

GLOBAL MARKET REPORT

Cocoa prices and sustainability

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Market Overview

Global cocoa production continues to grow and is expected to balance increasing demand.

Once used as a form of currency by the Mayans and Aztecs in Mexico and Central America before becoming one of the most important West African exports, cocoa is now widely consumed, primarily as the basic ingredient of chocolate (Just Fun Facts, 2022). Cocoa beans, believed to have originated in the Amazon Basin, are harvested from pods that grow on the cacao tree, which is found in tropical climates 20 degrees north and south of the equator at an altitude of up to 600 m (Tridge, 2021). Cacao trees can reach 4 m–20 m in height, take at least 3 years to produce pods, and are often intercropped with tropical fruit trees, as they tend to grow better in shaded conditions (Just Fun Facts, 2022; Tridge, 2021).

Producing cocoa is labour intensive, as the raw ingredient, cacao beans, is harvested and processed by hand. The pods are first

carefully cut from the tree to avoid damaging flowering sites and then are cracked open manually to access the beans encased in white pulp. The wet beans are fermented for 36 to 72 hours to drain away the pulp and establish the flavour before being dried to a moisture content of 7.5% by weight, so they can be stored and further aged or sold (International Cocoa Organization [ICCO], 2020b). Converting dried cocoa beans into a chocolate product requires roasting, which further brings out their flavour. This process is followed by winnowing, where the outer shell is separated from the bean, creating cocoa nibs. The nibs are then ground and heated into a cocoa liquor that can be pressed to yield cocoa butter and cake. Cocoa cake is broken down into cocoa powder. Cocoa liquor can be used directly or mixed with cocoa butter and other ingredients, such as sugar and milk powder, to make the chocolates we enjoy.

The four main cocoa varieties that have traditionally been cultivated around the world are Forastero, Criollo, Trinitario, and Nacional (Bar and Cocoa, 2022). Forastero cocoa, a higher-yielding and more robust

LIVELIHOODS

There are an estimated 5 million to 6 million cocoa farmers in the world.

About 90% of cocoa farms cover an area of 5 ha or less.

variety, produces bitter-tasting beans that account for about 80% of the cocoa beans cultivated worldwide (Tridge, 2021). The Criollo variety provides an aromatic and mildly bitter bean of higher quality and represents less than 5% of total global production (Frizzo, 2018; Phayanak, 2022; Tridge, 2021). The Trinitario variety is a hybrid of the Forastero and Criollo varieties and accounts for about 15% of global production (Frizzo, 2018; Phayanak, 2022; Tridge, 2021). Nacional is a rarer Ecuadorian variety representing about 2% of global production (Nutrition-Act, n.d.). This variety, which yields beans with little bitterness and a floral aroma (Bar and Cocoa, 2022; Fabricant, 2011; Spice Jungle, 2022), was devastated by an epidemic of plant diseases across Ecuador in 1920. Some small groves of trees were recently discovered in the country, and efforts are being made to revitalize the population of Nacional variety trees (Nutrition-Act, n.d.). The need for a more resilient cocoa variety led to the development of the CCN-51 high-yielding and disease-resistant cultivar that can be grown in full sun for low-quality bulk production (The Chocolate Journalist, 2017). This variety has come to dominate Ecuadorian cocoa production, representing 70% of all cocoa grown in 2019 (Toth, 2019). In addition to variety, factors such as climate and soils that are unique to the cocoa bean's origin affect the taste of the

cocoa. Cocoa has become a sophisticated product, with producers and manufacturers aiming to please a wide range of tastes.

Although cocoa is a basic raw material for a number of products, it is mostly consumed by the chocolate industry, which surpassed a retail value of USD 100 billion in 2021 and is expected to enjoy a 4.5%–5.5% compound annual growth rate (CAGR) until 2027 (EMR, 2021; Grand View Research, 2020; imarc, 2021; Mordor Intelligence, 2021b; Research and Markets, 2020). An estimated 5 million to 6 million cocoa farmers, with about 90% of these cultivating under 5 ha, underpin the livelihoods of 40 million to 50 million people who work for industries reliant on cocoa to produce their end products (CocoaNet, 2022; Tridge, 2021). For instance, the U.S. chocolate industry employed more than 40,000 people in 2022 (EMR, 2021). Only 5% of global production comes from plantations that are larger than 40 ha (Tridge, 2021).

Cocoa production grew from some 4.27 million tonnes (Mt) in 2008 to 5.76 Mt in 2020, cultivated on 12.10 million ha, according to the Food and Agriculture Organization of the United Nations (FAO, 2012). Production has grown significantly over the last decade, as its CAGR of 2.53% from 2008 to 2019 increased to 3.44% from 2014 to 2019.

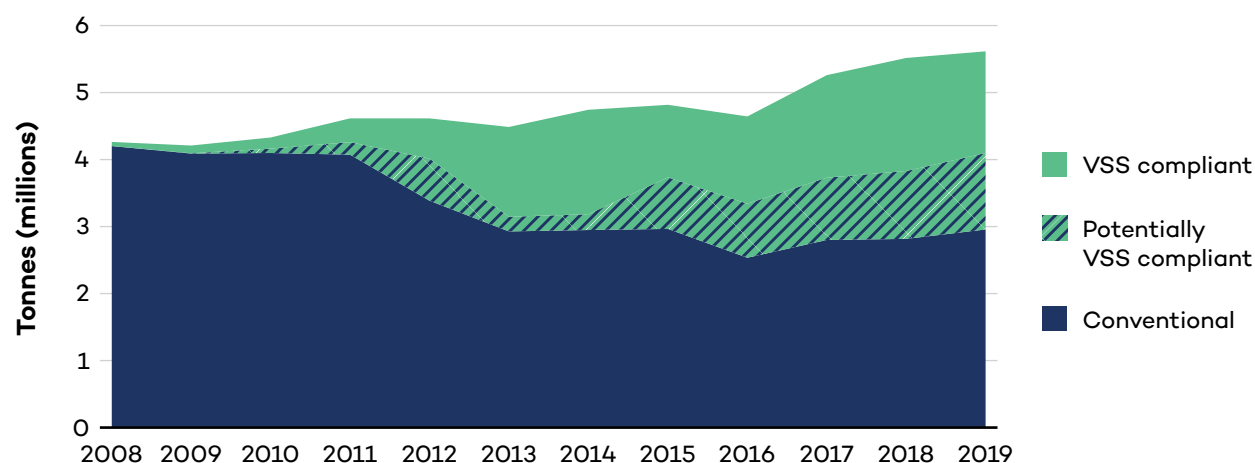
More than 70% of cocoa beans is exported in one form or another, providing an important source of foreign exchange revenues (Foreign Agricultural Service, 2022). The largest cocoa bean producers—Côte d'Ivoire, Ghana, and Indonesia (producing 2.2 Mt, 0.8 Mt, and 0.74 Mt, respectively, in 2020)—have been major

exporters of cocoa since 2016, respectively exporting 1.64 Mt, 0.52 Mt, and 0.21 Mt in 2020. Ecuador exported 0.32 Mt in 2020, making it the third biggest exporter by volume. The Netherlands, Germany, and the United States have been the largest importers in recent years, importing 0.99 Mt, 0.44 Mt, and 0.37 Mt, respectively, in 2020. Malaysia, once one of the world's top producers of cocoa, has become an important importer, surpassing the United States by importing 0.38 Mt in 2020 to meet increasing domestic demand (Grow Further, 2022).

The cocoa market has experienced record-breaking growth in global supply over the last decade (Tridge, 2021). However, demand will slightly outstrip supply in 2021/22, rising as supply drops, mostly

due to low agricultural input use and unfavourable weather conditions (Mera et al., 2021). The Russia–Ukraine war may affect yields, as trade sanctions have reduced the availability of fertilizers and sharp price increases make it difficult for some cocoa farmers to buy inputs (Confectionery Production, 2022; ICCO, 2022). The projected supply deficit is expected to narrow in 2022/23 as more agriculture inputs become available and conditions improve (Mera et al., 2021; Tridge, 2021).

Figure 1. Global cocoa production from 2008 to 2019. Voluntary sustainability standard (VSS)-compliant cocoa reached 27% to 47.3% of total production in 2019.



Note: Conventional production volumes do not comply with a VSS, while VSS-compliant production volumes refer to cocoa produced in compliance with at least one VSS. Production volumes that are defined as potentially VSS compliant cannot be definitively identified as conventional or VSS compliant with the data currently available.

Source: Meier et al., 2021; FAO, 2022.

A growing number of uncertainties, including climate change, are challenging the viability of the cocoa sector.

The COVID-19 pandemic has greatly affected the cocoa sector, as most cocoa is exported for chocolate production (Global Agriculture and Food Security Program, 2021; Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2021; Tridge, 2021). On the production side, the crisis has disrupted the availability of labour, inputs, and extension services as well as the logistics of moving the product to markets (Global Agriculture and Food Security Program, 2021; Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2021). Shipping disruptions have increased transportation costs and affected product quality and availability. Despite these challenges, global cocoa production expanded in 2020 from the previous year (Mera et al., 2021; Tridge, 2021).

The economic impacts of the pandemic, as well as government public health measures such as quarantines, are linked to declining demand for chocolate, a luxury item in most parts of the world (Global Agriculture and Food Security Program, 2021; Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2021; Tridge, 2021). However, this situation is expected to reverse as government restrictions on the movement of people have eased, and consumers are also buying chocolate in bulk and online (ReportLinker, 2021). Market disruptions in the cocoa sector caused by the pandemic will likely

continue in the near future as variants of COVID-19 emerge, with different effects on health and economies across the world (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2021). The ongoing Russia–Ukraine war may also affect the cocoa bean market, as both countries are importers.

Climate change is also expected to disrupt the global cocoa value chain, as some regions will become less productive and others completely unsuitable for growing cocoa (Bunn et al., 2017). For example, existing cocoa-producing areas in West Africa and the Brazilian and Peruvian Amazon are expected to become less suitable by 2050 (Ceccarelli et al., 2021; Igawa et al., 2022). High temperatures can increase seedling mortality, decrease leaf lifespan, and speed up pod ripening, all of which can affect cocoa bean yields and quality (Climate-Smart Cocoa, 2022). Cocoa farming is especially vulnerable to a lack of precipitation and prolonged droughts, as cocoa plants typically need more than 1,200 mm of rain annually to remain productive (Climate-Smart Cocoa, 2022). Severe droughts in West Africa caused a 5.5% drop in production among Ghanaian cocoa farmers from 2018 to 2019 (Tridge, 2021). In addition to drier growing conditions, West African cocoa farmers will have to contend with the Harmattan winds from the Sahara Desert, which led to 150,000 tonnes of estimated cocoa losses in 2016 and have been increasing in intensity due to climate change (Climate-Smart Cocoa, 2022; Fountain & Hutz-Adams, 2020). Cocoa farmers with operations in wetter areas, such as in Latin America, may be vulnerable to challenges linked to excess water, such as soil-nutrient leaching and fungal diseases (Climate-Smart Cocoa,

2022). Clearly, cocoa operations will need to adapt promptly to a changing climate.

In addition to being vulnerable to the effects of climate change, the cocoa sector is also a driver of climate change. In many parts of the world, cocoa farming is associated with deforestation. Large tracts of forests have been lost to give way to cocoa farms in West Africa, and cocoa production continues to pressure rainforests in the Congo Basin, the Amazon Basin, Colombia, and Indonesia (Fountain & Huetz-Adams, 2020). The loss of 70% of the forests in Ghana and Côte d'Ivoire over the last three decades is partly attributed to cocoa farming (Fountain & Huetz-Adams, 2020; Potts et al., 2017). Although deforestation rates have slowed in both countries, about 15% of Côte d'Ivoire's cocoa production still takes place in protected forests (Aboa, 2021b; Fountain & Huetz-Adams, 2020).

The cocoa sector must help reverse global deforestation if it is to mitigate climate change. This means renovating cocoa trees and intensifying existing cocoa production operations to dissuade cocoa farmers from encroaching on natural environments. Farmers may need to plant climate-tolerant varieties to become more resilient to climate change (Ceccarelli et al., 2021). For instance, wild cocoa varieties in Peru are projected to be more resistant to climatic changes than cultivated strains (Ceccarelli et al., 2021). Preventing soil depletion via fertilization could deter cocoa farmers from engaging in slash-and-burn agriculture to exploit other, more fertile soils (Schroth et al., 2016).

Equally important are measures that the industry can jointly implement to ensure that cocoa farming does not result in

deforestation, such as traceability systems that can track cocoa beans to their origin. A promising development in that direction is the recent agreement between the European Cocoa Association and the association of the Chocolate, Biscuit, and Confectionery Industry of Europe (Caobisco) to share the locations and details of the cocoa farms that their members are sourcing from. This information, housed and managed by producing countries in a central database, will allow governments to monitor cocoa farming practices more closely (Chandrasekhar, 2022).

Cocoa farming also has great potential to support reforestation as it is a suitable agroforestry crop. Furthermore, shade-grown cocoa offers protection against rising temperatures and a drop in precipitation (Schroth et al., 2016). Agroforestry cocoa can support climate change mitigation by sequestering carbon and climate adaptation by conserving biodiversity, maintaining soils, controlling pests, and providing favourable microclimates (Fountain & Huetz-Adams, 2020). Agroforestry, along with reforestation efforts at the landscape scale—that is, reforesting large, interconnected tracts of land—can influence regional rainfall patterns to counter precipitation deficits and prolonged droughts (Fountain & Huetz-Adams, 2020; World Agroforestry, n.d.-b). Still, agroforestry systems must be designed carefully to ensure that intercropping with cocoa plantations does not result in soil–water competition and significant productivity losses (Igawa et al., 2022). Cocoa farmers are also poised to benefit from the programs to reduce emissions from deforestation and forest degradation (REDD and REDD+) that are being promoted

in the sector to reverse deforestation and tackle climate change (Ameyaw et al., 2018). Clearly, cocoa farming and agroforestry need to become a joint effort to simultaneously enable climate change mitigation and adaptation among cocoa farmers.

MARKET VALUE

More than 800,000 farmers produced 1.52 Mt to 2.66 Mt of VSS-compliant cocoa in 2019 with a total farm gate value of USD 410 million to USD 760 million.

CAGR

Conventional production decreased at a CAGR of -3.15% from 2008 to 2019 and jumped to 0.04% from 2014 to 2019.

VSS-compliant production grew at a CAGR of 34% to 41% between 2008 and 2019 but slowed to -0.55% to 8% from 2014 to 2019.

VSSs can improve the sector's sustainability and resilience.

Efforts to make the cocoa sector more sustainable and resilient to challenges such as climate change are ongoing. The adoption of VSSs first started in the sector nearly 30 years ago (Fairtrade Foundation, 2022). Implementing VSSs allows farmers to differentiate themselves in the marketplace from conventional cocoa (Voora et al., 2019). In exchange for applying farming practices that can benefit communities and the environment, farmers can label their

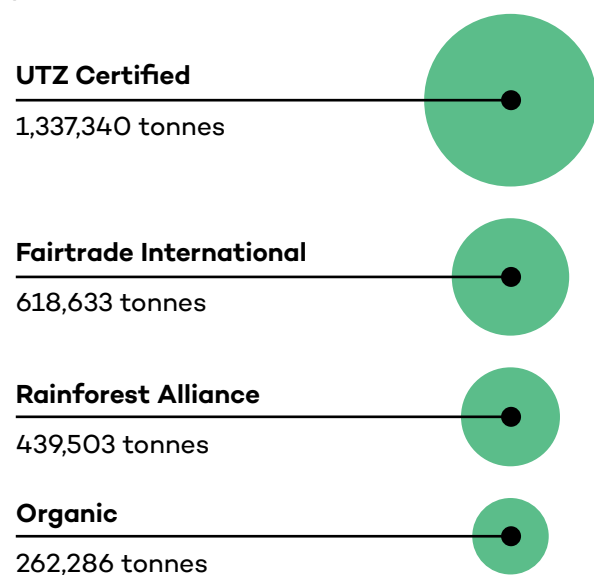
products as VSS compliant or produced in accordance with a VSS. Agricultural practices that comply with VSSs can support farming resilience in different ways. For instance, requiring farmers to improve soil health by using organic manure, covering crops, or fewer pesticides can help maintain soil moisture, adequate soil drainage, and aeration. These efforts, in turn, can sustain cocoa trees in dry spells and prevent soil erosion during heavy rains. Growing cocoa in agroforestry systems with different tree shades and intercropping with timber or cashews can also help stabilize soils, prevent water runoff, and protect cocoa trees from landslides due to intense rainfall. These crops can also enable farmers to diversify their sources of income (Organic Farming Research Foundation, n.d.; Tye et al., 2022).

More than 800,000 farmers produced 1.52 Mt–2.66 Mt of VSS-compliant cocoa in 2019 (see Figure 1). This cocoa had a farm gate value of at least USD 410 million to USD 760 million, dropping by 0.04 Mt to 0.17 Mt from the previous year (Meier et al., 2021). The most prominent VSS in the cocoa sector, in order by 2019 production volumes, are UTZ Certified (1.34 Mt), Fairtrade (619,000 tonnes), Rainforest Alliance (440,000 tonnes), and Organic (262,000 tonnes) (Meier et al., 2021). Rainforest Alliance and UTZ Certified merged in 2018, and the UTZ standard and correspondent label are gradually being replaced by the Rainforest Alliance Certification Program and the new Rainforest Alliance seal from 2020.

VSS-compliant cocoa, which grew at a CAGR of 34% to 41% between 2008 and 2019, represented 27% to 47% of global production in 2019. However, there are signs

How much cocoa is compliant (by VSS)?

Figure 2. VSS-compliant cocoa production volumes in 2019



Source: Meier et al., 2021.

that the supply of VSS-compliant cocoa may be slowing, as its CAGR dropped -0.55% to 8% from 2014 to 2019 (calculations based on Meier et al., 2021). The decline in VSS-compliant production is largely due to a drop in UTZ-certified cocoa, which fell from 1.6 Mt in 2018 to 1.34 Mt in 2019. This drop may be due to the implementation of the Cocoa Assurance Plan in West Africa and more stringent requirements on global positioning system data to ensure that farmers comply with criteria that protect forests and support the traceability of cocoa beans (Rainforest Alliance, 2019, 2022a; Uncommon Cocoa, 2020). The emergence of corporate sustainability programs in the cocoa sector (e.g., the Cocoa Life program from Mondelez International) and the increasing use of traders' programs (e.g., Barry Callebaut Cocoa Horizons) may also

be contributing to a slowdown in the uptake of VSSs as companies are shifting/linking their sustainable commitments to in-house programs (Potts, 2017) or those of value chain partners.

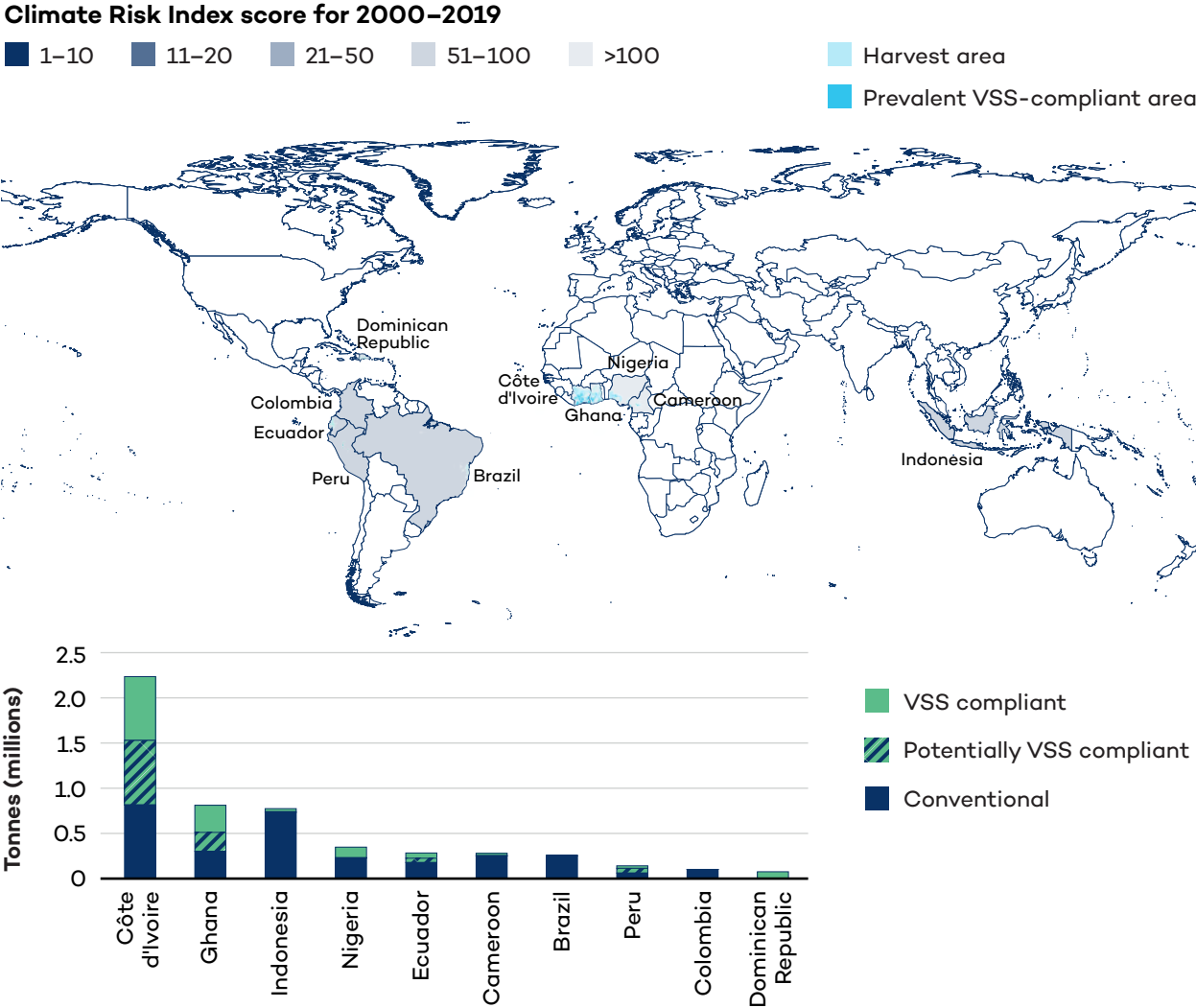
The sale of VSS-compliant cocoa as a conventional product is another challenge that must be addressed to secure its long-term viability. Companies often buy only a percentage of VSS-compliant volumes with a premium. According to our analysis, as much as 71% of VSS-compliant cocoa production may have been bought as certified between 2008 and 2019. Cocoa farmers who cannot sell their product as VSS-compliant sometimes do not receive premiums to cover their investments in exchange for meeting compliance requirements and paying certification (audit) costs. For instance, Rainforest Alliance (2022a) estimates that 45% of its certified cocoa was sold as certified in 2019, but that figure rose to 57% in 2020. UTZ reports that 71% of UTZ-certified cocoa was sold as such in 2019, and 68% was sold as such in 2020—though neither scheme defined premiums until 2020 (Rainforest Alliance, 2022a). Falling incomes and higher production and living costs in 2020 due to COVID-19-related supply chain disruptions have put farmers' livelihoods at risk, limiting their investments in sustainable production and climate resilience (Rainforest Alliance, 2020b). The pandemic will continue to affect cocoa-farming families by, for example, undermining household food security due to reduced profitability, limiting educational advancement, and increasing the risk of child labour amid temporary school closures (Fountain & Huetz-Adams, 2020). VSSs are working to strengthen the resilience of

cocoa farmers by advancing living income approaches and establishing linkages with buyers that require the protection of labour rights, among others.

According to our analysis, in 2019, about 85% of VSS-compliant cocoa came from

Africa (Côte d’Ivoire, Ghana, and Nigeria). The leader was Côte d’Ivoire, which produced almost half of all VSS-compliant cocoa that year (706,072 tonnes). Latin America and the Caribbean followed, with about 11% of VSS-compliant cocoa produced (Dominican Republic, Ecuador,

Figure 3. Cocoa-growing regions of the world: Distribution of cocoa production in the top 10 producing countries in 2019



Note: Countries with lower Climate Risk Index scores are those that have been most impacted by extreme weather events in the reference period.

Sources: Eckstein et al., 2021; FAO, 2022; Meier et al., 2021; Voora et al., 2019.

and Peru) (calculations based on Meier et al., 2021). Most VSS-compliant cocoa in Asia came mainly from Indonesia, with a bit of production in Papua New Guinea (see Figure 3).

Our analysis indicates that Côte d'Ivoire, Indonesia, Ghana, Cameroon, and Brazil offer VSSs the greatest opportunity to expand based on the size of their existing conventional cocoa production. Among the least-developed cocoa-producing countries, Haiti, Liberia, Guinea, the Central African Republic, the Democratic Republic of the Congo, and Sierra Leone offer VSSs the greatest opportunity to enable sustainable development by adopting more sustainable cocoa-farming practices based on their share of global cocoa production, the presence of VSSs, and their rating on the Human Development Index. In both cases, VSS-compliant cocoa expansion would occur strictly on existing lands currently supporting conventional cocoa production.

Just as important, VSS-compliant cocoa farming can also result in higher yields compared to conventional production. In 2019, VSS-compliant cocoa yields were higher in 13 cocoa-producing countries, potentially even in two, and lower in 13. VSS-compliant yields tended to be higher in major cocoa-producing countries such as Côte d'Ivoire, Indonesia, Cameroon, Nigeria, Peru, and Brazil, although VSS-compliant yields in Ghana were lower than conventional yields in 2019 (calculations based on Meier et al., 2021). This may be due to the support that farmers in these countries receive to improve their productivity, including access to credit, training, input, and planting material, and efforts to renovate cocoa trees (Kozicka

et al., 2018). Nevertheless, recent studies suggest that yields are relatively lower than their potential across major cocoa-producing countries, and efforts are needed to increase them to ensure a stable supply of cocoa and farmers' livelihoods (Kozicka et al., 2018).

Demand for sustainable cocoa is projected to increase, driven by regulations and other factors.

The COVID-19 pandemic has reduced demand for chocolate and cocoa beans due to government-imposed movement restrictions affecting chocolate purchases in airports and restaurants and people being less willing to spend on luxury items during the crisis (Global Agriculture and Food Security Program, 2021; Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2021). This drop resulted in a temporary oversupply of cocoa beans in 2020, which is limiting modernization efforts (Global Agriculture and Food Security Program, 2021; Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2021). Nevertheless, demand for chocolate is expected to rebound as pandemic restrictions lessen in different parts of the world (ReportLinker, 2021). Despite COVID-19 disruptions on global cocoa value chains, the long-term market prospects for sustainable cocoa post-pandemic are favourable (Mera et al., 2021; ReportLinker, 2021). In addition, rising demand for cocoa beans and chocolate in emerging countries such as India and China might contribute to this positive forecast.

Europe and North America remain the most important markets for VSS-compliant cocoa. Globally, demand for cocoa beans that comply with both certified Organic and Fairtrade schemes rose at an average annual rate of 6.9% between 2015 and 2019 (CBI Ministry of Foreign Affairs, 2021).

European policies, regulations, and national sustainability initiatives continue to drive demand for VSS-compliant cocoa. Switzerland, Germany, Belgium, and the Netherlands have set up national sustainable cocoa platforms designed to promote the consumption of sustainable cocoa (CBI Ministry of Foreign Affairs, 2021). The Dutch government established sustainable procurement guidelines with far-reaching implications for cocoa farmers who want to supply the world's largest cocoa bean importers (CBI Ministry of Foreign Affairs, 2020). Consequently, non-certified cocoa bean suppliers are having more difficulty accessing European markets.

According to the Dutch Centre for the Promotion of Imports from developing countries, between 2018 and 2020, demand for Organic and Fairtrade cocoa beans rose in Europe, particularly in high-quality markets. Sales of Organic cocoa are also expected to rise, with demand in Europe forecasted to grow at a 6.8% CAGR between 2021 and 2028. Rainforest Alliance/UTZ is the main VSS serving the bulk cocoa market, which accounts for most of the chocolate market. Demand for Rainforest Alliance-compliant cocoa is rising in this market, fuelled by the growing entry requirements of chocolate manufacturers and retailers in Europe.

Governments in the European Union (EU) are developing regulations that may influence future consumption trends for VSS-compliant cocoa. These include the EU Corporate Due Diligence Directive and the EU Corporate Sustainability Reporting Directive, which, in general terms, require targeted companies to identify social and environmental risks involving their value chain operations, implement mitigation activities, and report steps taken and their impacts based on certain metrics. This regulation particularly targets the cocoa sector. As elaborated above, there are critical concerns associated with deforestation, as well as child labour, since there continue to be reported cases of children that miss school due to working in cocoa plantations in conditions that can deteriorate their health and development (Ellingham, 2022; Whoriskey & Siegel, 2019).

Furthermore, the EU recently proposed a regulation on deforestation-free products, aiming to minimize the consumption of products originating from supply chains associated with deforestation or forest degradation. This is particularly important for the cocoa sector, as this commodity accounts for 7.54% of EU-driven deforestation. Targeted companies would need to comply with deforestation-free provisions included in the proposed regulation and with domestic laws in the producing countries (Oeschger, 2022). They would have to conduct risk assessments on whether their cocoa operations comply with zero-deforestation provisions, gather substantiated data, and act to address potential risks. Along the same lines, the United Kingdom adopted the Environmental Act 2021, through which targeted businesses

must establish and apply due diligence mechanisms to ensure their operations comply with the laws of the producing country concerning forest conservation, assess and mitigate potential risks, and gather related information.

Despite the potential use of VSSs to help companies conduct risk assessments and mitigation activities to comply with some deforestation-free provisions, it is still unclear how implementing these regulations may affect demand for VSS-compliant cocoa in Europe (Cocoa Coalition, 2022).

In North America, demand for VSS-compliant cocoa has stagnated as more consumers replace chocolate with healthier snacks (Yu, 2017a). Nevertheless, Fairtrade recently reported a 14% increase in cocoa-based product sales in the United States in the period 2017–2019 (Fairtrade America, 2020). Demand for organic cocoa continues to grow in the United States because the pandemic prompted consumers to choose healthier products with fewer pesticides. With a retail market value exceeding USD 400 million in 2020, the certified Organic cocoa market is expected to grow at a CAGR of 9.5% from 2021 to 2026 (GlobalNewswire, 2022).

It should be considered that VSSs have created mechanisms to help cocoa farmers comply with sustainability requirements, including forest conservation and deforestation prevention, which may be needed to enable millions of cocoa farmers across producing countries to comply with emerging regulations. These tools include training, supporting services, and in some cases, the use of technology such as satellite imagery, global positioning systems, and

traceability systems to monitor cocoa plantations in real time and ensure the final product is traced back to the cocoa plantation. Some VSSs have also defined chain-of-custody models and data-sharing platforms that make it easier to trade goods across the value chain and to share and report information to prove compliance of practices with the scheme (i.e., the Rainforest Alliance Multitrace Platform).

Nevertheless, cocoa farmers, VSSs, and downstream players will need to modify their mechanisms and tools to ensure that cocoa is deforestation-free and compliant with more demanding regulations. This is a priority as there are concerns about the effectiveness of monitoring and assurance systems that VSSs have put in place to ensure forests are preserved and are not cut down to expand cocoa plantations (Ingram et al., 2020). More importantly, farmers must receive the support and resources they need to comply with these provisions and be able to use adequate technology to collect the required data and supporting evidence (Cocoa Coalition, 2022). In Peru, private companies, smallholders, civil society organizations, and government institutions recently established the Coalition for Sustainable Production to help cocoa farmers comply with deforestation-free provisions through measures that include traceability, monitoring systems, and incentives (Tropical Forest Alliance, 2022).

There is potential to increase demand for VSS-compliant cocoa in producing countries.

Although demand for VSS-compliant cocoa has risen in traditional markets, the global supply of certified cocoa still exceeds demand. Balancing will require increasing consumption in emerging economies and producing countries (ICCO, 2020a). For instance, China's growing middle class and low per-capita cocoa consumption offer great potential for developing demand for VSS-compliant cocoa as these consumers are exposed to a growing array of confectionery goods (ICCO, 2020a; Mordor Intelligence, 2021a). Chinese consumers are also willing to pay premiums for chocolate as it is considered a luxury product and status symbol (Arenas, 2016; Peverelli, 2019; The Straits Times, 2019). This is why chocolates made with VSS-compliant cocoa could be sold in China as a value-added product.

VSS-compliant cocoa could also expand in the pharmaceutical and cosmetics industries, especially where consumers' disposable incomes in these markets are growing (Daxue Consulting, 2014). Creating demand for VSS-compliant cocoa in producing countries has been challenging, as cocoa is largely absent in local diets, especially in West Africa, and consumers are price-sensitive and unaware of sustainability issues (Resenale, 2019).

Despite these challenges, some producing countries are trying to increase domestic demand for locally produced cocoa.

For instance, Ghana has applied a 10-

year corporate tax freeze for processing local cocoa beans, a national chocolate day, education campaigns, and public procurement programs to boost the consumption of cocoa beans and chocolate in the country (Ghana Cocoa Board, 2021). Another example comes from Peru, where the government has put in place numerous initiatives designed to support farmers selling their cocoa and chocolate in local and international markets and promote sustainable production practices and value-added (i.e., organic chocolate bars with fruit). Anecdotal evidence suggests that consumers bought more organic chocolate locally as a result of the COVID-19 pandemic (Espinoza, 2021).

Leading cocoa traders and manufacturers purchased slightly more cocoa derived from more sustainable sources in 2020, but they have yet to achieve their sourcing commitments.

The eight largest cocoa traders and grinders bought 4.56 Mt of cocoa in 2020, slightly up from 4.41 Mt in 2017. However, this amount can include volumes that have been traded between them. From the total cocoa purchased in 2020, 1.62 Mt, or 35%, was compliant with a VSS or a corporate sustainability initiative, such as the Barry Callebaut Cocoa Horizons. This represents about 226,000 tonnes more than in 2017 (see Figure 4).

The five largest chocolate manufacturers bought 1.68 Mt of cocoa in 2020, slightly up from 1.62 Mt in 2017. Of the total cocoa purchased in 2020, 1.08 Mt, or 64%, complies with a VSS or a corporate sustainability initiative. This represents about 288,000 tonnes more than in 2017 (see Figure 4).

Corporate sustainability initiatives refer to cocoa production programs established by private companies rather than independent third parties (i.e., Nestlé Cocoa Plan, Mars' Cocoa for Generations) that aim to support good farming practices, traceability, and better farmers' incomes. To assess the coverage and performance of these programs, however, a detailed review of their criteria, assurance systems, and outcomes on the ground would be needed. Among the cocoa trading companies examined in this report, only Barry Callebaut and Cargill have sustainability sourcing commitments in place.

Both companies aim to meet their 100% sustainable cocoa sourcing targets by 2025 and 2030, respectively. Olam missed its ambitious target of sourcing 100% sustainable cocoa by 2020 and changed it to target 100% traceable cocoa by 2020. Among the largest chocolate manufacturers, Hershey and Ferrero Group report to have met their sustainability sourcing targets, while Nestlé, Mars, and Mondelez International have ambitious targets to be met by 2025. Most of the cocoa traders and chocolate manufacturers have plans to trace cocoa-based products back to the farm. Two new developments in sustainability sourcing commitments among the chocolate manufacturers examined include Nestlé and Mars pushing back their 100% sustainable

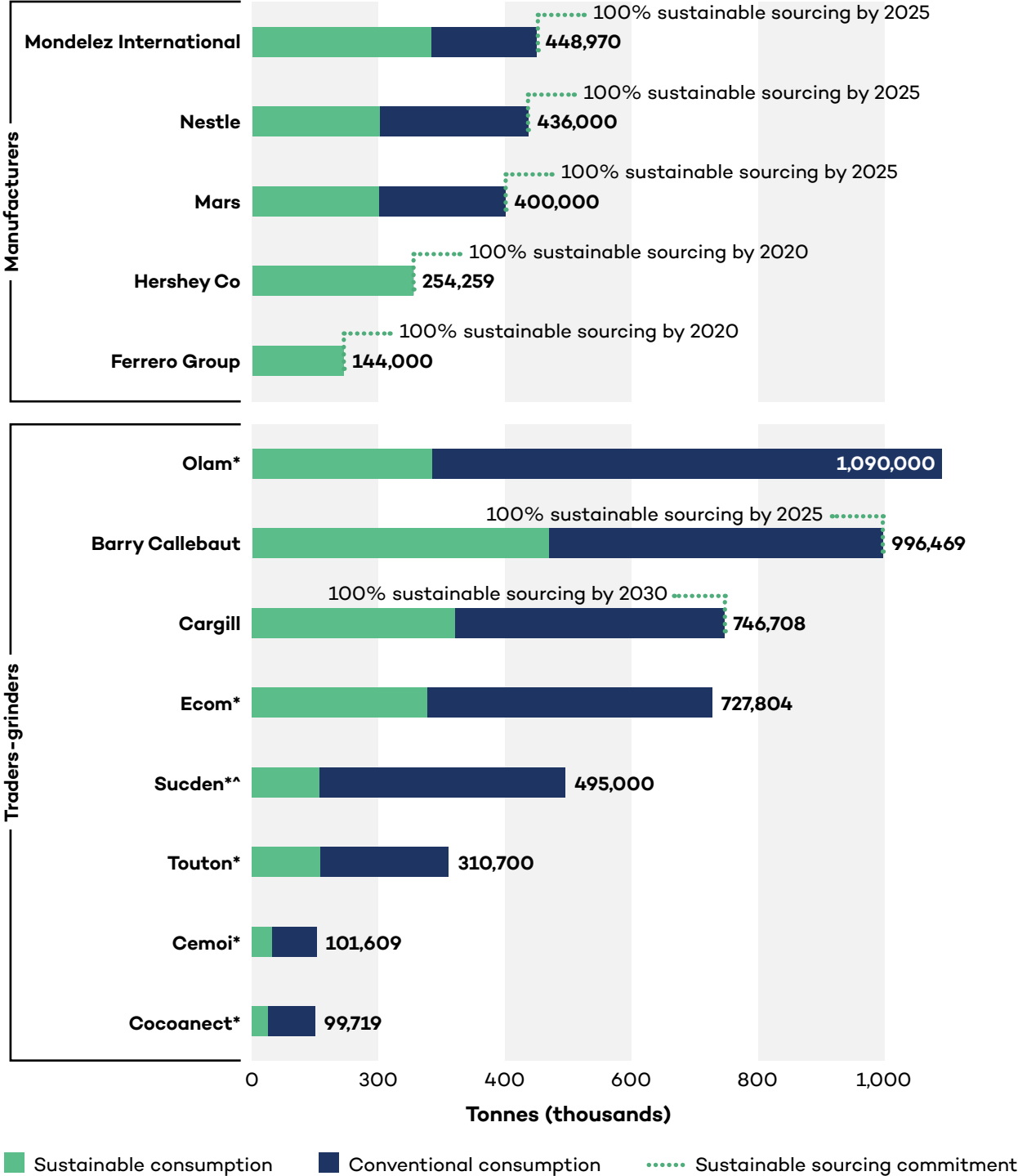
sourcing target by 5 years, to be reached by 2025. Based on the sourcing commitments of the largest cocoa traders and chocolate manufacturers examined and assessing them against current cocoa sourcing information, manufacturers and traders could source an additional 601,559 tonnes and 953,753 tonnes of cocoa complying with VSS or corporate programs by 2025 and 2030, respectively (see Figure 4).

Although the growth of VSS-compliant cocoa production has slowed in recent years, cocoa-consuming companies may continue to adopt new and more ambitious sustainable sourcing commitments, which could maintain and enhance demand for VSS-compliant and corporate sustainability initiative programs. Furthermore, consumption in emerging and producing countries may also expand. Nevertheless, forecasting VSS-compliant cocoa production can only be viewed as an educated guess. It is still uncertain how the multiple regulations the EU is putting in place will affect corporate sourcing programs.

There are two possible scenarios for the development of VSS-compliant cocoa production in the coming years. A more pessimistic outlook that weighs the short-term and slowing VSS-compliant production trend more heavily projects a fluctuating and small increase to some 1.62 Mt by 2025. This is due to corporate shifts from VSSs to in-house sustainability sourcing programs, a continued inability to sell VSS-compliant products as such, and the potential effects of EU regulations on corporate sourcing programs. A more optimistic outlook weighs the increasing long-term VSS-compliant production trend more heavily and projects a steady but fluctuating increase to over

Sustainable sourcing commitments are yet to be met.

Figure 4. Major cocoa-consuming companies and their sustainable sourcing commitments



* Sustainable sourcing commitments not found

^ This volume includes 53,000 tonnes that comply with VSS. The remaining volume is reported by the company as traceable or complying with third-party corporate schemes.

Sources: Authors' own estimations; personal correspondence with The Hershey Company, Sucden, and Touton; Barry Callebaut, 2017, 2020; Cargill, 2020; Cocoa & Forests Initiative et al., 2021; Cocoa Horizons Program, 2020; Cocoanect, 2019; Cosgrove, 2019; ECOM, 2022a, 2022b; Ferrero, 2021; Ferrero et al., 2019; Ferrero Corporate, 2021; Ferrero Group, 2020; Fountain & Hütz-Adams, 2018; Fountain & Huetz-Adams, 2020; "Hershey's announces milestones," 2013; Hershey, 2022; Ionova, 2018; Mars, Incorporated, 2020; Mars Wrigley, 2020a; Nestlé, 2020, 2022; Nieburg, 2015, 2019; Olam Cocoa, 2020; Sucden, 2020, 2022; Touton, 2022; Transparence Cacao, 2022; Yu, 2017b.

2.54 Mt by 2025. There are other possible futures between these two outlooks. While the production of VSS-compliant cocoa will likely fluctuate from year to year, we predict steady growth to just over 2 Mt by 2025 due to several factors. As demand for sustainable cocoa rises, this may drive more corporate sustainable sourcing commitments. There are potential positive effects of EU

due diligence and deforestation prevention regulations in sourcing more VSS-compliant cocoa, and VSS-compliant cocoa farmers could enjoy more consistent success by selling their harvest as VSS-compliant product. Consequently, we expect VSS-compliant cocoa production to reach 1.62 Mt to 2.54 Mt by 2025.

A Dive Into Cocoa Prices

Equitable pricing is critical for the long-term viability of the cocoa sector and related downstream industries.

Pricing can determine if cocoa farmers stand to gain financially from adopting VSSs. Efforts to shift the cocoa sector toward sustainability through tools such as VSSs are partly driven by a need to internalize the external costs associated with the sector. These costs are typically not captured in the market price of agricultural products and are borne by society, such as the negative effects of agrochemical use on human health and the environment.

For instance, the external costs of growing conventional cocoa in Côte d'Ivoire in 2016 amounted to EUR 5.75 per kg of cocoa

beans—or more than four times the farm gate price received by smallholder farmers that year (EUR 1.35 per kg) (Fobelets & de Groot Ruiz, 2016). Also, the external costs of growing conventional versus certified cocoa were found to be 16% higher and 49% less profitable (generating annual profits of EUR 229/ha vs. EUR 341/ha) in 2016 (Fobelets & de Groot Ruiz, 2016).

A year later, the external costs associated with Tony's Chocolonely cocoa farms—comprising Ghanaian and Ivorian smallholder cocoa farmers receiving a living wage—were found to be 54% lower than the weighted average external costs of conventional cocoa production in Ghana and Côte d'Ivoire (EUR 4.52/kg cocoa beans vs. EUR 9.91/kg cocoa beans) (Impact Institute, 2018). Internalizing these external costs in the market price would make VSS-compliant cocoa prices more competitive

than prices of conventionally grown cocoa. Therefore, examining how cocoa prices intersect with the sustainability of the sector is critical.

Cocoa supply, demand, and stocks are among the principal factors driving cocoa prices: the market price rises when supply falls or is limited, and vice versa (Foodcircle, n.d.). The price of cocoa futures, which are primarily traded on the New York and London stock markets, influences the international market price and is a benchmark reference for international prices as representative of the cocoa bean market. Futures prices also act as a reference for traders and buyers to make business decisions and for some producing countries to determine how much to pay cocoa farmers (Hütz-Adams & Schneeweiß, 2018).

Cocoa prices have been very volatile in the last decade, reaching highs in 2014/2015 amid fears of undersupply in Ghana and Côte d'Ivoire. The opposite occurred in 2016/2017, however, when heavy rainfalls in Côte d'Ivoire boosted production (Foodcircle, n.d.) and the market faced an oversupply, with prices dropping to USD 1,900/tonne from USD 3,000/tonne (Fountain & Hütz-Adams, 2018, Schreiber, 2020). More recently, the pandemic and the introduction of a "living income differential" (LID) for cocoa sold by Ghana and Côte d'Ivoire caused downward pressure on prices. As cocoa traders and grinders shifted their sourcing and pricing strategies, many stopped signing forward contracts due to a lack of demand for chocolate and cocoa-based products and transport uncertainties in the context of the pandemic; others preferred to source their cocoa from other origins or prioritize the use of their stocks

to avoid paying the LID, contributing to the market imbalance (Maile et al., 2020; Myers, 2021).

The overall market price has witnessed ascending trends, with an average of USD 2,389/tonne in the 2021/2022 season, though prices experimented with in 2022 have been lower than the previous year (ICCO, n.d.-a). According to the World Bank Group (2022), cocoa prices are expected to remain stable for the 2022/2023 season as pandemic-related disruptions ease, global demand bounces back, and the market finds a balance between supply and demand. However, the ongoing war in Ukraine has affected the availability and trade of fertilizers worldwide, directly impacting cocoa production. The lack of and high costs of fertilizers in West Africa risk undercutting 2022/2023 cocoa yields, which can lead to higher cocoa prices (Amuge, 2022; Confectionery Production, 2022).

Factors ranging from the natural cyclical production of trees to weather conditions such as heavy rains, higher temperatures, or droughts affect the supply of cocoa (Wong, 2021). Political and civil unrest in producing countries (Anderson, 2011), the treatment of the cocoa bean as a financial asset, speculation in stock markets (Gayi & Tsowou, 2017; Hütz-Adams & Schneeweiß, 2018), and the cocoa bean pricing systems implemented in producing countries can also trigger price changes (Bisseleua & Mfegue, 2020; Decloquement et al., 2021; Etaware et al., 2020; Foodcircle, n.d.). High volatility and continuous price drops create risks for all cocoa value chain participants, especially farmers. They bear the greatest risk as they cannot influence market prices, must handle the effects of weather events

and rising production costs, and are unable to adapt their supply to price fluctuations in the short term (Hütz-Adams & Schneeweiß, 2018). Increased volatility causes uncertainty for farmers and affects their incomes (Hütz-Adams & Schneeweiß, 2018).

Power imbalances and low farm gate prices contribute to perpetuating the poverty cycle among cocoa farmers.

Research suggests that about 2 million cocoa farmers live under the poverty line and do not earn enough money to support their livelihoods (Fobelets & de Groot Ruiz, 2016; “Poverty among cocoa farmers,” 2020).

Cocoa farmers continue receiving low farm gate prices that do not allow them to achieve a decent standard of living (ICCO, 2020a). Most are smallholders who depend on the crop for a living and struggle to cope with the effects of price volatility. They lack access to financial instruments such as loans or insurance (Bonnieux, 2019), and they tend to have limited bargaining power as they are mostly not organized. Low farm gate prices and poor yield returns have even prompted young workers to leave the countryside and migrate to cities in search of opportunities, undermining the continuity of the sector (Foodcircle, n.d.; Fountain & Huetz-Adams, 2020; ICCO, 2020a).

The type and quality of cocoa, rural infrastructure, the number of intermediaries along the chain, and national policies can also influence farm gate prices in producing countries. For instance, West African countries produce bulk cocoa beans,

with farmers receiving an average of USD 1,443.30/tonne of cocoa. Other countries, particularly in Latin America, produce “fine or flavour” cocoa, which is traded differently. Farmers in these countries receive higher prices over conventional cocoa—an average of USD 1,924.50/tonne (ICCA, n.d.-b). Plantation size and the level of organization of farmers also influence farmers’ prices and incomes. Organized farmers benefiting from private and public support usually produce varieties with higher quality and yield and enjoy better incomes and margins than non-organized farmers (FAO & Bureau d’analyse sociétale pour une information citoyenne [BASIC], 2020). They can also negotiate higher prices.

The concentration of power in the cocoa value chain, especially among cocoa traders, is an important factor creating price pressure on cocoa farmers (Hütz-Adams & Schneeweiß, 2018). Just a few big cocoa traders and processors manage a large part of the cocoa value chain, from buying beans to processing cocoa butter and powder to making chocolate (Gayi & Tsowou, 2017). The three largest cocoa companies alone can process two thirds of the world’s harvest (Fountain & Huetz-Adams, 2020; Hütz-Adams & Schneeweiß, 2018). Also, in many producing or chocolate-consuming countries, just a handful of companies account for large market shares (Hütz-Adams & Schneeweiß, 2018; Gayi & Tsowou, 2017). This concentration has exacerbated the power imbalances in the sector and increased the bargaining power of big and well-integrated players to the detriment of non-organized small farmers, who are usually “price takers” entrenched in a low bargaining position (Gayi & Tsowou, 2017).

Cocoa farmers are among the lowest earners in the value chain, while chocolate manufacturers and retailers generate the greatest profit.

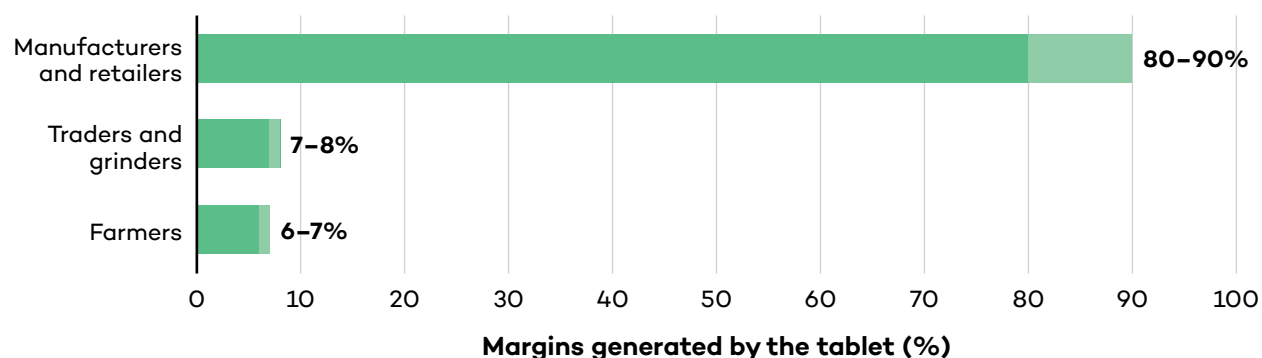
Several actors participate in the cocoa value chain, from cultivation to retail. After farmers sell their cocoa, local traders, exporters, and processors oversee its collection and transport, sometimes including local grinding and/or pressing. The cocoa then arrives at the importing country, where additional processing can occur (i.e., grinding and pressing), and cocoa is sold to chocolate makers. The end product is sold to retailers, who sell the chocolate to end consumers in supermarkets and stores.

The cocoa–chocolate value chain is highly asymmetric, with cocoa farmers receiving some of the smallest margins due to low prices at gate while bearing rising costs of production (Make Chocolate Fair!, n.d.).

Farm gate prices and margins differ by country. Farmers in West Africa receive about 70% of the Free on Board (FOB) price, while farmers in Latin America (i.e., Ecuador, Brazil) receive about 80% to 90% of the FOB price (Bymolt et al., 2018). In 2018, Ivorian and Cameroonian farmers received lower prices (USD 1.09/kg and USD 1.17/kg, respectively) than Ghanaian and Ecuadorian farmers (USD 1.43/kg and USD 1.65/kg, respectively). Margins were also higher for cocoa producers in Ecuador and Cameroon due to the lower costs of collection, transport, and taxes (FAO & BASIC, 2020).

In countries such as Ghana and Côte d’Ivoire, the costs of transportation and inputs such as insecticides, pesticides, and fertilizers have soared significantly, and the scarcity of labour has pushed costs higher (Aboa, 2022; Atoklo, 2020; Lonie et al., 2018; Reuters, 2022). These differences in costs across cocoa-producing countries are the result of the types of regulations and levels of state involvement in the sector (i.e., government providing inputs or subsidies),

Figure 5. Share of margins generated by a tablet of dark chocolate in 2018, by value chain actor.



Sources: Bhutada, 2020; FAO & BASIC, 2020.

as well as the type of varieties produced and their associated agricultural practices (i.e., production of finer flavour or higher-productivity cocoa varieties). Additionally, the commercialization of cocoa in producing countries involves many intermediaries between farmers and exporters, reducing farmers' margins further (Bhutada, 2020; Hütz-Adams & Schneeweiß, 2018; World Agroforestry, n.d.-a).

Profit margins for traders and grinders are reportedly low—around 7%–8%—but are compensated by the large volumes of cocoa traded (Fountain & Hütz-Adams, 2018; Fountain & Huetz-Adams, 2020, Bhutada, 2020). Retailers, on the other side, generate the most profit in the chain while trying to get the lowest price possible from chocolate producers (Climate-Smart Cocoa, 2022; Fountain & Huetz-Adams, 2020). Most turnover along the value chain goes to manufacturers and retailers (Fountain & Hütz-Adams, 2018; Fountain & Huetz-Adams, 2020; Hütz-Adams & Schneeweiß, 2018). In some European value chains, for instance, they make, on average, 70% of the total value of the final price of a tablet of dark chocolate and 90% of the total margins generated by this product. Farmers, in contrast, receive about 11% of the final price and less than 7% of the margins on the same tablet (FAO & BASIC, 2020).

The greater value created downstream is explained by intangible assets such as brand reputation, marketing, product elaboration, and distinction. These factors usually prevail over the origin of cocoa, farmers' work, and the value of adopting agricultural practices that contribute to natural resource conservation and the well-being of communities (FAO & BASIC, 2020).

There are chocolate manufacturers and retailers that can make, on average, 70% of the final price of a dark chocolate tablet and 90% of the total margin, while farmers receive 11% of the final price of this dark chocolate tablet and less than 7% of the total margin.

The combined share of value for retailers and manufacturers has been increasing. In 2018, their profit margins were reported to be 15% higher than in 2014 (FAO & BASIC, 2020). This shows how volatile prices have a smaller impact on actors in the middle and at the end of the chain. Cocoa traders, for instance, can counter volatile prices by storing beans and controlling the sales volume on the market. Manufacturers and retailers can pass price increases on to end consumers when prices fluctuate (FAO & BASIC, 2020). Farmers, however, need to sell their beans quickly because they need money and lack storage facilities or have inadequate storage (humid facilities) that can cause cocoa quality to deteriorate (FAO & BASIC, 2020; Make Chocolate Fair!, n.d.).

Farmers selling specialty or fine flavour cocoa through direct trade—that is, by establishing direct commercial relationships with grinders or importers and sidestepping intermediaries—usually obtain higher farm gate prices. In addition, cocoa buyers using direct trade are more transparent, often publishing their pricing data for every

transaction along its value chain (e.g., Uncommon Cacao and To'ak Chocolate) (Toth, 2021). They usually pursue long-term relationships with their suppliers, set minimum prices, and pay premiums based on value addition to ensure access to quality beans and on ethical and environmental considerations. These buyers typically understand the costs of production, post-harvest, export, import, and manufacturing, and they can trace the cocoa they purchase back to the cooperatives and farmers. Pricing models and premiums are often based on these factors. Some buyers involved in direct trade also consider living income benchmarks when setting the price to pay cocoa farmers (Aidenvironment & Sustainable Food Lab, 2018).

Additionally, some specialty buyers offer favourable trading terms such as pre-finance, quick payments, and long-term supply deals, and they help farmers access the futures market to hedge against price risks. However, specialty and fine flavour cocoa belong to a niche market that is growing but still small, accounting for less than 10% of the global market (Aidenvironment & Sustainable Food Lab, 2018; CBI Ministry of Foreign Affairs, 2020; Hütz-Adams & Schneeweiß, 2018). While big manufacturers in the sector are pushing for more sustainable forms of cocoa, consumers in some emerging markets are reluctant to pay the higher price for it. However, it is not an impediment for buyers and manufacturers to pay more for their cocoa and help farmers achieve better and more stable incomes, given their position in the market and strong profitability in recent years (The Living Income Community of Practice, 2022).

VSSs are trying to address challenges in the sector and seeking better financial outcomes for farmers.

VSSs operating in the cocoa sector, seeking to help small-scale farmers, have developed programs and mechanisms to address low farm gate prices and price volatility because they understand that economic sustainability underpins social and environmental sustainability. VSSs such as Fairtrade have mandatory price floors and premiums in place, while others, such as certified Organic and Rainforest Alliance/UTZ, offer premium models. Some are also working to implement additional premiums based on living income reference prices (Rainforest Alliance, 2020a).

In 2021, the Fairtrade price for conventional cocoa was USD 2,400/tonne plus a fixed premium of USD 240/tonne at the FOB level. Certified Organic farmers received a USD 300/tonne differential plus the premium (Fairtrade International, n.d.; Guimaraes, 2021). The scheme also requires traders to pay a price differential for Fairtrade cocoa beans in Ghana or Côte d'Ivoire if the reference price in these countries falls below the Fairtrade minimum price (Fairtrade International, n.d.; Guimaraes, 2021). These prices were implemented to act as a baseline, and producers can negotiate higher prices for VSS-compliant cocoa.

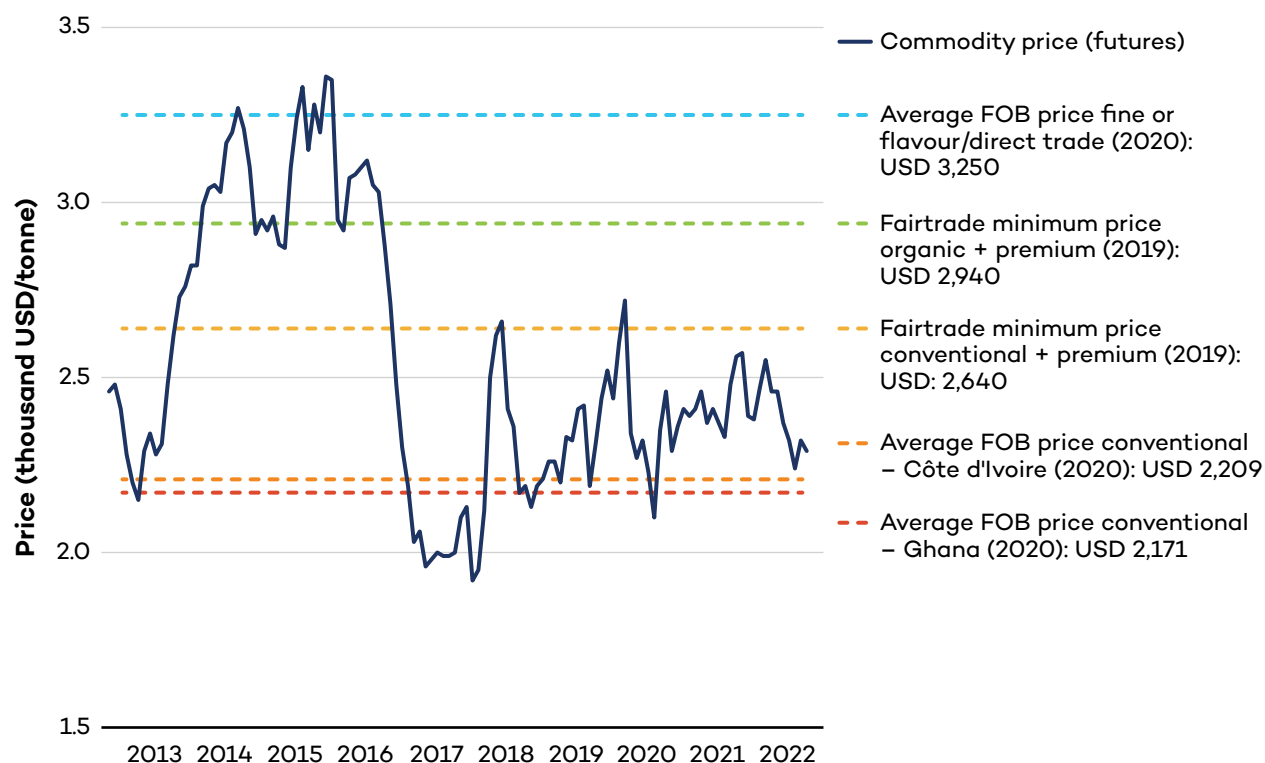
As of July 2020, Rainforest Alliance/UTZ introduced the requirement that all cocoa buyers must pay certified farms a minimum sustainability differential of USD 70/tonne that will have to reach individual farmers in full, in cash. This additional payment

can be used to reinvest in the farm, for family needs, or to cover production costs. In Ghana and Côte d'Ivoire, the average premiums that the first buyer paid to cocoa farmers in 2020 were EUR 78/tonne and EUR 90.27/tonne, respectively (Rainforest Alliance, 2020b). Buyers also are obliged to make cash or in-kind investments to farm groups and individual farmers based on the needs identified in their own investment plans (Rainforest Alliance, 2020a). This “sustainability investment” differential aims to share the costs of achieving and maintaining certification and of adopting farming practices designed to preserve forests

and soils and support farmers’ well-being (Rainforest Alliance, 2020a).

To better illustrate the differences between conventional, VSS-compliant, and specialty prices, Figure 6 showcases the cocoa market price (cocoa futures) from 2012 to 2021 (USD/tonne), the average FOB prices in Ghana and Côte d'Ivoire for conventional cocoa in 2020, prices paid by certification schemes such as Fairtrade and certified Organic (FOB) in 2019 based on available data, and average prices paid by specialty buyers through direct trade (FOB) in 2020. It should be noted that farmers receive a portion of the FOB price and that these are

Figure 6. Cocoa market price against Fairtrade, Organic, specialty prices, and average conventional prices in Ghana and Côte d'Ivoire-FOB (USD/tonne)



Source: Authors’ elaboration based on data from Fairtrade International, n.d; Fountain & Hütz-Adams, 2018; Indexamundi, 2022 (assuming Ghanaian farmers receive 70% of FOB and Ivorian farmers 62% of FOB price).

average prices and do not reflect the reality of all cocoa farmers.

According to our analysis and the data shown in Figure 6, cocoa producers associated with VSSs such as Fairtrade and certified Organic are more protected from international price drops and swings than farmers growing conventional cocoa. As of 2018, producers selling cocoa compliant with these VSSs may have received a price that is 20% to 30% higher than those selling conventional cocoa. Prices received by farmers tend to rise with double certification of Fairtrade and Organic. The price is even higher when farmers sell specialty or fine flavour cocoa through direct trade mechanisms. However, we can deduce that cocoa buyers may be more willing to pay premiums and LIDs for VSS-compliant cocoa when international prices are depressed, while premiums are less frequent when the market prices are higher than VSSs' minimum prices.

For cocoa farmers, the effects of participation in a VSS on prices and incomes are mixed, though it appears that small cocoa farmers who adopt VSSs tend to be more profitable (Francisco da Silva, n.d.). Some studies suggest that the share of the final price going to retailers and manufacturers is about the same whether they sell conventional or certified chocolate tablets, while the economic benefits of producing VSS-compliant cocoa at the farm level are more pronounced, particularly when farmers sell cocoa beans compliant with both Organic and Fairtrade certification (FAO & BASIC, 2020; Knöbelsdorfer et al., 2021).

Farmers can earn higher prices when selling cocoa beans that comply with Rainforest, certified Organic, or Fairtrade schemes. A 2020 study by FAO and BASIC shows that

farmers selling Rainforest beans received about EUR 1.49/kg compared to EUR 1.26/kg when selling conventional beans—meaning an 18% increase in the farm gate price. Farmers also got about EUR 2.30/kg when selling certified Organic and EUR 2.70/kg when selling cocoa beans with both Organic and Fairtrade certifications. This is about 87% higher than the price farmers received selling conventional cocoa, though this market is still limited (FAO & BASIC, 2020; Knöbelsdorfer et al., 2021).

The benefits of VSSs for farmers' incomes are linked not only to the establishment of minimum prices and premiums but also to stronger ties between actors along the chain promoted by the schemes. VSSs can increase value by strengthening farmers' relationships with buyers and improving access to inputs, technologies, and agricultural training, as well as supporting adaptation and mitigation actions against climate change (Hütz-Adams & Schneeweiß, 2018; Knöbelsdorfer et al., 2021). However, it is important to note that producing VSS-compliant cocoa implies higher operational costs (i.e., application fees, annual fees, audits) and time for farmers, who can obtain better prices only when selling certified cocoa as such. In many producing countries, few farmers can obtain and maintain certifications without subsidies, limiting their ability to benefit from higher prices (Elder et al., 2021).

There are also concerns that premiums or minimum prices implemented by some VSSs are insufficient to make a systemic change in the cocoa sector (Nieburg, 2017) as they are considered too low to have a significant influence on farmers' incomes and ensure that cocoa-producing households can live adequately from cocoa production (Hütz-

Adams & Schneeweiß, 2018). To address this issue, VSSs such as Fairtrade introduced record keeping for farm expenses and revenues among cocoa farmers in several producing countries in 2019, aiming to understand living incomes and establish a baseline to define living income reference prices in cocoa and other crops (Fairtrade International, 2021). They are working alongside other organizations to establish living income reference prices for cocoa in Côte d'Ivoire and Ghana, based on living income benchmarks of USD 4,230/tonne and USD 6,700/tonne, respectively. This reference price aims to establish how much full-time Fairtrade farmers need to be paid to be able to invest in sustainable farming practices and earn a living income when other key parameters, such as viable farm size and sustainable yields, are met (Fairtrade International, 2018; Myers, 2018; Rainforest Alliance, 2022b).

Rainforest Alliance is also exploring living income initiatives by designing a living income monitoring tool that allows cooperatives in West Africa to estimate the living income gap for their farmers. This tool can also help sourcing companies to determine how much they will need to pay these farmers to close the living income gap. The VSS has also embarked on pilot projects in Côte d'Ivoire to facilitate cash transfers and help farmers close this gap, aiming to expand the project to other regions through the development of a living income fund (Rainforest Alliance, 2020c, 2021, 2022b). It remains to be seen how these approaches adopted by VSSs will play out in practice and how they will address issues such as inflation or exchange rate dynamics. It could also lead to increased production without guaranteed

sales of VSS-compliant cocoa if supply outpaces demand, affecting farmers' income, or to buyers switching their sourcing to other countries (Brack, 2021).

Governments in cocoa-producing countries and chocolate companies have implemented initiatives to increase farmers' prices and address price volatility.

In addition to VSSs, some cocoa sector actors have adopted measures to increase farm gate prices and mitigate the effects of market price volatility. For instance, the governments of Côte d'Ivoire and Ghana, which regulate and control their domestic cocoa markets, have implemented price stabilization mechanisms and funds that support prices in a low-price environment and allow farmers to receive a stable farm gate price throughout the harvest season (Aidenvironment & Sustainable Food Lab, 2018). While these measures may protect farmers from short-term price volatility, they do not shield them from global price movements, as the farm gate prices are annually set by both countries based on international market pricing. This not only delays price signals to farmers, but these funds are also not sufficiently capable of compensating for larger or prolonged declines in global prices (Bhutada, 2020; Hütz-Adams et al., 2016).

Côte d'Ivoire and Ghana formed a partnership in 2019 to increase the price paid to cocoa farmers by introducing a USD 400/tonne LID starting in the 2020/21

season. The partnership was based on coordinating production seasons, including an agreement on market volumes and setting a standard price for producers to prevent smuggling along the border (Mieu, 2020). However, a drop in global demand due to the pandemic, increased cocoa supplies, and the implementation of the LID reduced sales and led big cocoa bean buyers to ask for steep country discounts and lower premiums to reduce manufacturing costs and raise margins (Chandrasekhar, 2021). Buyers and traders are still reluctant to pay premiums, and they fear the implementation of a mandatory living income differential may lead to a surplus of production and lower prices as a result (Aboa, 2021a). According to some experts, the implementation of the LID seems to have only brought a short-term price hike for farmers in West Africa (Chandrasekhar, 2021).

Most major cocoa-processing and manufacturing companies have developed their own cocoa sustainability commitments over the years through certification schemes, different pricing models, and by setting floor prices and premiums. For instance, Tony's Chocolonely pays the government-set price in Ghana and Côte d'Ivoire, plus the Fairtrade premium and an additional premium calculated in function of a living income benchmark (Aidenvironment & Sustainable Food Lab, 2018; Tony's Chocolonely, n.d.). Other chocolate companies, such as Ritter Sport and Taza, pay the international market price and offer premiums—either fixed or negotiated above a guaranteed minimum value based on quality beans (Taza Chocolate, 2016). Their model follows the Fairtrade Minimum Prices even though their cocoa is not always Fairtrade certified (Aidenvironment & Sustainable

Food Lab, 2018). Buyers, including Nestlé and Mondelez, do not offer fixed prices but have other sustainability programs in place, including training in good agricultural practices and other resources to maximize farmers' crops—though these programs are not specifically designed to address living incomes or help farmers cope with price volatility or low prices. Mars also offers premium payments and has publicly supported the LID, although it does not publish data on prices or premiums paid to farmers (Mars Wrigley, 2020b).

A way forward: What is needed to address low farm gate prices and build a more sustainable cocoa value chain?

While many initiatives aim to help cocoa farmers, more must be done to successfully reward them for their investments in more sustainable growing practices and risk-taking. Price volatility and extended periods of low prices can undermine farmers' gains and deter them from investing in productivity, quality, growing practices that conserve forests and water sources, and community development. Reducing or alleviating risks against market volatility should be a priority for all actors in the cocoa value chain (Aidenvironment & Sustainable Food Lab, 2018).

Simply redistributing profits within the chain would not considerably improve the situation of cocoa farmers (Hütz-Adams & Schneeweiß, 2018). Long-term planning, investments, and

systemic solutions are needed to transform the sector. These may require tackling poverty in cocoa-producing countries and addressing issues that are embedded in the global market economy. These issues include high market concentration and asymmetrical power relations among cocoa traders, manufacturers, and farmers; the effects of global supply and demand dynamics on farmers' livelihoods; and the influence of cocoa future prices in the real economy.

In this context, governments, private sector actors, and VSSs can consider some measures to make cocoa value chains fairer, increase farm gate prices, and mitigate the effects of price volatility. These measures include the following.

Enhancing price transparency and the accountability of value chain actors in cocoa markets. This could be achieved by promoting more transparent market information systems in producing countries overlooked by local and international actors. Encouraging transparency in cocoa pricing is important, as stakeholders in countries such as Côte d'Ivoire are concerned about the lack of transparency in the auction systems. Some farmers note a lack of information on how prices are determined and how volumes are awarded to buyers (Aidenvironment & Sustainable Food Lab, 2018). To address this, governments in consuming and producing countries could join forces to develop a price information system that would allow farmer organizations to have access to updated cocoa prices in real time and better negotiate their prices.

Efforts should be made to enhance price transparency from the buyers' side, too. Some cocoa manufacturers collect comprehensive

sets of data without publishing them, despite the need to support better-informed discussions in the sector (Fountain & Hütz-Adams, 2019). The industry should invest in and use better systems to trace cocoa volumes, prices, and premiums along the value chain—especially those paid back to farmers—and publish reliable data. This can help to highlight ways to ensure farmers receive premiums when these are paid. Some digital tools can help to increase transparency and build trust. Cocoa buyers such as Mars have adopted technology systems in Indonesia to give real-time support to farmers based on their needs; these tools allow farmers' plans, progress, and cocoa prices to be shared and for digital payments to be made directly to farmers (Mars Wrigley, 2020b). VSSs can also help to increase the transparency of prices paid to cocoa farmers by collecting data directly from the farm and publishing price dashboards by country illustrating the reference prices they define (i.e., minimum prices, premiums) and what farmers actually receive in each season.

Creating an “observatory” tool on prices and value distributed across different actors and costs in the cocoa sector—led, for instance, by the International Cocoa Organization with the support of producing countries and buyers—could facilitate a multistakeholder discussion at the national and global levels through the sharing of verified data on cocoa pricing (FAO & BASIC, 2020).

Promoting an enabling business environment and farmers' access to finance is key. Value chain inefficiency results in a high price disparity between what the farmer receives and what the consumer pays. Proper knowledge, information, and access to finance are needed. The Aceh

Cocoa Forum in Indonesia is an example of good practice for promoting a fair business environment. Any unfairness in the local cocoa chain from farm to export can be addressed at the forum, which was created to support transparent and fair cocoa trade in the country (Padjung, 2018). The forum acts as a reference point for transparent prices to farmers and buyers, who receive data on prices via a text message price information system.

Improving farmers' access to finance and price risk management instruments can underpin the profitability of cocoa farming when international markets are volatile. Affordable finance would enable cocoa farmers to procure inputs and enhance productivity, reduce production costs, and increase profit margins (Gayi & Tsowou, 2017). Access to more affordable finance can also be linked to the implementation of cocoa-growing practices that yield positive environmental results. For instance, farmers in Peru's Madre de Dios region benefit from a blended finance mechanism to grow VSS-compliant cocoa while encouraging them to grow deforestation-free cocoa in agroforestry systems and restore degraded land. The Althelia Climate Fund provides loans to a farmer cooperative using carbon credits as collateral. The cooperative receives grant finance to support farmers who cultivate cash and food crops, adopt practices complying with VSSs such as Organic and Fairtrade, and increase productivity (United Nations Climate Change, n.d.).

Supporting crop diversification and extension services. Governments in producing and consuming countries, sector governance bodies, cocoa traders and manufacturers, and standard-setting bodies

can support crop diversification and offer extension services to farmers. Farmers who rely solely on cocoa for their income face risks, and diversifying crops and income-generating activities help protect their livelihoods. Farmers also need support to integrate other crops to reduce an oversupply of cocoa in the market and diversify their income sources. Cocoa buyers, including Nestlé, support diversification programs by providing training and access to other crops or beekeeping to generate additional income (Nestlé Cocoa Plan, n.d.). VSSs can also promote the use of agroforestry techniques for growing cocoa with timber, mangoes, cashews, or other crops to encourage alternative sources of income. This strategy should go hand in hand with training on how to improve efficiency in production and new methods for harvesting cocoa to help manage labour costs.

Promoting better trade relations, rewarding farmers for adopting sustainable cocoa practices, and supporting the LID in mainstream markets. More traders, producers, and retailers should look at their own value chains and implement good purchasing practices by investing in product traceability that will allow tracing the cocoa they purchase back to farmers while also identifying who they are and promoting more favourable trading relationships with them and other suppliers (Aidenvironment & Sustainable Food Lab, 2018). These practices can include paying price differentials for quality beans and paying higher prices to farmers for growing cocoa that yields positive, measurable benefits to the environment and/or society (i.e., preserving forests, enhancing soil health, or ensuring child education, which is critical to reduce child labour rates in the cocoa

fields). Also, farmers would need support to collect and process related data and provide supporting evidence. VSSs, private sector actors, and extension service providers can play a role in strengthening the capacity of farmers to monitor their own cultivation and management practices, understand the metrics to measure, and use appropriate technology to collect and report data.

Chocolate manufacturers, cocoa companies, and VSSs operating in the cocoa sector could also develop and adopt living income policies based on the current reality of cocoa farmers' average income (Fountain & Hütz-Adams, 2019). Agreements among farmer organizations, retailers, and other industry players that guarantee decent prices for producers (without causing overproduction) and protect the environment should be considered and promoted (FAO & BASIC, 2020). Examples where living income reference prices in cocoa have been adopted should be further examined.

Importing and consuming countries can also support sustainable incomes for farmers in producing regions. Due diligence regulations for companies, currently being discussed in the EU and various European countries, offer an opportunity to make payment of a living income mandatory (Chandrasekhar, 2021).

Finally, **value creation and increasing demand in producing countries** can protect local farmers against high volatility in prices and increase the margins they obtain. There is already a growing trend toward grinding cocoa at its origin to capture more value from transformed products, such as cocoa butter and cocoa powder. For instance, the Conseil Café Cacao in Côte d'Ivoire launched the construction of two additional

cocoa processing facilities in 2020, each with a capacity of 50,000 tonnes/year, in the port of San-Pédro and Abidjan, adding to the existing processing capacity of 710,000 tonnes/year. The country currently processes about 35% of its raw cocoa beans and aims to process 100% of the local production by 2025 (Reuters Staff, 2018). Ecuador has also advanced in manufacturing its own chocolate bars and selling them overseas (Villacis et al., 2022), though high import tariffs for chocolate products in traditional markets such as Europe remain a challenge.

These initiatives are promising and can certainly help cocoa farmers and processors receive greater value from their cocoa beans. For their success, demand for cocoa-based products in producing countries would need to expand. This is also the case for supporting the market of VSS-compliant cocoa. Governments in producing countries and other organizations working in the sector, such as consumer associations and VSSs operating in these countries, can collaborate to implement measures that promote the consumption of cocoa-based products—particularly those made with VSS-compliant cocoa or produced using more sustainable agricultural practices.

These measures can include promotional activities such as “sustainable national cocoa days,” arranging and promoting agrotourism and ecotourism activities at cocoa plantations (Ministerio de Turismo, 2019), and raising consumer awareness of the benefits of consuming VSS-compliant cocoa, as well as implementing discount programs to purchase cocoa-based products that comply with VSSs.

Building sustainable and resilient cocoa production systems is critical. The

mechanisms listed above should not be considered in isolation, however, as pricing is just one part of the strategy to transform the sector. Coordination among industry actors is critical to ensure that farmers operate in inclusive and fair value chains by adopting sustainable practices while receiving sufficient incomes to sustain their livelihoods.

References

- 360 Market Updates. (2022, February 23). *Organic cocoa market in 2022 is estimated to grow at the modest CAGR of more than 95.% during the forecast period 2022-2026*. Global News Wire. <https://www.globenewswire.com/news-release/2022/02/23/2389962/0/en/Organic-Cocoa-Market-In-2022-is-estimated-to-grow-at-a-modest-CAGR-of-more-than-9-5-During-the-forecast-period-2022-2026.html>
- Aboa, A. (2021a, June 8). *Ivory Coast sells 2021/2022 cocoa contracts after wrangle over premium*. Reuters. <https://www.reuters.com/article/ivorycoast-cocoa-idUSL5N2NQ43C>
- Aboa A. (2021b). *Study finds around 15% of Ivory Coast's cocoa farms are in protected forest*. Reuters <https://www.reuters.com/business/environment/study-finds-around-15-ivory-coasts-cocoa-farms-are-protected-forest-2021-05-06/>
- Aboa, A. (2022). *Ghanaian, Ivorian cocoa yield in doubt as farmers shun costly fertilizers*. Reuters. <https://financialpost.com/pmnbusiness-pmn/ghanaian-ivorian-cocoa-yield-in-doubt-as-farmers-shun-costly-fertilizers>
- Aidenvironment & Sustainable Food Lab. (2018). *Pricing mechanisms in the cocoa sector: Options to reduce price volatility and promote farmer value capture*. <https://www.aidenvironment.org/wp-content/uploads/2018/06/Pricing-mechanisms-in-the-cocoa-sector.Oct2018.pdf>
- Ameyaw, L. K., Ettl, G., Leissle, K., & Anim-Kwapong, G. (2018). Cocoa and climate change: Insights from smallholder cocoa producers in Ghana regarding challenges in implementing climate change mitigation strategies. *Forests*, 9(12), 742. <https://doi.org/10.3390/f9120742>
- Amuge, O. (2022). *Global cocoa market weighs up implications of Russia-Ukraine conflict*. Business a.m. <https://www.businessamlive.com/global-cocoa-market-weighs-up-implications-of-russia-ukraine-conflict/>
- Anderson, R. (2011). *Ivory Coast crisis: Impact on the international cocoa trade*. BBC News. <https://www.bbc.com/news/business-12677418>
- Arenas, R. (2016). *China insights report: Chocolate opportunities*. Australian Food News. <https://www.ausfoodnews.com.au/2016/12/07/china-insights-report-chocolate-opportunities.html>
- Atoklo, D. (2020, August 18). *Farmers want cocoa price increased to GH¢700 per bag*. The Business & Financial Times Online. <https://thebftonline.com/2020/08/18/farmers-want-cocoa-price-increased-to-ghc700-per-bag/>
- Bar and Cocoa. (2022). *Varieties of cocoa beans*. <https://barandcocoa.com/pages/varieties-of-cocoa-beans>
- Barry Callebaut. (2017). *Progress report 2016/17*. https://www.barry-callebaut.com/sites/default/files/2019-01/barry-callebaut-forever-chocolate-progress-report-2016-17_0.pdf

- Barry Callebaut. (2020). *Forever chocolate progress report—GRI report 2019/20*. [https://www.barry-callebaut.com/sites/default/files/2020-12/Forever%20Chocolate%20GRI Report 2019-20 0 1.pdf](https://www.barry-callebaut.com/sites/default/files/2020-12/Forever%20Chocolate%20GRI%20Report%2019-20%2001.pdf)
- Bhutada, G. (2020). *Cocoa: A bittersweet supply chain*. Visual Capitalist. <https://www.visualcapitalist.com/cocoa-a-bittersweet-supply-chain/>
- Bisseleua, H., & Mfegue, V. (2020, July 1). *Following in the footsteps of COVID-19 for the cocoa swollen shoot virus: Contact tracing, testing, and treatment*. World Cocoa Foundation. <https://www.worldcocoafoundation.org/blog/following-in-the-footsteps-of-covid-19-for-the-cocoa-swollen-shoot-virus-contact-tracing-testing-and-treatment/>
- Bonnieux, G. (2019). *Access to finance for cocoa farmers*. Access to Finance Working Group, Swiss Platform of Sustainable Cocoa. [https://www.kakaoplattform.ch/fileadmin/redaktion/dokumente/news/Access to finance for cocoa Swiss Platform for Sustainable Cocoa June 2019.pdf](https://www.kakaoplattform.ch/fileadmin/redaktion/dokumente/news/Access_to_finance_for_cocoa_Swiss_Platform_for_Sustainable_Cocoa_June_2019.pdf)
- Brack, D. (2021, April). *Securing higher prices for cocoa: Price mechanisms in international trade*. ClientEarth. <https://www.clientearth.org/media/un1bznfi/cocoa-price-and-trade-paper-duncan-brack.pdf>
- Bunn, C., Lundy, M., Läderach, P., & Castro, F. (2017, November 13–17). *Global climate change impacts on cocoa* [Paper presentation]. 2017 International Symposium on Cocoa Research, Lima, Peru. <https://www.icco.org/wp-content/uploads/T4.152.-GLOBAL-CLIMATE-CHANGE-IMPACTS-ON-COCOA.pdf>
- Bymolt, R., Laven, A., & Tyszler, M. (2018). *Cocoa marketing and prices*. In *Demystifying the cocoa sector in Ghana and Côte d'Ivoire* (pp. 207–230). The Royal Tropical Institute (KIT). <https://www.kit.nl/wp-content/uploads/2018/12/Demystifying-cocoa-sector-chapter11-cocoa-marketing-and-prices.pdf>
- Cargill. (2022). *Consumer confidence*. <https://www.cargill.com/sustainability/cocoa/consumer-confidence>
- CBI Ministry of Foreign Affairs. (2020). *The European market potential for certified*. <https://www.cbi.eu/market-information/cocoa-cocoa-products/certified-cocoa/market-potential>
- CBI Ministry of Foreign Affairs. (2021). *What is the demand for cocoa on the European market?* <https://www.cbi.eu/market-information/cocoa/trade-statistics>
- Ceccarelli, V., Fremout T., Zavaleta, D., Lastra, S., Imán Correa, S., Arévalo-Gardini, E., Rodriguez, C. A., Hilacondo, W. C., & Thomas, E. (2021). *Climate change impact on cultivated and wild cacao in Peru and the search of climate change-tolerant genotypes*. *Diversity and Distributions*, 27(8), 1462–1476. <https://doi.org/10.1111/ddi.13294>
- Chandrasekhar, A. (2021). *Has a new price premium on cocoa really helped struggling African farmers?* SWI Swissinfo.ch. <https://www.swissinfo.ch/eng/business/has-a-new-price-premium-on-cocoa-really-helped-struggling-african-farmers-/46797948>

- Chandrasekhar, A. (2022). *European chocolate makers agree to share data with West Africa*. SWI Swissinfo.ch. <https://www.swissinfo.ch/eng/business/european-chocolate-makers-agree-to-share-data-with-west-africa/47888676#:~:text=ECA%20and%20CAOBISCO%20members%20have,Ivorian%20and%20Ghanaian%20cocoa%20boards>
- Climate-Smart Cocoa. (2022). *Climate change and potential hazards*. <https://climatesmartcocoa.guide/climate-change-and-potential-hazards/>
- Cocoa & Forests Initiative, Mondelez International, & Cocoa Life. (2021). *Cocoa life CFI progress: Towards climate resilient cocoa communities*. https://www.cocoalife.org/~/_media/CocoaLife/en/download/article/MDLZ-Cocoa_Life-CFI-2020-Progress_Report-April-2021.pdf
- Cocoa Coalition. (2022). *Cocoa Coalition joint position paper: The proposed EU regulation on deforestation*. <https://voicenetwork.cc/wp-content/uploads/2022/03/Cocoa-Coalition-Deforestation-response.pdf>
- Cocoa Horizons Program. (2020). *The cocoa snapshot*. https://www.cocoahorizons.org/sites/www.cocoahorizons.org/files/Cocoa_Horizons_Snapshot_19_20_Full_Year.pdf
- Cocoanect. (2019). *Sustainability*. <http://www.cocoanect.com/sustainability/>
- CocoaNet. (2022). *Where we are today*. <https://www.cacaonet.org//global-strategy/where-we-are-today>
- Confectionery Production. (2022, March 22). *ICCO cocoa organisation expresses concerns over global market impact of Ukrainian conflict*. <https://www.confectioneryproduction.com/news/38975/icco-cocoa-organisation-expresses-concerns-over-global-market-impact-of-ukranian-conflict/>
- Cosgrove, E. (2019, May 2). *Mondelez pledges to source all cocoa through its sustainability program by 2025*. Supply Chain Dive. <https://www.supplychaindive.com/news/Mondelez-sustainable-cocoa/553975/>
- Daxue Consulting. (2014). *Market of chocolate in China*. <https://daxueconsulting.com/market-chocolate-china/>
- Decloquement, J., Ramos-Sobrinho, R., Elias, S. G., Britto, D. S., Puig, A. S., Reis, A., Fernandes da Silva, R. A., Honorato-Júnior, J., Martins Newman Luz, E. D., Pinho, D. B., & Marelli, J.-P. (2021, March 15). *Phytophthora theobromicola sp. nov.: A new species causing black pod disease on cacao in Brazil*. *Frontiers in Microbiology*. <https://www.frontiersin.org/article/10.3389/fmicb.2021.537399>
- Eckstein, D., Künzel, V., & Schäfer, L. (2021). *Global climate risk index*. Germanwatch. <https://www.germanwatch.org/en/cri>
- ECOM. (2022a). *The business impact of sustainable programs*. ECOM Agroindustrial Corp. Lt. <https://www.ecomtrading.com/the-business-impact-of-sustainable-programs/>
- ECOM. (2022b). *Traceability – Certification*. ECOM Agroindustrial Corp. Lt. <https://www.ecomtrading.com/traceability-certification/>

- Elder, S., Wilkings, A., Larrea, C., Elamin, N., & Fernandez de Cordoba, S. (2021). *Standards and poverty reduction*. International Institute for Sustainable Development. <https://www.iisd.org/ssi/reviews/standards-and-poverty-reduction/>
- Ellingham, M. (2022, October 12). Nestlé pays to eliminate child labour from chocolate supply chain. *Financial Times*. <https://www.ft.com/content/43934be9-8e30-4555-ab89-d6fdf0faace2>
- EMR. (2021). *Global chocolate market report and forecast 2022-2027*. <https://www.expertmarketresearch.com/reports/chocolate-market>
- Espinoza, C. (2021). *Aumenta el consumo de café y chocolate orgánicos en el Perú durante la pandemia* [in Spanish]. Somos Periodismo. <https://somosperiodismo.com/aumenta-el-consumo-de-cafe-y-chocolate-organicos-en-el-peru-durante-la-pandemia/>
- Etaware, P. M., Adedeji, A. R., Osowole, O. I., & Odebode, A. C. (2020, January 10). ETAPOD: A forecast model for prediction of black pod disease outbreak in Nigeria. *PLOS ONE*, 15(1), e0209306. <https://doi.org/10.1371/journal.pone.0209306>
- Fabricant, F. (2011, January 11). Rare cacao beans discovered in Peru. *The New York Times*. <https://www.nytimes.com/2011/01/12/dining/12chocolate.html>
- Fairtrade America. (2020). *Cocoa impact report – 2019*. <https://www.fairtradeamerica.org/why-fairtrade/global-impact/reports-trends/cocoa-impact-report-2018-2019/>
- Fairtrade Foundation. (2022). *The history of Fairtrade*. <https://www.fairtrade.org.uk/what-is-fairtrade/the-impact-of-our-work/the-history-of-fairtrade/>
- Fairtrade International. (n.d.). *Fairtrade minimum price and premium information*. <https://www.fairtrade.net/standard/minimum-price-info>
- Fairtrade International. (2018, December 3). *Cocoa farmers to earn more through a higher Fairtrade minimum price*. <https://www.fairtrade.net/news/cocoa-farmers-to-earn-more-through-a-higher-fairtrade-minimum-price>
- Fairtrade International (2021). *The future is fair: Annual report 2020-2021*. <https://files.fairtrade.net/publications/Fairtrade-International-Annual-Report-2020-2021.pdf>
- Ferrero. (2021). *Ferrero sustainability report 2021: Key data*. <https://www.ferrerosustainability.com/int/en/sustainability-reports>
- Ferrero, Cocoa & Forests Initiative, & World Cocoa Foundation. (2019). *Ferrero annual progress report on CFI action plan: Côte d’Ivoire*. https://www.ferrerosustainability.com/int/sites/ferrerosustainability_int/files/2020-12/3788.pdf
- Ferrero Corporate. (2021, March 24). *Ferrero continues to scale cocoa sustainability programme*. <http://www.ferrero.com/news/ferrero-continues-to-scale-cocoa-sustainability-programme>
- Ferrero Group. (2020). *Ferrero Group sustainability report*. https://www.ferrerosustainability.com/int/sites/ferrerosustainability_int/files/2021-07/ferrero-sr20_210719.pdf

- Fobelets, V., & de Groot Ruiz, A. (2016). *The true price of cocoa from Ivory Coast*. True Price & IDH <https://trueprice.org/wp-content/uploads/2016/03/TP-Cocoa.pdf>
- Food and Agriculture Organization of the United Nations. (2022). *Crops and livestock products*. <https://www.fao.org/faostat/en/#data/QCL>
- Food and Agriculture Organization of the United Nations & Bureau d'analyse sociétale pour une information citoyenne. (2020). *Executive summary: Comparative study on the distribution of value in European chocolate chains*. <https://www.eurococoa.com/wp-content/uploads/Comparative-study-on-the-distribution-of-the-value-in-the-European-chocolate-chains-Executive-Summary-EN.pdf>
- Foodcircle. (n.d.). *Cocoa pricing*. <https://www.foodcircle.com/magazine/cocoa-pricing-commodity-market>
- Foreign Agricultural Service. (2022, June). *Coffee: World markets and trade*. United States Department of Agriculture. <https://apps.fas.usda.gov/psdonline/circulars/coffee.pdf>
- Fountain, A. C., & Huetz-Adams, F. (2020). *Cocoa barometer 2020*. Voice Network. <https://voicenetwork.cc/wp-content/uploads/2021/03/2020-Cocoa-Barometer-EN.pdf>
- Fountain, A. C., & Hütz-Adams, F. (2018). *Cocoa barometer 2018*. Voice Network. <https://www.voicenetwork.eu/wp-content/uploads/2019/07/2018-Cocoa-Barometer.pdf>
- Fountain, A. C., & Hütz-Adams, F. (2019, January). *Necessary farm gate prices for a living income: Existing living income reference prices are too low. Consultation paper for the 2020 Cocoa Barometer*. Voice Network. <https://voicenetwork.cc/wp-content/uploads/2020/01/200113-Necessary-Farm-Gate-Prices-for-a-Living-Income-Definitive.pdf>
- Francisco da Silva, A. (n.d.). *Mechanisms for shared responsibility in the cocoa global value chain: The traders' perspective on living income* [Master's thesis, Wageningen University and Research]. <https://edepot.wur.nl/532698>
- Frizo, C. (2018). *Getting to know the three main cacao varieties*. Perfect Daily Grind. <https://perfectdailygrind.com/2018/08/is-criollo-chocolate-really-king-the-myth-of-the-3-cacao-varieties/>
- Gayi, S. K., & Tsowou, K. (2017, March). *Cocoa industry: Integrating small farmers into the global value chain*. United Nations. <https://www.un-ilibrary.org/content/books/9789210579278>
- Ghana Cocoa Board. (2021). *COCOBOD launches 2021 National Chocolate Week to promote chocolate consumption*. Ghana Cocoa Board. <https://cocobod.gh/news/cocobod-launches-2021-national-chocolate-week-to-promote-chocolate-consumption>
- Global Agriculture and Food Security Program. (2021, March 9). *For Cargill cocoa & chocolate, the impacts of COVID-19 are widespread*. <https://www.gafspfund.org/index.php/news/cargill-cocoa-chocolate-impacts-covid-19-are-widespread>

- Grand View Research. (2020). *Chocolate market size, share & trends analysis report by product (traditional, artificial), by distribution channel (supermarket, hypermarket, convenience store, online), by region, and segment forecasts, 2020–2027*. <https://www.grandviewresearch.com/industry-analysis/chocolate-market>
- Grow Further. (2022). *Bring back the chocolate: Building a better cocoa bean in Malaysia*. <https://www.growfurther.org/bring-back-the-chocolate-building-a-better-cocoa-bean-in-malaysia/>
- Guimaraes, R. (2021, April). *Cocoa price differential announcement from Fairtrade International standards & pricing*. Fairtrade International. https://files.fairtrade.net/2021-04-06_Cocoa_FMPdifferential_Announcement_EN_Final.pdf
- Hershey. (2022). *Cocoa sourcing*. https://www.thehersheycompany.com/en_us/home/sustainability/sustainability-focus-areas/responsible-sourcing/priority-ingredients-and-materials/cocoa-sourcing.html
- Hershey announces milestones to achieve 100% certified cocoa by 2020*. Food and Drink Business Europe. (2013, March 16). <https://www.fdbusiness.com/hershey-announces-milestones-to-achieve-100-certified-cocoa-by-2020/>
- Hütz-Adams, F., Huber, C., Knoke, I., Morazán, D. P., & Mürlebach, M. (2016). *Strengthening the competitiveness of cocoa production and improving the income of cocoa producers in West and Central Africa*. Südwind Institute e.V. <https://suedwind-institut.de/files/Suedwind/Publikationen/2017/2017-06%20Strengthening%20the%20competitiveness%20of%20cocoa%20production%20and%20improving%20the%20income%20of%20cocoa%20producers%20in%20West%20and%20Central%20Africa.pdf>
- Hütz-Adams, F., & Schneeweiß, A. (2018). *Pricing in the cocoa value chain – Causes and effects*. Deutsche Gesellschaft für Internationale Zusammenarbeit. <https://suedwind-institut.de/files/Suedwind/Publikationen/2018/2018-13%20Pricing%20in%20the%20cocoa%20value%20chain%20%E2%80%93%20causes%20and%20effects.pdf>
- Igawa, T. K., de Toledo, P. M., & Anjos, L. J. S. (2022). Climate change could reduce and spatially reconfigure cocoa cultivation in the Brazilian Amazon by 2050. *PLOS ONE*, 17(1), e0262729. <https://doi.org/10.1371/journal.pone.0262729>
- imarc. (2021). *Chocolate market share, size, price and forecast 2022-2027*. <https://www.imarcgroup.com/prefeasibility-report-chocolate-manufacturing-plant>
- Impact Institute. (2018). *The true cost of cocoa – Tony’s Chocolonely progress report 2018*. <https://www.impactinstitute.com/the-true-cost-of-cocoa-tonys-chocolonely-progress-report-2018/>
- Indexmundi. (2022). *Cocoa beans monthly price – U.S. dollars per kilogram*. <https://www.indexmundi.com/commodities/?commodity=cocoa-beans&months=120>

- Ingram, V. J., Behagel, J., Mammadova, A., & Verschuur, X. (2020). *The outcomes of deforestation-free commodity value chain approaches* [Background report]. Forest and Nature Conservation Policy Group & Wageningen University and Research. <https://www.evidensia.eco/resources/1107/download/>
- International Cocoa Organization. (n.d.-a). *Cocoa daily prices*. <https://www.icco.org/statistics/>
- International Cocoa Organization. (n.d.-b). *What is fine or flavor cocoa?* <https://www.icco.org/fine-or-flavor-cocoa/>
- International Cocoa Organization. (2020a). *Cocoa economy informations*. <https://www.icco.org/economy/>
- International Cocoa Organization. (2020b). *Processing cocoa*. <https://www.icco.org/processing-cocoa/>
- International Cocoa Organization. (2022, August). *Cocoa market report*. <https://www.icco.org/wp-content/uploads/ICCO-Monthly-Cocoa-Market-Report-August-2022.pdf>
- Ionova, A. (2018, September 19). *Mars aims to tackle “broken” cocoa model with new sustainability scheme*. Reuters. <https://www.reuters.com/article/us-cocoa-mars-sustainability-idUKKCN1LZ1DZ>
- Just Fun Facts. (2022). *Interesting facts about cocoa beans*. <http://justfunfacts.com/interesting-facts-about-cocoa-beans/>
- Knöblsdorfer, I., Sellare, J., & Qaim, M. (2021). Effects of Fairtrade on farm household food security and living standards: Insights from Côte d’Ivoire. *Global Food Security*, 29. <https://www.sciencedirect.com/science/article/pii/S2211912421000456>
- Kozicka, M., Tacconi, F., Horna, D., & Gotor, E. (2018). *Forecasting cocoa yields for 2050*. Biodiversity International. <https://cgspace.cgiar.org/handle/10568/93236>
- Lonie, S., Martinez, M., Oulai, R., & Tullis, C. (2018). *Opportunities for digital financial services in the cocoa value chain in Côte d’Ivoire: Insights from new data*. World Bank. <https://openknowledge.worldbank.org/handle/10986/30203>
- Living Income Community of Practice. (2022). *Living Income Practitioner’s Workshop*. https://www.living-income.com/licopworkshopjune2022?utm_source=Living+Income+Community+of+Practice+mailing+list&utm_campaign=6e4c7507b3-EMAIL_CAMPAIGN_2018_01_11_COPY_01&utm_medium=email&utm_term=0_1d89d8432e-6e4c7507b3-60089326
- Maile, F., Tröster, B., Staritz, C., & Grumiller, J. (2022). *Who to blame? The rough start for living income cocoa prices in Côte d’Ivoire and Ghana*. EADI Blog. <https://www.developmentresearch.eu/?p=1252>
- Make Chocolate Fair! (n.d.). *Cocoa prices and income of farmers*. <https://makechocolatefair.org/issues/cocoa-prices-and-income-farmers-0>

- Mars, Incorporated. (2020). *Responsible cocoa today*. <https://www.mars.com/sustainability-plan/cocoa-for-generations/responsible-cocoa-today>
- Mars Wrigley. (2020a). *Cocoa for generations 2020 report*. https://deu.mars.com/sites/g/files/jydpvr386/files/2020-10/Mars-2020-Cocoa-for-Generations-Report_small.pdf
- Mars Wrigley. (2020b). *Reshaping the future of cocoa. Cocoa for generations, 2020 report*. https://deu.mars.com/sites/g/files/jydpvr386/files/2020-10/Mars-2020-Cocoa-for-Generations-Report_small.pdf
- Meier, C., Sampson, G., Larrea, C., Schlatter, B., Bermudez, S., & Dang, D., & Willer, H. (Eds.). (2021). *The state of sustainable markets 2021: Statistics and emerging trends*. International Trade Centre, International Institute for Sustainable Development, & Research Institute of Organic Agriculture. <https://intracen.org/fr/media/11643>
- Mera, C., Magdovitz, M., & Rawlings, A. (2021). *Outlook 2022: Hell in the handbasket*. RaboResearch.
- Mieu, B. (2020, September 8). *Ghana and Côte d'Ivoire taste success in raising price of cocoa*. The Africa Report.com. <https://www.theafricareport.com/40945/ghana-and-cote-divoire-taste-success-in-raising-price-of-cocoa/>
- Ministerie van Landbouw, Natuur en Voedselkwaliteit. (2021). *COVID-19 effects on cocoa sectors in Ghana and Côte d'Ivoire*. <https://www.agroberichtenbuitenland.nl/actueel/nieuws/2021/02/25/covid-19-effects-on-cocoa-sectors-in-ghana-and-cote-d%E2%80%99ivoire>
- Ministerio de Turismo. (2019). *Charlas dinamicas para celebrar el dia internacional del cacao* [in Spanish]. Gobierno de Ecuador. <https://www.turismo.gob.ec/charlas-dinamicas-para-celebrar-el-dia-internacional-del-cacao/>
- Mordor Intelligence. (2021a). *China chocolate market – Growth, trends, COVID-19, and forecasts (2022–2027)*. <https://www.mordorintelligence.com/industry-reports/china-chocolate-market>
- Mordor Intelligence. (2021b). *Chocolate market – Growth, trends, COVID-19 impact, and forecasts (2022-2027)*. <https://www.mordorintelligence.com/industry-reports/chocolate-market>
- Myers, A. (2018, December 3). *Fairtrade to increase its minimum price for cocoa and farmers' Premium payments*. Confectionerynews.com. <https://www.confectionerynews.com/Article/2018/12/03/Fairtrade-to-increase-its-Minimum-Price-for-cocoa-and-farmers-Premium-payments>
- Myers, A. (2021, May 26). *Cocoa future prices continue to wane – despite grindings up in North America and Southeast Asia*. Confectionerynews.com. <https://www.confectionerynews.com/Article/2021/05/26/Cocoa-future-prices-continue-to-wane-despite-grindings-up-in-North-America-and-Southeast-Asia>
- Nestlé. (2020). *Creating shared value and sustainability report 2020 appendix*. <https://www.nestle.com/sites/default/files/2021-03/creating-shared-value-appendix-2020.pdf>

- Nestlé. (2022). *Sustainable cocoa*. <https://www.nestle.com/sustainability/sustainable-sourcing/cocoa>
- Nestlé Cocoa Plan. (n.d.). *Empowering women to earn an income: The benefits of crop diversification*. <https://www.nestlecocoaplan.com/article-empowering-women-earn-income>
- Nieburg, O. (2015, February 6). *'We are going to be naked': Cémoi to source 100% traceable cocoa*. Confectionerynews.Com. <https://www.confectionerynews.com/Article/2015/02/06/Cemoi-launches-Transparence-cocoa-project>
- Nieburg, O. (2017, December 20). *Fair game: How effective is cocoa certification?* Confectionerynews.com. <https://www.confectionerynews.com/Article/2017/12/20/Fair-trade-How-effective-is-cocoa-certification>
- Nieburg, O. (2019, August 13). *Dissecting Cargill's 2030 pledge on sustainable cocoa*. Confectionerynews.Com. <https://www.confectionerynews.com/Article/2017/10/05/Cargill-makes-2030-pledge-on-sustainable-cocoa>
- Nutrition-Act. (n.d.). *National (Arriba) cacao/chocolate*. <https://www.nutrition-act.jp/nacional-cacao>
- Oeschger, A., & Sarmiento, F. (2022). *Due diligence requirements to tackle deforestation: An overview of the EU and British proposals*. International Institute for Sustainable Development. <https://www.iisd.org/articles/policy-analysis/deforestation-overview-eu-british-proposals>
- Olam Cocoa. (2020). *Cocoa compass impact report 2019-2020*. <https://www.olamgroup.com/content/dam/olamgroup/products-and-services/ofi/cocoa/sustainability-cocoa/sustainability-cocoa-pdfs/cocoa-compass-impact-report-2019-2020.pdf>
- Organic Farming Research Foundation. (n.d.) *Healthy soils increase resilience*. <https://ofrf.org/climate-toolkit/healthy-soils-increase-resilience/>
- Padjung, R. (2018). *Improving agricultural commodity supply-chain to promote economic activities in rural area*. *Earth and Environmental Sciences*, 157, 012057. <https://iopscience.iop.org/article/10.1088/1755-1315/157/1/012057>
- Peverelli, P. (2019). *Global brands to see stiffer competition in China's chocolate market*. Just Food. <https://www.just-food.com/features/global-brands-to-see-stiffer-competition-in-chinas-chocolate-market/>
- Phayanak. (2022). *What are the different varieties of cacao?* [Internet]. <https://chocolatephayanak.com/unkategorisiert/what-are-the-different-varieties-of-cacao/>
- Potts, J. (2017). *Throwing the chocolate bar out with the bathwater: How Cadbury's transition to an in-house sustainability standard threatens the sustainability of the cocoa sector*. International Institute for Sustainable Development. <https://www.iisd.org/sites/default/files/publications/cadbury-sustainability-standard-cocoa-industry-commentary.pdf>

- Potts, J., Voora, V., Lynch, M., & Mammadova, A. (2017). *Standards and biodiversity*. International Institute for Sustainable Development. <https://www.iisd.org/publications/report/standards-and-biodiversity>
- Poverty among cocoa farmers requires a coherent approach*. (2020, December 10). Wageningen University & Research. <https://www.wur.nl/en/newsarticle/Poverty-among-cocoa-farmers-requires-a-coherent-approach.htm>
- Rainforest Alliance. (2019). *The Rainforest Alliance launches cocoa assurance plan in West Africa*. <https://www.rainforest-alliance.org/in-the-field/rainforest-alliance-launches-cocoa-assurance-plan-in-west-africa/>
- Rainforest Alliance. (2020a). *Cocoa: The sustainability differential in cocoa*. <https://www.rainforest-alliance.org/business/certification/cocoa-sustainability-differential/>
- Rainforest Alliance. (2020b, June 30). *Global Covid-19 report*. <https://www.rainforest-alliance.org/in-the-field/global-covid-19-report/>
- Rainforest Alliance. (2020c). *What's in our 2020 certification program? Living income*. <https://www.rainforest-alliance.org/wp-content/uploads/2020/07/whats-in-our-2020-certification-program-living-income.pdf>
- Rainforest Alliance. (2021). *Living income: Moving from measurement to action*. <https://www.rainforest-alliance.org/business/tailored-services/living-income-moving-from-measurement-to-action>
- Rainforest Alliance. (2022a). *Cocoa certification data report 2021*. <https://www.rainforest-alliance.org/resource-item/cocoa-certification-data-report-2021/>
- Rainforest Alliance. (2022b). *Innovative ways to enhance living income for cocoa farmers*. <https://www.rainforest-alliance.org/in-the-field/the-living-income-module-project-bridging-the-gap-for-cocoa-farmers/>
- ReportLinker. (2021). The chocolate market was impacted by COVID-19 during its onset in 2020. *GlobeNewswire*. <https://www.globenewswire.com/news-release/2021/05/05/2223540/0/en/The-chocolate-market-was-impacted-by-COVID-19-during-its-onset-in-2020.html>
- Research and Markets. (2020). *Global chocolate market – Forecasts from 2020 to 2025*. <https://www.researchandmarkets.com/reports/5138783/global-chocolate-market-forecasts-from-2020-to>
- Resenale. (2019). *Producing what they don't consume*. Chocolate Class. <https://chocolateclass.wordpress.com/2019/03/23/producing-what-they-dont-consume/>
- Reuters Staff. (2018, June 22). *Ivory Coast's ICP to ramp up cocoa grinding at two plants*. Reuters. <https://www.reuters.com/article/cocoa-ivorycoast-idUSL8N1TO1E9>
- Schreiber, M. (2020). *The challenge of sustainable chocolate*. The New Republic <https://newrepublic.com/article/156569/challenge-sustainable-chocolate>

- Schroth, G., Läderach, P., Martinez-Valle, A. I., Bunn, C., & Jassogne, L. (2016). Vulnerability to climate change of cocoa in West Africa: Patterns, opportunities and limits to adaptation. *Science of The Total Environment*, 556, 231–241. <https://doi.org/10.1016/j.scitotenv.2016.03.024>
- Spice Jungle. (2022). *Nacional cacao: The return of a legend*. <https://www.spicejungle.com/the-jungle/nacional-cacao>
- Sucden. (2020). *Responsibility report 2020*. https://www.sucden.com/media/1571/sucden-2020-responsibility_report-final.pdf
- Sucden. (2022). *Sustainable cocoa*. <https://www.sucden.com/en/products-and-services/cocoa/sustainable-cocoa/>
- Taza Chocolate. (2016). *2016 transparency report*. <https://www.tazachocolate.com/pages/2016-transparency-report>
- The Chocolate Journalist. (2017, February 7). *The good, the bad and the ugly of cacao CCN-51*. <https://www.thechocolatejournalist.com/blog/good-bad-ugly-cacao-ccn-51>
- The Straits Times. (2019). *Chocolate is big business in China*. <https://www.straitstimes.com/lifestyle/food/chocolate-is-big-business-in-china>
- Tony's Chocolonely. (n.d.). *The living income model for cocoa*. <https://tonyschocolonely.com/us/en/our-mission/serious-cocoa-info/living-income-model>
- Toth, J. (2019, January 22). *The different grades of Ecuadorian cacao*. To'ak Chocolate. <https://toakchocolate.com/blogs/news/the-different-grades-of-ecuadorian-cacao>
- Toth, J. (2021). *Transparency report: How much we pay cacao growers*. To'ak Chocolate. <https://toakchocolate.com/blogs/news/transparency-report-2021-how-much-to-ak-pays-cacao-growers>
- Touton S.A. (2022). *Cocoa*. <https://touton.com/products/cocoa>
- Transparence Cacao. (2022). *Objectives*. <https://www.transparence-cacao.com/program/our-goals/>
- Tridge. (2021). *2021 industry report: Cocoa beans*. https://cdn.tridge.com/market_report_report/24/8e/b5/248eb54e641bb3bd67b2e7d4a976929c31509d62/Industry_Report_-_Cocoa_beans.pdf
- Tropical Forest Alliance. (2022). *Ensuring a sustainable source of chocolate: Agreement readies deforestation-free Peruvian cocoa for new European market regulations*. <https://www.tropicalforestalliance.org/en/news-and-events/news/ensuring-a-sustainable-source-of-chocolate-agreement-readies-deforestation-free-peruvian-cocoa-for-new-european-market-regulations>
- Tye, S., Pool, J., & Lomeli, L.G. (2022). *The potential for nature-based solutions initiatives to incorporate and scale climate adaptation*. <https://www.evidensia.eco/resources/2128/the-potential-for-nature-based-solutions-initiatives-to-incorporate-and-scale-climate-adaptation/>

- Uncommon Cacao. (2020). *An introduction to the newly implemented Living Income Differential (LID) in Ghana & Cote D'Ivoire*. <https://www.uncommoncacao.com/blog/2020/10/20/the-lid-in-ghana-and-cote-divoire>
- United Nations Climate Change. (n.d.). *Deforestation-free cocoa – Peru*. <https://unfccc.int/climate-action/momentum-for-change/financing-for-climate-friendly/deforestation-free-cocoa>
- Villacis, A., Barrera, V., Alwang, J., Caicedo, C., & Quiroz, J. (2022). *Strategies to strengthen Ecuador's high-value cacao value chain*. Inter-American Development Bank. <https://publications.iadb.org/publications/english/document/Strategies-to-Strengthen-Ecuadors-High-Value-Cacao-Value-Chain.pdf>
- Voora, V., Bermudez, S., & Larrea, C. (2019). *Global market report: Cocoa*. International Institute for Sustainable Development. <https://www.iisd.org/system/files/publications/ssi-global-market-report-cocoa.pdf>
- Whoriskey, P., & Siegel, R. (2019, June 5). *Cocoa's child laborers*. *The Washington Post*. <https://www.washingtonpost.com/graphics/2019/business/hershey-nestle-mars-chocolate-child-labor-west-africa/>
- Wong, Y. (2021). *Cocoa price forecast: What's next after multi-year highs?* Capital.com. <https://capital.com/cocoa-price-forecast-what-is-next-after-multi-year-highs>
- World Agroforestry. (n.d.-a). *Strategy for sustainable cocoa value chain in West and Central Africa: Towards a sustainable cocoa value chain for improved livelihoods and resilient cocoa landscapes*. https://www.worldagroforestry.org/sites/agroforestry/files/WCA%20Roadmaps_Cocoa_041.pdf
- World AgroForestry (n.d.-b). *The complex link between plants, trees and rain*. <https://www.worldagroforestry.org/news/complex-link-between-plants-trees-and-rain>
- World Bank Group. (2022, October). *Commodity markets outlook: Pandemic, war, recession: Drivers of aluminum and copper prices*. License: Creative Commons Attribution CC BY 3.0 IGO. <https://openknowledge.worldbank.org/bitstream/handle/10986/38160/CMO-October-2022.pdf>
- Yu, D. (2017a). *Chocolate confectionery contributes most to value sales of sustainable cocoa products: Euromonitor*. Confectionerynews.com. <https://www.confectionerynews.com/Article/2017/06/29/Euromonitor-forecasts-value-sales-of-sustainable-cocoa-products>
- Yu, D. (2017b, May 19). *Olam Cocoa to source 100% sustainable beans by 2020*. Confectionerynews. Com. <https://www.confectionerynews.com/Article/2017/05/18/Olam-to-source-100-sustainable-cocoa-by-2020>

Steffany Bermudez and Vivek Voora are both first authors of this report. Steffany Bermudez worked on cocoa prices and examining sustainable consumption preferences in developing countries in the market overview section. Vivek Voora worked on the market overview section examining supply and demand dynamics, production trends and forecasting, yields, and climate resilience in sustainable cocoa production.

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The Sustainable Commodities Marketplace Series provides a market performance overview and outlook for key agricultural commodities that comply with a number of voluntary sustainability standards (VSSs), focusing on global sustainable consumption and production. Each year, the series focuses on a different overarching theme, with individual reports for that year devoted to providing a market update for a chosen commodity. These reports are designed to be accessible and relevant for a range of audiences, including supply chain decision makers, procurement officers, policy-makers and producers. The series builds on *The State of Sustainable Markets 2021*, a joint publication from IISD, the International Trade Center (ITC), and the Research Institute of Organic Agriculture (FiBL), which examines over a dozen sustainability standards for various commodities.

The *Global Market Report* analyzes trends in cocoa production, consumption, trade flows, and other relevant areas. It uses 2019 data for cocoa production that is VSS-compliant, given that this was the most current data available when we conducted the analysis. The report also examines prices and margins in the cocoa sector, looking at how VSSs contribute to increasing farm prices. It also provides recommendations to VSSs and other actors to increase the price and income that farmers obtain for their cocoa and build sustainable and resilient cocoa systems.

IISD's State of Sustainability Initiatives (SSI) is an international research project that aims to advance sustainable and inclusive value chains. For over a decade, the SSI has been providing credible and solution-oriented analysis and dialogue on voluntary sustainability standards (VSSs) and their potential to contribute to sustainable development outcomes.

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