kirchherr, 2022; Mehrotra & Jaladi, 2022). The next research question - RQ3 - explores this avenue, as explained in the next section.

3.3.1.4. *Using the data to answer research question 3*

Research question 3 (RQ3) asks, “to what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d’Ivoire? Although the focus of RQ3 is on the consumer’s perspective, insights were drawn from farmers as well. Here, farmers’ viewpoints are valuable since farmers are well-placed to offer practical feedback on the feasibility of initiatives (van Vliet et al., 2021). The relevant farmer questionnaire questions are 23-24. This will become evident in section 4.4.

The relevant consumer questionnaire questions are 20, 22-25, 29-31, 33-36, 40, and 50-60. For example, question number 36 asks, “on a scale of 1-10, to what extent do you believe that achieving circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to maintain a living income? (1=to a small extent; 10= to a large extent)”. A score closer to 1 would indicate that the consumer considered circularity to have less of an impact on cocoa farmers achieving a living income. A score closer to 10 would indicate that the consumer considered circularity to have more of an impact on cocoa farmers achieving a living income.

If the mean score of the sampled consumers indicates that yes, they believe circularity has more of an impact on cocoa farmers achieving a living income than not, then these consumers would agree that harnessing circularity could help cocoa farmers achieve improvements in agriculture (Chapman et al., 2022; Chávez-Dulanto et al., 2021; Lindsey et al., 2022), including the maintenance of a living income (Giller, 2020). Such answers would confirm the assertion that

it is possible to achieve the situation where consumers support the circular economy (Luckstead et al., 2021). This evidence might also begin to satisfy the condition set by Erhun et al. (2021), that a circular supply chain requires commitment from consumers to the circular economy.

3.3.1.5. *Using the data to answer research question 4*

Research question 4 (RQ4) asks, “how could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d’Ivoire achieve circularity and maintain a living income? Although the focus of RQ4 is on eliciting the consumer’s perspective, insights were drawn from farmers as well. By involving farmers, the research empowers them, fosters trust within the value chain, and ensures that policies are realistic (Giller et al., 2021a). The relevant farmer questionnaire question is 26. This will become evident in section 4.5. The relevant consumer questionnaire questions are 20, 22-25, 29-31, 35, 40, 51-56, and 59-60.

An example of a relevant semi-structured interview question is the following: “how could entrepreneurial circular business models be leveraged so that Ivorian cocoa farming families maintain “*a decent income*” (Waarts & Kiewisch, 2021, p.56)?” This open-ended question invites the respondent to brainstorm how entrepreneurial circular business models could be implemented.

The invitation follows a series of interview questions that determine whether the respondent would agree with six claims, which were presented in the literature review. First, that economic poverty arguably leads to the waste of a cocoa farmer’s full potential (Derrer-Merk et al., 2022; Halkos & Aslanidis, 2023; Maslow, 1943). Second, that increased inequality between the rich and the poor causes political instability (McKnight, 2019; Oualy, 2021) and armed conflict (Buhaug & Von Uexkull, 2021; Ismail & Olonisakin, 2021). Third, that the circular economy is designed to reduce waste (Kirchherr et al., 2017, 2023; Korhonen et al., 2017, 2018; Merli et al., 2018). Fourth, that since economic poverty leads to the waste of an individual’s full potential, the circular economy is designed to reduce economic poverty (Erdiaw-Kwasie, 2023). Fifth, that the entrepreneurial circular business model (ECBM) is a tool that belongs to the circular economy (Awan & Sroufe, 2022; Bigliardi & Filippelli, 2021; Bocken et al., 2019; Manshoven & Gillabel, 2021). Finally, that ECBMs can be utilised by cocoa farmers in Côte

d'Ivoire to achieve circularity (Brenner, 2018; Ghisellini et al., 2023; Levänen et al., 2023) and maintain a living income (Waarts & Kiewisch, 2021).

In the next sections, the designs of the farmer questionnaire, consumer questionnaire, and semi-structured interviews are discussed, respectively.

3.3.1.6. *Design of the farmer questionnaire*

Collecting primary data from cocoa farmers allows for detailed insights into the ground-level factors influencing farming decisions. Unlike the consumer questionnaire and the semi-structured interviews, which mainly explore the end-user perspective, the farmer questionnaire is aimed at understanding the operational realities of cocoa farming, while also addressing the research questions that arose from the literature review. The combination of closed and open-ended questions enables a deeper understanding of the production side of the cocoa value chain.

Initially, a pilot version of the questionnaire, composed of 20 questions, was tested with a sample of 25 farmers. This pilot phase, as well as the revised questionnaire, was conducted in the San Pédro region of Côte d'Ivoire, as illustrated in Figure 14. The feedback received from farmer respondents was used to refine the questions. The revised version of the farmer questionnaire was composed of 26 questions, divided into four sections: demographic information about the farmers, challenges faced by farmers in the cocoa sector, farmers' perception of transparency, and farmers' views on circularity and business models. These four themes align with the four research questions of the research.

The farmer questionnaire was distributed in French, as this is the primary language spoken in the region. Responses were collected in French, and upon completion of the data collection, the final answers were translated into English for analysis.

3.3.1.7. *Design of the consumer questionnaire*

Collecting primary data from consumers reveals the demand side, complementing the farmer data and facilitating a comparison of production and consumption patterns. Closed and open-

ended questions serve to uncover consumer motivations behind purchasing decisions as well as consumer suggestions for improving the cocoa business model. While the farmer questionnaire focuses on production, and semi-structured interviews offer individual in-depth insights, the consumer questionnaire enables the identification of broader trends in consumer choices. The consumer questionnaire was also designed to address the research questions that arose from the literature review.

As with the farmer questionnaire, a pilot consumer questionnaire composed of 33 questions was developed in English. The pilot consumer questionnaire was distributed in person to a class of 22 students at the Royal Agricultural University in the United Kingdom. Feedback was compiled from the students who took the pilot questionnaire. Based on this feedback, decisions were made to adapt the questions to create a revised questionnaire.

The revised questionnaire comprised 60 questions and was translated into two further languages, in preparation for its distribution in the UK and in other countries. The revised questionnaire was translated into French and German. Translation was completed with the support of colleagues, the local community, and a professional translation service.

In terms of structure, the consumer questionnaire was divided into three parts. First, demographic questions (e.g. age, marital status). Second, questions about the respondent's relationship with chocolate (e.g. money spent on chocolate per year). Third, questions about the respondent's views on value chain transparency and the circular economy (e.g. the meaning of value chain transparency to the respondent). Finally, respondents were invited to add their email address if they wished to attend a follow-up semi-structured interview.

Research gaps were revealed as findings from the questionnaire were analysed. To fill these gaps, a next set of questions for the semi-structured interviews were developed.

This concludes the explanation for the design of the farmer and consumer questionnaires. In the next section, the design of the semi-structured interviews is discussed.

3.3.1.8. *Design of the semi-structured interviews*

Collecting primary data through semi-structured interviews makes it possible to gain in-depth insights that may not be captured by questionnaires. This enables deeper exploration of individual experiences, providing further nuance to the data collected. The semi-structured interviews were designed to fill the research gaps revealed by the questionnaires, while also addressing the research questions that arose from the literature review. Table 12 shows how the interview questions were prepared.

Table 12 Preparation for the semi-structured interviews

Research question	Research question answered/not answered/partially answered: Y/N/P	Semi-structured interview question
What are the existing constraints of the Ivorian cocoa value chain?	P	To what extent would you say that poverty is the root cause of forced child labour and excessive deforestation, as suggested by Boysen et al. (2023)? What else would you say contributes to forced child labour? And to excessive deforestation?
		If the CFA Franc were no longer pegged to the Euro, would this remove the constraints on the Ivorian cocoa value chain (Pérez, 2022) or not, and why? Would cocoa farmers be more likely to maintain a living income? Why?
		What is your opinion on Chinese Foreign Direct Investment in Côte d'Ivoire focusing on agriculture rather than social welfare (Allou et al., 2020)? What would be the effect of such foreign investment on resolving the living income of farmers in Côte d'Ivoire?
		If SDG 1 of ending poverty is achieved, is it likely that SDG 6 of universal access to safe water supply and sanitation will be met under current settings, as per Swe et al. (2021)? Why?

Table 12 illustrates the alignment between the interview questions and research question 1. This process of developing relevant interview questions was replicated for each of the four research questions. Interview questions designed to address research questions 2-4 are provided in Appendix Six – Semi-structured interview questions.

The semi-structured interviews involved participants from both academic and non-academic backgrounds, as detailed in Table 14. Some interviewees had also completed the questionnaire. The interviews were conducted in English and in French, with some participants responding in French or German. To ensure inclusivity, provisions were made to accommodate all respondents in their preferred language. The open-ended questions were guided by the framework of consumption theory, which serves as the theoretical foundation of the research, as explained in section 2.1.1 of the literature review.

The semi-structured interviews, consumer questionnaire, and farmer questionnaire were conducted with new respondents until data saturation was achieved. This ensured that no new themes or information emerged from further responses. The qualitative nature of the research makes it less rigidly defined (Radez et al., 2021; Shepherd et al., 2021) compared to purely quantitative studies. This flexibility allows for creative exploration in the analysis of phenomena (Haven & van Grootel, 2019; Malmberg et al., 2022; Plakoyiannaki et al., 2019).

This concludes the explanation of the research design. In the next section, population identification and sampling method are discussed.

3.4. Population identification and sampling method

This section covers population identification and sampling method of the farmer questionnaire, consumer questionnaire, and semi-structured interview respondents. There were two questionnaires, each composed of slightly different questions: one for farmers and one for consumers. The semi-structured interviews were conducted with professionals working both in and outside of academia.

3.4.1. Population identification

To optimize the chances of collecting data from representative samples, the first objective was to define the population as precisely as possible. The next sections explain the decisions made to identify the respective populations of farmers, consumers (both staff and students), and professionals working both in and outside of academia. Figure 14 shows the location of the

farmer respondents, Table 13 shows the subject areas of the students, and Table 14 shows the interviewees' areas of work.

3.4.1.1. *Farmers*

The geographic distribution of farmers answering the questionnaire was limited to the San-Pédro region, marked in red in Figure 14.



Figure 14 Map of the San-Pédro region, Côte d'Ivoire (Google Maps, 2025)

The zone marked out by the dotted red line in Figure 14 represents the region where cocoa farmers were invited to participate in the farmer questionnaire. In terms of language and culture, the San-Pédro region is represented by the Kroumen people, who are joined by several other ethnic groups and nationalities, such as the Baoulé, the Dioula, the Burkinabé, and the Malians.

3.4.1.2. *Consumers (staff and students)*

After careful consideration, the decision was made to elicit the perspectives of consumers located at a university. Most of the respondents would be students but some would be staff. The data between staff and students would be kept separate where appropriate. The respondents would be consumers of any products containing cocoa, including chocolate. Some of the respondents would have an opinion on cocoa even though they do not themselves consume products containing cocoa - their responses would also be analysed. No target age bracket was defined, although it was assumed that almost all, if not all, of the respondents would be aged 18 and older.

The population was narrowed down further to satisfy the following inclusion criteria:

- The respondents are located at universities, colleges, and institutions positioned along trade routes of the cocoa value chain.
- The respondents are located at universities, colleges, and institutions where the official language is English, French, German, or Dutch.

The universities, colleges, and institutions that satisfied these inclusion criteria were:

- Aix-Marseille Université (France)
- Babson College (USA)
- Bern University of Applied Sciences HAFL (Switzerland)
- Hartwick College (USA)
- Royal Agricultural University (United Kingdom)
- University of Hamburg (Germany)
- University of Hohenheim (Germany)
- Wageningen University & Research (the Netherlands)

Each of these universities, colleges, and institutions had respondents who consume products containing cocoa, including chocolate. The opinion of these respondents (consumers) was the target point of analysis.

The excluded respondents (consumers) were those based at universities, colleges, and research institutions other than the eight that were selected. Future research could contribute meaningfully in at least three ways. Firstly, by targeting respondents in countries other than the UK, France, Germany, Switzerland, the Netherlands, and the USA. Secondly, by targeting additional regions and universities in the countries included in the research. Thirdly, by targeting the same populations as the research but adapting the measurement materials (i.e. the farmer questionnaire, consumer questionnaire, and semi-structured interviews). However, in identifying populations, consistency in the methodology (e.g. inclusion criteria used) should be maintained (Camic et al., 2023; Sharkey et al., 2022; Ziauddeen et al., 2022).

Finally, population identification for consumer questionnaire data was decided using the following reasoning. While university students may not necessarily be representative of the general population in terms of age, consumption patterns, or disposable income (Hristov et al., 2023; Loh et al., 2021; Pocol et al., 2021; Wild et al., 2022), they often represent many different backgrounds in a relatively small area (Naylor et al., 2021; Slotnick et al., 2023; Tindle et al., 2022; van Hooijdonk et al., 2023), which allows for cost-effective access to varied perspectives. This was deemed sufficient justification for the selection of university students from the population of consumers of cocoa-based products. However, the potential limitation of this choice was generalizability to the broader population.

Interestingly, the student respondents who completed the consumer questionnaire reported studying a range of subjects, as shown in Table 13.

Table 13 Subject areas of students (n=207)

Subject area of students	Count
Agriculture & Food Systems	48
Business & Management	44
Law & Legal Studies	36
Social Sciences	26
Humanities & Arts	15
Natural Sciences	14
Interdisciplinary Studies	9
Health Sciences	9
Engineering & Technology	6
Total	207

The nine categories shown in Table 13 are a simplification of the 115 different subjects indicated by the student respondents, such as Business Law, Agricultural Engineering, Literature, Political Science, Ancient History, Dental Surgery, and Sociology, among others. The inclusion of respondents from a wide range of perspectives is considered a strength. It allows for the generation of diverse viewpoints that contribute to a balanced response to the research's research questions. To complement the responses from students, staff indicated that the subjects they teach include Human Rights at the tertiary level, and teaching in secondary schools.

3.4.1.3. *Academic and non-academic interviewees*

The purpose of collecting semi-structured interview data was to fill research gaps identified after analysing the data from the questionnaires. To optimise the likelihood of filling these research gaps, interview respondents were invited from both in and outside of academia, as shown in Table 14.

Table 14 Interviewees' area of work (n=12)

Area of work	Count
Entrepreneur	4
Academia	3
NGO	2
Corporate	2
Former cocoa cooperative manager	1
Total	12

Some of the interviewees in Table 14 are, or have been, heavily involved in the cocoa sector, some to a moderate extent, and others not at all. By inviting potential interviewees from populations outside of the university context (van de Werfhorst, 2020), the applicability of the findings to the broader population might well have been improved to a certain extent.

This concludes the explanation of population identification. In the next section, the sampling method is discussed.

3.4.2. Sampling method

This section discusses the sampling method, the inclusion criteria for sampling respondents, how the samples were contacted, and how the data was managed.

3.4.2.1. *Overview of the sampling method*

After careful reflection, the decision was made to use the convenience sampling method, which falls under the category of non-probability sampling methods (Raifman et al., 2022). The questionnaires were distributed to farmers and consumers by the researcher, colleagues of the researcher, lecturers and volunteers.

Distributing the questionnaire to students registered at universities was both cost effective and aligned with literature advocating universities as centres for the development of the circular economy (Aarikka-Stenroos et al., 2021; Ghisellini & Ulgiati, 2020; Prieto-Sandoval et al., 2019). The advantage of using the convenience sampling method is that it is an effective way to gather data (Zickar & Keith, 2022). However, there are three main disadvantages. Firstly, there is no way to determine whether the sample is representative of the population (McEwan, 2020). This means that the results are not generalizable (Baltes & Ralph, 2022). Secondly, convenience samples are generally at risk of sampling bias (Borle et al., 2021). Finally, convenience samples are at risk of selection bias (Liu et al., 2021).

This concludes the explanation of the sampling method. The next section considers the inclusion criteria for sampling farmers, staff, students, and interviewees.

3.4.2.2. *Inclusion criteria for the farmer and consumer questionnaire respondents*

Once the population had been identified, the next priority was to choose a strategy for collecting data from a representative sample. For the questionnaires, farmers, staff, and

students were invited to take part as respondents if they met the following inclusion criteria, which were used as guidelines:

Farmers:

- the farmer is either actively involved in certification programmes or not.
- the farmer is either male or female (no gender is excluded).
- the farmer owns a cocoa plantation or not (regardless of their age).

Staff and students:

- the staff member or student is located at or in the vicinity of the university library.
- the respondent is a student of the lecturer.
- the respondent is a classmate of the volunteer.

All respondents:

- the respondent answered, “yes”, they are willing to take part in the questionnaire.

The exclusion criterion for inviting individuals to take part in the questionnaire was as follows:

- the individual answered, “no”, they are not willing to take part in the questionnaire.

3.4.2.3. *Inclusion criteria for the interviewees*

Respondents who had indicated their interest were invited to take part as respondents of the semi-structured interviews. After initial analyses of the questionnaire data, the respondents were invited to be interviewed. No respondent who indicated their interest in being interviewed was excluded.

Several individuals who had not taken the questionnaire were invited to be interviewed if they met the following inclusion criteria, which were used as guidelines:

- the respondent is interested in the topic of cocoa.
- the respondent works in academia or not.
- the respondent answered, “yes”, they are willing to take part in the semi-structured interviews.

The exclusion criterion for inviting individuals to be interviewed was as follows:

- the individual answered, “no”, they are not willing to take part in the semi-structured interviews.

This concludes the discussion on inclusion and exclusion criteria for sampling respondents. The next section explains how the samples were contacted.

3.4.2.4. *Contacting the samples*

The samples were contacted in person by the researcher, colleagues, lecturers and volunteers. The invitation to take part in the questionnaire was made with the guidance of the following data collection protocol:

Farmers, staff, and students:

- visit the cocoa farm or the university library.
- approach one to four farmers or students at a time.
- kindly ask the potential respondent if they work on or own the cocoa plantation, or if they study at the university.
- if the respondent consents to participate, provide the link to the questionnaire or administer it.

During the data collection process, potential improvements for future research were identified. One such improvement could be the use of a QR code to reduce the time it takes for the consumer respondent to access the questionnaire. However, the advantages and disadvantages of this method should be carefully considered. For instance, spending time with the respondent to guide them to the questionnaire can help establish rapport, potentially leading to more meaningful responses (Lund, 2023; Stantcheva, 2023; Wardropper et al., 2021). Additionally, since most cocoa farmers lack smartphones, alternative methods would need to be considered to ensure inclusivity. Regardless, the procedure of collecting data should be kept consistent for all respondents.

3.4.2.5. *Data management*

Data was organised and stored electronically. To safeguard sensitive information, all data was anonymised (Mansfield et al., 2020; Rieke et al., 2020; White et al., 2022). The data was saved in the cloud regularly. The purposes of keeping the data organised were to analyse them efficiently and to support fellow researchers if they set out to validate and add to the findings in future.

This concludes the explanation of population identification and sampling method. The next section discusses the quality of the research.

3.5. Quality of the research

This section discusses the quality of the research from three perspectives. Firstly, the implications of collecting a portion of the data when Covid-19 lockdowns were still in place. Secondly, the reliability and validity of the data. Finally, the external and internal validity of the study.

3.5.1. Implications of the Covid-19 lockdowns

During the early stages of the research, Covid-19 lockdowns were in place in various forms at all the locations where staff and students were asked to participate. Data collection continued whilst adhering to local lockdown policies (e.g. wearing the appropriate facemask, keeping a safe distance between individuals, and regularly using hand sanitiser). One of the implications of collecting data during this extraordinary time is that responses may reflect pandemic-induced stress. For example, students and staff having to deal with the uncertainty, health risks, and isolation caused by the pandemic (Wilkialis et al., 2021) may well have found it particularly difficult to brainstorm solutions to the challenges of a different group of people in a faraway country. Equally, one could argue that the pandemic-induced stress in some way made it easier for respondents to relate to the struggles of almost any other group of people.

3.5.2. Reliability and validity of the data

Reliability means the results can be consistently reproduced (Choi et al., 2020; Eddy et al., 2020; Malek et al., 2021). Although the research is qualitative, there are aspects of its design that incorporate quantitative tests. The quantitative tests were thoroughly researched and carefully designed. All steps of conducting the questionnaires and the semi-structured interviews were carried out in the same way for each respondent. This ensures that the results can be consistently reproduced.

Validity means the research actually measures the concept it claims to be interested in (Antonoplis, 2023; El-Den et al., 2020; Haraldstad et al., 2019; Viglia & Dolnicar, 2020). When the questionnaires were developed, a pilot version was conducted both with the farmers and with the consumers. Conducting a pilot questionnaire allowed the researcher to test whether the questions actually addressed the central problem of the thesis and to check whether the questions were phrased in a way that was understandable to the respondents. Before conducting the semi-structured interviews, questions relating to each of the research questions were prepared.

To maintain structure, the interview questions were guided by the theoretical framework of consumption theory (Ando & Modigliani, 1963; Friedman, 1957; Keynes, 1936), which underpins the research, as indicated in section 2.1.1 of the literature review. In addition, the conversations taking place during the interviews reflected upon the United Nations Sustainable Development Goals (Sachs et al., 2019; United Nations Department of Economic and Social Affairs, 2023), in line with the research plan shown in Table 10.

This concludes the discussion on the reliability and validity of the data. The next section considers the external and internal validity of the research.

3.5.3. External and internal validity of the research

External validity is the extent to which findings from the research can be generalized to other contexts – for example, to other situations, groups, or events (Jager et al., 2020). In the research, threats to external validity included sampling bias (Westreich et al., 2019), the Hawthorne effect (Demetriou et al., 2019), and the use of convenience sampling (Egami & Hartman, 2023; Mattila et al., 2021).

Sampling bias occurred when respondents differed substantially from the population. For example, the respondents approached at the library may have had significantly different opinions to respondents who spend more time elsewhere on campus. Therefore, the results could not be generalized.

The Hawthorne effect may have influenced respondents, causing them to alter their behaviour because they were aware they were being studied. For example, a question asking the respondent to divide pay between stakeholders might have caused the respondent to a) try and be helpful by confirming the researcher's hypothesis (Mummolo & Peterson, 2019) or b) try to give the most socially desirable answers, out of fear of being judged (Bamberg & Verkuyten, 2022; Wenz et al., 2021). In short, respondents might have skewed their answers because they knew their answers would be analysed. Consequently, the results could not be generalized.

The use of convenience sampling reduced the research's external validity because the samples could not be representative of the population. For example, the findings of the *t*-test performed at the Royal Agricultural University (RAU) could not be generalized to the entire population at the RAU. Similarly, the findings made at the RAU could not be generalized to the population at a different university in the United Kingdom, or to university populations across the United Kingdom. Building on this logic, if the sample findings could not be generalized to their respective populations in Aix-Marseille Université, Babson College, Bern University of Applied Sciences HAFL, Hartwick College, the RAU, University of Hamburg, University of Hohenheim, and Wageningen University & Research, then it is unlikely that any of these samples could be generalized to other populations.

While the external validity of this study was relatively low, this presented the opportunity of yielding a relatively high internal validity due to the trade-off phenomenon that exists between external and internal validity (Schneeweiss & Patorno, 2021)⁷. To capitalize on the opportunity of maximizing internal validity against the backdrop of the research's low external validity, the threats to internal validity had to be reduced⁸. Four threats to internal validity that a) were relevant to the research and b) were reduced, are history, maturation, attrition, and instrumentation (Matthay & Glymour, 2020), as illustrated in Table 15.

⁷ Internal validity is the degree of confidence that the causal relationship being tested is trustworthy and not influenced by other factors or variables (Grégoire et al., 2019; Lonati et al., 2018). Both internal and external validity can be impacted by data collection procedures (Findley et al., 2021; Rogers & Révész, 2019).

⁸ Threats to internal validity generally include history, maturation, testing, participant selection, attrition, regression to the mean, instrumentation, and social interaction (Martella et al., 2023; Reichardt, 2022).

Table 15 How threats to internal validity were reduced (adapted from Martella et al., 2023; Matthay & Glymour, 2020; Reichardt, 2022)

Threat to internal validity	Explanation	Example	How the threat was reduced
History	Unforeseen events change the conditions of the research, influencing the results.	The respondent watches an informational video fed by a different source showing excessive pay to Ivorian cocoa farmers, causing the respondent to falsely decrease the pay to Ivorian cocoa farmers.	Conditions of the research were kept stable as far as reasonably possible for each sample.
Maturation	The passage of time impacts the dependent variable. In the research - the pay to farmers as determined by the respondent.	Decades are allowed to pass. The pay to Ivorian cocoa farmers increases to the extent that they maintain a living income. The respondent's answer after watching the informational video no longer needs to indicate a higher pay to Ivorian cocoa farmers.	The time lapse between identifying the problem and collecting data was kept reasonable.
Attrition	Over the course of a longer study, respondents drop out. If the drop-out is caused by the experimental intervention (as opposed to coincidence), it can threaten internal validity and cause attrition bias.	Respondents lose trust in the promises of higher pay for Ivorian cocoa farmers and therefore quit the research. The average pay answer now skews towards the remaining respondents' opinion, not because the intervention worked, but because respondents who lost trust are not included in the post-test.	The research was limited to a reasonable timeframe.
Instrumentation	There is a change in how the dependent variable is measured during the research.	The scales used to determine the respondent's opinion are changed.	The scales were kept constant.

Table 15 shows how four threats to internal validity were reduced. The threat of history was reduced by keeping the conditions of the research stable as far as reasonably possible for each sample. The threat of maturation was reduced by maintaining a reasonable time lapse between identifying the problem and collecting data. The threat of attrition was reduced by limiting the research to a reasonable timeframe. Finally, the threat of instrumentation was reduced by keeping measurement scales constant.

This concludes the explanation of the quality of the research. The next section contains a summary of the methodology.

3.6. Summary of the methodology

This section provides a summary of the methodology. The summary covers the steps that have been explained in the chapter, including: the method used to find relevant literature, the aims and approach, research design, population identification and sampling method, and quality of the research.

Narrative review: the literature was reviewed using the narrative review method (Snyder, 2019), a method commonly used in qualitative research. The review involved choosing adapted keywords at three distinct phases to find relevant sources. The ‘diverge, converge, emerge’ process was inspired by creative problem-solving methodologies in design thinking (Liedtka, 2018). The literature was sourced from databases including the RAU library, Google Scholar, and Wiley, using filters to ensure relevance and accuracy (Martiniuk et al., 2022). Each source was critically evaluated to avoid bias and ensure its utility in addressing knowledge gaps. The literature review shaped the development of the research questions, aligning the research with existing theory. It also informed the design of the farmer questionnaire, consumer questionnaire, and semi-structured interview questions. This ensured that the data collection instruments captured data pertinent to the themes identified in the literature. The carefully tied connection between theory, research questions, and data collection enhances the research’s methodological coherence and academic rigour (Nowell & Albrecht, 2019; Sovacool et al., 2018).

Aims and approach: the research has two broad aims. The first is to elicit consumer opinion on the relationship between improved value chain transparency and the living income of cocoa farmers in Côte d'Ivoire. The second is to explore the potential impact circularity could have in enabling farmers to maintain a living income. The qualitative approach was chosen to address the research aims and questions.

Research design: the literature review informed the research, including the answers to all four research questions. Primary data was also used to answer the research questions. The primary data was collected using a farmer questionnaire, consumer questionnaire, and semi-structured interviews. The technique of grouping was used to more effectively answer the research questions that arose from the literature review.

Population identification and sampling method: the identified population for the farmer questionnaire was cocoa farmers in the San-Pédro region of Côte d'Ivoire. For the consumer questionnaire, the identified population included staff and students registered at a university. For the semi-structured interviews, respondents working in and outside of academia were invited to participate. The convenience sampling method was used, which falls under the category of non-probability sampling methods (Banning, 2020; Etikan & Babatope, 2019; Raifman et al., 2022). Distributing the consumer questionnaire to students registered at universities was both cost effective and aligned with literature advocating universities as centres for the development of the circular economy (Aarikka-Stenroos et al., 2021; Ghisellini & Ulgiati, 2020; Prieto-Sandoval et al., 2019).

Quality of the research: steps were taken to guarantee both reliability and validity. To establish reliability, tests and questions were thoroughly researched and carefully designed to ensure that the results could be consistently reproduced (Choi et al., 2020; Eddy et al., 2020; Malek et al., 2021). For validity, which indicates that the research actually measures what it intends to measure (Antonoplis, 2023; El-Den et al., 2020; Haraldstad et al., 2019; Viglia & Dolnicar, 2020), pilot versions of the farmer questionnaire and consumer questionnaire were conducted to confirm that the questions were clearly worded and easily understood by the respondents. Additionally, questions relating to each of the research questions were prepared before conducting the semi-structured interviews. Finally, the threats to internal validity were reduced to capitalize on the opportunity of maximizing internal validity against the backdrop of the research's low external validity.

This concludes the methodology chapter and provides structure for the data analysis, which follows in the next chapter.

4. Data Analysis

This chapter presents the analysis of the primary data collected to address the research questions. The analysis is based on three datasets: a farmer questionnaire (n=215), a consumer questionnaire (n=212), and semi-structured interviews with 12 stakeholders, as illustrated in Figure 13. The ‘grouping’ technique is used to answer each research question using a specific combination of the datasets, as explained in Table 11. Please note that the interpretation of the findings will be conducted in Chapter 5 (Discussion).

4.1. Overview of the farmer and consumer datasets

This section presents an analysis of the primary data collected through farmer and consumer questionnaires. Table 16 provides a summary of the median income, most common education level, and age of the respondents, focusing on farmers, staff, and students. The section will explore the demographic characteristics of the respondents, including an analysis of farmers’ income, education levels, and age. Descriptive information for the 12 interviewees is provided separately in Table 14.

Table 16 Summary of primary data collected using questionnaires

	Farmers	Staff	Students
Median income per month in £	£108 (n=211)	£3,164 (n=6)	£400 (n=193)
Most common education level	54.2% no formal education (n=214)	50% undergraduate (n=6)	52.6% undergraduate (n=209)
Median age in years	41 (n=215)	25 (n=6)	22 (n=209)

Table 16 shows a median monthly income of £108 for farmers, £3,164 for staff, and £400 for students. Significantly, more than half of farmers indicated having no formal education, not even primary school level. It was confirmed that most farmers in the sample could not read or write. In comparison, at least half of the staff and half of the students had completed an undergraduate degree. The median age was 41 years for farmers, 25 years for staff, and 22 years for students.

Focusing on the data for farmers only, Figure 15 shows the farmers' monthly income.

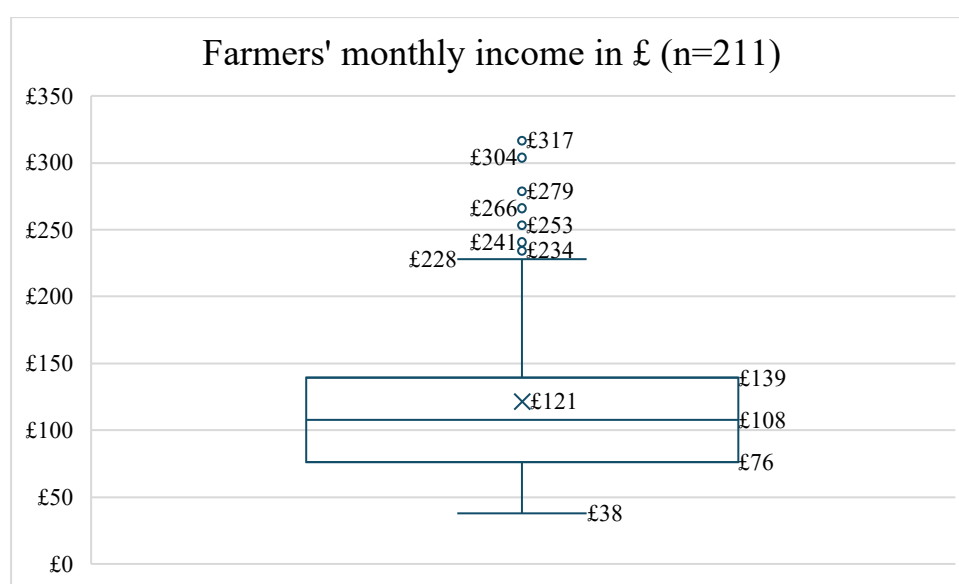


Figure 15 Farmers' monthly income in £ (n=211)

Figure 15 shows that the farmers' (n=211) mean monthly income was £121, with a median of £108, and a standard deviation of £61. The currency conversion from CFA Francs to British Pounds Sterling was calculated using the last day of the month when the questionnaire was distributed, which was November 2024⁹ for the farmer dataset.

In terms of education level, 54.2% of the farmers indicate having no formal level of education, as shown in Figure 16.

⁹ 1 CFA Franc = £0.00126663 on 30 November 2024 according to www.xe.com

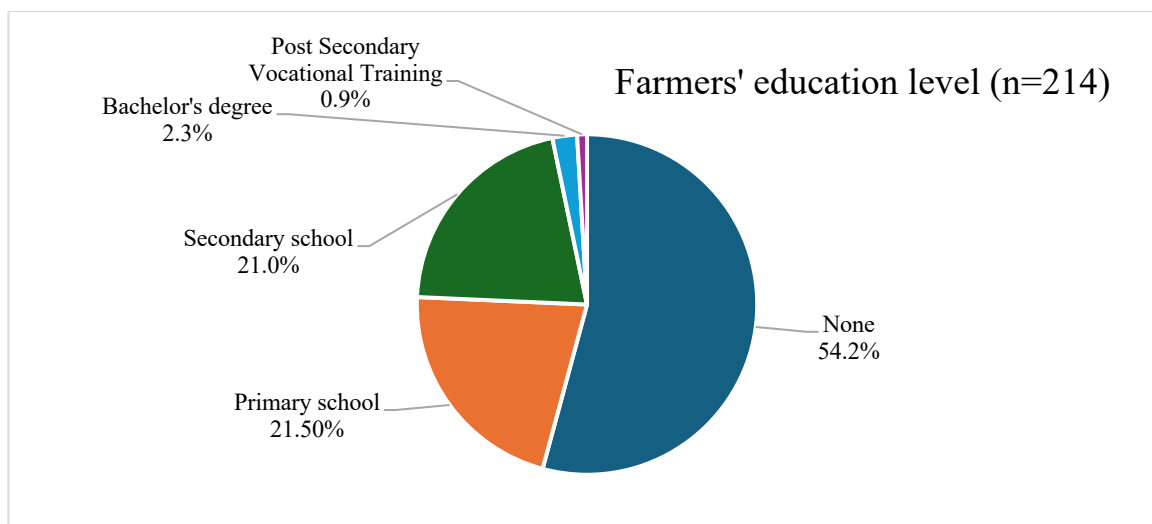


Figure 16 Farmers' education level (n=214)

In the data used to create Figure 16, it was confirmed that those farmers who did not have a formal level of education did not know how to read or write.

For the 215 farmers who responded to the question regarding their age, the mean was 43 years, the median was 41 years, and the standard deviation was 10 years, as shown in Figure 17.

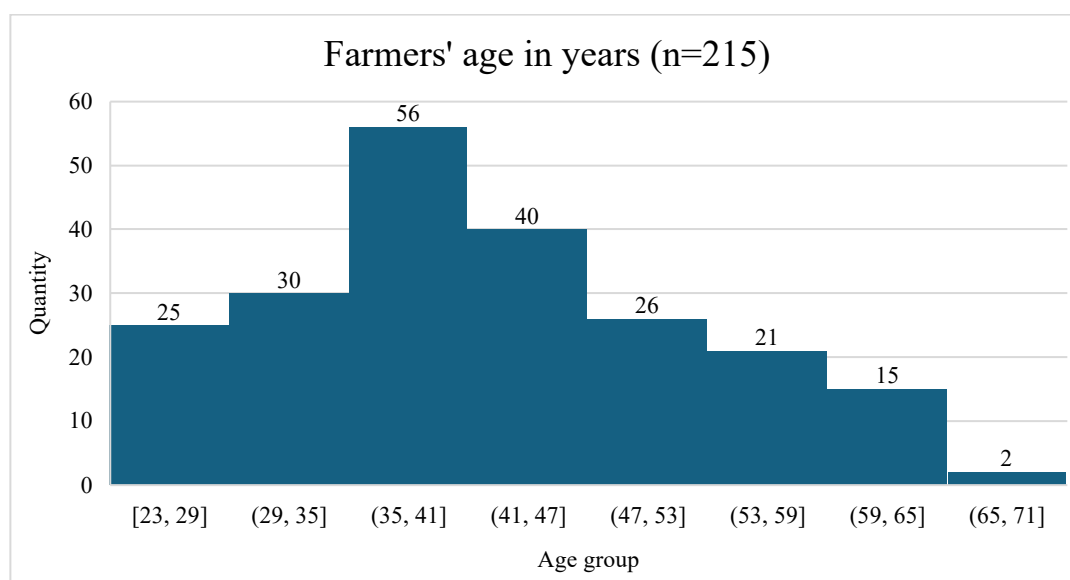


Figure 17 Farmers' age in years (n=215)

In Figure 17, the sample exhibits a normal distribution, with most farmers aged between 29-53 years old.

The analysis of the data collected using the farmer questionnaire and the consumer questionnaire builds on the literature review chapter, which addressed the central problem of the research - Ivorian cocoa farmers failing to maintain a living income.

To re-iterate, the central research question was: “to what extent do consumers believe that value chain transparency and circularity would enable Ivorian cocoa farmers to maintain a living income?” The four research questions were:

1. What are the existing constraints of the Ivorian cocoa value chain?
2. How do consumers perceive value chain transparency?
3. To what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d’Ivoire?
4. How could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d’Ivoire achieve circularity and maintain a living income?

The literature review provided some answers, especially to research question 1, in determining the existing constraints of the Ivorian cocoa value chain. These existing constraints were further addressed through the farmer and consumer questionnaires. In triangulating data, semi-structured interviews were used to strengthen and increase the validity of the results. Research questions 2 to 4 were answered using a similar procedure. Data from the farmer and consumer questionnaires partially answered research questions 2 to 4. Data from semi-structured interviews was used to fully answer these questions. In the next sections, each research question is answered and summarised separately. The chapter concludes with a summary of the answers to all the research questions.

4.2. Answer to research question 1

This section addresses the first research question: “what are the existing constraints of the Ivorian cocoa value chain?” This question was partly answered in section 2.2 of the literature review, where three supply-side constraints were identified: forced child labour, excessive deforestation, and farmers failing to maintain a living income. To provide a more comprehensive and up to date response, the answer is developed through a combination of primary data from farmer and consumer questionnaires, as well as semi-structured interviews, analysed in alignment with consumption theory (Friedman, 2020; Keynes, 2018; Modigliani, 2005). The findings are also analysed through the lens of achieving the 17 Sustainable Development Goals (SDGs) (Sachs et al., 2019; United Nations Department of Economic and Social Affairs, 2023), in line with the research plan shown in Table 10. Although the UN SDGs do not serve as a theoretical framework in the way that consumption theory does, the SDGs provide an action plan. This utility of the SDGs will become more evident in the discussion on operationalising a new conceptual framework in section 5.5.2.

The section begins with a presentation of the findings from the farmer questionnaire (section 4.2.1), which identifies current constraints faced by cocoa farmers in Côte d’Ivoire. This is followed by an examination of the consumer questionnaire results (section 4.2.2), considering the impact of factors such as income, awareness, and age on the cocoa value chain. The next sub-section explores the insights from semi-structured interviews (section 4.2.3), offering more in-depth perspectives on the root causes of the constraints. Finally, the findings are summarized (section 4.2.4).

4.2.1. Farmer questionnaire findings

This section presents the findings from the farmer questionnaire, which sought to identify existing constraints faced by cocoa farmers in Côte d’Ivoire. The analysis highlights challenges related to cocoa production, as well as farmers’ perceptions of the degree of inequality within

the cocoa value chain. Furthermore, this section addresses farmers' views on the sufficiency of their income to meet their family's basic needs.

An account of the existing constraints of the Ivorian cocoa value chain was elicited by asking a sample of 215 farmers to identify the problems they face when growing and selling cocoa in Côte d'Ivoire. The results of a preliminary question are shown in Figure 18.

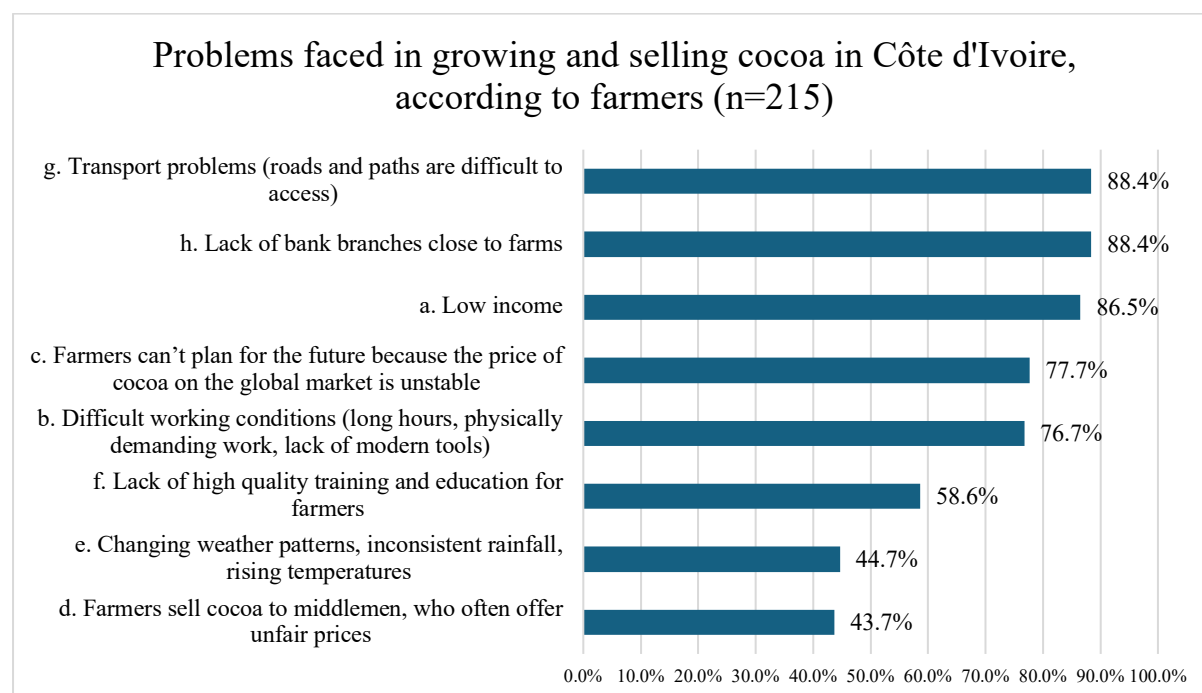


Figure 18 Problems faced in growing and selling cocoa in Côte d'Ivoire, according to farmers (n=215)

Figure 18 shows how more than 80% of the sample of farmers identified three particular problems (i.e. constraints), including: transport problems, a lack of bank branches close to farms, and low income. More than 70% of the sample of farmers identified unstable world cocoa prices making it difficult for farmers to plan for the future, and difficult working conditions. Finally, more than 40% of the sample of farmers identified a lack of high-quality training, changing weather patterns, and unfair prices from middlemen.

Next, an attempt was made to understand the extent to which farmers - the producers themselves - believe that there is inequality in the Ivorian cocoa value chain. The question asked farmers to mark their view on a scale of 1 to 10, where 1 means there is significant inequality and 10 means there is almost no inequality. Table 17 shows the results.

Table 17 Farmers' views on the extent to which there is inequality in the cocoa value chain (n=215)

Average (mean)	1.93
Standard deviation	0.85
Sample size (n)	215

In Table 17, a mean score of 1.93 out of 10 indicates that the sample of farmers considers the cocoa value chain to be suffering from significant inequality. A standard deviation of 0.85 suggests there is rather strong consensus on this issue.

Interestingly, when asked the extent to which farmers deem their income to be sufficient to cover their family's basic needs, the answers were not as expected. Farmers were asked to mark, on a scale of 1 to 10, where 1 means "not enough at all" and 10 means "more than enough," the extent to which they make enough money farming cocoa to take care of their family's basic needs. Figure 19 shows the results.

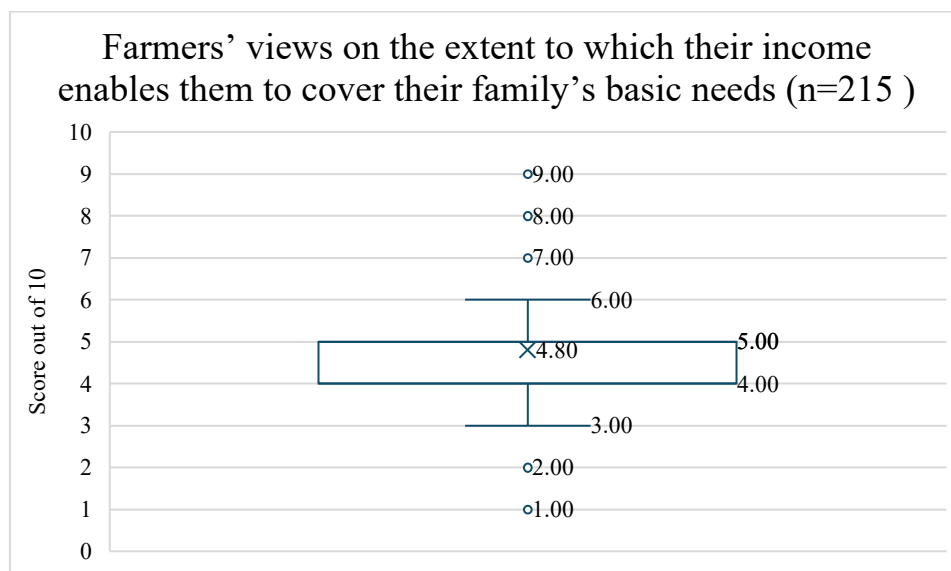


Figure 19 Farmers' views on the extent to which their income enables them to cover their family's basic needs (n=215)

Given that 86.5% of the sample of farmers indicated low income to be an existing constraint, as shown in Figure 18, one might expect the average score in Figure 19 to be low, around 1-3, to confirm that income is too low to meet family needs. Yet, the average is 4.80, and the

standard deviation is 1.62. It is true, however, that there were multiple outliers ranging from 1 to 9. At this stage, one might interpret that while the sample of farmers agree that low income is a constraint, each family shows varying levels of resilience to meet their family's needs with the income they currently receive.

4.2.2. Consumer questionnaire findings

This section presents the findings from the consumer questionnaire, exploring how demographic factors influence the Ivorian cocoa value chain. The analysis focuses on three characteristics of consumers: income, awareness of Côte d'Ivoire's role as a leading cocoa producer, and age. Each of these factors is examined through hypotheses on consumption reviewed in section 2.1.2.

4.2.2.1. Consumer income

Figure 20 and Figure 21 depict monthly income for students and staff, respectively. In Figure 20, the median for students was £400 (n=193) and in Figure 21, the median for staff was £3,164 (n=6).

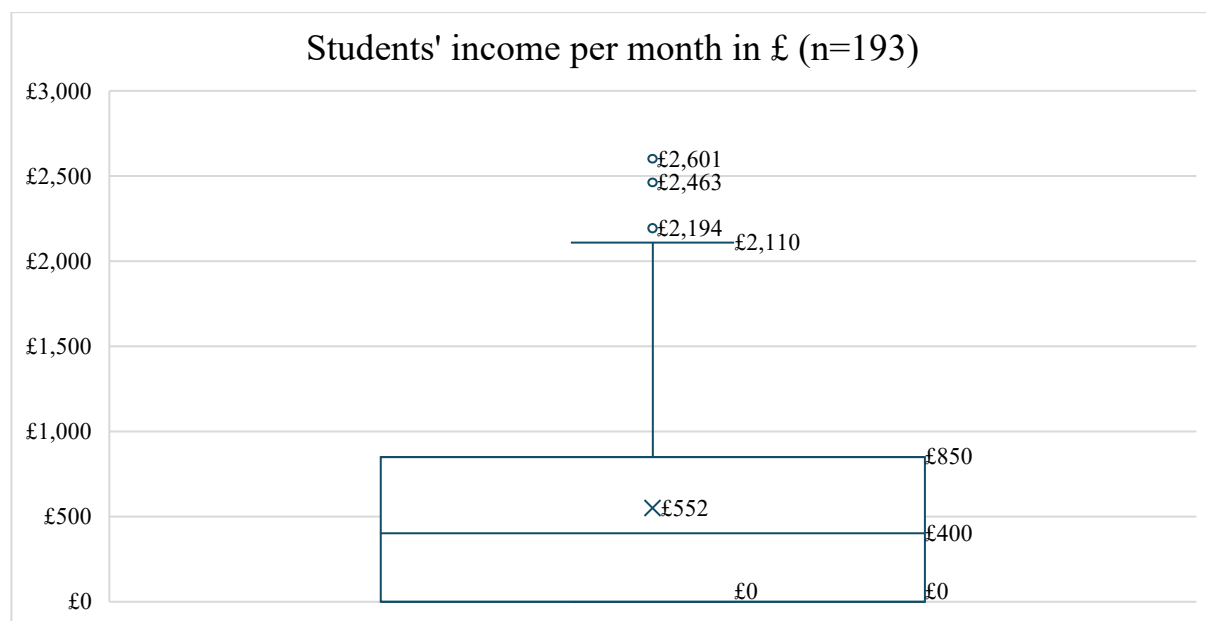


Figure 20 Students' monthly income in £ (n=193)

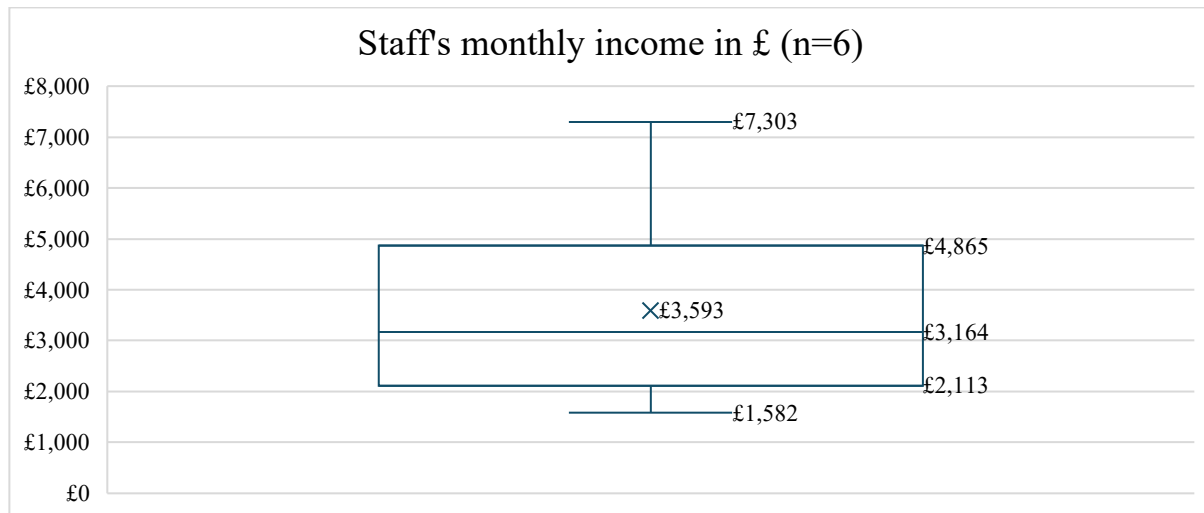


Figure 21 Staff's monthly income in £ (n=6)

In the literature review, it was gleaned that a greater proportion of income is saved as real income increases (Keynes, 1936). Applying this knowledge, one can hypothesize that cocoa consumers will tend to spend a smaller percentage of their disposable income as it rises, creating a curved effect at higher income levels (Baselgia & Foellmi, 2022). Subsequently, as employment and aggregate income rise, not all the additional employment is needed to meet the needs of additional consumption of products containing cocoa (O'callaghan et al., 2022).

4.2.2.2. Consumer awareness

A second aspect of the consumer's profile highlighted is their awareness of the Ivorian cocoa value chain. One way of determining awareness level was to ask respondents whether they already knew that Côte d'Ivoire had been ranked as the world's top exporter of cocoa beans in terms of volume and sales for the last 10 years. Table 18 shows how respondents answered the question.

Table 18 Consumer awareness of Côte d'Ivoire's status as top exporter of cocoa beans in terms of volume and sales for the combined dataset (n=215)

Did you know that for the last 10 years, the Ivory Coast has been ranked as the world's top exporting country of cocoa beans in terms of both volume and sales?

	Frequency	Percent	Valid Percent	Cumulative Percent
No response	1	.5	.5	.5
No	157	73.0	73.0	73.5
Yes	57	26.5	26.5	100.0
Total	215	100.0	100.0	

In Table 18, the data shows that consumers were for the most part unaware of Côte d'Ivoire's status as the world's leading cocoa exporter in terms of sales and volume. The majority (73.0%) of the respondents answered "no". While this may have indicated a certain lack of awareness, it also showed a level of honesty one might not necessarily expect from respondents. One respondent out of 215 left the question unanswered. Figure 22 illustrates the data regarding awareness.

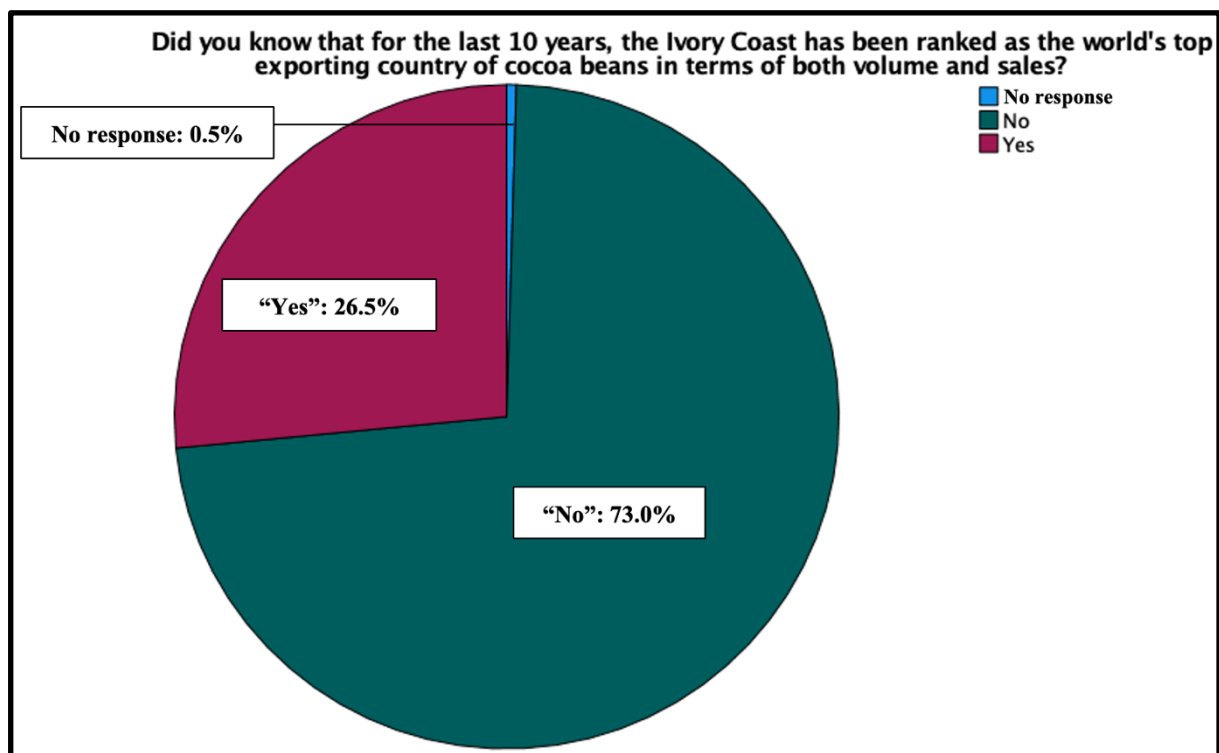


Figure 22 Pie chart showing consumer awareness of Côte d'Ivoire's status as top exporter of cocoa beans in terms of volume and sales for the combined dataset (n=215)

In the literature review, it was gleaned that an individual's income and expectations of future income affect current spending (Yun et al., 2023). Furthermore, an individual's level of spending is determined not by their current income but by what Friedman calls permanent income (Friedman, 1957). Applying this knowledge, one can hypothesize that consumers will decide how they spend on products made using cocoa according to what they reasonably expect to earn on a consistent, ongoing basis (van Tran, 2022). Moreover, if the consumer spends as a function of their awareness of their expected income, the consumer should also spend as a function of their awareness of the Ivorian cocoa market. The fact that most consumers did not know about Côte d'Ivoire's role as a world-leading cocoa producer before taking the questionnaire leads to two suggested ideas aimed at improving the modern-day cocoa business model. Firstly, there is opportunity to educate the consumer base about the Ivorian cocoa value chain. Secondly, educating the consumer could lead to an adjustment in their decision-making towards purchasing behaviour that, potentially, enables farmers to maintain a living income.

4.2.2.3. *Consumer age*

A third and final aspect of the consumer's profile highlighted in this section was their age. Table 19 shows the age of respondents in the combined dataset.

Table 19 Age of consumer questionnaire respondents in the combined dataset of UK, France, Germany, USA, Switzerland, and Netherlands (n=215)

N	Valid	215
	Missing	0
Mean		23.30
Std. Error of Mean		.324
Median		22.00
Mode		21
Std. Deviation		4.747
Variance		22.537
Range		37
Minimum		18
Maximum		55

Of the 215 responses in Table 19, the average age was 23 years old, with a standard deviation of 4.75 years. The youngest respondent was 18 and the oldest was 55 years old. Figure 23 illustrates the data regarding age.

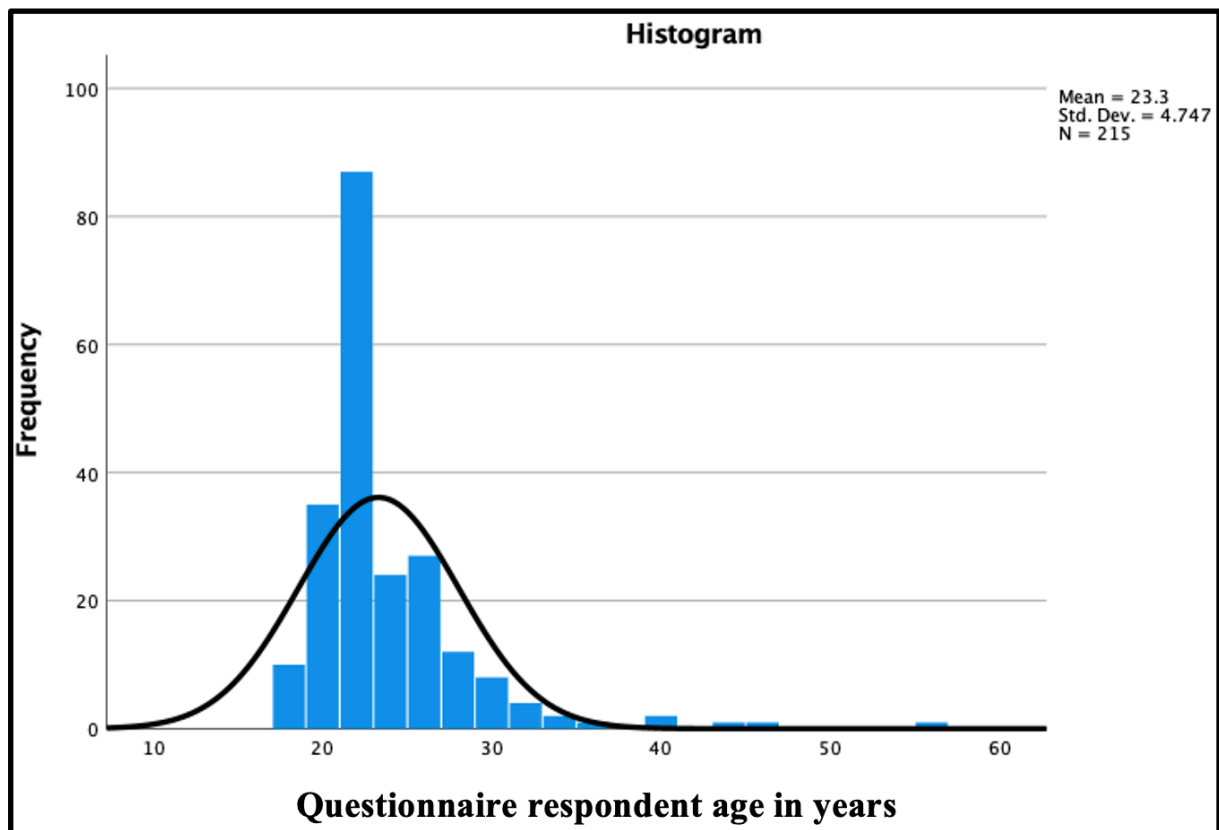


Figure 23 Histogram showing the age of consumer questionnaire respondents in the combined dataset of UK, France, Germany, USA, Switzerland, and the Netherlands (n=215)

In the literature review, it was gleaned that consumers adapt their current consumption “as a function of their resources and the rate of return on capital with parameters depending on age” (Ando & Modigliani, 1963, p.56). Applying this knowledge, one can hypothesize that consumers will tend to smooth out their consumption throughout their life by borrowing when their income is in a trough and saving when their income is at a peak (Horioka, 2021; Jantan, 2020). Furthermore, the savings of consumers will be low during youth and old age but high during middle age (Lučić et al., 2023). Finally, the savings of cocoa consumers are neither preserved during a steward’s life nor passed on to the next generation (Ando & Modigliani, 1963; Jantan, 2020; Lučić et al., 2023; Modigliani, 1988).

To summarize this section, three constraints were identified in the literature review – forced child labour, excessive deforestation, and farmers failing to maintain a living income. However, a fourth constraint was identified in the questionnaire: aspects of the consumer’s profile in terms of their income (Keynes, 1936; O’callaghan et al., 2022), their awareness (Friedman,

1957; Yun et al., 2023), and their age (Ando & Modigliani, 1963; Jantan, 2020; Lučić et al., 2023; Modigliani, 1988). The next phase of primary data analysis for research question 1 involved using semi-structured interviews and analysing the data through the lens of the Sustainable Development Goals (SDGs).

4.2.3. Semi-structured interview findings

For research question 1, data from the semi-structured interviews was used to provide deeper insights into the root causes of the existing constraints within the Ivorian cocoa value chain. The relevant aspects of the interviews focused on understanding the relationship between poverty, forced child labour, and excessive deforestation, as discussed by Boysen et al. (2023). Interviewees from diverse backgrounds – including academic, regional, and international perspectives – offered varied responses, which contributed to a broader understanding of the issue. This section delves into their responses, highlighting differing viewpoints and the implications for addressing the constraints.

In answering research question 1 (RQ1), the existing constraint of cocoa farmers failing to maintain a living income was broadly labelled “poverty”. One of the angles used to answer RQ1 was to ask interviewee respondents: “to what extent would you say that poverty is the root cause of the constraints of forced child labour and excessive deforestation, as suggested by Boysen et al. (2023)? And, what else would you say are contributing factors to the manifestation of these constraints?”

The interviewees’ answers varied, depending perhaps on their different political viewpoints. Although the lack of consensus obscured potential solutions, the difference of opinion showed that these were questions worth asking. In considering three interviewees’ responses selected from inside and outside of academia, different conclusions were reached. One interviewee claimed that there is no link between poverty and forced child labour or excessive deforestation. A second interviewee argued that there is indeed a link between these phenomena but that the issue is multi-faceted. A third interviewee argued that there is a very close link between the phenomena but asserted that they would prefer to use different terminology (e.g. “*criminality*”) to address the issue of the existing constraints of the Ivorian cocoa value chain. The first interviewee (Int 1) spoke from a European perspective. The second

interviewee (Int 2) used the example of cocoa production in Papua New Guinea. The third interviewee (Int 10) spoke from an Ivorian perspective.

Int 1 argued that poverty is not related to forced child labour and does not necessarily cause excessive deforestation. In their view, Côte d'Ivoire is *“more complicated than other countries because there is a lot of settlement of internal migrants”*. Migrants to the North of Côte d'Ivoire migrate further South partly for what they perceive to be better work opportunities. Therefore, forced child labour and excessive deforestation are caused less by poverty and more by migration. Int 1 went on to both ask and answer their own reflective question:

“Are West African cocoa producing households poor? On an absolute scale, yes, but on a relative scale, probably no. Most households in most of West Africa who have cocoa are better off than comparable households who don't.”

This reflection suggested that in measuring poverty across global value chains, one needs to be precise and careful before, if ever, passing judgement. Int 1 used the following example to illustrate their point:

“... (where I grew up), lots of kids would go on newspaper rounds before going to school, delivering the newspaper... and that was to earn money... Now, did it harm their education? Yes, because they have been on the streets for two hours before they went to school... In agricultural communities... children regularly help on the farm... but not at the expense of education. So, the issue is whether child labour is at the expense of their education. I think for children in West Africa, living with their parents, child labour probably is not at the expense of their education. Now there are... allegedly some children (who) are sent away to work in other families... (so) I think one needs to distinguish between children who are really where they are in order that they can work and children who are working along with everything else they do.”

This example stressed the importance of understanding the difference between forced child labour as opposed to forms of voluntary child labour. This is particularly relevant in the context of aligning the achievement of the SDGs with resolving the existing constraints of the Ivorian cocoa value chain (Fritsche et al., 2020; Marchetti et al., 2020).

Int 2, on the other hand, argued that fundamentally, poverty is the cause of forced child labour and excessive deforestation. However, they emphasized that there is no single factor that leads to child labour, deforestation, and the other issues. Their explanation was that poverty causes low productivity “*because the farmers have poor health, poor education, and (few) incentives.*” It remained to be seen whether an answer from an Ivorian perspective would support this assertion.

In commenting on cocoa production in the Bougainville region of Papua New Guinea, Int 2 used the following example:

“When you ask farmers, do you want your children to come back and be cocoa farmers? The answer is invariably: ‘no, I sent them to have a good schooling, and I would rather they get a job in an office or in business...’ There are some very interesting consequences of this. One is that those children do not come back and so the villagers lose the healthy, well-educated labour. Subsequently the average age of cocoa farmers gets older, and their health issues start to build up. They have less labour to spend on cocoa farming, but to compensate for that they also get remittance income from their children in towns. And if you look at their livelihood strategies, even though they own a cocoa farm, the income they get from selling beans is becoming less and less important. So, the incentive to invest in improving productivity becomes less important, and the main function of the cocoa trees then is essentially just to mark out their farm.”

This example illustrated how a traditional cocoa farming family might allow for their portfolio of income generating activities to evolve whilst maintaining the essence of their productive capacity (Renier et al., 2023; Vervuurt et al., 2022; Yao et al., 2023; Zanli et al., 2022). Achieving the SDGs might require cocoa farming families to develop work streams that go beyond sustainability certifications (Abu et al., 2021; Human & Fromm, 2021; Lock & Alexander, 2023; Ruf, 2021).

Int 10 spoke from an Ivorian perspective. In their view, the level of cocoa farmers’ income is very closely linked to the phenomenon of crime. Whereas Int 2 sought to explain how poverty causes low productivity, Int 10 claimed that crime causes poverty. Int 10’s words on the matter were as follows:

“I would say child labour is Western terminology. I prefer to call it as it is: criminality. One cannot discredit an activity that is already catastrophic and deplorable. These are people who engage in mafia activity, who harvest children and force them to work. So, it's criminality.”

The choice of vocabulary by Int 10 was poignant. It revealed a willingness to challenge the flow of today's debate about achieving the SDGs, perhaps due to the interviewees' deeper understanding of the problem from both ends of the cocoa value chain (Busquet et al., 2021; Grafton et al., 2023; Hepburn & Jackson, 2022; Pizzi et al., 2020; Thévenon & Edmonds, 2019; United Nations, 2023a).

To summarize this section, it is important to distinguish between forced child labour as opposed to forms of voluntary child labour in the context of aligning the achievement of the SDGs with resolving the existing constraints of the Ivorian cocoa value chain (Fritsche et al., 2020; Marchetti et al., 2020). Achieving the SDGs might require cocoa farming families to develop work streams that go beyond sustainability certifications (Abu et al., 2021; Human & Fromm, 2021; Lock & Alexander, 2023; Ruf, 2021). A willingness to challenge the flow of today's debate about achieving the SDGs may require deeper understanding of existing constraints from both ends of the cocoa value chain (Busquet et al., 2021; Grafton et al., 2023; Hepburn & Jackson, 2022; Pizzi et al., 2020; Thévenon & Edmonds, 2019; United Nations, 2023a).

4.2.4. Summary: answer to research question 1

Research question 1, “what are the existing constraints of the Ivorian cocoa value chain?” was partly answered by the literature review in that three existing constraints were identified: forced child labour, excessive deforestation, and farmers failing to maintain a living income. These constraints were further explored using primary data, including farmer and consumer questionnaires.

In the farmer questionnaire, 215 cocoa farmers were asked to identify key issues they face in growing and selling cocoa. The top three constraints, cited by more than 80% of the farmers, were transport problems, a lack of bank branches near farms, and low income. Over 70% of farmers also noted unstable world cocoa prices, difficult working conditions, and a lack of

high-quality training as significant problems. Additionally, more than 40% of farmers pointed to changing weather patterns and unfair pricing practices from middlemen as challenges. When asked about inequality in the value chain (between all stakeholders from bean to bar), farmers overwhelmingly perceived the cocoa value chain as highly unequal, with a mean score of 1.93 out of 10, and a standard deviation of 0.85 (n=215), indicating strong consensus on this issue.

Interestingly, while 86.5% of farmers had already identified low income as a constraint, the responses to the question about whether their income was sufficient to meet their family's basic needs were somewhat surprising. The average score for income sufficiency was 4.80 out of 10, with a standard deviation of 1.62. This suggests that although many farmers recognised low income as a constraint, their individual ability to meet basic needs varied, with some farmers demonstrating resilience in managing their income despite challenges.

The consumer questionnaire revealed that aspects of the consumer's profile – specifically income (Keynes, 2018), awareness (Friedman, 2020), and age (Modigliani, 2005) – also represent constraints in the Ivorian cocoa value chain. A majority of consumers (73%) were unaware that Côte d'Ivoire has been the world's top exporter of cocoa beans for the past decade, highlighting a significant gap in consumer awareness that could potentially influence purchasing behaviour and support for sustainable (c.f. circular) cocoa production.

The next phase of primary data analysis involved semi-structured interviews, where interviewees explored the root causes of the constraints. In discussing the links between poverty, forced child labour, and excessive deforestation, differing perspectives emerged. One interviewee argued that poverty was not the primary cause, while others emphasized the multi-faceted nature of the problem, with some viewing forced child labour as criminal activity. These varied perspectives underscored the complexity of addressing these constraints and need for a deeper understanding of the factors involved in the Ivorian cocoa value chain.

In the context of aligning the achievement of the Sustainable Development Goals (SDGs) with resolving these constraints, it is important to distinguish between forced and voluntary child labour (Fritsche et al., 2020; Marchetti et al., 2020). Achieving the SDGs might also require cocoa farming families to develop alternative work streams that go beyond current sustainability certifications (Abu et al., 2021; Human & Fromm, 2021; Lock & Alexander, 2023; Ruf, 2021). The differing viewpoints on poverty, child labour, and deforestation illustrate

the need for a comprehensive understanding of these issues from both ends of the cocoa value chain (Busquet et al., 2021; Grafton et al., 2023; Hepburn & Jackson, 2022; Pizzi et al., 2020; Thévenon & Edmonds, 2019; United Nations, 2023a).

Further interpretation of research question 1 with respect to the existing literature is conducted in section 5.1.

In answering RQ1, it was hypothesized that the sustainable management of existing constraints would require implementing a specific concept, such as circularity, or a unique framework that would be fit for purpose.

This concludes the answer to research question 1. In the next section, research question 2 is addressed.

4.3. Answer to research question 2

This section addresses the second research question, “how do consumers perceive value chain transparency?” Data from the farmer questionnaire (section 4.3.1), consumer questionnaire (section 4.3.2), and semi-structured interviews (section 4.3.3) are analysed in relation to literature on transparency, as reviewed in section 2.3.1, and in line with the methodology explained in section 3.3. The findings highlight themes such as trust, traceability, and fairness shaping consumer and farmer perceptions. A summary of the findings follows at the end (section 4.3.4).

4.3.1. Farmer questionnaire findings

This section presents the findings from three scale-based questions aimed at understanding farmers’ perceptions of value chain transparency. The questions explore their views on the importance of pricing information, their understanding of the cocoa’s journey post-farm, and their trust in the fairness of the cocoa value chain.

The first question asked, how important is it for farmers to have information about how cocoa is priced and sold on global markets. Table 20 shows the farmers' views, where 1 means "not important at all" and 10 means "very important".

Table 20 Importance for farmers to have information about how cocoa is priced and sold on global markets (n=215)

Average (mean)	4.04
Standard deviation	2.22
Sample size (n)	215

Interestingly, the average in Table 20 was much lower, at 4.04, than one might expect. Some of the reasons given by the farmers for this low score were: *"I don't care much about it"* or *"there is no point"*, perhaps indicating a sense of apathy. However, of the few farmers who did give a higher score of 8-10, the reasons provided included: *"to be able to demand an increase in the farmgate purchase price"* and *"just to get an idea (of the market)"*, perhaps indicating a willingness to compete and innovate.

A second question on farmers' views of VCT asked, how well do you understand what happens to your cocoa after it leaves your farm? Table 21 shows the results, where 1 means "not very well at all" and 10 means "very well".

Table 21 How well farmers understand what happens to their cocoa after it leaves their farm (n=215)

Average (mean)	2.20
Standard deviation	0.91
Sample size (n)	215

In Table 21, while such a low score, at 2.20, might suggest a useful form of humility on the part of farmers, in that they are eager to keep learning about their trade, the result could also be revealing an important problem. Namely, that farmers cannot in good conscience confirm that they fully understand and hence trust the mechanisms of the value chain once their cocoa leaves their farm.

Finally, a third question, which builds on the second, asks farmers whether they have enough information to trust the fairness of the cocoa value chain. Table 22 reveals the answers, where 1 means “not at all” and 10 means “absolutely”.

Table 22 Farmers’ trust in the fairness of the cocoa value chain (n=215)

Average (mean)	2.00
Standard deviation	0.77
Sample size (n)	215

In Table 22, at a score of 2.00, the sample of farmers confirm that they do not currently have enough information to trust the fairness of the CVC. A standard deviation of 0.77 indicates relatively strong consensus on this point.

4.3.2. Consumer questionnaire findings

This section presents the findings from the consumer questionnaire questions on value chain transparency. It examines how respondents define transparency and explores recurring themes. One of the questionnaire questions asked staff and students, “what does value chain transparency mean to you?” The 10 most frequently used words are listed in Table 23.

Table 23 The ten most frequently used words by respondents answering the question: “What does value chain transparency mean to you?”

Rank	Word	Length	Count	Weighted Percentage	Similar Words
1	product	7	120	7.88%	product, production, products
2	knowing	7	66	4.34%	know, knowing, knows
3	chain	5	53	3.48%	chain, chains
4	transparency	12	33	2.17%	transparency, transparent
5	means	5	31	2.04%	mean, means
6	comes	5	30	1.97%	come, comes, coming
7	conditions	10	28	1.84%	conditions
8	step	4	27	1.77%	step, steps
9	produced	8	26	1.71%	produced, producer, producers, produces, producing
10	supply	6	25	1.64%	supplied, supplies, supply

Table 23 shows that the most frequently used word was “product”, appearing 120 times. This occurred even though no reference to the word ‘product’ was made in the question. The second most frequently used word, “*knowing*”, appeared 66 times, and the third most frequently used

word, “*chain*”, appeared 53 times. For the sampled respondents, one might conclude that consumers focused on the notion of a product rather than a service when they considered the meaning of value chain transparency. The word choice of “*knowing*”, “*traceability*”, “*honest*” and “*information*” seemed to relate to ‘transparency’. Figure 24 re-illustrates the data linked to Table 23 in the form of a word cloud, but this time includes the top 30 most frequently used words instead of just the top 10.



Figure 24 Word cloud showing the 30 most frequently used words used by consumers answering the question: “what does value chain transparency mean to you?”

Figure 24 was created using 215 consumer questionnaire respondents’ answers. The more frequently a word was used, the larger the font and more prominent the word is. A selection of 17 answers (chosen for relevance and quality) is presented in the following list to provide a more in-depth sense of the respondents’ answer to: “what does value chain transparency mean to you?”

1. “To me, it means that I can see where a product and its ingredients come from. Ideally, one would also be able to see if the producers of the various ingredients are paid fairly.”
2. “For me it means that I can access if I wish and without difficulty all information detailing all of the steps that allow the company to sell me their product (production conditions, export conditions, supplier selection, raw materials selection, packaging materials selection, etc.). I think that in this day and age we must link the idea of

transparency with the notion of trust. I can be presented with production steps taken by the brand, and this can be advertised as "transparent", but if I do not trust the brand, I will not consider the company to be transparent in their production methods, no matter the details they give me on their production methods."

3. *"In my opinion, this concerns a given product (chocolate), the degree of traceability (provenance of the cocoa used) and the share of remuneration of the different actors who participated in the creation of the product, all indicated on the wrapper (the packaging)."*
4. *"For me, this means the traceability of the price development of a product from the lowest chain (farmer) to the retailer. The goal would be that I would then know how much the product was actually worth and how much I finally paid for it. In other words, I would know how little money the farmer gets compared to the seller."*
5. *"Trust, no exploitation, equality, knowledge of origin."*
6. *"There must be strict legal requirements for compliance with high standards of human and natural rights. These should be effectively controlled so that I, as a consumer, do not fall for sales strategies. Companies should make these data available; these data must be made transparent for the benefit of consumers and supervisory authorities."*
7. *"1. Traceability of the countries/regions of origin of all ingredients contained in the product. 2. Traceability of all countries/regions in which the ingredients are further processed."*
8. *"To know where the product comes from, what is in it, how it was produced (social and material conditions)."*
9. *"For me, this means being able to find out about the origin and quality of the product, e.g. whether it is safe, healthy, or has harmful effects on the environment or where and how, and under what conditions it is manufactured."*
10. *"Traceable supply chain, transparency across Tier 1 to Tier-n suppliers."*
11. *"Better working conditions; more knowledge and thus the opportunity to make better choices when it comes to consumption."*
12. *"For me, this term means that customers should be informed about where the products they consume come from and under what working conditions these products were manufactured. For me, transparency in the value chain is about ensuring that the producers of this product, especially workers, are paid appropriately through sufficient information about the manufacture of non-regional, i.e. exotic products."*

13. *“For me, it means acting honestly within a company, from which everyone involved benefits, and not just the people who are responsible for sales. For me, transparency in the value chain means, in other words, the balanced work and profit relationship between the actors from all economic sectors who have contributed something to the end-product.”*
14. *“Honestly I have no idea what that means so just googled it.”*
15. *“That I can inform myself easily about where a product comes from, how it has been produced and who produced it.”*
16. *“Transparency about the social and ecological conditions all along the value chain: no child labour, no destruction of rainforest, guaranteed minimum wages and social security for the workers.”*
17. *“That you know almost every link in the production chain, what it produces, where products are transported, where raw materials come from, how the working conditions are, how the environmental conditions are, and that you can trace all products.”*

A few themes emerged from the selection. For the respondents, value chain transparency seemed to be closely tied to the notions of trust, traceability, worker’s pay, and working conditions. As findings were drawn from the SSI data – presented hereafter in section 4.3.3 - these same notions re-occurred. The fact that respondents repeated the notions even though they a) did not know of each other and b) were asked different questions, suggests that there is a strong correlation between value chain transparency on the one hand, and trust, traceability, worker’s pay, and working conditions, on the other. It is interesting that respondents made no reference to how companies gain competitive advantage (Nyamah et al., 2022; Porter, 2008) through value chain transparency.

4.3.3. Semi-structured interview findings

Given the findings from the farmer and consumer questionnaires, further in-depth understanding was sought on how consumers perceive value chain transparency. One area of interest was understanding the link between transparency and trust. To this end, specific questions were formulated for the semi-structured interviews (SSIs). One SSI question that contributed to answering RQ2 was: “how might the concepts of transparency, visibility, and

trust be tied together to show the link between the consumer's choice, the provenance of the cocoa bean, and the welfare of the farmer?"

According to interviewee 6 (Int 6), the concepts of transparency, visibility, and trust could be tied together if a system were introduced that enabled consumers to be better informed about their purchase, the provenance of the cocoa bean, and the welfare of the farmer. To achieve this, Int 6 argued for the application of a *"simple method, such as scales regarding value chain fairness printed on the labels"*. Currently, in Switzerland and in Europe, consumers are accustomed to the Nutri-Score system, which rates the nutritional value of a product. The Nutri-Score works with colours. If the product is nutritionally healthy, then it has an "A" rating with a green colour. As nutritional value decreases, the label turns yellow, and eventually red. The system was developed in France. Int 6 asserted:

"I think the (Nutri-Score) system can be used to rate value chain fairness. (Ideally, such a rating system would show the extent to which) the farmer is paid correctly. However, for this to work, studies on the number of working hours (compared to mechanized production hours) are needed."

The idea proposed by Int 6 foreshadows what value chain transparency could mean to consumers if such a Nutri-Score system were adapted to the concept of fairness (Chandan et al., 2023; Gilbert, 2024; Lambin & Furumo, 2023). As found in section 2.3.1 of the literature review, consumers are prepared to reward sustainable production methods, and companies have a responsibility to carefully market the sustainability attributes of their value proposition to different consumer segments (Hofer et al., 2021; Viciunaite & Alfnes, 2020).

In explaining the need for the proposed fairness scale to account for manual working hours compared to mechanized production hours, Int 6 used the example of the world market for rice in Dakar. In this market, rice produced in different world regions, using different methods (manual vs mechanized) and therefore at varying levels of quality, is sold at the same price. The controversial issue is that Senegalese rice, for example, takes 200 times more hours of work than rice produced in Louisiana or Camargue. This means that a person in France produces 200 times more rice than a person in Senegal because the former completes the work with machines while the latter works by hand. Int 6 argued:

“I don't find it normal that a product for which the farmer spent 200 times more time (and whose quality is higher) is paid the same amount per kilo as the farmer who spent 1/200th of the time (whose quality is lower). It's as if the farmer from Camargue had 200 people working for him for free, thanks to mechanization.”

This example shows that labour productivity plays an important role in determining the farmer's price. If value chain transparency were to be measured on a fairness scale akin to the Nutri-Score system (Carruba et al., 2022; Hau & Lange, 2023; Peters & Verhagen, 2022), the consumer price would have to reflect the farmer's share with due respect to the type of work they completed (Brans, 2023; Sodhi & Tang, 2019).

The answer provided by interviewee 8 (Int 8) echoed the themes that emerged from the questionnaire respondents, especially with regards to tracing the product. Int 8 claimed that *“the concepts of transparency, visibility and trust can be encapsulated in the concept of traceability”*. Consumers in Europe, Japan or the United States want to know where the product comes from. In Int 8's opinion, traceability provides this information.

Int 8 continued with the statement that a consumer's need for traceability is very closely linked to the requirements of the new EU deforestation regulation due in 2024 which, incidentally, was also brought up by Int 1:

“If a retailer or a brand can demonstrate to the consumer that he or she is buying a banana or coffee or cocoa coming from this plantation in Côte d'Ivoire, that will be very much appreciated, I believe” (Int 8).

This statement underlines that consumers are more likely to accept, commit to, and purchase from, a value chain where the traceability issue has been resolved (Anastasiadis et al., 2021; Suchek et al., 2021; Testa et al., 2020). This would entail stakeholders between the plantation, the port of exportation, the port of destination, the manufacturers' location, the manufacturers of semi-finished products, the chocolate factory, and then the retailer - the whole value chain

between the plantation and the consumer (Ki et al., 2021; Santana & Ribeiro, 2022; Schenten et al., 2019; Superti et al., 2021).

Int 8 used the following example to illustrate what the consumer might appreciate in terms of traceability:

“(If you) order a coffee, you (might also receive) a very small pot of milk. On the milk there (would be) a picture of the farmer with his cow. So, imagine you are buying your coffee (and) you are given three millilitres of milk coming from (Mrs. Jane Foster) from this village – this is impressive for the consumer.”

This example illustrates how consumers might appreciate – and be willing to pay a premium for – a company’s efforts to provide transparent information about their value chain (Hofer et al., 2021; Mollenkopf et al., 2021; Renier et al., 2023; zu Ermgassen et al., 2022).

4.3.4. Summary: answer to research question 2

To summarize, research question 2 asked, “how do consumers perceive value chain transparency?” In contrasting the answers drawn from questionnaire respondents with those drawn from the semi-structured interviews, seven conclusions were reached.

First, the insights from the farmer questionnaire revealed that farmers’ understanding of the cocoa value chain is limited. When asked how well they understand what happens to their cocoa after it leaves their farm, farmers gave a mean score of 2.20 out of 10 (standard deviation=0.91, n=215), indicating that they have very little understanding of the post-farm processes. This low score reflects a lack of transparency in the value chain from the farmer’s perspective. Additionally, when asked if they had enough information to trust the fairness of the cocoa value chain, the farmers gave a mean score of 2.00 out of 10 (standard deviation=0.77, n=215), showing strong consensus that they do not feel adequately informed to trust the fairness of the value chain. These findings suggest that farmers are sceptical of the transparency and fairness within the cocoa value chain.

Second, when it came to how important it is for farmers to have information about how cocoa is priced and sold on global markets, the mean score provided by the farmers was 4.04 (standard deviation=2.22, n=215). This score, while still below the midpoint, indicates that there is some interest among farmers in understanding the global pricing mechanisms, although many farmers expressed what appears to be apathy, with some stating it was not important to them. However, those who scored higher (8-10) suggested that having this information could help them advocate for higher prices and better market conditions.

Third, in terms of consumer responses, the findings showed that consumers focused more on the notion of a product rather than a service when considering the meaning of value chain transparency. The most frequently used words by consumers included “*product*,” “*knowing*,” and “*chain*,” emphasizing that they think about transparency primarily in terms of the physical product, rather than the service or processes behind it. Fourth, consumers made no reference to how companies gain competitive advantage (Porter, 2008) through value chain transparency. Fifth, themes emerged suggesting that, for the consumers, value chain transparency is closely tied to the notions of trust, traceability, worker’s pay, and working conditions (Anastasiadis et al., 2021; Suchek et al., 2021; Testa et al., 2020). These themes were reinforced in both the consumer questionnaire and the semi-structured interviews (SSIs), where respondents consistently highlighted that they expect transparency to provide insights into not only the product’s journey but also the ethical aspects of production.

Sixth, data drawn from the SSIs validated the themes identified in the consumer questionnaire. For instance, Int 8 emphasized that traceability is key to transparency, stating that consumers want to know where the product comes from and the conditions under which it was produced. The repeated mentions of trust and traceability across both datasets suggest that these are central to consumer perceptions of value chain transparency. Finally, the data from the semi-structured interviews introduced a novel idea for measuring value chain fairness. Int 6 proposed adapting existing systems, such as the Nutri-Score, which is currently used for nutritional transparency, to evaluate the fairness of the value chain. This proposed system could enhance consumer understanding of how equitably farmers are compensated, with particular consideration given to the manual labour involved in production, thereby fostering improved transparency and fairness. Such a system, capable of measuring fairness across the entire value chain, could be developed through a theoretical framework inspired by the Nutri-Score label

and the OECD circularity scoreboard (Chandan et al., 2023; Gilbert, 2024; Lambin & Furumo, 2023).

Further interpretation of research question 2 with respect to the existing literature is conducted in section 5.2.

This concludes the answer to research question 2. In the next section, research question 3 is addressed.

4.4. Answer to research question 3

This section presents the findings that address research question 3, “to what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d’Ivoire?” The analysis draws on data from farmer and consumer questionnaires as well as semi-structured interviews, in line with the methodology explained in Table 11. The data is analysed through the lens of section 2.3.3 of the literature review: consumer opinion on achieving circularity. The findings are structured as follows: initially, the results from the farmer questionnaire are analysed (section 4.4.1), focusing on farmers’ views on viable circular solutions to the living income issue. Following this, consumer questionnaire findings are presented (section 4.4.2), divided into several subsections that delve into several aspects of consumer views on circularity and its impact on the cocoa value chain. Given the findings from the farmer and consumer questionnaires, the analysis turns to the semi-structured interviews (section 4.4.3). The section concludes with a summary of the answer to research question 3 (section 4.4.4).

4.4.1. Farmer questionnaire findings

This section explores the responses from farmers regarding the potential of circularity solutions to support their efforts in maintaining a living income. The responses provide insights into the strategies farmers believe would be effective.

Figure 25 illustrates farmers' perspectives on viable circularity implementation solutions that could support them in achieving a living income.

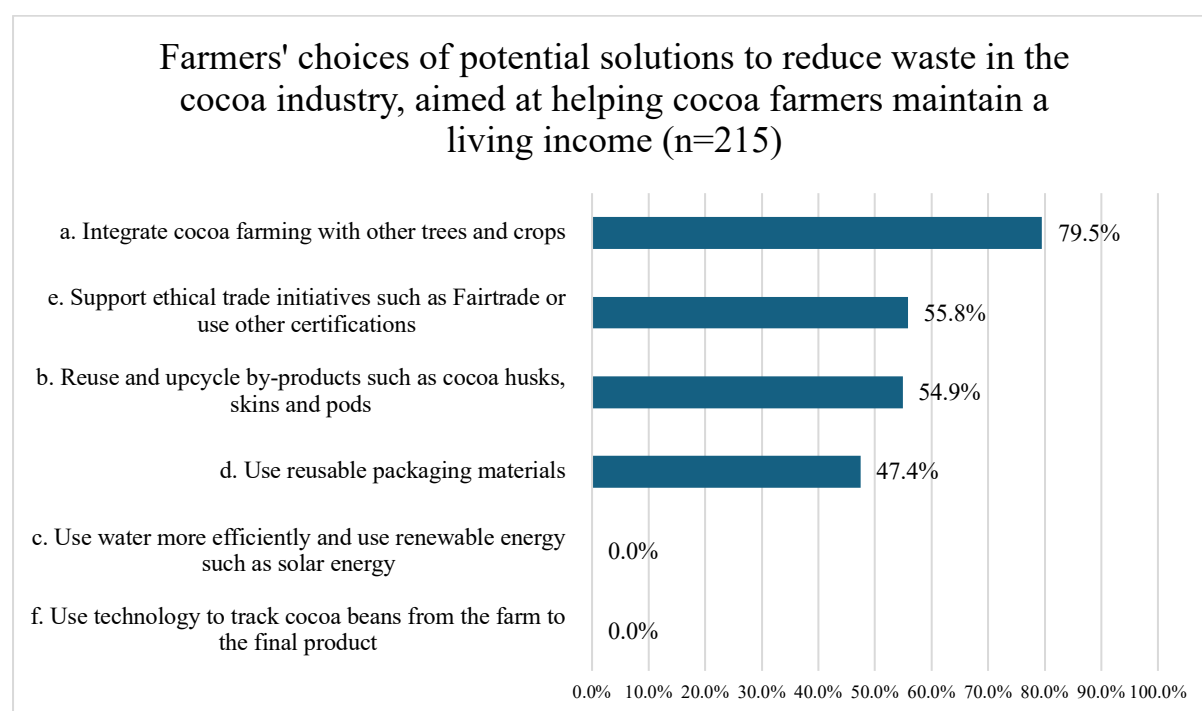


Figure 25 Farmers' choices of potential solutions to reduce waste in the cocoa industry, so that cocoa farmers maintain a living income (n=215)

In Figure 25, the most popular solution according to farmers, at 79.5%, was agroforestry. A close second and third most popular, at 55.8% and 54.9%, were ethical trade certifications and upcycling by-products such as husks, skins and pods. In fourth position, at 47.4% was reusable packaging materials. Notably, none of the farmers selected using water more efficiently or using renewable energy such as solar. This non-selection would ignore the intent of SDGs 6 (clean water and sanitation), 7 (affordable and clean energy), 12 (responsible consumption and production), and 13 (climate action). Furthermore, no farmer selected tracking as a potential solution. This non-selection in turn might ignore the objectives of policies such as the Corporate Sustainability Due Diligence Directive (CSDDD), which covers aspects of transparency, accountability, human rights, and environmental due diligence (Official Journal of the European Union, 2024).

To follow up on the question of the viability of circular solutions, farmers were asked to provide new circular business ideas. Most farmers, 195 out of 215, decided not to suggest a new circular

business idea. However, there were two phrases that were repeated. The first was: “*to allow the commercialisation of by-products*”, which was echoed by 16 farmers. And the second was: “*to receive training*”, which was voiced by 4 farmers.

4.4.2. Consumer questionnaire findings

This section addresses the consumer perspective on the potential for circularity to enable cocoa farmers in Côte d’Ivoire to maintain a living income. The section is structured into five sub-sections. First, consumers were asked to evaluate circularity’s impact on farmers achieving a living income, with data presented from six countries: the UK, France, Germany, USA, Switzerland, and the Netherlands. A final dataset combining the six countries is also analysed. Second, consumers were asked whether they believe that it is possible to adapt the chocolate value chain to ensure that farmers in Côte d’Ivoire achieve and maintain a living income. Third, they were asked to identify which solution best serves the goal of improving the lives of cocoa farmers globally: improved value chain transparency, better implementation of the circular economy, neither, or both. Fourth, the same question was asked, but with a specific focus on cocoa farmers in Côte d’Ivoire. Finally, consumers rated to on a scale of 1 to 10 the extent to which they believe current literature on value chain transparency and the circular economy addresses the problem of living income at the farmer’s level.

4.4.2.1. *Circularity’s impact on farmers achieving a living income*

To determine the consumer’s view regarding circularity’s impact on farmers achieving a living income, one of the questionnaire questions asked: “on a scale of 1-10, to what extent do you believe that achieving circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to maintain a living income? (1=to a small extent; 10= to a large extent)”. The following series of tables and graphs present the results for the six countries’ datasets - the United Kingdom, France, Germany, the United States of America, Switzerland, and the Netherlands - before concluding with the results from the combined dataset. The series begins with the United Kingdom dataset.

United Kingdom

Table 24 shows descriptive statistics regarding questionnaire respondents' view of circularity in the United Kingdom (UK) dataset. On a scale of 1-10, an answer closer to 1 indicated that the consumer believes circularity would have a small impact on enabling cocoa farmers to maintain a living income. An answer closer to 10 indicated that the consumer believes circularity would have a great impact on enabling cocoa farmers to maintain a living income.

Table 24 Consumer views on circularity's impact on achieving a living income in the UK dataset (n=44)

N	Valid	44
	Missing	3
Mean		6.20
Std. Error of Mean		.257
Median		6.00
Mode		6
Std. Deviation		1.706
Variance		2.911
Skewness		-.423
Std. Error of Skewness		.357
Kurtosis		1.507
Std. Error of Kurtosis		.702
Range		9
Minimum		1
Maximum		10

In Table 24, the arithmetic mean was 6.20 for the sample of 44 valid answers. The median of 6.00 and mode of 6 confirm that the sample mean of 6.20 was true to a satisfactory level. The standard error of the mean of 0.257 represents a margin of error of $\pm 3\%$ to $\pm 5\%$ since $0.257 \div 6.20 = 0.041$. This satisfied the chosen requirements for sampling accuracy (i.e. a margin of error of the mean between $\pm 3\%$ to $\pm 5\%$), which were selected by following the guidance of Rea & Parker (2014, p.165). Table 25 shows the frequency of each of the respondents' answers.

Table 25 Frequency of consumer views on circularity's impact on achieving a living income in the UK dataset (n=44)

On a scale of 1–10, to what extent do you believe that attaining circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to achieve and maintain a living income? (1=to a small extent; 10= to a large extent)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.1	2.3	2.3
	3	2	4.3	4.5	6.8
	4	2	4.3	4.5	11.4
	5	7	14.9	15.9	27.3
	6	14	29.8	31.8	59.1
	7	9	19.1	20.5	79.5
	8	7	14.9	15.9	95.5
	10	2	4.3	4.5	100.0
	Total	44	93.6	100.0	
Missing	System	3	6.4		
Total		47	100.0		

In Table 25, the most frequently occurring answers in the UK dataset were 6 and 7, as illustrated in Figure 26.

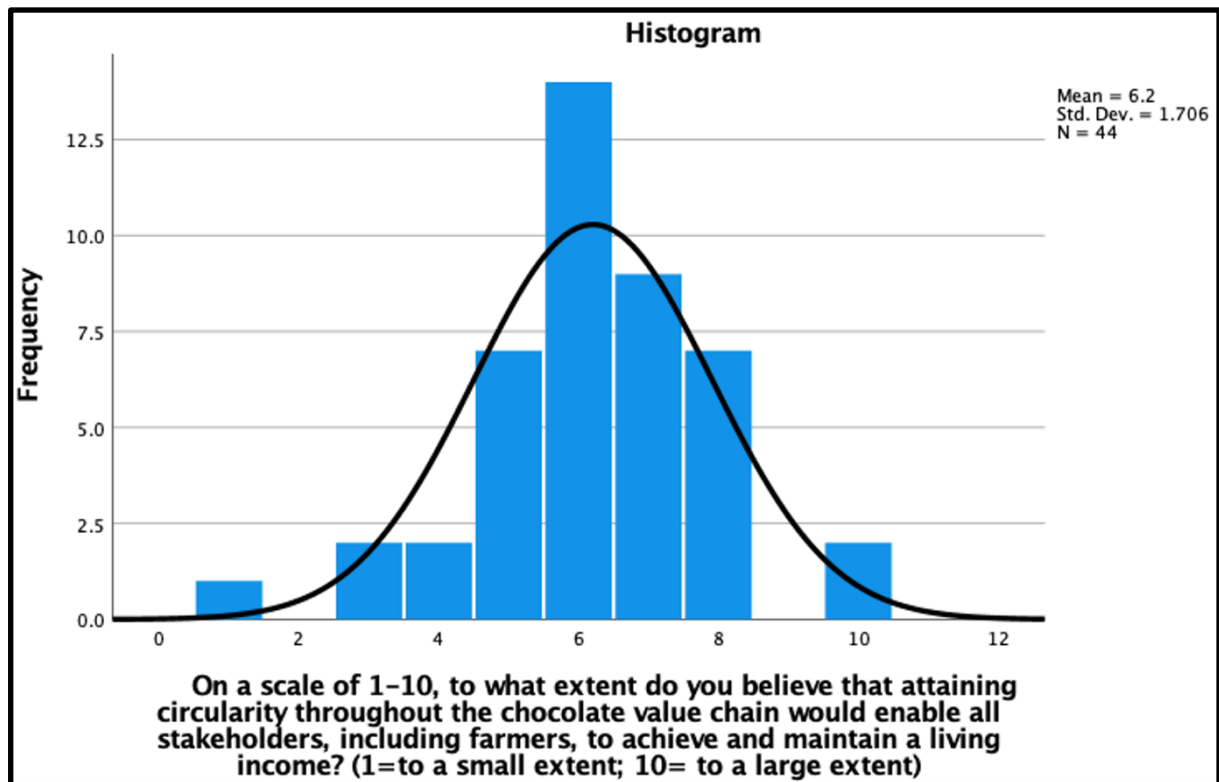


Figure 26 Histogram showing consumer views on circularity's impact on achieving a living income in the UK dataset (n=44)

In Figure 26, the average of 6.20 on the scale of 1-10, where 1 means “to a small extent” and 10 means “to a large extent”, showed that respondents in the UK dataset believe, to a significant extent, that achieving circularity throughout the chocolate value chain would indeed enable all stakeholders, including farmers, to achieve and maintain a living income. Given the UK data, the next series illustrate data collected in France.

France

Table 26 shows descriptive statistics regarding questionnaire respondents’ view of circularity in the France dataset. On a scale of 1-10, an answer closer to 1 indicated that the consumer believes circularity would have a small impact on enabling cocoa farmers to maintain a living income. An answer closer to 10 indicated that the consumer believes circularity would have a great impact on enabling cocoa farmers to maintain a living income.

Table 26 Consumer views on circularity’s impact on achieving a living income in the France dataset (n=46)

N	Valid	46
	Missing	1
Mean		6.41
Std. Error of Mean		.289
Median		6.00
Mode		6
Std. Deviation		1.962
Variance		3.848
Skewness		.071
Std. Error of Skewness		.350
Kurtosis		-.247
Std. Error of Kurtosis		.688
Range		8
Minimum		2
Maximum		10
Sum		295

In Table 26, the arithmetic mean was 6.41 for the sample of 46 valid answers. The median of 6.00 and mode of 6 confirm that the sample mean was true to a satisfactory level. The standard error of the mean of 0.289 represents a margin of error of $\pm 3\%$ to $\pm 5\%$ since $0.289 \div 6.41 = 0.045$. This satisfied the chosen requirements for sampling accuracy (i.e. a margin of error of the mean between $\pm 3\%$ to $\pm 5\%$), which were selected by following the guidance of Rea & Parker (2014, p.165). Table 27 shows the frequency of each of the respondents’ answers.

Table 27 Frequency of consumer views on circularity's impact on achieving a living income in the France dataset (n=46)

On a scale of 1–10, to what extent do you believe that attaining circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to achieve and maintain a living income? (1=to a small extent; 10= to a large extent)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.1	2.2	2.2
	3	3	6.4	6.5	8.7
	4	1	2.1	2.2	10.9
	5	10	21.3	21.7	32.6
	6	11	23.4	23.9	56.5
	7	8	17.0	17.4	73.9
	8	4	8.5	8.7	82.6
	9	4	8.5	8.7	91.3
	10	4	8.5	8.7	100.0
	Total	46	97.9	100.0	
Missing	System	1	2.1		
Total		47	100.0		

In Table 27, the most frequently occurring answers in the France dataset were 5 and 6, as illustrated in Figure 27.

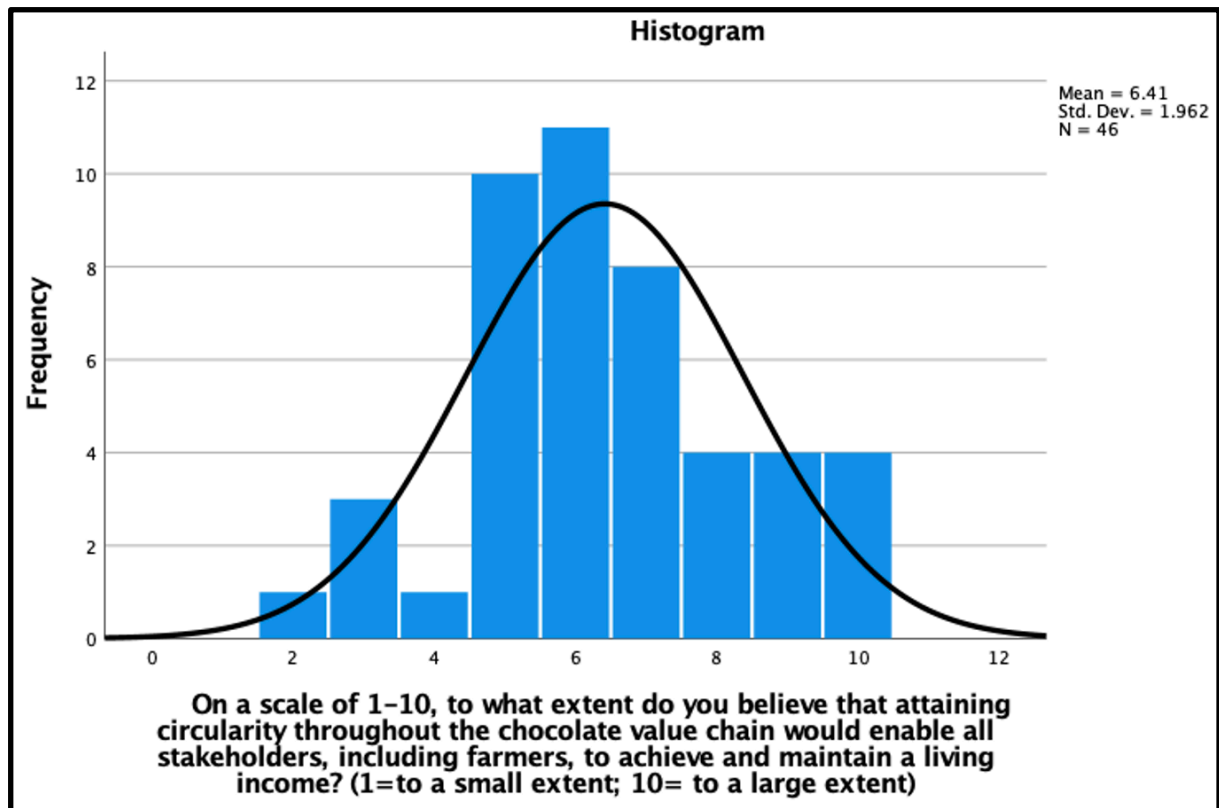


Figure 27 Histogram showing consumer views on circularity's impact on achieving a living income in the France dataset (n=46)

In Figure 27, the average of 6.41 on the scale of 1-10, where 1 means “to a small extent” and 10 means “to a large extent”, showed that respondents in the France dataset believe, to a significant extent, that achieving circularity throughout the chocolate value chain would indeed enable all stakeholders, including farmers, to achieve and maintain a living income. Given the France data, the next series illustrate data collected in Germany.

Germany

Table 28 shows descriptive statistics regarding questionnaire respondents’ view of circularity in the Germany dataset. On a scale of 1-10, an answer closer to 1 indicated that the consumer believes circularity would have a small impact on enabling cocoa farmers to maintain a living income. An answer closer to 10 indicated that the consumer believes circularity would have a great impact on enabling cocoa farmers to maintain a living income.

Table 28 Consumer views on circularity's impact on achieving a living income in the Germany dataset (n=42)

N	Valid	42
	Missing	10
Mean		6.14
Std. Error of Mean		.263
Median		6.00
Mode		6
Std. Deviation		1.705
Variance		2.906
Skewness		.108
Std. Error of Skewness		.365
Kurtosis		.170
Std. Error of Kurtosis		.717
Range		7
Minimum		3
Maximum		10
Sum		258

In Table 28, the arithmetic mean was 6.14 for the sample of 42 valid answers. The median of 6.00 and mode of 6 confirm that the sample mean was true to a satisfactory level. The standard error of the mean of 0.263 represents a margin of error of $\pm 3\%$ to $\pm 5\%$ since $0.263 \div 6.14 = 0.043$. This satisfied the chosen requirements for sampling accuracy (i.e. a margin of error of the mean between $\pm 3\%$ to $\pm 5\%$), which were selected by following the guidance of Rea & Parker (2014, p.165). Table 29 shows the frequency of each of the respondents' answers.

Table 29 Frequency of consumer views on circularity's impact on achieving a living income in the Germany dataset (n=42)

On a scale of 1–10, to what extent do you believe that attaining circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to achieve and maintain a living income? (1=to a small extent; 10= to a large extent)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	4	7.7	9.5	9.5
	4	2	3.8	4.8	14.3
	5	7	13.5	16.7	31.0
	6	13	25.0	31.0	61.9
	7	8	15.4	19.0	81.0
	8	5	9.6	11.9	92.9
	9	1	1.9	2.4	95.2
	10	2	3.8	4.8	100.0
	Total	42	80.8	100.0	
	Missing System	10	19.2		
Total		52	100.0		

In Table 29, the most frequently occurring answers in the Germany dataset were 6 and 7, as illustrated in Figure 28.

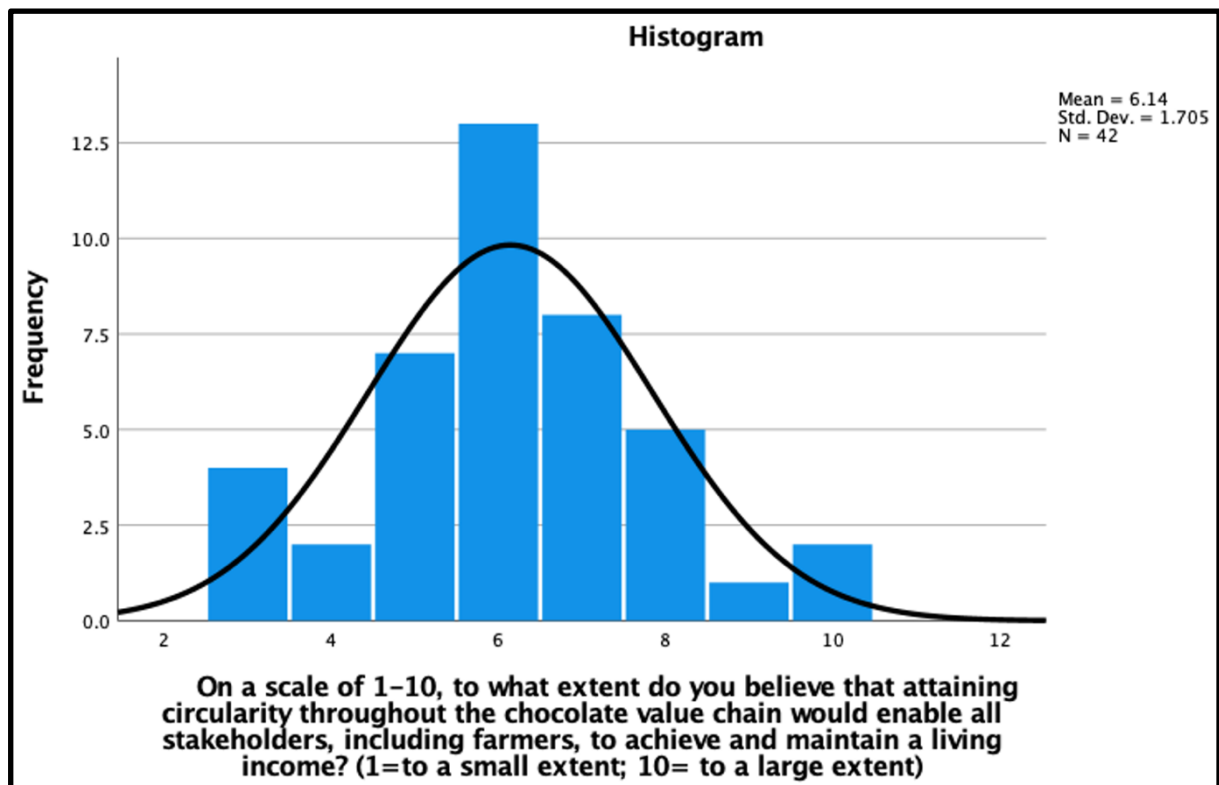


Figure 28 Histogram showing consumer views on circularity's impact on achieving a living income in the Germany dataset (n=42)

In Figure 28, the average of 6.14 on the scale of 1-10, where 1 means “to a small extent” and 10 means “to a large extent”, showed that respondents in the Germany dataset believe, to a significant extent, that achieving circularity throughout the chocolate value chain would indeed enable all stakeholders, including farmers, to achieve and maintain a living income. Given the Germany data, the next series illustrate data collected in the United States of America.

United States of America

Table 30 shows descriptive statistics regarding questionnaire respondents' view of circularity in the United States of America (USA) dataset. On a scale of 1-10, an answer closer to 1 indicated that the consumer believes circularity would have a small impact on enabling cocoa farmers to maintain a living income. An answer closer to 10 indicated that the consumer believes circularity would have a great impact on enabling cocoa farmers to maintain a living income.

Table 30 Consumer views on circularity's impact on achieving a living income in the USA dataset (n=43)

N	Valid	43
	Missing	10
Mean		7.09
Std. Error of Mean		.255
Median		7.00
Mode		8
Std. Deviation		1.674
Variance		2.801
Skewness		-.154
Std. Error of Skewness		.361
Kurtosis		-.024
Std. Error of Kurtosis		.709
Range		7
Minimum		3
Maximum		10
Sum		305

In Table 30, the arithmetic mean was 7.09 for the sample of 43 valid answers. The median of 7.00 and mode of 8 confirm that the sample mean was true to a satisfactory level. The standard error of the mean of 0.255 represents a margin of error of $\pm 3\%$ to $\pm 5\%$ since $0.255 \div 7.09 = 0.036$. This satisfied the chosen requirements for sampling accuracy (i.e. a margin of error of the mean between $\pm 3\%$ to $\pm 5\%$), which were selected by following the guidance of Rea & Parker (2014, p.165). Table 31 shows the frequency of each of the respondents' answers.

Table 31 Frequency of consumer views on circularity's impact on achieving a living income in the USA dataset (n=43)

On a scale of 1–10, to what extent do you believe that attaining circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to achieve and maintain a living income? (1=to a small extent; 10= to a large extent)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	1.9	2.3	2.3
	4	2	3.8	4.7	7.0
	5	3	5.7	7.0	14.0
	6	10	18.9	23.3	37.2
	7	8	15.1	18.6	55.8
	8	13	24.5	30.2	86.0
	9	1	1.9	2.3	88.4
	10	5	9.4	11.6	100.0
	Total	43	81.1	100.0	
Missing	System	10	18.9		
Total		53	100.0		

In Table 31, the most frequently occurring answers in the USA dataset were 8 and 6, as illustrated in Figure 29.

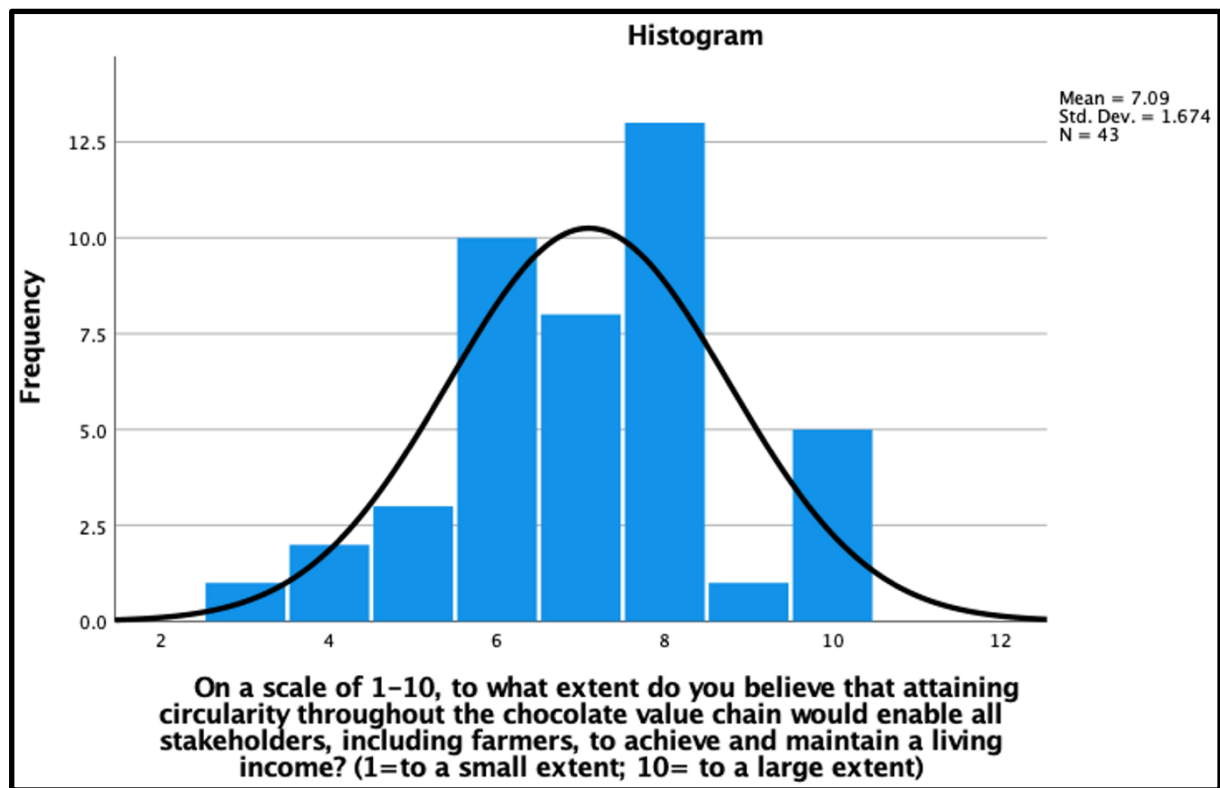


Figure 29 Histogram showing consumer views on circularity's impact on achieving a living income in the USA dataset (n=43)

In Figure 29, the average of 7.09 on the scale of 1-10, where 1 means “to a small extent” and 10 means “to a large extent”, showed that respondents in the USA dataset believe, to a significant extent, that achieving circularity throughout the chocolate value chain would indeed enable all stakeholders, including farmers, to achieve and maintain a living income. Given the USA data, the next series illustrate data collected in Switzerland.

Switzerland

Table 32 shows descriptive statistics regarding questionnaire respondents' view of circularity in the Switzerland dataset. On a scale of 1-10, an answer closer to 1 indicated that the consumer believes circularity would have a small impact on enabling cocoa farmers to maintain a living

income. An answer closer to 10 indicated that the consumer believes circularity would have a great impact on enabling cocoa farmers to maintain a living income.

Table 32 Consumer views on circularity's impact on achieving a living income in the Switzerland dataset (n=7)

N	Valid	7
	Missing	1
Mean		6.71
Std. Error of Mean		.865
Median		7.00
Mode		8
Std. Deviation		2.289
Variance		5.238
Skewness		-.329
Std. Error of Skewness		.794
Kurtosis		.064
Std. Error of Kurtosis		1.587
Range		7
Minimum		3
Maximum		10
Sum		47

In Table 32, the arithmetic mean was 6.71 for the sample of 7 valid answers. The median of 7.00 and mode of 8 confirm that the sample mean was true to a somewhat satisfactory level. The standard error of the mean of 0.865 did not represent a margin of error of $\pm 3\%$ to $\pm 5\%$ since $0.865 \div 6.71 = 0.13$. This did not satisfy the chosen requirements for sampling accuracy (i.e. a margin of error of the mean between $\pm 3\%$ to $\pm 5\%$), which were selected by following the guidance of Rea & Parker (2014, p.165). Collecting at least 23 more responses for this dataset would have exceeded the $n=30$ mark and might have yielded a lower standard error of the mean. If future studies build on this work, it would be recommended to achieve a minimum of 30 responses per dataset. Table 33 shows the frequency of each of the respondents' answers.

Table 33 Frequency of consumer views on circularity's impact on achieving a living income in the Switzerland dataset (n=7)

On a scale of 1–10, to what extent do you believe that attaining circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to achieve and maintain a living income? (1=to a small extent; 10= to a large extent)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	12.5	14.3	14.3
	5	1	12.5	14.3	28.6
	6	1	12.5	14.3	42.9
	7	1	12.5	14.3	57.1
	8	2	25.0	28.6	85.7
	10	1	12.5	14.3	100.0
	Total	7	87.5	100.0	
Missing	System	1	12.5		
Total		8	100.0		

In Table 33, the most frequently occurring answer in the Switzerland dataset was 8, as illustrated in Figure 30.

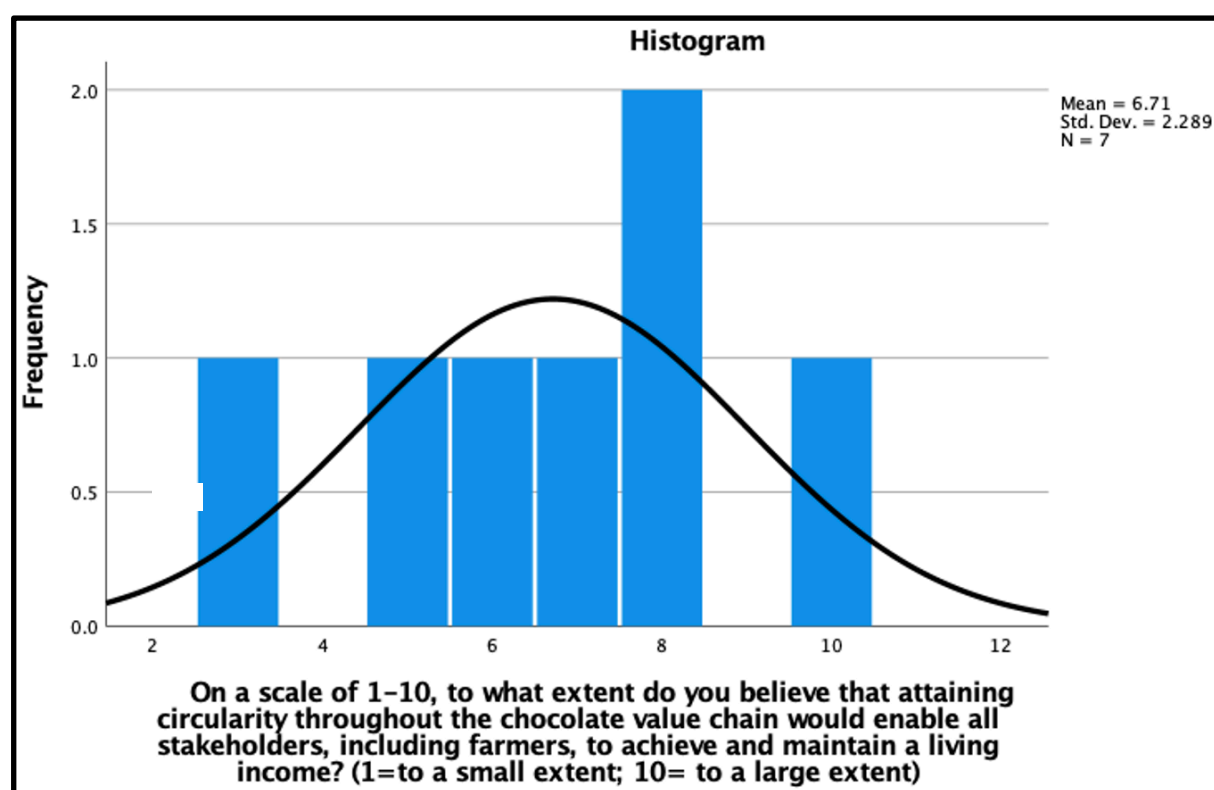


Figure 30 Histogram showing consumer views on circularity's impact on achieving a living income in the Switzerland dataset (n=7)

In Figure 30, the average of 6.71 on the scale of 1-10, where 1 means “to a small extent” and 10 means “to a large extent”, showed that respondents in Switzerland dataset believe, to a significant extent, that achieving circularity throughout the chocolate value chain would indeed enable all stakeholders, including farmers, to achieve and maintain a living income. However, a sample size of $n \geq 30$ would be needed for improved sampling accuracy. Given the Switzerland data, the next series illustrate data collected in the Netherlands.

Netherlands

Table 34 shows descriptive statistics regarding questionnaire respondents’ view of circularity in the Netherlands dataset. On a scale of 1-10, an answer closer to 1 indicated that the consumer believes circularity would have a small impact on enabling cocoa farmers to maintain a living income. An answer closer to 10 indicated that the consumer believes circularity would have a great impact on enabling cocoa farmers to maintain a living income.

Table 34 Consumer views on circularity's impact on achieving a living income in the Netherlands dataset (n=8)

N	Valid	8
	Missing	0
Mean		6.75
Std. Error of Mean		.901
Median		6.50
Mode		6 ^a
Std. Deviation		2.550
Variance		6.500
Skewness		-.043
Std. Error of Skewness		.752
Kurtosis		-.995
Std. Error of Kurtosis		1.481
Range		7
Minimum		3
Maximum		10
Sum		54

a. Multiple modes exist. The smallest value is shown

In Table 34, the arithmetic mean was 6.75 for the sample of 8 valid answers. The median of 6.50 and mode of 6 confirm that the sample mean was true to a satisfactory level. The standard error of the mean of 0.901 did not represent a margin of error of $\pm 3\%$ to $\pm 5\%$ since $0.901 \div 6.75 = 0.13$. This did not satisfy the chosen requirements for sampling accuracy (i.e. a margin

of error of the mean between $\pm 3\%$ to $\pm 5\%$), which were selected by following the guidance of Rea & Parker (2014, p.165). Collecting at least 22 more responses for this dataset would have exceeded the $n=30$ mark and might have yielded a lower standard error of the mean. If future studies build on this work, it would be recommended to achieve a minimum of 30 responses per dataset. Table 35 shows the frequency of each of the respondents' answers.

*Table 35 Frequency of consumer views on circularity's impact on achieving a living income in the Netherlands dataset
($n=8$)*

On a scale of 1–10, to what extent do you believe that attaining circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to achieve and maintain a living income? (1=to a small extent; 10= to a large extent)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	12.5	12.5	12.5
	4	1	12.5	12.5	25.0
	6	2	25.0	25.0	50.0
	7	1	12.5	12.5	62.5
	8	1	12.5	12.5	75.0
	10	2	25.0	25.0	100.0
	Total	8	100.0	100.0	

In Table 35, the most frequently occurring answers in the Netherlands dataset were 10 and 6, as illustrated in Figure 31.

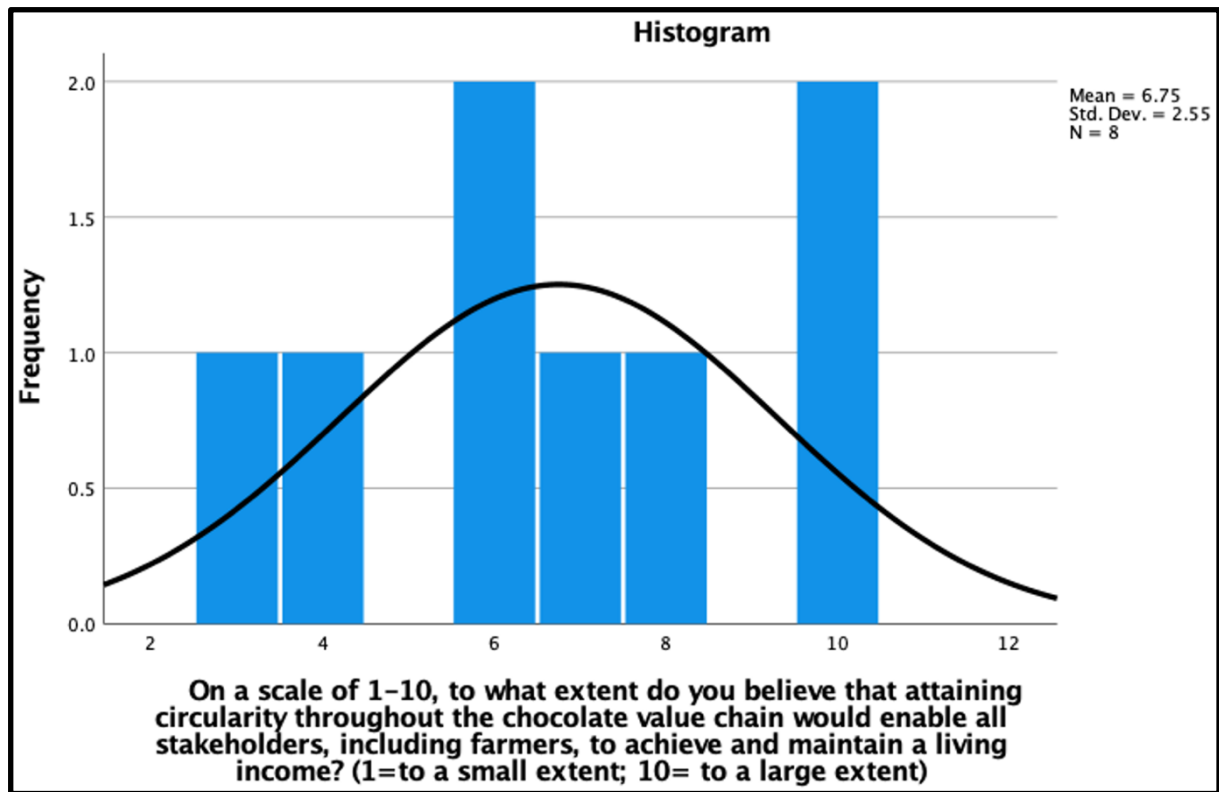


Figure 31 Histogram showing consumer views on circularity's impact on achieving a living income in the Netherlands dataset (n=8)

In Figure 31, the average of 6.75 on the scale of 1-10, where 1 means “to a small extent” and 10 means “to a large extent”, showed that respondents in the Netherlands dataset believe, to a significant extent, that achieving circularity throughout the chocolate value chain would indeed enable all stakeholders, including farmers, to achieve and maintain a living income. However, a sample size of $n \geq 30$ would be needed for improved sampling accuracy. Given the Netherlands data, the next series illustrate data collected in the combined dataset of the UK, France, Germany, USA, Switzerland, and the Netherlands.

Combined dataset including the UK, France, Germany, USA, Switzerland, and the Netherlands

Table 36 shows descriptive statistics regarding questionnaire respondents’ view of circularity in the combined dataset including the UK, France, Germany, USA, Switzerland, and the Netherlands. On a scale of 1-10, an answer closer to 1 indicated that the consumer believes circularity would have a small impact on enabling cocoa farmers to maintain a living income.

An answer closer to 10 indicated that the consumer believes circularity would have a great impact on enabling cocoa farmers to maintain a living income.

Table 36 Consumer views on circularity's impact on achieving a living income in the combined dataset (n=190)

N	Valid	190
	Missing	25
Mean		6.48
Std. Error of Mean		.133
Median		6.00
Mode		6
Std. Deviation		1.837
Variance		3.373
Skewness		-.065
Std. Error of Skewness		.176
Kurtosis		.014
Std. Error of Kurtosis		.351
Range		9
Minimum		1
Maximum		10
Sum		1232

In Table 36, the arithmetic mean was 6.48 for the sample of 190 valid answers. The median of 6.00 and mode of 6 confirm that the sample mean was true to a satisfactory level. The standard error of the mean of 0.133 represents a margin of error of $\pm 3\%$ to $\pm 5\%$ since $0.133 \div 6.48 = 0.021$. This satisfied the chosen requirements for sampling accuracy (i.e. a margin of error of the mean between $\pm 3\%$ to $\pm 5\%$), which were selected by following the guidance of Rea & Parker (2014, p.165). Table 37 shows the frequency of each of the respondents' answers.

*Table 37 Frequency of consumer views on circularity's impact on achieving a living income in the combined dataset
(n=190)*

On a scale of 1–10, to what extent do you believe that attaining circularity throughout the chocolate value chain would enable all stakeholders, including farmers, to achieve and maintain a living income? (1=to a small extent; 10= to a large extent)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.5	.5	.5
	2	1	.5	.5	1.1
	3	12	5.6	6.3	7.4
	4	8	3.7	4.2	11.6
	5	28	13.0	14.7	26.3
	6	51	23.7	26.8	53.2
	7	35	16.3	18.4	71.6
	8	32	14.9	16.8	88.4
	9	6	2.8	3.2	91.6
	10	16	7.4	8.4	100.0
	Total	190	88.4	100.0	
Missing	System	25	11.6		
Total		215	100.0		

In Table 37, the most frequently occurring answers in the combined dataset including the UK, France, Germany, USA, Switzerland, and the Netherlands were 6 and 7, as illustrated in Figure 32.

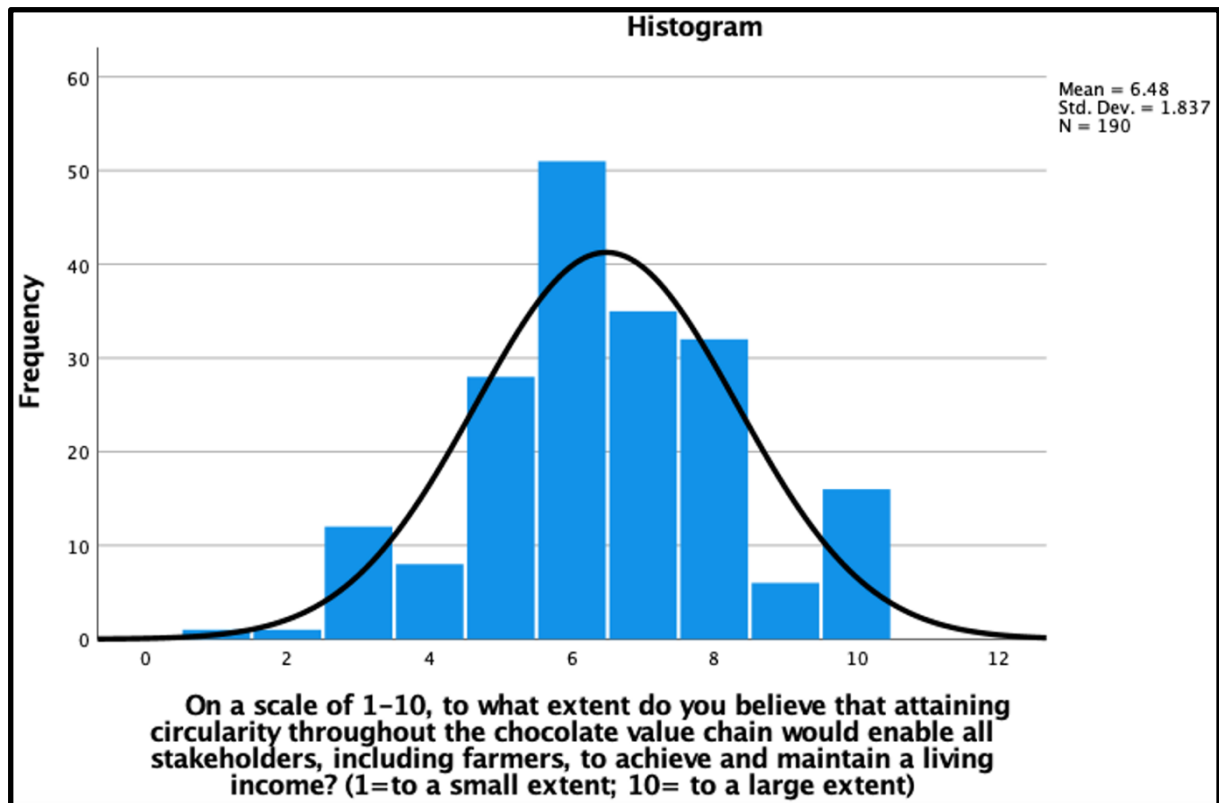


Figure 32 Histogram showing consumer views on circularity's impact on achieving a living income in the combined dataset (n=190)

Figure 32 shows that 190 respondents gave an answer. Of the 190 responses, the mean score was 6.48. A score closer to 1 indicated that the consumer considers circularity to have less of an impact on cocoa farmers achieving a living income. A score of 10 indicated that the consumer considers circularity to have more of an impact on cocoa farmers achieving a living income. At a mean score of 6.48, the consumers sampled in the combined dataset indicated that they do indeed consider circularity to have more of an impact on cocoa farmers achieving a living income than not. These answers show that the sampled consumers would agree that harnessing circularity could help cocoa farmers achieve improvements in agriculture (Chapman et al., 2022; Chávez-Dulanto et al., 2021; Lindsey et al., 2022), including the maintenance of a living income (Giller, 2020).

This concludes the section on consumer views regarding circularity's impact on farmers achieving a living income. The next section considers consumer opinion on whether it is possible to adapt the chocolate value chain so that farmers in Côte d'Ivoire can achieve and maintain a living income.

4.4.2.2. *Is it possible to adapt the chocolate value chain?*

In an effort to gauge whether consumers believe farmers in Côte d'Ivoire could achieve and maintain a living income, they were asked: “do you as a consumer believe it is possible to adapt the chocolate value chain so that farmers in Côte d'Ivoire can achieve and maintain a living income?” Table 38 shows the results.

Table 38 Consumer views on whether the chocolate value chain can be adapted so that farmers in Côte d'Ivoire can achieve and maintain a living income in the combined dataset (n=215)

**Do you as a consumer believe it is possible to adapt the chocolate value chain so that farmers in Ivory Coast can achieve and maintain a living income?
Yes or no, please.**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	34	15.8	15.8	15.8
	Yes	181	84.2	84.2	100.0
	Total	215	100.0	100.0	

In Table 38, the majority of respondents (181 i.e. 84.2%) in the combined dataset (n=215) indicated that “Yes” it is possible to adapt the chocolate value chain so that farmers in Côte d'Ivoire can achieve and maintain a living income. There were no empty cells for this question. Figure 33 illustrates the data.

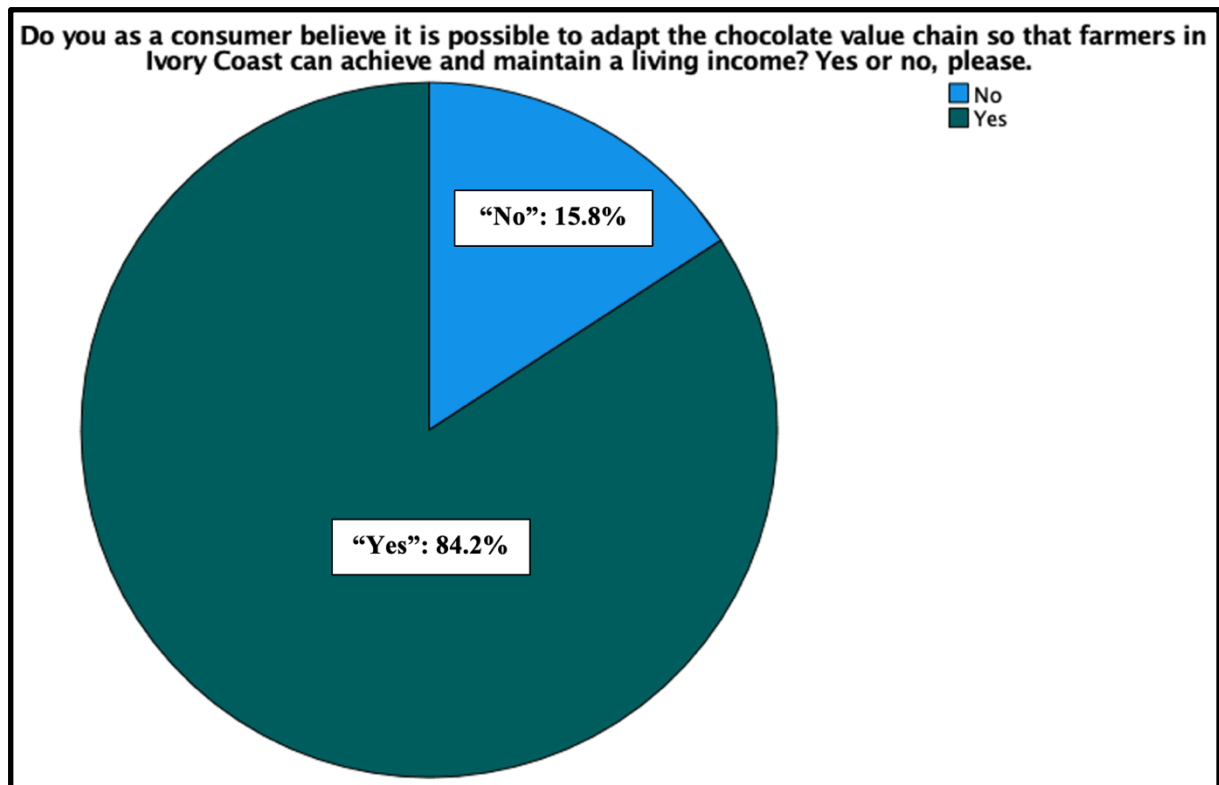


Figure 33 Pie chart showing consumer views on whether the chocolate value chain can be adapted so that farmers in Côte d'Ivoire can achieve and maintain a living income in the combined dataset (n=215)

Figure 33 shows the difference between respondents who answered “Yes” in green (181) and respondents who answered “No” in blue (34). Most respondents (181 out of 215 i.e. 84.2%) in the combined dataset indicated that “Yes” it is possible to adapt the chocolate value chain so that farmers in Côte d'Ivoire can achieve and maintain a living income. This data serves as evidence that consumers believe it is possible to reverse the current downward trend in real prices paid to farmers (Giller et al., 2021a). However, this question neither asked the consumer whether investment in smallholder agriculture (Giller et al., 2021a) would be a viable method, nor whether the implementation of circularity is an example of such an investment (Ayan et al., 2022; Bjornlund et al., 2022; Silvestri et al., 2022). These items will be covered in the answer to research question 4, in section 4.5.

This concludes the section regarding consumer opinion on whether it is possible to adapt the chocolate value chain so that farmers in Côte d'Ivoire can achieve and maintain a living income. The next section considers consumer opinion on which solution they believe best serves the goal of improving the lives of cocoa farmers around the world: a) improved value

chain transparency, b) improved implementation of the circular economy, c) neither of these, or d) both.

4.4.2.3. *Improving the lives of cocoa farmers worldwide*

This question asked the consumer to suggest a solution that best serves the goal of improving the lives of cocoa farmers around the world: a) improved value chain transparency, b) improved implementation of the circular economy, c) neither of these, or d) both. The purpose of this question was to provide the respondent with an opportunity to both decide upon an optimum solution and potentially brainstorm novel ideas. Table 39 shows the results.

Table 39 Respondents' views on solutions to improve the lives of cocoa farmers globally in the combined dataset (n=215)

As a consumer, would you say that improving the lives of cocoa farmers around the world depends more on improved value chain transparency, improved implementation of the circular economy, neither of these or both? If neither of these, please do make a suggestion.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Empty cell/Suggestion	73	34.0	34.0	34.0
	Improved value chain transparency	24	11.2	11.2	45.1
	Improved implementation of the circular economy	11	5.1	5.1	50.2
	Neither	2	.9	.9	51.2
	Both	105	48.8	48.8	100.0
	Total	215	100.0	100.0	

In Table 39, out of 215 answers to the question of how the lives of cocoa farmers globally can be improved, 48.8% selected “both improved value chain transparency and improved implementation of the circular economy”, 34.0% either gave a suggestion of their own or left the cell empty, 11.2% selected “improved value chain transparency”, 5.1% selected “improved implementation of the circular economy”, and 0.9% selected “neither”, as illustrated in Figure 34.

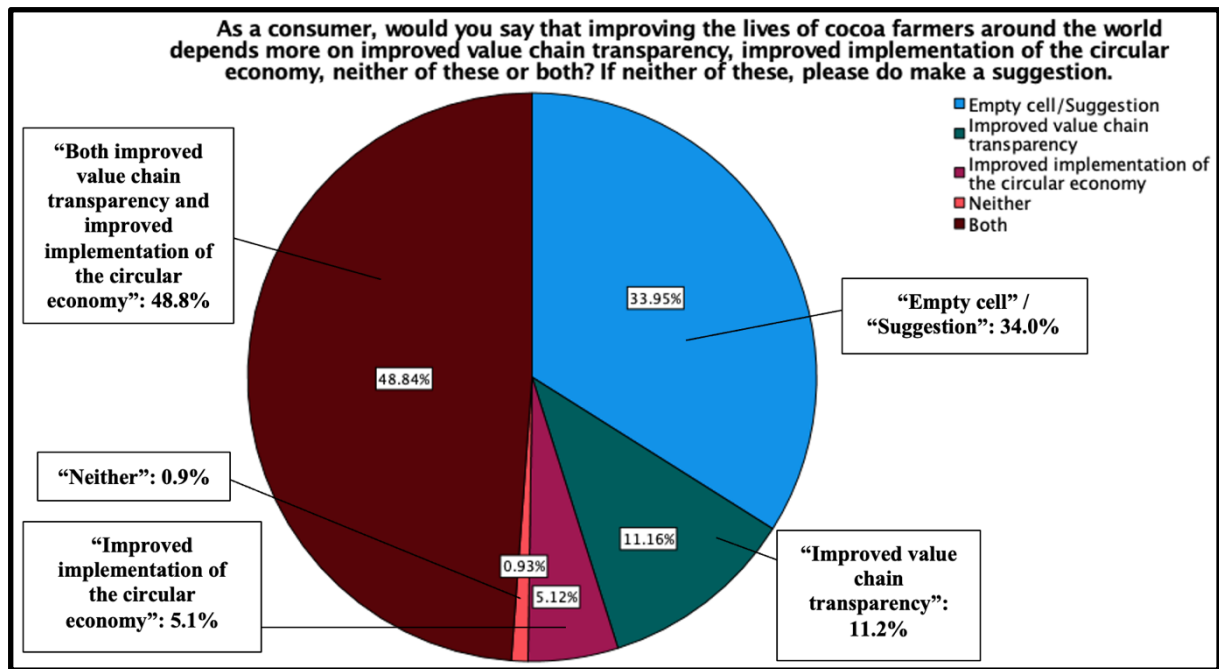


Figure 34 Pie chart showing the consumers' views on solutions to improve the lives of cocoa farmers globally in the combined dataset (n=215)

In Figure 34, of the 215 respondents, 34% of the cells were either empty or contained suggestions. A selection of the 21 suggestions (chosen for relevance and quality) given by the respondents were as follows:

1. *"Better transparency of the production chain and subsequent legislation (penalty if human rights are not respected)."*
2. *"It depends on several factors... human greed, better transparency of the value chain and... better implementation of the circular economy."*
3. *"Neither. End capitalism."*
4. *"Political guidelines."*
5. *"Improved implementation of the circular economy, but mainly from the economic system called capitalism."*
6. *"Improving living conditions is most likely to depend on avoiding the situation where most of the money flows only into the tertiary sector."*
7. *"Neither of these. Better working conditions in general in the countries where cocoa is produced (e.g. occupational health and safety, prohibition of child labour, maternity protection)."*

8. *“On neither, it depends on the understanding of fairness and the stopping of exploitation of poorer/weaker by the rich/powerful.”*
9. *“Especially value chain transparency. For me it depends on whether farmer cooperatives in the Global South can build up their own manufacturing units to have control over the value chain and politics should enable these processes. This would imply a radical change in trading policies of the European Union.”*
10. *“Neither. The problem is the governments that allow companies to exploit the people and natural resources in developing nations. If new governments arose that forced companies in the area to pay their fair share, the farmers would make a living wage. Otherwise, I believe value chain transparency would make a bigger difference than implementation of the circular economy.”*
11. *“Both as well as legislation and increased activism to bring more attention to the issue.”*
12. *“Making improvements of their working conditions - farmers should fight the urge to accept less.”*
13. *“Neither. There is a need for political intervention and economic development in cocoa producing countries.”*
14. *“These solutions could help but... the problem here is capitalism and the power inequality inside the value chain, allowing some stakeholders to abuse it to enslave other workers. Also, the place where the value is created is not OK, since poor stakeholders export raw material and cannot capture the value creation resulting from transformation. So, transparency and circular economy is only part of the answer, since it would involve little paradigm shift, still allowing some stakeholders to steal the value of the work of others and accumulation of money (closely linked with power) is still the main goal and focus, not questioning the social and environmental impact, or even the real (and not created through marketing) needs of the consumers. Social and solidarity economy in addition to decentralization and relocation of value creation. Also reduced consumption is a must, as well as rethinking the production systems, to ensure their sustainability.”*
15. *“Neither. I think it depends on capitalism.”*
16. *“Probably depends on both of these, but also on the recognition of the farmers as labour force and the subsequent creation of labour unions.”*

One of the repeated themes was an adaptation of the capitalist system. Some went so far as to say: *“end capitalism”*. A few key words used by the respondents were *“greed”*, *“fairness”*,

“*political intervention*”, and “*maternity protection*”. This data supports the notion that a framework aimed at improving the lives of cocoa farmers around the world would need to account for the consumer’s growing interest in production chain sustainability (Arekrans et al., 2023; Visco et al., 2022). Furthermore, the introduction of such a framework would need to resolve criticism against the supposedly unclear implementation methods of circularity (Corvellec et al., 2022).

This concludes the section regarding consumer opinion on which solution they believe best serves the goal of improving the lives of cocoa farmers around the world: a) improved value chain transparency, b) improved implementation of the circular economy, c) neither of these, or d) both. In the next section, the same question was asked but instead of improving the lives of cocoa farmers around the world, the scope was focused on cocoa farmers in Côte d’Ivoire.

4.4.2.4. *Improving the lives of cocoa farmers in Côte d’Ivoire*

This question asked the consumer to suggest a solution they believe best serves the goal of improving the lives of cocoa farmers in Côte d’Ivoire. The options were a) improved value chain transparency, b) improved implementation of the circular economy, c) neither of these, or d) both. The variation on the previous question allows for a comparison of consumers’ responses when the scope was narrowed to cocoa farmers located in Côte d’Ivoire, as opposed to cocoa farmers globally. The purpose of this question was also to provide the respondent with an opportunity to select the most effective solution and potentially brainstorm novel ideas. The results are shown in Table 40.

Table 40 Respondents' views on solutions to improve the lives of cocoa farmers in Côte d'Ivoire in the combined dataset
(n=215)

As a consumer, would you say that improving the lives of cocoa farmers in Ivory Coast depends more on improved value chain transparency, improved implementation of the circular economy, neither of these or both? If neither of these, please do make a suggestion.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Empty cell/Suggestion	66	30.7	30.7	30.7
	Improved value chain transparency	38	17.7	17.7	48.4
	Improved implementation of the circular economy	15	7.0	7.0	55.3
	Both	96	44.7	44.7	100.0
	Total	215	100.0	100.0	

In Table 40, of the 215 responses, 44.7% selected “both value chain transparency and circular economy”, 30.7% either left the cell empty or provided a suggestion of their own, 17.7% selected “improved value chain transparency”, and 7.0% selected “improved implementation of the circular economy”. Not one respondent answered “neither”. When the consumer wrote “neither”, it would form part of a suggestion. Figure 35 illustrates these results.

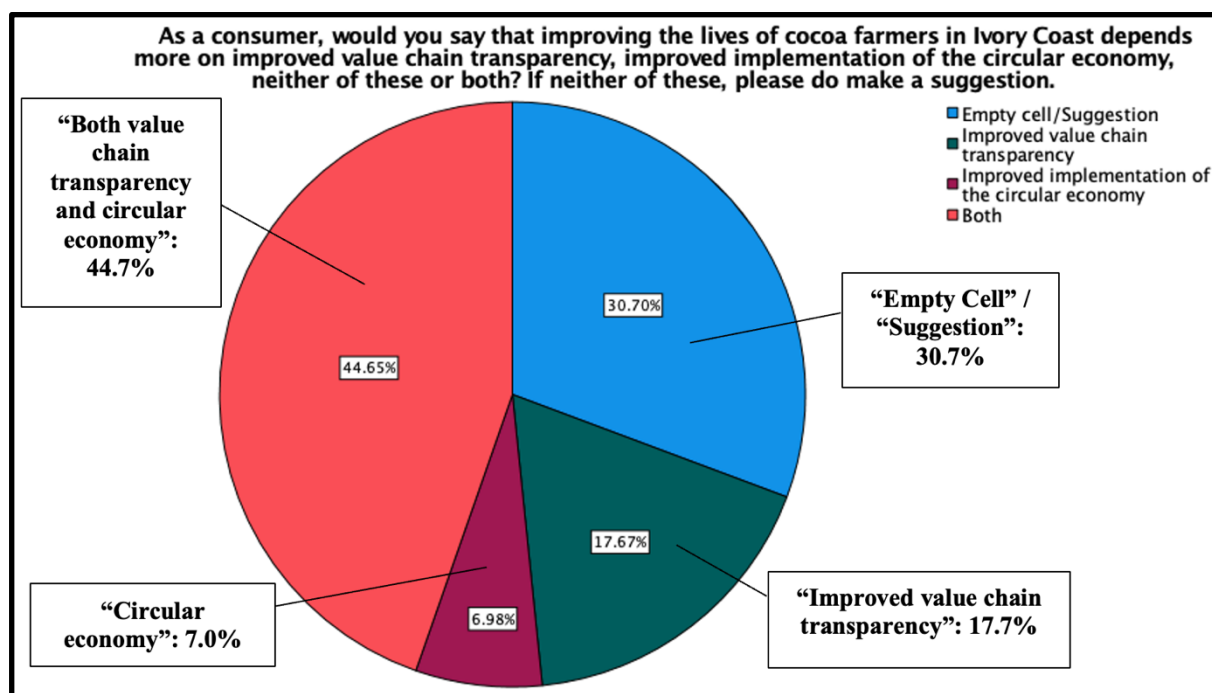


Figure 35 Pie chart showing the consumers' views on solutions to improve the lives of cocoa farmers in Côte d'Ivoire in the combined dataset (n=215)

In Figure 35, of the 215 respondents responding to the narrower scope of farmers in Côte d'Ivoire as opposed to around the world, 30.7% of the cells were either empty or contained suggestions. Sometimes a suggestion would simply be a “*do not know*” or a repeat of the previous answer given regarding cocoa farmers around the world. A selection of the 22 suggestions (chosen for relevance and quality) given by the respondents were as follows:

1. *“It relies on people caring. Most people will just buy what is cheapest and easiest for them. They can easily know that what they are buying is not good but if they don't care that doesn't help. But those who do care will hopefully make a big enough difference so I'd say transparency would help more.”*
2. *“I do not know.”*
3. *“Yes, but under certain conditions, in particular the assurance of the establishment of a mechanism guaranteeing a living income through transparent and democratic cooperatives.”*
4. *“Change in politics regarding industries and dependency on former colonial power like France.”*

Aside from increased suggestions alluding to consumer awareness about value chain fairness and historical narratives of colonialism, there was little difference in ideas to improve the lives of cocoa farmers in Côte d'Ivoire compared to those for cocoa farmers around the world. Nevertheless, the fact that respondents answered this question indicated that they see a potential solution for cocoa farmers both in Côte d'Ivoire and around the world. Furthermore, the repetition in the answers indicated a saturation point; there was no need to collect further data.

The 7% voting for circular economy in the Côte d'Ivoire-focused question was a 1.9% increase from the previous question pertaining to the broader “cocoa farmers around the world”. This increase could be interpreted as negligible. However, the mere fact that the circular economy was voted for in both instances suggests that it is possible to achieve the backing of consumers (Luckstead et al., 2021) in the context of utilizing circularity to reduce the negative impact of constraints such as forced child labour, excessive deforestation, and cocoa farmers failing to maintain a living income (Castellani et al., 2022; Gboko et al., 2021; Ladu & Morone, 2021; Renier et al., 2023; Staritz et al., 2022; van Vliet et al., 2021; Zanli et al., 2022).

This concludes the section regarding consumer opinion on which solution they believe best serves the goal of improving the lives of cocoa farmers a) around the world and b) in Côte d'Ivoire. In the next section, the consumer was asked to rank on a scale from 1-10 the extent to which they believe current literature on value chain transparency and the circular economy addresses the problem of living income at the farmer's level.

4.4.2.5. *Current literature on living income at farmer level*

In this question, the consumer's opinion on current literature pertaining to the constraints of the Ivorian cocoa value chain was elicited. The purpose of this question was to justify the contribution of further literature and data on value chain transparency and the circular economy, especially with regards to the problem of living income at the farmer's level. To this end, the consumer was asked to rank on a scale from 1-10 the extent to which they believe current literature on value chain transparency and the circular economy addresses the problem of living income at the farmer's level. Table 41 presents the results.

Table 41 Extent to which consumers believe that current literature on value chain transparency and the circular economy addresses the problem of living income at the farmer's level (1: to a lesser extent; 10: to a greater extent)

N	Valid	180
	Missing	35
Mean		4.66
Std. Error of Mean		.142
Median		5.00
Mode		5
Std. Deviation		1.907
Variance		3.635
Skewness		.146
Std. Error of Skewness		.181
Kurtosis		-.276
Std. Error of Kurtosis		.360
Range		9
Minimum		1
Maximum		10
Sum		838
Percentiles	25	3.00
	50	5.00
	75	6.00

In Table 41, the arithmetic mean was 4.66 for the sample of 180 valid answers. The median of 5.00 and mode of 5 confirm that the sample mean was true to a satisfactory level. The standard error of the mean of 0.142 represented a margin of error of $\pm 3\%$ to $\pm 5\%$ since $0.142 \div$

4.66 = 0.03. This satisfied the chosen requirements for sampling accuracy (i.e. a margin of error of the mean between $\pm 3\%$ to $\pm 5\%$), which were selected by following the guidance of Rea & Parker (2014, p.165). Table 42 shows the frequency of each of the respondents' answers.

Table 42 Frequency of the extent to which consumers believes that current literature on value chain transparency and the circular economy addresses the problem of living income at the farmer's level (1: to a lesser extent; 10: to a greater extent)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	10	4.7	5.6	5.6
	2	13	6.0	7.2	12.8
	3	29	13.5	16.1	28.9
	4	25	11.6	13.9	42.8
	5	55	25.6	30.6	73.3
	6	16	7.4	8.9	82.2
	7	16	7.4	8.9	91.1
	8	13	6.0	7.2	98.3
	9	2	.9	1.1	99.4
	10	1	.5	.6	100.0
	Total	180	83.7	100.0	
Missing	System	35	16.3		
Total		215	100.0		

In Table 42, the most frequently occurring answers were 5 and 3, as illustrated in Figure 36.

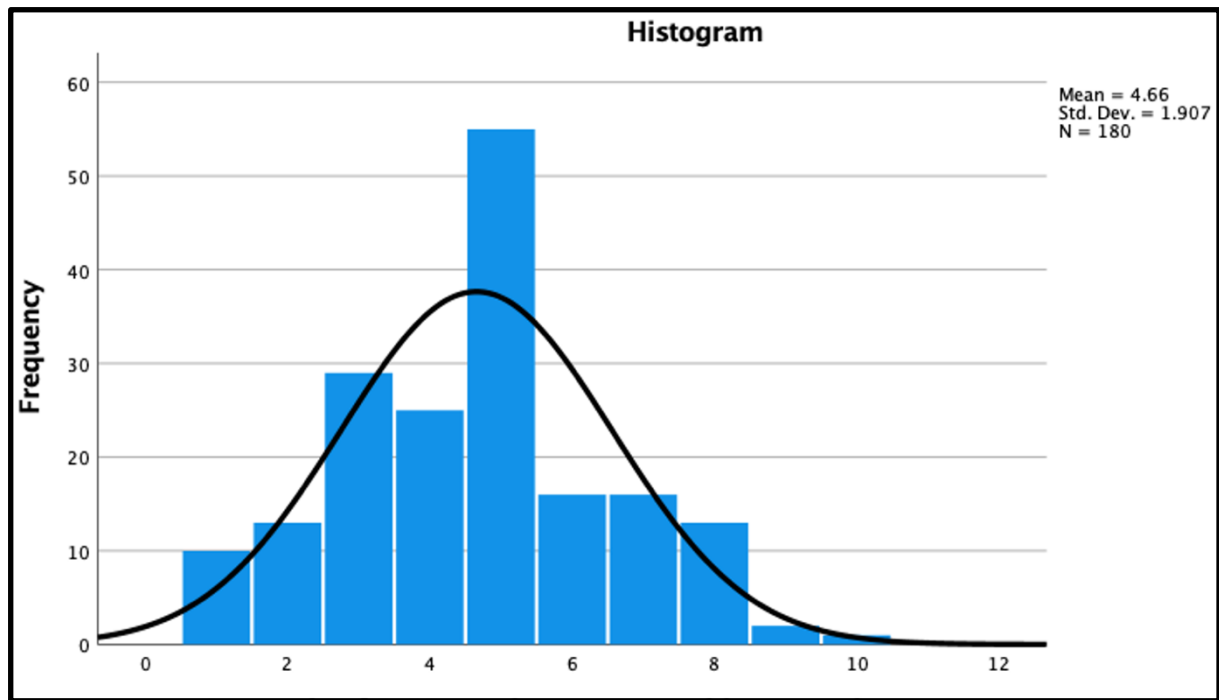


Figure 36 Extent to which consumers believe that current literature on value chain transparency and the circular economy addresses the problem of living income at the farmer's level (1: to a lesser extent; 10: to a greater extent)

Figure 36 shows that 180 respondents gave an answer. Of the 180 responses, the mean score was 4.66. A score closer to 1 indicated that the consumer believes current literature on value chain transparency (VCT) and the circular economy (CE) does not address the problem of living income at the farmer's level to a significant extent. A score closer to 10 indicated the opposite. The sampled answers show how consumers believe that there is a lack of VCT and CE literature addressing the problem of living income at farmer level (Ferasso et al., 2020; Suchek et al., 2021; Testa et al., 2020).

This concludes the questionnaire-based section regarding consumer opinion on the extent to which they believe current literature on value chain transparency and the circular economy addresses the problem of living income at the farmer's level. The next section delves a little bit deeper using the interview data.

4.4.3. Semi-structured interview findings

While the farmer and consumer questionnaire findings provided some valuable insights into answering research question 3, further in-depth understanding was sought through semi-

structured interviews. The interviews aimed to explore how consumers' commitment to circularity could be measured, particularly in the context of enabling Ivorian cocoa farmers to maintain a living income.

One question posed during the interviews was, “how could consumers' commitment to the circular economy be measured in the context of enabling Ivorian cocoa farmers to maintain a living income?” According to interviewee 4 (Int 4), it is unlikely that consumers' commitment to circularity could be measured at this point in time. The reason being that circularity is not a term that most consumers in their region would know at all. Int 4 claimed: *“I may hear it in (the university) halls... I hear about sustainability and purchases of that sort, but I have never heard anything about circularity.”* Regardless, Int 4 continued to suggest a solution. One idea would be simply to measure circular purchases and compare this number with non-circular purchases. However, Int 4 conceded that purchases counted as being circular might be “*accidental*” – in that the consumer's true intent was not necessarily to ‘buy circular’.

To illustrate how the notion of circularity may be more present in some regions than others, Int 4 used the following example:

“There's an incredible store on... the island of Martha's Vineyard, which is off the coast of Massachusetts. They offer upcycled, recycled, remade, and re-used (products). That to me is a circular economy store... but I do not know that we have developed language here that would be recognizable for people to be motivated to purchase based on circularity.”

The example illustrates how consumers' commitment to circularity would likely need to be accompanied by language that supports a full-fledged transition to circular purchasing behaviour (Clément et al., 2022; Erhun et al., 2021).

In contrast with Int 4's answer, which focused on language and geography, the answer given by interviewee 11 (Int 11) considered economics. To measure the consumer's commitment to circularity, Int 11 argued that one needs to study purchasing behaviour more broadly than one product. In Int 11's view:

“If the consumer is committed to circularity across all their purchases, their commitment is going to be much higher than another consumer who is just picking one product.”

Int 11 explained as follows:

“A consumer might like the story behind a product. The branding looks good to them, so they say ‘okay, it’s kind of sustainable’, but in the rest of their purchasing, they are just buying commercial type brands.”

This explanation shows how buying one brand of circular chocolate might be a starting point. However, the question remains, how does the consumer demonstrate their commitment across all their purchases? Subsequent questions may include: are consumers just buying on trend? Or are they buying circular because they are committed to circularity across the spectrum of products that they buy? This is where one would need to consider their entire basket of goods (Li & Kallas, 2021; Puchol-Miquel et al., 2022; Wurster & Reis, 2022).

If consumers are more broadly buying circular products, then they are cutting out costs across the board (Carodenuto & Buluran, 2021; Searle & McWha-Hermann, 2021). Applying this understanding to the situation of Ivorian cocoa farmers, circular purchasing reduces costs along the value chain, enabling cocoa farmers to benefit from a better deal (Ayan et al., 2022; Bjornlund et al., 2022; Giller et al., 2021a; Silvestri et al., 2022).

4.4.4. Summary: answer to research question 3

To summarize, research question 3 asked, “to what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d’Ivoire?”

4.4.4.1. *Insights from farmers*

The farmer questionnaire findings reveal insights into the potential solutions that farmers believe could help them achieve a living income through circularity. As illustrated in Figure

25, 79.5% of farmers selected agroforestry as the most viable solution, followed by 55.8% supporting ethical trade certifications and 54.9% favouring upcycling by-products such as husks, skins, and pods. 47.4% of farmers identified reusable packaging materials as another potential solution. Interestingly, none of the farmers selected using water more efficiently or the implementation of renewable energy, such as solar power, despite their alignment with SDGs related to clean water, affordable energy, responsible consumption, and climate action. Additionally, tracking solutions were also not considered by any farmers, which may be seen as overlooking policies such as the Corporate Sustainability Due Diligence Directive (CSDDD), which focuses on transparency, accountability, human rights, and environmental due diligence.

When asked for new circular business ideas, most farmers (195 out of 215) did not provide any suggestions. However, two recurring ideas emerged: 16 farmers expressed interest in allowing the commercialization of cocoa by-products, and 4 farmers emphasized the importance of receiving training.

4.4.4.2. *Consumers' views on circularity's impact*

Consumers were asked to rate circularity's impact on farmers' ability to maintain a living income. The majority of consumers agreed that circularity could enable farmers to maintain a living income. The arithmetic means for the different datasets are as follows:

- UK dataset: mean = 6.20 (n=44), margin of error = 4.1%.
- France dataset: mean = 6.41 (n=46), margin of error = 4.5%.
- Germany dataset: mean = 6.14 (n=42), margin of error = 4.3%.
- USA dataset: mean = 7.09 (n=43), margin of error = 3.6%.
- Switzerland dataset: mean = 6.71 (n=7), margin of error = 13% (not meeting the sampling accuracy requirement of 3-5%).
- Netherlands dataset: mean = 6.75 (n=8), margin of error = 13% (not meeting the sampling accuracy requirement of 3-5%).

The combined dataset (n=190) had a mean of 6.48 with a margin of error of 2.1%, indicating a general agreement that harnessing circularity could help cocoa farmers achieve

improvements in agriculture (Chapman et al., 2022; Chávez-Dulanto et al., 2021; Lindsey et al., 2022), including the maintenance of a living income (Giller, 2020).

4.4.4.3. *Feasibility of adapting the chocolate value chain*

Consumers were asked whether it is possible to adapt the chocolate value chain to help farmers maintain a living income. A significant majority (84.2%) of respondents believed that it is possible. This data suggests that consumers believe it is possible to reverse the current downward trend in real prices paid to farmers (Giller et al., 2021a).

4.4.4.4. *Solutions to improve the lives of cocoa farmers globally*

Consumers were asked to state which solution best serves the goal of improving the lives of cocoa farmers around the world: a) improved value chain transparency, b) improved implementation of the circular economy, c) neither of these, or d) both. In response, 48.8% of respondents (n=215) chose “both improved value chain transparency and improved implementation of the circular economy” as the solution to improve the lives of cocoa farmers globally. Other responses included suggestions for political intervention, fairness, and calls for systemic changes. One of the repeated themes was an adaptation of the capitalist system. Some respondents went so far as to say: “*end capitalism*”. A few key words used by the respondents were “*greed*”, “*fairness*”, “*political intervention*”, and “*maternity protection*”. This data supports the notion that a framework aimed at improving the lives of cocoa farmers around the world would need to account for the consumer’s growing interest in production chain sustainability (Arekrans et al., 2023; Visco et al., 2022). Furthermore, the introduction of such a framework would need to resolve criticism against the supposedly unclear implementation methods of circularity (Corvellec et al., 2022).

4.4.4.5. *Solutions to improve the lives of cocoa farmers in Côte d’Ivoire*

Consumers were asked the same question as in section 4.4.4.4 but instead of improving the lives of cocoa farmers around the world, the scope was narrowed to cocoa farmers in Côte d’Ivoire. In response, 44.7% of respondents (n=215) selected “both value chain transparency and circular economy”. Not one respondent answered “neither” without suggesting an

alternative solution. Aside from increased responses alluding to consumer awareness about value chain fairness and historical narratives of colonialism, there was little difference in ideas to improve the lives of cocoa farmers in Côte d'Ivoire compared to those for cocoa farmers around the world. Nevertheless, the fact that respondents answered this question indicated that they see a potential solution for cocoa farmers both in Côte d'Ivoire and around the world. Furthermore, the repetition in the answers indicated a saturation point; there was no need to collect further data. The 7% voting for circular economy in the Côte d'Ivoire-focused question was a 1.9% increase from the previous question pertaining to the broader "cocoa farmers around the world". This increase could be interpreted as negligible. However, the mere fact that the circular economy was voted for in both instances suggests that it is possible to achieve the backing of consumers (Luckstead et al., 2021) in the context of utilizing circularity to reduce the negative impact of constraints such as forced child labour, excessive deforestation, and cocoa farmers failing to maintain a living income (Castellani et al., 2022; Gboko et al., 2021; Ladu & Morone, 2021; Renier et al., 2023; Staritz et al., 2022; van Vliet et al., 2021; Zanli et al., 2022).

4.4.4.6. *Consumers' perception of value chain transparency and circularity in the literature*

Consumers were asked to indicate on a scale from 1-10 the extent to which they believe current literature on value chain transparency (VCT) and the circular economy (CE) addresses the problem of living income at the farmer's level. Of the 180 responses, the mean score was 4.66. The sampled answers show how consumers feel there is a lack of VCT and CE literature addressing the problem of living income at farmer level (Ferasso et al., 2020; Suchek et al., 2021; Testa et al., 2020).

4.4.4.7. *Measuring consumer commitment to circularity*

When comparing the responses from the farmer questionnaire, consumer questionnaire, and semi-structured interviews, the data suggests the need for a new framework to measure consumer commitment to circularity. Such a framework would focus on assessing the fairness of the value chain and allow for consumer interaction on this issue (Carruba et al., 2022; Hau & Lange, 2023; Peters & Verhagen, 2022; Veldhuizen et al., 2020).

Further interpretation of research question 3 with respect to the existing literature is conducted in section 5.3.

This concludes the answer to research question 3. In the next section, research question 4 is answered.

4.5. Answer to research question 4

The fourth and final research question asks, “how could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d’Ivoire achieve circularity and maintain a living income?” To provide a comprehensive answer, several sub-questions were explored. First, what are farmers’ views on the effect of circularity on their living income? Second, would consumers increase the share paid to cocoa farmers? Third, how do consumers define entrepreneurship? Fourth, could circularity be designed to reduce economic poverty? Finally, how could entrepreneurial circular business models be leveraged?

The following sections present the findings from the farmer questionnaire (section 4.5.1), consumer questionnaire (section 4.5.2), and semi-structured interviews (section 4.5.3), each offering insights into the sub-questions. A summary of the findings is presented in section 4.5.4. The findings culminate in the development of a new conceptual tool for leveraging ECBMs, which will be introduced in section 4.6.

4.5.1. Farmer questionnaire findings

To start, farmers were asked whether they believe achieving circularity would help them earn a living income. Figure 37 shows farmers’ responses, where 1 means “not at all” and 10 means “very much so”.

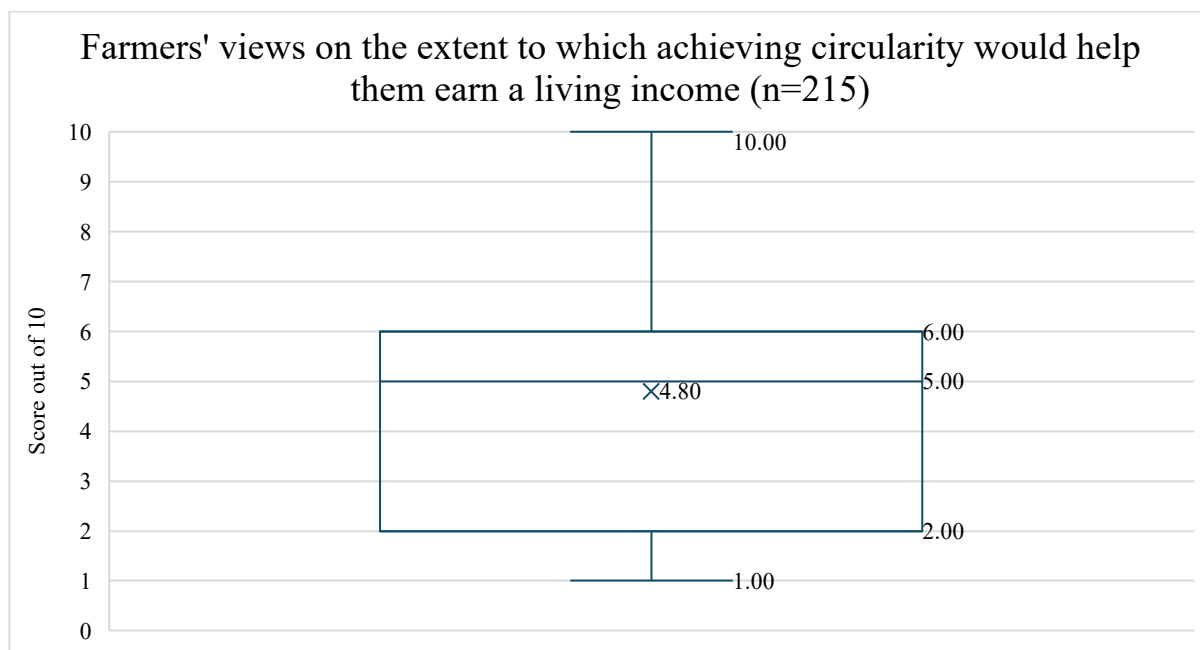


Figure 37 Farmers' views on the extent to which achieving circularity would help them earn a living income (n=215)

As shown in Figure 37, farmers gave a broad range of answers between 1 and 10, with a median of 5 and a mean of 4.8. The standard deviation was 2.31. This mix of answers could be interpreted as a symptom of the uncertain feeling farmers might have about the effectiveness of circularity. However, it could also be argued that the living income problem remains incredibly difficult for farmers to resolve, no matter the proposed solution.

The farmers' data on this question presented a serious challenge. How could the living income problem be solved if the farmers' trust in circularity is not guaranteed? In the next sections, an attempt at finding new and effective solutions is made, using a combination of the consumer questionnaire and the semi-structured interview findings. The data is analysed through the lens of section 2.3.4 of the literature review: leveraging entrepreneurial circular business models. The answer culminates in the development of a new conceptual framework.

4.5.2. Consumer questionnaire findings

This section presents the findings from the consumer questionnaire, which explored consumer perceptions of the share of the price paid for cocoa that should be attributed to farmers. The analysis includes three components: initial responses, revised responses after watching an

informational video about cocoa farming, and a statistical comparison of the two sets of responses. Additionally, interview data will be incorporated to provide further insights into the consumer mindset. This could enhance the understanding of how increased awareness may influence perceptions of fair compensation for farmers.

One way of visualizing the end-goal of achieving and maintaining a living income at farmer level is to determine what percentage of the share paid by consumers is attributed to farmers. Table 43 reveals the consumers' answers on what they believe should be the percentages paid to farmers. In the first instance, consumers answered without external input. In the second, consumers gave an answer after watching an informational video¹⁰ that depicts a thought-provoking scene taken from modern-day cocoa farms. In the third row, a paired samples *t*-test is performed to determine the difference of the means between answers given before and after watching the informational video. The fourth row indicates Cronbach's Alpha levels for each of the datasets to provide a measure of the reliability of the data.

¹⁰ Permission was obtained from the author (van de Velde, 2018, 2021) of the video, and the link (<https://vimeo.com/139873232>) was shared with respondents, who were requested to watch from 9:10 to 9:52.

Table 43 Arithmetic mean percentage share of consumer price attributed to farmers by respondents before and after watching informational video

	United Kingdom (n=45)	Germany (n=46)	France (n=47)	USA (n=47)	Combined dataset with UK, Germany, France, USA, Switzerland, and the Netherlands (n=212)
Mean % share attributed to farmers before watching informational video	30.5%	28.9%	32.1%	30.7%	31.6%
Mean % share attributed to farmers after watching informational video	37.6%	36.8%	41.7%	37.4%	39.0%
Paired samples t-test – difference of the means	-7.07% at the p <.001 significance level	-7.84% at the p <.001 significance level	-9.52% at the p <.001 significance level	-6.67% at the p <.001 significance level	-7.41% at the p<0.001 significance level
Cronbach's Alpha*	.669	.713	.690	.815	0.790

*Cronbach's α indicates the overall reliability of a scale (Field, 2018). In general, a Cronbach's α value between about 0.7-0.8 indicates good reliability (Kline, 1999) in (Field, 2018, p.826).

As shown in Table 43, after watching the informational video, the consumers decided to increase the share paid to farmers in every dataset: UK, Germany, France, USA, and the combined dataset including UK, Germany, France, USA, Switzerland, and the Netherlands. The occurrence of consumers deciding to increase the share paid to farmers in the independent country sets in descending order was as follows - France up by 9.52%, Germany up by 7.84%, UK up by 7.07%, and the USA up by 6.67%. The combined dataset indicates a decision to increase farmers' share by 7.41%. The change in the means indicates that, after viewing the informational video, consumers tend to allocate a higher percentage of pay to farmers compared to their allocation prior to watching the video.

The decision was made that any dataset with a Cronbach's Alpha value between 0.6-0.9 would be acceptable in terms of reliability. Given this criterion, all the datasets had an acceptable level of reliability. The most reliable datasets were Germany at 0.713 and the combined dataset at 0.790, since both these values fell within the stricter target range of 0.7-0.8.

An example given by Int 10 gives a farmer-level blueprint that echoes the consumer-led adjustment shown in Table 43:

"...As for the (farmers) we have trained... I trained 2,000 farmers - you can watch the Netflix report called Rotten Bitter chocolate season 2... 2,000 farmers who are in the villages processing cocoa and earn more money than before. They now earn 5 euros per kilo of roasted and shelled cocoa, instead of the standard 1 euro per kilo of raw cocoa. And do you know what the (farmers) decide to do when they earn the extra money? The first thing they do is send their child to school; they don't leave them hanging around."

This example supports the notion that the long-term effects of ECBM implementation could include improved education levels across the community and higher incomes for cocoa farming families. Although Int 10 did not explicitly mention this, existing literature suggests that the overall health of the population would also benefit (Pigeaud & Sylla, 2020; Sackou-Kouakou et al., 2021). These improvements in education, income, and health are likely to result from farming communities' enhanced ability to pursue entrepreneurial ventures (Doherty, 2021; Kouamé et al., 2020; Kouman et al., 2020; Yeboah et al., 2022).

4.5.3. Semi-structured interview findings

This section presents findings from the semi-structured interviews, integrated with data from the farmer and consumer questionnaires, to explore ECBM implementation in the cocoa value chain. The analysis will cover how consumers perceive entrepreneurship, the potential of circularity in addressing economic poverty, and how ECBMs could be leveraged to guarantee the maintenance of a living income for cocoa farmers in Côte d'Ivoire.

4.5.3.1. *How do consumers understand the concept of entrepreneurship?*

The consumer questionnaire findings showed that consumers would increase the share paid to cocoa farmers if they became aware of the constraints of the value chain. To further explore this, a deeper understanding of consumers' perceptions of entrepreneurship was sought. To this end, one of the SSI questions asked, "how would you define entrepreneurship (Bischoff et al., 2020; O'Reilly & Binns, 2019; Pauceanu et al., 2021; Theodoraki et al., 2022)?"

Interviewee 4 (Int 4) answered:

"I would define entrepreneurship as the concept and practice of identifying and building opportunity, almost always through partnerships to address a particular problem or need. It doesn't have to be a business venture. It can be any response whereby a person or group uses their network, their ingenuity, their vision, their resources to make something where there wasn't something before - something necessary and helpful."

The definition above highlighted entrepreneurship as a response to an opportunity (Ratten, 2023), where partnerships are used to address problems that need solving.

According to Interviewee 7 (Int 7), entrepreneurship is the undertaking of an economic activity with which you offer value to consumers and to producers. It is a way to create economic and social value, by offering products or services that are valuable to people in the eco-system in which the company is active. Entrepreneurship is about how well a company can create a

certain value for someone, but there are variations of the term. Int 7 used the example of social entrepreneurship to illustrate:

“With social entrepreneurship we are moving away from the idea that value (should) only be economic benefit for the company owners and the consumer of your product or service. Instead, we are (embracing) a more holistic view that entrepreneurship can also mean creating societal value. It is always about creating value, but we are now re-thinking what that value may or has to mean.”

Given this interpretation, entrepreneurship might lead to a stable, profitable company (Bischoff et al., 2020; Unger et al., 2009) without seeking big returns in the short-term future (Espinosa et al., 2021; Theodoraki et al., 2022).

Interviewee 10 (Int 10) argued that the entrepreneur is the one who finds sustainable solutions to a given problem. Int 10 suggested the following definition:

“(In the context of entrepreneurship, one has) to carry out an activity that will allow (the company) to earn, but which is also a solution to a given problem in society.”

According to Int 10, farmers are pioneering entrepreneurs because they operate the plantation (McGrath & MacMillan, 2000; O'Reilly & Binns, 2019). However, it is a stage of entrepreneurship that is not profitable for farmers because the buyer sets the price for the raw material. Apparently, nothing can be done to change this. Nonetheless, the cocoa farmer could learn from the winemaker (Pauceanu et al., 2021). The farmer could move on to transformation with a little more training (Bhidé, 1994; Rosário et al., 2022). From there, the farmer could operate in the transformation sector, which would be ideal (Chapman et al., 2022; Chávez-Dulanto et al., 2021; Giller, 2020; Giller et al., 2021a; Lindsey et al., 2022).

4.5.3.2. *Could the circular economy be designed to reduce economic poverty?*

Given the definitions for entrepreneurship found in section 2.3.4, the next objective was to determine whether consumers believe that circularity could reduce economic poverty. Thus, a next set of SSI questions asked: “would you say that the circular economy is designed to reduce

waste (Kirchherr et al., 2017; Morseletto, 2020; Stahel, 2016)? And since economic poverty leads to the waste of an individual's full potential, would you say that the circular economy is designed to reduce economic poverty (Erdiaw-Kwasie, 2023)? Why would you say so?"

The selection of interviewees agreed that the concept of the circular economy is designed to reduce waste. The interviewees also supported the argument that economic poverty leads to the waste of an individual's potential (Maslow, 1943). However, there was disagreement as to whether circularity is designed to reduce economic poverty, as opposed to waste. According to Interviewee 3 (Int 3), the circular economy is indeed designed to reduce waste. However, supporting communities without a voice (i.e. economically impoverished) to have a voice (i.e. to become economically empowered in real terms) is probably not circularity per se. Int 3 foresaw a risk that circularity will probably be (appropriated) to meet the ends of individuals with power and resources. In Int 3's view:

"Circularity will largely be implemented to drive resource efficiency, and to reduce waste to drive more profit. Circularity will not necessarily be introduced to provide greater value to all people within the supply chain."

This interpretation indicated that circularity would need to explicitly state the aim of reducing economic poverty (Kravchenko et al., 2019; Sinkovics et al., 2021). Furthermore, if companies provide resources for communities as part of circularity schemes, the companies' intent would need to be scrutinised: are the companies operating in this way because it is the right thing to do? Or are the companies following this strategy because they want to be perceived as doing the right thing (Eisenreich et al., 2022; Mhatre et al., 2021)?

Interviewee 5 (Int 5) also showed reservations when asked if circularity is designed to reduce economic poverty. Int 5 went further still, criticising the relevance of circularity to the cocoa sector. In Int 5's words:

"Thinking about circularity in terms of the cocoa sector (is problematic) because cocoa is produced in one place and consumed somewhere else."

This viewpoint could be interpreted as a) a complete dismissal of circularity in the cocoa sector, or b) a challenge with the purpose of strengthening the resolve of a budding concept (González-

Sánchez et al., 2020; Puntillo et al., 2021). The latter is more likely, given that the 3 P's framework of the circular economy – People, Policies and Places – devotes swathes of discussion to location-specific contexts (Lüdeke-Freund et al., 2018; OECD, 2020; Winterstetter et al., 2021).

4.5.3.3. *How could entrepreneurial circular business models be leveraged?*

To further explore the potential of ECBMs, a final SSI question asked, “how could entrepreneurial circular business models be leveraged so that Ivorian cocoa farming families maintain “*a decent income*” (Waarts & Kiewisch, 2021, p.56)?” Responses from private sector interviewees provided valuable insights.

Interviewee 9 (Int 9) suggested two entrepreneurial circular business model (ECBM) opportunities in the context of cocoa farming. One example was using the shell of the pod as compost. The shell would normally have been thrown away even though it contains valuable nutrients that can benefit the farmer's plantation. A second example was where the fruit pulp, which also was previously discarded, is used to make a cocoa-based fruit juice. Essentially, when the cocoa beans are fermented, one can extract some of the pulp and still have enough pulp for fermentation to occur. Both examples show how new income streams can be generated using the by-products of cocoa. Int 9 used the following example:

“We work with a company... that is putting this circular business model into practice, and it is functioning... Their product... is quite popular. Consumers drink the cocoa-based juice on its own but also mix (drinks) with it.”

Effectively it is a new product line generated from what was previously a waste stream (Bigliardi & Filippelli, 2021; Tan et al., 2022). A by-product of the cocoa business can now be marketed. The circular model generates an additional income for farmers as well as an added value to society (Cullen et al., 2021; Poponi et al., 2020; Suchek et al., 2022).

The ideas put forth by Interviewee 10 (Int 10) reinforced Int 9's support of using previously wasted by-products in ECBMs. Int 10 argued that the entirety of the cocoa pod is not adequately monetized in the modern-day cocoa model. The chocolate that the consumer sees represents

only 30% of the potential value throughout the value chain. The remaining 70% of the cocoa pod remains unexploited. Int 10 claimed that one simply has to recover the pectin and the potassium carbonate inside the pod to make jams and other products. Even cocoa leaves can be used. Cocoa itself is a citrus fruit, so it is possible to make a cocoa juice, a cocoa vinegar, and many other products. Diversifying the product mix derived from the cocoa pod would ensure that the circular economy can be an effective solution to the problem of farming families failing to earn a living income (Brenner, 2018; Coulibaly & Erbao, 2019).

One plan of action would be for multinationals to establish a circular economy strategy for pectin to be purchased by the agri-food industry at a fair price. This income stream could build on the “€1 and some change” currently earned by farmers (Int 10). Experts, research and development teams, specialists, and scientists could put a lot of energy into such a strategy. The broad aim would be for the circular economy to significantly improve farmers' lives (Levänen et al., 2023; Savolainen et al., 2020; Waarts & Kiewisch, 2021).

Int 10 spoke of two examples that showed the global reach of circularity. The first was their participation at the Africa circular economy Forum in Abidjan in 2023. In their second example, Int 10 told the story of an ECBM start-up that harvests cocoa beans, multiplies the stem cells, and then makes chocolate in a laboratory. According to Int 10, this could be the future of the cocoa and chocolate industry:

“It is shocking, but it is science too. (This start-up) raised 4 million dollars a few years ago to... complete the project and (a university) has acted similarly. These are chocolate products made in the laboratory that do not require ecological transport, (excessive) deforestation, or (forced) child labour.”

The discussion illustrates that it is possible to transform the cocoa business model through science and technology (Bai et al., 2022; Kayikci et al., 2023; Kraft & Kellner, 2022; Toth-Peter et al., 2023). Therefore, the circular economy could arguably lead to a cocoa business model that truly values farmers and improves their lives (German Federal Ministry for Economic Cooperation, 2021; Ghisellini et al., 2023; Giller, 2020; Traoré & Dzifa Torvikey, 2022).

4.5.4. Summary: answer to research question 4

To summarize this section, research question 4 asked, “how could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d’Ivoire achieve circularity and maintain a living income?” To provide a complete answer to this research question, five sub-questions were asked.

4.5.4.1. *Farmers’ views on circularity and living income*

Farmers were first asked about their views on whether achieving circularity would enable them to maintain a living income. As shown in Figure 37, the farmers’ responses varied greatly, with a mean of 4.8, a median of 5, and a standard deviation of 2.31, indicating a range of uncertainty among farmers regarding the potential of circularity to help maintain a living income. This uncertainty highlights the challenges cocoa farmers face in resolving the living income problem, regardless of the solutions proposed. The complexity of this issue led to the exploration of new, more effective solutions by integrating findings from both the consumer questionnaire and SSI results. This led to the development of a new conceptual tool called the Fair Score Framework.

4.5.4.2. *Consumers’ willingness to increase farmers’ share*

One angle to assess the potential of circularity in addressing the living income challenge is to determine consumer willingness to increase the share of the price paid to farmers. Table 43 illustrates that after viewing an informational video about cocoa farming challenges, consumers in all countries (UK, Germany, France, USA, and the combined dataset of multiple countries including Switzerland and the Netherlands) increased the percentage they believe should be attributed to farmers. The combined dataset revealed an increase of 7.41%. The data in the independent country sets show the following increases to farmers’ pay, in descending order as follows - France up by 9.52%, Germany up by 7.84%, UK up by 7.07%, and the USA up by 6.67%. Given the researcher’s decision that any dataset with a Cronbach’s Alpha value between 0.6-0.9 was acceptable in terms of reliability, all the datasets had an acceptable level of reliability. The most reliable datasets were Germany at 0.713 and the combined dataset at

0.790, since both these values fell within the stricter target range of 0.7-0.8 Cronbach's Alpha. The change in the means suggests that consumers are prepared to change their view on what they believe farmers should be paid. This change also implies that a well-informed consumer base can play a pivotal role in ensuring farmers receive a fairer share of the profits.

Data from an SSI conducted with Int 10 provided a farmer-level blueprint that echoed the consumer-led adjustment shown in the *t*-test. Essentially, farmers who are afforded the opportunity of earning higher wages in ECBMs prioritize sending their children to school. Int 10's perspective supports the notion that the long-term effects of ECBM implementation could include improved education levels across the community and higher incomes for cocoa farming families. Although Int 10 did not explicitly mention this, existing literature suggests that the overall health of the population would also benefit (Pigeaud & Sylla, 2020; Sackou-Kouakou et al., 2021). These improvements in education, income, and health are likely to result from farming communities' enhanced ability to pursue entrepreneurial ventures (Doherty, 2021; Kouamé et al., 2020; Kouman et al., 2020; Yeboah et al., 2022).

4.5.4.3. *Consumers' understanding of entrepreneurship*

To explore the potential of leveraging ECBMs, it is important to understand how consumers define and perceive entrepreneurship. The SSI data revealed diverse interpretations of entrepreneurship. For example, Int 4 described entrepreneurship as identifying and building opportunities through partnerships to solve problems, while Int 7 emphasized creating both economic and social value. Int 10, on the other hand, highlighted that farmers are already the pioneering entrepreneurs but often face challenges due to, for example, the price-setting power of buyers. These differing views provide a broader understanding of how ECBMs could evolve to benefit cocoa farmers. One suggestion was for cocoa farmers to emulate winemakers and take on the role of transformation in the value chain.

4.5.4.4. *Circularity's role in reducing economic poverty*

When asked whether circularity could reduce economic poverty, interviewees expressed mixed views. Most agreed that circularity is designed to reduce waste, but opinions differed on whether it can address economic poverty. Int 3 raised concerns that circularity might be

exploited by powerful stakeholders for profit, without genuinely improving the lives of economically disadvantaged stakeholders in the value chain. Int 5 also questioned the relevance of circularity in the cocoa sector, arguing that it is difficult to apply due to the geographical separation between cocoa production and consumption. Nevertheless, some interviewees acknowledged that circularity could be an effective tool to empower farmers, if explicitly designed to reduce poverty.

4.5.4.5. *Leveraging ECBMs for cocoa farmers*

To address the challenge of achieving circularity and maintain a living income for cocoa farmers, several ECBMs were proposed. Interviewees suggested utilizing cocoa by-products to generate new income streams. For instance, Int 9 proposed using cocoa pod shells as compost and fruit pulp to create a cocoa-based juice. These by-products, previously discarded, could now be marketed to add value to the cocoa business and generate additional income for farmers. Similarly, Int 10 suggested diversifying the use of cocoa pod components, such as using the pectin and potassium carbonate inside the pod to create jams, or making cocoa juice, cocoa vinegar, and other products.

These examples highlight how leveraging ECBMs in the cocoa sector could provide new income streams for farmers, reducing waste and increasing the value derived from the entire cocoa pod. Furthermore, Int 10 suggested that powerful stakeholders (e.g. multinationals) could help create markets for these by-products (e.g. pectin), as long as the products are sold at a fair price. The potential for ECBMs to improve the cocoa business model was also illustrated by an example of a start-up creating lab-grown chocolate, eliminating the need for ecological transport, deforestation, or forced child labour. This showcases the possibility of transforming the cocoa business model through circularity, potentially leading to a more fair cocoa sector.

Further interpretation of research question 4 with respect to the existing literature is conducted in section 5.4.

This concludes the answer to research question 4. The collection of findings from this chapter, including the literature review, the farmer questionnaire, consumer questionnaire, and the semi-

structured interviews led to a suggested “Fair Score Framework,” which will be discussed in the next section.

4.6. Introducing the Fair Score Framework

This section introduces the Fair Score Framework (FSF), a conceptual tool designed to measure the fairness of value chains. The FSF is derived from insights gathered through the literature review, farmer and consumer questionnaires, and semi-structured interviews. Further development and operationalisation of the FSF will be explored in Chapter 5 (Discussion), where its application and potential impact will be examined in detail.

The Fair Score Framework (FSF) is inspired by two separate frameworks that were introduced in section 2.3.3 of the literature review: the Nutri-Score framework, and the OECD circularity scoreboard. The FSF assigns a level of fairness to a product. The Fair Score scale of fairness ranges from “A” to “E”, with “A” being most fair and “E” being least fair, on a relative scale. Table 44 illustrates how the scoring might work.

Table 44 Fair Score scoring method

Product	Fair Score (out of 100)	Fair Score Rating (A to E)
Chocolate bar	51-61	C
Cocoa powder	62-72	B
Cocoa butter	73-100	A

As shown in Table 44, a product’s “Fair Score” out of 100 is assigned a Fair Score rating. For example, a Fair Score between 51-61 (inclusive) would be categorized as a “C” Fair Score rating. A Fair Score between 73-100 (inclusive) would be categorized as an “A” Fair Score rating. What is not shown in Table 44 is that each Fair Score letter grade would be accompanied by a corresponding colour. For example, the colour green for “A”, to yellow for “C”, to red for “E”. The combination of a coloured letter grade would allow for improved consumer interaction at point of sale (Corvellec et al., 2022).

This whole section on the Fair Score Framework (FSF) will be further developed in sections 5.5.1 (explaining the FSF) and 5.5.2 (operationalising the FSF). The development and use of the FSF will be built upon the findings of the research.

This concludes the data analysis chapter and allows for a discussion of the research, which follows in the next chapter.

5. Discussion

This chapter provides an interpretation of the findings from Chapter 4 (Data Analysis). The discussion addresses each of the four research questions through the lens of consumption theory and the hypotheses from section 2.1. The chapter will explore the contribution to theory, particularly the operationalisation of the Fair Score Framework in section 5.5. Additionally, the chapter provides an overview of the research's dissemination strategies. A summary of the discussion concludes the chapter.

5.1. Interpretation of research question 1

The purpose of research question 1 was to identify the existing constraints of the Ivorian cocoa value chain. Based on the findings from section 4.2, and through the lens of Keynes's Absolute Income Hypothesis (AIH), students (lower income) are likely to consume a larger proportion of their income on cocoa products than staff (higher income). For cocoa farmers, particularly in the Ivorian context, lower-income consumers (e.g. students) may be more price-sensitive than higher-income consumers (e.g. staff). This creates a potential vulnerability in the value chain. As consumer income fluctuates (e.g. during economic downturns), cocoa demand might sharply decrease, impacting the livelihoods of cocoa farmers. The AIH could motivate farmers to cater to markets that are less price sensitive, ensuring stable incomes for farmers.

Through the lens of Friedman's Permanent Income Hypothesis (PIH), the consumption behaviour of higher-income consumers (e.g. staff) is less likely to be affected by immediate income changes. Instead, they base their purchasing decisions on their permanent income expectations (i.e. their ongoing financial stability). This group might be less likely to change consumption patterns even in the face of fluctuations in their income because their consumption decisions are based on long-term stability. In the context of the Ivorian cocoa value chain, if higher-income consumers maintain stable demand for cocoa products regardless of their short-term income changes, cocoa farmers might benefit from more predictable, less volatile, demand. However, if there is growing awareness around circularity, even higher-

income consumers could change their consumption patterns based on values. Thus, it can be argued that the cocoa industry needs to address circularity concerns to cater to this demographic.

Through the lens of Modigliani's Life-Cycle Hypothesis (LCH), younger consumers (e.g. students) tend to have lower incomes and might consume a larger proportion of their income, often prioritizing current consumption. However, over the course of their lives, as they age and their income rises (e.g. once they transition into full-time employment), they may save more and consume less proportionally. The age factor is critical here. Younger consumers are more likely to be price-sensitive and might reduce consumption if prices rise, which could impact cocoa demand in the short term. Older consumers with higher and more stable incomes may spend less on cocoa products, shifting the market demand toward higher-end cocoa goods. Farmers in the cocoa value chain might face market fluctuations due to changing consumption patterns over the life cycle of consumers. Younger consumers might be more inclined to purchase affordable chocolate products, but as consumers age and their incomes stabilize, they may seek premium chocolate, which could provide a more stable demand stream for cocoa farmers.

In integrating the three hypotheses, several implications can be interpreted. Lower-income consumers (e.g. students) may be more responsive to price changes, creating instability in demand. In contrast, higher-income consumers (e.g. staff) may be less affected by short-term income variations, suggesting that the cocoa industry could focus on stabilizing demand through high-quality, premium products targeted at these more consistent consumers. Higher-income consumers will likely continue purchasing cocoa products based on their long-term income expectations, which suggests that cocoa producers could focus on ethical production practices to appeal to this group's more long-term view on consumption. Younger consumers might spend a larger portion of their disposable income on cocoa products, but as they grow older, their consumption may decrease proportionally as they save more. Therefore, cocoa producers could target different market segments at different life stages, offering products that cater to changing preferences over the consumer's life cycle.

To conclude, by applying Keynes's AIH, Friedman's PIH, and Modigliani's LCH, it appears that the Ivorian cocoa value chain faces several demand and supply-side constraints. Understanding how income, permanent income, and age influence consumer behaviour could

help address supply-side challenges such as transport problems, a lack of bank branches close to farms, unstable world cocoa prices, difficult working conditions, forced child labour, excessive deforestation, and farmers' living income. Targeted interventions – such as promoting ethical consumption and catering to consumer preferences over the life cycle – could be effective in improving the cocoa business model. Data therefore showed that resolving these existing constraints requires the implementation of a specific concept, such as circularity. An alternative or additional framework that is fit for purpose could also be considered.

5.2. Interpretation of research question 2

The purpose of research question 2 was to understand the consumer's perception of the concept of value chain transparency. The following interpretation is based on the findings from section 4.3.

5.2.1. What does transparency mean to farmers?

The farmers' response to the question regarding the importance of knowing how cocoa is priced and sold on global markets yielded an average score of 4.04, with a standard deviation of 2.22 (see Table 20). This suggests a general lack of interest or an underappreciation of the significance of value chain transparency. Through the lens of Keynes's AIH – farmers, being at the lower end of the income scale, may prioritize immediate financial concerns over broader issues such as market transparency. As the farmers' primary concern is likely their current income rather than broader global pricing mechanisms, the low score could reflect apathy due to a lack of immediate economic benefit. However, the farmers who gave higher scores (between 8 and 10) seem to view market transparency as a means to demand higher farmgate prices – *prix bord champ* – or perhaps gain insight into the market dynamics that could influence their economic situation. This could suggest that as farmers' awareness and expectations about the pricing system are enhanced, they might see value chain transparency as a way to maintain a living income. Thus, it is not simply a matter of economic apathy; the farmers might be focused on immediate financial concerns, which override longer-term interests such as understanding the broader cocoa market structure. However, there is a clear

indication that if transparency leads to immediate economic benefits (such as higher prices for their cocoa), it might increase their interest in the global market.

In Table 21, which illustrates farmers' self-reported understanding of what happens to cocoa after it leaves the farm, the score of 2.20 with a standard deviation of 0.91 indicates a poor level of understanding. This low score could reflect a lack of transparency, potentially creating feelings of mistrust between farmers and other value chain stakeholders, as well as among farmers themselves. Through the lens of Friedman's PIH, this result could be explained by long-term income expectations. Farmers who are (or who feel) disconnected from the broader value chain might not perceive a significant link between their production and the global market. They might not have access to information that could help them understand the long-term implications of their actions within the value chain. The absence of this long-term knowledge might lead to lower expectations of improvement in their own economic situation. This would be consistent with Friedman's theory that consumers make consumption decisions based on their perceived long-term income.

For the farmers, if they believe that their long-term economic prospects are not significantly affected by understanding the broader value chain, they may have little motivation to invest in learning about these systems. Lack of transparency in the value chain might then reinforce a sense of resignation or helplessness, especially if they feel that the final price they receive for cocoa is dictated by factors they cannot influence. This reflects a mismatch between the farmers' immediate concerns (AIH) and their long-term income expectations (PIH), where a lack of understanding about the long-term process of cocoa's journey creates a sense of detachment and distrust.

In Table 22, farmers' trust in the fairness of the cocoa value chain is measured. The score of 2.00 and a standard deviation of 0.77 clearly indicates a lack of trust in the fairness of the cocoa value chain. This finding highlights the perceived inequities in the current structure of the value chain, especially regarding fair compensation for farmers. Here, Modigliani's LCH can be applied to explain why consumers (including farmers) might feel that they are not being compensated fairly. If farmers perceive that the current structure of the cocoa value chain results in unfair compensation for their labour, they may feel that their lifetime income will not improve without a more equitable distribution of the value chain's proceeds. The low level of trust in fairness also speaks to a lack of transparency in the broader market system, which might

prevent farmers from seeing how the value chain operates or where the discrepancies in compensations lie. If they had more visibility into the process, they might better understand the value of their contribution and demand fairer remuneration. This result suggests that farmers' consumption decisions could be shaped by their belief in fairness within the cocoa value chain. Since transparency plays a critical role in building trust, farmers might be more willing to engage in the value chain if they feel they can trust that their efforts will be fairly compensated. The lack of transparency here implies a breakdown of trust between different levels of the value chain, which affects farmers' long-term economic decisions.

5.2.2. What does transparency mean to consumers?

Trust and traceability emerged as important themes when consumers shared their views on what transparency means to them. Many consumers indicated the desire for clear information on product origins and workers' compensation. Through the lens of Keynes's AIH, consumers with higher disposable incomes are more likely to demand transparency because they can afford to prioritize ethical considerations over price. These consumers may be more interested in long-term ethical consumption and thus willing to invest in products that are traceable and transparent, even if it means paying a premium. In contrast, lower-income consumers might be less concerned with transparency because they cannot afford to pay the premium. For these consumers, price and immediate utility are likely more important than ensuring fair wages for workers, even if they would have preferred the latter to be included as the norm.

The responses from consumers also indicated that transparency means having information about product origins, production conditions, fair wages for workers, and the traceability of the product throughout the value chain. These consumer perceptions are tied to ethical consumption and circularity, with transparency seen as an important factor for establishing trust. Friedman's PIH helps explain consumer interest in value chain transparency. Consumers are often willing to pay more for ethically sourced products. Their consumption choices are influenced by the long-term benefits of supporting companies that align with their values. Consumers who expect higher lifetime income might prioritize buying from companies that demonstrate ethical behaviour in their value chain. Modigliani's LCH may suggest that younger consumers who happen to be more focused on long-term social welfare are more likely to value transparency as part of their lifetime consumption goals. These consumers are more

willing to support companies that share their ethical values, expecting that their consumption choices will lead to long-term positive social impact.

Overall, the consumer responses show that transparency can influence purchasing decisions, particularly in consumer markets where ethical consumption is on the rise. There is a pattern in the data suggesting that consumers are increasingly looking for transparency as part of a larger ethical consumption trend.

5.3. Interpretation of research question 3

The purpose of research question 3 was to determine the extent to which consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d'Ivoire. The following interpretation is based on the findings from section 4.4.

5.3.1. Farmers' choices of potential circular solutions

The findings in Figure 25 show that the most popular solution for achieving circularity among cocoa farmers was agroforestry (79.5%), followed closely by ethical trade certifications (55.8%) and upcycling by-products (54.9%). These opinions suggest that farmers are actively considering solutions that could provide long-term economic benefits, particularly through improved environmental sustainability and the efficient use of by-products. Keynes's AIH posits that consumers (or in this case farmers) will tend to spend a smaller proportion of their disposable income as their income rises. Applying the AIH to the cocoa value chain, this suggests that farmers may be more inclined to adopt sustainable practices such as agroforestry or upcycling by-products when they believe their overall income has reached a stable and high level. However, the adoption of these solutions may be constrained by farmers' immediate income needs. Agroforestry, while popular, likely involves a longer payback period, which could deter farmers who face immediate financial pressures. The reluctance to invest in solutions like renewable energy or water efficiency may reflect an undercurrent of insufficient disposable income or lack of immediate financial security, which is characteristic of the AIH.

The AIH also highlights the issue of opportunity costs – farmers must weigh the potential long-term benefits of sustainable practices against the immediate financial needs of their households. This aligns with the finding that while agroforestry was favoured, many farmers did not propose new circular business ideas, perhaps due to the high upfront costs and uncertain financial returns of implementing new practices. As such, the current financial constraints farmers face may limit their ability to consider innovative solutions, despite their long-term viability in supporting a living income.

The farmers' non-selection of water efficiency and renewable energy solutions, such as solar power, is an important finding. This could be interpreted in light of the economic theory. Friedman's PIH suggests that consumption decisions are driven not by current income but by expectations of future income. If farmers are hesitant to invest in water efficiency or renewable energy, it may indicate that they have a low level of confidence in their future income stability. This expectation of uncertain or low future income could discourage them from making substantial investments in practices that require significant upfront costs, such as solar energy systems or water-efficient technologies. Moreover, farmers might view these investments as long-term expenditures that do not provide immediate returns, which would be inconsistent with their focus on short-term income security. Since farmers in Côte d'Ivoire already face significant market volatility and income fluctuations (see Figure 18), their reluctance to adopt these solutions suggests they are making rational decisions based on their perception of future financial stability, or lack thereof. Thus, despite the potential of renewable energy and water efficiency to improve productivity in the long run, the immediate economic reality makes such investments seem too risky.

The farmers' repeated suggestions of *“to allow the commercialization of by-products”* and *“to receive training”* as potential circular business ideas reflect the need for more support and guidance in the implementation of circular practices. Modigliani's LCH suggests that consumers smooth their consumption and saving patterns over time, borrowing during income troughs and saving during peaks. For cocoa farmers, the ideas of training and commercialization opportunities signal an attempt to increase future income stability. By focusing on improving their skills (through training) and finding new markets for by-products (through commercialization), farmers are essentially aiming to increase their permanent income expectations (c.f. Friedman's PIH). The repeated requests for training also indicate that farmers are looking for ways to manage the uncertainty of their income over their life cycle.

By diversifying their income streams – whether through agroforestry, upcycling, or better utilization of by-products – they hope to stabilize their financial situation over time. This aligns with the LCH’s emphasis on smoothing consumption throughout life. Here, farmers seek knowledge and opportunities to ensure a steadier income stream, even in years when cocoa prices are volatile.

The farmers’ desire to learn more about circular solutions and improve their businesses can be seen as an effort to manage their expectations of future income, as per Friedman’s PIH. However, the fact that only a few farmers (16) suggested commercializing by-products, while 195 did not, may suggest that while there is an awareness of the potential benefits of circular practices, the uncertainty surrounding their success in local markets prevents many from proposing such ideas. This implies that farmers’ expectations of future income stability might not yet be strong enough to encourage widespread innovation or risk-taking.

In interpreting the farmer questionnaire findings through the lens of consumption theory, several implications can be inferred. Keynes’s AIH helps explain the farmers’ reluctance to adopt high-cost circular solutions like renewable energy. They are constrained by immediate financial pressures and may be less willing to make long-term investments unless their income is stable enough to bear such costs. Friedman’s PIH provides insight into why farmers may hesitate to invest in circularity solutions that require upfront costs. Their consumption decisions are likely based on their expectations of future income, and if these expectations are not positive, they will refrain from making such investments. Modigliani’s LCH suggests that farmers are seeking ways to stabilize their income over time, which is reflected in their desire for training and opportunities to commercialize by-products. However, a lack of immediate financial security and market uncertainty limits their ability to take full advantage of these opportunities.

Overall, the farmer questionnaire findings suggest that while there is an awareness of the potential benefits of circular practices, cocoa farmers’ current economic constraints and income expectations play a central role in determining the feasibility of implementing circularity within the cocoa value chain. This highlights the need for targeted interventions that address both supply-side constraints and consumer demand, particularly in helping farmers secure stable future income expectations through circular practices.

5.3.2. Consumer views regarding circularity's impact on farmers' living income

This section interprets consumer views on the impact of circularity on cocoa farmers' ability to achieve a living income. The AIH, PIH, and LCH are applied, with the understanding that most respondents in the consumer questionnaire were students aged 23 years old on average (see Table 19). This demographic detail alters the applicability of certain aspects of the theories, particularly regarding income and life-cycle considerations.

Keynes's AIH posits that consumer consumption decisions are driven by their current income. However, since most of the respondents in this part of the research are students - likely with lower current disposable income, as shown in Table 16 – the typical predictions of AIH may not apply to the same extent. Students are often in a phase where their current income does not reflect their long-term earning potential. This suggests that even though students might not have disposable incomes, their views may be influenced by other factors, such as demand for trust, traceability and transparency (c.f. selection of 17 answers after Figure 24). The relatively high mean scores for countries like the USA (mean=7.09 in Figure 29), where consumers typically have higher disposable incomes, might be indicative of students in these countries holding stronger beliefs in the role of circularity in enabling farmers to earn a living income. In contrast, France (mean=6.41 in Figure 27), the UK (mean=6.20 in Figure 26), and Germany (mean=6.14 in Figure 28) show slightly lower, but still notable support, which might suggest that even students in these countries value circularity.

Friedman's PIH suggests that individuals base their consumption decisions on their expected long-term income rather than their current income. For students, their permanent income is likely expected to be higher once they enter the workforce. Thus, their support for circularity may not be grounded in their present economic situation, but rather in their expectations of future income. Students, even with limited disposable income, may believe in the long-term investment value of circularity. These students may view circularity as essential for future social responsibility, even if they are not directly affected by current income disparities in the cocoa sector. The responses in France, the UK, and Germany, though slightly lower than in the USA, suggest that students are thinking beyond immediate income considerations. They may perceive circularity as a way to address global inequities over time. This would be in line with

the PIH, where future income expectations and long-term values influence current attitudes towards circularity.

Modigliani's LCH posits that individuals base their consumption and savings decisions on their life-stage. Given that most of the respondents in the consumer questionnaire are students with an average age of 23 (see Table 19), they are likely early in their life cycle, where income is expected to increase over time. The LCH would suggest that students, even though they currently have limited resources, might still see the value in supporting circularity if they anticipate higher future earnings and see long-term value in circular practices. The higher mean scores in countries like the USA (mean=7.09 in Figure 29) could be partially due to students in this country having a longer-term perspective, viewing circularity as an investment in future income equality in the cocoa value chain. This would reflect the LCH's emphasis on long-term planning. However, the slightly lower mean in France (mean=6.41 in Figure 27), the UK (mean=6.20 in Figure 26), and Germany (mean=6.14 in Figure 28), could suggest that, while these students still support the concept, their (potentially and) relatively lower expectations of future income may make them more cautious about how effective circularity would be in achieving a living income for cocoa farmers.

In interpreting the consumer questionnaire findings through the lens of consumption theory, several implications can be inferred. Keynes's AIH might explain why consumers with higher disposable income (like, perhaps, those in the USA) express stronger support for circularity. However, since most respondents are students, their support may stem less from their current income and more from their educational exposure to issues of global economic equity. Friedman's PIH explains why students might support circularity despite low current income. They are likely considering their future income prospects and the long-term societal benefits of circularity. Their belief in circularity's positive impact on farmers' income could reflect their expectations for a more circular and fair cocoa industry in the future. Modigliani's LCH aligns well with the student demographic. Even though they are at the beginning of their life cycle with limited current income, they may support circularity because they see it as a long-term solution to global challenges including a living income for cocoa farmers. Their future expectations likely influence their views on the longer-term impact of circularity.

Finally, the combined dataset (mean=6.48 in Figure 32) supports the idea that students across the six countries recognize the importance of circularity for cocoa farmers' living income.

However, they perhaps do so from a perspective shaped by values of social responsibility. Even in countries with lower average disposable incomes, students are likely focused on long-term solutions that circularity can provide. These students are likely informed by their educational background and future income expectations.

5.3.3. Measuring consumer commitment to circularity

The responses from the interviewees, who spanned a broad age range and were not students (see Table 14), provide valuable insights into measuring consumer commitment to circularity. The diversity in the interview sample enhances the applicability of the AIH, PIH, and LCH, as these theories are particularly relevant to different income levels and life-stage transitions, which can vary significantly across consumers outside the student population.

Keynes's AIH posits that consumption is primarily driven by current income levels. Int 4's observation that many consumers are unfamiliar with circularity may reflect this, as lower-income consumers normally prioritize affordability over circularity. Circular purchases, as noted by Int 4, may be "*accidental*," indicating that circularity is not a deliberate choice for many due to immediate income constraints. To accurately measure commitment to circularity, it is necessary to segment consumers by income levels. Higher-income consumers are more likely to engage in circular purchasing due to greater disposable income, while lower-income consumers may require targeted education and incentives to adopt circular behaviour.

Friedman's PIH argues that consumers base consumption decisions on long-term income expectations, not just current income. Int 11's suggestion to examine broader purchasing behaviour highlights this. A consumer committed to circularity would consistently incorporate circularity into all purchases, not just one product. This would align with the PIH, as consumers with stable or growing long-term incomes are more likely to make circular purchasing choices over time. For example, while a consumer may initially purchase a single circular product (e.g. circular chocolate), their broader commitment to circularity would depend on their perceived future income and financial stability. This would suggest that long-term income expectations influence their sustained commitment to circular consumption.

Modigliani's LCH emphasizes that consumption decisions are based on life stage. Given the wide range of interviewees (see Table 14), the LCH helps to understand how consumers' commitment to circularity varies across life stages. Younger consumers may initially show interest in circular products but may not fully commit due to income limitations. In contrast, older consumers with greater financial stability may be more inclined to integrate circularity across their basket of goods. Int 11's focus on examining purchasing behaviour across product categories reflects the idea that as consumers move through life stages and achieve greater financial stability, their commitment to circularity can strengthen to include more aspects of their consumption. This suggests that circularity could become a more integral part of consumption as consumers' income increases over their life cycle.

In applying these theories to the situation of Ivorian cocoa farmers, several implications can be inferred. If consumers' commitment to circularity is driven by long-term income expectations (PIH) or life-stage (LCH), the demand for circular cocoa products may increase as consumers progress through life stages and experience greater financial stability. In contrast, the AIH might suggest that immediate income constraints may prevent lower-income consumers from consistently choosing circular products, hindering their ability to support circular cocoa production. Thus, a successful transition to circular consumption would require addressing these income-related constraints and aligning the benefits of circularity with consumers' financial capacities across income groups and life stages.

5.4. Interpretation of research question 4

The purpose of research question 4 was to determine how entrepreneurial circular business models (ECBMs) could be leveraged so that cocoa farmers in Côte d'Ivoire achieve circularity and maintain a living income. The following interpretation is based on the findings from section 4.5.

5.4.1. Farmers' views on the effectiveness of circularity in securing a living income

Figure 37 shows that farmers' views on the effectiveness of circularity in securing a living income are mixed. With a mean of 4.8 and median of 5, the answers suggest that there is uncertainty and a lack of consensus among farmers regarding the impact of circularity on their income. The standard deviation of 2.31 indicates a significant variation in responses, which reinforces the idea that different farmers perceive circularity's benefits in very different ways. This variation could be due to several factors, as will be explored in the following paragraphs.

Keynes's AIH suggests that consumer spending is primarily a function of their current disposable income. As income increases, the marginal propensity to consume decreases, meaning people will spend a smaller proportion of their additional income as they become wealthier. The broad range of answers from the farmers (ranging from 1 to 10) could suggest that farmers' responses are influenced by their current income levels. If farmers are at the lower end of the income spectrum, they may be more concerned with survival and immediate consumption needs rather than investing in long-term circularity. The uncertainty reflected in the broad range of answers may stem from short-term financial pressures that prevent them from seeing the potential long-term benefits of circularity. Keynesian theory would suggest that immediate income constraints can make it difficult for farmers to invest in long-term changes like circularity, particularly if the benefits of circular practices seem distant or uncertain.

Friedman's PIH suggests that consumption decisions are based on a consumer's expected long-term income, rather than their current income. Consumers form their consumption decisions based on expected income over time, which means that short-term fluctuations in income will have little impact on consumption behaviour. Farmers were asked whether achieving circularity would help them maintain a living income, and their answers varied significantly, with a mean of 4.8 and standard deviation of 2.31 (see Figure 37). The variation in answers suggests that farmers' responses are likely influenced by their expectations of future income rather than their current income or the immediate impact of circularity. Those who expect a stable or increasing income in the future may see the adoption of circular business models as a positive long-term

investment, while those who expect income to remain uncertain or volatile may be more sceptical of the potential benefits. Friedman's theory helps understand that farmers' investment decisions in circularity might be based not only on immediate needs but on expectations of future stable cocoa prices and income. If farmers are pessimistic about the stability of cocoa prices (which is the case as shown in Figure 18), they may not be willing to invest in the upfront costs of circular practices.

Modigliani's LCH posits that consumers smooth out their consumption over their lifetimes, borrowing when income is low and saving when it is high. Applying this to farmers, those in the cocoa sector might experience periods of low income (e.g. during low season or when cocoa prices are low) and periods of higher income (e.g. during high season or when prices rise). The uncertainty expressed in the farmers' responses can be seen as an indication that some farmers are uncertain about their long-term income trends. If they expect cocoa prices to remain unstable, they might hesitate to invest in circularity, as the expected net return on investment is calculated as being too low in current settings. Modigliani's theory might suggest that farmers who are in a middle-income bracket may be more willing to invest in circular practices, as they would aim to smooth consumption and invest in the future, while younger farmers or older farmers (with less income stability) may not have the savings or access to credit to make these long-term investments.

Piketty argues that wealth accumulation disproportionately benefits the wealthy because the rate of return on capital ' r ' often exceeds the rate of return on output ' g ', which exacerbates inequality. This leads to systemic disparities in income and wealth, restricting the purchasing power of lower-income consumers. The variation in responses among farmers could be partially explained by systemic inequalities within the cocoa value chain. More powerful stakeholders in the cocoa sector (who benefit from capital returns, r) may receive far more from the industry's growth than the farmers (who largely rely on labour and have limited capital). Farmers in Côte d'Ivoire may perceive that no matter how much they adopt circular practices, the benefits are likely to be minimal without structural changes in the value chain that address inequalities. If the return to farmers is limited by factors outside their control (e.g. global market forces), then the uncertainty about circularity's effectiveness could stem from the belief that systemic inequalities will prevent any real income growth, regardless of adopting circular practices. Piketty's theory suggests that farmers might see circularity as a potential solution but

also may believe that without systemic reforms in the value chain, their income will remain relatively stagnant.

To summarize, Keynes's AIH might suggest that the variation in responses indicates that farmers are influenced by their current disposable income. Those facing immediate financial constraints may prioritize immediate consumption over long-term investments like circularity. Friedman's PIH might suggest that farmers' investment decisions in circularity are likely influenced by their long-term income expectations. Those with pessimistic views on cocoa market stability may be less inclined to adopt circular practices. Modigliani's LCH might suggest that farmers' ability to invest in circularity could depend on their stage in life and income fluctuations. Those with greater income stability (middle-aged farmers) may be more willing to invest in circular practices, whereas younger or older farmers may be more concerned with short-term financial stability. Piketty's critique of inequality suggests that farmers may view circularity with scepticism if they believe systemic inequalities in the cocoa value chain prevent them from benefiting properly, no matter their efforts. Overall, the broad range of responses to whether circularity could ensure a living income suggests that there are complex barriers – including immediate income constraints, uncertainty, and market inequalities – that would need to be addressed for circular business models to be viable for cocoa farmers in Côte d'Ivoire.

5.4.2. Would consumers increase the share paid out to cocoa farmers?

The data presented in Table 43 and dissected in the accompanying analysis reveals a clear shift in consumer attitudes regarding the percentage of the consumer price they believe should be allocated to cocoa farmers after watching an informational video¹¹. The core findings indicate that across the datasets for the UK, Germany, France, and the USA, consumers increased the percentage share allocated to farmers after watching an informational video that depicts the challenges faced by cocoa farmers. The most significant increase occurred in France (9.52%), followed by Germany (7.84%), the UK (7.07%), and the USA (6.67%). The combined dataset,

¹¹ Permission was obtained from the author (van de Velde, 2018, 2021) of the video, and the link (<https://vimeo.com/139873232>) was shared with respondents, who were requested to watch from 9:10 to 9:52.

which includes responses from all countries (including the Netherlands and Switzerland), shows an average increase of 7.41%.

Keynes's AIH suggests that consumption behaviour is strongly influenced by a consumer's current income. However, the demographic in the consumer questionnaire consists mostly of students aged 23 on average (see Table 19). These students are typically at an early stage in their life cycle with lower (see Table 16) and more variable incomes. As a result, the sampled students may be more price-sensitive and less likely to allocate a large percentage of their limited resources to supporting ethical consumption practices. Nevertheless, the data shows a significant shift after watching the informational video. This could indicate that students, despite their limited income, are still capable of adjusting their consumption preferences based on ethical considerations. The video likely prompted these younger consumers to empathize with the plight of cocoa farmers, causing a shift in how they perceive the fair allocation of resources in the cocoa value chain. The increase in the share allocated to farmers might thus be reflective of a desire among the students to support a cause they deem important, even if their financial capacity to do so is constrained. Given the lower incomes typical of students, this suggests that ethical consumption choices are not entirely dependent on having substantial disposable income, but rather on raising awareness and influencing values. The informational video likely helped students recognize the socio-economic challenges cocoa farmers face. This motivated the students to contribute more, even within the limits of their current financial situation.

According to Friedman's PIH, consumers base consumption decisions not on their current income, but on their expectations of long-term income. In the case of younger consumers, particularly students, it is plausible that they view their current income as subject to change as they progress in their education and career. As such, their consumption decisions are influenced more by their long-term expectations of income rather than their present financial constraints. For these students, the informational video might have caused a shift in their long-term thinking, making them more inclined to allocate a higher share of their consumption to cocoa farmers once they considered the broader, long-term impacts of their purchase decisions. The video likely reinforced the idea that by supporting fairer compensation for farmers, they are contributing to a more just future. This aligns with Friedman's theory, where consumers make decisions based on a perception of their future capacity to engage in ethical consumption, even if their current incomes are modest.

Modigliani's LCH posits that individuals base their consumption decisions on their entire life cycle, aiming to smooth consumption across their life stages. In this case, students, who are in the early stages of their life cycle, may not yet have reached the phase of stable, long-term income. Therefore, they might not be as inclined to think about smoothing consumption over their entire life in the same way that older consumers would. However, for younger consumers, the LCH might still be relevant, albeit in a modified form. As younger students, they are likely at a stage where they are forming habits and values that will shape their future consumption patterns. The informational video may have influenced their long-term perspectives, encouraging them to view their consumption choices as part of a broader, more global context that involves ethical considerations beyond immediate personal gain. Thus, students, even in the early stages of their life cycle, may be influenced by long-term social and ethical considerations rather than short-term financial constraints. Their decision to allocate a higher share of the consumer price to farmers can be viewed as an expression of their developing values, which could lead to more circular consumption patterns in the future. The educational intervention may have helped to shift (or reveal) their priorities toward ethical consumption, potentially impacting their future behaviours as they move into different life-cycle stages with more financial stability.

The Cronbach's Alpha values for the datasets (ranging from 0.669 to 0.815) indicate that the data is reliable, with the combined dataset showing a Cronbach's Alpha of 0.790, which falls within the stricter reliability range of 0.7-0.8. This reinforces the validity of the observed shift in consumer attitudes, suggesting that the increase in the percentage share allocated to farmers is a genuine reflection of the impact of the informational video, rather than a result of measurement errors.

The change in consumer behaviour – specifically the increased willingness to pay a higher percentage to farmers – suggests that entrepreneurial circular business models (ECBMs) could play a critical role in addressing the living income issue for cocoa farmers. Even among students, who may have limited financial resources, raising awareness of the challenges faced by cocoa farmers can result in greater support for initiatives aimed at ensuring farmers receive a fairer share of the consumer price. The example provided by Int 10, where farmers were able to invest in their children's education because they started to earn more money, illustrates some of the potential long-term benefits of ECBMs. These models can foster more ethical and

sustainable consumption patterns, even among younger, less financially established consumers (including farmers). By focusing on education and ethical engagement, ECBMs can drive higher consumer willingness to allocate more funds to farmers, leading to better outcomes for cocoa farming families and communities in the long run.

5.4.3. What does entrepreneurship mean to consumers?

Int 4 defines entrepreneurship as identifying and building opportunities through partnerships. This highlights a dynamic, opportunity-driven view of entrepreneurship where consumers use their resources and networks to address societal problems. This aligns with the concept of entrepreneurship as a process of responding to gaps in the market, where consumers view it as a way of solving economic and social challenges. Int 7 expands on this by describing social entrepreneurship, which moves beyond profit generation to creating social value. This perspective emphasizes a more holistic approach where economic value is balanced with societal impact. Int 10 defines entrepreneurs as agents of change who find solutions to societal problems. In this case, Int 10 sees farmers as pioneers of entrepreneurship, even if in a frequently unprofitable stage.

Keynes's AIH posits that consumers tend to make consumption decisions based on their current income, and that as their income rises, their propensity to spend the additional income diminishes. When applied to consumer understanding of entrepreneurship, this theory helps explain how consumers' willingness to support cocoa farmers in entrepreneurial ventures may vary based on their income levels. In the context of cocoa farmers transitioning from raw production to more entrepreneurial ventures, such as transformation (as per Int 10), consumers' willingness to pay a premium for ethically produced cocoa products is likely to depend on their current disposable income. Int 4 defined entrepreneurship as *"identifying and building opportunity... through partnerships to address a particular problem or need,"* which emphasizes value creation and problem-solving. Consumers who agree with this definition may be more willing to pay a higher price for such value, especially if they can afford it. However, the AIH suggests that consumers' willingness to support these entrepreneurial efforts may not be universal. Consumers with higher income may show more interest in supporting cocoa farmers who adopt these new entrepreneurial practices, while those with lower income may be more price-sensitive and less inclined to prioritize ethical considerations. For example,

wealthier consumers might support the entrepreneurial endeavors that Int 7 - who mentions “*creating societal value*” – describes, but consumers with lower income may be less willing to pay the associated premium, as their consumption decisions are driven by more immediate financial needs.

Friedman’s PIH suggests that consumers make consumption decisions based on their expected long-term income rather than their current income. If consumers perceive the purchase of ethically produced cocoa as a way to support long-term sustainability and societal value, they may be willing to engage in this behaviour even if their current income is not high. Int 7 articulated the idea of ‘social entrepreneurship’, explaining that it is about creating value beyond just economic benefit for the company. This broader, more holistic, definition of value creation may appeal to consumers who are considering long-term societal impact, rather than just short-term financial gain. As Int 7 noted, entrepreneurship is about “*creating societal value*,” which could resonate with consumers who anticipate that their purchases will contribute to the long-term wellbeing of cocoa farmers and indeed the industry. Even if a consumer’s current income is modest, they may still be willing to purchase from companies supporting these entrepreneurial ventures, believing that the long-term societal benefit (e.g. circular farming, improved livelihoods for farmers) justifies a higher price. For example, consumers who believe in the long-term benefits of supporting transformation in the cocoa sector, as discussed by Int 10, may view their purchase as an investment in the future of cocoa farming, even if their current financial situation does not allow for significant increases in consumption.

According to Modigliani’s LCH, consumers adjust their consumption based on their life stage. Consumers who are in the earlier stages of their life cycle, with less financial security, may prioritize affordability, while those in later stages, with greater financial stability, may be more likely to support entrepreneurial ventures such as those in the circular cocoa industry. Int 10 defined entrepreneurship as finding “*solutions to a given problem*.” This reflects the idea of long-term sustainability, which may appeal to consumers at different life stages. Consumers who are further along in their life cycle, who may have more disposable income, could be more likely to support cocoa farmers engaged in transformation, for example. These consumers are more likely to prioritize the long-term benefits of entrepreneurial circular farming practices, as Modigliani’s LCH suggests. For example, older consumers with stable incomes might be more inclined to pay a higher price for cocoa products that support the entrepreneurial circular efforts

of farmers, as they are in a stronger financial position to do so. Younger consumers, who might be in the early stages of their careers, could be more constrained by limited income and more concerned with price, potentially resulting in lower willingness to support higher-priced cocoa products.

From the data, it is clear that consumer understandings of entrepreneurship are shaped by varying definitions of value creation. Int 4 and Int 7 both focus on the importance of solving problems and creating value, with Int 7 particularly noting the shift to creating “*societal value*” through entrepreneurship. These definitions suggest that consumers who value ethical and social outcomes might be more open to paying a premium for products that reflect these values. However, the extent to which consumers are willing to support such efforts likely depends on their income and life cycle stage. According to Keynes’s AIH, consumers with higher incomes are more likely to support these entrepreneurial initiatives, while those with lower incomes will be more price sensitive. Friedman’s PIH suggests that consumers who believe in the long-term societal benefits of supporting entrepreneurial circular ventures might still be willing to pay more, even if their current income is limited. Modigliani’s LCH further emphasizes that older, more financially secure consumers are more likely to support ECBM initiatives, as they have more disposable income and can prioritize long-term value over immediate financial constraints.

5.4.4. Could the circular economy be designed to reduce economic poverty?

The question at hand revolves around whether the circular economy, which is primarily focused on reducing waste, can also reduce economic poverty. A key theoretical underpinning here can be drawn from Maslow’s hierarchy of needs (Maslow, 1943), which theorizes that economic poverty leads to the deprivation of an individual’s full potential. In this context, circular economy models could potentially help elevate individuals from lower levels of Maslow’s pyramid, such as basic needs, toward higher-order needs, by creating opportunities for greater income and resource access. According to Int 3, circularity is indeed designed to reduce waste, which aligns with the theory proposed by Kirchherr et al. (2017, 2023) and Morsetto (2020) that circularity’s primary aim is to minimize resource waste and maximize efficiency. Int 3 also acknowledges the connection between economic poverty and wasted potential (Maslow, 1943),

indicating that while circularity can address resource efficiency and waste reduction, it does not necessarily translate to a direct reduction of economic poverty. This critique suggests a potential conflict between the profit-driven nature of circularity and the social empowerment of economically marginalized consumers. The concern raised by Int 3 aligns with the idea that circularity efforts may, in practice, serve the interests of powerful stakeholders who prioritize resource efficiency and profit over equitable poverty alleviation (Kravchenko et al., 2019; Sinkovics et al., 2021). This draws attention to the risk that economic empowerment for marginalized groups may not be the central concern for firms adopting circularity, but rather a secondary or incidental benefit.

The concept of economic poverty as a form of wasted potential (Maslow, 1943) is important in understanding the broader social impact of ECBMs. Int 3's perspective that circularity may be used primarily for resource efficiency rather than explicit poverty alleviation aligns with Keynes's (2018) theory of income and employment, where consumer spending is linked to effective demand and economic growth. If ECBMs, especially those within sectors like cocoa production, do not directly address income distribution (Piketty, 2017), they risk failing to uplift economically disadvantaged groups. This may highlight the chronic underdevelopment of certain sectors, including aspects of the cocoa business model, where farmers face low margins and limited control over pricing (a form of economic poverty).

Int 5, when discussing the relevance of circularity to the cocoa sector, expressed doubts by stating that cocoa is produced in one location but consumed elsewhere, implying a disconnect between circularity's ideal of localized cycles and the fragmented nature of the global cocoa value chain. This comment suggests that location-specific contexts – such as those emphasized by the 3 P's framework of the circular economy (People, Policies, and Places) – must be carefully considered when applying circular principles to a global commodity like cocoa. Modigliani's LCH can be useful in this regard as it emphasizes consumption smoothing over time based on lifetime income. This would suggest that without attention to the broader socio-economic systems in which cocoa farmers operate, circularity might not offer the stability or income opportunities necessary to break the cycle of poverty. Thus, the disconnect between production and consumption in the cocoa sector presents a challenge for applying circularity principles that typically emphasize the localization of value chains. This contradiction may echo the opportunistic use of circularity raised by Int 3, where firms may leverage circularity principles not to help farmers directly, but rather to improve value chain efficiency or brand

image. This would align more with Keynes's AIH, where consumer spending or investment decisions are driven by the broader economic context, not necessarily by direct poverty alleviation efforts.

Both Int 3 and Int 5 express concerns about the intent behind circular economy adoption. Int 3's scepticism regarding circularity's ability to reduce economic poverty suggests a potential mismatch between the stated objectives of circular models and the actual outcomes for marginalized populations. This is particularly relevant to Friedman's PIH, which posits that consumers' consumption behaviour is driven by their long-term expectations of income rather than by temporary fluctuations. Therefore, if circularity efforts in cocoa do not result in stable, predictable income or long-term benefits for farmers, they may fail to sustainably reduce economic poverty, even if they reduce waste. The critique by Int 3 about the appropriation of circularity for profit-driven motives can be connected to Eisenreich et al.'s (2022) assertion that corporate social responsibility may sometimes be motivated by branding goals rather than genuine commitment to economic equity. This insight points to the need for circular models to incorporate social value explicitly if they are to align with goals of poverty alleviation and true economic empowerment.

In summary, the responses from Interviewees 3 and 5 provide an insightful critique of circularity in the context of cocoa production. While circularity can effectively reduce waste – as suggested by Kirchherr et al. (2017, 2023) and Morseletto (2020) – it appears that its ability to reduce economic poverty is not guaranteed. According to Keynes (2018), a consumption-driven economy requires stable income levels and government intervention to maintain aggregate demand, which can indirectly reduce the risk of poverty by ensuring a minimum level of economic security. Without careful attention to the intent behind ECBMs, circularity in the cocoa sector risks becoming an abstract ideal rather than a practical solution for farmers' living income. Thus, to reduce economic poverty, circular models must integrate not only sustainability and waste reduction but also clear social and economic empowerment objectives for farmers. This calls for intentional policies that align circularity with poverty alleviation goals, ensuring that those most affected by economic hardship can benefit from these models. It is proposed that such policies be informed by the Fair Score Framework (please see section 4.6, section 5.5.1, and section 5.5.2).

5.4.5. How could entrepreneurial circular business models be leveraged?

In answering how entrepreneurial circular business models (ECBMs) could help Ivorian cocoa farming families achieve and maintain a living income, two private sector interviewees (Int 9 and Int 10) offered examples of circularity that could create new income streams from previously discarded cocoa by-products. These insights can be analysed using Keynes's AIH, Friedman's PIH, and Modigliani's LCH to understand how ECBMs may impact cocoa farmers' incomes.

Keynes's AIH posits that consumption is primarily determined by current income. According to this hypothesis, an increase in income leads to an increase in consumption, but this is subject to diminishing marginal propensity to consume as income rises (Keynes, 2018). In this context, Int 9's suggestion of using cocoa pod shells as compost and cocoa pulp to make cocoa-based fruit juice provides an immediate increase in income for cocoa farmers. These products, which were previously considered waste, now become a source of additional revenue, increasing the disposable income of the farmers. If this additional income is significant enough, it would align with the AIH, where the farmers' consumption behaviour could shift toward higher consumption, assuming the additional income generated is not just saved but used to meet immediate consumption needs. Thus, ECBMs can directly affect farmers' economic well-being and consumption through additional income generation from otherwise discarded by-products (Bigliardi & Filippelli, 2021). However, as per the AIH, the amount of increase in consumption would depend on how substantial these new income streams are relative to farmers' existing income levels.

Friedman's PIH argues that consumers base their consumption decisions on their permanent income rather than current income, meaning that they adjust their consumption based on expected long-term income rather than short-term fluctuations (Friedman, 2020). In the case of cocoa farmers, ECBMs such as the ones suggested by Int 10, which involve monetizing the entire cocoa pod (70% of which is currently wasted), could lead to a more stable and predictable long-term income for farmers. The sale of by-products such as pectin, cocoa leaves, or cocoa-based juices could contribute to a consistent income stream that cocoa farmers can rely on, even in years when cocoa prices are volatile or low. From a PIH perspective, the establishment by powerful stakeholders such as multinationals of a circularity strategy that involves selling

by-products at fair market prices could signal to cocoa farmers that their income will be more stable in the long run. This stability could encourage them to adjust their permanent income expectations, leading to more predictable consumption patterns, as they can rely on continuous cash flow from several sources, not just from the sale of cocoa beans. This reinforces the proposition that ECBMs can provide new, steady income streams for farmers, which could allow them to consume more consistently over time, irrespective of market fluctuations.

Modigliani's LCH posits that consumers plan their consumption and savings over the course of their lifetime, aiming to smooth consumption despite income fluctuations (Modigliani, 2005). From this perspective, cocoa farmers would likely focus on long-term financial stability and planning for future consumption. The introduction of an ECBM in cocoa farming, as suggested by Int 10, where the entire cocoa pod is used and monetized, could enable farmers to accumulate savings and smooth their consumption over their lifetime. This model may provide farmers with a more diversified income base, which can support consumption during periods of low income or unexpected expenses, such as during low season or in years when the cocoa crop fails. By incorporating multiple revenue streams (such as cocoa juice, jams, and vinegar from cocoa pods), cocoa farmers could better balance their income over time. They would not have to rely solely on the bi-seasonal cocoa harvests, which are often unstable, but could instead manage long-term income expectations that match their consumption needs, thus enabling them to plan more effectively for the future. The proposition that ECBMs can stabilize income and improve long-term financial security aligns with Modigliani's theory. A more diversified approach to farming can help farmers smooth their income over their life cycle, enabling them to manage future consumption needs more effectively.

In summary, the entrepreneurial circular business models (ECBM) proposed by the interviewees, such as utilizing cocoa pod by-products to create compost, fruit juice, or other value-added products, can play a significant role in increasing the income of cocoa farmers. This could, in turn, support both immediate and long-term consumption patterns. Through the lens of Keynes's AIH, the introduction of additional income streams via ECBMs could impact current income, leading to increased consumption and improved quality of life for farmers. According to Friedman's PIH, an ECBM that provides stable, long-term income from diversified by-products can help provide a more predictable financial future, allowing farmers to plan their consumption and savings based on their permanent income. Based on Modigliani's LCH, by stabilizing income over time, ECBMs could enable cocoa farmers to engage in long-

term financial planning, ensuring that they can smooth consumption throughout their lives, even in the face of unpredictable income from cocoa farming alone. In all, leveraging entrepreneurial circular business models within the cocoa farming sector can enhance income stability and provide a pathway toward sustainable consumption for farmers, ultimately leading to improved economic welfare and poverty alleviation. These findings align with the broader objectives of circular economies in creating sustainable, long-term income streams while also addressing societal needs.

However, while ECBMs have the potential to enhance income stability for cocoa farmers, they will need to be designed with clearly integrated objectives aimed at value chain fairness. If ECBMs are to create a new cocoa business model that truly improves farmer livelihoods, it is proposed that they be leveraged to full effect by following the Fair Score Framework (please see section 4.6, section 5.5.1, and section 5.5.2).

This concludes the interpretation of the research questions. The following sections will elaborate on the research's contribution to theory and dissemination strategies.

5.5. Contribution to theory

The research contributes to theory by introducing a new conceptual tool named the “Fair Score Framework” (FSF). The FSF is inspired by two separate frameworks that were introduced in section 2.3.3 of the literature review: the Nutri-Score framework (Carruba et al., 2022; Hau & Lange, 2023; Peters & Verhagen, 2022), and the circularity scoreboard for cities developed by the Organisation for Economic Cooperation and Development (OECD, 2020, 2022). As stated at the end of section 4.6 of the data analysis chapter, the development and use of the Fair Score Framework will now be elaborated upon.

5.5.1. Explaining the Fair Score Framework

The Fair Score Framework (FSF) is a new conceptual tool that can be used to measure the fairness of a value chain. The FSF can display this information to consumers in the form of a

user-friendly overall score. The FSF score could become a front-of-pack, value chain-fairness, label.

The FSF is based on a scale of 5 colours and letters, where “A” is green to represent the best level of fairness while “E” is red to indicate the worst level of fairness. For any given value chain, the “Fair Score” out of 100 points is calculated using ten criteria, supported by literature. The value chain being evaluated is assigned a colour and letter according to the resulting score. The FSF letter grades and colours, which were briefly introduced in section 4.6 of the data analysis chapter, could be set up as shown in Table 45.

Table 45 Fair Score Framework (FSF) letter grades and colours

FSF score out of 100	FSF letter grade and colour
73-100	A (Green)
62-72	B (Light Green)
51-61	C (Yellow)
40-50	D (Orange)
0-39	E (Red)

In Table 45, the ranges 0-39, 40-50, 51-61, 62-72, and 73-100 are suggested for each of the five categories of FSF scores: “A” (Green), “B” (Light Green), “C” (Yellow), “D” (Orange), and “E” (Red). Using Table 45 as point of reference, the following example applies.

A value chain has scored a total of 83 out of 100 points, based on specific criteria and indicators, which places the value chain in the “A” (Green) Fair Score-category (i.e. the most fair category). This is illustrated in Figure 38.

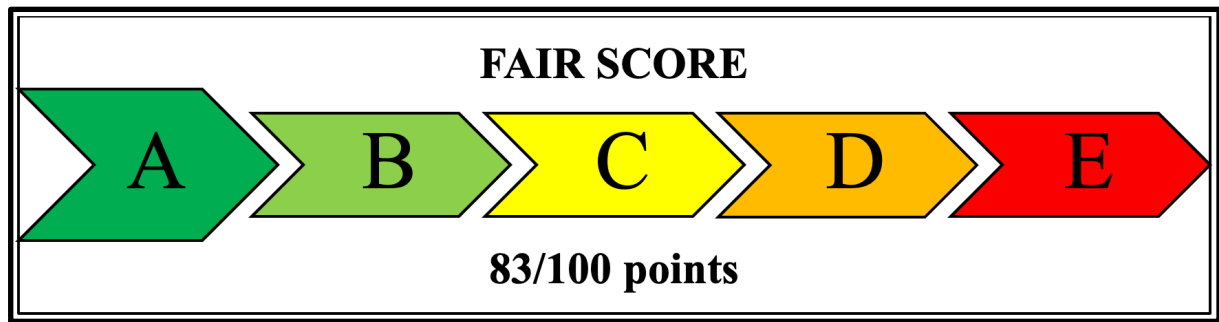


Figure 38 Fair Score Framework example of an "A" (Green) grade value chain

In Figure 38, the score of 83 points out of 100 could be awarded using a process illustrated in Table 46:

Table 46 Example of a value chain scoring an “A (Green)” using the Fair Score Framework (FSF)

Criterion	Indicators based on research	An example of scores out of 10 (where 1 is worst and 10 is best)
Criterion 1	Indicator 1.1	8
Criterion 2	Indicator 2.1 Indicator 2.2	8
Criterion 3	Indicator 3.1 Indicator 3.2	7
Criterion 4	Indicator 4.1	9
Criterion 5	Indicator 5.1 Indicator 5.2	9
Criterion 6	Indicator 6.1 Indicator 6.2	9
Criterion 7	Indicator 7.1	8
Criterion 8	Indicator 8.1 Indicator 8.2 Indicator 8.3	7
Criterion 9	Indicator 9.1 Indicator 9.2	9
Criterion 10	Indicator 10.1	9
	Total Score out of 100	83
	Fair Score letter A to E	A (Green)

Table 46 shows how an FSF score could be calculated for an “A” (Green) grade value chain, based on specific criteria and indicators. In the following paragraphs, the FSF is used to measure the fairness of the modern-day Ivorian cocoa value chain, using criteria and indicators according to findings in the research. After careful study, the modern-day Ivorian cocoa value chain might yield 23/100 points, a rating of “E” (Red), as shown in Figure 39:

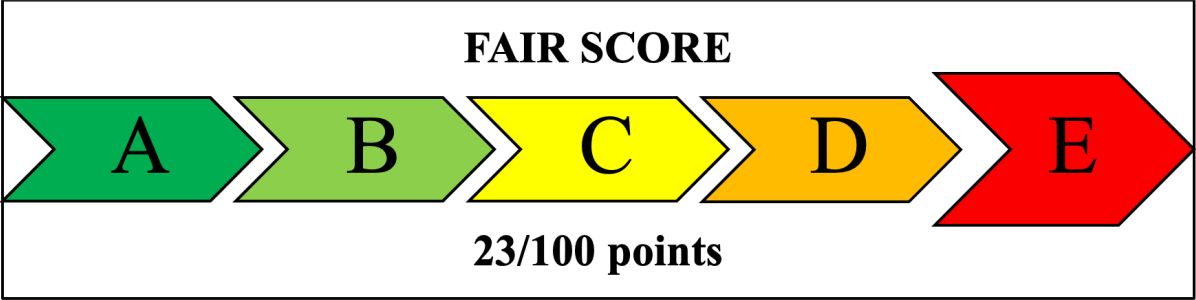


Figure 39 Application of the Fair Score Framework to the modern-day Ivorian cocoa value chain

The rating of 23/100 in Figure 39 has been calculated using the specific criteria and indicators shown in the first two columns of Table 47. The scores in the third column are estimations based on the knowledge gained from the research.

Table 47 Application of the Fair Score Framework to the modern-day Ivorian cocoa value chain

Criterion	Indicators based on current research	Estimated score out of 10 (where 1 is worst and 10 is best)
1. Farmer's Pay	Cocoa farmers achieve and maintain a living income (Anker & Anker, 2017; Giller, 2020; van Vliet et al., 2021).	1
2. Transparency	Value chain transparency is used as a tool to gain competitive advantage (Kraft et al., 2022; Montecchi et al., 2021; Porter, 2008).	2
3. Circularity	The value chain is circular; it aims to reduce the waste of resources in all its forms (Kirchherr et al., 2023; Morsetto, 2020; Shevchenko et al., 2023).	1
4. Forced Child Labour	There is no forced child labour (Thévenon & Edmonds, 2019; Traoré & Dzifa Torvikey, 2022; Wayoro, 2023).	1
5. Excessive Deforestation	There is no excessive deforestation (Renier et al., 2023; Yao et al., 2023; zu Ermgassen et al., 2022).	1
6. Entrepreneurial Circular Business Models	Entrepreneurial circular business models are operating profitably (Blanchard et al., 2021; Lahti et al., 2018; Suchek et al., 2022).	2
7. Individual's Full Potential	The full potential of individuals is not wasted (Derrer-Merk et al., 2022; Halkos & Aslanidis, 2023; Maslow, 1943).	1
8. Sustainable Development Goals	The value chain achieves the UN SDGS (Sachs et al., 2019; Staritz et al., 2022; United Nations Department of Economic and Social Affairs, 2023).	2
9. Demand	The level of consumer demand for the product and/or service justifies the operation of business (Friedman, 2020; Keynes, 2018; Modigliani, 2005).	9
10. Common Good	The value chain serves the common good (OECD, 2020, 2023; Sachs et al., 2019; United Nations Department of Economic and Social Affairs, 2023).	3
	Total score out of 100	23
	Fair Score letter A to E	E (Red)

In Table 47, the modern-day Ivorian cocoa value chain has been given a rating in each of the 10 criteria of the FSF. Adding the points in each criterion together yielded a total FSF score of 23 out of 100, which falls in the category of an “E” (Red) grade.

In this instance, the FSF has been applied to the cocoa value chain. However, if successful, the FSF could be applied in a multitude of sectors. Furthermore, just as the Nutri-Score framework has been implemented in France, Belgium, Spain, and other nations (Deschasaux et al., 2020; Hercberg et al., 2022; van der Bend et al., 2022), so too could the Fair Score Framework be adopted in multiple countries.

The public needs a simple value chain fairness label for the following reasons: vulnerable value chain actors (e.g. farmers in the case of the cocoa value chain) fail to maintain a living income despite recent efforts (such as the Living Income Differential) to resolve this problem (Gboko et al., 2021; Staritz et al., 2022; van Vliet et al., 2021). Given that the Nutri-Score label can help consumers shift to healthier diets (von Philipsborn et al., 2019; World Health Organization Regional Office for Europe, 2015), perhaps the Fair Score Framework could support consumers in purchasing from fairer value chains.

If the FSF could imitate the Nutri-Score nutritional label, an efficient value chain fairness label should, according to experts, a) be colour-coded (Bogliacino et al., 2023; Enax et al., 2016; Sah et al., 2021) to help consumers compare the fairness of several value chains and b) be applied to as many products as possible and give both positive and negative evaluations (BEUC The European Consumer Organisation, 2024; Talati et al., 2019; Ter Borg et al., 2021).

Finally, this section has shown a simplified version of the FSF, using one indicator per criterion. Each criterion could be weighted by using multiple indicators, a procedure that could potentially be developed in future research.

5.5.2. Operationalising the Fair Score Framework

In the context of the research, operationalising the Fair Score Framework refers to putting theory into practice. It is proposed that the operationalisation of the FSF be based on the indicators of the United Nations Sustainable Development Goals (UN SDGs). These goals

provide a global action plan aimed at achieving sustainable development. This contrasts with consumption theory, which is a theoretical framework that provides models to analyse economic behaviour. This section is composed of five parts: basing the operationalisation of the FSF on the indicators of the UN SDGs, local knowledge – applying the FSF in Côte d’Ivoire’s cocoa value chain, constraints in remote farming regions, recent developments in Côte d’Ivoire, and matching the FSF criteria with SDG goals, targets, and indicators.

5.5.2.1. *Basing the operationalisation of the FSF on the indicators of the UN SDGs*

The FSF and SDGs serve distinct yet complementary purposes. The FSF measures the fairness of a value chain and displays this information to consumers in the form of a user-friendly overall score, specifically adjusted for industries such as cocoa. In contrast, the SDGs are a broad set of global goals aimed at achieving a more sustainable future for everyone on earth (Sachs et al., 2019; United Nations Department of Economic and Social Affairs, 2023), and encompassing issues such as the eradication of poverty, the reduction of inequalities, and the management of climate change (Herrero et al., 2021; Leal Filho et al., 2021). While the FSF is designed for practical implementation in multiple countries and value chains, including cocoa, the SDGs provide overarching, long-term objectives for global sustainable development.

Table 48 shows how the SDGs relate to the supply-side constraints of the cocoa value chain identified in section 2.2 of the literature review. A check mark indicates the applicability of each SDG to a particular constraint.

Table 48 Matching the 17 SDGs with the identified cocoa value chain constraints (Renier et al., 2023; Staritz et al., 2022; Traoré & Dzifa Torvikey, 2022; United Nations Department of Economic and Social Affairs, 2023)

Sustainable Development Goals	Cocoa value chain constraints		
	Forced child labour	Excessive deforestation	Farmers failing to maintain a living income
1: No poverty	✓	✓	✓
2: Zero hunger	✓	✓	✓
3: Good health and well-being	✓	✓	✓
4: Quality education	✓	✓	✓
5: Gender equality	✓	✓	✓
6: Clean water and sanitation	✓	✓	✓
7: Affordable and clean energy	✓	✓	✓
8: Decent work and economic growth	✓	✓	✓
9: Industry, innovation, and infrastructure	✓	✓	✓
10: Reduced inequalities	✓	✓	✓
11: Sustainable cities and communities	✓	✓	✓
12: Responsible consumption and production	✓	✓	✓
13: Climate action	✓	✓	✓
14: Life below water	✓	✓	✓
15: Life on land	✓	✓	✓
16: Peace, justice, and strong institutions	✓	✓	✓
17: Partnerships for the goals	✓	✓	✓

Table 48 shows how the SDGs apply to each of the cocoa value chain's identified constraints of forced child labour, excessive deforestation, and farmers failing to maintain a living income (Fritsche et al., 2020; Marchetti et al., 2020). This alignment suggests that achieving the SDGs could simultaneously resolve these constraints (Delabre et al., 2020; Lambin & Furumo, 2023; Octavia et al., 2022; Veldhuizen et al., 2020).

However, the concept of sustainability presents numerous implementation issues (Grafton et al., 2023; Pizzi et al., 2020; United Nations, 2023a). For example, sustainability certifications can sometimes give the impression of progress in reducing poverty and deforestation, while the reality may be different. This disparity leads to a loss of trust in sustainability certification schemes (Lock & Alexander, 2023).

Given the SDG deadline of 1st January 2030 (United Nations, 2023b), less than five years away, innovative solutions are needed to meet these goals in time (Berrone et al., 2023). One such solution is to revolutionize data reporting methods (Ballerini & Bergh, 2021; Fraisl et al., 2020; González et al., 2023). According to Fritz et al. (2019), the SDG indicators could be fed by a combination of traditional data (e.g. National Statistics Offices, World Bank, OECD, WTO, ILO) and new sources of non-traditional data (e.g. satellite imagery, mobile phone records, financial data, weather stations, and citizen-generated data).

Thus, the operationalisation of the FSF, aligned with the SDGs, presents an opportunity to enhance consumer awareness and foster the purchase of products from fairer value chains. If successful, the FSF could contribute to achieving the SDGs by the 2030 deadline.

5.5.2.2. *Local knowledge – applying the FSF in Côte d'Ivoire's cocoa value chain*

As confirmed by Int 12, the concept of *prix bord champ* (farmgate price) is both well-known and well communicated across Côte d'Ivoire, even among farmers in remote areas. When farmers decide to sell their cocoa for less than the *prix bord champ*, they are aware of the loss in potential earnings. However, at the point of sale, no receipt or invoice is exchanged, which reduces transaction transparency. This lack of documentation complicates the management of cocoa sales, as there is no formal record to track the details of the transaction. In a revised

model, the client (often known as the *pisteur*) could respect a culture where not only the beans are exchanged but also a receipt for the transaction. Improved tracking of transactions in remote areas could also lead to increased tax revenue for the Ivorian government.

The *prix bord champ* is typically 1,000 F CFA per kilogramme of cocoa beans, although this price can fluctuate depending on the time of year and whether the beans are certified. Farmers in remote locations often sell their beans for a lower price, around 400 F CFA per kilogram, rather than the 1,000 F CFA they should be earning.

The maximum capacity of a truck transporting cocoa beans is 40 tonnes. If all 40,000 kg of beans in a truck are sold at the *prix bord champ* (1,000 F CFA per kg), the total payment for the cocoa would amount to 40 million F CFA. To provide context for an international audience, Table 49 shows the equivalent amounts in selected currencies:

Table 49 Farmers' revenue from selling 40 tonnes of cocoa beans (www.xc.com, 2025)

Currency	Revenue at 400 F CFA per kg	Revenue at 1,000 F CFA per kg	Potential increase
CFA Francs XOF	XOF 16 million	XOF 40 million	XOF 24 million
British Pound Sterling GBP	£ 20,176	£ 50,440	£ 30,264
Euro EUR	€ 24,384	€ 60,960	€ 36,576
US Dollar USD	\$ 25,600	\$ 64,000	\$ 38,400

The second column in Table 49 shows the revenue that farmers currently earn when they agree to sell their cocoa beans below the *prix bord champ*, which occurs very frequently. The third column shows the value of 40 tonnes of cocoa beans, priced at the *prix bord champ* rate of 1,000 F CFA per kilogramme, converted into selected international currencies. The fourth column shows the potential increase in revenue if farmers sell at the *prix bord champ* rather than at the lower price they (reluctantly) accept currently.

5.5.2.3. *Constraints in remote farming regions*

In remote regions in Côte d'Ivoire, an important constraint impeding the sale of cocoa beans at the proper *prix bord champ* is the severe lack of liquidity. This issue stems from limited access to financial institutions, such as banks and ATMs, and a general lack of cash flow within rural areas. As a result, many farmers are unable to negotiate the correct price for their beans, often accepting lower payments due to immediate financial pressures or limited access to markets.

This issue increases the economic vulnerability of small-scale farmers and represents a significant challenge in the sustainable development of the cocoa sector. The lack of liquidity precludes the fair compensation for farmers. This, in turn, limits farmers' ability to reinvest in sustainable practices that could improve the long-term viability of the cocoa value chain.

5.5.2.4. *Recent developments in Côte d'Ivoire*

In the last 3-5 years (i.e. between 2020-2025), some progress has been made, particularly with the introduction of the *code producteur* system. This new system, which functions similarly to farm identification codes in European agricultural markets, is designed to register individual farmers rather than groups. It could be argued that this marks a significant step forward in terms of traceability; each farmer is now uniquely identified, improving both transparency and accountability within the value chain.

By adopting the *code producteur* system, Côte d'Ivoire has made progress in monitoring sustainable agricultural practices. This innovation could play a pivotal role in improving the effectiveness of initiatives aimed at ensuring fair compensation for cocoa farmers. The *code producteur* system could also facilitate the integration of sustainability metrics, such as those provided by the FSF.

5.5.2.5. *Matching FSF criteria with SDG goals, targets, and indicators*

Building upon the relationships outlined in Table 47 and the mapping of SDGs to cocoa value chain constraints in Table 48, the FSF criteria have been aligned with specific SDG goals, targets, and indicators in Table 50. This alignment demonstrates how the Fair Score Framework can directly contribute to advancing the SDGs by addressing key sustainability challenges within the cocoa value chain. The FSF has been designed for adaptability in sectors other than cocoa too.

Table 50 FSF criteria matched with SDG goals, targets and indicators (United Nations, 2025)

FSF criterion	FSF indicators based on current research	Example SDG goal(s)	Example SDG target(s)	Example SDG indicator(s)
1. Farmer's Pay	Cocoa farmers achieve and maintain a living income (Anker & Anker, 2017; Giller, 2020; van Vliet et al., 2021).	1. No poverty 2. Zero hunger 3. Good health and wellbeing 4. Quality education 6. Clean water and sanitation 8. Decent work and economic growth	1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round 3.1 By 2030, reduce the global maternity mortality ratio to less than 70 per 100,000 live births 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all 8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7% GDP growth per annum in the least developed countries	1.1.1 Proportion of the population living below the international poverty line by sex, age, employment status and geographical location (urban/rural) 2.1.1 Prevalence of undernourishment 3.1.1 Maternal mortality ratio 4.1.1 Proportion of children and young people (a) in grades 2/2; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex 6.1.1 Proportion of population using safely managed drinking water services 8.1.1 Annual growth rate of real GDP per capita
2. Transparency	Value chain transparency is used as a tool to gain competitive advantage (Kraft et al., 2022; Montecchi et al., 2021; Porter, 2008).	12. Responsible consumption and production 16. Peace, justice, and strong institutions	12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries 16.1 Significantly reduce all forms of violence and related death rates everywhere	12.1.1 Number of countries developing, adopting or implementing policy instruments aimed at supporting the shift to sustainable consumption and production 16.1.1 Number of victims of intentional homicide per 100,000 population, by sex and age
3. Circularity	The value chain is circular; it aims to reduce the waste of resources in all its forms (Kirchherr et al., 2023; Morseletto, 2020; Shevchenko et al., 2023).	12. Responsible consumption and production 13. Climate action 14. Life below water	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population 14.1.1 (a) Index of coastal eutrophication; and (b) plastic debris intensity

4. Forced Child Labour	There is no forced child labour (Thévenon & Edmonds, 2019; Traoré & Dzifa Torvikey, 2022; Wayoro, 2023).	8. Decent work and economic growth 10. Reduced inequalities	10.1 By 2030, progressively achieve and sustain income growth of the bottom 40% of the population at a rate higher than the national average	10.1.1 Growth rates of household expenditure or income per capita among the bottom 40% of the population and the total population
5. Excessive Deforestation	There is no excessive deforestation (Renier et al., 2023; Yao et al., 2023; zu Ermgassen et al., 2022).	13. Climate action 15. Life on land	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	15.1.1 Forest area as a proportion of total land area
6. Entrepreneurial Circular Business Models	Entrepreneurial circular business models are operating profitably (Blanchard et al., 2021; Lahti et al., 2018; Suchek et al., 2022).	7. Affordable and clean energy 9. Industry, innovation, and infrastructure	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	7.1.1 Proportion of population with access to electricity 9.1.1 Proportion of the rural population who live within 2 km of an all-season road
7. Individual's Full Potential	The full potential of individuals is not wasted (Derrer-Merk et al., 2022; Halkos & Aslanidis, 2023; Maslow, 1943).	4. Quality education 5. Gender equality	5.1 End all forms of discrimination against all women and girls everywhere	5.1.1 Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex
8. Sustainable Development Goals	The value chain achieves the UN SDGS (Sachs et al., 2019; Staritz et al., 2022; United Nations Department of Economic and Social Affairs, 2023).	16. Peace, justice, and strong institutions 17. Partnerships for the goals	17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection	17.1.1 Total government revenue as a proportion of GDP, by source
9. Demand	The level of consumer demand for the product and/or service justifies the operation of business (Friedman, 2020; Keynes, 2018; Modigliani, 2005).	8. Decent work and economic growth 10. Reduced inequalities	8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high value-added and labour-intensive sectors	8.2.1 Annual growth rate of real GDP per employed person
10. Common Good	The value chain serves the common good (OECD, 2020, 2023; Sachs et al., 2019; United Nations Department of Economic and Social Affairs, 2023).	1. No poverty 11. Sustainable cities and communities	11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing

Table 50 shows the links between the FSF criteria and SDG goals, targets and indicators. This mapping illustrates how the FSF can contribute to the achievement of the SDGs. For the sake of conciseness, not all targets and indicators have been included.

To conclude this section, the Fair Score Framework (FSF) is introduced as a new conceptual tool that could be used to assess and communicate the fairness of value chains. It is proposed that the operationalisation of the FSF be based on the United Nations Sustainable Development Goals (UN SDGs). The FSF, designed for global application and in multiple industries, can be used to address constraints in the cocoa value chain (CVC), such as forced child labour, deforestation, and low farmer income. Addressing these CVC constraints with the FSF aligns with SDG objectives such as poverty eradication and climate action. Table 48 illustrates the relationship between SDGs and CVC constraints, suggesting that achieving the SDGs could simultaneously mitigate the identified constraints.

However, challenges remain in the credibility of sustainability initiatives. There is a need for innovative data reporting to meet the 2030 SDG deadline. Incorporating both traditional and non-traditional data sources is proposed to improve data accuracy.

The application of the FSF to Côte d'Ivoire is considered. Knowledge of the local Ivorian context highlights the impact of limited access to financial services, which causes farmers to accept lower prices than the *prix bord champ*. Recent initiatives, such as the *code producteur* system, improve traceability but also offer potential for improved integration of FSF metrics. The successful application of the FSF in the Ivorian context, properly integrated with local initiatives such as the *code producteur*, along with its seamless alignment with UN SDGs, could increase the likelihood of enhancing fairness and sustainability in the cocoa value chain.

Building upon the connections established in Table 47 and Table 48, Table 50 matches the FSF criteria with SDG goals, targets, and indicators. This matching demonstrates how the Fair Score Framework can contribute to the achievement of the SDGs. Although the example in Table 50 relates to cocoa, the FSF has been designed to adapt to the contexts of multiple sectors.

Given the explanation of the contribution to theory, the next section explains the research's dissemination strategies.

5.6. Dissemination strategies

There are several dissemination strategies that stem from the research. These include: the possible future implementation of a new conceptual framework called the “Fair Score Framework”, a chapter in a forthcoming academic textbook, full paper conference proceedings, conference presentations, posters, and webinars.

5.6.1. Possible real-world implementation of the “Fair Score Framework”

In the research, it has been shown how value chain transparency and circularity can be used as conceptual tools with which a firm gains competitive advantage. In showing this relationship, a new conceptual framework called the “Fair Score Framework” (FSF) has been introduced.

In a practical sense, the demonstration of how to apply the FSF to the modern-day Ivorian cocoa value chain could contribute to developing a stronger, fairer, and cleaner cocoa economy. Furthermore, this demonstration could potentially inform practice for academia, companies, and governments in a portfolio of sectors.

5.6.2. Contribution to an academic textbook

One of the contributions of the research has been the submission of a manuscript, which was accepted as part of a book chapter of an academic textbook due to be published by Palgrave Macmillan in 2025. The manuscript submitted by the researcher is titled “Applying the circular economy framework to the global cocoa value chain”.

The title of the forthcoming academic textbook featuring the researcher’s manuscript is: “Structural Transformation and Economic Development in Africa: Opportunities and Challenges”. The book originates from a selection of papers presented at the 6th Annual Centre for African Research on Enterprise and Economic Development (CAREED) Conference 2022

at the University of the West of Scotland. The book fills a need in the existing literature in terms of a) the applied approach that allows authors to showcase the challenges and opportunities facing global value chains (GVCs) in an accessible and reader friendly manner, and b) the inclusion of concepts such as the circular economy, which adds new and refreshing dimensions to ongoing debates on the structural transformation of GVCs.

The book is co-edited by two previous co-editors of a book published by Palgrave Macmillan in 2019, which was also based on selected papers from a previous CAREED conference: “Logistics and Global Value Chains in Africa: The Impact on Trade and Development”, edited by Dr Adebisi Adewole and Dr John Struthers.

5.6.3. Contributions to conference proceedings

Work derived from the research has been used to contribute a presentation and a full paper to the 2022 International Symposium on Cocoa Research in Montpellier, France. The paper, titled “Consumer perception of the circular economy and the cocoa value chain in Côte d’Ivoire” is available at <https://zenodo.org/records/10224067>.

5.6.4. Contributions to conference presentations and posters

A presentation titled “Integrating the circular economy framework within the global cocoa value chain” was given at the 2022 Conference named “Enterprise, Innovation and Structural Transformation of Africa in a Post-Covid Era”, which was hosted online by the Centre for African Research on Enterprise and Economic Development, University of the West of Scotland.

A poster titled “The effect of improved value chain transparency on the living income of Ivorian cocoa farmers” was presented at the Doctoral Day of the 2021 Institute for Small Business and Entrepreneurship Conference in Cardiff, Wales.

5.6.5. Contribution to webinars

The research has involved organising webinars about the circular economy, which were held in 2021, including:

- Webinar 1 titled “Future avenues of research on the circular economy” which can be found at <https://youtube.com/watch?v=hfVMDFH27uI>.
- Webinar 2 titled “What if we applied circular design?” available at <https://www.youtube.com/watch?v=-MDK5HL1hvI>.
- Webinar 3 titled “Burrus Development and achieving living income at farmer level” which can be viewed at <https://www.youtube.com/watch?v=8qgYGwB7lcs>.
- Webinar 4 titled “The golden formula for sustainability business strategies” online at https://www.youtube.com/watch?v=_vvfBXfdPQg.

This concludes the explanation of the research’s dissemination strategies. The next section provides a summary of the discussion.

5.7. Summary of the discussion

Research question 1 sought to explore the constraints within the Ivorian cocoa value chain. It was found that lower-income consumers are more price-sensitive (as per Keynes’s AIH), causing demand volatility, while higher-income consumers exhibit stable demand based on long-term income expectations (as per Friedman’s PIH). Additionally, younger consumers prioritize current consumption, impacting short-term demand, whereas older consumers may shift toward premium products (as per Modigliani’s LCH). The research also identifies supply-side constraints, such as transport issues, financial access, unstable cocoa prices, poor working conditions, forced child labour, excessive deforestation, and farmers failing to maintain a living income, which further complicate the value chain’s stability. To address both demand volatility and supply-side challenges, targeted interventions, such as promoting circularity, ethical consumption, and segmenting consumers by life stages, are needed to enhance the sustainability of the cocoa value chain.

Research question 2 analyses consumer perceptions of value chain transparency through the lens of Keynes's AIH, Friedman's PIH, and Modigliani's LCH. For farmers, the low average score of 4.04 (standard deviation=2.22) on the importance of understanding cocoa pricing suggests limited interest in transparency. AIH indicates that farmers, focused on immediate income, may overlook broader market structures unless they perceive direct financial benefit. The very low understanding score of 2.20 (standard deviation=0.91) about the journey of cocoa post-farm suggests that a lack of transparency contributes to farmer disengagement, reinforcing the idea that low long-term income expectations (PIH) diminish their motivation to understand the value chain. Furthermore, the trust score of 2.00 (standard deviation=0.77) highlights perceived unfairness in the value chain, which, according to Modigliani's LCH, may undermine farmers' long-term confidence in the system.

For consumers transparency was linked to trust and traceability. High-income consumers, in line with Keynes's AIH, are more likely to prioritize ethical considerations over price due to their ability to absorb the premium for traceable, ethically sourced products. While lower-income consumers, constrained by budget limitations, have to focus more on price, they are willing to pay for transparency within their means. As per Friedman's PIH and Modigliani's LCH, consumers with higher lifetime income are perhaps more inclined to support transparent value chains. Overall, the data indicates a growing trend toward ethical consumption, coupled with an increasing demand for value chain transparency.

Research question 3 sought to determine the extent to which consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d'Ivoire. Farmers favour agroforestry (79.5%), ethical trade certifications (55.8%), and upcycling by-products (54.9%) as circular solutions, indicating interest. However, financial constraints, such as low disposable income, limit their adoption of high-cost solutions like renewable energy and water efficiency. Keynes's AIH suggests that farmers prioritize immediate financial needs, limiting investment in long-term solutions. Friedman's PIH explains that their reluctance may stem from low expectations of future income stability. Modigliani's LCH highlights farmers' focus on increasing permanent income through training and by-product commercialization to stabilize income over time.

Consumers, mainly students, show support for circularity's role in improving farmers' incomes. Higher disposable income in countries like the USA appears to correlate with stronger support

for circularity (mean = 7.09), while lower support in countries like France (mean = 6.41) and the UK (mean = 6.20) suggests that potentially lower future income expectations make these respondents more cautious in supporting circularity. Friedman's PIH and Modigliani's LCH explain that students' long term income expectations shape their support for circularity.

Consumer commitment to circularity is influenced by income and life-stage. Higher-income consumers are more likely to engage in circular consumption, while lower-income consumers, who have to prioritize affordability, may need further incentives. The PIH suggests that sustained commitment to circularity depends on future income expectations. The LCH posits that as consumers progress through life stages and achieve greater financial stability, their commitment to circularity may increase.

Research question 4 aimed to determine how ECBMs could be leveraged to ensure that farmers maintain a living income. In studying consumer attitudes toward the share paid to farmers, significant findings were made. After viewing an informational video showing the challenges faced by cocoa farmers, there was a marked shift in consumer attitudes regarding the proportion of the consumer price allocated to farmers. In the UK, Germany, France, and the USA, consumers indicated an increased willingness to allocate a higher percentage to farmers, with France exhibiting the largest increase (9.52%). Despite a sample predominantly consisting of students with lower incomes, the findings suggest that ethical consumption choices can be driven by values, not just disposable income. This shift in attitudes underscores the importance of awareness-raising initiatives in influencing consumer behaviour, even among price-sensitive populations.

In studying consumer understanding of entrepreneurship, it was found that consumers perceive entrepreneurship as an opportunity-driven process aimed at addressing societal problems. Definitions provided by interviewees, such as creating social value (Int 7), align with broader views of entrepreneurship that extend beyond profit generation. The research draws on Keynes's AIH to suggest that wealthier consumers may be more inclined to support ECBMs, while those with lower incomes may have to prioritize immediate financial needs over ethical considerations. However, Friedman's PIH implies that consumers who anticipate long-term societal benefits, even with modest incomes, may still engage in supporting ECBMs. Modigliani's LCH adds another layer, suggesting that consumers in different life stages will

vary in their willingness to pay for ECBM premiums, with older consumers possibly more inclined to support them if they have greater financial stability.

In studying circularity's potential to alleviate poverty, it was found that while circularity aims to reduce waste and increase resource efficiency, its potential to directly address economic poverty remains uncertain. Maslow's hierarchy of needs suggests that economic poverty restricts an individual's potential, and while circularity may improve resource management it does not necessarily ensure equitable distribution of wealth. There is a risk that circularity, if not explicitly designed to address farmers' living income, may primarily serve the interests of powerful stakeholders rather than marginalized populations (such as Ivorian cocoa farmers). This is especially pertinent in sectors like cocoa farming, where farmers often face low margins and limited pricing control. Thus, while circular business models can reduce waste, their effectiveness in poverty alleviation depends on explicitly stating poverty reduction goals.

In exploring how to leverage ECBMs, the research highlights how they could increase the likelihood of farmers maintaining a living income through the generation of new income streams from cocoa by-products that are typically wasted (e.g. cocoa pod shells and pulp). Using Keynes's AIH, these income-generating activities could immediately increase farmers' disposable income, thereby stimulating consumption and investment. According to Friedman's PIH, ECBMs can help cocoa farmers mitigate the impacts of market volatility by creating stable and predictable long-term income from diversified by-products. Modigliani's LCH posits that a diversified income stream allows cocoa farmers to plan for long-term financial stability, smoothing consumption despite fluctuations in cocoa harvests or market prices.

Finally, it was noted that while ECBMs have the potential to guarantee a living income for cocoa farmers, they need to integrate objectives aimed at value chain fairness. If ECBMs are to create a new cocoa business model that truly improves farmer livelihoods, it is proposed that they be leveraged by following the Fair Score Framework.

The research introduces the Fair Score Framework (FSF), a new conceptual tool designed to measure the fairness of value chains. The FSF is inspired by the Nutri-Score framework and the OECD circularity scoreboard. It provides consumers with an accessible label that uses a 5-colour letter grading system, where "A" (green) indicates the highest level of fairness and "E" (red) the lowest. The Ivorian cocoa value chain, when evaluated using the FSF, currently falls

into the “E” (red) category, with a score of 23 out of 100. This score highlights severe constraints such as farmers’ failure to maintain a living income.

It is proposed that the FSF be operationalised based on indicators from the UN SDGs. By aligning the FSF with the SDGs, issues such as poverty reduction, inequality, and climate action are addressed. For example, addressing issues like low wages in cocoa farming is closely aligned with SDG goal number 1: “no poverty”.

In the context of Côte d’Ivoire, practical constraints are identified, such as limited access to financial services, which forces farmers to accept lower prices than the farmgate price - “*prix bord champ*”. Recent initiatives like the “*code producteur*” system have improved transparency and traceability in the cocoa value chain, offering opportunities for better integration of the FSF. By incorporating FSF metrics, Côte d’Ivoire’s cocoa sector could see improvements in fairness, helping farmers maintain a living income.

Finally, the FSF has potential applications beyond the cocoa sector. The successful implementation of the FSF could contribute to achieving SDG targets across multiple sectors.

Several dissemination strategies stem from the research, including: the possible future implementation of the “Fair Score Framework”, a chapter in a forthcoming academic textbook, full paper conference proceedings, conference presentations, posters, and webinars.

This concludes the discussion chapter, which will be followed by the conclusion chapter.

6. Conclusion

The purpose of this chapter is to confirm the unique contribution the research makes to knowledge. The chapter contains four components. Firstly, an outline of the research' aims, central problem, and research questions. Secondly, the answers to the research questions. Thirdly, the research's contributions to theory, the proposed operationalisation of the Fair Score Framework, and further dissemination strategies. Finally, a statement of limitations, reflections, and recommendations for future research.

6.1. Aims, central problem, and research questions

6.1.1. Aims

As explained in section 3.2 of the methodology chapter, the research has two broad aims. The first is to elicit consumer opinion on the relationship between improved value chain transparency and the living income of cocoa farmers in Côte d'Ivoire. The second is to explore the potential impact circularity could have in enabling farmers to maintain a living income.

6.1.2. Central problem

The central problem addressed in the research is Ivorian cocoa farmers failing to maintain a living income (Giller, 2020; van Vliet et al., 2021; Waarts & Kiewisch, 2021). Although interventions such as Fairtrade certification and the Living Income Differential may have partially resolved the issue of cocoa farmers failing to maintain a living income, the literature shows that further improvements are needed (Boysen et al., 2021, 2023; Gboko et al., 2021; Staritz et al., 2022).

6.1.3. Research questions

To contribute to the literature, the following central research question was asked: to what extent do consumers believe that value chain transparency and circularity would enable Ivorian cocoa farmers to maintain a living income? The development of the research questions was grounded in a critical evaluation of the literature. The research questions that arose from the literature review are the following:

1. What are the existing constraints of the Ivorian cocoa value chain?
2. How do consumers perceive value chain transparency?
3. To what extent do consumers believe that achieving circularity would enable cocoa farmers to maintain a living income in Côte d'Ivoire?
4. How could entrepreneurial circular business models be leveraged so that cocoa farmers in Côte d'Ivoire achieve circularity and maintain a living income?

6.2. Answers to the research questions

6.2.1. Answer to research question 1

Research question 1 aimed to identify the existing constraints within the Ivorian cocoa value chain. The farmer questionnaire (n=215) revealed several challenges. More than 80% of farmers identified transport problems, lack of bank branches near farms, and low income as major constraints. In addition, over 70% of farmers reported facing issues related to unstable world cocoa prices, difficult working conditions, and lack of high-quality training. Over 40% pointed to changing weather patterns and unfair pricing practices by middlemen as further challenges.

In addition, the data showed that farmers perceived the cocoa value chain as highly unequal (for the wording of the question please see question 25 in Appendix Four – Farmer questionnaire), with a mean of 1.93 out of 10. A standard deviation of 0.85 (n=215) signals a strong consensus among farmers on this issue. This suggests that farmers feel disproportionately disadvantaged within the value chain, leading to a general sense of inequity.

Another interesting finding emerged regarding income sufficiency. While 86.5% of farmers identified low income as a constraint, responses regarding whether their income was sufficient to meet their family's basic needs were more varied. The mean score for income sufficiency was 4.80 out of 10, with a standard deviation of 1.62, indicating that although many farmers recognize income as a challenge, their individual ability to meet basic needs differs. Some farmers may have developed mechanisms to manage their income more effectively despite the challenges they face.

Using Keynes's AIH, Friedman's PIH, and Modigliani's LCH, the research explored how income levels, consumption patterns, and age-related preferences shape the cocoa market. Keynes's AIH suggests that lower-income consumers, such as students, are more price-sensitive and allocate a larger portion of their income to cocoa products than higher-income consumers. Friedman's PIH indicates that consumers base their purchasing decisions on their expectations of long-term income, rather than their current income. Modigliani's LCH highlights the role of age in consumption patterns. Together, these theories reveal that the Ivorian cocoa value chain faces demand-side constraints in the form of price sensitivity, income stability, and shifting consumption over the consumer's life cycle.

These insights suggest that targeting stable, high-income markets and promoting ethical consumption could help stabilize the demand for cocoa and, consequently, support farmers' incomes. Furthermore, the integration of circularity or other tailored frameworks into the cocoa value chain could address the supply-side challenges including transport problems, a lack of bank branches close to farms, unstable world cocoa prices, difficult working conditions, forced child labour, excessive deforestation, and farmers' living income. Ultimately, a deeper understanding of consumer behaviour, coupled with targeted interventions, allows for the mitigation of both the demand and supply-side constraints. Moreover, the effective management of constraints could support the achievement of the Sustainable Development Goals in the Ivorian cocoa value chain and beyond.

6.2.2. Answer to research question 2

Research question 2 sought to characterize consumer perception of value chain transparency. Insights from the farmer questionnaire highlighted a gap in farmers' understanding of the cocoa value chain, particularly post-farm processes. When farmers were asked how well they understood what happens to their cocoa after it leaves their farm, the mean score was 2.20 out of 10 (standard deviation=0.91, n=215), indicating a profound lack of knowledge regarding the downstream processes. This reflects a significant issue of transparency from the farmers' perspective.

Further, when asked if they had enough information to trust the fairness of the cocoa value chain, the farmers gave a mean score of 2.00 out of 10. The standard deviation was 0.77 (n=215), demonstrating a strong consensus that they do not feel adequately informed to trust the fairness of the value chain. This lack of trust and transparency could contribute to feelings of inequity within the farming community, which is likely to influence their engagement with the broader value chain.

The farmer questionnaire also revealed that although a portion of farmers expressed interest in understanding global cocoa pricing mechanisms, their engagement with this topic was limited. The mean score for the importance of understanding cocoa pricing and sales on global market was 4.04 out of 10 (standard deviation=2.22, n=215), suggesting that while some farmers value such information, others were either apathetic or did not view it as critical to their daily operations. It may be that while some farmers do not currently prioritize transparency regarding cocoa pricing, they recognize its potential benefits in improving their economic situation.

From the consumer perspective, transparency is largely understood in terms of product characteristics such as trust, traceability, fair wages, and working conditions. These themes align with the growing trend of ethical consumption, where consumers increasingly demand transparency in the products they purchase. Respondents consistently repeated the importance of trust and traceability across both the questionnaire data and semi-structured interviews, further validating the relevance of these concepts in their perceptions of value chain transparency. However, it is noteworthy that respondents did not address how firms might

leverage transparency for competitive advantage. This leaves an opportunity for further exploration in understanding how firms can utilize transparency as a tool to differentiate themselves in the market.

Applying Keynes's AIH, Friedman's PIH, and Modigliani's LCH, the data reveals that consumer interest in transparency is shaped by factors such as current income, long-term financial expectations, and age. While students, as lower-income consumers, are typically more price-sensitive, they still display a willingness to pay a premium for ethically produced products, within their financial means. This suggests that even lower-income consumers, when motivated by values such as fair wages, may prioritize ethical consumption as far as they can afford it. On the other hand, higher-income consumers are more likely to prioritize transparency as part of their broader long-term consumption goals. These findings suggest that different income groups exhibit varying levels of commitment to transparency. Wealthier consumers may be more likely to prioritize ethical practices as part of their long-term consumer behaviour; lower income consumers may be just as if not more committed to prioritizing ethical practices within their means.

The development of a new system to assess end-to-end fairness in the cocoa value chain was proposed. Inspired by frameworks like the Nutri-Score label and the OECD circularity scoreboard, the Fair Score Framework (FSF) could help measure fairness and promote transparency throughout the value chain. Given that consumers increasingly demand transparency as part of the ethical consumption movement, the introduction of the FSF could address farmer concerns, consumer concerns, and offer firms a potential competitive advantage.

6.2.3. Answer to research question 3

Research question 3 aimed to determine the extent to which consumers believe that achieving circularity would enable cocoa farmers in Côte d'Ivoire to maintain a living income. The farmer questionnaire revealed perspectives on potential circularity solutions. A large majority of farmers (79.5%) identified agroforestry as a viable solution to reduce waste and support a living income. 55.8% of the farmers highlighted ethical trade certifications and 54.9% chose upcycling of cocoa by-products. These findings suggest that farmers are aware of the potential

for circular practices to improve their economic conditions. However, there were notable gaps in farmer engagement with other circularity strategies. None of the farmers selected water efficiency or renewable energy, which may indicate a perceived disconnection between such solutions and the farmers' immediate needs. Moreover, no farmers chose tracking as a potential solution, which could reflect limited trust in the role that traceability might play in improving value chain fairness.

When asked to suggest new circular business ideas, 195 out of 215 farmers refrained from offering any suggestions. This hesitance to propose new ideas could reflect a lack of resources or confidence in implementing circular solutions. Nonetheless, some recurring themes emerged from the responses. A total of 16 farmers expressed an interest in facilitating the commercialization of by-products, while 4 farmers indicated a need for training to better implement circular practices. These insights suggest that while farmers may see the potential of circularity, their engagement with the concept is constrained by a lack of knowledge and resources.

From the consumer perspective, in response to whether circularity could enable cocoa farmers to maintain a living income, respondents in the combined dataset (n=190) provided a mean score of 6.48, indicating general agreement that circularity could improve the conditions of cocoa farmers, including sustaining a living income. The margin of error was within the acceptable range (2.1%), further reinforcing the reliability of these results. Additionally, 84.2% of consumers agreed that adapting the chocolate value chain could help Côte d'Ivoire's cocoa farmers maintain a living income. This suggests a strong sense of optimism that the downward trend in farmers' real incomes could be reversed through circularity.

When asked to identify the most effective solution for improving cocoa farmers' livelihoods, nearly 50% of consumers selected both improved value chain transparency and circular economy implementation. This response underscores the growing consumer interest in sustainability and highlights the need for frameworks addressing the dual goals of transparency and circularity. Furthermore, a small increase of 1.9% in support of circularity solutions focused on Côte d'Ivoire, as compared to globally, suggests that consumers are inclined to back localized solutions that address the existing constraints faced by farmers locally.

However, despite a growing interest in ethical consumption, consumers feel the existing literature insufficiently addresses the issue of living income. The mean score of 4.66 (n=180) indicates that consumers feel the current body of research lacks depth and fails to provide a comprehensive understanding of how circularity and transparency can improve farmers' economic conditions.

The semi-structured interviews sought to further explore how consumer commitment to circularity could be measured in relation to supporting Ivorian cocoa farmers. Int 4 expressed scepticism about measuring such commitment, noting that the term 'circularity' is largely unfamiliar to many consumers. This points to the challenge of engaging consumers in regions where the language around circularity has yet to take hold. In contrast, Int 11 provided a more economic perspective on measuring consumer commitment to circularity, suggesting that a more holistic view of consumer behaviour is needed. Int 11 emphasized that the true measure of a consumer's commitment to circularity would involve assessing whether they consistently purchase 'circular' across their basket of goods, not just in isolated instances. Furthermore, Int 11 pointed out that when consumers demonstrate a broader commitment to circular purchasing behaviour, this could help reduce costs across the entire value chain, which in turn could benefit farmers. This aligns with research that suggests circular consumption can help reduce costs and improve market outcomes for producers like cocoa farmers (Silvestri et al., 2022).

6.2.4. Answer to research question 4

Research question 4 sought to determine how entrepreneurial circular business models (ECBMs) could be leveraged so that cocoa farmers in Côte d'Ivoire achieve circularity and maintain a living income. The following insights emerged from farmers, consumers, and interviewees.

When asked whether circularity could enable them to maintain a living income, farmers responded with a broad range of answers between 1 and 10 (where 1 means "not at all" and 10 means "very much so"). The median was 5 and the mean was 4.8, with a standard deviation of 2.31. This variability suggests that farmers have mixed views on the potential effectiveness of circularity in improving their livelihoods. Given the complexity of maintaining a living income, these varied responses highlight the difficulty in resolving the issue, regardless of the proposed

solution. One might deduce that farmers do not perceive circularity as a panacea but rather as one possible tool in a broad set of solutions.

From the consumer perspective, a paired samples *t*-test revealed that respondents increased the share paid to farmers after viewing an informational video¹² on the Ivorian cocoa value chain. The combined dataset from France, Germany, the UK, the USA, Switzerland, and the Netherlands (n=212) showed a 7.41% increase in farmers' share. All datasets had acceptable reliability, with Germany (0.713) and the combined dataset (0.790) being the most reliable. These findings suggest that educating consumers on the value chain can drive increased willingness to support fairer payments to farmers.

Insights from the semi-structured interviews reveal a range of perspectives on how ECBMs could be leveraged for cocoa farmers to achieve circularity and maintain a living income. Int 3 expressed concern that while circularity is designed to reduce waste, it might not necessarily reduce economic poverty for cocoa farmers. This concern aligns with the critique that circularity may primarily serve the interests of profit-driven stakeholders, rather than focusing on addressing the living income of marginalised stakeholders (i.e. farmers). Int 5 raised doubts about the effectiveness of circularity in the cocoa sector, specifically due to the alleged disconnect between the local nature of cocoa production and the global consumption patterns in the cocoa value chain. Int 5 suggested that applying circularity in this fragmented context – where cocoa is produced in one location but consumed elsewhere – poses a challenge.

On the other hand, Int 9 and Int 10 offered optimistic perspectives. They proposed that using cocoa by-products, such as cocoa pod shells and fruit pulp, could create new income streams for farmers. Int 9 suggested that cocoa pod shells could be turned into compost, while Int 10 saw potential in transforming cocoa by-products into products like cocoa juice, jams, and vinegar, among others. This would help generate additional revenue streams, thereby diversifying farmers' income sources. This could lead to increased financial stability in the long term. Moreover, Int 10 argued that powerful stakeholders, such as multinationals, could support these ECBMs by purchasing cocoa by-products, such as pectin, at fair market prices, ensuring a more predictable income for farmers.

¹² Permission was obtained from the author (van de Velde, 2018, 2021) of the video, and the link (<https://vimeo.com/139873232>) was shared with respondents, who were requested to watch from 9:10 to 9:52.

The potential for ECBMs to improve the income of cocoa farmers in Côte d'Ivoire is evident, but significant challenges remain. Farmers have expressed mixed views on whether circularity will help them earn a living income. This uncertainty stems from the complexity of the living income problem, which may not be resolved by circularity alone. Additionally, the concerns raised by Int 3 about the potential prioritization of profit-driven motives over the living income of farmers highlight a concern that needs to be addressed if ECBMs are to benefit farmers effectively.

The optimistic views from interviewees 9 and 10 regarding the use of cocoa by-products point to potential opportunities for increased revenue through diversification. These opportunities could be further bolstered by the involvement of powerful stakeholders, for example through purchasing these by-products at fair prices. This would help stabilize farmers' incomes in the long term. Furthermore, the long-term benefits of implementing ECBMs could include a combination of improved education, higher incomes, and better health outcomes for farming communities.

In conclusion, while ECBMs have the potential to provide new revenue streams and enhance income stability for cocoa farmers, they need to be designed with clearly integrated objectives aimed at value chain fairness. ECBMs could ultimately create a new cocoa business model that truly values farmers and improves their livelihoods. These ECBMs could be leveraged for optimal effect by basing systems decisions on the Fair Score Framework (please see section 4.6, section 5.5.1, and section 5.5.2).

6.2.5. Answer to the central research question

The central research question asked, “to what extent do consumers believe that value chain transparency and circularity would enable Ivorian cocoa farmers to maintain a living income?” The extent to which consumers believe that value chain transparency (VCT) and circularity would enable Ivorian cocoa farmers to maintain a living income is shaped by mixed perspectives from farmers, consumers, and interviewees. Farmers indicate uncertainty about circularity's potential to resolve their income issues. Consumers believe that both VCT and circularity could contribute to farmers maintaining a living income, but with certain limitations.

Int 3 raised the concern that poverty alleviation needs to be explicitly stated in circularity policy, while Interviewees 9 and 10 suggest that cocoa by-products could be used to diversify income and perhaps stabilize farmer incomes over time. From a consumption theory perspective, Keynes's AIH suggests that these new income streams could immediately increase consumption, improving farmers' quality of life if the income is substantial enough. Friedman's PIH suggests that farmers would then likely adjust their consumption based on expected permanent income, rather than short-term gains. Modigliani's LCH posits that farmers may plan their consumption and savings over their lifetime, which could be facilitated by consistent, diversified income. Overall, the data suggests that while circularity could help to reduce waste, the concept is not guaranteed to help alleviate poverty. This indicates an opportunity to develop circularity policies that explicitly align with poverty reduction goals. Thus, it is proposed that ECBMs be leveraged by incorporating the Fair Score Framework (please see section 4.6, section 5.5.1, and section 5.5.2).

6.3. Contribution to theory and dissemination strategies

6.3.1. Contribution to theory

The research contributes to theory by introducing a new conceptual model called the "Fair Score Framework" (FSF). The FSF is inspired by two separate frameworks that were presented in section 2.3.3 of the literature review: the Nutri-Score framework (Carruba et al., 2022; Hau & Lange, 2023; Peters & Verhagen, 2022), and the circularity scoreboard for cities developed by the Organisation for Economic Cooperation and Development (OECD, 2020, 2022).

6.3.1.1. *Operationalisation of the Fair Score Framework*

It is proposed that the operationalisation of the FSF be based on the indicators of the UN SDGs. The set of UN SDGs serves as an action plan for achieving sustainable development. This contrasts with consumption theory, which is a theoretical framework that provides models to analyse economic behaviour.

The FSF and SDGs serve distinct yet complementary purposes. The FSF measures the fairness of a value chain and displays this information to consumers in the form of a user-friendly overall score, specifically adjusted for industries such as cocoa. In contrast, the SDGs are a broad set of global goals aimed at achieving a more sustainable future for everyone on earth (Sachs et al., 2019; United Nations Department of Economic and Social Affairs, 2023), and encompassing issues such as the eradication of poverty, the reduction of inequalities, and the management of climate change (Herrero et al., 2021; Leal Filho et al., 2021). While the FSF is designed for practical implementation in multiple countries and value chains, including cocoa, the SDGs provide overarching, long-term objectives for global sustainable development.

Table 48 in the discussion chapter shows how the SDGs relate to the supply-side constraints of the cocoa value chain identified in section 2.2 of the literature review. Critically, the SDGs apply to each of the cocoa value chain's identified constraints of forced child labour, excessive deforestation, and farmers failing to maintain a living income (Fritsche et al., 2020; Marchetti et al., 2020). Thus, it appears that achieving the SDGs coincides with resolving the identified constraints of the cocoa value chain (Delabre et al., 2020; Lambin & Furumo, 2023; Octavia et al., 2022; Veldhuizen et al., 2020).

However, sustainability as a concept is fraught with implementation issues (Grafton et al., 2023; Pizzi et al., 2020; United Nations, 2023a). For example, sustainability certifications can sometimes give the impression of successful action to reduce poverty and deforestation. When the reality shows otherwise, there is a loss of trust in the sustainability certification sector (Lock & Alexander, 2023).

Given that the SDG deadline of 1st January 2030 is less than five years away (United Nations, 2023b), innovative solutions are needed for the goals to be met in time (Berrone et al., 2023). One such solution is to revolutionize data reporting methods (Ballerini & Bergh, 2021; Fraisl et al., 2020; González et al., 2023). According to Fritz et al. (2019), the SDG indicators could be fed by a combination of traditional data (e.g. National Statistics Offices, World Bank, OECD, WTO, ILO) and new sources of non-traditional data (e.g. satellite imagery, mobile phone records, financial data, weather stations, and citizen-generated data).

It is proposed that the operationalisation of the FSF be based on the SDGs, as illustrated in Table 50. Figure 18 shows that more than 80% of the sample of farmers identified three

particular constraints, including transport problems, a lack of bank branches close to farms, and low income. More than 70% of farmers also highlighted unstable world cocoa prices, which make it difficult for them to plan for the future, as well as difficult working conditions. Additionally, over 40% of farmers identified a lack of high-quality training, changing weather patterns, and unfair prices from middlemen. The FSF has been specifically designed to address these constraints. By incorporating these farmer-voiced challenges, the FSF aims not only to support consumers in purchasing from fairer value chains but also to improve the livelihoods of farmers. If the FSF successfully supports consumers to purchase from fairer value chains, there is potential for increased success in achieving the 2030 SDGs on time.

6.3.2. Dissemination strategies

The findings of the research have been disseminated using six different strategies. Firstly, through the possible future implementation of a new conceptual framework named the “Fair Score Framework”. Secondly, through contributing to a chapter in a forthcoming academic textbook: “Applying the circular economy framework to the global cocoa value chain” in the book titled “Structural Transformation and Economic Development in Africa: Opportunities and Challenges”. Thirdly, through contributing to conference proceedings at the 2022 International Symposium on Cocoa Research with a paper titled “Consumer perception of the circular economy and the cocoa value chain in Côte d’Ivoire”, available at <https://zenodo.org/records/10224067>. Fourthly, through contributing to conference presentations including “Integrating the circular economy framework within the global cocoa value chain”, given at the 2022 conference themed “Enterprise, Innovation and Structural Transformation of Africa in a Post-Covid Era”, which was hosted online by the Centre for African Research on Enterprise and Economic Development at the University of the West of Scotland. Fifthly, through a poster titled “The effect of improved value chain transparency on the living income of Ivorian cocoa farmers”, which was presented at the Doctoral Day of the 2021 Institute for Small Business and Entrepreneurship conference in Cardiff, Wales. Finally, through contributing to webinars about the circular economy, which were held in 2021, including:

- Webinar 1 titled “Future avenues of research on the circular economy”, which is online at <https://youtube.com/watch?v=hfVMDFH27uI>.
- Webinar 2 titled “What if we applied circular design?”, which can be found at <https://www.youtube.com/watch?v=-MDK5HL1hvI>.
- Webinar 3 titled “Burrus Development and achieving living income at farmer level”, which is available at <https://www.youtube.com/watch?v=8qgYGwB7lcs>.
- Webinar 4 titled “The golden formula for sustainability business strategies”, which can be viewed at https://www.youtube.com/watch?v=_vvfBXfdPQg.

6.4. Limitations, reflection, and future research

This last section contains a statement of the research’s limitations, reflections, and suggestions for future research.

6.4.1. Limitations

The farmer questionnaire was distributed in the San-Pédro region. Whilst this is one of the most important cocoa-producing areas of Côte d’Ivoire, one could argue that collecting data from additional regions, such as Nawa or Haut-Sassandra might provide further relevant insights.

Although sample sizes for the consumer questionnaires were large enough for country to country comparison (assuming a minimum requirement of $n > 30$) in the datasets for the United Kingdom ($n=45$), Germany ($n=46$), France ($n=47$), the USA ($n=47$), and the combined dataset with UK, Germany, France, the USA, Switzerland, and the Netherlands ($n=212$), this was not so in the individual country datasets for the Netherlands ($n=8$), or Switzerland ($n=7$). No data was collected from Belgium ($n=0$) either, even though attempts were made. Therefore, future research could improve on the current study by increasing the sample size of data collected in the Netherlands, Switzerland, and Belgium.

Regarding the semi-structured interviews (n=12), saturation was reached but future research could improve on the current study by increasing the sample size. However, in this study it was ensured that SSIs were conducted with a balanced mix of stakeholders working in and outside of academia. Future studies would make significant contributions to knowledge if this balance were maintained.

6.4.2. Closing reflection

The research offers valuable insights into the potential of value chain transparency and circularity in enabling Ivorian cocoa farmers to maintain a living income. Consumers show support for both concepts, with nearly 50% regarding the solutions as complementary. However, the findings highlight a discrepancy between consumer demand for these solutions and the immediate pressures cocoa farmers currently face. Overall, the research underscores the need for more robust frameworks to align consumer demand with actionable solutions that address farmers' socio-economic challenges. This shows the need for new conceptual tools such as the Fair Score Framework (FSF). Encouragingly, the research's *t*-test results show a 7.41% increase in the share paid to farmers after consumers watched an informational video, suggesting that consumer education can drive ethical consumption and support fairer payments to farmers.

6.4.3. Future research

A few concepts that could be used as lens to study the cocoa value chain include the Efficient Market Hypothesis (Colin-Jaeger et al., 2020; Delcey & Sergi, 2023; Kelikumea et al., 2020; Mananyi & Struthers, 1997), the Time Value of Money (Knoke et al., 2020; Magni & Marchioni, 2020; Scudder et al., 2022; Weber, 2021), and the Fisher Effect by Irving Fisher (Bianchi & Mendoza, 2020; Ruzima et al., 2023; Schulze, 2022; Shobande & Shodipe, 2021).

Based on these concepts, three further questions may be considered for future research. First, how does one reduce the occurrence of a 'Tragedy of the Commons' in a circular economy (Githinji et al., 2023; Prasad et al., 2022; Skene, 2022; Zwarteveen et al., 2021)? Second, how can commercial confidentiality be respected whilst improving value chain transparency

(Budler et al., 2024; Ebinger & Omondi, 2020; Gligor et al., 2022; Mol, 2015)? Finally, how could growth be measured along the global cocoa value chain using theories introduced in the Dasgupta Review (Folke et al., 2021; Groom & Turk, 2021; Spash & Hache, 2022; www.gov.uk, 2024)?

To finish, data from the research will be made available upon request for researchers to improve on the work completed.

This concludes the research and starts the conversation about future research.

Appendices

Appendix One – Côte d’Ivoire’s top 5 most exported and imported goods from 2016 to 2022 (World Bank, 2024b)

Table 51 Côte d’Ivoire’s top 5 exports in USD from 2016 to 2022 (adapted from World Bank, 2024b)

Ranking	2022	2021	2020	2019	2018	2017	2016
1	Cocoa beans, whole or broken, raw or roasted (Product code 180100) \$3.21B	Cocoa beans, whole or broken, raw or roasted (Product code 180100) \$4.29B	Cocoa beans, whole or broken, raw or roasted (Product code 180100) \$3.63B	Cocoa beans, whole or broken, raw or roasted (Product code 180100) \$3.58B	Cocoa beans, whole or broken, raw or roasted (Product code 180100) \$3.25B	Cocoa beans, whole or broken, raw or roasted (Product code 180100) \$3.51B	Cocoa beans, whole or broken, raw or roasted (Product code 180100) \$3.06B
2	Petroleum oils (excl. crude); preparation (Product code 271000) \$2.03B	Gold in unwrought forms non-monetary (Product code 710812) \$1.71B	Gold in unwrought forms non-monetary (Product code 710812) \$1.47B	Gold in unwrought forms non-monetary (Product code 710812) \$1.08B	Cashew nuts, fresh or dried (Product code 080130) \$1.15B	Cashew nuts, fresh or dried (Product code 080130) \$1.10B	Cashew nuts, fresh or dried (Product code 080130) \$0.85B
3	Technically specified natural rubber (Product code 400122) \$1.55B	Technically specified natural rubber (Product code 400122) \$1.27B	Cashew nuts, fresh or dried (Product code 080130) \$0.91B	Petroleum oils (excl. crude); preparation (Product code 271000) \$1.08B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.94B	Gold in unwrought forms non-monetary (Product code 710812) \$0.84B	Gold in unwrought forms non-monetary (Product code 710812) \$0.81B
4	Gold in unwrought forms non-monetary (Product code 710812) \$1.48B	Cashew nuts, fresh or dried (Product code 080130) \$1.08B	Technically specified natural rubber (Product code 400122) \$0.77B	Petroleum oils and oils obtained from bituminous (Product code 270900) \$0.90B	Gold in unwrought forms non-monetary (Product code 710812) \$0.80B	Technically specified natural rubber (Product code 400122) \$0.74B	Cocoa paste, not defatted (Product code 180310) \$0.68B
5	Cashew nuts, fresh or dried (Product code 080130) \$0.99B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.94B	Cocoa paste, not defatted (Product code 180310) \$0.71B	Cashew nuts, fresh or dried (Product code 080130) \$0.80B	Petroleum oils and oils obtained from bituminous (Product code 270900) \$0.71B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.71B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.58B

Table 52 Côte d'Ivoire's top 5 imports in USD from 2016 to 2022 (adapted from World Bank, 2024b)

Ranking	2022	2021	2020	2019	2018	2017	2016
1	Petroleum oils and oils obtained from bituminous (Product code 270900) \$2.40B	Petroleum oils and oils obtained from bituminous (Product code 270900) \$1.38B	Petroleum oils and oils obtained from bituminous (Product code 270900) \$1.44B	Petroleum oils and oils obtained from bituminous (Product code 270900) \$1.49B	Petroleum oils and oils obtained from bituminous (Product code 270900) \$1.54B	Petroleum oils and oils obtained from bituminous (Product code 270900) \$0.81B	Petroleum oils and oils obtained from bituminous (Product code 270900) \$1.02B
2	Petroleum oils (excl. crude); preparation (Product code 271000) \$1.91B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.67B	Semi-milled or wholly milled rice (Product code 100630) \$0.43B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.52B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.62B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.64B	Semi-milled or wholly milled rice (Product code 100630) \$0.39B
3	Semi-milled or wholly milled rice (Product code 100630) \$0.64B	Semi-milled or wholly milled rice (Product code 100630) \$0.54B	Petroleum oils (excl. crude); preparation (Product code 271000) \$0.39B	Semi-milled or wholly milled rice (Product code 100630) \$0.48B	Semi-milled or wholly milled rice (Product code 100630) \$0.58B	Floating or submersible drilling or production (Product code 890520) \$0.58B	Other medicaments of mixed or unmixed products, (Product code 300490) \$0.26B
4	Floating or submersible drilling or production (Product code 890520) \$0.59B	Frozen fish (Product code 030379) \$0.37B	Other medicaments of mixed or unmixed products (Product code 300490) \$0.26B	Other medicaments of mixed or unmixed products (Product code 300490) \$0.24B	Other medicaments of mixed or unmixed products (Product code 300490) \$0.23B	Semi-milled or wholly milled rice (Product code 100630) \$0.45B	Frozen fish (Product code 030379) \$0.18B
5	Butanes, liquefied (Product code 271113) \$0.49B	Butanes, liquefied (Product code 271113) \$0.33B	Frozen fish (Product code 030379) \$0.25B	Frozen fish (Product code 030379) \$0.23B	Frozen fish (Product code 030379) \$0.22B	Other medicaments of mixed or unmixed products (Product code 300490) \$0.20B	Automobiles with reciprocating piston engine (Product code 870323) \$0.15B

Appendix Two - Côte d'Ivoire's top 5 export and import partners from 2016 to 2022 (World Bank, 2024b)

Table 53 Côte d'Ivoire's top 5 export and import partners in 2022 (adapted from World Bank, 2024b)

Top 5 export partners			Top 5 import partners		
Market	Trade (in US\$)	Partner share (%)	Exporter	Trade (in US\$)	Partner share (%)
Mali	\$1.46B	8.91	China	\$2.58B	14.4
Netherlands	\$1.43B	8.68	Nigeria	\$2.17B	12.12
Switzerland	\$1.33B	8.06	France	\$1.20B	6.68
United States	\$0.852B	5.34	India	\$0.932B	5.21
Burkina Faso	\$0.852B	5.19	United States	\$0.832B	4.65

Table 54 Côte d'Ivoire's top 5 export and import partners in 2021 (adapted from World Bank, 2024b)

Top 5 export partners			Top 5 import partners		
Market	Trade (in US\$)	Partner share (%)	Exporter	Trade (in US\$)	Partner share (%)
Netherlands	\$1.33B	8.65	China	\$2.16B	15.44
United States	\$1.24B	8.09	France	\$1.31B	9.38
Vietnam	\$0.919B	5.99	Nigeria	\$1.25B	8.96
Mali	\$0.874B	5.7	India	\$0.857B	6.14
Belgium	\$0.853B	5.56	United States	\$0.667B	4.77

Table 55 Côte d'Ivoire's top 5 export and import partners in 2020 (adapted from World Bank, 2024b)

Top 5 export partners			Top 5 import partners		
Market	Trade (in US\$)	Partner share (%)	Exporter	Trade (in US\$)	Partner share (%)
Netherlands	\$1.25B	9.99	China	\$1.58B	14.98
United States	\$0.835B	6.7	Nigeria	\$1.38B	13.06
Switzerland	\$0.805B	6.46	France	\$1.14B	10.8
Vietnam	\$0.801B	6.43	India	\$0.539B	5.12
Belgium	\$0.678B	5.44	United States	\$0.423B	4.02

Table 56 Côte d'Ivoire's top 5 export and import partners in 2019 (adapted from World Bank, 2024b)

Top 5 export partners			Top 5 import partners		
Market	Trade (in US\$)	Partner share (%)	Exporter	Trade (in US\$)	Partner share (%)
Netherlands	\$1.36B	10.68	China	\$1.80B	17.19
United States	\$0.768B	6.04	Nigeria	\$1.41B	13.45
France	\$0.753B	5.92	France	\$1.13B	10.74
Malaysia	\$0.634B	4.99	United States	\$0.522B	4.98
Vietnam	\$0.621B	4.88	India	\$0.447B	4.27

Table 57 Côte d'Ivoire's top 5 export and import partners in 2018 (adapted from World Bank, 2024b)

Top 5 export partners			Top 5 import partners		
Market	Trade (in US\$)	Partner share (%)	Exporter	Trade (in US\$)	Partner share (%)
Netherlands	\$1.35B	11.44	China	\$1.64B	14.97
United States	\$1.08B	9.15	Nigeria	\$1.35B	12.3
Vietnam	\$0.802B	6.78	France	\$1.13B	10.31
Germany	\$0.754B	6.38	India	\$0.499B	4.55
France	\$0.639B	5.41	Netherlands	\$0.400B	3.65

Table 58 Côte d'Ivoire's top 5 export and import partners in 2017 (adapted from World Bank, 2024b)

Top 5 export partners			Top 5 import partners		
Market	Trade (in US\$)	Partner share (%)	Exporter	Trade (in US\$)	Partner share (%)
Netherlands	\$1.49B	11.98	China	\$1.30B	13.48
United States	\$1.19B	9.53	France	\$1.06B	11.05
Vietnam	\$0.798B	6.41	Nigeria	\$0.886B	9.22
France	\$0.629B	5.06	Spain	\$0.870B	9.05
Germany	\$0.610B	4.9	India	\$0.454B	4.72

Table 59 Côte d'Ivoire's top 5 export and import partners in 2016 (adapted from World Bank, 2024b)

Top 5 export partners			Top 5 import partners		
Market	Trade (in US\$)	Partner share (%)	Exporter	Trade (in US\$)	Partner share (%)
Netherlands	\$1.25B	11.63	China	\$1.49B	17.41
United States	\$0.959B	8.9	France	\$1.14B	13.26
Belgium	\$0.668B	6.2	Nigeria	\$0.977B	11.39
France	\$0.588B	5.45	India	\$0.378B	4.4
Vietnam	\$0.551B	5.11	United States	\$0.325B	3.79

Appendix Three – Côte d’Ivoire GDP Deflators for 2016 to 2022 (World Bank Data, 2024c)

Table 60 Côte d'Ivoire GDP Deflators for 2016 to 2022 (World Bank Data, 2024c)

Year	2016	2017	2018	2019	2020	2021	2022
GDP Deflator (2015 base year)	98.82016756	97.79078036	99.43559828	101.4077567	103.261879	107.3202065	109.5587972

Table 61 Côte d'Ivoire and its top trade partners' GDP Deflators for 2022 (World Bank Data, 2024c)

Country	GDP Deflator for 2022
Côte d'Ivoire (2015 base year)	109.5587972
Mali (1999 base year)	205.1823405
Netherlands (2015 base year)	118.8654763
Switzerland (2015 base year)	102.744203
China (2020 base year)	106.4193192
France (2015 base year)	110.9800956
India (2011-2012 base year)	167.6866853

Appendix Four – Farmer questionnaire

Consent to participate in research

Thank you for your interest in participating in this questionnaire. Before proceeding, please read the following information carefully:

- By participating in this questionnaire, you agree that your responses will be collected and analysed for the purpose of this research project.
- Your participation is entirely voluntary, and you may withdraw at any time without penalty.
- All data will be anonymized, and your responses will remain confidential. No identifying information will be shared or published.
- The results of this study may be used for academic publications, presentations, or other research-related outputs.

If you have any questions or concerns about this survey or your participation, please contact Simeon Human at 10418130@rau.ac.uk.

By proceeding with this questionnaire, you confirm that you have read and understood this information and consent to participate in the study.

Questionnaire for farmers

Demographic information

1. What is your country of birth?
2. In which country do you live?
3. Which country have you lived in for most of your life?
4. What is your age in years?
5. What is your highest completed level of education? (No qualification, Secondary School, Undergraduate, Postgraduate, Doctoral, Post-Doctoral)
6. What is your occupation?
7. On average, how much money do you spend per month in CFA Francs?
8. If you are studying, what course are you studying?
9. What is your income per month in CFA Francs?
10. What language(s) do you speak at work?
11. What is your gender?
12. What is your ethnicity?
13. What language(s) do you speak at home?
14. What is your religion?
15. What is your marital status?
16. What is your current employment status?
17. How many children (including dependants) do you have?

Challenges in cocoa farming

18. What problems do you face in growing and selling cocoa in Côte d'Ivoire? Choose one or more of the following:

☐	Low income
☐	Difficult working conditions (long hours, physically demanding work, lack of modern tools)
☐	Farmers can't plan for the future because the price of cocoa on the global market is unstable
☐	Farmers sell cocoa to middlemen, who often offer unfair prices
☐	Changing weather patterns, inconsistent rainfall, rising temperatures
☐	Lack of high quality training and education for farmers
☐	Transport problems (roads and paths are difficult to access)
☐	Lack of bank agencies close to farms

19. On a scale of 1 to 10, where 1 means "not enough at all" and 10 means "more than enough," to what extent do you make enough money farming cocoa to take care of your family's basic needs? Please explain your answer if you would like to.

1 ☹	2	3	4	5	6	7	8	9	10 ☺

Perceptions of transparency

20. On a scale of 1 to 10, where 1 means "not important at all" and 10 means "very important," do you think it is important for farmers to have information about how cocoa is priced and sold in global markets? Please explain your answer if you would like to.

1 ☹	2	3	4	5	6	7	8	9	10 ☺

21. On a scale of 1 to 10, where 1 means "not well at all" and 10 means "very well," how well do you understand what happens to your cocoa after it leaves your farm? Please explain your answer if you would like to.

1 ☹️	2	3	4	5	6	7	8	9	10 😊

22. On a scale of 1 to 10, where 1 means "not at all" and 10 means "very much so", would you say that you have enough information to trust the fairness of the cocoa supply chain (the steps that get a product from the farmer to the consumer)? Please explain your answer if you would like to.

1 ☹️	2	3	4	5	6	7	8	9	10 😊

Circularity and business models

23. Which of the following changes will reduce waste in the cocoa business, so that cocoa farmers could earn enough to live well? Choose one or more options:

☐	Integrate cocoa farming with other trees and crops
☐	Reuse and upcycle by-products such as cocoa husks, skins and pods
☐	Use water more efficiently and use renewable energy such as solar energy
☐	Use reusable packaging materials
☐	Support ethical trade initiatives such as Fairtrade or use other certifications
☐	Use technology to track cocoa beans from the farm to the final product

24. What new business ideas would help you and other farmers reduce waste, while also earning enough to live well? Please explain your answer.

25. On a scale of 1 to 10, where 1 means "not treated fair at all" and 10 means "treated totally fair," would you say that there is inequality in the cocoa business? (Are some people in the cocoa business treated unfairly while others get excessive benefits?) Please explain your answer if you would like to.

1 ☹	2	3	4	5	6	7	8	9	10 ☺

26. On a scale of 1 to 10, where 1 means "not at all" and 10 means "very much so" to what extent do you think making changes to reduce waste in the cocoa business will help you earn enough as a farmer to take care of your family's basic needs? Please explain your answer if you would like to.

1 ☹	2	3	4	5	6	7	8	9	10 ☺

Appendix Five – Consumer questionnaire

Consent to participate in research

Thank you for your interest in participating in this questionnaire. Before proceeding, please read the following information carefully:

- By participating in this questionnaire, you agree that your responses will be collected and analysed for the purpose of this research project.
- Your participation is entirely voluntary, and you may withdraw at any time without penalty.
- All data will be anonymized, and your responses will remain confidential. No identifying information will be shared or published.
- The results of this study may be used for academic publications, presentations, or other research-related outputs.

If you have any questions or concerns about this survey or your participation, please contact Simeon Human at 10418130@rau.ac.uk.

By proceeding with this questionnaire, you confirm that you have read and understood this information and consent to participate in the study.

Questionnaire for consumers

Demographics

1. What is your country of birth?
2. In which country do you live?
3. Which country have you lived in for most of your life?
4. What is your age in years?
5. What is your highest completed level of education? (No qualification, Secondary School, Undergraduate, Postgraduate, Doctoral, Post-Doctoral)

6. What is your occupation?
7. On average, how much money do you spend per month in dollars US\$?
8. What course are you studying?
9. What is your income per month in dollars US\$?
10. What language(s) do you speak at work?
11. What is your gender?
12. What is your ethnicity?
13. What language(s) do you speak at home?
14. What is your religion?
15. What is your marital status?
16. What is your current employment status?
17. How many children (including dependants) do you have?
18. Would you consider yourself to be internationally-minded?

Your relationship with chocolate

19. Do you eat chocolate?
 - Yes
 - No
 - I used to
20. Did you know that for the last 10 years, the Ivory Coast has been ranked as the world's top exporting country of cocoa beans in terms of both volume and sales?
 - Yes
 - No
21. What is your favourite chocolate?

22. On average, how much time do you spend reading a **chocolate's** label before buying it?

- 0-2 seconds
- 3-10 seconds
- 11-20 seconds
- 21-40 seconds
- 41 seconds or more

23. On average, how much time do you spend reading a **coffee product's** label before buying it?

- 0-2 seconds
- 3-10 seconds
- 11-20 seconds
- 21-40 seconds
- 41 seconds or more

24. On average, how much money do you spend on **chocolate** per month in dollars US\$?
(any product containing cocoa)

25. On average, how much money do you spend on **coffee** per month in dollars US\$?

Your view on value chain transparency and the circular economy

26. What does value chain transparency mean to you?

27. On a scale of 1-10, to what extent do you believe that improved value chain transparency would have an effect on the living income of cocoa farmers **around the world**? (1=no effect; 10=large effect)

Quick facts about Ivory Coast:

- Known as Côte d'Ivoire
- Located in West Africa bordering Burkina Faso, Ghana, Guinea, Liberia, and Mali
- Population: approximately 28 million, of which 6 million people are cocoa farmers (2021 est.)
- Local currency is the CFA franc with ISO currency code XOF (ISO - International Organization for Standardization)
- US\$1 = 569 CFA francs (6th Oct 2021)

28. On a scale of 1-10, to what extent do you believe that improved value chain transparency would have an effect on the living income of cocoa farmers **in Ivory Coast**? (1=no effect; 10=large effect)

Please would you pay extra attention to the next two questions and to the special instructions? Your carefully considered answers will help improve the robustness of the statistical analysis I will conduct after the completion of your survey.

29. In an ideal world, what would you as a consumer say is a fair percentage of the US\$1.00 you pay for chocolate distributed between Farmers, Transporters, Grinders, Manufacturers, Traders, and Retailers? Please ensure your answer adds up to 100%. Please don't select more than 1 answer(s) per row.

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Farmers											
Transporters											
Grinders											
Manufacturers											
Traders											
Retailers											

Special instruction: please would you watch from **9:10 to 9:52** of this video and then come back to the survey: <https://vimeo.com/139873232>

The next question is identical to the one you answered before watching the video. Please would you answer the second appearance of the same question, having reflected on the contents of the video?

- 30.** After watching the video, what would you now say is a fair percentage of the US\$1.00 you pay for chocolate distributed between Farmers, Transporters, Grinders, Manufacturers, Traders, and Retailers? Please ensure your answer adds up to 100%. Please don't select more than 1 answer(s) per row.

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Farmers											
Transporters											
Grinders											
Manufacturers											
Traders											
Retailers											

- 31.** On a scale of 1-10, how much do you know about the circular economy? (0=I've never heard of it; 10=I've read wide and deep on the topic)
- 32.** What have you read about the circular economy? Please feel free to cite authors' names.
- 33.** What three words would you use to describe the circular economy?
- 34.** On a scale of 1-10, to what extent would say that the consumer has a role to play in accelerating the global transition towards a circular economy? (1: no role; 10: a major role)
- 35.** How would you say can a consumer help accelerate and solidify the transition towards a circular economy?

36. On a scale of 1-10, to what extent do you believe that attaining circularity throughout the chocolate value chain would enable all stakeholders, **including farmers**, to achieve and maintain a living income? (1=to a small extent; 10= to a large extent)
37. Would you be willing to pay a premium for chocolate that is certified under the norms of the circular economy framework and whose value chain can be monitored under international transparency standards?
- Yes
 - No
38. If you answered yes to the previous question, what percentage of the retail price would you pay extra?
39. Do you believe that chocolate should be circular and have a transparent value chain and that you should not have to pay a premium for this certification? Yes or no, please.
40. If you can only choose to render one of these two products circular, which one do you pick - chocolate or coffee?
41. Do you as a consumer earn a living wage? Yes or no, please.
42. If and when you buy fair-trade/sustainable/circular products, do you experience a sense of feel-good, a warm glow of giving? Yes or no, please.
43. If yes, how does the warm glow of giving compare with the extra money you paid?
Less consequent, equal consequence, more consequent.
44. Of all the chocolate value chain stakeholders, who is likely to achieve and maintain a living income first?
45. Of all the chocolate value chain stakeholders, who is likely to achieve and maintain a living income last?

46. Do you believe it is a problem if one stakeholder does not achieve a living income? Yes or no, please.
47. Is it a success if all stakeholders achieve and maintain a living income? Yes or no, please.
48. If a farmer earns too little income, do you believe it is a problem that needs to be solved? Yes or no, please.
49. If a stakeholder earns exceptionally high income relative to others in the same market, do you believe it is their right to keep all of the money? Yes or no, please.
50. Is it wrong to redistribute excess returns to those in need? Yes or no, please.
51. Of all the stakeholders in the chocolate value chain, who is responsible for the attainment of improved value chain transparency and circularity? (farmers, transporters, grinder, manufacturers, traders, retailers, consumers)
52. Do you think that if chocolate circularity is achieved, other food sectors will follow by example? Yes or no, please.

Please watch **11:23-11:38** of the following video and kindly return to the survey: <https://vimeo.com/139871735>

53. Do you as a consumer believe it is possible to adapt the chocolate value chain so that farmers **around the world** can achieve and maintain a living income? Yes or no, please.
54. Do you as a consumer believe it is possible to adapt the chocolate value chain so that farmers **in Ivory Coast** can achieve and maintain a living income? Yes or no, please.
55. As a consumer, would you say that improving the lives of cocoa farmers **around the world** depends more on improved value chain transparency, improved implementation of the circular economy, neither of these or both? If neither of these, please do make a suggestion.

- 56.** As a consumer, would you say that improving the lives of cocoa farmers in **Ivory Coast** depends more on improved value chain transparency, improved implementation of the circular economy, neither of these or both? If neither of these, please do make a suggestion.
- 57.** How would you measure the level of improved value chain transparency and circularity implementation throughout the cocoa value chain?
- 58.** How would you improve value chain transparency and circularity from cocoa bean to chocolate bar?
- 59.** On a scale of 1-10, to what extent would you say that current literature on value chain transparency and the circular economy addresses the problem of inadequate income at the farmer's level? (1: to a lesser extent; 10: to a greater extent)

Invitation to interview

- 60.** In the next few weeks after completing this survey, would you like to take part in an online 15-minute interview about chocolate? The goal will be to collect further thoughts you might have on transparency along the cocoa value chain. If you are interested, please add your e-mail address here:

Final page

Thank you for completing this survey. If you have any questions, please email Simeon Human at 10418130@rau.ac.uk and I will be happy to talk more about my research.

Informational video: Big Tree Global Ltd

<https://www.bigtreeglobal.net/films>

Appendix Six – Semi-structured interview questions

Consent to participate in research

Thank you for your interest in participating in this interview. Before proceeding, please take note of the following information:

- By participating in this interview, you agree that your responses will be collected and analysed for the purpose of this research project.
- Your participation is entirely voluntary, and you may withdraw at any time without penalty.
- All data will be anonymized, and your responses will remain confidential. No identifying information will be shared or published.
- The results of this study may be used for academic publications, presentations, or other research-related outputs.

If you have any questions or concerns about this survey or your participation, please contact Simeon Human at 10418130@rau.ac.uk.

By proceeding with this interview, you confirm that you have understood this information and consent to participate in the study.

Semi-structured interview questions

Semi-structured interview questions relating to research question 1: what are the existing constraints of the Ivorian cocoa value chain?

- To what extent would you say that poverty is the root cause of forced child labour and excessive deforestation, as suggested by Boysen et al. (2023)? What else would you say contributes to forced child labour? And to excessive deforestation?

- If the CFA Franc was no longer pegged to the Euro, would this remove the constraints of the Ivorian cocoa value chain (Pérez, 2022) or not, and why? Would cocoa farmers be more likely to maintain a living income? Why?
- What is your opinion on Chinese Foreign Direct Investment in Côte d'Ivoire focusing on investment in agriculture, rather than social welfare (Allou et al., 2020)? What would the effect be of foreign investment in terms of resolving the living income of farmers in Côte d'Ivoire?
- If SDG 1 of ending poverty is achieved, is it likely that SDG 6 of universal access to safe water supply and sanitation will be met under current settings, as per Swe et al. (2021)? Why?

Semi-structured interview questions relating to research question 2: how do consumers perceive value chain transparency?

- Why might some consumers care about companies' supply chain practices even when they (the non-consumers) do not directly benefit from the efforts made (Hofer et al., 2021; Mollenkopf et al., 2021)?
- How might the concepts of transparency, visibility, and trust, be tied together to show the link between the consumer's choice, the provenance of the cocoa bean, and the welfare of the farmer?
- How might consumer evaluations be won back when consumers learn how a company is rectifying their supply chain problems (Nichols et al., 2019)?
- Could Value chain transparency be considered as a tool that companies use to build trust with their consumers? If so, how?

Semi-structured interview questions relating to research question 3: to what extent do consumers believe that achieving circularity would enable Ivorian cocoa farmers to maintain a living income?

- How could consumers' commitment to the circular economy be measured in the context of enabling Ivorian cocoa farmers to maintain a living income?
- Would you say that women are more responsible in adopting sustainable behaviour, unlike young men (Gallo et al., 2023)? What might be the reasons?

- Would you say that living wage research needs to adopt a more person-centric perspective on work and wages? For example, should the lens extend the focus past mere wage rates, towards a clearer understanding of the context in which decent work is completed (Searle & McWha-Hermann, 2021)? How might this work?
- If consumers are really willing to pay 29.5% extra for sustainable (i.e. circular) food products such as chocolate, coffee, tomatoes, and almonds, how might that extra premium best reach the Ivorian cocoa farmer (S. Li & Kallas, 2021)?

Semi-structured interview questions relating to research question 4: how could entrepreneurial circular business models be leveraged to that Ivorian cocoa farmers maintain a living income?

- How would you define entrepreneurship (Bischoff et al., 2020; McGrath & MacMillan, 2000; O'Reilly & Binns, 2019; Pauceanu et al., 2021; Ratten, 2023; Theodoraki et al., 2022; Unger et al., 2009)?
- Would you say that economic poverty leads to the waste of an individual's full human potential (Derrer-Merk et al., 2022; Halkos & Aslanidis, 2023; Maslow, 1943)? Why?
- Would you say that increased inequality between the rich and the poor causes political instability (McKnight, 2019; Oualy, 2021) and armed conflict (Buhaug & Von Uexkull, 2021; Ismail & Olonisakin, 2021)? Why?
- Would you say that the circular economy is designed to reduce waste (Blomsma & Brennan, 2017; Boulding, 1966; Kirchherr et al., 2017; Korhonen et al., 2017, 2018; Merli et al., 2018; Moraga et al., 2019; Morsetto, 2020; Shevchenko et al., 2023; Stahel, 2016; Ying & Li-jun, 2012)? And since economic poverty leads to the waste of an individual's full human potential, would you say that the circular economy is designed to reduce economic poverty (Erdiaw-Kwasie, 2023)? Why would you say so?
- How could entrepreneurial circular business models be leveraged so that Ivorian cocoa farming families maintain "a decent income" (Waarts & Kiewisch, 2021, p.56)?

Semi-structured interview questions relating to Operationalising the Fair Score Framework:

- How could some of the metrics used in the Nutri-Score (Hercberg et al., 2022) and the OECD circularity scoreboard (OECD, 2022) be applied in the cocoa sector?
- How could indicators specific to the Fair Score Framework be aligned with indicators specific to the United Nations Sustainable Development Goals (Sachs et al., 2024)?
- How can it be ensured that the indicators and metrics used in the Fair Score Framework are effective in enabling farmers to achieve and maintain a living income (Giller & de Haas, 2025)?

References

- Aarikka-Stenroos, L., Ritala, P., & Thomas, L. D. W. (2021). Circular economy ecosystems : A typology, definitions, and implications. In *Research Handbook of Sustainability Agency* (pp. 260–276). Edward Elgar. <https://doi.org/10.4337/9781789906035.00024>
- Abbott, R., Orr, N., McGill, P., Whear, R., Bethel, A., Garside, R., Stein, K., & Thompson-Coon, J. (2019). How do “robopets” impact the health and well-being of residents in care homes? A systematic review of qualitative and quantitative evidence. *International Journal of Older People Nursing*, 14(3), e12239. <https://doi.org/10.1111/OPN.12239>
- Abel, A. B., Bernanke, B. S., & Croushore, D. (2024). *Macroeconomics (Eleventh Edition)* (Kindle Edi). Pearson Education.
- Abu, I. O., Szantoi, Z., Brink, A., Robuchon, M., & Thiel, M. (2021). Detecting cocoa plantations in Côte d’Ivoire and Ghana and their implications on protected areas. *Ecological Indicators*, 129, 107863. <https://doi.org/10.1016/J.ECOLIND.2021.107863>
- Agrawal, R., Yadav, V. S., Majumdar, A., Kumar, A., Luthra, S., & Arturo Garza-Reyes, J. (2023). Opportunities for disruptive digital technologies to ensure circularity in supply Chain: A critical review of drivers, barriers and challenges. *Computers & Industrial Engineering*, 178, 109140. <https://doi.org/10.1016/J.CIE.2023.109140>
- Ahene-Codjoe, A. A., Alu, A. A., & Mehrotra, R. (2022). Abnormal pricing in international commodity trading: Evidence from Ghana. *International Economics*, 172, 331–348. <https://doi.org/10.1016/J.INTECO.2022.01.002>
- Ahizi, M. N., Kouman, C. Y., Ouattara, A., Kouamé, N. P., Dede, A., Fairet, E., & Shirley, M. H. (2021). Detectability and impact of repetitive surveys on threatened West African crocodylians. *Ecology and Evolution*, 11(21), 15062–15076. <https://doi.org/10.1002/ECE3.8188>
- Ainsworth, M., & Munoz, J. (1986). *The Cote d’Ivoire Living Standards Survey Design and Implementation* (LSM 26; Living Standards Measurement Study (LSMS) Working Paper). <http://documents.worldbank.org/curated/en/875681468247233266/The-Cote-dIvoire-living-standards-survey-design-and-implementation>
- Alasti, F. M., Asefi, N., Maleki, R., & SeiedlouHeris, S. S. (2020). The influence of three different types and dosage of alkaline on the inherent properties in cocoa powder. *Journal of Food Science and Technology*, 57(7), 2561. <https://doi.org/10.1007/S13197-020->

- Alho, C. F. B. V., da Silva, A. F., Hendriks, C. M. J., Stoorvogel, J. J., Oosterveer, P. J. M., & Smaling, E. M. A. (2021). Analysis of banana and cocoa export commodities in food system transformation, with special reference to certification schemes as drivers of change. *Food Security*, 13(6), 1555–1575. <https://doi.org/10.1007/S12571-021-01219-Y/FIGURES/7>
- Allou, E. J., Adeleye, B. N., Cheng, J., & Abdul, R. (2020). Is there a nexus between China outward foreign direct investment and welfare in Côte d’Ivoire? Empirical evidence from the Toda–Yamamoto procedure. *African Development Review*, 32(3), 499–510. <https://doi.org/10.1111/1467-8268.12456>
- Almås, I., Cappelen, A. W., Sørensen, E. Ø., & Tungodden, B. (2024). Attitudes to inequality: preferences and beliefs. *Oxford Open Economics*, 3(Supplement_1), i64–i79. <https://doi.org/10.1093/OOEC/ODAE001>
- Amoutchi, A. I., Kamelan, T. M., Kargbo, A., Arioste, D., Gneho, D., Kouamelan, E. P., & Mehner, T. (2023). Local fishers’ knowledge on the ecology, economic importance, and threats faced by populations of African snakehead fish, *Parachanna obscura*, within Côte d’Ivoire freshwater ecosystems. *Aquaculture, Fish and Fisheries*. <https://doi.org/10.1002/AFF2.106>
- Anastasiadis, F., Apostolidou, I., & Michailidis, A. (2021). Food Traceability: A Consumer-Centric Supply Chain Approach on Sustainable Tomato. *Foods*, 10(3), 543. <https://doi.org/10.3390/FOODS10030543>
- Andersen, L. E., Andersen, N. N., Anker, R., & Anker, M. (2022). *Report: Living incomes Rural areas and small towns of coffee and cocoa growing regions of Cajamarca, Cusco, Junin, and San Martin, Peru*.
- Anderson, K. (2023). Agriculture’s globalization: Endowments, technologies, tastes and policies. *Journal of Economic Surveys*, 37(4), 1314–1352. <https://doi.org/10.1111/JOES.12529>
- Andersson, J., & Andersson, M. (2019). Beyond Miracle and Malaise. Social Capability in Côte d’Ivoire and Senegal during the Development Era 1930–1980. *Studies in Comparative International Development*, 54(2), 210–232. <https://doi.org/10.1007/S12116-019-09283-4>
- Ando, A., & Modigliani, F. (1963). The “Life-Cycle” Hypothesis of Saving: Aggregate Implications and Tests. *The American Economic Review*, 53(1), 55–84. <http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=14&sid=e8c7bf61-0b32-45e6->

8ee1-2467c5bdd790%40sdc-v-sessmgr03

- Anker, R., & Anker, M. (2017). *Living Wages Around the World: Manual for Measurement*. Edward Elgar Publishing. <https://doi.org/10.4337/9781786431462>
- Antonoplis, S. (2023). Studying Socioeconomic Status: Conceptual Problems and an Alternative Path Forward. *Perspectives on Psychological Science*, 18(2), 275–292. <https://doi.org/10.1177/17456916221093615>
- Arekrans, J., Ritzén, S., & Laurenti, R. (2023). The role of radical innovation in circular strategy deployment. *Business Strategy and the Environment*, 32(3), 1085–1105. <https://doi.org/10.1002/BSE.3108>
- Asante-Poku, N. A., & van Huellen, S. (2021). Commodity exporter's vulnerabilities in times of COVID-19: the case of Ghana. *Canadian Journal of Development Studies*, 42(1–2), 122–144. <https://doi.org/10.1080/02255189.2020.1857225>
- Atangana, A. R., Gngangoh, J. Z., Yao, A. K., Kouakou, T. D., Nda, A. M. N., & Kouamé, C. (2021). Rebuilding Tree Cover in Deforested Cocoa Landscapes in Côte d'Ivoire: Factors Affecting the Choice of Species Planted. *Forests*, 12(2), 198. <https://doi.org/10.3390/F12020198>
- Aubréville, A. (2015). In Search of the Forest in Côte D'ivoire, parts 1 & 2. *BOIS & FORETS DES TROPIQUES*, 1(323). <https://revues.cirad.fr/index.php/BFT/article/view/BFT323-71-101>
- Awan, U., & Sroufe, R. (2022). Sustainability in the Circular Economy: Insights and Dynamics of Designing Circular Business Models. *Applied Sciences*, 12(3), 1521. <https://doi.org/10.3390/APP12031521>
- Ayan, B., Güner, E., & Son-Turan, S. (2022). Blockchain Technology and Sustainability in Supply Chains and a Closer Look at Different Industries: A Mixed Method Approach. *Logistics*, 6(4), 85. <https://doi.org/10.3390/LOGISTICS6040085>
- Bahr, R., Clarsen, B., Derman, W., Dvorak, J., Emery, C. A., Finch, C. F., Häggglund, M., Junge, A., Kemp, S., Khan, K. M., Marshall, S. W., Meeuwisse, W., Mountjoy, M., Orchard, J. W., Pluim, B., Quarrie, K. L., Reider, B., Schwellnus, M., Soligard, T., ... Chamari, K. (2020). International Olympic Committee Consensus Statement: Methods for Recording and Reporting of Epidemiological Data on Injury and Illness in Sports 2020 (Including the STROBE Extension for Sports Injury and Illness Surveillance (STROBE-SIIS)). *Orthopaedic Journal of Sports Medicine*, 8(2). <https://doi.org/10.1177/2325967120902908>
- Bai, C., Quayson, M., & Sarkis, J. (2022). Analysis of Blockchain's enablers for improving

- sustainable supply chain transparency in Africa cocoa industry. *Journal of Cleaner Production*, 358, 131896. <https://doi.org/10.1016/J.JCLEPRO.2022.131896>
- Ballerini, L., & Bergh, S. I. (2021). Using citizen science data to monitor the Sustainable Development Goals: a bottom-up analysis. *Sustainability Science*, 16(6), 1945–1962. <https://doi.org/10.1007/S11625-021-01001-1/TABLES/5>
- Ballet, J., Konaté, F., Kouamé, S. Y., Maternowska, C., & Olié, L. (2022). Child protection policy: Understanding drivers of violence affecting children in Côte d'Ivoire. *Development Policy Review*, 40(1), e12548. <https://doi.org/10.1111/DPR.12548>
- Baltes, S., & Ralph, P. (2022). Sampling in Software Engineering Research: A Critical Review and Guidelines. In *Empirical Software Engineering* (Vol. 27, Issue 4, p. 94).
- Bamberg, K., & Verkuyten, M. (2022). Internal and external motivation to respond without prejudice: a person-centered approach. *Journal of Social Psychology*, 162(4), 435–454. <https://doi.org/10.1080/00224545.2021.1917498>
- Banati, P., Jones, N., & Youssef, S. (2020). Intersecting Vulnerabilities: The Impacts of COVID-19 on the Psycho-emotional Lives of Young People in Low- and Middle-Income Countries. *The European Journal of Development Research*, 32, 1613–1638. <https://doi.org/10.1057/s41287-020-00325-5>
- Banerjee, A. V., & Duflo, E. (2019). *Good economics for hard times: better answers to our biggest problems* (1st ed.). Allen Lane.
- Banning, E. B. (2020). Sampled to Death? The Rise and Fall of Probability Sampling in Archaeology. *American Antiquity*, 86(1), 43–60. <https://doi.org/10.1017/aaq.2020.39>
- Barima, Y. S. S., Konan, G. D., Kouakou, A. T. M., & Bogaert, J. (2020). Cocoa Production and Forest Dynamics in Ivory Coast from 1985 to 2019. *Land*, 9(12). <https://doi.org/10.3390/land9120524>
- Baselgia, E., & Foellmi, R. (2022). *Inequality and growth: A review on a great open debate in economics*. Helsinki: The United Nations University World Institute for Development Economics Research (UNU-WIDER). <https://doi.org/10.35188/UNU-WIDER/2022/136-5>
- Bassett, T. J. (1988). Breaking up the bottlenecks in food-crop and cotton cultivation in northern Côte d'Ivoire. *Africa*, 58(2), 147–174. <https://doi.org/10.2307/1160659>
- Baumol, W. J. (1968). Entrepreneurship in Economic Theory. *The American Economic Review*, 58(2), 64–71.
- Bedasa, Y., & Deksis, K. (2024). Food insecurity in East Africa: An integrated strategy to address climate change impact and violence conflict. *Journal of Agriculture and Food*

- Research*, 15, 100978. <https://doi.org/10.1016/J.JAFR.2024.100978>
- Bekoin, T. R. (2023). Pesticides et développement agricole de la Côte d'Ivoire : le cas du binôme café-cacao, de la colonisation à nos jours. *Environnement, Risques & Santé*, 22(3), 179–184. <https://doi.org/10.1684/ERS.2023.1728>
- Bell, E., Bryman, A., & Harley, B. (2019). *Business Research Methods* (5th ed.). Oxford University Press.
- Benjamin, D., & Deaton, A. (1993). Household Welfare and the Pricing of Cocoa and Coffee in Cote d'Ivoire: Lessons from the Living Standards Surveys. *World Bank Economic Review*, 7(3), 293–318. <https://academic.oup.com/wber/article/7/3/293/1708681>
- Berlan, A. (2016). Whose Business is it Anyway: Children and Corporate Social Responsibility in the International Business Agenda. *Children & Society*, 30, 159–168. <https://doi.org/10.1111/chso.12149>
- Berrone, P., Rousseau, H. E., Ricart, J. E., Brito, E., & Giuliadori, A. (2023). How can research contribute to the implementation of sustainable development goals? An interpretive review of SDG literature in management. *International Journal of Management Reviews*, 25(2), 318–339. <https://doi.org/10.1111/IJMR.12331>
- Berte, S., Dit, D., & Adou, F. (2023). Challenges connected with the energy choice and transition in bakeries of Abidjan, Côte d'Ivoire. *Energy, Sustainability and Society*, 13(1), 1–15. <https://doi.org/10.1186/S13705-022-00378-W>
- Bertrand, W., & De Buhr, E. (2015). Trade, Development and Child Labor: Regulation and Law in the Case of Child Labor in the Cocoa Industry. *Law and Development Review*, 8(2), 503–521. <https://doi.org/10.1515/LDR-2015-0019>
- BEUC The European Consumer Organisation. (2024). *Nutri-Score Factsheet*. www.pronutriscore.org.
- Bhidé, A. (1994). How Entrepreneurs Craft Strategies That Work. *Harvard Business Review*. <https://www.researchgate.net/publication/234612607>
- Bianchi, J., & Mendoza, E. G. (2020). A Fisherian approach to financial crises: Lessons from the Sudden Stops literature. *Review of Economic Dynamics*, 37, S254–S283. <https://doi.org/10.1016/J.RED.2020.06.001>
- Bigliardi, B., & Filippelli, S. (2021). Investigating Circular Business Model Innovation through Keywords Analysis. *Sustainability*, 13(9), 5036. <https://doi.org/10.3390/SU13095036>
- Bischoff, K. M., Gielnik, M. M., & Frese, M. (2020). When capital does not matter: How entrepreneurship training buffers the negative effect of capital constraints on business creation. *Strategic Entrepreneurship Journal*, 14(3), 369–395.

<https://doi.org/10.1002/SEJ.1364>

- Bitty, E. A., Bi, S. G., Bene, J.-C. K., Kouassi, P. K., & McGraw, W. S. (2015). Cocoa Farming and Primate Extirpation Inside Cote D'ivoire's Protected Areas. *Tropical Conservation Science*, 8(1), 95–113. <https://doi.org/10.1177/194008291500800110>
- Bjornlund, V., Henning Bjornlund, , & van Rooyen, A. (2022). Why food insecurity persists in sub-Saharan Africa: A review of existing evidence. *Food Security*, 14, 845–864. <https://doi.org/10.1007/s12571-022-01256-1>
- Blanchard, O., Amighini, A., & Giavazzi, F. (2021). *Macroeconomics: A European Perspective (Fourth Edition)* (Kindle Edi). Pearson Education.
- Bleiker, J., Morgan-Trimmer, S., Knapp, K., Hopkins, S., Knapp, (K, & Hopkins@, S. J. (2019). Navigating the maze: Qualitative research methodologies and their philosophical foundations. *Radiography*, 25, S4–S8. <https://doi.org/10.1016/j.radi.2019.06.008>
- Blomsma, F., & Brennan, G. (2017). The Emergence of Circular Economy: A New Framing Around Prolonging Resource Productivity. *Journal of Industrial Ecology*, 21(3), 603–614. <https://doi.org/10.1111/jiec.12603>
- Boateng, E., Junior, P. O., Gatsi, J. G., Anokye, A. M., Abeka, M. J., & Asafo-Adjei, E. (2023). Institutions and venture capital market development in sub-Saharan Africa. *Journal of International Development*, 36, 1381–1406. <https://doi.org/10.1002/jid.3864>
- Bocken, N. M. P., Pauw, I. de, Bakker, C., & Grinten, B. van der. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320. <https://doi.org/10.1080/21681015.2016.1172124>
- Bocken, N., Strupeit, L., Whalen, K., & Nussholz, J. (2019). A Review and Evaluation of Circular Business Model Innovation Tools. *Sustainability*, 11(8), 2210. <https://doi.org/10.3390/SU11082210>
- Boeckx, P., Bauters, M., & Dewettinck, K. (2020). Poverty and climate change challenges for sustainable intensification of cocoa systems. *Current Opinion in Environmental Sustainability*, 47, 106–111. <https://doi.org/10.1016/J.COSUST.2020.10.012>
- Boegman, S. J., Carodenuto, S., Rebitt, S., Grant, H., & Cisneros, B. (2023). Seeing through transparency in the craft chocolate industry: The what, how, and why of cacao sourcing. *Journal of Agriculture and Food Research*. <https://doi.org/10.1016/j.jafr.2023.100739>
- Bogliacino, F., Charris, R., Codagnone, C., Folkvord, F., Gaskell, G., Gómez, C., Liva, G., & Montealegre, F. (2023). Less is more: Information overload in the labelling of fish and aquaculture products. *Food Policy*, 116. <https://doi.org/10.1016/j.foodpol.2023.102435>
- Borle, P., Reichel, K., Voelter-Mahlknecht, S., Ariza-Montes, A., Mucci, N., & Leal-

- Rodríguez, A. L. (2021). Is There a Sampling Bias in Research on Work-Related Technostress? A Systematic Review of Occupational Exposure to Technostress and the Role of Socioeconomic Position. *International Journal of Environmental Research and Public Health*, 18(4), 2071. <https://doi.org/10.3390/IJERPH18042071>
- Bougrine, H., & Rochon, L.-P. (2022). *A brief history of economic thought: from the mercantilists to the post-Keynesians*. Edward Elgar Publishing. https://books.google.com/books/about/A_Brief_History_of_Economic_Thought.html?id=urp8EAAAQBAJ
- Boulding, K. (1966). The Economics of the Coming Spaceship Earth. In H. Jarrett (Ed.), *Environmental Quality in a Growing Economy* (pp. 3–14). The Johns Hopkins Press.
- Bouwman, H., Nikou, S., & de Reuver, M. (2019). Digitalization, business models, and SMEs: How do business model innovation practices improve performance of digitalizing SMEs? *Telecommunications Policy*, 43(9), 101828. <https://doi.org/10.1016/J.TELPOL.2019.101828>
- Boysen, O., Ferrari, E., Nechifor, V., & Tillie, P. (2021). *Impacts of the Cocoa Living Income Differential Policy in Ghana and Côte d'Ivoire Economics of Agriculture in Côte d'Ivoire*. <https://doi.org/10.2760/984346>
- Boysen, O., Ferrari, E., Nechifor, V., & Tillie, P. (2023). Earn a living? What the Côte d'Ivoire–Ghana cocoa living income differential might deliver on its promise. *Food Policy*, 114. <https://doi.org/10.1016/J.FOODPOL.2022.102389>
- Brans, L. (2023). “Who made my clothes?” how transparency apps bring politics to cultural fields. *Journal of Consumer Culture*. <https://doi.org/10.1177/14695405231166875/FORMAT/EPUB>
- Brenner, B. (2018). Transformative Sustainable Business Models in the Light of the Digital Imperative—A Global Business Economics Perspective. *Sustainability*, 10(12), 4428. <https://doi.org/10.3390/SU10124428>
- Britannica. (2023). *Côte d'Ivoire - Rural Areas, Markets, and Deforestation in Côte d'Ivoire*. <https://www.britannica.com/place/Cote-dIvoire/Settlement-patterns>
- Bryman, A. (1994). The Mead/Freeman Controversy: Some Implications for Qualitative Researchers. In Burgess RG (Ed.), *Studies in Qualitative Methodology Volume 4*. JAI Press.
- Budler, M., Quiroga, B. F., & Trkman, P. (2024). A review of supply chain transparency research: Antecedents, technologies, types, and outcomes. *Journal of Business Logistics*, 45(1). <https://doi.org/10.1111/JBL.12368>

- Buhaug, H., & Von Uexkull, N. (2021). Vicious Circles: Violence, Vulnerability, and Climate Change. *Annual Review of Environment and Resources*, 46, 545–568. <https://doi.org/10.1146/annurev-environ-012220>
- Busquet, M., Bosma, N., & Hummels, H. (2021). A multidimensional perspective on child labor in the value chain: The case of the cocoa value chain in West Africa. *World Development*, 146. <https://doi.org/10.1016/J.WORLDDEV.2021.105601>
- Camic, P. M., Rossi-Harries, S., Harding, E., Harrison, C. R., Sullivan, M. P., Grillo, A., Brotherhood, E. V., & Crutch, S. J. (2023). Talking Lines: A Research Protocol Integrating Verbal and Visual Narratives to Understand the Experiences of People Affected by Rarer Forms of Dementia. *International Journal of Qualitative Methods*, 22, 1–10. <https://doi.org/10.1177/16094069231176195>
- Campiglio, E., Dumas, L., Monnin, P., & von Jagow, A. (2023). Climate-related risks in financial assets. *Journal of Economic Surveys*, 37(3), 950–992. <https://doi.org/10.1111/JOES.12525>
- Canagarajah, S., & Nielsen, H. S. (2001). Child Labor in Africa: A Comparative Study. *Annals of the American Academy of Political and Social Science*, 575, 71–91. <https://doi.org/10.1177/0002716201575001005>
- Canning, A. (2023). Fair Trade factory farms: a false solution to a real problem. *Journal of Fair Trade*, 4(1), 1–14. <https://doi.org/10.2307/48745273>
- Capurso, A. (2024). The Mediterranean diet: a historical perspective. *Aging Clinical and Experimental Research*, 36(1), 1–6. <https://doi.org/10.1007/S40520-023-02686-3>
- Carnevali, E., & Ystehede, A. P. (2023). Is socialism back? A review of contemporary economic literature. *Journal of Economic Surveys*, 37(2), 239–270. <https://doi.org/10.1111/joes.12488>
- Carodenuto, S. (2019). Governance of zero deforestation cocoa in West Africa: New forms of public-private interaction. *Environmental Policy & Governance*, 29(1), p55-66, 12p. <https://doi.org/10.1002/eet.1841>
- Carodenuto, S., & Buluran, M. (2021). The effect of supply chain position on zero-deforestation commitments: evidence from the cocoa industry. *Journal of Environmental Policy & Planning*, 23(6), 716–731. <https://doi.org/10.1080/1523908X.2021.1910020>
- Carruba, M. O., Caretto, A., De Lorenzo, A., Fatati, G., Ghiselli, A., Lucchin, L., Maffei, C., Malavazos, A., Malfi, G., Riva, E., Ruocco, C., Santini, F., Silano, M., Valerio, A., Vania, A., & Nisoli, E. (2022). Front-of-pack (FOP) labelling systems to improve the quality of nutrition information to prevent obesity: NutrInform Battery vs Nutri-Score. *Eating and*

- Weight Disorders*, 27(5), 1575–1584. <https://doi.org/10.1007/S40519-021-01316-Z/FIGURES/2>
- Castellani, P., Ferronato, N., & Torretta, V. (2022). Setting priorities to achieve Sustainable Development Goals through appropriate waste management systems in Uganda. *Environmental Development*, 44, 100764. <https://doi.org/10.1016/J.ENVDEV.2022.100764>
- Chai, H. H., Gao, S. S., Chen, K. J., Duangthip, D., Chin, E., Lo, M., Chu, C. H., Chai, H. H. ;, Gao, S. S. ;, Chen, K. J. ;, Duangthip, D. ;, Lo, E. C. M. ;, & Chu, C. H. A. (2021). A Concise Review on Qualitative Research in Dentistry. *International Journal of Environmental Research and Public Health*, 18(3), 942. <https://doi.org/10.3390/IJERPH18030942>
- Chandan, A., John, M., & Potdar, V. (2023). Achieving UN SDGs in Food Supply Chain Using Blockchain Technology. *Sustainability*, 15(3), 2109. <https://doi.org/10.3390/SU15032109>
- Chapman, C. A., Abernathy, K., Chapman, L. J., Downs, C., Effiom, E. O., Gogarten, J. F., Golooba, M., Kalbitzer, U., Lawes, M. J., Mekonnen, A., Omeja, P., Razafindratsima, O., Sheil, D., Tabor, G. M., Tumwesigye, C., & Sarkar, D. (2022). The future of sub-Saharan Africa’s biodiversity in the face of climate and societal change. *Frontiers in Ecology and Evolution*, 10, 790552. <https://doi.org/10.3389/FEVO.2022.790552/BIBTEX>
- Charef, R., Emmitt, S., Alaka, H., & Fouchal, F. (2019). Building Information Modelling adoption in the European Union: An overview. *Journal of Building Engineering*, 25(100777). <https://doi.org/10.1016/j.jobe.2019.100777>
- Chatelain, C., Gautier, L., & Spichiger, R. (1996). Deforestation in southern Côte d’Ivoire: a high-resolution remote sensing approach. In L. van der Maesen, X. van der Burgt, & J. van Medenbach de Rooy (Eds.), *BIODIVERSITY OF AFRICAN PLANTS* (pp. 259–266). https://doi.org/10.1007/978-94-009-0285-5_34
- Chauhan, C., Parida, V., & Dhir, A. (2022). Linking circular economy and digitalisation technologies: A systematic literature review of past achievements and future promises. *Technological Forecasting and Social Change*, 177, 121508. <https://doi.org/10.1016/J.TECHFORE.2022.121508>
- Chávez-Dulanto, P. N., Thiry, A. A. A., Glorio-Paulet, P., Vögler, O., & Carvalho, F. P. (2021). Increasing the impact of science and technology to provide more people with healthier and safer food. *Food and Energy Security*, 10(1), e259. <https://doi.org/10.1002/FES3.259>
- Chen, L., Lee, H. L., & Tang, C. S. (2022). Supply chain fairness. *Production and Operations*

- Management*, 31(12). <https://doi.org/10.1111/poms.13849>
- Choi, J., Suryanto, B. H. R., Wang, D., Du, H. L., Hodgetts, R. Y., Ferrero Vallana, F. M., MacFarlane, D. R., & Simonov, A. N. (2020). Identification and elimination of false positives in electrochemical nitrogen reduction studies. *Nature Communications*, 11(1), 1–10. <https://doi.org/10.1038/s41467-020-19130-z>
- CIRAD. (2024a). *Ivory Coast - CIRAD*. <https://www.cirad.fr/en/worldwide/our-regional-offices/west-africa-forest-and-humid-savannah/pays/ivory-coast>
- CIRAD. (2024b). *Sustainability of production systems and new dynamics in the cocoa sector - Cocoa4Future - Cirad*. <https://www.cirad.fr/en/worldwide/cirad-worldwide/projects/cocoa4future-project>
- Clément, M., Rougier, E., Berrou, J. P., Combarous, F., & Darbon, D. (2022). “What’s in the middle”: Scratching beneath the surface of the middle class(es) in Brazil, Côte d’Ivoire, Turkey and Vietnam. *World Development*, 158, 105988. <https://doi.org/10.1016/J.WORLDDEV.2022.105988>
- Cloutier, C., & Ravasi, D. (2021). Using tables to enhance trustworthiness in qualitative research. *Strategic Organization*, 19(1), 113–133. <https://doi.org/10.1177/1476127020979329>
- Cogneau, D., & Jedwab, R. (2012). Commodity Price Shocks and Child Outcomes: The 1990 Cocoa Crisis in Cote d’Ivoire *. *Economic Development and Cultural Change*, 60(3), 507–534. <https://doi.org/10.1086/664017>
- Colin-Jaeger, N., Delcey, T., & Colin, N. (2020). When efficient market hypothesis meets Hayek on information: beyond a methodological reading. *Journal of Economic Methodology*, 27(2), 97–116. <https://doi.org/10.1080/1350178X.2019.1675896>
- Colombo, S. M., Roy, K., Mraz, J., Wan, A. H. L., Davies, S. J., Tibbetts, S. M., Øverland, M., Francis, D. S., Rocker, M. M., Gasco, L., Spencer, E., Metian, M., Trushenski, J. T., & Turchini, G. M. (2023). Towards achieving circularity and sustainability in feeds for farmed blue foods. *Reviews in Aquaculture*, 15(3), 1115–1141. <https://doi.org/10.1111/RAQ.12766>
- Conroy, C. P. (2010). *France as a Negative Influence on the Côte d’Ivoire: The Consequences of Foreign Interference* [Salve Regina University]. https://digitalcommons.salve.edu/pell_theses
- Corona, B., Shen, L., Reike, D., Rosales Carreón, J., & Worrell, E. (2019). Towards sustainable development through the circular economy—A review and critical assessment on current circularity metrics. *Resources, Conservation and Recycling*, 151, 104498.

- <https://doi.org/10.1016/J.RESCONREC.2019.104498>
- Corvellec, H., Stowell, A. F., & Johansson, N. (2022). Critiques of the circular economy. *Journal of Industrial Ecology*, 26(2), 421–432. <https://doi.org/10.1111/JIEC.13187>
- Coulibaly-Ballet, M. (2021). The Role of the Fairtrade Label in the Spread of Sustainable Production and Responsible Consumption in West Africa: The Case of Côte d'Ivoire. In *Marketing for Sustainable Development* (pp. 195–215). John Wiley & Sons, Ltd. <https://doi.org/10.1002/9781119882176.CH11>
- Coulibaly, S. K., & Erbao, C. (2019). An empirical analysis of the determinants of cocoa production in Cote d'Ivoire. *Journal of Economic Structures*, 8(1), 5. <https://doi.org/10.1186/s40008-019-0135-5>
- Craven, M. (2015). Between law and history: the Berlin Conference of 1884-1885 and the logic of free trade. *London Review of International Law*, 3(1), 31–59. <https://doi.org/10.1093/LRIL/LRV002>
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative & Mixed Methods Approaches* (5th ed.). SAGE Publications Ltd.
- Cullen, U. A., De Angelis, R., Alpsahin Cullen, U., & De Angelis, R. (2021). Circular entrepreneurship: A business model perspective. *Resources, Conservation and Recycling*, 168, 105300. <https://doi.org/10.1016/j.resconrec.2020.105300>
- Degtiar, I., & Rose, S. (2023). A Review of Generalizability and Transportability. *Annual Review of Statistics and Its Application*, 10, 501–524. <https://doi.org/10.1146/annurev-statistics-042522>
- Delabre, I., Alexander, A., & Rodrigues, C. (2020). Strategies for tropical forest protection and sustainable supply chains: challenges and opportunities for alignment with the UN sustainable development goals. *Sustainability Science*, 15(6), 1637–1651. <https://doi.org/10.1007/S11625-019-00747-Z/TABLES/4>
- Delcey, T., & Sergi, F. (2023). The efficient market hypothesis and rational expectations macroeconomics. How did they meet and live (happily) ever after? *The European Journal of the History of Economic Thought*, 30(1), 86–116. <https://doi.org/10.1080/09672567.2022.2108869>
- Delic, M., & Eysers, D. R. (2020). The effect of additive manufacturing adoption on supply chain flexibility and performance: An empirical analysis from the automotive industry. *International Journal of Production Economics*, 228, 107689. <https://doi.org/10.1016/J.IJPE.2020.107689>
- DeLuca-Acconi, R. A. (2017). Empowering Social Workers to Transform the Dominant

- Narrative: Advocating for Human Rights over Corporate Profit. *Journal of Human Rights and Social Work*, 2(1–2), 3–15. <https://doi.org/10.1007/S41134-016-0025-9/TABLES/4>
- Demetriou, C., Hu, L., Smith, T. O., & Hing, C. B. (2019). Hawthorne effect on surgical studies. *ANZ Journal of Surgery*, 89(12), 1567–1576. <https://doi.org/10.1111/ANS.15475>
- Derrer-Merk, E., Ferson, S., Mannis, A., Bentall, R. P., & Bennett, K. M. (2022). Belongingness challenged: Exploring the impact on older adults during the COVID-19 pandemic. *PloS One*, 17(10). <https://doi.org/10.1371/JOURNAL.PONE.0276561>
- Deschasaux, M., Huybrechts, I., Julia, C., Hercberg, S., Egnell, M., Srouf, B., Kesse-Guyot, E., Latino-Martel, P., Biessy, C., Casagrande, C., Murphy, N., Jenab, M., Ward, H. A., Weiderpass, E., Overvad, K., Tjønneland, A., Linn Rostgaard-Hansen, A., Boutron-Ruault, M.-C., Romana Mancini, F., ... Touvier, M. (2020). Association between nutritional profiles of foods underlying Nutri-Score front-of-pack labels and mortality: EPIC cohort study in 10 European countries. *BMJ*, 370, 3173. <https://doi.org/10.1136/bmj.m3173>
- Diallo, M., & Wouterse, F. (2022). Agricultural development promises more growth and less poverty in Africa: Modelling the potential impact of implementing the Comprehensive Africa Agriculture Development Programme in six countries. *Development Policy Review*, e12669. <https://doi.org/10.1111/DPR.12669>
- Diarrassouba, A., Gnagbo, A., Célestin Kouakou, Y., Campbell, G., Tiedoué, M. R., Tondossama, A., Köhl, H. S., & Koné, I. (2020). Differential response of seven duiker species to human activities in Taï National Park, Côte d'Ivoire. *African Journal of Ecology*, 58(1), 58–68. <https://doi.org/10.1111/AJE.12680>
- Díaz-Muñoz, C., & De Vuyst, L. (2022). Functional yeast starter cultures for cocoa fermentation. *Journal of Applied Microbiology*, 133(1), 39–66. <https://doi.org/10.1111/JAM.15312>
- Díaz-Valderrama, J. R., Leiva-Espinoza, S. T., & Aime, M. C. (2020). The history of cacao and its diseases in the Americas. *Phytopathology*, 110(10), 1604–1619. <https://doi.org/10.1094/PHYTO-05-20-0178-RVW/ASSET/IMAGES/LARGE/PHYTO-05-20-0178-RVWT2.JPEG>
- Didier, E. (2022). Free from Numbers? The Politics of Qualitative Sociology in the US Since 1945. In A. Mennicken & R. Salais (Eds.), *The New Politics of Numbers: Utopia, Evidence and Democracy* (pp. 417–463). Palgrave Macmillan.
- Djezou, W. (2016). Land Tenure Security and Deforestation: A case Study of Forest land conversion to Perennial crops in Côte d'Ivoire. *Economics Bulletin*, 36(1), 173–186.

- Do Canto, N. R., Grunert, K. G., de Barcellos, M. D., Rohenkohl do Canto, N., Grunert, K. G., Dutra de Barcellos, M., Borrello, M., & Cembalo, L. (2021). Circular Food Behaviors: A Literature Review. *Sustainability*, 13(4), 1872. <https://doi.org/10.3390/su13041872>
- Doherty, J. (2021). Mobilizing social reproduction: gendered mobility and everyday infrastructure in Abidjan. *Mobilities*, 16(5), 758–774. <https://doi.org/10.1080/17450101.2021.1944288>
- Doua-Bi, G. Y. A., Zo-Bi, I. C., Amani, B. H. K., Elogne, A. G. M., N'dja, J. K., N'Guessan, A. E., & Hérault, B. (2021). Taking advantage of natural regeneration potential in secondary forests to recover commercial tree resources in Côte d'Ivoire. *Forest Ecology and Management*, 493. <https://doi.org/10.1016/J.FORECO.2021.119240>
- Drakopoulos, S. A. (2021). The marginalization of absolute and relative income hypotheses of consumption and the role of fiscal policy. *The European Journal of the History of Economic Thought*, 28(6), 965–984. <https://doi.org/10.1080/09672567.2021.1946120>
- Duan, Y., & Aloysius, J. A. (2019). Supply chain transparency and willingness-to-pay for refurbished products. *International Journal of Logistics Management*, 30(3), 797–820. <https://doi.org/10.1108/IJLM-01-2019-0025/FULL/XML>
- Dumbrell, N. P., Adamson, D., & Wheeler, S. A. (2020). Is social licence a response to government and market failures? Evidence from the literature. *Resources Policy*, 69, 101827. <https://doi.org/10.1016/J.RESOURPOL.2020.101827>
- Durach, C. F., Blesik, T., von Düring, M., & Bick, M. (2021). Blockchain Applications in Supply Chain Transactions. *Journal of Business Logistics*, 42(1), 7–24. <https://doi.org/10.1111/JBL.12238>
- Durán-Romero, G., López, A. M., Beliaeva, T., Ferasso, M., Garonne, C., & Jones, P. (2020). Bridging the gap between circular economy and climate change mitigation policies through eco-innovations and Quintuple Helix Model. *Technological Forecasting & Social Change*, 160. <https://doi.org/10.1016/j.techfore.2020.120246>
- Duran, D., Sieleunou, I., & Özaltın, E. (2020). *HEALTH SYSTEMS ASSESSMENT FOR CÔTE D'IVOIRE Accelerating Reforms toward Universal Health Coverage*.
- Ebinger, F., & Omondi, B. (2020). Leveraging Digital Approaches for Transparency in Sustainable Supply Chains: A Conceptual Paper. *Sustainability*, 12(15), 6129. <https://doi.org/10.3390/SU12156129>
- Eddy, L. H., Bingham, D. D., Crossley, K. L., Shahid, N. F., Ellingham-Khan, M., Otteslev, A., Figueredo, N. S., Mon-Williams, M., & Hill, L. J. B. (2020). The validity and reliability of observational assessment tools available to measure fundamental movement

- skills in school-age children: A systematic review. *PLOS ONE*, 15(8), e0237919. <https://doi.org/10.1371/JOURNAL.PONE.0237919>
- Egami, N., & Hartman, E. (2023). Elements of External Validity: Framework, Design, and Analysis. *American Political Science Review*, 117, 1070–1088. <https://doi.org/10.1017/S0003055422000880>
- Ehui, S. K., & Hertel, T. W. (1989). Deforestation and Agricultural Productivity in the Côte d'Ivoire. *American Journal of Agricultural Economics*, 71(3), 703–711. <https://doi.org/10.2307/1242026>
- Eisenreich, A., Füller, J., Stuchtey, M., & Gimenez-Jimenez, D. (2022). Toward a circular value chain: Impact of the circular economy on a company's value chain processes. *Journal of Cleaner Production*, 378, 134375. <https://doi.org/10.1016/j.jclepro.2022.134375>
- El-Den, S., Schneider, C., Mirzaei, A., & Carter, S. (2020). How to measure a latent construct: Psychometric principles for the development and validation of measurement instruments. *International Journal of Pharmacy Practice*, 28(4), 326–336. <https://doi.org/10.1111/IJPP.12600>
- Ellenbogen, M. (2003). Can the Tariff Act Combat Endemic Child Labor Abuses - The Case of Cote d'Ivoire. *Texas Law Review*, 82. <https://heinonline.org/HOL/Page?handle=hein.journals/tlr82&id=1331&div=&collection=>
- Enax, L., Krajbich, I., & Weber, B. (2016). Salient nutrition labels increase the integration of health attributes in food decision-making. *Judgment and Decision Making*, 11(5), 460–471. <https://doi.org/10.1017/S1930297500004563>
- Endörfer, R., & Larue, L. (2024). What's the Point of Efficiency? On Heath's Market Failures Approach. *Business Ethics Quarterly*, 34(1), 35–59. <https://doi.org/10.1017/BEQ.2022.21>
- Erdiaw-Kwasie, M. O. (2023). Circularity Challenges in SDGs Implementation: A Review in Context. In *Circular Economy Strategies and the UN Sustainable Development Goals* (pp. 3–18). https://doi.org/10.1007/978-981-99-3083-8_1
- Erhun, F., Kraft, T., & Wijnsmas, S. (2021). Sustainable Triple-A Supply Chains. *Production and Operations Management*, 30(3), 644–655. <https://doi.org/10.1111/POMS.13306>
- Erken, H., Donselaar, P., & Thurik, R. (2018). Total factor productivity and the role of entrepreneurship. *J Technol Transf*, 43, 1493–1521. <https://doi.org/10.1007/s10961-016-9504-5>

- Espinosa, V. I., Neira, M. A. A., & de Soto, J. H. (2021). Principles of Sustainable Economic Growth and Development: A Call to Action in a Post-COVID-19 World. *Sustainability*, 13(23), 13126. <https://doi.org/10.3390/SU132313126>
- Etikan, I., & Babatope, O. (2019). A Basic Approach in Sampling Methodology and Sample Size Calculation. *MedLife Clinics*, 1, 1006.
- Evans, M. (2004). Culture and empire 1830-1962: An overview. In *Empire and Culture: The French Experience 1830-1940* (pp. 1–23). Palgrave Macmillan. https://doi.org/10.1057/9780230000681_1/COVER
- Favourate, Y., & Sebele-Mpofu, | Y. (2020). Saturation controversy in qualitative research: Complexities and underlying assumptions. A literature review. *Cogent Social Sciences*, 6(1). <https://doi.org/10.1080/23311886.2020.1838706>
- Feddersen, N. B., Morris, R., Ronkainen, N. J., Sæther, S. A., Littlewood, M. A., & Richardson, D. J. (2021). A Qualitative Meta-Study of a Decade of the Holistic Ecological Approach to Talent Development. *Scandinavian Journal of Sport and Exercise Psychology*, 3, 24–39. <https://doi.org/10.7146/SJSEP.V3I.128317>
- Feng, G., & Zhang, M. (2021). A Literature Review on Digital Finance, Consumption Upgrading and High-quality Economic Development. *Journal of Risk Analysis and Crisis Response*, 11(4), 189–197. <https://doi.org/10.54560/JRACR.V11I4.312>
- Fenton III, R. P. (2020). Cacao capitalism in coastal Ecuador: Production processes and accumulation in non-transitional agrarian capitalism during the long 19th century. *Journal of Agrarian Change*, 20, 618–636. <https://doi.org/10.1111/joac.12387>
- Ferasso, M., Beliaeva, T., Kraus, S., Clauss, T., & Ribeiro-Soriano, D. (2020). Circular economy business models: The state of research and avenues ahead. *Business Strategy and the Environment*, 29(8), 3006–3024. <https://doi.org/10.1002/bse.2554>
- Ferreira, I. A., Gisselquist, R. M., & Tarp, F. (2022). On the Impact of Inequality on Growth, Human Development, and Governance. *International Studies Review*, 24(1), 58. <https://doi.org/10.1093/ISR/VIAB058>
- Field, A. (2018). *Discovering Statistics Using IBM SPSS Statistics* (5th ed.). SAGE Publications Ltd.
- Findley, M. G., Kikuta, K., & Denly, M. (2021). External Validity. *Annual Review of Political Science*, 24, 365–393. <https://doi.org/10.1146/annurev-polisci-041719>
- Flemming, K., Atkin, K., Ward, C., & Watt, I. (2019). Adult family carers' perceptions of their educational needs when providing end-of-life care: a systematic review of qualitative research. *AMRC Open Research*, 1(2), 1–26.

- <https://doi.org/10.12688/amrcopenres.12855.1>
- Folke, C., Polasky, S., Rockström, J., Galaz, V., Westley, F., Le Lamont, M., Scheffer, M., Sterblom, H. O. ., Carpenter, S. R., Chapin, F. S., Seto, K. C., Weber, E. U., Crona, B. I., Daily, G. C., Dasgupta, P., Gaffney, O., Gordon, L. J., Hoff, H., Levin, S. A., ... Walker, B. H. (2021). Our future in the Anthropocene biosphere. *Ambio*, 50, 834–869. <https://doi.org/10.1007/s13280-021-01544-8>
- Food and Agriculture Organization of the United Nations. (2024). *FAO Statistical Database*. <https://www.fao.org/faostat/en/#data/QCL>
- Ford, S. A., Jepsen, M. R., Kingston, N., Lewis, E., Brooks, T. M., MacSharry, B., & Mertz, O. (2020). Deforestation leakage undermines conservation value of tropical and subtropical forest protected areas. *Global Ecology and Biogeography*, 29(11), 2014–2024. <https://doi.org/10.1111/GEB.13172>
- Försterling, G., Orth, R., & Gellert, B. (2023). Transition to a Circular Economy in Europe through New Business Models: Barriers, Drivers, and Policy Making. *Sustainability*, 15(10), 8212. <https://doi.org/10.3390/su15108212>
- Fraisl, D., Campbell, J., See, L., Wehn, U., Wardlaw, J., Gold, M., Moorthy, I., Arias, R., Piera, J., Oliver, J. L., Masó, J., Penker, · Marianne, & Steffen Fritz, ·. (2020). Mapping citizen science contributions to the UN sustainable development goals. *Sustainability Science*, 15, 1735–1751. <https://doi.org/10.1007/s11625-020-00833-7>
- Friedman, M. (1957). *A Theory of the Consumption Function*. ProQuest Ebook Central. Picker Partners Publishing. <https://ebookcentral.proquest.com>
- Friedman, M. (2020). *A Theory of the Consumption Function*. Dover Publications, Inc.
- Fritsche, U., Brunori, G., Chiaramonti, D., Galanakis, C. M., Hellweg, S., Matthews, R., & Panoutsou, C. (2020). *Future transitions for the Bioeconomy towards Sustainable Development and a Climate-Neutral Economy Knowledge Synthesis Final Report*. <https://doi.org/10.2760/667966>
- Fritz, S., See, L., Carlson, T., Haklay, M. (Muki), Oliver, J. L., Fraisl, D., Mondardini, R., Brocklehurst, M., Shanley, L. A., Schade, S., Wehn, U., Abrate, T., Anstee, J., Arnold, S., Billot, M., Campbell, J., Espey, J., Gold, M., Hager, G., ... West, S. (2019). Citizen science and the United Nations Sustainable Development Goals. *Nature Sustainability*, 2(10), 922–930. <https://doi.org/10.1038/s41893-019-0390-3>
- Gallo, T., Pacchera, F., Cagnetti, C., & Silvestri, C. (2023). Do Sustainable Consumers Have Sustainable Behaviors? An Empirical Study to Understand the Purchase of Food Products. *Sustainability*, 15(5), 4462. <https://doi.org/10.3390/SU15054462>

- Gama-Rodrigues, A. C., Müller, M. W., Gama-Rodrigues, E. F., & Mendes, F. A. T. (2021). Cacao-based agroforestry systems in the Atlantic Forest and Amazon Biomes: An ecoregional analysis of land use. *Agricultural Systems*, 194, 103270. <https://doi.org/10.1016/J.AGSY.2021.103270>
- Gboko, K. C., Ruf, F., & Faure, G. (2021). Orchestrating a Multi-Stakeholder Supply Chain Network: The Case of Exporters in Cocoa Certification in Cote d'Ivoire. *Journal of Innovation Economics & Management*, 1(34), 33–56. <https://doi.org/10.3917/JIE.034.0033>
- Geng, Y., Sarkis, J., & Bleischwitz, R. (2019). How to globalize the circular economy. *Nature*, 565(7738), 153–155. <https://doi.org/10.1038/d41586-019-00017-z>
- Gereffi, G., Humphrey, J., & Sturgeon, T. (2006). The governance of global value chains. *Review of International Political Economy*, 12(1), 78–104. <https://doi.org/10.1080/09692290500049805>
- German Federal Ministry for Economic Cooperation. (2021). *Guiding steps towards living income in the supply chain: How to mainstream living income in your company's activities*.
- Ghisellini, P., Ncube, A., Rotolo, G., Vassillo, C., Kaiser, S., Passaro, R., & Ulgiati, S. (2023). Evaluating Environmental and Energy Performance Indicators of Food Systems, within Circular Economy and “Farm to Fork” Frameworks. *Energies*, 16(4), 1671. <https://doi.org/10.3390/EN16041671>
- Ghisellini, P., & Ulgiati, S. (2020). Circular economy transition in Italy. Achievements, perspectives and constraints. *Journal of Cleaner Production*, 243, 118360. <https://doi.org/10.1016/J.JCLEPRO.2019.118360>
- Gilbert, C. L. (2024). Cocoa: Origin Differentials and the Living Income Differential. *The European Journal of Development Research*, 1–26. <https://doi.org/10.1057/S41287-023-00612-X>
- Giller, K. E. (2020). The Food Security Conundrum of sub-Saharan Africa. *Global Food Security*, 26, 100431. <https://doi.org/10.1016/J.GFS.2020.100431>
- Giller, K. E., & de Haas, M. (2025). *Pathways to African Food Security: Challenges, Threats and Opportunities towards 2050* (1st Editio). Routledge. <https://doi.org/10.4324/9781032649696>
- Giller, K. E., Delaune, T., Silva, J. V., Descheemaeker, K., van de Ven, G., Schut, A. G. T., van Wijk, M., Hammond, J., Hochman, Z., Taulya, G., Chikowo, R., Narayanan, S., Kishore, A., Bresciani, F., Teixeira, H. M., Andersson, J. A., & van Ittersum, M. K.

- (2021a). The future of farming: Who will produce our food? *Food Security*, 13(5), 1073–1099. <https://doi.org/10.1007/S12571-021-01184-6>
- Giller, K. E., Delaune, T., Silva, J. V., van Wijk, M., Hammond, J., Descheemaeker, K., van de Ven, G., Schut, A. G. T., Taulya, G., Chikowo, R., & Andersson, J. A. (2021b). Small farms and development in sub-Saharan Africa: Farming for food, for income or for lack of better options? *Food Security*, 13(6), 1431–1454. <https://doi.org/10.1007/S12571-021-01209-0>
- Ginio, R. (2006). *French Colonialism Unmasked: The Vichy Years in French West Africa*. University of Nebraska Press. https://books.google.fr/books?hl=en&lr=&id=jaHZxkPJzKMC&oi=fnd&pg=PP9&ots=UZy9O7gdYA&sig=FV0w9N8ts1BrgqPmLdbshkgOR4&redir_esc=y#v=onepage&q&f=false
- Githinji, M., van Noordwijk, M., Muthuri, C., Speelman, E. N., & Jan Hofstede, G. (2023). Farmer land-use decision-making from an instrumental and relational perspective. *Current Opinion in Environmental Sustainability*, 63, 101303. <https://doi.org/10.1016/J.COSUST.2023.101303>
- Gligor, D. M., Davis-Sramek, B., Tan, A., Vitale, A., Russo, I., Golgeci, I., & Wan, X. (2022). Utilizing blockchain technology for supply chain transparency: A resource orchestration perspective. *Journal of Business Logistics*, 43(1), 140–159. <https://doi.org/10.1111/JBL.12287>
- Gomes, G. M., Moreira, N., & Ometto, A. R. (2022). Role of consumer mindsets, behaviour, and influencing factors in circular consumption systems: A systematic review. *Sustainable Production and Consumption*, 32, 1–14. <https://doi.org/10.1016/J.SPC.2022.04.005>
- González-Sánchez, R., Settembre-Blundo, D., Ferrari, A. M., & García-Muiña, F. E. (2020). Main Dimensions in the Building of the Circular Supply Chain: A Literature Review. *Sustainability*, 12(6), 2459. <https://doi.org/10.3390/SU12062459>
- González, A., Guinness, S. M., Murphy, E., Kelliher, G., & Hagin-Meade, L. (2023). Priorities, Scale and Insights: Opportunities and Challenges for Community Involvement in SDG Implementation and Monitoring. *Sustainability*, 15(6), 4971. <https://doi.org/10.3390/SU15064971>
- Google Maps. (2025). *San-Pédro - Google Maps*. <https://www.google.com/maps/place/San-Pédro,+Côte+d'Ivoire/@5.8498633,-7.7857739,7z/data=!4m6!3m5!1s0xf9633c16eea0803:0x35a152794dfaf968!8m2!3d4.85>

80767!4d-

6.9209135!16s%2Fg%2F11bx56g03j?entry=tту&g_ep=EgoyMDI1MDExNC4wIKXM
DSoASAFQAw%3D%3D

- Grabs, J., & Carodenuto, S. L. (2021). Traders as sustainability governance actors in global food supply chains: A research agenda. *Business Strategy and the Environment*, 30(2), 1314–1332. <https://doi.org/10.1002/BSE.2686>
- Grafström, J., & Aasma, S. (2021). Breaking circular economy barriers. *Journal of Cleaner Production*, 292, 126002. <https://doi.org/10.1016/J.JCLEPRO.2021.126002>
- Grafton, Q. R., Biswas, A. K., Bosch, H., Fanaian, S., Gupta, J., Revi, A., Sami, N., & Tortajada, C. (2023). Goals, progress and priorities from Mar del Plata in 1977 to New York in 2023. *Nature Water*, 1(3), 230–240. <https://doi.org/10.1038/s44221-023-00041-4>
- Gray, D. E. (2018). *Doing Research in the Real World* (4th ed.). SAGE Publications Ltd.
- Grégoire, D. A., Binder, J. K., & Rauch, A. (2019). Navigating the validity tradeoffs of entrepreneurship research experiments: A systematic review and best-practice suggestions. *Journal of Business Venturing*, 34(2), 284–310. <https://doi.org/10.1016/J.JBUSVENT.2018.10.002>
- Grodal, S., Anteby, M., & Holm, A. L. (2021). Achieving Rigor in Qualitative Analysis: The Role of Active Categorization in Theory Building. *Academy of Management Review*, 46(3), 591–612. <https://doi.org/10.5465/AMR.2018.0482>
- Gröne, K., Mayer, I., & Braun, B. (2023). Living Wages and Living Incomes in Fair Supply Chains? A Critical Review. *DIE ERDE – Journal of the Geographical Society of Berlin*, 154(3), 73–79. <https://doi.org/10.12854/ERDE-2023-711>
- Groom, B., & Turk, Z. (2021). Reflections on the Dasgupta Review on the Economics of Biodiversity. *Environmental and Resource Economics*, 79(1), 1–23. <https://doi.org/10.1007/S10640-021-00560-2/FIGURES/3>
- Großschädl, F., Schoberer, D., Doris, |, Lohrmann, C., Everink, I., Adam, |, Gordon, L., Schols, J. M. G. A., & Silvia Bauer, |. (2023). Obesity and its associated factors in older nursing home residents in three European countries-Secondary data analyses from the “International Prevalence Measurement of Care Quality.” *International Journal of Older People Nursing*, 18(3), p1-11. <https://doi.org/10.1111/opn.12530>
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In *Handbook of Qualitative Research*. Sage.
- Guha, C., Vieceili, A. K., Wong, G., Manera, K., & Tong, A. (2021). Qualitative research

- methods and its application in nephrology. *Nephrology*, 26(10), 755–762. <https://doi.org/10.1111/NEP.13888>
- Gyamera, E. A., Domfeh, O., & Ameyaw, G. A. (2023). Cacao Swollen Shoot Viruses in Ghana. *Plant Disease*, 107(5), 1261–1278. <https://doi.org/10.1094/PDIS-10-22-2412-FE/ASSET/IMAGES/LARGE/PDIS-10-22-2412-FEF19.JPEG>
- Haas, L., & Schenk-Hoppé, K. R. (2023). International trade: Smarten up to talk the talk. *Manchester School*, 91(6), 521–569. <https://doi.org/10.1111/MANC.12458>
- Haddad, L., & Hoddinott, J. (1994). Women's income and boy-girl anthropometric status in the Côte d'Ivoire. *World Development*, 22(4), 543–553. [https://doi.org/10.1016/0305-750X\(94\)90110-4](https://doi.org/10.1016/0305-750X(94)90110-4)
- Hafner, S., Anger-Kraavi, A., Monasterolo, I., & Jones, A. (2020). Emergence of New Economics Energy Transition Models: A Review. *Ecological Economics*, 177. <https://doi.org/10.1016/j.ecolecon.2020.106779>
- Halkos, G. E., & Aslanidis, P. S. C. (2023). Causes and Measures of Poverty, Inequality, and Social Exclusion: A Review. *Economies*, 11(4), 110. <https://doi.org/10.3390/ECONOMIES11040110>
- Halog, A., Balanay, R., Anieke, S., Tsz, &, & Yu, Y. (2021). Circular Economy across Australia: Taking Stock of Progress and Lessons. *Circular Economy and Sustainability*, 1, 283–301. <https://doi.org/10.1007/s43615-021-00020-5>
- Hämäläinen, M., Kraft, T., Thomas, D., & Zheng, Y. (2021). Supply Chain Transparency at Goodio Chocolate. In *Springer Series in Supply Chain Management* (Vol. 10, pp. 225–241). Springer Nature. https://doi.org/10.1007/978-3-030-51957-5_11/COVER
- Han, C., Jia, F., Jiang, M., & Chen, L. (2022). Modern slavery in supply chains: a systematic literature review. *International Journal of Logistics Research and Applications*. <https://doi.org/10.1080/13675567.2022.2118696>
- Haraldstad, K., Wahl, A., Andenæs, R., Andersen, J. R., Andersen, M. H., Beisland, E., Borge, C. R., Engebretsen, E., Eisemann, M., Halvorsrud, L., Hanssen, T. A., Haugstvedt, A., Haugland, T., Johansen, V. A., Larsen, M. H., Løvereide, L., Løyland, B., Kvarme, L. G., Moons, P., ... Helseth, S. (2019). A systematic review of quality of life research in medicine and health sciences. *Quality of Life Research*, 28(10), 2641–2650. <https://doi.org/10.1007/S11136-019-02214-9/TABLES/5>
- Harley, B., & Cornelissen, J. (2020). Rigor With or Without Templates? The Pursuit of Methodological Rigor in Qualitative Research. *Organizational Research Methods*, 25(2), 239–261. <https://doi.org/10.1177/1094428120937786>

- Harris, S., Martin, M., & Diener, D. (2021). Circularity for circularity's sake? Scoping review of assessment methods for environmental performance in the circular economy. *Sustainable Production and Consumption*, 26, 172–186. <https://doi.org/10.1016/J.SPC.2020.09.018>
- Harry, B., & Lipsky, M. (2014). Qualitative Research on Special Education Teacher Preparation. In *Handbook of research on special education teacher preparation* (pp. 445–460).
- Hassoun, A., Carpena Rodríguez, M., Önal, B., Pakseresht, A., Kaliji, S. A., & Xhakollari, V. (2022). How Blockchain Facilitates the Transition toward Circular Economy in the Food Chain? *Sustainability*, 14(18), 11754. <https://doi.org/10.3390/SU141811754>
- Hau, R. C., & Lange, K. W. (2023). Can the 5-colour nutrition label “Nutri-Score” improve the health value of food? *Journal of Future Foods*, 3(4), 306–311. <https://doi.org/10.1016/J.JFUTFO.2023.03.002>
- Haven, T. L., & van Grootel, L. (2019). Preregistering qualitative research. *Accountability in Research*, 26(3), 229–244. <https://doi.org/10.1080/08989621.2019.1580147>
- Hecht, C., Spreuer, K. G., Figgenger, J., & Sauer, D. U. (2022). Market Review and Technical Properties of Electric Vehicles in Germany. *Vehicles*, 4(4), 903–916. <https://doi.org/10.3390/VEHICLES4040049>
- Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, 292, 114523. <https://doi.org/10.1016/j.socscimed.2021.114523>
- Hepburn, S., & Jackson, A. (2022). Colonial Exceptions: The International Labour Organization and Child Labour in British Africa, c.1919–40. *Journal of Contemporary History*, 57(2), 218–241. <https://doi.org/10.1177/0022009420988063/FORMAT/EPUB>
- Hercberg, S., Touvier, M., & Salas-Salvado, J. (2022). The Nutri-Score nutrition label: A public health tool based on rigorous scientific evidence aiming to improve the nutritional status of the population. *International Journal for Vitamin and Nutrition Research*, 92(3–4), 147–157. <https://doi.org/10.1024/0300-9831/A000722>
- Herrero, M., Mason-D, D., Palmer, J., Bogard, J. R., Bonnett, G. D., Godde, C. M., McIntyre, C. L., Bodirsky, B. L., Pradhan, P., Popp, A., Rockström, J., Hall, A., Ricketts, K., Campbell, B. M., Jarvis, A., Loboguerrero, A. M., Herrero, M., Thornton, P. K., Mason-D, D., ... Rockström, J. (2021). Articulating the effect of food systems innovation on the Sustainable Development Goals. *The Lancet Planetary Health*, 5, 50–62. [https://doi.org/10.1016/S2542-5196\(20\)30277-1](https://doi.org/10.1016/S2542-5196(20)30277-1)

- Hirsch, R. (2021). Risk and Trouble: Adam Smith on Profit and the Protagonists of Capitalism. *American Journal of Political Science*, 65(1), 166–179. <https://doi.org/10.1111/AJPS.12556>
- Hobbs, J. E. (2019). Heterogeneous consumers and differentiated food markets: Implications for quality signaling in food supply chains. *Canadian Journal of Agricultural Economics/Revue Canadienne d'agroeconomie*, 67(3), 237–249. <https://doi.org/10.1111/CJAG.12202>
- Hoddinott, J., & Haddad, L. (1995). DOES FEMALE INCOME SHARE INFLUENCE HOUSEHOLD EXPENDITURES? EVIDENCE FROM CÔTE D'IVOIRE. *Oxford Bulletin of Economics and Statistics*, 57(1), 77–96. <https://doi.org/10.1111/J.1468-0084.1995.TB00028.X>
- Hofer, C., Duan, Y., & Aloysius, J. A. (2021). Consumers care and firms should too: On the benefits of disclosing supplier monitoring activities. *Journal of Operations Management*, 67(3), 360–381. <https://doi.org/10.1002/JOOM.1129>
- Horioka, C. Y. (2021). Is the selfish life-cycle model more applicable in Japan and, if so, why? A literature survey. *Review of Economics of the Household*, 19(1). <https://doi.org/10.1007/s11150-020-09511-0>
- Horne, L. C., & Heath, J. (2022). A market failures approach to justice in health. *Politics, Philosophy and Economics*, 21(2), 165–189. <https://doi.org/10.1177/1470594X221089670/FORMAT/EPUB>
- Hosang, G. M., Havers, L., Shuai, R., Fonagy, P., Fazel, M., Morgan, C., Karamanos, A., Fancourt, D., McCrone, P., Smuk, M., Bhui, K., & Shakoor, S. (2023). Protocol for secondary data analysis of 4 UK cohorts examining youth adversity and mental health in the context of intersectionality. *PLOS ONE*, 18(8), e0289438. <https://doi.org/10.1371/JOURNAL.PONE.0289438>
- Hristov, H., Erjavec, K., Pravst, I., Juvančič, L., & Kuhar, A. (2023). Identifying Differences in Consumer Attitudes towards Local Foods in Organic and National Voluntary Quality Certification Schemes. *Foods*, 12(6), 1132. <https://doi.org/10.3390/FOODS12061132/S1>
- Human, S., & Fromm, I. (2021). Transportation inefficiencies in the cocoa value chains in Ivory Coast: Is sustainability possible? *Journal of Agricultural Extension and Rural Development*, 13(1), 51–59. <https://doi.org/10.5897/jaerd2020.1151>
- Hussain, N. M., Spiers, J., Kobab, F., & Riley, R. (2023). The Impact of Race and Gender-Related Discrimination on the Psychological Distress Experienced by Junior Doctors in the UK: A Qualitative Secondary Data Analysis. *Healthcare*, 11(6), 834.

- <https://doi.org/10.3390/HEALTHCARE11060834>
- ICCO, & International Cocoa Organization. (2024). *Production Statistics - International Cocoa Organization*. ICCO Quarterly Bulletin of Cocoa Statistics. <https://www.icco.org/statistics/#data>
- Ingram, V., van Rijn, F., Waarts, Y., & Gilhuis, H. (2018). The Impacts of Cocoa Sustainability Initiatives in West Africa. *Sustainability*, 10, 20. <https://doi.org/10.3390/su10114249>
- International Cocoa Organization. (2018). *Berlin Declaration of the Fourth World Cocoa Conference*. World Cocoa Conference. <https://www.icco.org/berlin-declaration-of-the-fourth-world-cocoa-conference/>
- International Monetary Fund. (2022). *IMF Country Report No. 22/205 Côte d'Ivoire*. <https://www.imf.org/en/Publications/CR/Issues/2022/07/01/Cte-dIvoire-2022-Article-IV-Consultation-Press-Release-and-Staff-Report-520258>
- International Monetary Fund. (2023). Côte d'Ivoire country report 23/204. In *IMF Staff Country Reports* (Vol. 2023, Issue 204). <https://doi.org/10.5089/9798400245596.002>
- Isaac, M. E., Gagliardi, S., Ordoñez, J. C., & Sauvadet, M. (2024). Shade tree trait diversity and functions in agroforestry systems: A review of which traits matter. *Journal of Applied Ecology*, 61(6), 1159–1173. <https://doi.org/10.1111/1365-2664.14652>
- Ismail, O., & Olonisakin, 'Funmi. (2021). Why do youth participate in violence in Africa? A review of evidence. *Conflict, Security and Development*, 21(3), 371–400. <https://doi.org/10.1080/14678802.2021.1933035>
- Jacquemin, M. Y. (2004). Children's domestic work in Abidjan, Côte d'Ivoire: The petites bonnes have the floor. *Childhood*, 11(3), 383–397. <https://doi.org/10.1177/0907568204044889>
- Jaganjac, B., Hansen, K. W., Lunde, H., & Hunnes, J. A. (2024). The role of organizational culture and structure in implementing sustainability initiatives. *Business Ethics, the Environment and Responsibility*. <https://doi.org/10.1111/BEER.12710>
- Jager, K. J., Tripepi, G., Chesnaye, N. C., Dekker, F. W., Zoccali, C., & Stel, V. S. (2020). Where to look for the most frequent biases? *Nephrology*, 25(6), 435–441. <https://doi.org/10.1111/NEP.13706>
- Jantan, M. S. (2020). The Improvement in Life Expectancy: Systematic Literature Review of Retirement Saving. *SSRN Electronic Journal*. <https://doi.org/10.2139/SSRN.3582234>
- Jean-Marie, E., Jiang, W., Bereau, D., & Robinson, J. C. (2022). Theobroma cacao and Theobroma grandiflorum: Botany, Composition and Pharmacological Activities of Pods and Seeds. *Foods (Basel, Switzerland)*, 11(24). <https://doi.org/10.3390/FOODS11243966>

- Jellason, N. P., Robinson, E. J. Z., Chapman, A. S. A., Neina, D., Devenish, A. J. M., Po, J. Y. T., & Adolph, B. (2021). A Systematic Review of Drivers and Constraints on Agricultural Expansion in Sub-Saharan Africa. *Land*, 10(3). <https://doi.org/10.3390/land10030332>
- Jia, F., Peng, S., Green, J., Koh, L., & Chen, X. (2020). Soybean supply chain management and sustainability: A systematic literature review. *Journal of Cleaner Production*, 255, 120254. <https://doi.org/10.1016/J.JCLEPRO.2020.120254>
- Jones, R. A. C. (2020). Disease Pandemics and Major Epidemics Arising from New Encounters between Indigenous Viruses and Introduced Crops. *Viruses* 2020, 12, 1388. <https://doi.org/10.3390/V12121388>
- Jongkind, C. C. H. (2012). Description of *Dactyladenia globosa* (Chrysobalanaceae), a new tree species from Sierra Leone, Liberia and Côte d'Ivoire. *Plant Ecology and Evolution*, 145(1), 126–128. <https://doi.org/10.5091/PLECEVO.2012.594>
- Kano, L., Tsang, E. W. K., & Wai-chung Yeung, H. (2020). Global value chains: A review of the multi-disciplinary literature. *Journal of International Business Studies*, 51, 577–622. <https://doi.org/10.1057/s41267-020-00304-2>
- Karakislak, I., Hildebrand, J., & Schweizer-Ries, P. (2023). Exploring the interaction between social norms and perceived justice of wind energy projects: a qualitative analysis. *Journal of Environmental Policy and Planning*, 25(2), 155–168. <https://doi.org/10.1080/1523908X.2021.2020631>
- Kayikci, Y., Gozacan-Chase, N., & Rejeb, A. (2023). Blockchain entrepreneurship roles for circular supply chain transition. *Business Strategy and the Environment*. <https://doi.org/10.1002/BSE.3489>
- Kelikumea, I., Olaniyib, E., & Iyohab, F. A. (2020). Efficient market hypothesis in the presence of market imperfections: Evidence from selected stock markets in Africa. *International Journal of Management, Economics and Social Sciences (IJMESS)*, 9(1), 37–57. <https://doi.org/10.32327/IJMESS/9.1.2020.3>
- Kendall, H., Clark, B., Rhymer, C., Kuznesof, S., Hajslova, J., Tomaniova, M., Brereton, P., & Frewer, L. (2019). A systematic review of consumer perceptions of food fraud and authenticity: A European perspective. *Trends in Food Science & Technology*, 94, 79–90. <https://doi.org/10.1016/J.TIFS.2019.10.005>
- Keynes, J. M. (2018). *The General Theory of Employment, Interest, and Money*. Palgrave Macmillan. <https://doi.org/https://doi.org/10.1007/978-3-319-70344-2>
- Keynes, John Maynard. (1936). *The General Theory of Employment, Interest and Money*.
- Ki, C. W., Park, S., & Ha-Brookshire, J. E. (2021). Toward a circular economy: Understanding

- consumers' moral stance on corporations' and individuals' responsibilities in creating a circular fashion economy. *Business Strategy and the Environment*, 30(2), 1121–1135. <https://doi.org/10.1002/BSE.2675>
- Kirchherr, J. (2022). Circular economy and growth: A critical review of “post-growth” circularity and a plea for a circular economy that grows. *Conservation & Recycling*, 179, 106033. <https://doi.org/10.1016/j.resconrec.2021.106033>
- Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>
- Kirchherr, J., Yang, N. H. N., Schulze-Spüntrup, F., Heerink, M. J., & Hartley, K. (2023). Conceptualizing the Circular Economy (Revisited): An Analysis of 221 Definitions. *Resources, Conservation and Recycling*, 194, 107001. <https://doi.org/10.1016/J.RESCONREC.2023.107001>
- Kissi, E. A., & Herzig, C. (2024). The implications of governance factors for economic and social upgrading in Ghana's cocoa value chain. *Agricultural and Food Economics*, 12(1), 1–23. <https://doi.org/10.1186/S40100-024-00295-W/TABLES/5>
- Kline, P. (1999). *The handbook of psychological testing* (2nd ed.). Routledge.
- Knoke, T., Gosling, E., & Paul, C. (2020). Use and misuse of the net present value in environmental studies. *Ecological Economics*, 174, 106664. <https://doi.org/10.1016/J.ECOLECON.2020.106664>
- Knott, E., Rao, A. H., Summers, K., & Teeger, C. (2022). Interviews in the social sciences. *Nature Reviews Methods Primers*, 2(1), 73. <https://doi.org/10.1038/s43586-022-00150-6>
- Ko, T., Lee, J., Park, D., & Ryu, D. (2023). Supply chain transparency as a signal of ethical production. *Managerial and Decision Economics*, 44(3), 1565–1573. <https://doi.org/10.1002/MDE.3765>
- Korhonen, J., Honkasalo, A., & Seppälä, J. (2017). Circular Economy: The Concept and its Limitations. *Ecological Economics*, 143, 37–46. <https://doi.org/10.1016/j.ecolecon.2017.06.041>
- Korhonen, J., Nuur, C., Feldmann, A., & Birkie, S. E. (2018). Circular economy as an essentially contested concept. *Journal of Cleaner Production*, 175, 544–552. <https://doi.org/10.1016/J.JCLEPRO.2017.12.111>
- Kouakou, J.-L., Gonedelé BiID, S., Anderson Bitty, E., Iestine KouakouID, C., Kouassi Yao, A., Bénoît Kassé, K., & Ouattara, S. (2020). Ivory Coast without ivory: Massive extinction of African forest elephants in Côte d'Ivoire. *PLOS ONE*, 15(10), 14.

<https://doi.org/10.1371/journal.pone.0232993>

- Kouamé, K. M., Fofana, A., Abouo, N. V., & Koba, T. A. (2020). Sustainable Thermochemical Valorization of Cashew Nut Waste in West Africa: Experimental Study and Evaluation of the Energy Potential in Côte d'Ivoire. *International Journal of Renewable Energy Research*, 10(3), 1405–1414. <https://doi.org/10.20508/IJRER.V10I3.11106.G8016>
- Kouamé, R. M. A., Guglielmo, F., Abo, K., Ouattara, A. F., Chabi, J., Sedda, L., Donnelly, M. J., & Edi, C. (2022). Education and Socio-economic status are key factors influencing use of insecticides and malaria knowledge in rural farmers in Southern Côte d'Ivoire. *BMC Public Health*, 22(1), pp.1-11. <https://doi.org/10.1186/s12889-022-14446-5>
- Kouassi, A. T., Boko, A. C. E., Blei, S. H., Angaman, D. M., & Barima, Y. S. S. (2024). Influence of Shade in Cocoa Agroforestry Systems on Physicochemical and Functional Characteristics of Cocoa Beans in Bonon, Central-West Côte d'Ivoire. *International Journal of Food Science*. <https://doi.org/10.1155/2024/1543904>
- Kouassi, C., Khan, D., Achille, L. S., Omifolaji, J. K., Espoire, M. M. R. B., Zhang, K. B., Yang, X. H., & Horning, N. (2022). CONFLICT-INDUCED DEFORESTATION DETECTION IN AFRICAN CÔTE D'IVOIRE USING LANDSAT IMAGES AND RANDOM FOREST ALGORITHM: A CASE IN MOUNT PEKO NATIONAL PARK. *APPLIED ECOLOGY AND ENVIRONMENTAL RESEARCH*, 20(3), 2035–2058. https://doi.org/10.15666/aeer/2003_20352058
- Kouassi, J.-L., Diby, L., Konan, D., Kouassi, A., Bene, Y., & Kouamé, C. (2023). Drivers of cocoa agroforestry adoption by smallholder farmers around the Taï National Park in southwestern Côte d'Ivoire. *Scientific Reports*, 13, 14309. <https://doi.org/10.1038/s41598-023-41593-5>
- Kouassi, J. A. K., Normand, E., Koné, I., & Boesch, C. (2019). Bushmeat consumption and environmental awareness in rural households: a case study around Taï National Park, Côte d'Ivoire. *Oryx*, 53(2), 293–299. <https://doi.org/10.1017/S0030605317000333>
- Kouassi, J. L., Gyau, A., Diby, L., Bene, Y., & Kouamé, C. (2021). Assessing land use and land cover change and farmers' perceptions of deforestation and land degradation in south-west Côte d'Ivoire, West Africa. *Land*, 10(4), 429. <https://doi.org/10.3390/LAND10040429/S1>
- Kouassi, J. L., Kouassi, A., Bene, Y., Konan, D., Tondoh, E. J., & Kouame, C. (2021). Exploring barriers to agroforestry adoption by cocoa farmers in south-western Côte d'Ivoire. *Sustainability (Switzerland)*, 13(23), 13075. <https://doi.org/10.3390/SU132313075/S1>

- Kouassi, J. L., Wandan, N., & Mbow, C. (2022a). Observed climate trends, perceived impacts and community adaptation practices in Côte d'Ivoire. *Environmental and Socio-Economic Studies*, 10(3), 43–58. <https://doi.org/10.2478/ENVIRON-2022-0016>
- Kouassi, J. L., Wandan, N., & Mbow, C. (2022b). Exploring spatio-temporal trends and environmental drivers of wildfire occurrence and impacts in Côte d'Ivoire, West Africa. *African Journal of Ecology*, 60(4), 1218–1236. <https://doi.org/10.1111/AJE.13066>
- Kouman, K., Mouroufie, V., Kam, O., & Sangare, M. (2020). Environnement socio-culturel et sous représentativité des femmes dans les programmes de lutte contre le travail des enfants dans le secteur du cacao en Côte d'Ivoire. *African Sociological Review / Revue Africaine de Sociologie*, 24(2), 170–183. <https://doi.org/10.2307/48630997>
- Kraft, S. K., & Kellner, F. (2022). Can Blockchain Be a Basis to Ensure Transparency in an Agricultural Supply Chain? *Sustainability*, 14(13), 8044. <https://doi.org/10.3390/SU14138044>
- Kraft, T., Valdés, L., & Zheng, Y. (2022). Consumer trust in social responsibility communications: The role of supply chain visibility. *Production and Operations Management*, 31(11), 4113–4130. <https://doi.org/10.1111/POMS.13808>
- Kraft, T., & Zheng, Y. (2021). How Supply Chain Transparency Boosts Business Value. *MIT Sloan Management Review*, 63(1), 34–40.
- Kravchenko, M., Pigosso, D. C., & Mcaloone, T. C. (2019). Towards the ex-ante sustainability screening of circular economy initiatives in manufacturing companies: Consolidation of leading sustainability-related performance indicators. *Journal of Cleaner Production*, 241. <https://doi.org/10.1016/j.jclepro.2019.118318>
- Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2023). *International Economics: Theory and Policy (Twelfth Edition)* (Kindle Edi). Pearson Education.
- Kwan, P., & Wang, W. (2022). Survey on the Applications of Blockchain in Agriculture. *Agriculture*, 12(9), 1333. <https://doi.org/10.3390/AGRICULTURE12091333>
- Ladu, L., & Morone, P. P. (2021). Holistic approach in the evaluation of the sustainability of bio-based products: An Integrated Assessment Tool. *Sustainable Production and Consumption*, 28, 911-924e6. <https://doi.org/10.1016/J.SPC.2021.07.006>
- Lahti, T., Wincent, J., & Parida, V. (2018). A Definition and Theoretical Review of the Circular Economy, Value Creation, and Sustainable Business Models: Where Are We Now and Where Should Research Move in the Future? *Sustainability 2018, Vol. 10, Page 2799*, 10(8), 2799. <https://doi.org/10.3390/SU10082799>
- Lam, R. (2014). Language assessment training in Hong Kong: Implications for language

- assessment literacy. *Language Testing*, 32(2), 169–197.
<https://doi.org/10.1177/0265532214554321>
- Lambin, E. F., & Furumo, P. R. (2023). Deforestation-Free Commodity Supply Chains: Myth or Reality? *Annual Review of Environment and Resources*, 48(1).
<https://doi.org/10.1146/ANNUREV-ENVIRON-112321-121436>
- Langridge, P., Alaux, M., Almeida, N. F., Ammar, K., Baum, M., Bekkaoui, F., Bentley, A. R., Beres, B. L., Berger, B., Braun, H. J., Brown-Guedira, G., Burt, C. J., Caccamo, M. J., Cattivelli, L., Charmet, G., Civián, P., Cloutier, S., Cohan, J. P., Devaux, P. J., ... Zhang, X. (2022). Meeting the Challenges Facing Wheat Production: The Strategic Research Agenda of the Global Wheat Initiative. *Agronomy*, 12(11), 2767.
<https://doi.org/10.3390/AGRONOMY12112767>
- Laven, A. (2010). *The risks of inclusion: Shifts in governance processes and upgrading opportunities for cocoa farmers in Ghana* [Royal Tropical Institute (KIT)]. www.kit.nl
- Leal Filho, W., Lovren, V. O., Will, M., Lange Salvia, A., & Frankenberger, F. (2021). Poverty: A central barrier to the implementation of the UN Sustainable Development Goals. *Environmental Science and Policy*, 125, 96–104.
<https://doi.org/10.1016/j.envsci.2021.08.020>
- Lee, H., & Park, M. S. (2023). Transformation of the global governance in the cocoa sector with three characteristics: Diversification, flexibilization, and coordination. *Forest Policy and Economics*, 153, 102977. <https://doi.org/10.1016/J.FORPOL.2023.102977>
- Lefèvre, H., Moro, M. R., & Lachal, J. (2019). Research in adolescent healthcare: The value of qualitative methods. *Archives de Pédiatrie*, 26(7), 426–430.
- Levänen, J., Park, S., & Rosca, E. (2023). Circular solutions in developing countries: Coping with sustainability tensions by means of technical functionality and business model relevance. *Business Strategy and Development*, 6(1), 75–94.
<https://doi.org/10.1002/BSD2.224>
- Li, S., & Kallas, Z. (2021). Meta-analysis of consumers' willingness to pay for sustainable food products. *Appetite*, 163, 105239. <https://doi.org/10.1016/j.appet.2021.105239>
- Li, T., Higgins, J. P. T., & Deeks, J. J. (2019). Collecting data. In *Cochrane Handbook for Systematic Reviews of Interventions* (pp. 109–141). John Wiley & Sons, Ltd.
<https://doi.org/10.1002/9781119536604.CH5>
- Liedtka, J. (2018). Design Thinking: What it is and Why it Works. *Harvard Business Review*, 96(5), 72–79.
- Lindsey, P. A., Anderson, S. H., Dickman, A., Gandiwa, P., Harper, S., Morakinyo, A. B.,

- Nyambe, N., O'Brien-Onyeka, M., Packer, C., Parker, A. H., Robson, A. S., Ruhweza, A., Sogbohossou, E. A., Steiner, K. W., & Tumenta, P. N. (2022). *Shepherding Sub-Saharan Africa's Wildlife Through Peak Anthropogenic Pressure Toward a Green Anthropocene. Annual Review of Environment and Resources*. <https://doi.org/10.1146/annurev-environ-120920>
- Liu, C., S Badana, A. N., Burgdorf, J., Fabius, C. D., Roth, D. L., & Haley, W. E. (2021). Systematic Review and Meta-Analysis of Racial and Ethnic Differences in Dementia Caregivers' Well-Being. *Gerontologist*, 61(5), 228–243. <https://doi.org/10.1093/geront/gnaa028>
- Liu, Z., James, S., Walpole, G., & White, G. R. T. (2023). A communities of practice approach to promoting regional circular economy innovation: evidence from East Wales. *European Planning Studies*, 31(5), 988–1006. <https://doi.org/10.1080/09654313.2022.2132785>
- Lock, W., & Alexander, A. (2023). Sustainable Development Frontiers: Is 'Sustainable' Cocoa Delivering Development and Reducing Deforestation? *Development and Change*. <https://doi.org/10.1111/DECH.12781>
- Loh, S., Knight, A., & Loopstra, R. (2021). Working-age adults using food banks in England have significantly poorer health and higher rates of mental health conditions than adults in the general population: A cross-sectional quantitative study. *Health and Social Care in the Community*, 29(5), 1594–1605. <https://doi.org/10.1111/HSC.13226>
- Löhr, K., Aruqaj, B., Baumert, D., Bonatti, M., Brüntrup, M., Bunn, C., Castro-Nunez, A., Chavez-Miguel, G., Lilia, M., Rio, D., Hachmann, S., Camilo Morales Muñoz, H., Ollendorf, F., Rodriguez, T., Rudloff, B., Schorling, J., Schuffenhauer, A., Schulte, I., Sieber, S., ... Weinhardt, M. (2021). Social Cohesion as the Missing Link between Natural Resource Management and Peacebuilding: Lessons from Cocoa Production in Côte d'Ivoire and Colombia. *Sustainability*, 13(13002), 25. <https://doi.org/10.3390/su132313002>
- Lonati, S., Quiroga, B. F., Zehnder, C., & Antonakis, J. (2018). On doing relevant and rigorous experiments: Review and recommendations. *Journal of Operations Management*, 64, 19–40.
- Long, H., Brooks, J. M., Harvie, M., Maxwell, A., & French, D. P. (2019). How do women experience a false-positive test result from breast screening? A systematic review and thematic synthesis of qualitative studies. *British Journal of Cancer*, 121(4), 351–358. <https://doi.org/10.1038/s41416-019-0524-4>
- López, R. (1998). The Tragedy of the Commons in Côte d'Ivoire Agriculture: Empirical

- Evidence and Implications for Evaluating Trade Policies. *The World Bank Economic Review*, 12(1), 105–131. <https://doi.org/10.1093/WBER/12.1.105>
- Lucero, L. J., & Gonzalez Cruz, J. (2020). Reconceptualizing Urbanism: Insights From Maya Cosmology. *Frontiers in Sustainable Cities*, 2(1), 496176. <https://doi.org/10.3389/FRSC.2020.00001/BIBTEX>
- Lučić, A., Barbić, D., & Uzelac, M. (2023). Theoretical underpinnings of consumers' financial capability research. *International Journal of Consumer Studies*, 47(1), 373–399. <https://doi.org/10.1111/IJCS.12778>
- Luckstead, J., Snell, H. A., Nalley, L. L., Nayga, R. M., & Sarpaning, J. (2021). A multi-country study on consumers' valuation for child-labor-free chocolate: Implications for child labor in cocoa production. *Applied Economic Perspectives and Policy*. <https://doi.org/10.1002/aepp.13165>
- Lüdeke-Freund, F., Gold, S., & Bocken, N. M. P. (2018). A Review and Typology of Circular Economy Business Model Patterns. *Journal of Industrial Ecology*, 23(1). <https://doi.org/10.1111/jiec.12763>
- Lund, B. (2023). The questionnaire method in systems research: an overview of sample sizes, response rates and statistical approaches utilized in studies. *VINE Journal of Information and Knowledge Management Systems*, 53(1), 1–10. <https://doi.org/10.1108/VJIKMS-08-2020-0156/FULL/XML>
- Lynch, L., Andrikopoulou, E., & Dadashzadeh, N. (2023). What is the general population's perception of smart motorways in the UK? *Environmental Science & Sustainable Development*, 19–33. <https://doi.org/10.21625/ESSD.V8I3.954>
- MacQueen, K. M., Guest, G., Namey, E., Mack, N., & Woodsong, C. (2005). *Qualitative Research Methods: A Data Collector's Field Guide*. Family Health International. www.fhi360.org.
- Madden, A. D. (2022). A review of basic research tools without the confusing philosophy. *Higher Education Research and Development*, 41(5), 1633–1647. <https://doi.org/10.1080/07294360.2021.1920895>
- Maffei, A., Raabe, N., & Ursprung, H. W. (2006). Political Repression and Child Labour: Theory and Empirical Evidence. *The World Economy*, 29(2). <https://doi.org/10.1111/j.1467-9701.2006.00778.x>
- Magni, C. A., & Marchioni, A. (2020). Average rates of return, working capital, and NPV-consistency in project appraisal: A sensitivity analysis approach. *International Journal of Production Economics*, 229(107769).

- Maguire-Rajpaul, V. A., Sandbrook, C., McDermott, C., & Hirons, M. A. (2022). Climate-smart cocoa governance risks entrenching old hegemonies in Côte d'Ivoire and Ghana: a multiple environmentality analysis. *Geoforum*, 130, 78–91. <https://doi.org/10.1016/J.GEOFORUM.2021.09.015>
- Malek, S., Reinhold, E. J., & Pearce, G. S. (2021). The Beighton Score as a measure of generalised joint hypermobility. *Rheumatology International*, 41(10), 1707–1716. <https://doi.org/10.1007/S00296-021-04832-4/TABLES/1>
- Malhotra, S., White, H., de la Cruz, N., Saran, A., Eyers, J., John, D., Beveridge, E., & Blöndal, N. (2021). PROTOCOL: evidence and gap map: studies of the effectiveness of transport sector interventions in low- and middle-income countries. *Campbell Systematic Reviews*, 17(1). <https://doi.org/10.1002/CL2.1136>
- Malmborg, K., Wallin, I., Brukas, V., Do, T., Lodin, I., Neset, T. S., Norström, A. V., Powell, N., & Tonderski, K. (2022). Knowledge co-production in the Helge å catchment: a comparative analysis. *Ecosystems and People*, 18(1), 565–582. <https://doi.org/10.1080/26395916.2022.2125583>
- Mananyi, A., & Struthers, J. J. (1997). Cocoa market efficiency: a cointegration approach. *Journal of Economic Studies*, 24(3), 141–151. <https://doi.org/10.1108/01443589710167356/FULL/XML>
- Mansfield, K. L., Gallacher, J. E., Mourby, M., & Fazel, M. (2020). Five models for child and adolescent data linkage in the UK: a review of existing and proposed methods. *Evid Based Ment Health*, 23, 39–44. <https://doi.org/10.1136/ebmental-2019-300140>
- Manshoven, S., & Gillabel, J. (2021). Learning through Play: A Serious Game as a Tool to Support Circular Economy Education and Business Model Innovation. *Sustainability*, 13(23), 13277. <https://doi.org/10.3390/SU132313277>
- Marchetti, L., Cattivelli, V., Cocozza, C., Salbitano, F., & Marchetti, M. (2020). Beyond Sustainability in Food Systems: Perspectives from Agroecology and Social Innovation. *Sustainability*, 12(18), 7524. <https://doi.org/10.3390/SU12187524>
- Martella, A. M., Martella, R. C., Yacilla, J. K., Newson, A., Shannon, E. N., & Voorhis, C. (2023). How Rigorous is Active Learning Research in STEM Education? An Examination of Key Internal Validity Controls in Intervention Studies. *Educational Psychology Review*, 35(4), 1–48. <https://doi.org/10.1007/S10648-023-09826-1/FIGURES/2>
- Martínez-Zarzoso, I. (2019). *The Euro and the CFA Franc: Evidence of Sectoral Trade Effects* (Discussion Paper No. 311. ISSN: 1439-2305).
- Martiniuk, A., Challinor, J., Arora, R. S., Handayani, S. A., & Lam, C. (2022). Digital solutions

- to facilitate education, training and professional support for paediatric oncology and other health professionals in rural and other low-resource settings. *Health Education*, 122(2), 232–259. <https://doi.org/10.1108/HE-02-2021-0035/FULL/XML>
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370–396. <https://doi.org/10.1037/H0054346>
- Matthay, E. C., & Glymour, M. M. (2020). A Graphical Catalog of Threats to Validity: Linking Social Science with Epidemiology. *Epidemiology (Cambridge, Mass.)*, 31(3), 376. <https://doi.org/10.1097/EDE.0000000000001161>
- Mattila, A. S., Luo, A., Xue, X., & Ye, T. (2021). How to avoid common mistakes in experimental research? *International Journal of Contemporary Hospitality Management*, 33(1), 367–374. <https://doi.org/10.1108/IJCHM-07-2020-0696/FULL/PDF>
- McEwan, B. (2020). Sampling and validity. *Annals of the International Communication Association*, 235–247. <https://doi.org/10.1080/23808985.2020.1792793>
- McGrath, R. G., & MacMillan, I. C. (2000). *The entrepreneurial mindset: Strategies for continuously creating opportunity in an age of uncertainty (Vol. 284)*. Harvard Business Press.
- McKnight, A. (2019). *Understanding the Links between Inequalities and Poverty (LIP) Understanding the relationship between poverty, inequality and growth: a review of existing evidence* (CASEpaper 216/LIPpaper 8). <http://sticerd.lse.ac.uk/case>
- Meemken, E.-M., Barrett, C. B., Michelson, H. C., Qaim, M., Reardon, T., & Sellare, J. (2021). Sustainability standards in global agrifood supply chains. *Nature Food*, 2, 758–765. <https://doi.org/10.1038/s43016-021-00360-3>
- Mehrotra, S., & Jaladi, S. R. (2022). How start-ups in emerging economies embrace circular business models and contribute towards a circular economy. *Journal of Entrepreneurship in Emerging Economies*, 14(5), 727–753. <https://doi.org/10.1108/JEEE-10-2021-0410/FULL/XML>
- Merli, R., Preziosi, M., & Acampora, A. (2018). How do scholars approach the circular economy? A systematic literature review. *Journal of Cleaner Production*, 178, 703–722. <https://doi.org/10.1016/J.JCLEPRO.2017.12.112>
- Mhatre, P., Panchal, R., Singh, A., & Bibyan, S. (2021). Sustainable Production and Consumption A systematic literature review on the circular economy initiatives in the European Union. *Sustainable Production and Consumption*, 26, 187–202. <https://doi.org/10.1016/j.spc.2020.09.008>
- Mitchell, M. I. (2022). Land reform and peacebuilding in Côte d’Ivoire: Navigating the

- minefield. *Journal of Agrarian Change*, 22(2), 378–397.
<https://doi.org/10.1111/JOAC.12472>
- Modigliani, F. (1988). The Role of Intergenerational Transfers and Life-Cycle Saving in the Accumulation of Wealth. *Journal of Economic Perspectives*, 2(2), 15–40.
<https://doi.org/10.1257/jep.2.2.15>
- Modigliani, F. (2005). *The Collected Papers of Franco Modigliani, Volume 6*. The MIT Press.
<https://doi.org/https://doi.org/10.7551/mitpress/1923.001.0001>
- Mol, A. P. J. (2015). Transparency and value chain sustainability. *Journal of Cleaner Production*, 107, 154–161. <https://doi.org/10.1016/J.JCLEPRO.2013.11.012>
- Mollenkopf, D. A., Duan, Y., & Aloysius, J. A. (2021). Communicating Supply Chain Sustainability: Transparency and Framing Effects. *International Journal of Physical Distribution & Logistics Management*, 52(1), 68–87. <https://doi.org/10.1108/IJPDLM-04-2020-0107>
- Mollenkopf, D. A., Peinkofer, S. T., & Chu, Y. (2022). Supply chain transparency: Consumer reactions to incongruent signals. *Journal of Operations Management*, 68(4), 306–327.
<https://doi.org/10.1002/JOOM.1180>
- Montecchi, M., Plangger, K., & Etter, M. (2019). It's real, trust me! Establishing supply chain provenance using blockchain. *Business Horizons*, 62(3), 283–293.
<https://doi.org/10.1016/J.BUSHOR.2019.01.008>
- Montecchi, M., Plangger, K., & West, D. C. (2021). Supply chain transparency: A bibliometric review and research agenda. *International Journal of Production Economics*, 238, 108152. <https://doi.org/10.1016/J.IJPE.2021.108152>
- Moraga, G., Huysveld, S., Mathieux, F., Blengini, G. A., Alaerts, L., van Acker, K., de Meester, S., & Dewulf, J. (2019). Circular economy indicators: What do they measure? *Resources, Conservation and Recycling*, 146, 452–461.
<https://doi.org/10.1016/J.RESCONREC.2019.03.045>
- Morseletto, P. (2020). Targets for a circular economy. *Resources, Conservation and Recycling*, 153, 104553. <https://doi.org/10.1016/J.RESCONREC.2019.104553>
- Muhammad, D. R. A., Rahayu, E. S., & Fibri, D. L. N. (2021). Revisiting the Development of Probiotic-based Functional Chocolates. *Reviews in Agricultural Science*, 9, 233–248.
https://doi.org/10.7831/RAS.9.0_233
- Mummolo, J., & Peterson, E. (2019). Demand Effects in Survey Experiments: An Empirical Assessment. *American Political Science Review*, 113, 517–529.
<https://doi.org/10.1017/S0003055418000837>

- N'Gbala, F. N. G., Guéi, A. M., & Tondoh, J. E. (2017). Carbon stocks in selected tree plantations, as compared with semi-deciduous forests in centre-west Côte d'Ivoire. *Agriculture, Ecosystems and Environment*, 239, 30–37. <https://doi.org/10.1016/J.AGEE.2017.01.015>
- Napo, S. (2022). Assessing public debt sustainability under COVID-19 uncertainty: Evidence from Côte d'Ivoire. *African Development Review*, 34(S1), S141–S160. <https://doi.org/10.1111/1467-8268.12649>
- Naylor, R., Dollinger, M., Mahat, M., & Khawaja, M. (2021). Students as customers versus as active agents: conceptualising the student role in governance and quality assurance. *Higher Education Research & Development*, 1–14. <https://doi.org/10.1080/07294360.2020.1792850>
- Neilson, J., Dwiartama, A., Fold, N., & Permadi, D. (2020). Resource-based industrial policy in an era of global production networks: Strategic coupling in the Indonesian cocoa sector. *World Development*, 135. <https://doi.org/10.1016/j.worlddev.2020.105045>
- Neubauer, B. E., Witkop, C. T., & Varpio, L. (2019). How phenomenology can help us learn from the experiences of others. *Perspectives on Medical Education*, 8(2), 90–97. <https://doi.org/10.1007/S40037-019-0509-2/TABLES/2>
- Nguimkeu, P., & Okou, C. (2021). Leveraging digital technologies to boost productivity in the informal sector in Sub-Saharan Africa. *Review of Policy Research*, 38(6), 707–731. <https://doi.org/10.1111/ROPR.12441>
- Nguyen, T. T., Grote, U., Neubacher, F., Rahut, D. B., Do, M. H., & Paudel, G. P. (2023). Security risks from climate change and environmental degradation: implications for sustainable land use transformation in the Global South. *Current Opinion in Environmental Sustainability*, 63, 101322. <https://doi.org/10.1016/J.COSUST.2023.101322>
- Nichols, B., Stolze, H., & Kirchoff, J. F. (2019). Spillover effects of supply chain news on consumers' perceptions of product quality: An examination within the triple bottom line. *Journal of Operations Management*, 65(6), 536–559. <https://doi.org/10.1002/joom.1033>
- Nieves-Orduña, H. E., Krutovsky, K. V., & Gailing, O. (2023). Geographic distribution, conservation, and genomic resources of cacao *Theobroma cacao* L. *Crop Science*, 63(4), 1750–1778. <https://doi.org/10.1002/CSC2.20959>
- Niskanen, J., Anshelm, J., & McLaren, D. (2020). Local conflicts and national consensus: The strange case of circular economy in Sweden. *Journal of Cleaner Production*, 261, 121117. <https://doi.org/10.1016/J.JCLEPRO.2020.121117>

- Nkamleu, G. B., & Kielland, A. (2006). Modeling farmers' decisions on child labor and schooling in the cocoa sector: A multinomial logit analysis in Côte d'Ivoire. *Agricultural Economics*, 35(3), 319–333. <https://doi.org/10.1111/J.1574-0862.2006.00165.X>
- Nowell, B., & Albrecht, K. (2019). A Reviewer's Guide to Qualitative Rigor. *Journal of Public Administration Research and Theory*, 29(2), 348–363. <https://doi.org/10.1093/JOPART/MUY052>
- Nyamah, E. Y., Attatsi, P. B., Nyamah, E. Y., & Opoku, R. K. (2022). Agri-food value chain transparency and firm performance: the role of institutional quality. *Production and Manufacturing Research*, 10(1), 62–88. <https://doi.org/10.1080/21693277.2022.2062477>
- O'Callaghan, B., Yau, N., & Hepburn, C. (2022). How Stimulating Is a Green Stimulus? The Economic Attributes of Green Fiscal Spending. *Annual Review of Environment and Resources*, 47, 697–723. <https://doi.org/10.1146/annurev-environ-112420>
- O'Reilly, C., & Binns, A. J. M. (2019). The Three Stages of Disruptive Innovation: Idea Generation, Incubation, and Scaling. *California Management Review*, 61(3), 49–71. <https://doi.org/10.1177/0008125619841878>
- Obeng, G. A. (2022). Governance of organic cocoa production: An analysis of EU regulation through the framework of multilevel governance. *Development Policy Review*, 40(6). <https://doi.org/10.1111/DPR.12625>
- Obi, C. I. (2007). *Perspectives on Côte d'Ivoire: Between Political Breakdown and Post-Conflict Peace* (Discussion Paper 39).
- Observatory of Economic Complexity. (2024). *Cocoa Beans (HS: 1801) Product Trade, Exporters and Importers | The Observatory of Economic Complexity*. <https://oec.world/en/profile/hs/cocoa-beans#country-comparison>
- Ochieng, L., Salehi, M., Ochieng, R., Nijhof, D., Wong, R., Gupta, V., Prasad, R., & Ochieng, B. (2022). Augmented video consultations in care homes during the COVID-19 pandemic: a qualitative study. *BJGP Open*, 6(4). <https://doi.org/10.3399/BJGPO.2022.0073>
- Octavia, D., Suharti, S., Murniati, Dharmawan, I. W. S., Nugroho, H. Y. S. H., Supriyanto, B., Rohadi, D., Njurumana, G. N., Yeny, I., Hani, A., Mindawati, N., Suratman, Adalina, Y., Prameswari, D., Hadi, E. E. W., & Ekawati, S. (2022). Mainstreaming Smart Agroforestry for Social Forestry Implementation to Support Sustainable Development Goals in Indonesia: A Review. *Sustainability*, 14(15), 9313. <https://doi.org/10.3390/SU14159313>
- OECD. (2020). *The Circular Economy in Cities and Regions: Synthesis Report* (OECD Urban Studies). OECD Publishing. <https://doi.org/10.1787/10ac6ae4-en>

- OECD. (2022). *Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard* (Financing SMEs and Entrepreneurs). OECD. <https://doi.org/10.1787/E9073A0F-EN>
- OECD. (2023). *Income inequality (indicator)*. <https://doi.org/https://doi.org/10.1787/459aa7f1-en> (accessed on 31 May 2023)
- OECD. (2025). *OECD Data Explorer • Income distribution database*. [https://data-explorer.oecd.org/vis?fs\[0\]=Topic%252C1%257CSociety%2523SOC%2523%257CInequality%2523SOC_INE%2523&pg=0&fc=Topic&bp=true&snb=2&df\[ds\]=dsDisseminateFinalDMZ&df\[id\]=DSD_WISE_IDD%2540DF_IDD&df\[ag\]=OECD.WISE.INE&df\[vs\]=1.0&pd=2021%252C2021&dq=NLD%252BUSA%252BGBR%252BCHE%252](https://data-explorer.oecd.org/vis?fs[0]=Topic%252C1%257CSociety%2523SOC%2523%257CInequality%2523SOC_INE%2523&pg=0&fc=Topic&bp=true&snb=2&df[ds]=dsDisseminateFinalDMZ&df[id]=DSD_WISE_IDD%2540DF_IDD&df[ag]=OECD.WISE.INE&df[vs]=1.0&pd=2021%252C2021&dq=NLD%252BUSA%252BGBR%252BCHE%252)
- Official Journal of the European Union. (2024). *Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on corporate sustainability due diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859 Text with EEA relevance*. <http://data.europa.eu/eli/dir/2024/1619/oj>
- Ongolo, S., Kouassi, S. K., Chérif, S., & Giessen, L. (2018). The Tragedy of Forestland Sustainability in Postcolonial Africa: Land Development, Cocoa, and Politics in Côte d'Ivoire. *Sustainability*, 10(12), 4611. <https://doi.org/10.3390/SU10124611>
- Onwuegbuzie, A. J., & Leech, N. L. (2006). Linking Research Questions to Mixed Methods Data Analysis Procedures 1. *The Qualitative Report*, 11(3), 474–498. <http://nsuworks.nova.edu/tqr/vol11/iss3/3>
- Opferkuch, K., Caeiro, S., Salomone, R., & Ramos, T. B. (2021). Circular economy in corporate sustainability reporting: A review of organisational approaches. *Business Strategy and the Environment*, 30(8), 4015–4036. <https://doi.org/10.1002/BSE.2854>
- Otto, S., Hildebrandt, J., Will, M., Henn, L., & Katrin Beer, . (2021). Tying Up Loose Ends. Integrating Consumers' Psychology into a Broad Interdisciplinary Perspective on a Circular Sustainable Bioeconomy. *Journal of Agricultural and Environmental Ethics*, 34, 8. <https://doi.org/10.1007/s10806-021-09851-6>
- Oualy, J. M. R. (2021). Income Inequality and Socio-Political Instability in Sub-Saharan Africa. *Managing Global Transitions*, 19(1). <https://doi.org/10.26493/1854-6935.19.49-72>
- Ouattara, T. A., Kouamé, K. F., Zo-Bi, I. C., Vaudry, R., & Grinand, C. (2021). Changes in land cover and land use from 2016 to 2019 in south-east côte d'ivoire: Impacts of cash crops on forests. *Bois et Forêts Des Tropiques*, 347, 89–104. <https://doi.org/10.19182/BFT2021.347.A31868>
- Ouattara, T. A., Sokeng, V. C. J., Zo-Bi, I. C., Kouamé, K. F., Grinand, C., & Vaudry, R.

- (2022). Detection of Forest Tree Losses in Côte d'Ivoire Using Drone Aerial Images. *Drones*, 6(4), 83. <https://doi.org/10.3390/DRONES6040083>
- Ousmane, S., Dibi, H. N., Kouassi, K. H., Kouassi, K. É., & Ouattara, K. (2020). Political-military crises and vegetation dynamics in Mont Peko National Park in Côte d'Ivoire. *BOIS & FORETS DES TROPIQUES*, 343, 27–37. <https://doi.org/10.19182/BFT2020.343.A31837>
- Panizzut, N., Rafi-ul-Shan, P. M., Amar, H., Sher, F., Mazhar, M. U., & Klemes, J. J. (2021). Exploring relationship between environmentalism and consumerism in a market economy society: A structured systematic literature review. *Cleaner Engineering and Technology* 2. <https://doi.org/10.1016/j.clet.2021.100047>
- Parker, S. C. (2009). Theories of entrepreneurship. In *The Economics of Self-Employment and Entrepreneurship* (pp. 39–67). Cambridge University Press. <https://doi.org/https://doi.org/10.1017/CBO9780511493430.004>
- Parra-Paitan, C., zu Ermgassen, E. K. H. J., Meyfroidt, P., & Verburg, P. H. (2023). Large gaps in voluntary sustainability commitments covering the global cocoa trade. *Global Environmental Change*, 81, 102696. <https://doi.org/10.1016/J.GLOENVCHA.2023.102696>
- Patinkin, D. (1975). The Collected Writings of John Maynard Keynes: From the Tract to the General Theory. *The Economic Journal*, 85(338), 249. <https://doi.org/10.2307/2230991>
- Pauceanu, A. M., Rabie, N., Moustafa, A., & Jiroveanu, D. C. (2021). Entrepreneurial Leadership and Sustainable Development—A Systematic Literature Review. *Sustainability*, 13(21), 11695. <https://doi.org/10.3390/SU132111695>
- Payrovnaziri, S. N., Chen, Z., Rengifo-Moreno, P., Miller, T., Bian, J., Chen, J. H., Liu, X., & He, Z. (2020). Explainable artificial intelligence models using real-world electronic health record data: a systematic scoping review. *Journal of the American Medical Informatics Association*, 27(7), 1173–1185. <https://doi.org/10.1093/JAMIA/OCAA053>
- Pereirinha, J. A., & Pereira, E. (2023). Living wages in Portugal: In search of dignity in a polarised labour market. *Social Policy & Administration*, 1–16. <https://doi.org/10.1111/SPOL.12887>
- Pérez-Armendáriz, B., & Cardoso-Ugarte, G. A. (2020). Traditional fermented beverages in Mexico: Biotechnological, nutritional, and functional approaches. *Food Research International*, 136, 109307. <https://doi.org/10.1016/J.FOODRES.2020.109307>
- Pérez, F. J. (2022). An Enduring Neocolonial Alliance: A History of the CFA Franc. *American Journal of Economics and Sociology*, 81(5), 851–887.

<https://doi.org/10.1111/AJES.12485>

- Perez, M., Lopez-Yerena, A., Vallverdú-Queralt, A., & Vallverd U-Queralt, A. (2020). Traceability, authenticity and sustainability of cocoa and chocolate products: a challenge for the chocolate industry. *Critical Reviews in Food Science and Nutrition*, 62(2), 475–489. <https://doi.org/10.1080/10408398.2020.1819769>
- Peters, L., Hobson, C. W., & Samuel, V. (2022). A systematic review and meta-synthesis of qualitative studies that investigate the emotional experiences of staff working in homeless settings. *Health & Social Care in the Community*, 30(1), 58–72. <https://doi.org/10.1111/HSC.13502>
- Peters, S., & Verhagen, H. (2022). An Evaluation of the Nutri-Score System along the Reasoning for Scientific Substantiation of Health Claims in the EU—A Narrative Review. *Foods*, 11(16), 2426. <https://doi.org/10.3390/FOODS11162426>
- Pigeaud, F., & Sylla, N. S. (2020). *Africa's Last Colonial Currency The CFA Franc Story (Translated by Thomas Fazi)*. Pluto Press. www.plutobooks.com
- Piketty, T. (2017). *Capital in the Twenty-First Century* (T. by A. Goldhammer (ed.); Kindle edi). The Belknap Press of Harvard University Press.
- Pizzi, S., Caputo, A., Corvino, A., & Venturelli, A. (2020). Management research and the UN sustainable development goals (SDGs): A bibliometric investigation and systematic review. *Journal of Cleaner Production*, 276. <https://doi.org/10.1016/j.jclepro.2020.124033>
- Plakoyiannaki, E., Wei, T., & Prashantham, S. (2019). Rethinking Qualitative Scholarship in Emerging Markets: Researching, Theorizing, and Reporting. *Management and Organization Review*, 15(2), 217–234. <https://doi.org/10.1017/MOR.2019.27>
- Pocol, C. B., Marinescu, V., Dabija, D.-C., & Amuza, A. (2021). Clustering Generation Z university students based on daily fruit and vegetable consumption: empirical research in an emerging market. *British Food Journal*, 123(8), 2705–2727. <https://doi.org/10.1108/BFJ-10-2020-0900>
- Poponi, S., Arcese, G., Mosconi, E. M., Arezzo, M., & Trifiletti, D. (2020). Entrepreneurial Drivers for the Development of the Circular Business Model: The Role of Academic Spin-Off. *Sustainability*, 12. <https://doi.org/10.3390/su12010423>
- Porter, M. E. (2008). *Competitive Advantage: Creating and Sustaining Superior Performance* (Kindle). The Free Press.
- Poucher, Z. A., Tamminen, K. A., Caron, J. G., & Sweet, S. N. (2020). Thinking through and designing qualitative research studies: a focused mapping review of 30 years of qualitative

- research in sport psychology. *International Review of Sport and Exercise Psychology*, 13(1), 163–186. <https://doi.org/10.1080/1750984X.2019.1656276>
- Prasad, P., Damani, O. P., & Sohoni, M. (2022). How can resource-level thresholds guide sustainable intensification of agriculture at farm level? A system dynamics study of farm-pond based intensification. *Agricultural Water Management*, 264, 107385. <https://doi.org/10.1016/J.AGWAT.2021.107385>
- Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R. J., & Ormazabal, M. (2019). Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises. *Corporate Social Responsibility and Environmental Management*, 26(6), 1473–1484. <https://doi.org/10.1002/csr.1761>
- Public Health France. (2024). *Nutri-Score | Santé publique France*. <https://www.santepubliquefrance.fr/determinants-de-sante/nutrition-et-activite-physique/articles/nutri-score>
- Puchol-Miquel, M., Barat, J. M., & Pérez-Esteve, É. (2022). Sustainability Labeling in the Perception of Sensory Quality and Consumer Purchase Intention of Cocoa and Chocolate. In *Trends in Sustainable Chocolate Production* (pp. 291–324). Springer International Publishing. https://doi.org/10.1007/978-3-030-90169-1_9/COVER
- Puntillo, P., Gulluscio, C., Huisinigh, D., & Veltri, S. (2021). Reevaluating waste as a resource under a circular economy approach from a system perspective: Findings from a case study. *Business Strategy and the Environment*, 30(2), 968–984. <https://doi.org/10.1002/BSE.2664>
- Putri, D. N., De Steur, H., Juvinal, J. G., Gellynck, X., & Schouteten, J. J. (2024). Sensory attributes of fine flavor cocoa beans and chocolate: A systematic literature review. *Journal of Food Science*, 89(4), 1917–1943. <https://doi.org/10.1111/1750-3841.17006>
- Qu, D., Shevchenko, T., Saidani, M., Xia, Y., & Ladyka, Y. (2021). Transition towards a circular economy: the role of university assets in the implementation of a new model. *Detritus*, 17, 3–14. <https://doi.org/10.31025/2611-4135/2021.15141>
- Radez, J., Reardon, T., Creswell, C., Peter, ., Lawrence, J., Evdoka-Burton, G., & Waite, P. (2021). Why do children and adolescents (not) seek and access professional help for their mental health problems? A systematic review of quantitative and qualitative studies. *European Child & Adolescent Psychiatry*, 30, 183–211. <https://doi.org/10.1007/s00787-019-01469-4>
- Radić, M., Ravasi, D., & Munir, K. (2021). Privatization: Implications of a Shift from State to Private Ownership. *Journal of Management*, 47(6), 1596–1629.

<https://doi.org/10.1177/0149206320988356/FORMAT/EPUB>

- Raifman, S., Devost, M. A., Digitale, J. C., Chen, Y.-H., & Morris, M. D. (2022). Respondent-Driven Sampling: a Sampling Method for Hard-to-Reach Populations and Beyond. *Current Epidemiology Reports*, 9, 38–47. <https://doi.org/10.1007/s40471-022-00287-8>
- Rapp, D. J., Herbener, J. M., & Gordon, D. (2024). On the Ethics of Fair Value Accounting: Distributive Effects, Distributive Injustice, and Implications for Social Peace. *Quarterly Journal of Austrian Economics*, 27(1). <https://doi.org/10.35297/001C.117210>
- Rathgens, J., Gröschner, S., & von Wehrden, H. (2020). Going beyond certificates: A systematic review of alternative trade arrangements in the global food sector. *Journal of Cleaner Production*, 276, 123208. <https://doi.org/10.1016/j.jclepro.2020.123208>
- Ratten, V. (2023). Entrepreneurship: Definitions, opportunities, challenges, and future directions. *Global Business and Organizational Excellence*, 42(5), 79–90. <https://doi.org/10.1002/JOE.22217>
- Rea, L. M., & Parker, R. A. (2014). *Designing and conducting survey research: A comprehensive guide* (4th ed.). Jossey-Bass, A Wiley Brand.
- Reichardt, C. S. (2022). The Counterfactual Definition of a Program Effect. *American Journal of Evaluation*, 43(2), 158–174. <https://doi.org/10.1177/1098214020975485/FORMAT/EPUB>
- Reis, R., & Tenreyro, S. (2022). Helicopter Money: What Is It and What Does It Do? *Annual Review of Economics*, 14, 313–335. <https://doi.org/10.1146/ANNUREV-ECONOMICS-051420-020618>
- Rejeb, A., Zailani, S., Rejeb, K., Treiblmaier, H., & Keogh, J. G. (2022). Modeling enablers for blockchain adoption in the circular economy. *Sustainable Futures*, 4, 100095. <https://doi.org/10.1016/J.SFTR.2022.100095>
- Renier, C., Vandromme, M., Meyfroidt, P., Ribeiro, V., Kalischek, N., & zu Ermgassen, E. K. H. J. (2023). Transparency, traceability and deforestation in the Ivorian cocoa supply chain. *Environmental Research Letters*, 18, 24030. <https://doi.org/10.1088/1748-9326/acad8e>
- Reynaud, E. (2017). *The International Labour Organization and the Living Wage: A Historical Perspective* (90). www.ilo.org/publns.
- Rieke, N., Hancox, J., Li, W., Milletari, F., Roth, H. R., Albarqouni, S., Bakas, S., Galtier, M. N., Landman, B. A., Maier-Hein, K., Ourselin, S., Sheller, M., Summers, R. M., Trask, A., Xu, D., Baust, M., & Cardoso, M. J. (2020). The future of digital health with federated learning. *NPJ Digital Medicine*, 3(1), 1–7. <https://doi.org/10.1038/s41746-020-00323-1>

- Robson, K., Dean, M., Haughey, S., & Elliott, C. (2021). A comprehensive review of food fraud terminologies and food fraud mitigation guides. *Food Control*, 120, 107516. <https://doi.org/10.1016/J.FOODCONT.2020.107516>
- Rogers, J., & Révész, A. (2019). Experimental and quasi-experimental designs. In *The Routledge Handbook of Research Methods in Applied Linguistics*. Taylor and Francis. <https://doi.org/10.4324/9780367824471-12/EXPERIMENTAL-QUASI-EXPERIMENTAL-DESIGNS-JOHN-ROGERS-ANDREA-R>
- Romeiras, M. M., Duarte, M. C., Francisco-Ortega, J., Catarino, L., & Havik, P. (2018). Recovering Plant Data for Guinea-Bissau: Implications for Biodiversity Knowledge of West Africa. *Diversity*, 10(4), 109. <https://doi.org/10.3390/D10040109>
- Rosário, A. T., Raimundo, R. J., & Cruz, S. P. (2022). Sustainable Entrepreneurship: A Literature Review. *Sustainability*, 14(9), 5556. <https://doi.org/10.3390/SU14095556>
- Rosca, E., Tate, W. L., Bals, L., Huang, F., & Ciulli, F. (2022). Coordinating multi-level collective action: how intermediaries and digital governance can help supply chains tackle grand challenges. *International Journal of Operations & Production Management*, 42(12), 1937–1968. <https://doi.org/10.1108/IJOPM-07-2022-0432>
- Ruf, F. (2021). Les standards dits durables appauvrissent-ils les planteurs de cacao ? Interactions entre déforestation en Côte d’Ivoire et au Libéria, crédit à l’achat d’engrais et baisse des cours. *Cahiers Agricultures*, 30(38). <https://doi.org/10.1051/cagri/2021024>
- Ruf, F. (2022). Covid-19, Living income differential and decline in income of cocoa producers in Côte d’Ivoire. *Cahiers Agricultures*, 31. <https://doi.org/10.1051/CAGRI/2022022>
- Ruf, F., Kone, S., & Bebo, B. (2019). Côte d’Ivoire’s cashew nut boom: A social and ecological transition of the cotton and cocoa systems. *Cahiers Agricultures*, 28. <https://doi.org/10.1051/CAGRI/2019019>
- Ruzima, M., Boachie, M. K., Põlajeva, T., & Iddrisu, A. A. (2023). Does the Fisher effect hold in Rwanda? *Quality and Quantity*, 57(3), 2657–2672. <https://doi.org/10.1007/S11135-022-01479-6/TABLES/10>
- Sabates-Wheeler, R., & Sumberg, J. (2022). Breaking out of the policy enclave approach to child labour in sub-Saharan African agriculture. *Global Social Policy*, 22(1), 46–66. <https://doi.org/10.1177/1468018121991813>
- Sachs, J. D., Lafortune, G., & Fuller, G. (2024). *The SDGs and the UN Summit of the Future: Sustainable Development Report 2024*. <https://doi.org/10.25546/108572>
- Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six Transformations to achieve the Sustainable Development Goals. *Nature*

- Sustainability*, 2, 805–814. <https://doi.org/10.1038/s41893-019-0352-9>
- Sackou-Kouakou, J.-G., Kouamé, J., Tiadé, M.-L., Desquith, A. A., Dagnogo, A., Hounsa-Alla, A., Attia-Konan, R., Coulibaly, M., & Kouadio, K. L. (2021). Renunciation of care for financial reasons among women in a peri-urban neighborhood in Abidjan-Côte d’Ivoire. *Sante Publique*, 33(2), 285–293. <https://doi.org/10.3917/SPUB.212.0285>
- Sah, A., Hillenbrand, C., & Vogt, J. (2021). Visible sugar : Salient sugar information impacts health perception of fruit juices but only when motivated to be responsible and not when motivated to enjoy. *Appetite*, 164, 105262. <https://doi.org/10.1016/J.APPET.2021.105262>
- Saleh, E. A., Lazaridou, F. B., Klapprott, F., Wazaify, M., Heinz, A., & Kluge, U. (2023). A systematic review of qualitative research on substance use among refugees. *Addiction*, 118(2), 218–253. <https://doi.org/10.1111/ADD.16021>
- Santana, S., & Ribeiro, A. (2022). Traceability Models and Traceability Systems to Accelerate the Transition to a Circular Economy: A Systematic Review. *Sustainability*, 14(9), 5469. <https://doi.org/10.3390/SU14095469/S1>
- Sassen, M., van Soesbergen, A., Arnell, A. P., & Scott, E. (2022). Patterns of (future) environmental risks from cocoa expansion and intensification in West Africa call for context specific responses. *Land Use Policy*, 119. <https://doi.org/10.1016/J.LANDUSEPOL.2022.106142>
- Savolainen, V., Clottey, V. A., Doubi, B. T. S., Konan, J. L., Quain, M., Bezeng, B. S., Logah, V., Wireko-Kena, A., Osekre, E. A., Atuah, L., Angui, C. M. V., Ameka, G., Turkson, B., Boatemaa, A., Anankware, J. P., Boafo, H. A., Agyei-Dwarko, D., & Collins, C. M. (Tilly. (2020). Systems thinking creates opportunities for a circular economy and sustainable palm agriculture in Africa. *Current Research in Environmental Sustainability*, 1, 31–34. <https://doi.org/10.1016/J.CRSUST.2020.05.001>
- Schäfer, N. (2022). Making transparency transparent: a systematic literature review to define and frame supply chain transparency in the context of sustainability. *Management Review Quarterly*, 73(2), 579–604. <https://doi.org/10.1007/S11301-021-00252-7>
- Schenten, J., Führ, M., Kleihauer, S., & Schönborn, J. (2019). Traceability as driver for more sustainable chemistry in the global textile supply chains. *Current Opinion in Green and Sustainable Chemistry*, 19, 87–93. <https://doi.org/10.1016/J.COGSC.2019.08.003>
- Schneeweiss, S., & Patorno, E. (2021). Conducting Real-world Evidence Studies on the Clinical Outcomes of Diabetes Treatments. *Endocrine Reviews*, 42(5), 658–690. <https://doi.org/10.1210/ENDREV/BNAB007>

- Schouteten, J. J., Gellynck, X., & Slabbinck, H. (2021). Do Fair Trade Labels Bias Consumers' Perceptions of Food Products? A Comparison between a Central Location Test and Home-Use Test. *Sustainability*, 13(3), 1384. <https://doi.org/10.3390/SU13031384>
- Schultz, T. P. (2003). Wage rentals for reproducible human capital: Evidence from Ghana and the Ivory Coast. *Economics and Human Biology*, 1(3), 331–366. <https://doi.org/10.1016/J.EHB.2003.08.004>
- Schulze, T. (2022). *Monetary Policy, Financial Stability, and Default in Advanced and Emerging Market Economies*. University of Oxford.
- Scudder, M., Wampe, N., Waviki, Z., Applegate, G., & Herbohn, J. (2022). Smallholder cocoa agroforestry systems; is increased yield worth the labour and capital inputs? *Agricultural Systems*, 196, 103350. <https://doi.org/10.1016/J.AGSY.2021.103350>
- Searle, R. H., & McWha-Hermann, I. (2021). “Money’s too tight (to mention)”: a review and psychological synthesis of living wage research. *European Journal of Work and Organizational Psychology*, 30(3), 428–443. <https://doi.org/10.1080/1359432X.2020.1838604>
- Senou, R. B., Dégila, J., Adjobo, E. C., & Djossou, A. P. M. (2019). Blockchain for Child Labour Decrease in Cocoa Production in West and Central Africa. *IFAC-PapersOnLine*, 52(13), 2710–2715. <https://doi.org/10.1016/J.IFACOL.2019.11.617>
- Sharkey, A., Pontikes, E., & Hsu, G. (2022). The Impact of Mandated Pay Gap Transparency on Firms’ Reputations as Employers. *Administrative Science Quarterly*, 67(4), 1136–1179. <https://doi.org/10.1177/00018392221124614>
- Shepherd, R., Lorente, L., Vignoli, M., Nielsen, K., & Peiró, J. M. (2021). Challenges influencing the safety of migrant workers in the construction industry: A qualitative study in Italy, Spain, and the UK. *Safety Science*, 142, 105388. <https://doi.org/10.1016/J.SSCI.2021.105388>
- Shevchenko, T., Saidani, M., Ranjbari, M., Kronenberg, J., Danko, Y., & Laitala, K. (2023). Consumer behavior in the circular economy: Developing a product-centric framework. *Journal of Cleaner Production*, 384. <https://doi.org/10.1016/J.JCLEPRO.2022.135568>
- Shi, J., Tarkiainen, L., Martikainen, P., & van Raalte, A. (2021). The impact of income definitions on mortality inequalities. *SSM - Population Health*, 15. <https://doi.org/10.1016/J.SSMPH.2021.100915>
- Shipp, A. J., & Jansen, K. J. (. (2021). The “other” time: a review of the subjective experience of time in organizations. *Academy of Management Annals*, 15(1), 299–334. <https://doi.org/10.5465/annals.2018.0142>

- Shobande, O. A., & Shodipe, O. T. (2021). Monetary Policy Interdependency in Fisher Effect: A Comparative Evidence. *Journal of Central Banking Theory and Practice*, 1, 203–226. <https://doi.org/10.2478/jcbtp-2021-0010>
- Silverman, D. (2000). *Doing Qualitative Research: A Practical Handbook*. Sage.
- Silvestri, C., Silvestri, L., Piccarozzi, M., & Ruggieri, A. (2022). Toward a framework for selecting indicators of measuring sustainability and circular economy in the agri-food sector: a systematic literature review. *The International Journal of Life Cycle Assessment*, 1–39. <https://doi.org/10.1007/S11367-022-02032-1>
- Singh, M., Massimo, L., & Collins, C. M. (2022). Evaluation of Protected Areas in Côte d'Ivoire and Ghana, West Africa, Using a Remote Sensing-Based Approach. *Land*, 11(5), 720. <https://doi.org/10.3390/LAND11050720>
- Sinkovics, N., Gunaratne, D., Sinkovics, R. R., & Molina-Castillo, F. J. (2021). Sustainable Business Model Innovation: An Umbrella Review. *Sustainability*, 13(13), 7266. <https://doi.org/10.3390/SU13137266>
- Skene, K. R. (2022). Steering the circular economy: A new role for Adam Smith's invisible hand. In *Circular Economy and Sustainability* (pp. 21–33). Elsevier. <https://doi.org/10.1016/B978-0-12-819817-9.00028-4>
- Slotnick, M. J., Wolfson, J. A., & Leung, C. W. (2023). Tap water perceptions and water filter use vary with socio-demographic characteristics and are associated with water and sugar-sweetened beverage consumption in university students. *Public Health Nutrition*, 26(11), 2288–2293. <https://doi.org/10.1017/S1368980023001659>
- Smith, A. (2008). *An Inquiry into the Nature and Causes of the Wealth of Nations: A Selected Edition (Oxford World's Classics)* (K. Sutherland (ed.); Kindle Edi). Oxford University Press (OUP).
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Sodhi, M. M. S., & Tang, C. S. (2019). Research Opportunities in Supply Chain Transparency. *Production and Operations Management*, 28(12), 2946–2959. <https://doi.org/10.1111/POMS.13115>
- Sonwa, D. J., Weise, S. F., Schroth, G., Janssens, M. J. J., & Shapiro, H.-Y. (2019). Structure of cocoa farming systems in West and Central Africa: a review. *Agroforestry Systems*, 93. <https://doi.org/10.1007/s10457-018-0306-7>
- Sopha, B. M., Purnamasari, D. M., & Ma'mun, S. (2022). Barriers and Enablers of Circular

- Economy Implementation for Electric-Vehicle Batteries: From Systematic Literature Review to Conceptual Framework. *Sustainability*, 14(10), 6359. <https://doi.org/10.3390/SU14106359>
- Sovacool, B. K., Axsen, J., & Sorrell, S. (2018). Promoting novelty, rigor, and style in energy social science: Towards codes of practice for appropriate methods and research design. *Energy Research & Social Science*, 45, 12–42. <https://doi.org/10.1016/J.ERSS.2018.07.007>
- Spash, C. L., & Hache, F. (2022). The Dasgupta Review deconstructed: an exposé of biodiversity economics. *Globalizations*, 19(5), 653–676. <https://doi.org/10.1080/14747731.2021.1929007>
- Stahel, W. R. (2016). The circular economy. *Nature*, 531(7595), 435–438. <https://doi.org/10.1038/531435a>
- Stantcheva, S. (2023). How to Run Surveys: A Guide to Creating Your Own Identifying Variation and Revealing the Invisible. *Annual Review of Economics*, 15, 205–234. <https://doi.org/10.1146/ANNUREV-ECONOMICS-091622-010157>
- Staritz, C., Tröster, B., Grumiller, J., & Maile, F. (2022). Price-Setting Power in Global Value Chains: The Cases of Price Stabilisation in the Cocoa Sectors in Côte d’Ivoire and Ghana. *The European Journal of Development Research*. <https://doi.org/10.1057/s41287-022-00543-z>
- Staritz, C., Tröster, B., Grumiller, J., & Maile, F. (2023). Price-Setting Power in Global Value Chains: The Cases of Price Stabilisation in the Cocoa Sectors in Côte d’Ivoire and Ghana. *European Journal of Development Research*, 35(4), 840–868. <https://doi.org/10.1057/S41287-022-00543-Z/FIGURES/4>
- Suchek, N., Ao, J. ~, Ferreira, J., & Fernandes, P. O. (2022). A review of entrepreneurship and circular economy research: State of the art and future directions. *Business Strategy & the Environment*, 31(5), 2256–2283. <https://doi.org/10.1002/bse.3020>
- Suchek, N., Fernandes, C. I., Kraus, S., Filser, M., & Sjögrén, H. (2021). Innovation and the circular economy: A systematic literature review. *Business Strategy and the Environment*, 30(8), 3686–3702. <https://doi.org/10.1002/BSE.2834>
- Sun, Y., Blewitt, C., Edwards, S., Fraser, A., Newman, S., Cornelius, J., & Skouteris, H. (2023). Methods and Ethics in Qualitative Research Exploring Young Children’s Voice: A Systematic Review. *International Journal of Qualitative Methods*, 22, 1–15. https://doi.org/10.1177/16094069231152449/SUPPL_FILE/SJ-PDF-1-IJQ-10.1177_16094069231152449.PDF

- Superti, V., Merino-Saum, A., Baur, I., & Binder, C. R. (2021). Unraveling how the concept of circularity relates to sustainability: An indicator-based meta-analysis applied at the urban scale. *Journal of Cleaner Production*, 315, 128070. <https://doi.org/10.1016/J.JCLEPRO.2021.128070>
- Swe, K. T., Rahman, M. M., Rahman, M. S., Teng, Y., Abe, S. K., Hashizume, M., & Shibuya, K. (2021). Impact of poverty reduction on access to water and sanitation in low- and lower-middle-income countries: country-specific Bayesian projections to 2030. *Tropical Medicine and International Health*, 26(7), 760–774. <https://doi.org/10.1111/TMI.13580>
- Talati, Z., Egnell, M., Hercberg, S., Julia, C., & Pettigrew, S. (2019). Consumers' Perceptions of Five Front-of-Package Nutrition Labels: An Experimental Study Across 12 Countries. *Nutrients*, 11(8), 1934. <https://doi.org/10.3390/NU11081934>
- Tan, J., Tan, F. J., & Ramakrishna, S. (2022). Transitioning to a Circular Economy: A Systematic Review of Its Drivers and Barriers. *Sustainability (Switzerland)*, 14(3), 1757. <https://doi.org/10.3390/SU14031757/S1>
- Taquette, S. R., & Borges da Matta Souza, L. M. (2022). Ethical Dilemmas in Qualitative Research: A Critical Literature Review. *International Journal of Qualitative Methods*, 21, 1–15. <https://doi.org/10.1177/16094069221078731>
- Tavlas, G. S. (2023). Milton Friedman and the Road to Monetarism: A Review Essay. *History of Political Economy*, 55(1), 173–192. <https://doi.org/10.1215/00182702-10213681>
- Ter Borg, S., Steenbergen, E., Milder, I. E. J., & Temme, E. H. M. (2021). Evaluation of Nutri-Score in Relation to Dietary Guidelines and Food Reformulation in The Netherlands. *Nutrients*, 13(12), 4536. <https://doi.org/10.3390/NU13124536>
- Testa, F., Iovino, R., & Iraldo, F. (2020). The circular economy and consumer behaviour: The mediating role of information seeking in buying circular packaging. *Business Strategy and the Environment*, 29(8), 3435–3448. <https://doi.org/10.1002/BSE.2587>
- Theodoraki, C., Dana, L.-P., & Caputo, A. (2022). Building sustainable entrepreneurial ecosystems: A holistic approach. *Journal of Business Research*, 140, 346–360. <https://doi.org/10.1016/j.jbusres.2021.11.005>
- Thévenon, O., & Edmonds, E. (2019). *Child labour: Causes, consequences and policies to tackle it* (No. 235; Social, Employment and Migration Working Papers). <https://doi.org/10.1787/f6883e26-en>
- Thirlwall, A. (2020). The Age of Fragmentation by Alessandro Roncaglia: A Review Article. *PSL Quarterly Review*, 73(295), 343–365. https://doi.org/10.13133/2037-3643_73.295_4
- Thomson, S. B. (2011). Qualitative Research: Validity. *JOAAG*, 6(1).

- Tindle, R., Castillo, P., Doring, N., Grant, L., & Willis, R. (2022). Developing and validating a university needs instrument to measure the psychosocial needs of university students. *British Journal of Educational Psychology*, 92(4), 1550–1570. <https://doi.org/10.1111/BJEP.12515>
- Tondoh, J. E., Kouamé, F. N. guessa., Martinez Guéi, A., Sey, B., Wowo Koné, A., & Gnessougou, N. (2015). Ecological changes induced by full-sun cocoa farming in Côte d'Ivoire. *Global Ecology and Conservation*, 3, 575–595. <https://doi.org/10.1016/J.GECCO.2015.02.007>
- Toth-Peter, A., Torres De Oliveira, R., Mathews, S., Barner, L., & Figueira, S. (2023). Industry 4.0 as an enabler in transitioning to circular business models: A systematic literature review. *Journal of Cleaner Production*, 393, 136284. <https://doi.org/10.1016/j.jclepro.2023.136284>
- Traoré, N., & Dzifa Torvikey, G. (2022). Migrants in the Plantation Economy in Côte d'Ivoire: A Historical Perspective. In J. Kofi Teye Editor (Ed.), *Migration in West Africa* (pp. 187–208). Springer.
- Treiblmaier, H., & Garaus, M. (2023). Using blockchain to signal quality in the food supply chain: The impact on consumer purchase intentions and the moderating effect of brand familiarity. *International Journal of Information Management*, 68, 102514. <https://doi.org/10.1016/J.IJINFOMGT.2022.102514>
- Tröster, B., & Gunter, U. (2023). The Financialization of Coffee, Cocoa and Cotton Value Chains: The Role of Physical Actors. *Development and Change*, 54(6), 1550–1574. <https://doi.org/10.1111/DECH.12802>
- Tsanakas, J. A., van der Heide, A., Radavičius, T., Denafas, J., Lemaire, E., Wang, K., Poortmans, J., Voroshazi, E., & John Tsanakas, C. A. (2019). Towards a circular supply chain for PV modules: Review of today's challenges in PV recycling, refurbishment and re-certification. *Progress in Photovoltaics: Research and Applications*, 28(6), 454–464. <https://doi.org/10.1002/pip.3193>
- Uher, J. (2021). Psychometrics is not measurement: Unraveling a fundamental misconception in quantitative psychology and the complex network of its underlying fallacies. *Journal of Theoretical and Philosophical Psychology*, 41(1), 58–84. <https://doi.org/10.1037/TEO0000176>
- Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2009). Human capital and entrepreneurial success: A meta-analytical review. *Journal of Business Venturing*, 26, 341–358. <https://doi.org/10.1016/j.jbusvent.2009.09.004>

- United Nations. (2023a). *KEY MESSAGES The Sustainable Development Goals Report 2023: Special Edition*.
- United Nations. (2023b). *Transforming our world: the 2030 Agenda for Sustainable Development*. <https://sdgs.un.org/2030agenda>
- United Nations. (2025). *THE 17 GOALS | Sustainable Development*. UN SDGs. <https://sdgs.un.org/goals>
- United Nations Department of Economic and Social Affairs. (2023). *The 17 Sustainable Development Goals*. United Nations Sustainable Development Goals. <https://sdgs.un.org/goals>
- Van Baalen, S. (2021). Local elites, civil resistance, and the responsiveness of rebel governance in Côte d'Ivoire. *Journal of Peace Research*, 58(5), 930–944. <https://doi.org/10.1177/0022343320965675>
- Van Baalen, S. (2023). Civilian Protest in Civil War: Insights from Côte d'Ivoire. *American Political Science Review*, 1–16. <https://doi.org/10.1017/S0003055423000564>
- Van de Velde, M. (2018). *Beyond shareholder theory: exploring effective business models balancing profits and purpose*. University of Glasgow.
- Van de Velde, M. (2021). *Love your legacy*. Big Tree Global Limited.
- Van de Werfhorst, H. G. (2020). Are universities left-wing bastions? The political orientation of professors, professionals, and managers in Europe. *British Journal of Sociology*, 71(1), 47–73. <https://doi.org/10.1111/1468-4446.12716>
- Van der Bend, D. L. M., van Eijdsen, M., van Roost, M. H. I., de Graaf, K., & Roodenburg, A. J. C. (2022). The Nutri-Score algorithm: Evaluation of its validation process. *Frontiers in Nutrition*, 9, 974003. <https://doi.org/10.3389/FNUT.2022.974003/BIBTEX>
- Van der Ven, H., Rothacker, C., & Cashore, B. (2018). Do eco-labels prevent deforestation? Lessons from non-state market driven governance in the soy, palm oil, and cocoa sectors. *Global Environmental Change*, 52, 141–151. <https://doi.org/10.1016/J.GLOENVCHA.2018.07.002>
- Van Hooijdonk, K. J. M., Simons, S. S. H., van Noorden, T. H. J., Geurts, S. A. E., & Vink, J. M. (2023). Prevalence and clustering of health behaviours and the association with socio-demographics and mental well-being in Dutch university students. *Preventive Medicine Reports*, 35, 102307. <https://doi.org/10.1016/J.PMEDR.2023.102307>
- Van Tran, N. (2022). Understanding Household Consumption Behaviour: What do we Learn from a Developing Country? *B.E. Journal of Economic Analysis and Policy*, 22(4), 801–858. <https://doi.org/10.1515/BEJEAP-2022->

- Van Vliet, J. A., Slingerland, M. A., Waarts, Y. R., & Giller, K. E. (2021). A Living Income for Cocoa Producers in Côte d'Ivoire and Ghana? *Frontiers in Sustainable Food Systems*, 5. <https://doi.org/10.3389/FSUFS.2021.732831>
- Veldhuizen, L. J., Giller, K. E., Oosterveer, P., Brouwer, I. D., Janssen, S., Van Zanten, H. H., & Slingerland, M. A. (2020). The Missing Middle: Connected action on agriculture and nutrition across global, national and local levels to achieve Sustainable Development Goal 2. *Global Food Security*, 24. <https://doi.org/10.1016/j.gfs.2019.100336>
- Vervuurt, W., Slingerland, M. A., Pronk, A. A., & van Bussel, L. G. J. (2022). Modelling greenhouse gas emissions of cacao production in the Republic of Côte d'Ivoire. *Agroforestry Systems*, 96(2), 417–434. <https://doi.org/10.1007/S10457-022-00729-8/FIGURES/5>
- Viciunaite, V., & Alfnes, F. (2020). Informing sustainable business models with a consumer preference perspective. *Journal of Cleaner Production*, 242. <https://doi.org/10.1016/j.jclepro.2019.118417>
- Viglia, G., & Dolnicar, S. (2020). A review of experiments in tourism and hospitality. *Annals of Tourism Research*, 80, 102858. <https://doi.org/10.1016/J.ANNALS.2020.102858>
- Villa, D., Causer, H., & Riley, G. A. (2021). Experiences that challenge self-identity following traumatic brain injury: a meta-synthesis of qualitative research. *Disability and Rehabilitation*, 43(23), 3298–3314.
- Vindrola-Padros, C., & Johnson, G. A. (2020). Rapid Techniques in Qualitative Research: A Critical Review of the Literature. *Qualitative Health Research*, 30(10), 1596–1604. <https://doi.org/10.1177/1049732320921835/FORMAT/EPUB>
- Visco, A., Scolaro, C., Facchin, M., Brahimi, S., Belhamdi, H., Gatto, V., & Beghetto, V. (2022). Agri-Food Wastes for Bioplastics: European Prospective on Possible Applications in Their Second Life for a Circular Economy. *Polymers*, 14(13), 2752. <https://doi.org/10.3390/POLYM14132752>
- Vogel, C., Mathé, S., Geitzenauer, M., Ndah, H. T., Sieber, S., Bonatti, M., & Lana, M. (2020). Stakeholders' perceptions on sustainability transition pathways of the cocoa value chain towards improved livelihood of small-scale farming households in Cameroon. *International Journal of Agricultural Sustainability*, 18(1), 55–69. <https://doi.org/10.1080/14735903.2019.1696156>
- Von Philipsborn, P., Stratil, J., Burns, J., Busert, L., Pfadenhauer, L., Polus, S., Holzapfel, C., Hauner, H., & Rehfuess, E. (2019). Environmental interventions to reduce the

- consumption of sugar-sweetened beverages and their effects on health (Review). *Cochrane Database of Systematic Reviews*. <https://doi.org/10.1002/14651858.CD012292.pub2>
- Waarts, Y., & Kiewisch, M. (2021). *Balancing the living income challenge: Towards a multi-actor approach to achieving a living income for cocoa farmers*.
- Wade, R., & Ellis, G. (2022). Reclaiming the Windy Commons: Landownership, Wind Rights, and the Assetization of Renewable Resources. *Energies*, 15(10), 3744. <https://doi.org/10.3390/EN15103744>
- Walden, J., Steinbrecher, A., & Marinkovic, M. (2021). Digital Product Passports as Enabler of the Circular Economy. *Chemie-Ingenieur-Technik*, 93(11), 1717–1727. <https://doi.org/10.1002/CITE.202100121>
- Wales, C., Harvey, M., & Warde, A. (2006). Recuperating from BSE: The shifting UK institutional basis for trust in food. *Appetite*, 47, 187–195. <https://doi.org/10.1016/j.appet.2006.05.007>
- Wardropper, C. B., Dayer, A. A., Goebel, M. S., & Martin, V. Y. (2021). Conducting conservation social science surveys online. *Conservation Biology*, 35(5), 1650–1658. <https://doi.org/10.1111/COBI.13747>
- Wayoro, D. (2023). Local-level exposure to conflicts and child health: Evidence from Côte d'Ivoire. *Journal of International Development*, 1–32. <https://doi.org/10.1002/JID.3776>
- Weber, R. (2021). Embedding futurity in urban governance: Redevelopment schemes and the time value of money. *Environment and Planning A: Economy and Space*, 53(3), 503–524. <https://doi.org/10.1177/0308518X20936686/FORMAT/EPUB>
- Weekes-Vagliani, W. (1990). *Analyse des variables socio-culturelles et de l'ajustement en Côte d'Ivoire* (OECD Development Centre Working Papers, 18151949; No.9). <https://doi.org/https://doi.org/10.1787/488458680613>
- Wenz, A., Al Baghal, T., & Gaia, A. (2021). Language Proficiency Among Respondents: Implications for Data Quality in a Longitudinal Face-To-Face Survey. *Journal of Survey Statistics and Methodology*, 9(1), 73–93. <https://doi.org/10.1093/JSSAM/SMZ045>
- Westreich, D., Edwards, J. K., Lesko, C. R., Cole, S. R., & Stuart, E. A. (2019). Target Validity and the Hierarchy of Study Designs. *American Journal of Epidemiology*, 188(2), 438–443. <https://doi.org/10.1093/AJE/KWY228>
- White, T., Blok, E., & Calhoun, V. D. (2022). Data sharing and privacy issues in neuroimaging research: Opportunities, obstacles, challenges, and monsters under the bed. *Human Brain Mapping*, 43(1), 278–291. <https://doi.org/10.1002/HBM.25120>
- Wild, H., Kyröläinen, A. J., & Kuperman, V. (2022). How representative are student

- convenience samples? A study of literacy and numeracy skills in 32 countries. *PLOS ONE*, 17(7), e0271191. <https://doi.org/10.1371/JOURNAL.PONE.0271191>
- Wildeboer, V., & Savini, F. (2022). The state of the circular economy: waste valorization in Hong Kong and Rotterdam. *International Journal of Urban and Regional Research*, 46(5), 749–765. <https://doi.org/10.1111/1468-2427.13122>
- Wilkialis, L., Rodrigues, N. B., Cha, D. S., Siegel, A., Majeed, A., Lui, L. M. W., Tamura, J. K., Gill, B., Teopiz, K., & McIntyre, R. S. (2021). Social Isolation, Loneliness and Generalized Anxiety: Implications and Associations during the COVID-19 Quarantine. *Brain Sciences*, 11(12), 1620. <https://doi.org/10.3390/BRAINSCI11121620>
- Wimmer, T., Geyer-Klingenberg, J., Hütter, M., Schmid, F., & Rathgeber, A. (2021). The impact of speculation on commodity prices: A Meta-Granger analysis. *Journal of Commodity Markets*, 22, 100148. <https://doi.org/10.1016/J.JCOMM.2020.100148>
- Winterstetter, A., Heuss-Assbichler, S., Stegemann, J., Kral, U., Osmani, M., & Rechberger, H. (2021). The role of anthropogenic resource classification in supporting the transition to a circular economy. *Journal of Cleaner Production*, 297. <https://doi.org/10.1016/j.jclepro.2021.126753>
- Woods-Hill, C. Z., Xie, A., Lin, J., Wolfe, H. A., Plattner, A. S., Malone, S., Chiotos, K., & Szymczak, J. E. (2022). Numbers and narratives: how qualitative methods can strengthen the science of paediatric antimicrobial stewardship. *JAC-Antimicrobial Resistance*, 4(1). <https://doi.org/10.1093/JACAMR/DLAB195>
- World Bank. (2024a). *Cocoa beans, whole or broken, raw or roasted exports by country* | 2022. <https://wits.worldbank.org/trade/comtrade/en/country/ALL/year/2022/tradeflow/Exports/partner/WLD/product/180100>
- World Bank. (2024b). *Cote d'Ivoire Trade Summary* | WITS Data. <https://wits.worldbank.org/CountryProfile/en/Country/CIV/Year/LTST/Summary>
- World Bank. (2024c). *Pink Sheets Commodity Markets Prices*. <https://www.worldbank.org/en/research/commodity-markets>
- World Bank Data. (2024a). *GDP (current US\$) - Cote d'Ivoire* | Data. <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2023&locations=CI&start=2013>
- World Bank Data. (2024b). *GDP deflator (base year varies by country) - Cote d'Ivoire* | Data. <https://data.worldbank.org/indicator/NY.GDP.DEFL.ZS?end=2023&locations=CI&start=2013>
- World Bank Data. (2024c). *GDP deflator (base year varies by country)* | Data.

- <https://data.worldbank.org/indicator/NY.GDP.DEFL.ZS?end=2023&start=2013>
- World Bank Data. (2024d). *GDP per capita, PPP (current international \$) - Cote d'Ivoire, United Kingdom, France, Switzerland, Germany, United States, Netherlands* | Data. <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?end=2023&locations=CI-GB-FR-CH-DE-US-NL&start=2013>
- World Bank Data. (2024e). *Unemployment, total (% of total labor force) (modeled ILO estimate) - Cote d'Ivoire* | Data. <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=CI>
- World Bank Data. (2024f). *World Real GDP - GDP (constant 2015 US\$)* | Data. <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2022&start=2016&view=chart>
- World Bank, & World Bank Data. (2024). *Inflation, consumer prices (annual %) - Cote d'Ivoire* | Data. <https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?end=2023&locations=CI&start=1961>
- World Health Organization Regional Office for Europe. (2015). *European Food and Nutrition Action Plan 2015-2020*. <http://www.euro.who.int/pubrequest>
- World Inequality Database. (2023). *World Inequality Database*. <https://wid.world/> (Accessed on 31 May 2023)
- Wurster, S., & Reis, C. F. de B. (2022). Priority Products for Sustainability Information and Recommendation Software: Insights in the Context of the EU's Action Plan Circular Economy. *Sustainability*, 14(19), 11951. <https://doi.org/10.3390/SU141911951>
- www.gov.uk. (2024). *The Economics of Biodiversity: The Dasgupta Review – Reactions - GOV.UK*. <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review/the-economics-of-biodiversity-the-dasgupta-review-reactions>
- www.xe.com. (2025). *Xe Currency Converter - Live Exchange Rates Today February 2025*. <https://www.xe.com/currencyconverter/>
- www.xe.com. (2024). *US Dollar to CFA Franc Exchange Rate Chart* | Xe. <https://www.xe.com/currencycharts/?from=USD&to=XOF&view=10Y>
- Yang, M., Chen, · Lin, Wang, J., Goodluck Msigwa, ·, Ahmed, ·, Osman, I., Fawzy, · Samer, David, ·, Rooney, W., & Yap, P.-S. (2023). Circular economy strategies for combating climate change and other environmental issues. *Environmental Chemistry Letters*, 21, 55–80. <https://doi.org/10.1007/s10311-022-01499-6>

- Yao, K. L., Kouakou, K. E., Kouassi, A. M., Deguy, A. J.-P. J. -P., & Camara, M. (2023). Analysis of Land Use Change in the N'ZI Watershed of Côte d'Ivoire Using Landsat Satellite Images. *Earth and Space Science*, 10(3), 16. <https://doi.org/10.1029/2022EA002744>
- Yeboah, S. A., Abbey, E., & Boampong, M. (2022). Beyond educational workshops: How child-focused NGOs can draw African rural parents out for sustainable intervention in childhoods. *Children and Society*. <https://doi.org/10.1111/CHSO.12656>
- Ying, J., & Li-jun, Z. (2012). Study on Green Supply Chain Management Based on Circular Economy. *Physics Procedia*, 25, 1682–1688. <https://doi.org/10.1016/J.PHPRO.2012.03.295>
- Yu, Y., Yazan, D. M., Junjan, V., & Iacob, M. E. (2022). Circular economy in the construction industry: A review of decision support tools based on Information & Communication Technologies. *Journal of Cleaner Production*, 349, 131335. <https://doi.org/10.1016/J.JCLEPRO.2022.131335>
- Yuan, C., Wang, S., & Yu, X. (2020). The impact of food traceability system on consumer perceived value and purchase intention in China. *Industrial Management and Data Systems*, 120(4), 810–824. <https://doi.org/10.1108/IMDS-09-2019-0469/FULL/XML>
- Yun, W. S., Yassin, J., Taasim, S., & Madli, F. (2023). Household Consumption Function Based on Permanent Income Hypothesis: A Systematic Review. *International Journal of Academic Research in Economics and Management Sciences*, 12(1), 440–452. <https://doi.org/10.6007/IJAREMS/v12-i1/16654>
- Zanli, B. L. G. L., Gbossou, K. C., Tang, W., Kamoto, M., & Chen, J. (2022). A review of biochar potential in Cote d'Ivoire in light of the challenges facing Sub-Saharan Africa. *Biomass and Bioenergy*, 165. <https://doi.org/10.1016/J.BIOMBIOE.2022.106581>
- Ziauddeen, N., Gurdasani, D., O'Hara, M. E., Hastie, C., Roderick, P., Yao, G., & Alwan, N. A. (2022). Characteristics and impact of Long Covid: Findings from an online survey. *PLOS ONE*, 17(3), e0264331. <https://doi.org/10.1371/JOURNAL.PONE.0264331>
- Zickar, M. J., & Keith, M. G. (2022). Innovations in Sampling: Improving the Appropriateness and Quality of Samples in Organizational Research. *Annual Review of Organizational Psychology and Organizational Behavior*, 10, 315–337. <https://doi.org/10.1146/annurev-orgpsych-120920>
- Zu Ermgassen, E. K. H. J., Bastos Lima, M. G., Bellfield, H., Dontenville, A., Gardner, T., Godar, J., Heilmayr, R., Indenbaum, R., dos Reis, T. N. P., Ribeiro, V., Abu, I. O., Szantoi, Z., & Meyfroidt, P. (2022). Addressing indirect sourcing in zero deforestation commodity

supply chains. *Science Advances*, 8(17), 3132.
https://doi.org/10.1126/SCIADV.ABN3132/SUPPL_FILE/SCIADV.ABN3132_SM.PDF

Zwarteveen, M., Kuper, M., Olmos-Herrera, C., Dajani, M., Kemerink-Seyoum, J., Frances, C., Beckett, L., Lu, F., Kulkarni, S., Kulkarni, H., Aslekar, U., Börjeson, L., Verzijl, A., Dominguez Guzmán, C., Oré, M. T., Leonardelli, I., Bossenbroek, L., Ftouhi, H., Chitata, T., ... De Bont, C. (2021). Transformations to groundwater sustainability: from individuals and pumps to communities and aquifers. *Current Opinion in Environmental Sustainability*, 49, 88–97. <https://doi.org/10.1016/J.COSUST.2021.03.004>