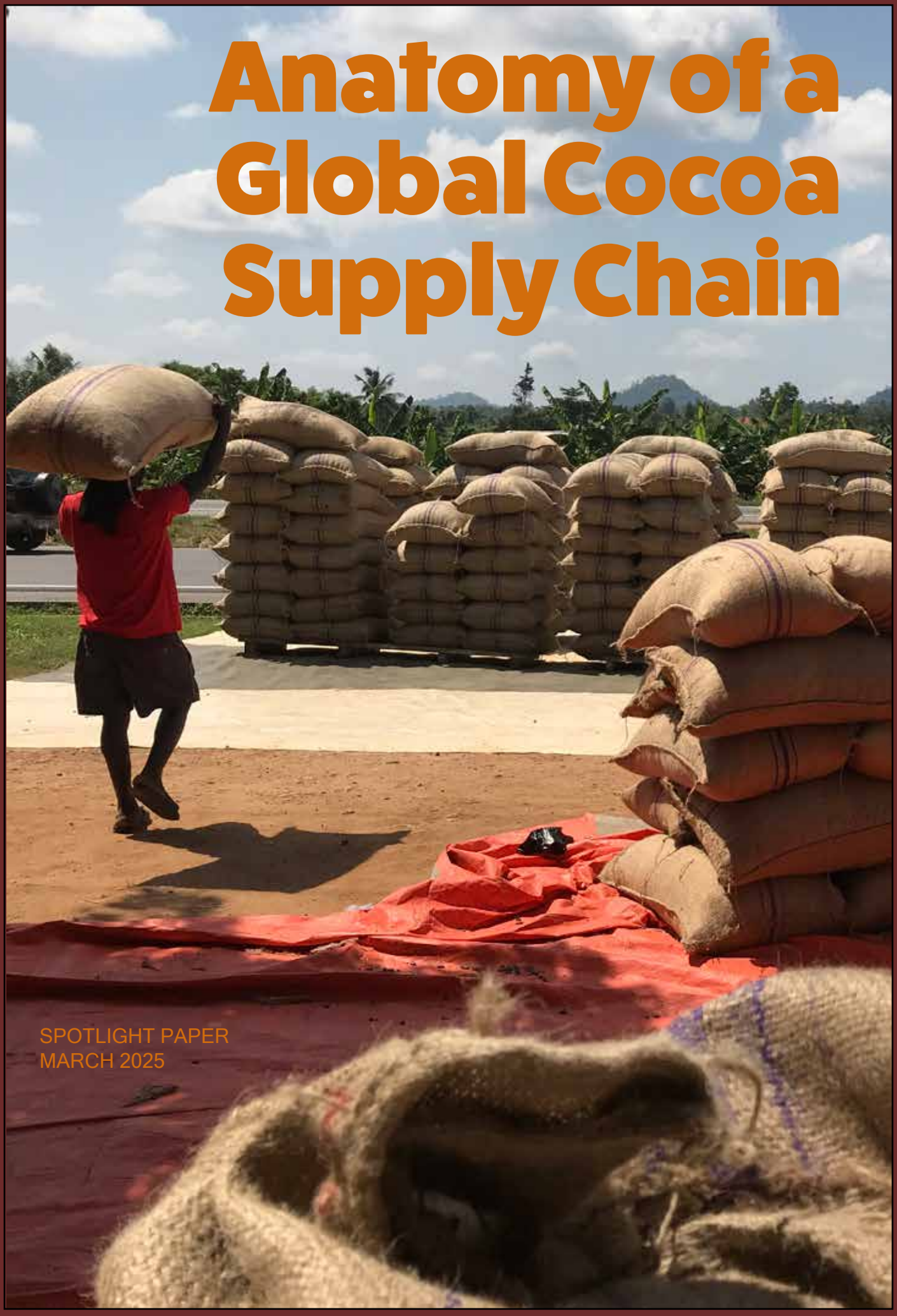
Anatomy of a Global Cocoa Supply Chain



SPOTLIGHT PAPER
MARCH 2025

AFRICAN COCOA MARKETPLACE

Picterra

CHOCOA

Anatomy of a Global Cocoa Supply Chain

This Spotlight Paper examines the complex global cocoa supply chain, tracing the journey of cocoa from smallholder farms to major trading houses and ultimately to consumers. Through a detailed analysis of key actors, processes, and challenges within the supply chain, this paper highlights the interdependencies between stakeholders. It identifies critical points where efficiencies or interventions could improve sustainability, economic outcomes, and ethical practices within the industry. Emphasis is placed on small-holder farmers, intermediaries, exporters, processors, and the major trading houses dominating the market.

An interconnected network

The global cocoa supply chain is a vast and interconnected network critical to producing chocolate and cocoa-based products. Cocoa production is concentrated mainly in West Africa, where Cote d'Ivoire and Ghana account for over 60% of the world's supply. This paper explores the anatomy of the cocoa supply chain, analysing each stage from the smallholder farmer through to the global trading houses that manage large volumes of cocoa on international markets. It further addresses how various factors, including economic, social, and environmental considerations, influence the efficiency and ethics of cocoa production.

Smallholder farmers

Smallholder farmers are the foundation of cocoa and primarily produce cocoa beans, which account for 90% of global production. High-quality cocoa starts with skilled post-harvest practices, and quality control is often checked at the coop level. Located predominantly in rural areas of West Africa, Latin America, and Southeast Asia, these farmers face various challenges, including limited access to financing, agricultural inputs, and fair market pricing. They typically operate on 2-5 hectares of land and produce limited yields due to soil degradation, climate-related threats and numerous challenges implementing mechanized farming techniques.

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Challenges facing smallholder farmers

Economic Vulnerability: Despite skyrocketing cocoa prices, many smallholder farmers live below the poverty line, with limited bargaining power against more prominent market actors. With an unprecedented rise in market prices by over 300% in just 16 months and the value of a kilogram now being more than $11, the governments of Ghana and Cote d'Ivoire significantly increased farmgate prices last year: from $2.06 to $3.06 per kg in Ghana, and from $1.71 to $3.09 in Côte d'Ivoire.

As the Voice Network stated in its paper on Fairtrade Foundation's new Living Income Reference Prices (LIRP), these higher farmgate prices remain well below what most farmers need to earn

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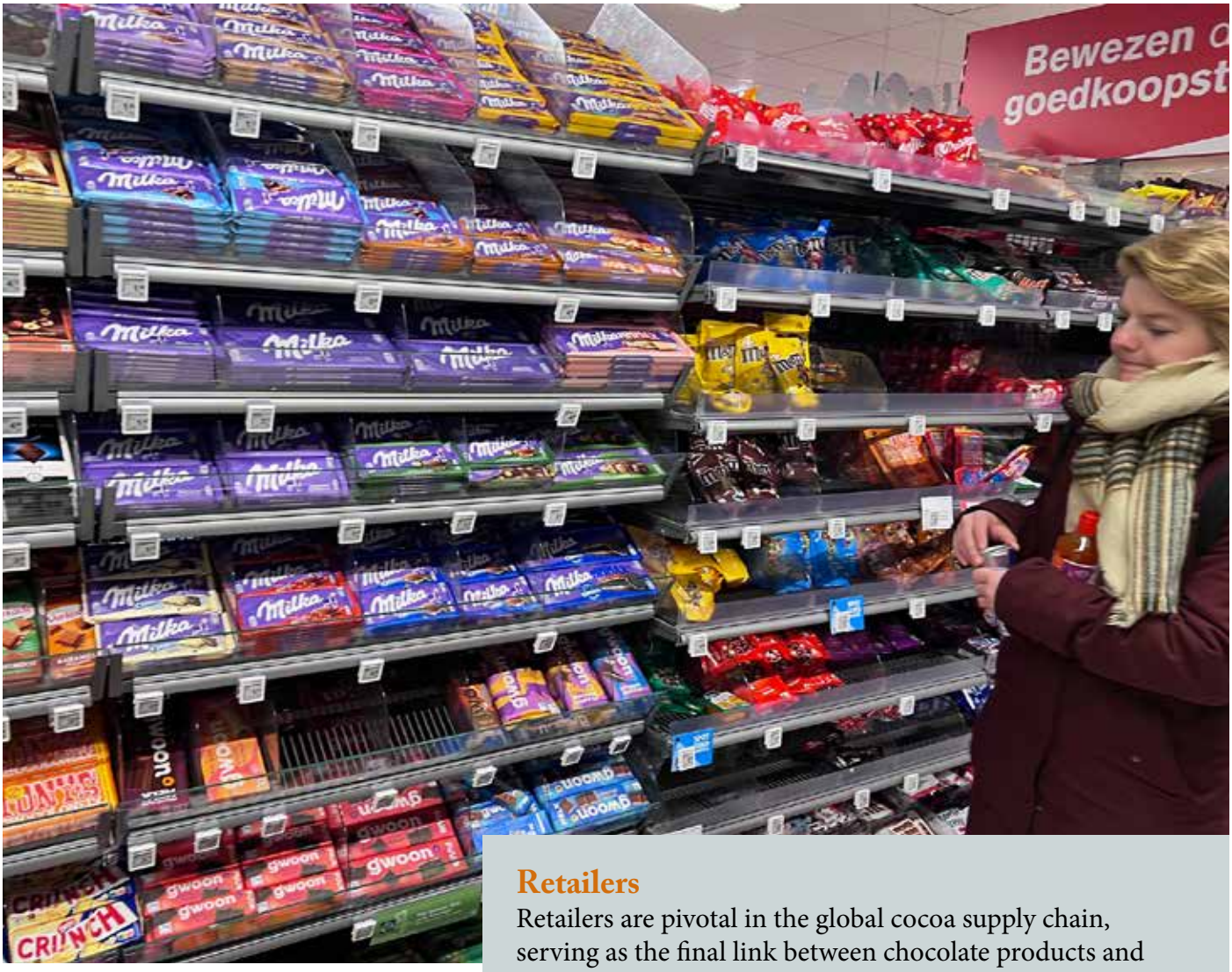


a living income. 'The fact that Fairtrade has increased the LIRP by 20% should not distract from the fact that it is lower than current farmgate prices. It also creates a fundamental problem for the LIRP model. A recent study by Cocobod and Swissco calculated the LIRP for Ghana at $4.32.'

According to an Oxfam survey in 2023, cocoa farming households' net incomes in West Africa have declined significantly. 'Overall, participating farmers' net income decreased by an estimated 16.38% between the 2019-20 and 2021-22 harvesting season. The Survey discovered average net income declines were more pronounced for women farmers (21.44% versus 14.15% for men). 'The Living Income Differential (LID) implemented by the Ghanaian [and Cote d'Ivoire] government in 2019-20 helped to buffer income shocks as it increased the farmgate

Retailers

Retailers are pivotal in the global cocoa supply chain, serving as the final link between chocolate products and consumers. Improving traceability within the cocoa supply chain is crucial for retailers to verify their products' ethical and sustainable sourcing. Progress has been made, with the average proportion of a trader's direct cocoa supply traceable to the farm increasing from 52% in 2022 to 71% in 2023. However, challenges remain, especially in indirect supply chains, where traceability is still limited.

Retailers face the challenge of managing a vast array of products, each with its own set of environmental and social issues. In the context of cocoa, this includes addressing deforestation, biodiversity loss, and human rights concerns. By prioritizing sustainable sourcing and supporting certification programs, retailers can mitigate these challenges and promote a more sustainable cocoa industry. Retailers' influence extends to ethical Sourcing and Human Rights Due Diligence, and they are expected to ensure that their products are sourced responsibly. Recognizing the complexity of cocoa supply chains, retailers often collaborate to promote sustainable practices. Initiatives like the Retailer Cocoa Collaboration in Europe exemplify such efforts, where retailers work together to uphold high social and environmental standards in cocoa sourcing. Retailers are urged to ensure that their cocoa supply chains are free from deforestation and the conversion of natural ecosystems.

photo: cocoaradar.com

price by 28% in its first season. Nevertheless, due to a dramatic decline in production, nearly 90% of farmers said they were worse off when they compared their household income today to three years ago.

Dependency on middlemen: Most smallholder farmers rely on intermediaries to transport and sell their beans, limiting their ability to secure fair prices.

Sustainability Concerns: Deforestation and lack of sustainable farming techniques impact environmental outcomes in cocoa-producing regions.

Intermediaries and aggregators

Intermediaries, or aggregators, play a vital role in transporting cocoa beans from rural farms to larger buyers. They connect smallholder farmers with national and international markets. These intermediaries may include small local traders, cooperatives, or more prominent aggregators that collect beans, aggregate volumes, and handle logistics.

Role of aggregators

Aggregators often negotiate prices with farmers, facilitate quality checks, and prepare beans for export. They bridge the gap between smallholder farmers and exporters but can introduce inefficiencies, as beans change hands multiple times before reaching a trading house.

Issues in the Aggregation Process

Price Transparency: Smallholder

Cocoa traders are pivotal intermediaries in the global cocoa supply chain, balancing the needs of producers, processors, and markets through various roles. They often buy cocoa beans from farmers or cooperatives, manage storage and transportation logistics, and handle exportation to chocolate-producing regions. Additionally, cocoa traders provide essential financial services, such as price hedging, to protect against market volatility. Major traders often vertically integrate by participating in cocoa processing and, in some cases, chocolate production, giving them significant influence over supply dynamics and pricing.

Leading companies in cocoa trading include:

- **Cargill**—Known for its vast agribusiness operations, Cargill sources and processes cocoa beans and maintains strong ties with growers and manufacturers worldwide.
- ofi (**Olam**) - Based in Singapore, ofi is one of the largest cocoa traders with deep ties in West Africa. It invests heavily in sustainability and works directly with smallholder farmers to promote ethical sourcing and reduce child labour.
- **Barry Callebaut** - Although primarily a chocolate processor, Barry Callebaut also engages in cocoa trading, ensuring stable supplies of cocoa products for its chocolate manufacturing operations and those of other brands.
- **Ecom Agroindustrial** - ECOM is a prominent player in soft commodity trading, including cocoa. It emphasizes sustainability and direct sourcing, often working with cooperatives to improve farming practices and market access.
- **Sucden and Touton Group** - Both firms trade cocoa, emphasizing fair pricing and environmental standards.

These companies' influence is strengthened by their commitment to traceability and compliance with new regulations. These players stabilize supply chains and advance sustainability from farm to consumer despite climate impacts, volatile prices, and regulatory shifts.

photo: cocoaradar.com

farmers often receive opaque pricing information from aggregators, leading to inequitable income distribution.

Quality Standards: Aggregators are responsible for initial quality assessment; however, variability in standards may affect the final product quality.

Exporters and processing firms

Once beans reach the export stage, they are prepared for international shipping and processed to ensure quality control standards. Exporters consolidate beans from multiple aggregators and prepare them for global markets, often working closely with international cocoa processing companies.

Global processing companies

Global cocoa processing firms operate near cocoa-growing regions to reduce transportation costs and ensure product quality. They process beans into cocoa liquor, butter, and powder for further manufacturing. Notable companies in this stage include Barry Callebaut, ofi, and Cargill, among the most prominent global cocoa processors.

Economic influence of processors

Processing firms exert significant control over cocoa's pricing and quality standards, often placing downward pressure on smallholder farmers' earnings by maximizing economies of scale.

Trading houses

International cocoa trading houses are 'the gatekeepers of global cocoa.' ECOM, Sucden, and Touton dominate cocoa supply trading and financial management. These firms connect exporters with large-scale processors and chocolate manufacturers, ensuring smooth flow and price stability through futures markets and long-term contracts.

Key functions of trading houses

Price Stabilization: Trading houses use derivatives to hedge against price volatility, manage financial risks, and provide stability to buyers.

Logistics Management: Trading houses oversee the global distribution network, handling transportation and storage across regions to maintain supply chain continuity.

Challenges and controversies

Trading houses are criticized for maintaining low cocoa prices, contributing to persistent poverty among cocoa farmers. They also face scrutiny over a lack of transparency in sourcing practices, where issues such as child labour and deforestation remain prevalent in cocoa-producing regions.

Certification

Despite its efficiency, the cocoa supply chain has significant ethical and sustainability challenges that require multi-stakeholder solutions.

While some consumers are going beyond certification and looking to origin for good provenance in their cocoa, sustainable certification is still a standard that defines quality chocolate

In the last full cocoa season 2022-2023, it is estimated approximately 5 million tonnes of cocoa were produced worldwide. Cote d'Ivoire and Ghana are by far the two largest cocoa growing countries, accounting for 50 % of global cocoa production, followed by Ecuador with 9%. In Asia, Indonesia is the largest producer country

source: kakaoplattform.ch

produced fairly and reasonably. Fairtrade and Rainforest Alliance certifications aim to improve working conditions and sustainability. However, these certifications are not universally adopted, and additional mechanisms are needed to enforce sustainable and ethical practices throughout the chain.

Traceability

Traceability is vital in the cocoa supply chain and ensures transparency and accountability at every production stage. The process involves systematically tracking the journey of cocoa beans from farms to shop shelves, keeping track of all the processes undergone. This not only aids in maintaining quality control but also addresses ethical concerns. Blockchain solutions are one method that is increasingly used to lay the groundwork for enhancing transparency throughout supply chains, enabling the establishment of monitoring systems, and enhancing the reliability of sustainability claims.

The current landscape of cocoa production involves several processes, from cultivation on farms to the final processing of cocoa beans into various cocoa-based products. Traceability ensures ethical practices, quality control, and environmental sustainability.

Emerging Trends

Lab-based chocolate production is experiencing significant advancements to address sustainability challenges and meet evolving consumer preferences.

1. Cell-Cultured Chocolate:
Innovative companies are developing chocolate by cultivating cacao plant cells in controlled environments, eliminating the need for traditional farming. This method involves extracting cells from cacao trees and nurturing them in bioreactors to produce cocoa solids and butter. For instance, California Cultured is pioneering this technology to create non-GMO chocolate, aiming to reduce environmental impacts and ensure a consistent supply.

2. Sustainable Production Practices:
Researchers are exploring using the entire cacao pod, including typically discarded components like the pulp and endocarp, to create chocolate with reduced reliance on refined sugars. This approach not only enhances sustainability but also improves the nutritional profile of chocolate. A team at ETH Zurich has developed such a method, resulting in chocolate with higher fibre content and lower saturated fats.

3. Cocoa-Free alternatives:
Some startups create chocolate analogs without using cacao to address ethical and environmental concerns. Voyage Foods, for example, produces cocoa-free chocolate using sunflower seed protein and grape seeds. Its product mimics traditional chocolate in taste and texture.

Cocoa beans are processed around the globe into cocoa mass, cocoa butter, cocoa powder, chocolate or other cocoa products. One third of the annual harvest is ground in Europe. 590,000 tons – or 12 % of the beans – are ground in the Netherlands alone

source: kakaoplattform.ch

Consumers

Consumers play a critical role in shaping the global cocoa supply chain through their purchasing choices, advocacy, and demand for ethical and sustainable practices. Their influence can drive companies and governments to adopt responsible sourcing and fair labour practices.

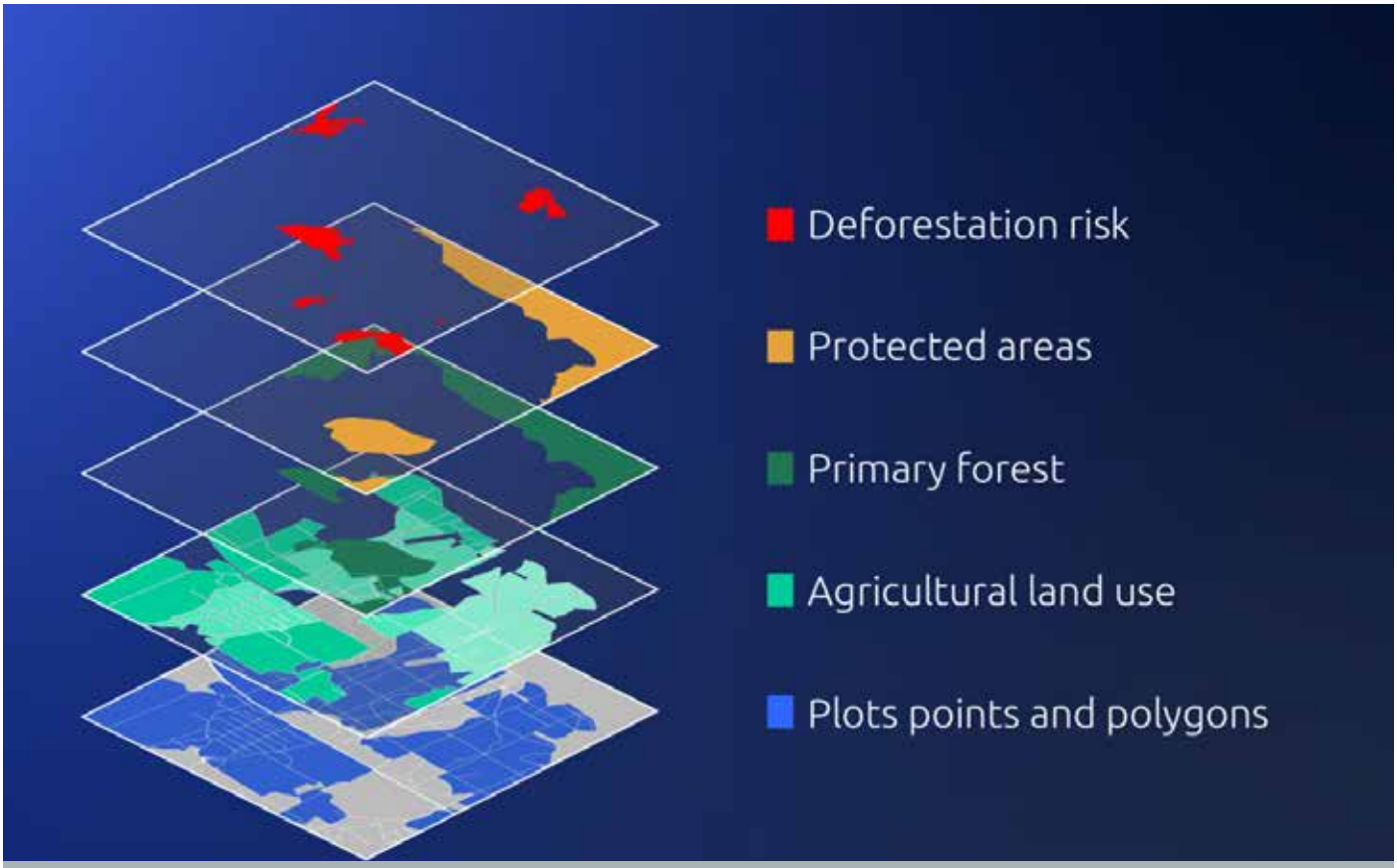
For example, by choosing ethical and sustainable chocolate with labels including Fairtrade, Rainforest Alliance, and various organic labels that support environmentally friendly farming without synthetic pesticides. Through their collective pressure, they can sign petitions or engage in social media activism to push companies to improve transparency and ethical sourcing.

By raising awareness and advocacy, they can educate themselves and others on issues such as child labour, deforestation, and fair wages in the cocoa industry and share information through social media or local community events. More importantly, they can harness their spending by avoiding brands with poor ethical practices. By making informed choices, advocating for fair trade, and demanding transparency, consumers can drive change within the global cocoa supply chain, ultimately leading to better conditions for farmers, less environmental damage, and a more sustainable chocolate industry.

Still, consumers are increasingly opting for more affordable chocolates and candies over premium options. This shift is primarily driven by rising prices and economic considerations.
The increasing cost of cocoa, which has more than doubled due to supply chain disruptions and poor harvests in West Africa, has significantly impacted chocolate prices. Consequently, consumers are gravitating towards more affordable non-chocolate confections over traditional chocolates. Additionally, major confectionery companies are adjusting their strategies in response to these trends.

While premiumization has been a key driver for US chocolate sales in the past, current economic pressures and rising costs are leading consumers to favour more budget-friendly options.

photo: Pete Wright on Unsplash



Mapping the supply chain

Sustainability, transparency, and ethical sourcing are imperative in the global cocoa supply chain. One of the most effective technological advancements in achieving this goal is polygon mapping, a method that leverages geographic information systems (GIS) and satellite technology to digitally outline farm boundaries. This innovative approach is crucial in enhancing traceability across the cocoa supply chain. Ensuring the traceability of cocoa to its exact land plots must also meet the stringent traceability standards set by the forthcoming European Union Deforestation Regulation (EUDR).

Open data provides the foundational information for polygon mapping, and many operators rely on open platforms like Global Forest Watch (GFW). However, many experts argue that GFW alone should not be used for EUDR compliance or business-sensitive assessments. This is a highly complex and specialised area. After all, if you are an operator or producer exporting a commodity to the European Union, you don't want a consignment of cocoa rejected because of a poor due diligence statement with incomplete farm geolocation that leaves open the question of the exact provenance of the goods.

Even before the EUDR was passed, many operators were already working with satellite and image mapping companies to create polygons of farms in their supply chain to ensure that cocoa and other commodities like palm oil are not sourced from protected forest areas. A recent post by Picterra, the AI-powered geospatial solutions provider, states that by adopting comprehensive and transparent compliance strategies, businesses can meet regulatory requirements and enhance their operational efficiency, market access, and reputation.

Forthcoming Legislation

The European Union Deforestation Regulation (EUDR), formally adopted in May 2023, aims to ensure that products consumed within the European Union do not contribute to global deforestation or forest degradation. Initially set to apply to large companies from 30 December 2024 and small and medium enterprises from 30 June 2025, the implementation has been postponed by 12 months. The new dates are December 30, 2025, for large companies and June 30, 2026, for smaller enterprises.

photo: Picterra

What can be done?

As we have witnessed in this Spotlight Paper, the cocoa supply chain is a complex, multi-stakeholder process that spans several stages, including farming, trading, processing, manufacturing, and retail.

This complexity often results in challenges such as lack of transparency, inefficiency, unethical practices, and difficulty ensuring sustainability.

The 2022 Cocoa Barometer report noted that systemic change is required to implement full supply chain traceability at the farm level. At present, there are many ways that companies are approaching traceability.

The EUDR's stringent traceability and compliance requirements will pose several challenges to the Global Cocoa Supply Chain, including ensuring full traceability of cocoa to its origin plots.

Critics fear that the regulation might exclude small-scale farmers from the EU market and disrupt supply chains due to additional compliance costs. Any potential market access restrictions could affect the livelihoods of cocoa farmers and the economies of producing countries.

Tony's Chocolonely Tony's Open Chain platform is arguably the most impressive platform. It leads by example through Tony's 5 Sourcing Principles. Its farmer-first approach prioritizes human rights and environmental protection, aiming to reverse what the Dutch brand describes as 'institutionalized inequality.'

Blockchain technology has emerged as a potential solution to address supply chain issues by providing a secure, transparent, and decentralized ledger system.

Companies, including Barry Callebaut and Mars, have implemented blockchain solutions to enhance traceability. By scanning QR codes on product packaging, consumers can access detailed information about the product's journey.

The Cargill Cocoa Promise uses blockchain to record transactions and ensure farmers are paid directly. This fosters trust and transparency in the supply chain.

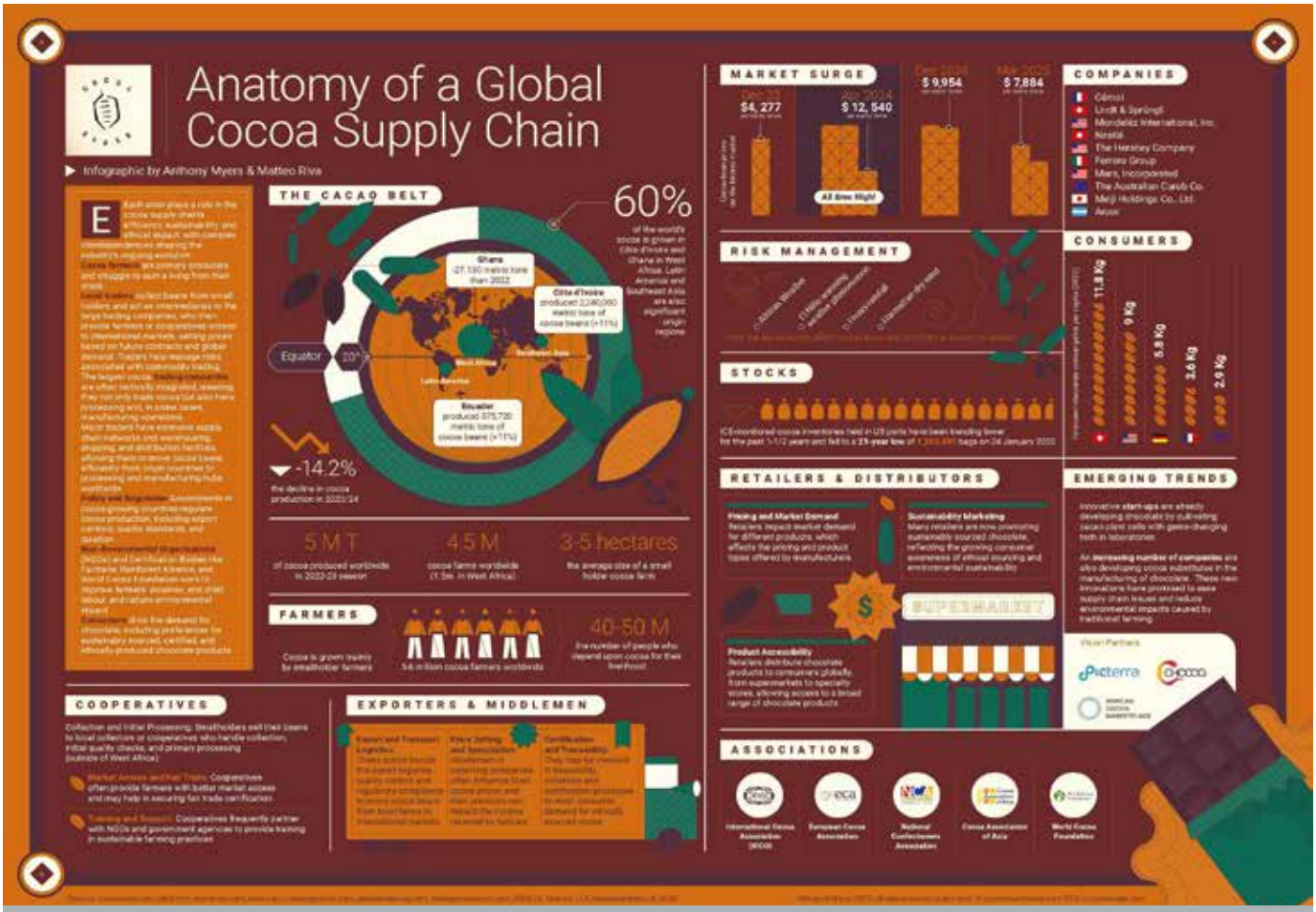
According to Cocoa Barometer, transparency is the disclosure of information necessary to know what is happening in the supply chain. Transparency has an outward-looking dimension when demonstrating performance and building.

Traceability commonly refers to the ability to track a product's origin, production, processing history, and distribution. It plays a key role in supply chain management. Traceability information usually remains in the ownership of the supply chain actors that generate it unless required by law, commercial agreements, or voluntarily disclosed.

The adoption of blockchain in cocoa supply chains is expected to grow as technology becomes more accessible and cost-effective. Partnerships between technology providers, governments, and industry stakeholders will be essential to address challenges and scale solutions. Emerging trends such as integration with IoT devices and AI can further enhance the efficiency and accuracy of blockchain applications.

Fair Pricing and Economic Support

To ensure the sustainability of smallholder cocoa farming, stakeholders—including governments, NGOs, and cocoa companies—must collaborate on solutions that guarantee farmers' fair pricing and economic stability.



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About Picterra

Picterra bridges the gap between the physical and digital worlds, transforming satellite and drone imagery into verifiable data for ESG, compliance, and sustainability. Instead of relying on manual audits or self-reported claims, their GeoAI-powered platform delivers precise, visual, and verified evidence to track land use, detect environmental changes, and meet regulatory requirements.
picterra.ch/

About African Cocoa Marketplace

ACM is an online marketplace that directly connects Africa's cocoa sellers with international buyers, ensuring mutual trust and transparency in every trade. Our mission is to become the world's leading marketplace for African cocoa products and services, ensuring buyers receive the sourcing transparency they need and sellers receive the most favorable possible trade terms.
cocoamarket.com

About CHOCOA

CHOCOA is dedicated to creating a world improving market access for sustainable cocoa—the foundation for better chocolate. Our annual conference event in Amsterdam is an opportunity to exchange experience on improved sustainability, expand your business opportunities, meet peers and cocoa & chocolate enthusiasts, and collaborate in shaping a better industry.
chocoa.nl/

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