



Genie Capital

NIKOKA PROTOCOL · INDUSTRIAL STACK

# Cocoa Industry:

## Structural Diagnosis and Scenarios

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October 2026



## About this report

|              |                                                                                             |
|--------------|---------------------------------------------------------------------------------------------|
| PREPARED FOR | Governments of Cocoa Producing Nations, Development Partners, Executives, Media, the People |
| PREPARED BY  | Genie Capital Ltd                                                                           |
| FRAMEWORK    | Nikoka Protocol, Industrial Stack                                                           |
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# Executive Summary

The global cocoa industry is not a market. It is a protocol regime — a layered system in which the rules of coordination are written by the actors that extract value from the substrate, while the substrate itself has no seat at the table where its price, quality standards, and market access are determined.

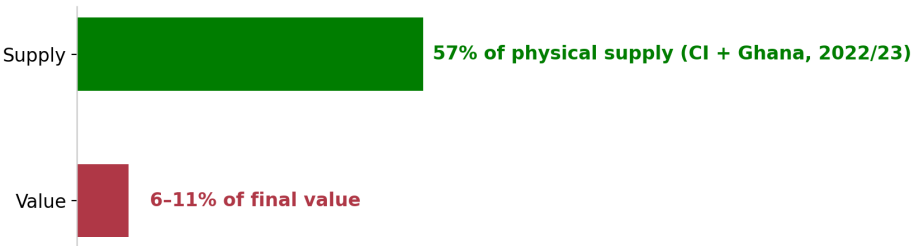


The cocoa anomaly in six numbers. Sources: FAO Investment Centre (2026); ICCO; GhanaWeb; Anadolu Agency; Vrije Universiteit Amsterdam.

This report applies the Industrial Stack framework to cocoa. The stack decomposes industry into five enabling layers, read from the top down: Producer → Aggregator → Platform → Infrastructure → Protocol. Each layer enables the one above it. Each layer below holds leverage over the layer above. The stack is fractal — the same structure recurs at every resolution.

The core finding is structural, not moral:

- **Infrastructure** — the substrate holders, principally Côte d'Ivoire and Ghana — controls the physical supply — Côte d'Ivoire and Ghana alone produce 49–57% of the world's beans (ICCO) — but captures only 6–11% of final consumer value.
- **Producer and Aggregator** — the chocolate manufacturers and the transnational traders — control the Protocol layer. They write the standards, convene the multi-stakeholder initiatives, staff the boards meant to oversee them, lobby the regulators, and hold structural majority power in the intergovernmental body.
- **The result** is a designed asymmetry, inherited from the colonial marketing-board system and never dismantled. Independence transferred the flags, not the architecture.



Share of physical supply versus share of final value captured by the Infrastructure layer.

The 2023/2024 price crisis was the first time the Infrastructure layer exercised structural power — by defaulting on forward contracts and withholding supply. Prices exceeded \$12,000/tonne. The system seized. But the power was negative: it disrupted flow without capturing value. The windfall went to whoever happened to sell at the peak. The structural position of the substrate did not change.

This report presents three scenarios:

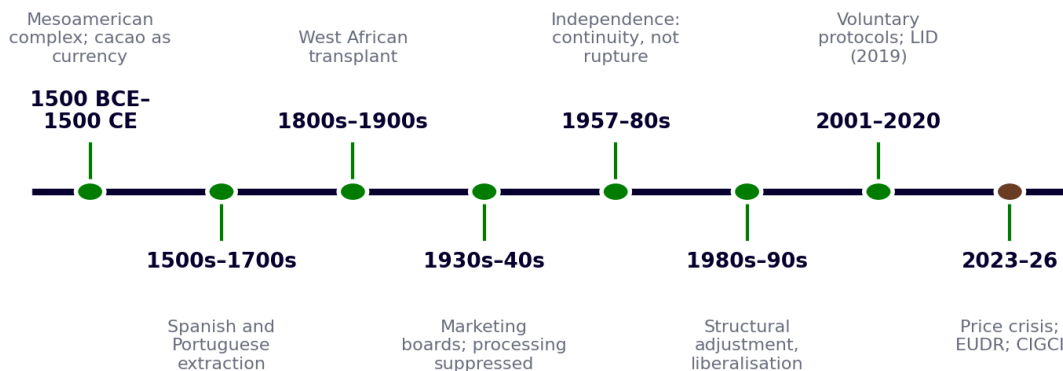
1. **Continue as is** — Producer/Aggregator protocol control persists. Substrate capture remains 6–11%. The terminal state is not stable poverty but substitution: cocoa engineered out of the mass market.
2. **Partial Infrastructure control (~25%)** — An enforceable price floor, an origin grinding mandate, and African-led certification. Substrate capture roughly triples. Nobody dies.
3. **Full Infrastructure control (~60%)** — Production quotas, binding floors, own price discovery, equity in the layers above. Cocoa becomes a resource rent. The industry restructures around African terms. Nobody dies.

The decisive constraint: only two nations can change the outcome — Côte d'Ivoire and Ghana. Together they hold the half-to-three-fifths share that makes a cartel viable. No other producer can anchor it.

*The power is real. The understanding is the first step. The protocols are the mechanism.*

## PART ONE

# Evolution: From Discovery to Structural Trap



*Cocoa's structural history, from the Mesoamerican complex to the present.*

## 1.1 Pre-Colonial Origins and the Mesoamerican Complex (1500 BCE – 1500 CE)

Cocoa was not discovered as a commodity. It was cultivated, ritualised, and monetised long before European contact.

Theobroma cacao — “food of the gods” — was domesticated in the upper Amazon basin and spread through Mesoamerica. The Olmec, Maya, and Aztec civilisations cultivated it. Among the Aztec, cacao beans functioned as currency: a Nahuatl document records that a tomato cost one bean, a rabbit ten, a turkey hen one hundred. Cacao was consumed as a bitter, spiced drink — xocolātl — reserved for elites, priests, and warriors. It was embedded in ritual, tribute, and cosmology.

This matters for the structural diagnosis. Cocoa entered the European imagination as a prestige good with an indigenous protocol system — units of value, ritual meaning, preparation standards. The Spanish did not invent cocoa’s cultural value. They transplanted its production and relocated its protocol.

## 1.2 The Spanish and Portuguese Extraction System (1500s–1700s)

The Spanish encountered cacao in Mesoamerica in the early 16th century. By the 17th century, they had established plantations in Venezuela, Ecuador, and the Caribbean. The Portuguese planted cacao in Bahia, Brazil.

The pattern that emerged was already structurally familiar:

- Production in the tropics, under coerced or enslaved labour.

- Consumption in Europe, among the aristocracy and emerging bourgeoisie.
- Processing in the metropole — chocolate houses in Madrid, Paris, and London, not in Caracas or Bahia.
- Price discovery in European markets, not at origin.

Cacao was the first commodity to be refined into a European ritual — the chocolate house — while its production remained entirely colonial. The value migrated upward through the stack from the moment the system was built.

### 1.3 The West African Transplant (1800s–1900s)

The decisive structural event was the transplant of cocoa to West Africa.

By the late 19th century, disease and declining yields in the Americas, combined with rising European demand, pushed cultivation to the Gulf of Guinea. The Portuguese established cocoa on São Tomé and Príncipe using coerced labour from Angola and Cape Verde — a system exposed by British journalist Henry Nevinson in *A Modern Slavery* (1906), which triggered a boycott of Portuguese cocoa.

The British and French then developed cocoa in their own West African colonies:

- **Gold Coast (Ghana)** — Tetteh Quarshie brought Amelonado beans from Fernando Po in 1879. By the 1920s, the Gold Coast was the world's largest producer.
- **Côte d'Ivoire** — French colonial policy encouraged cocoa after 1910, though it lagged Ghana until the 1960s.
- **Nigeria** — cocoa expanded in the southwest from the 1890s.
- **Cameroon, Togo, São Tomé** — smaller but significant.

West Africa had the decisive advantage: rainforest conditions, low land costs, and abundant labour. But the architecture that developed was not a market. It was an extraction corridor.

### 1.4 The Marketing Board System (1930s–1940s)

The most consequential institutional innovation was the marketing board.

In response to the Great Depression's price collapse, British colonial administrations established statutory marketing boards:

- Gold Coast Cocoa Marketing Board (1947, though precursor controls existed earlier)
- Nigeria Cocoa Marketing Board (1947)
- Cameroon and French West African equivalents under French administration

The boards were presented as price stabilisation instruments. Their actual functions were more extensive:

1. **Monopsony buying** — the board was the sole legal buyer of cocoa. Farmers had no alternative outlet.
2. **Price-setting** — the board fixed the farmgate price, often well below the world price.
3. **Surplus extraction** — the difference between world and farmgate prices accrued to the board, and therefore to the colonial administration.

4. **Export financing** — board surpluses financed colonial infrastructure, administration, and in some cases the metropole's war effort.
5. **Farmer demobilisation** — by centralising buying, the boards prevented farmers from organising collectively or withholding supply.

This was the Protocol layer being built at origin — but by and for the metropole. The rules were made in London and Paris. The institution sat in Accra, but its logic was imported.

## 1.5 The Prohibition of Processing

Colonial policy deliberately suppressed processing at origin.

In the Gold Coast, colonial administrators discouraged local grinding, pressing, and manufacturing. Cocoa was to be exported as raw beans and processed in Britain, the Netherlands, France, and later Switzerland and Germany.

The reasoning was explicit: processing at origin would compete with metropolitan industry and would require capital, skills, and energy that the colony was not to develop. The colony's role in the stack was defined as Infrastructure — substrate provision — with no aspiration to Platform.

*This is the origin of the value-capture asymmetry. It was not a market outcome. It was policy.*

## 1.6 Railways, Roads, and the Geometry of Extraction

Colonial infrastructure was built to extract, not to develop.

- Railways ran from cocoa-producing hinterlands to ports — Takoradi, Tema, Abidjan, San Pédro, Lagos, Douala — not between producing regions.
- Roads served export corridors.
- Ports were designed for bulk raw bean export, not for imports of finished goods or for domestic distribution.

The geometry was radial: everything pointed outward. Internal market integration — which would have enabled regional trade, domestic processing, and industrial development — was structurally absent. This geometry persists. It is one reason why intra-African cocoa trade is minimal and why processing capacity remains underdeveloped.

## 1.7 Colonial Crises and Farmer Resistance (1930s–1950s)

The board system was not accepted passively.

- **1937–1938 Gold Coast cocoa hold-up** — farmers withheld beans to protest low prices and the buying cartel. The hold-up lasted months and demonstrated that the substrate could disrupt, even before independence.

- **1947–1948 Gold Coast boycotts** — farmers again withheld supply, targeting the marketing board and European firms.
- **The cocoa swollen-shoot disease crisis (1936 onward)** — destroyed millions of trees in the Gold Coast and forced mass replanting, which created the age structure of today’s tree stock.

These episodes matter because they establish a precedent: the substrate has exercised disruptive power before. The 2023/2024 crisis is not unprecedented in kind — only in scale.

## 1.8 Independence: Continuity, Not Rupture (1957–1980s)

Independence transferred political sovereignty but did not dismantle the architecture.

### What changed:

- African governments took control of the marketing boards.
- Flags replaced colonial administrators.
- Rhetoric shifted to development and self-reliance.
- Ghana’s Nkrumah government nationalised cocoa buying and expanded COCOBOD’s role.

### What did not change:

- Export orientation — economies remained dependent on raw bean exports.
- Processing abroad — cocoa still ground in Europe.
- Price discovery — still in London, New York, and later Chicago.
- Protocol-setting — still in Brussels, Washington, and Geneva.
- The layers above Infrastructure — still controlled by the same transnational firms or their successors.

The boards were repurposed from colonial extraction to state patronage. Instead of financing the metropole, board surpluses financed political machines, public employment, and elite accumulation. The structural function — capturing value at origin and redistributing it away from farmers — persisted.

## 1.9 The Commodity Boom and Bust (1960s–1980s)

Independence coincided with a cocoa price boom, then a bust.

- **1960s–1970s** — world cocoa prices were relatively strong. Ghana and Côte d’Ivoire expanded production. Côte d’Ivoire, under Houphouët-Boigny, pursued aggressive expansion and overtook Ghana as the world’s largest producer by the late 1970s.
- **1980s** — prices collapsed. Debt crises hit. Terms of trade deteriorated.

The cocoa sectors of both countries entered the 1980s with structural weaknesses:

- Over-taxation of farmers through marketing boards, which suppressed production incentives and encouraged smuggling.
- Under-investment in replanting, disease control, and processing.
- Dependence on a single commodity for foreign exchange.

## 1.10 Structural Adjustment and Liberalisation (1980s–1990s)

The IMF and World Bank prescribed liberalisation.

### The package:

- Abolish marketing boards or strip their monopsony power.
- Remove price controls.
- Privatisise state enterprises.
- Open markets to competition.

### The effect in cocoa:

- **Ghana** — COCOBOD survived but lost its monopsony. Licensed Buying Companies (LBCs) were introduced in 1993. Farmers could sell to multiple buyers. But COCOBOD retained price-setting and export control.
- **Côte d'Ivoire** — the Caistab (stabilisation fund) was abolished in 1999. Private traders took over buying and export. The state retained a regulatory role through the Conseil du Café-Cacao, but its instruments were weaker.
- **Nigeria, Cameroon** — similar liberalisation, with similar outcomes.

The message was clear: don't intervene in commodity markets. Supply management was treated as a distortion. The IMF's 1963–1974 buffer stock and quota debates, and the collapse of the International Coffee Agreement in 1989, reinforced the doctrine.

But the real lesson should have been different. Without supply management, the substrate is a price taker. Liberalisation did not create a market — it removed the only instruments the producing states had to shape one.

## 1.11 The Sustainable Cocoa Era (2000–2020)

By the late 1990s, cocoa faced a legitimacy crisis.

- **Child labour** — exposed by Channel 4 and the US State Department. Senator Tom Harkin and Representative Eliot Engel introduced the Harkin-Engel Protocol (2001), which threatened mandatory “slave free” labelling.
- **Deforestation** — cocoa expansion in West Africa was linked to national park destruction, particularly in Côte d'Ivoire.
- **Farmer poverty** — persistent and worsening.

Industry's response was self-regulation.

- **Harkin-Engel Protocol (2001)** — industry agreed to voluntary standards. The mandatory labelling requirement was abandoned. Deadlines were repeatedly extended.
- **International Cocoa Initiative (2002)** — industry-funded, industry-governed, addressing child labour.
- **Certification schemes** — Rainforest Alliance, Fairtrade, UTZ proliferated.
- **Corporate sustainability programmes** — Cocoa Life (Mondelez), Cocoa Plan (Nestlé), Cocoa Horizons (Barry Callebaut), Cocoa Promise (Cargill).

- **Cocoa & Forests Initiative (2017)** — a public-private partnership between Côte d'Ivoire, Ghana, and 35 companies, facilitated by the World Cocoa Foundation.

This was Protocol-building by the Producer and Aggregator layers — rules written by the actors they were meant to regulate. The pattern is consistent: when binding regulation is threatened, industry offers voluntary standards. When voluntary standards fail, industry offers new voluntary standards.

## 1.12 The LID and the Attempt at Price Coordination (2019–2020)

In 2019, Côte d'Ivoire and Ghana introduced the Living Income Differential (LID) — a \$400 per tonne premium on all cocoa bean sales, split between the two countries.

The LID was the first serious attempt at positive price-setting by the substrate. It was not a supply control; it was a price floor bolted onto the market mechanism.

### Why it underperformed:

- It was tied to forward sales at previous seasons' benchmark prices. When world prices spiked, the benefit flowed to buyers and resellers, not farmers.
- It applied only to beans sold through official channels. Smuggling — beans leaking into Togo, Burkina Faso, Guinea, and Liberia — escaped the premium.
- It was not enforced with export licensing or penalties.
- It did not control supply. It added a premium without restricting volume.

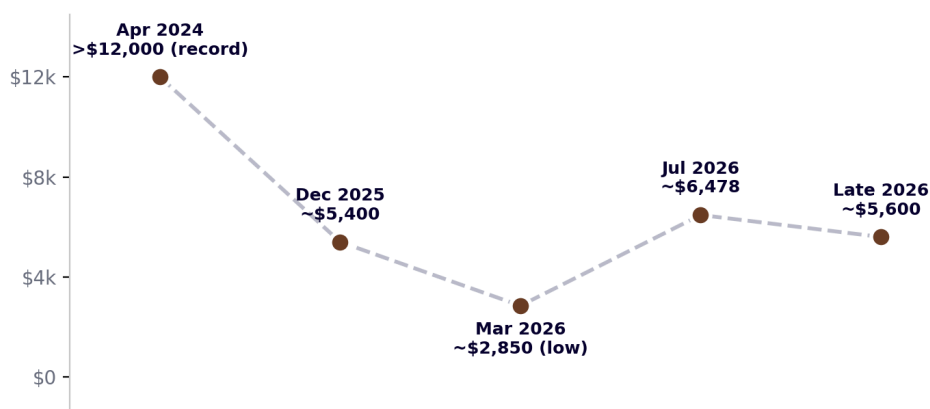
The LID established the precedent of coordination. It did not establish the mechanism of power.

## 1.13 The 2023/2024 Crisis: Infrastructure Bites Back

The first structural rupture came not from policy but from physical collapse.

### The sequence:

- **2023** — West African supply, already stressed by aging trees, CSSVD, and underinvestment, was hit by climate-driven drought. Prices rose 61% over the year.
- **Late 2023 – early 2024** — El Niño conditions intensified. Harmattan winds and drought reduced pod development.
- **2024** — Côte d'Ivoire and Ghana, accounting for roughly 57% of global output in 2022/23 and about 49% in 2023/24 (ICCO), defaulted on hundreds of thousands of tonnes of forward commitments. Ghana sought to delay delivery of up to 350,000 metric tons. Côte d'Ivoire suspended raw cocoa exports in June 2024 to prioritise domestic grinding.
- **April 2024** — ICE cocoa futures exceeded \$12,000/tonne, an all-time high. Prompt prices traded over \$3,000/tonne above one-year forward contracts — a backwardation signalling genuine physical scarcity, not speculation.
- **2025** — prices collapsed 53–58% from the peak, trading around \$5,300–5,500/tonne by December. US tariff exemptions on cocoa from major origins removed a policy-driven risk premium.
- **2026** — prices have been volatile: a cyclical low near \$2,850/tonne in March, a 24-week high near \$6,478/tonne in July, settling around \$5,600/tonne in late 2026.



Reported cocoa price points, 2024–2026 (US\$ per tonne). Points are the figures cited in this report, not a continuous price series.

### The mechanism of power was negative:

- **Defaults** — Ghana and Côte d’Ivoire failed to deliver contracted beans. Trading houses absorbed at least \$1 billion in losses on derivatives. Ghana’s failure to deliver forced buyers into the spot market at extreme prices.
- **Export suspension** — Côte d’Ivoire halted raw exports for the remainder of June 2024, edging prices to a five-week peak.
- **Farmer withholding** — in both countries, farmers hoarded beans rather than selling at state-fixed farmgate prices, treating the mandated price as a floor and speculating on upward revisions.

*The lesson: the substrate can disrupt. It has not yet captured an advantageous position. The windfall went to whoever happened to sell at the peak. The structural position of the Infrastructure layer did not change.*

## 1.14 The Present Moment (2026)

Two governments have begun to institutionalise coordination:

- **Côte d’Ivoire–Ghana Cocoa Initiative (CIGCI)** — founded 2018, moving from consultation to coordination.
- **Living Income Differential (LID)** — \$400/tonne premium, introduced 2019, reinforced in June 2026.
- **African Regional Standard for Sustainable Cocoa (ARS-1000)** — African-led certification being rolled out in Côte d’Ivoire and Ghana, where it will become mandatory.
- **Joint declaration (June 2026)** — commitment to harmonised producer prices, unified marketing strategies, and a common framework for price determination.
- **50% domestic processing target** by 2026/27.

The EUDR is the looming protocol event. The EU Deforestation Regulation enters into force on 30 December 2026 for large and mid-sized firms, with a 30 June 2027 deadline for micro and small

enterprises. It requires cocoa to be deforestation-free, fully traceable, and legally produced. The compliance burden falls on the substrate.

Mondelez has been accused of lobbying to weaken the EUDR — spending between €1.2 million and €1.5 million lobbying EU institutions after the regulation was adopted in 2023, meeting regularly with European officials and lobbying in France, Germany, Ireland, and Luxembourg. In June 2026, Mondelez CEO Dirk Van de Put met the US ambassador to the EU; the following day the ambassador published an opinion piece calling for further “simplifications” to the EUDR.

This is Producer-layer protocol control in action.

# Diagnosis: The State Today — Industrial Stack Analysis

## 2.1 The Framework

The Industrial Stack decomposes industry into five enabling layers, read from the top down. Each layer has sub-layers. Each sub-layer has functions. Each function has examples. The resolution matters because different industries bottleneck at different layers, and different problems require different zoom levels.

| Layer                 | Analogy                                      | Control     | Output dimensions        | Enables flow by                                                |
|-----------------------|----------------------------------------------|-------------|--------------------------|----------------------------------------------------------------|
| <b>Producer</b>       | Value makers                                 | Input       | Quality × Quantity       | Transforming inputs into output                                |
| <b>Aggregator</b>     | Market creators                              | Matching    | Selection × Access       | Routing inputs and output to the right place                   |
| <b>Platform</b>       | Toolmakers and parts makers                  | Abstraction | Simplicity × Versatility | Providing the means and components of production               |
| <b>Infrastructure</b> | Substrate providers and heavy machine makers | Substrate   | Bandwidth × Reliability  | Providing raw materials, energy, transport, and heavy capacity |
| <b>Protocol</b>       | Standard setters                             | Logic       | Coherence × Universality | Making things compatible so they can flow at all               |

**Reading order:** Producer → Aggregator → Platform → Infrastructure → Protocol.

**Enablement order:** Protocol enables Infrastructure, which enables Platform, which enables Aggregator, which enables Producer.

**Flow order:** Material, energy, goods, information, money, and people move upward from the base to the Producer, then out to the consumer.

**Dependency and leverage:** Each layer depends on the layers below it. Each layer below holds power over the layer above. The Producer is the most exposed position in the stack because every layer below it can squeeze it. The Protocol is the most structurally powerful position because it has no layer below it to be squeezed by.



*The Industrial Stack applied to cocoa: who sits in each layer, and what they capture.*

## 2.2 Layer 1: Producer — Value Makers

**Function:** Transform inputs into industrial output. **Control:** Input. **Output dimensions:** Quality × Quantity. **Enables flow by:** Performing the actual transformation — the visible act of making.

In cocoa, the Producer layer is the chocolate, confectionery, food, pharmaceutical, cosmetics, and nutraceutical manufacturers — the firms that take cocoa liquor, butter, and powder and turn them into finished consumer products.

### Sub-layer: Chocolate and Confectionery Manufacturers

| Firm                   | HQ          | Global chocolate/confectionery share  | Notes                                          |
|------------------------|-------------|---------------------------------------|------------------------------------------------|
| Mars, Inc.             | USA         | ~14% global chocolate market          | World's largest confectionery company; private |
| Mondelēz International | USA         | ~12.31% global confectionery (2024)   | Cadbury, Toblerone, Milka; spun off from Kraft |
| Ferrero Group          | Italy       | \$15.3B chocolate/confectionery sales | Nutella, Ferrero Rocher, Kinder; private       |
| Nestlé SA              | Switzerland | \$8.5B chocolate sales (2025)         | KitKat, Smarties, Nesquik                      |
| Lindt & Sprüngli       | Switzerland | \$5.5B sales (2025)                   | Premium segment leader                         |
| The Hershey Company    | USA         | \$11.2B chocolate sales               | Kisses, Reese's; US-focused                    |

### Sub-layer: Food, Pharmaceutical, Cosmetics, Nutraceutical Manufacturers

Cocoa is a substrate for multiple Producer sectors, not just chocolate:

- **Food** — cocoa powder as ingredient in baked goods, beverages, cereals, dairy.
- **Pharmaceutical** — cocoa butter as suppository base (theobroma oil); theobromine as a mild stimulant and bronchodilator.
- **Cosmetics** — cocoa butter as emollient in lotions, lip balms, soaps; cocoa flavanols in skincare.
- **Nutraceuticals** — cocoa flavanols for cardiovascular health; theobromine for cognitive and metabolic claims; premium and growing segment.
- **Cocoa-free chocolate** — emerging segment using shea, palm, carob, oats, and synthetic flavouring.

This is the key insight for the stack framing: cocoa beans are not the Producer. Cocoa beans are the substrate. The Producer is the manufacturer that transforms cocoa intermediates into finished goods. Farmers, plantations, fermentation, drying, and primary processing sit at Infrastructure — the substrate layer.

### Value Capture in the Producer Layer

The Producer layer captures the largest share of retail value. A widely cited FAO Investment Centre study (2026) found that chocolate brands and retailers receive a combined 70% of the value of a chocolate bar, while cocoa farmers receive about 11%. Earlier ICCO data put the farmer share at 3% (2012), rising to 6.6% in later studies. The direction of travel is not encouraging: the Zenodo record shows the cocoa bean share of a chocolate bar decreasing from 50% in the 1970s to less than 6% today.

The Producer layer's power comes from brand ownership and consumer access. It does not need to own the farms. It needs to own the shelf.

### Producer Layer Diagnostics

| Question                 | Cocoa answer                                                       |
|--------------------------|--------------------------------------------------------------------|
| Is quality high enough?  | Yes — product quality is controlled at the factory, not at origin  |
| Is quantity sufficient?  | Variable — dependent on substrate availability                     |
| Is cost competitive?     | Yes — cocoa is a small share of the retail bar's cost structure    |
| Is the output mix right? | Shifting — reformulation, premium tiering, cocoa-free alternatives |

The Producer layer is structurally insulated. It can pass costs downstream to consumers, reformulate to reduce cocoa content, or pivot to cocoa-free alternatives. It bears no structural risk from substrate failure.

## 2.3 Layer 2: Aggregator — Market Creators

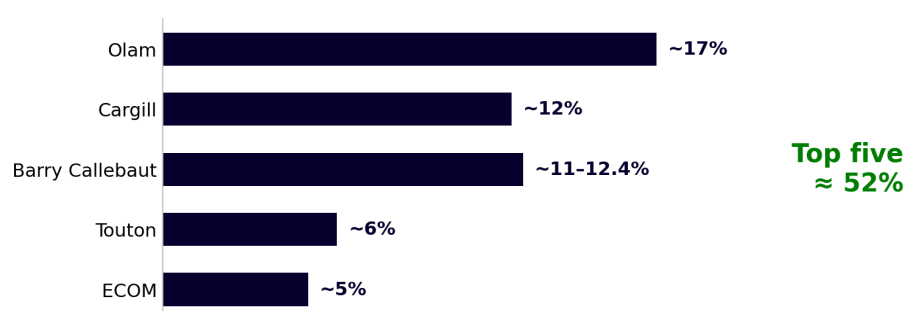
**Function:** Match supply, demand, capacity, and logistics. **Control:** Matching. **Output dimensions:** Selection × Access. **Enables flow by:** Routing inputs and output to the right place at the right time.

The Aggregator layer in cocoa is a highly concentrated oligopoly. A few transnational corporations control the physical flow of beans and the first stage of processing.

## Sub-layer: Commodity Trading

| Firm                | HQ          | Global cocoa trade share | Notes                                              |
|---------------------|-------------|--------------------------|----------------------------------------------------|
| Olam International  | Singapore   | ~17%                     | Largest single trader; Olam Food Ingredients (OFI) |
| Cargill             | USA         | ~12%                     | Integrated processor and trader                    |
| Barry Callebaut     | Switzerland | ~11–12.4%                | World's largest cocoa grinder; integrated          |
| ECOM Agroindustrial | Switzerland | ~5%                      | Significant mid-tier trader                        |
| Touton              | France      | ~6%                      | Key mid-tier trader                                |
| ADM                 | USA         | Significant              | Also a major processor                             |
| ED&F Man            | UK          | Significant              | Part of ECA membership                             |

**Concentration:** The five largest traders listed here — Olam (~17%), Cargill (~12%), Barry Callebaut (~12.4%), Touton (~6%), and ECOM (~5%) — collectively account for about 52% of the global cocoa trading market. Transnational traders handled 62% of the cocoa bean trade (Vrije Universiteit Amsterdam, 2021).



*Reported cocoa trade shares for the five largest traders (Barry Callebaut at its upper-range figure of 12.4%). Together they hold about 52%.*

## Sub-layer: Distribution and Logistics

- **Local buying stations** — rural collection points operated by LBCs, cooperatives, or traders.
- **Licensed Buying Companies (LBCs)** — Ghana's post-liberalisation buying structure; ~40 licensed firms.
- **Cooperatives** — farmer organisations that aggregate and sell; variable capacity.
- **Port operators** — Abidjan, San Pédro, Tema, Takoradi, Lagos, Douala.
- **Freight forwarders** — arrange shipping, customs, documentation.
- **Warehousing** — storage at port and inland; quality-critical.

## Sub-layer: Wholesale Markets and Price Discovery

- **ICE Cocoa futures** — London (ICE Futures Europe) and New York (ICE Futures US). The reference prices for the global industry.
- **ICCO daily prices** — indicative, not traded.

- **Physical trading** — bilateral contracts between traders and processors.
- **Origin price-setting** — COCOBOD (Ghana) and Conseil du Café-Cacao (Côte d'Ivoire) set farmgate prices administratively.

This is the critical structural feature: price discovery happens outside the producing countries. The substrate's value is determined in London and New York, by actors whose exposure is financial as well as physical. Producing states set farmgate prices, but these are derived from world prices, not determinants of them.

### Sub-layer: Trade Finance, Insurance, and Risk Management

- **Trade finance** — letters of credit, pre-export finance, warehouse receipts. Provided by international banks and trading houses.
- **Insurance** — cargo, political risk, credit.
- **Hedging** — futures and options on ICE; over-the-counter derivatives.
- **Structured finance** — prepayment facilities, offtake agreements.

Ghana's COCOBOD is a case study in Aggregator-layer dependency. COCOBOD raises an annual syndicated loan — historically around \$1.3–1.8 billion — to finance the crop purchase. The loan is syndicated by international banks. COCOBOD's debt position is now estimated at GH¢32.91 billion plus \$481 million external, with LBCs owed approximately \$185 million. The debt constrains procurement, delays farmer payments, and creates liquidity bottlenecks.

### Aggregator Layer Diagnostics

| Question                  | Cocoa answer                                             |
|---------------------------|----------------------------------------------------------|
| Is selection deep enough? | No — few buyers, limited competition at farmgate         |
| Is access open enough?    | No — licensed buying schemes restrict entry              |
| Is matching efficient?    | No — long lead times, poor information flow              |
| Is logistics reliable?    | No — port congestion, road quality, seasonal bottlenecks |

## 2.4 Layer 3: Platform — Toolmakers and Parts Makers

**Function:** Provide the modular, deployable means and components of production. **Control:** Abstraction.

**Output dimensions:** Simplicity × Versatility. **Enables flow by:** Giving producers and aggregators the ability to cut, form, assemble, measure, move, and control.

The Platform layer in cocoa provides the industrial means of production: processing equipment, parts, software, packaging.

## Sub-layer: Machine Tools and Processing Equipment

| Firm                | HQ          | Function                       | Notes                                                                                |
|---------------------|-------------|--------------------------------|--------------------------------------------------------------------------------------|
| Bühler Group        | Switzerland | Processing equipment           | Machines process 60% of world's cocoa harvest; secured nearly all major 2025 tenders |
| Royal Duyvis Wiener | Netherlands | Cocoa butter pressing          | Major competitor                                                                     |
| Aasted              | Denmark     | Chocolate production equipment | Key player                                                                           |
| Selmi Group         | Italy       | Specialised machinery          | Chocolate processing                                                                 |
| Sollich             | Germany     | Chocolate production equipment | Significant provider                                                                 |
| Netzsch             | Germany     | Grinding and dispersion        | Cocoa processing                                                                     |
| Lehmann             | Germany     | Cocoa processing               | Roasting, winnowing                                                                  |

This is the layer that converts beans into intermediates and intermediates into finished goods. It is dominated by European firms — Swiss, Dutch, Danish, Italian, German — with deep technical lock-in. A cocoa processing plant built around Bühler equipment requires Bühler parts, Bühler service, and Bühler-trained technicians.

## Sub-layer: Parts and Components

- **Power transmission** — bearings, gears, belts, chains, couplings, gearboxes.
- **Motion control** — motors (AC, DC, servo, stepper), drives, actuators (electric, hydraulic, pneumatic), cylinders, valves, pumps.
- **Fasteners** — bolts, screws, nuts, washers, rivets.
- **Sealing** — gaskets, O-rings, lip seals, mechanical seals.
- **Fluid power** — hydraulics, pneumatics, fittings, hoses, tubing.
- **Electrical/electronic** — motors, generators, transformers, sensors, PLCs, connectors, PCBs, cables, power supplies.
- **Structural** — castings, forgings, stampings, extrusions, weldments, machined parts.
- **Subassemblies** — modules, kits, prefabricated systems, skids, packages.

## Sub-layer: Software and Control Systems

- **ERP** — SAP, Oracle, Microsoft Dynamics.
- **MES** — manufacturing execution systems.
- **SCADA** — supervisory control and data acquisition.
- **PLM** — product lifecycle management.
- **Traceability systems** — farm-to-factory chain of custody; critical for EUDR compliance.
- **Digital twin and simulation** — process optimisation.
- **Farm management apps** — emerging; used by some cooperatives and NGOs.

### Sub-layer: Packaging

- **Primary packaging** — films, foils, wrappers, moulds.
- **Secondary packaging** — cartons, cases, labels.
- **Equipment** — fillers, sealers, labellers, palletisers.

### Platform Layer Diagnostics

| Question                         | Cocoa answer                                           |
|----------------------------------|--------------------------------------------------------|
| Is it simple enough to use?      | No — traceability systems are complex for smallholders |
| Is it versatile enough to adapt? | Partially — processing equipment is specialised        |
| Is it precise enough?            | No — quality inconsistent across farms and batches     |
| Is it available?                 | No — many origins lack processing infrastructure       |

The Platform layer is where origin processing capacity would sit. Côte d'Ivoire and Ghana have begun investing — both target 50% domestic processing by 2026/27 — but capacity remains limited, and the equipment is imported from the same European suppliers who dominate the layer.

## 2.5 Layer 4: Infrastructure — Substrate Providers

**Function:** Provide the physical foundation on which production rests. **Control:** Substrate. **Output dimensions:** Bandwidth × Reliability. **Enables flow by:** Providing materials, energy, transport, and heavy capacity at scale.

This is the base of the physical supply chain. In cocoa, it is:

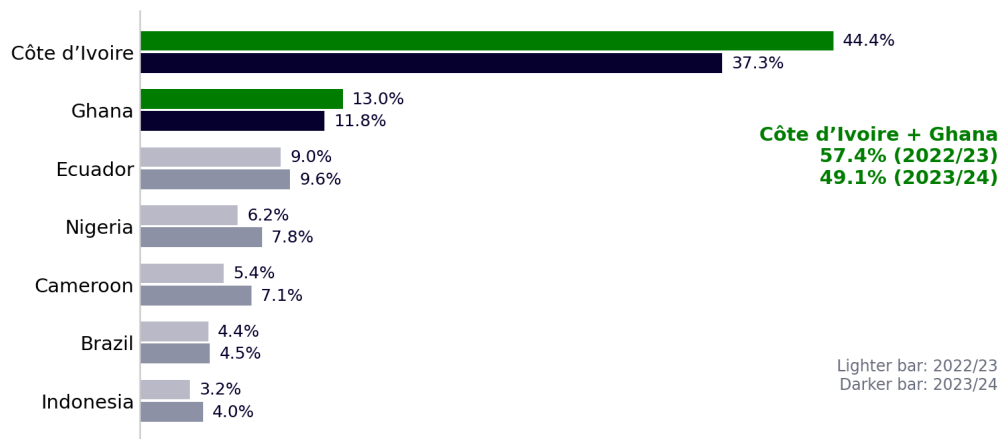
- **The farms** — ~6 million smallholders, mostly 2–5 hectares.
- **The land and climate** — rainforest conditions, rainfall, soil fertility.
- **The biological stock** — tree age, variety, disease status.
- **Primary processing** — fermentation, drying, bagging.
- **Energy** — grid, generators, solar.
- **Transport** — rural roads, trunk roads, rail, ports.
- **Heavy machinery** — tractors, trucks, cranes, port equipment.
- **Warehousing** — storage, silos, bagging lines.

## Sub-layer: The Substrate — Cocoa Production

| Country                                | Share of world, 2022/23 (ICCO) | Share of world, 2023/24 (ICCO) | 2026/27 forecast (StoneX)  | Notes                                           |
|----------------------------------------|--------------------------------|--------------------------------|----------------------------|-------------------------------------------------|
| <b>Côte d'Ivoire</b>                   | 44.4% (2,241 kt)               | 37.3% (1,674 kt)               | 1.77M tonnes (down 11%)    | World's largest producer; Conseil du Café-Cacao |
| <b>Ghana</b>                           | 13.0% (654 kt)                 | 11.8% (530 kt)                 | 585,000 tonnes (down 10%)  | Second-largest; COCOBOD; debt-constrained       |
| <b>Ecuador</b>                         | 9.0% (454 kt)                  | 9.6% (430 kt)                  | Growing                    | Rapidly expanding; projected to overtake Ghana  |
| <b>Nigeria</b>                         | 6.2% (315 kt)                  | 7.8% (350 kt)                  | ~305,000 tonnes (down 11%) | Poor infrastructure; contracting                |
| <b>Cameroon</b>                        | 5.4% (270 kt)                  | 7.1% (320 kt)                  | Stable                     | Has expressed interest in CIGCI                 |
| <b>Brazil</b>                          | 4.4% (220 kt)                  | 4.5% (200 kt)                  | Growing                    | Bahia; swing producer                           |
| <b>Indonesia</b>                       | 3.2% (160 kt)                  | 4.0% (180 kt)                  | —                          | Sulawesi-centric; aging trees                   |
| <b>Côte d'Ivoire + Ghana</b>           | <b>57.4%</b>                   | <b>49.1%</b>                   | —                          | The two-nation core                             |
| <b>Côte d'Ivoire + Ghana + Nigeria</b> | <b>63.7%</b>                   | <b>56.9%</b>                   | —                          | Three-nation total                              |
| <b>World total</b>                     | <b>5,043 kt</b>                | <b>4,489 kt</b>                | —                          | ICCO Quarterly Bulletin, Vol. LI, No. 1         |

Peru, Colombia, and the Dominican Republic are smaller producers in growing premium and origin segments. Shares are calculated from ICCO production data in thousand tonnes (kt); the 2023/24 crop was a shortfall year.

Africa produces approximately 72–74% of the world's cocoa beans (ICCO). Côte d'Ivoire and Ghana together account for 57.4% of global production in 2022/23 and 49.1% in the shortfall year 2023/24. Together with Nigeria, they account for 63.7% and 56.9% respectively.



Share of global cocoa production by country, calculated from ICCO data (2022/23 and 2023/24).

### Sub-layer: The Biological Constraint

The substrate is not a tap. It is a biological stock with a multi-year production cycle.

- **Tree age** — average tree age in West Africa is 25+ years, well past peak yield. Replanting takes 3–5 years to first harvest.
- **Disease** — Cacao swollen-shoot virus (CSSVD) has wiped out entire farms in Ghana. Control requires cutting and replanting, which farmers cannot afford.
- **Soil fertility** — declining under continuous cultivation without inputs.
- **Climate** — cocoa is rain-fed. Drought is an infrastructure failure. El Niño threatens late 2026.
- **Youth exit** — farming is aging. Young people leave for cities.

This is the binding constraint. Unlike oil, cocoa cannot be extracted faster by investing more capital. The stock must be replanted, rehabilitated, and protected — a decade-long process.

### Sub-layer: Climate as Infrastructure

Cocoa is grown in a narrow band: roughly 20°N to 20°S, with specific rainfall (1,500–2,000mm annually), temperature (18–32°C), and humidity requirements. Climate change is shifting suitable zones, increasing drought frequency, and altering disease vectors.

- **Drought** — El Niño conditions in late 2026 threaten West African production. Drought already covered over half of Côte d'Ivoire and two-thirds of Ghana in recent seasons.
- **Heat stress** — above 32°C, photosynthesis declines and pod development fails.
- **Deforestation feedback** — loss of shade trees increases temperature and reduces moisture retention, accelerating stress.

### Sub-layer: Transport and Ports

- **Rural roads** — often unpaved, impassable in rainy season, delaying harvest transport.
- **Trunk roads** — variable quality; congestion at peak season.
- **Ports** — Abidjan, San Pédro (Côte d'Ivoire); Tema, Takoradi (Ghana); Lagos/Apapa (Nigeria); Douala (Cameroon). Port congestion in late 2025 stranded cocoa as farmers rushed to sell.
- **Shipping** — container availability, freight rates, route reliability.

### Sub-layer: Energy

- **Grid** — unreliable in many producing regions; load shedding.
- **Diesel backup** — expensive; raises processing costs.
- **Solar** — emerging; limited scale.
- **Biomass** — cocoa pod husks as fuel; underutilised.

### Infrastructure Layer Diagnostics

| Question                 | Cocoa answer                                      |
|--------------------------|---------------------------------------------------|
| Is capacity sufficient?  | No — ports, roads, warehouses all constrained     |
| Is it reliable?          | No — climate, power, and transport all unreliable |
| Is it located correctly? | No — processing often far from farms              |
| Is it cost-competitive?  | No — logistics costs are high                     |

This is the layer that determines whether beans arrive at all. It is the layer with the most physical power and the least economic leverage.

## 2.6 Layer 5: Protocol — Standard Setters

**Function:** Make things compatible so they can flow at all. **Control:** Logic. **Output dimensions:** Coherence × Universality. **Enables flow by:** Defining the rules of coordination — units, dimensions, grades, interfaces, safety, quality, process, transport, grid, environment.

This is the most powerful layer. It is the base of the stack. Nothing above it works without it. But it is also the layer people notice least — until it breaks, fragments, or gets captured.

### Sub-layer: Units and Measures

- **SI base units** — metre, kilogram, second, ampere, kelvin, mole, candela.
- **Cocoa-specific measures** — metric tonnes, moisture content (%), bean count per 100g, free fatty acid content, cut test percentage.
- **Currency** — USD (international trade), CFA franc (West African origin pricing), local currencies.
- **Time zones** — relevant for trade execution and settlement.

### Sub-layer: Quality Standards

- **ICCO grades** — Grade I (fully fermented, low defects), Grade II (partially fermented, higher defects). ICCO also works on fine flavour cocoa classification.
- **Cut test** — visual assessment of fermentation and defects.
- **Flavour standards** — origin-specific profiles; emerging formalisation.
- **ISO 34101** — sustainable and traceable cocoa standard.

## Sub-layer: Certification and Sustainability Standards

| Scheme                          | HQ                    | Cocoa area certified                             | Notes                                                 |
|---------------------------------|-----------------------|--------------------------------------------------|-------------------------------------------------------|
| <b>Rainforest Alliance</b>      | USA/International     | ~10.2% of global cocoa area                      | Largest scheme; merged with UTZ                       |
| <b>Fairtrade International</b>  | Germany/International | ~21% market share in international supply chains | Minimum price and premium                             |
| <b>Organic (EU, USDA, etc.)</b> | Various               | Smaller                                          | Premium segment                                       |
| <b>ARS-1000</b>                 | Côte d'Ivoire/Ghana   | Emerging; mandatory rollout                      | African-led; first serious counter-protocol           |
| <b>Corporate schemes</b>        | Various               | Large                                            | Cocoa Life, Cocoa Plan, Cocoa Horizons, Cocoa Promise |

## Sub-layer: Regulatory Standards

- **EUDR** — EU Deforestation Regulation; entering force 30 December 2026 (large/mid-sized firms), 30 June 2027 (micro/small). Requires deforestation-free, traceable, legally produced cocoa. Cocoa and coffee account for 2% and 1% respectively of global commodity-driven deforestation, but the regulation's compliance burden falls heavily on smallholders.
- **EU food safety** — maximum residue levels, contaminants, hygiene.
- **FDA** — US food safety, labelling.
- **HACCP, ISO 22000** — food safety management.
- **Pharmacopeia** — USP (US), EP (Europe) for cocoa butter in pharmaceuticals.
- **EU Cosmetics Regulation** — for cocoa butter in cosmetics.
- **Child labour laws** — US, EU, national.
- **Living Income Differential** — \$400/tonne premium; administratively set.

## Sub-layer: Trade Rules and Price-Setting

- **ICE futures contracts** — the reference price.
- **Origin price-setting** — COCOBOD and Conseil du Café-Cacao set farmgate prices.
- **Export licensing** — national control over who can export.
- **Tariffs** — EU, US, and other import duties.
- **Rules of origin** — determine tariff treatment.

## Sub-layer: Traceability Standards

- **EUDR due diligence** — geolocation of plots, chain of custody, risk assessment.
- **Farm-level GPS mapping** — being rolled out across West Africa.
- **Chain of custody models** — identity preserved, segregated, mass balance, book and claim.
- **Digital systems** — emerging; variable coverage.

## The Capture of the Protocol Layer

This is the core structural finding. The Protocol layer is controlled by the Producer and Aggregator layers. The mechanisms:

| Tool                                                              | Who uses it                     | What it does                                                         |
|-------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------|
| <b>Industry associations (ECA, CAOISCO)</b>                       | Aggregators, Producers          | Lobby EU institutions, participate in ICCO, sit on initiative boards |
| <b>Voluntary protocols (Harkin-Engel, ICI)</b>                    | Producers                       | Preempt mandatory regulation; self-define compliance                 |
| <b>Private standards (Cocoa Life, Cocoa Plan, Cocoa Horizons)</b> | Producers, Aggregators          | Replace third-party certification with self-set criteria             |
| <b>Governance capture of MSIs (CFI, WCF)</b>                      | Producers, Aggregators          | Industry body convenes and governs the initiative                    |
| <b>Direct lobbying (Mondelez on EUDR)</b>                         | Producers                       | Delay, weaken, or dilute binding regulation                          |
| <b>Structural power (ICCO voting)</b>                             | Producer/Aggregator home states | Majority voting control in intergovernmental body                    |
| <b>Captive contracts (Mars certification)</b>                     | Producers                       | Enforce buyer-defined standards through market access                |

### Specific evidence:

- **European Cocoa Association (ECA)** states that “one of its primary roles is one of lobbying, principally within the European Union.” Its members include ADM, Barry Callebaut, Cargill, ECOM, and ED&F Man — the core of the Aggregator layer. Together they process 75% of beans imported into Europe, represent 40% of world processing, and 50% of industrial chocolate production. The ECA holds observer status at the ICCO and participates in its quality working group. It sits on the Steering Committee of the Global Issues Group and the Board of the International Cocoa Initiative.
- **World Cocoa Foundation (WCF)** — the industry body that facilitates the Cocoa & Forests Initiative — has a board drawn from member companies. Its current chair is from The Hershey Company; its vice-chair/treasurer is from Nestlé. Of sixteen board members, not one is from the producing region.
- **ICCO voting structure** — when the 2010 International Cocoa Agreement entered into force, producing countries accounted for 43.17% of votes, while consuming countries — the European Union and Switzerland — accounted for 54.90%. The consumers hold the majority.
- **Mondelez lobbying** — €1.2–1.5 million on EU lobbying after EUDR adoption; met regularly with European officials and influential lawmakers, including German MEPs from the EPP; lobbied in France, Germany, Ireland, and Luxembourg; CEO met US ambassador to the EU, who then published an op-ed calling for “simplifications.”
- **Voluntary self-regulation** — the Harkin-Engel Protocol (2001) preempted mandatory labelling. The International Cocoa Initiative (2002) is industry-funded and industry-governed, though it also receives public money (e.g., \$4.5 million from the US Department of Labor in 2015).



*Voting shares under the 2010 International Cocoa Agreement (the remaining 1.93% is not attributed in the source).*

## Protocol Layer Diagnostics

| Question                | Cocoa answer                                                  |
|-------------------------|---------------------------------------------------------------|
| Are standards coherent? | No — multiple certification schemes, conflicting requirements |
| Are they universal?     | No — EUDR applies only to EU imports; other markets lag       |
| Are they fragmented?    | Yes — heavily                                                 |
| Are they captured?      | Yes — by Producer and Aggregator interests                    |

## 2.7 Value Capture: The Structural Anomaly

| Layer          | Who controls                                                                | Value captured                                         |
|----------------|-----------------------------------------------------------------------------|--------------------------------------------------------|
| Producer       | Mars, Mondelez, Ferrero, Nestlé, Lindt, Hershey, plus food/pharma/cosmetics | ~70% of retail (with retail)                           |
| Aggregator     | Olam, Cargill, Barry Callebaut, ECOM, Touton, ADM                           | Trading margin, finance, logistics, information        |
| Platform       | Bühler, Duyvis Wiener, Aasted, Selmi, Sollich                               | Equipment rents, technology lock-in, service contracts |
| Infrastructure | Côte d'Ivoire, Ghana, Ecuador, Indonesia, Nigeria, Cameroon, Brazil         | 6–11% of final value                                   |
| Protocol       | EU, ISO, ICCO, Producer/Aggregator lobbying                                 | Rule-making power over all layers                      |

**The anomaly, stated plainly:** The Infrastructure layer produces the raw material for a \$120–140 billion retail market. It captures 6–11% of final value. Oil-producing states capture 50–90%. Milk producers in managed systems capture 42–83%. Soybean farmers in efficient channels capture 34–93%. Apple growers in direct channels capture 20–70%.

*The gap is not physical. It is institutional. And only two nations have the volume to close it.*

## 2.8 The Fractal Nature of the Stack

The stack is fractal — the same five-layer structure recurs at every resolution.

### Inside a Producer (a chocolate factory):

| Layer          | Factory equivalent                                 |
|----------------|----------------------------------------------------|
| Producer       | Work cells, lines, shifts                          |
| Aggregator     | Internal logistics, scheduling, material handling  |
| Platform       | Machines, tools, fixtures, gauges, robots          |
| Infrastructure | Utilities, building, power, water, compressed air  |
| Protocol       | Work instructions, specs, tolerances, safety rules |

### Inside an Aggregator (a trading house):

| Layer          | Trading house equivalent                      |
|----------------|-----------------------------------------------|
| Producer       | Kitting, blending, value-added services       |
| Aggregator     | Purchasing, sales, vendor management          |
| Platform       | WMS, scanners, forklifts, packaging equipment |
| Infrastructure | Warehouses, trucks, racks, conveyors          |
| Protocol       | Product codes, EDI standards, packaging specs |

### Inside an Infrastructure (a port):

| Layer          | Port equivalent                                 |
|----------------|-------------------------------------------------|
| Producer       | Stevedoring, terminal operations                |
| Aggregator     | Shipping lines, freight forwarders, agents      |
| Platform       | Cranes, gantries, straddle carriers, IT systems |
| Infrastructure | Berths, quays, channels, roads, rail            |
| Protocol       | IMO rules, customs codes, safety standards      |

### Inside a Platform (a machine shop):

| Layer          | Machine shop equivalent                          |
|----------------|--------------------------------------------------|
| Producer       | Finished machined parts                          |
| Aggregator     | Job scheduling, material sourcing, order intake  |
| Platform       | Lathes, mills, fixtures, cutters, gauges         |
| Infrastructure | Building, power, compressed air, coolant         |
| Protocol       | Tolerances, material specs, inspection standards |

The fractal nature means you can zoom to any level and find the same structure. The resolution you choose depends on the question you are asking.

## 2.9 Resolution: Choosing Your Zoom Level

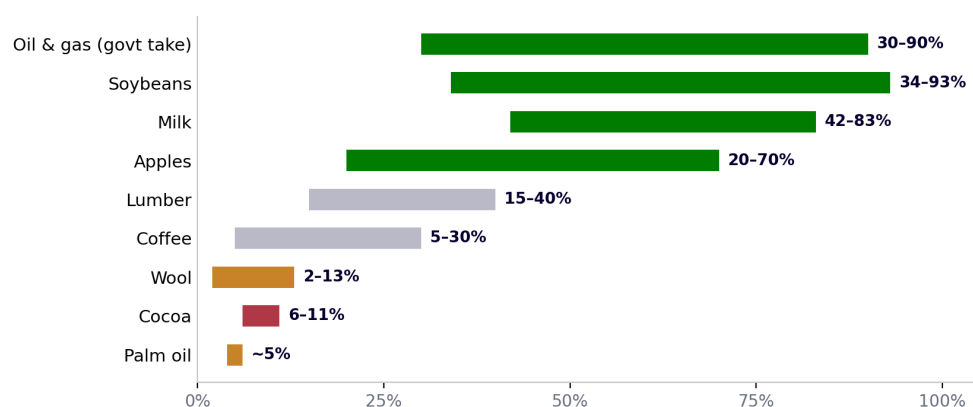
| Resolution       | Unit of analysis                 | Typical question               | Cocoa answer                                                                      |
|------------------|----------------------------------|--------------------------------|-----------------------------------------------------------------------------------|
| <b>Industry</b>  | Whole sector                     | Where does value accrue?       | Brands/retailers ~70%; farmers ~6–11%                                             |
| <b>Layer</b>     | Producer → Protocol              | Which layer is the bottleneck? | Infrastructure (climate, ports) and Protocol (EUDR, certification, price-setting) |
| <b>Sub-layer</b> | Transport, certification         | Where is capacity constrained? | Ports, rural roads, traceability systems                                          |
| <b>Function</b>  | Ports, logistics brokers         | What enables this function?    | Cranes, warehouses, customs, digital systems                                      |
| <b>Firm</b>      | Cargill, Barry Callebaut         | Where does this firm sit?      | Aggregator (trading) and Platform (processing)                                    |
| <b>Asset</b>     | A port, a fab, a mine, a factory | What enables this asset?       | Depends on the asset                                                              |
| <b>Process</b>   | Welding, assembly, machining     | What enables this process?     | Depends on the process                                                            |

The right resolution is the one that reveals the bottleneck. For cocoa today, that means zooming into Infrastructure (climate resilience, port capacity, rural roads, biological stock rehabilitation) and Protocol (EUDR compliance, price-setting, certification coherence).

# Competitive Analysis: Substrate Value Capture Across Commodities

## 3.1 The Comparison Table

| Industry             | Substrate rights holder                              | Value capture share            | Key mechanism                                                                   |
|----------------------|------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------|
| <b>Oil &amp; Gas</b> | Producing states (Angola, Indonesia, Malaysia, Iraq) | 30–90% government profit share | Sovereign ownership, PSAs, OPEC quotas, resource nationalism                    |
| <b>Milk</b>          | Dairy farmers (Canada, India, Indonesia, France)     | 42–83% of retail price         | Supply management boards, cooperatives, price floors tied to cost of production |
| <b>Soybeans</b>      | Farmers (India, Indonesia)                           | 34–93% depending on channel    | Cooperative marketing, direct sales                                             |
| <b>Apples</b>        | Growers (India, Australia)                           | 20–70% depending on channel    | Direct-to-retail channels, cooperative structures                               |
| <b>Lumber</b>        | Timber producers/landowners                          | 15–40%                         | Auction systems, landowner cooperatives                                         |
| <b>Coffee</b>        | Smallholder farmers                                  | 5–30% of retail                | Cooperatives, quality differentiation                                           |
| <b>Palm Oil</b>      | Smallholders                                         | ~5% of final value             | Vertically integrated conglomerates, RSPO                                       |
| <b>Wool</b>          | Growers                                              | 2–13% of retail                | Auction systems, limited downstream integration                                 |
| <b>Cocoa</b>         | Smallholder farmers                                  | 6–11% of retail                | Voluntary sustainability schemes, price-taking                                  |



Substrate-holder value capture by commodity, using the ranges in the comparison table.

## 3.2 The Pattern

The data reveals a consistent structural pattern:

| Condition                                     | Value capture             | Examples              |
|-----------------------------------------------|---------------------------|-----------------------|
| Substrate power + institutionalised protocols | High (50–90%)             | Oil & gas             |
| Substrate power + cooperative structures      | Moderate to high (34–83%) | Milk, soybeans        |
| Substrate power + quality differentiation     | Variable (20–70%)         | Apples, coffee        |
| Substrate power + no protocols                | Low (2–11%)               | Cocoa, palm oil, wool |

*The pattern is clear: physical leverage without institutionalised protocols produces price-taking, not value capture.*

## 3.3 Oil and Gas: The OPEC Model

What they built:

- **OPEC (1960)** — production quotas, member allocations, compliance monitoring, price bands.
- **Sovereign ownership** — national oil companies control reserves.
- **Production Sharing Agreements (PSAs)** — legal frameworks guaranteeing the state a majority share.
- **Resource nationalism** — renegotiation of concession terms.

The numbers:

- Indonesia's base split for oil is 53% to the state.
- Angola's government profit share ranges from 30–80%.
- Established producers such as Algeria, Egypt, Iraq, and Tunisia aim for government take of about 75%.
- Iraq's PSC has an AETR exceeding 90%.
- Deloitte reports that government take in oil and gas commonly exceeds 75% of total profits.

**The mechanism:** Sovereign ownership of the resource, combined with institutionalised production management, converts physical leverage into ongoing value capture.

**The lesson for cocoa:** OPEC's power has never been absolute — compliance is imperfect, non-OPEC producers undermine quotas, and price bands are breached. But the institutional framework exists. It converts leverage into rules.

## 3.4 Milk: The Supply Management Model

What they built:

- **Supply management boards** — set farmgate prices based on cost of production.

- **Production quotas** — control supply.
- **Import controls** — limit foreign competition.
- **Cooperatives** — collective bargaining and marketing.

**The numbers:**

- In the US, farm share of the retail dairy dollar has dropped from 52 cents in 1980 to just 25 cents today — but this reflects a liberalised market, not a managed one.
- In managed systems, producer share has been observed as high as 80–85%.
- FAO AGRIS found farmer share of milk retail price increased from 45% to 54% over three decades.
- Indian studies record producer share of consumer price at 80.96% and 81.85%.
- Kenyan dairy farmers receive 85% of the price consumers pay for milk.

**The mechanism:** Supply management sets the price at the farmgate based on cost of production, not on a speculative exchange. The farmer is not a price taker; the price is a policy variable.

**The lesson for cocoa:** Milk is perishable, local, and politically salient in a way cocoa is not. But the institutional mechanism — price-setting based on cost of production — is directly transferable.

### 3.5 Soybeans: The Cooperative Model

**What they built:**

- **Farmer cooperatives** — collective marketing, input purchasing, storage.
- **Direct market channels** — bypassing intermediaries.
- **Contract farming** — pre-agreed prices and volumes.

**The numbers:**

- Farmer share value of 92.86% in efficient marketing channels.
- Producer share in consumer rupee of 82.58% in direct market channels.
- Soya bean producers obtain about 81% of final price through farmer cooperative unions.
- Soybean farmers in Madhya Pradesh capture 89–93% of the final consumer price.

**The mechanism:** Cooperative structures reduce the number of intermediaries between farmer and consumer, and give farmers collective bargaining power.

**The lesson for cocoa:** Cocoa has 6 million atomised smallholders. Cooperatives exist but are weak. Consolidation through cooperatives, state marketing monopolies, or land reform is a precondition for supply management.

### 3.6 Apples: The Direct Channel Model

**What they built:**

- **Direct-to-retailer channels** — bypassing mandis and wholesalers.
- **Cold chain infrastructure** — storage and transport.
- **Cooperative marketing** — collective grading, packing, branding.

**The numbers:**

- Producer's share in consumer's rupee at 68.02%.
- Producer's share at 69.57% in producer–retailer–consumer channels.
- Apple growers in some channels capture 20–70% depending on structure.
- In India, the apple value chain has been studied extensively because it shows how channel structure determines farmer share.

**The mechanism:** Direct channels and cooperative infrastructure compress the intermediary chain.

**The lesson for cocoa:** Origin processing and direct trade relationships (bean-to-bar, single-origin) are the equivalent. They are growing but remain a small share of the market.

### 3.7 Coffee: Quality Differentiation and Cooperatives

**What they built:**

- **Cooperatives** — collective processing, marketing, export.
- **Quality differentiation** — specialty coffee, single-origin, direct trade.
- **Export consortia** — collective bargaining at origin.

**The numbers:**

- Farmers retain generally only 10% of retail sales value; 15% for instant coffee; 25–30% for final.
- FOB-to-retail price share ranges from 14.5% to 28.1%.
- German market: farmers received 24% of retail price for ground coffee, just 6% for capsules.
- Ethiopian coffee farmers capture ~82% of export margin in some cases — the highest in Africa.

**The mechanism:** Where cooperatives are strong and quality differentiation is real, farmer share rises dramatically. The variation itself is instructive — it shows that structure, not commodity, determines capture.

**The lesson for cocoa:** Ethiopia's coffee model is the closest analogue to what cocoa could achieve. It combines cooperative structures, quality differentiation, and state-supported export coordination.

### 3.8 Palm Oil: The Trap of Vertical Integration

**What happened:**

- **Vertically integrated conglomerates** — plantation companies own the supply chain from plantation to refinery to consumer goods.
- **Smallholders** — produce nearly one-third of global palm oil but capture a disproportionately small share.
- **RSPO certification** — voluntary standard, industry-influenced.

**The numbers:**

- FMCG and retail companies earn two-thirds of gross profit.
- Smallholders earn only 5% of final product's value.
- Independent smallholder profitability is close to zero in some studies.

**The mechanism:** Vertical integration allows downstream actors to capture the value created at the plantation. Certification does not change the structural distribution.

**The lesson for cocoa:** This is where cocoa is heading in Scenario 1. Certification without structural power does not change capture.

### 3.9 Wool: The Weakest Substrate

**What happened:**

- **Auction systems** — price discovery at auction, with no supply management.
- **Limited downstream integration** — growers do not own processing or branding.
- **Synthetic competition** — wool lost share to synthetics.

**The numbers:**

- On a suit retailing for \$40, the grower's share is \$1.00 (2.5%).
- Wool used for high-end apparel makes only 2% of final value.
- Returns to growers for raw wool averaged about 13% of retail prices of finished products.

**The mechanism:** No supply management, no cooperative power, no branding. The grower is a pure price taker.

**The lesson for cocoa:** Wool is the cautionary tale. A natural fibre with strong heritage and premium positioning, reduced to 2–13% capture because it never built institutional power. Cocoa is closer to wool than to oil.

### 3.10 What the Comparison Establishes

The comparison across commodities establishes three propositions:

1. **Physical dominance does not produce value capture.** Côte d'Ivoire and Ghana alone hold 49–57% of supply, yet the substrate captures 6–11%. Wool's growers hold significant supply and capture 2–13%. Palm oil smallholders hold a third of supply and capture ~5%. Physical share is not power.
2. **Institutionalised protocols are the decisive variable.** Oil, milk, soybeans, and apples all have mechanisms that convert physical position into price. Cocoa, wool, and palm oil smallholders do not.
3. **The mechanisms are known and transferable.** Supply management (milk), production quotas (oil), cooperative marketing (soybeans), direct channels (apples), quality differentiation (coffee). Cocoa does not need to invent — it needs to adopt and enforce.

# Why Conventional Tools Miss It

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Conventional analysis of the cocoa industry fails because it applies the wrong frameworks. There are five recurring fallacies.

## 4.1 The “Market” Fallacy

Conventional economics treats cocoa as a market with supply, demand, and price discovery. It models the industry as a chain of voluntary transactions and assumes that prices reflect underlying fundamentals.

**Why this misses it:** Cocoa is not a market. It is a protocol regime. The rules are written by the layers that extract value from the substrate. The Producer and Aggregator layers control the Protocol layer — through industry associations, voluntary standards, governance capture of multi-stakeholder initiatives, direct lobbying, and structural power in intergovernmental bodies.

The price of cocoa is not discovered at origin. It is discovered in London and New York, by actors whose exposure is financial as well as physical. Producing states set farmgate prices, but these are derived from world prices. The market is constructed, and the construction is controlled from above.

## 4.2 The “Development” Fallacy

Conventional development policy treats cocoa-producing nations as recipients of aid, technical assistance, and capacity-building. It frames the problem as poverty rather than structural extraction.

**Why this misses it:** The value is being captured, not created insufficiently. Cocoa is a \$120–140 billion retail market. The substrate produces the raw material. The value is extracted upward through the stack. Development aid does not address the structural asymmetry — it palliates the symptoms.

Worse, the development framework legitimises the existing structure. It assumes that the producing nations need help to participate in a system whose rules they did not write and cannot change. It channels resources into compliance with standards set elsewhere — EUDR traceability, certification audits, sustainability programmes — rather than into protocol power.

## 4.3 The “Sustainability” Fallacy

Conventional sustainability frameworks treat cocoa as a voluntary improvement problem. Certification schemes, corporate responsibility programmes, and multi-stakeholder initiatives are framed as solutions.

**Why this misses it:** Sustainability without structural power is a cost borne by the substrate. EUDR compliance costs fall on smallholders. Certification costs fall on farmers. The benefits flow to the brands that can claim sustainability credentials.

The framework is backwards. The question is not how to make cocoa sustainable. The question is who captures the value — and whether the substrate will remain viable as a result. A farm that cannot afford to replant will not be sustainable, no matter how many certificates it holds.

## 4.4 The “Consumer” Fallacy

Conventional analysis often frames the industry as a tension between consumers and producers, with consumers driving demand and producers responding.

**Why this misses it:** Consumers do not lobby. They do not set standards. They do not convene multi-stakeholder initiatives. They sit outside the stack — at the point where flow terminates.

The actors inside the stack are Producers and Aggregators, and they are the ones who control Protocol. Mondelez’s €1.2–1.5 million EU lobbying spend is a Producer action. The ECA is an Aggregator body. The WCF board is Producers and Aggregators. The ICCO voting bloc is the states that host them, acting as instruments of the firms.

The adversary is not a consumer bloc. It is a set of firms with margins, shareholders, brand exposure, and supply chain dependencies. Those can be squeezed differently than states can.

## 4.5 The “Colonialism Is Over” Fallacy

Conventional political economy treats colonialism as a historical period that ended with independence. It assumes that the institutional architecture of the colonial economy was dismantled.

**Why this misses it:** Independence transferred political sovereignty but did not dismantle the architecture.

- Marketing boards were repurposed from colonial extraction to state patronage — but they still captured value at origin and redistributed it away from farmers.
- Export orientation continued.
- Processing abroad continued.
- Price discovery remained in London and New York.
- Protocol-setting remained in Brussels, Washington, and Geneva.
- The layers above Infrastructure remained under the same transnational firms or their successors.

Structural adjustment in the 1980s and 1990s weakened the instruments producing states had — abolishing marketing boards, removing price controls, privatising state enterprises. It did not replace them with new instruments. It removed the state from the Protocol layer without building a counter-protocol.

*The result is a system that is formally post-colonial and structurally colonial. The flags changed. The architecture did not.*

## 4.6 What Conventional Tools Would Prescribe — and Why They Fail

| Conventional tool        | Prescription                              | Why it fails                                                                                      |
|--------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------|
| Aid                      | Transfer resources to producing countries | Does not change the structural distribution; often funds compliance with externally set standards |
| Certification            | Voluntary standards to improve practices  | Costs borne by substrate; benefits captured by brands; does not change price                      |
| Corporate responsibility | Industry-led programmes                   | Industry governs the programme; conflict of interest                                              |
| Trade liberalisation     | Open markets, remove distortions          | Removes the only instruments producing states have; increases price-taking                        |
| Technical assistance     | Improve productivity                      | Increases volume, which lowers price in a price-taking market                                     |
| Diversification          | Move into other crops                     | Does not address protocol power; replicates the same structure elsewhere                          |
| Deforestation regulation | EUDR-style compliance                     | Compliance costs fall on substrate; does not change value capture                                 |

**The common failure:** All of these tools operate within the existing protocol regime. None of them change who writes the rules.

## 4.7 The Correct Diagnostic Lens

The correct lens is the Industrial Stack. It asks:

- Which layer controls the Protocol?
- Which layer captures the value?
- Which layer bears the risk?
- Which layer holds physical leverage but no institutional power?
- What protocols would convert physical leverage into value capture?

For cocoa, the answers are:

- **Protocol control:** Producer and Aggregator layers.
- **Value capture:** Producer and Aggregator layers (~70% with retail).
- **Risk bearing:** Infrastructure layer (climate, disease, price volatility, compliance costs).
- **Physical leverage without institutional power:** Infrastructure (Côte d'Ivoire and Ghana).
- **Required protocols:** Supply management, enforceable price floor, origin processing mandate, African-led certification, own price discovery.

# Three Scenarios

## 5.1 Framework for the Scenarios

The scenarios are not forecasts. They are the available futures. Which one obtains depends on a single variable: whether Côte d'Ivoire and Ghana convert their physical leverage into institutionalised protocol power.

Each scenario is described in terms of:

- **Protocol control** — who writes the rules.
- **Mechanism** — the instruments used.
- **Substrate capture** — the share of final value.
- **Downstream effects** — on farmers, origin economies, Aggregators, Producers, consumers, and geopolitics.
- **Requirements** — what must exist for the scenario to hold.
- **Failure mode** — how the scenario collapses if requirements are not met.



*Substrate capture and implied value under each scenario, on a \$120–140bn retail market (the report's own arithmetic).*

## 5.2 Scenario 1: Continue As Is — Producer and Aggregator Control of Protocol

### Protocol Control

Producer and Aggregator firms. Voluntary schemes, private standards, industry associations, governance capture, direct lobbying.

### Mechanism

- LID remains a surcharge, not a floor.
- CIGCI remains consultative, not enforcement.
- EUDR compliance costs borne at the base.

- No supply management.
- No enforceable price mechanism.
- Certification schemes proliferate and fragment.
- Corporate sustainability programmes continue as the primary vehicle for “responsibility.”

## Substrate Capture

6–11%, trending toward the lower bound.

## Arithmetic

On a \$120–140bn retail market, the substrate receives roughly \$7–15bn (6% of \$120bn to 11% of \$140bn). At ~5 million tonnes of production, that is a farmgate equivalent consistent with historical norms — volatile, low, and insufficient for replanting.

## Downstream Effects

### On farmers:

- Farmgate prices administratively set and disconnected from world prices.
- Ghana cut ~30% and Côte d’Ivoire ~57% in late 2025 while retail stayed elevated.
- Volatility absorbed at the base, upside captured above.
- Inability to invest in replanting, rehabilitation, or disease control.
- Continued youth exit.

### On the substrate itself:

- Aging trees (25+ years average in West Africa).
- CSSVD spreading.
- Declining soil fertility.
- Youth exit from farming.
- El Niño late 2026 as a live threat.
- Biological capacity erodes quietly.

### On the Aggregator layer:

- Continued consolidation.
- Traders capture volatility through finance and information asymmetry.
- COCOBOD’s \$1.85bn debt and the 2025 port congestion are symptoms, not causes.
- Finance terms remain favourable to traders and unfavourable to origin.

### On the Producer layer:

- Stable margins.
- Reformulation, shrinkflation, premium tiering.
- No structural risk borne.
- Capacity to absorb price spikes through downstream pass-through.

### On the Protocol layer:

- Producer/Aggregator control deepens.
- EUDR becomes the de facto global standard.
- Certification fragments and raises costs at the base.
- African-led standards (ARS-1000) are marginalised or co-opted.

#### On consumers:

- No material change.
- Chocolate remains affordable.
- Premium and mass segments diverge.

### Terminal State

Scenario 1 does not end in stable poverty. It ends in substitution.

If supply is unreliable and expensive, the Producer layer has a rational response:

- **Cocoa-free chocolate** — using shea, palm, carob, oats, and synthetic flavouring.
- **Cocoa butter equivalents (CBEs)** — shea and palm-based substitutes.
- **Reformulation** — reducing cocoa content, adjusting recipes.
- **Synthetic flavouring** — replicating chocolate notes without cocoa.
- **Premium tiering** — concentrating real cocoa in high-margin products.

The industry has already begun. At sufficient price and volatility, mass-market chocolate does not need cocoa.

*The substrate's greatest risk is not exploitation. It is becoming optional.*

Once substitution reaches scale, the Infrastructure layer loses its leverage permanently. The 2023/2024 price spike would be remembered not as a warning shot but as the last one.

### Failure Mode

This is not a failure mode — it is the default. Scenario 1 requires no action. It is what happens if nothing changes.

## 5.3 Scenario 2: Partial Infrastructure Control of Protocol (~25%)

### Protocol Control

Shared and contested. Infrastructure gains enforceable but non-absolute protocol power.

### Mechanism

- **LID converted from surcharge to binding floor** with enforcement — export licensing, penalties, border controls.
- **ARS-1000 rolled out as mandatory origin standard** — positioned as the African-led equivalent under EUDR, recognised as equivalent rather than subordinate.

- **Origin grinding mandate** — minimum share of beans processed domestically before export.
- **CIGCI moves from consultation to coordination with teeth** — harmonised producer prices, joint marketing, common price framework.
- **African-led certification recognised as equivalent** — not subject to unilateral EU revision.
- **Coordinated export management** — without full production quotas.

Partial because it excludes production quotas, does not own price discovery, and does not capture the Platform layer.

### Substrate Capture

~25% of retail value. Roughly a 2.3–4x increase in substrate share (about triple at the midpoint of today's 6–11% range).

### Arithmetic

On a \$120–140bn retail market, \$30–35bn to the substrate versus ~\$7–15bn today. At ~5 million tonnes of production, that is a farmgate equivalent of roughly \$6,000–7,000/tonne sustained — well above historical norms and consistent with the proposed regional floor.

### Downstream Effects

#### On farmers:

- Rural incomes rise materially.
- Funds replanting, rehabilitation, and disease control.
- Retains young farmers.
- The only path that restores the biological capacity of the substrate.
- Living income becomes achievable.

#### On origin economies:

- Fiscal space expands.
- Cocoa becomes a meaningful revenue base rather than a subsistence sector.
- Governments gain capacity to invest in Infrastructure — roads, power, ports — which is the layer that is actually binding.
- Reduced dependence on aid and external finance.

#### On the Aggregator layer:

- Margins compress.
- Traders lose the volatility arbitrage.
- Some consolidation.
- Finance terms shift as risk moves from farmer to buyer.
- Trading houses adapt — some move into origin processing, some exit.

#### On the Producer layer:

- Retail prices rise modestly — 5–15% at the bar.
- Mass-market volumes decline slightly.

- Premium and single-origin segments grow.
- Reformulation continues but does not accelerate to substitution because the price signal is not extreme enough.
- Brand margins compress modestly.

#### On consumers:

- Chocolate remains affordable.
- Cocoa is a small share of the retail bar's cost structure.
- A 5–15% price adjustment on a discretionary, low-share-of-wallet product does not change behaviour materially.
- Premium and mass segments diverge further.

#### On geopolitics:

- Moderate friction with EU and US.
- Some trade diplomacy.
- Accelerated funding for substitution research, but not at scale.
- Recognition of African-led standards as legitimate.

### “Nobody Will Die”

Correct. Cocoa is not food-security critical, not energy-critical, and not a scarce medicine. It is a discretionary input. A 25% share is an economic adjustment, not an existential one.

### Requirements

- **Enforcement against smuggling.** Beans already leak from Ghana into Togo and Burkina Faso, and from Côte d'Ivoire into Guinea and Liberia. A floor without border enforcement is a subsidy to smugglers.
- **Fringe producer tolerance.** Ecuador, Indonesia, Nigeria, and Brazil will expand into any gap. Their expansion is slow (3–5 year biological lag) but real. Partial control requires either buying them in or accepting leakage.
- **State capacity over the substrate.** This is the hardest part. Six million smallholders are not a cartel. Consolidation through cooperatives, state marketing monopolies, or land reform is a precondition.
- **Processing capacity at origin.** A price floor without grinding capacity just means expensive beans. The Platform layer must be captured domestically to convert bean price into value capture.
- **Institutional continuity.** Enforcement must survive political turnover, elections, and elite rotation.
- **Financial infrastructure.** Trade finance, insurance, and risk management that do not depend on London or Zurich.

### Failure Mode

Partial control without enforcement collapses into Scenario 1 with higher prices for a few seasons, followed by substitution. This is the most likely failure — it is where the LID already is.

## 5.4 Scenario 3: Full Infrastructure Control of Protocol (~60%)

### Protocol Control

Infrastructure becomes the rule-maker, not the rule-taker.

### Mechanism

- **Production quotas** — OPEC-style, with member allocations and compliance monitoring.
- **Binding price floor with enforcement** — not a surcharge but a floor backed by export licensing.
- **Origin grinding covering the majority of volume** — cocoa butter, liquor, and powder produced where the beans are grown.
- **African-led certification as the global standard** — ARS-1000 not as an alternative to EUDR but as its recognised equivalent, or its replacement.
- **Own price discovery** — an Abidjan or Accra cocoa exchange, breaking the London/New York duopoly.
- **Ownership in the Aggregator and Platform layers** — African trading houses, African processing equity, African finance.
- **Equity participation in downstream** — joint ventures, offtake agreements with equity, sovereign wealth fund investments.

Full control because the producing states set the terms across all layers, not just the price of beans.

### Substrate Capture

~60% of retail value. This is not a price adjustment. It is a restructuring of the industry.

### Arithmetic

\$72–84bn of a \$120–140bn retail market flowing to the substrate and origin economies. This is the same order of magnitude as resource rents in a well-negotiated extractive sector.

### Downstream Effects

#### On the substrate:

- Cocoa becomes a rent-generating sector.
- Governments capture resource rents, as oil states do.
- This funds Infrastructure — the layer that has been binding for a century.
- It also creates the classic resource-rent risks: patronage, Dutch disease, elite capture.
- Botswana avoided these; Nigeria and Angola did not.
- Institutional quality of the state becomes the determining variable.

#### On the Aggregator layer:

- Structural disruption.
- Transnational traders lose their matching monopoly.
- African trading houses and exchanges take share.
- Finance shifts to African institutions.

- This is the layer most directly displaced.
- Some trading houses adapt by partnering with origin states; others exit or shrink.

#### On the Producer layer:

- This is where the adjustment bites.
- Mass-market chocolate prices rise substantially — plausibly 30–60% at the bar.
- Volume declines in the mass segment.
- Cocoa-free chocolate becomes mainstream in mass-market confectionery.
- The West’s Producer layer does not disappear; it pivots.
- Premium, indulgence, and single-origin segments grow.
- But the mass-market chocolate bar as it exists today changes character.

#### On consumers:

- Chocolate becomes a more premium product.
- Consumption shifts rather than collapses.
- Nobody dies — but the everyday bar becomes less everyday.

#### On geopolitics:

- This is where the West’s counter-move becomes real.
- Trade retaliation, tariff barriers, accelerated substitution funding, and diplomatic pressure are all rational responses.
- The West’s control of Protocol has been its instrument; it will not surrender it without a fight.
- The CFA franc’s peg to the euro becomes a vulnerability.
- Sovereign wealth fund design and governance become strategic priorities.

### “Nobody Will Die”

Correct, and it is worth being precise about why. Cocoa is not a staple, not an energy source, and not a critical medicine. The demand is real but discretionary. A 60% substrate share redistributes income within a wealthy global confectionery market. The adjustment is economic and structural, not humanitarian. The people who lose are shareholders in Mars, Mondelez, Cargill, Olam, and Barry Callebaut — not consumers facing scarcity.

### Requirements

- **Consolidated state control over the substrate.** This is the precondition, and it is the hardest. It means cooperatives with real enforcement power, state marketing monopolies, or land reform. Six million atomised smallholders cannot run a cartel.
- **Buy-in or neutralisation of fringe producers.** Ecuador, Indonesia, Nigeria, Brazil, Cameroon. Either they join the quota system or the quota leaks.
- **Enforcement capacity.** Border control, export licensing, monitoring, and penalties that survive political turnover.
- **Capture of the Platform layer.** Grinding, processing, and manufacturing capacity at origin. Without this, a price floor is just an export tax.

- **African financial institutions.** Trade finance, insurance, and risk management that do not depend on London or Zurich.
- **A price discovery venue.** An African exchange with enough liquidity to be the reference price.
- **Institutional quality.** Botswana-style rent management, not Angola/Nigeria-style rent capture.
- **Currency sovereignty.** The CFA franc's peg to the euro becomes a constraint on monetary policy and a vulnerability to pressure.

### Failure Mode

Full control without institutional capacity collapses into rent-seeking, smuggling, and substitution simultaneously — the Angolan/Nigerian oil outcome applied to cocoa: high nominal capture, poor development outcomes, and eventual demand destruction. The Botswana outcome — captured rents reinvested into state capacity — is the model, and it is rare.

## 5.5 Scenario Comparison

| Dimension                    | Scenario 1                    | Scenario 2                        | Scenario 3                                    |
|------------------------------|-------------------------------|-----------------------------------|-----------------------------------------------|
| <b>Protocol control</b>      | Producer + Aggregator         | Shared, contested                 | Infrastructure                                |
| <b>Substrate capture</b>     | 6–11%                         | ~25%                              | ~60%                                          |
| <b>Mechanism</b>             | Voluntary schemes, surcharge  | Enforceable floor, origin mandate | Quotas, binding floor, own exchange           |
| <b>Farmgate</b>              | Stagnant, volatile            | Roughly triples                   | Structural rent                               |
| <b>Producer effect</b>       | Stable margins, reformulation | 5–15% price rise, volume dip      | 30–60% price rise, mass substitution          |
| <b>Aggregator effect</b>     | Consolidated, profitable      | Margin compression                | Structural displacement                       |
| <b>Consumer effect</b>       | No change                     | 5–15% price rise                  | 30–60% price rise, premium shift              |
| <b>Substitution risk</b>     | High and rising               | Low                               | Moderate, mass segment only                   |
| <b>Terminal state</b>        | Substrate becomes optional    | Substrate becomes a partner       | Substrate becomes a rentier                   |
| <b>Precondition</b>          | None                          | Enforcement, origin processing    | State control, fringe neutralisation          |
| <b>Actors required</b>       | —                             | Côte d'Ivoire + Ghana             | Côte d'Ivoire + Ghana + fringe + institutions |
| <b>Geopolitical friction</b> | None                          | Moderate                          | High                                          |

## 5.6 The Caveat: Only Two Nations

This is the constraint that determines which scenario is possible.

**Côte d'Ivoire is the pivot.** At 37–44% of global production (ICCO, 2022/23–2023/24), it is the only single actor whose withholding moves the world price. The June 2024 export suspension demonstrated this.

**Ghana is the necessary partner.** At 12–13% and declining, it no longer has the volume to act alone, but combined with Côte d'Ivoire it creates the half-to-three-fifths share that makes a cartel viable. Ghana's institutional infrastructure — COCOBOD — is also the more developed marketing apparatus, even if its \$1.85bn debt is a liability.

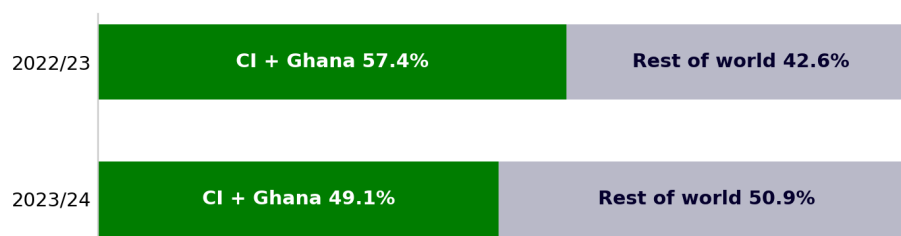
No other producer can anchor this.

- Ecuador at ~9–10% and growing is a fringe expander, not a cartel core.
- Indonesia at ~3–4% is too small to anchor.
- Nigeria at ~6–8% is contracting, with poor infrastructure.
- Brazil is a swing producer at best, focused on its own domestic market.
- Cameroon, Peru, Colombia, Dominican Republic are too small to anchor.

The strategic problem reduces to a bilateral coordination problem between two states with:

- **A shared currency zone** — the CFA franc, tied to the euro, which is itself a protocol dependency.
- **Different institutional capacity** — COCOBOD's debt vs. the Conseil du Café-Cacao's export controls.
- **A history of coordinated action** — the LID, CIGCI, ARS-1000 — but no enforcement mechanism.
- **A shared exposure to smuggling** across their mutual border and to their neighbours.
- **Different political economies** — Ghana's competitive buying vs. Côte d'Ivoire's more centralised system.

The 2023/2024 episode proved they can disrupt. It did not prove they can coordinate.



*Côte d'Ivoire and Ghana combined versus other producers, share of world production (ICCO).*

*The bilateral problem is the strategic problem. Everything else follows from whether these two states can build a joint enforcement mechanism that survives political turnover, smuggling pressure, and external retaliation.*

## 5.7 How Each Scenario Could Emerge

**Scenario 1 emerges by default.** No action is required. It is the path of least resistance, favoured by the Producer and Aggregator layers, embedded in existing institutions, and consistent with the advice of conventional development agencies.

**Scenario 2 emerges if:**

- CIGCI adopts enforceable instruments — export licensing, harmonised floor, traceability standards.
- ARS-1000 achieves EU recognition as an equivalent standard.
- Origin processing reaches 50% of volume.
- Both states maintain policy continuity through elections.
- Fringe producers are either bought in or tolerated.
- Smuggling is contained.

#### Scenario 3 emerges if:

- Both states consolidate control over the substrate — through cooperatives, state marketing, or land reform.
- Production quotas are adopted and enforced.
- Fringe producers join or are neutralised.
- Origin processing covers the majority of volume.
- An African price discovery venue achieves liquidity.
- Financial institutions at origin can finance trade and processing.
- Institutional quality supports rent management rather than rent capture.
- External retaliation is absorbed.

The probability ordering is Scenario 1 > Scenario 2 > Scenario 3. But probability is not destiny. The 2023/2024 crisis showed that the system can be disrupted by physical events. The question is whether the disruption is converted into institutional power or dissipates.

## 5.8 What Each Scenario Means for Each Actor

| Actor                      | Scenario 1                         | Scenario 2                         | Scenario 3                             |
|----------------------------|------------------------------------|------------------------------------|----------------------------------------|
| <b>Ivorian farmer</b>      | Continued poverty, volatile prices | Rising income, replanting possible | Rentier income, but institutional risk |
| <b>Ghanaian farmer</b>     | Continued poverty, COCOBOD debt    | Rising income, debt restructured   | Rentier income, but institutional risk |
| <b>Côte d'Ivoire state</b> | Weak fiscal position               | Expanding fiscal space             | Rent capture, Dutch disease risk       |
| <b>Ghana state</b>         | Debt crisis, weak fiscal position  | Fiscal stabilisation               | Rent capture, Dutch disease risk       |
| <b>Ecuador</b>             | Fringe expander                    | Fringe expander, possible member   | Member or neutralised                  |
| <b>Olam</b>                | Consolidated, profitable           | Margin compression, adaptation     | Structural displacement                |
| <b>Cargill</b>             | Consolidated, profitable           | Margin compression, adaptation     | Structural displacement                |
| <b>Barry Callebaut</b>     | Consolidated, profitable           | Margin compression, adaptation     | Structural displacement                |
| <b>Mars</b>                | Stable margins, reformulation      | Modest price rise, volume dip      | Substantial price rise, substitution   |

| Actor            | Scenario 1                    | Scenario 2                     | Scenario 3                           |
|------------------|-------------------------------|--------------------------------|--------------------------------------|
| <b>Mondelēz</b>  | Stable margins, reformulation | Modest price rise, volume dip  | Substantial price rise, substitution |
| <b>Bühler</b>    | Stable equipment demand       | Origin processing demand grows | Origin processing demand surges      |
| <b>EU</b>        | Protocol control deepens      | Shared protocol control        | Contested protocol control           |
| <b>US</b>        | Indirect influence            | Indirect influence             | Contested influence                  |
| <b>Consumers</b> | No change                     | 5–15% price rise               | 30–60% price rise, premium shift     |

# Conclusion

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The cocoa industry is not a market. It is a protocol regime in which the rules are written by the layers that extract value from the substrate, and the substrate has no seat at the table where its own price, quality standards, and market access are determined.

## The Diagnosis, Stated Plainly

- **Infrastructure** — Côte d'Ivoire, Ghana, Ecuador, Indonesia, Nigeria, Cameroon — holds the physical substrate. It is fragmented, undercapitalised, and climate-exposed. It captures 6–11% of final value.
- **Aggregator** — Olam, Cargill, Barry Callebaut, ECOM, Touton — controls matching, finance, logistics, and information. It captures trading margin and shapes the terms on which beans flow.
- **Platform** — Bühler, Duyvis Wiener, Aasted, Selmi, Sollich — controls the means of processing. It captures equipment rents and technology lock-in.
- **Producer** — Mars, Mondelēz, Ferrero, Nestlé, Lindt, Hershey — controls brands and consumer access. It captures ~70% of retail value with retail.
- **Protocol** — controlled by the Producer and Aggregator layers through industry associations, voluntary standards, governance capture of multi-stakeholder initiatives, direct lobbying, and structural power in intergovernmental bodies.

The Producer and Aggregator layers do not need to own the farms. They own the matching, the machines, and the rules. That is where the leverage sits.

## The 2023/2024 Warning

The 2023/2024 price spike was a warning shot from the base of the stack. It proved that Infrastructure can disrupt. It also proved that disruption is not the same as power. The producing countries can make the system bleed, but they cannot yet make it serve them.

The windfall went to whoever happened to sell at the peak. The structural position of the substrate did not change. The protocols still belonged to the Producer and Aggregator layers.

## The Comparative Evidence

The comparison with petroleum, milk, soybeans, apples, coffee, palm oil, and wool establishes three propositions:

1. **Physical dominance does not produce value capture.** Côte d'Ivoire and Ghana alone hold 49–57% of supply, yet the substrate captures 6–11%. Wool's growers capture 2–13%. Palm oil smallholders capture ~5%.
2. **Institutionalised protocols are the decisive variable.** Oil, milk, soybeans, and apples all have mechanisms that convert physical position into price. Cocoa does not.

3. **The mechanisms are known and transferable.** Supply management (milk), production quotas (oil), cooperative marketing (soybeans), direct channels (apples), quality differentiation (coffee). Cocoa does not need to invent — it needs to adopt and enforce.

## The Three Futures

**Scenario 1** is the default. It ends with cocoa engineered out of the mass market. The substrate becomes optional. The 2023/2024 spike is remembered as the last warning.

**Scenario 2** is achievable with enforcement capacity and origin processing. Substrate capture rises to ~25%. The substrate becomes a partner rather than a victim. Nobody dies.

**Scenario 3** is possible with state control over the substrate, fringe neutralisation, and capture of the Platform layer. Substrate capture rises to ~60%. Cocoa becomes a resource rent. The industry restructures around African terms. Nobody dies — but the everyday chocolate bar becomes less everyday, and the shareholders of Mars, Mondelez, Cargill, Olam, and Barry Callebaut absorb the adjustment.

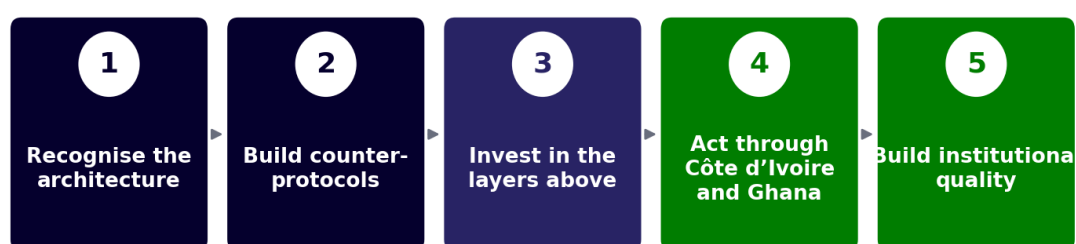
## The Decisive Constraint

Only Côte d'Ivoire and Ghana can change the outcome.

Together they hold the half-to-three-fifths share that makes a cartel viable. No other producer can anchor it. The strategic problem reduces to a bilateral coordination problem between two states with a shared currency, different institutional capacities, a history of coordinated declarations without enforcement, and a shared exposure to smuggling.

The 2023/2024 episode proved they can disrupt. It did not prove they can coordinate.

## The Path



*The path from recognition to institutional quality.*

1. **Recognise the architecture.** The colonial setup was designed to extract. Independence did not dismantle it. Structural adjustment weakened the instruments that could have replaced it.
2. **Build counter-protocols.** An enforceable price floor. ARS-1000 as a global standard. An origin processing mandate. African price discovery.
3. **Invest in the layers above.** Platform (processing equipment). Aggregator (trading houses, finance). Protocol (standards, certification).

4. **Act through the two nations that can.** Côte d'Ivoire and Ghana, with fringe buy-in or neutralisation.
5. **Build institutional quality.** Rent management, not rent capture. Botswana, not Angola.

## The Final Statement

Nobody dies in any scenario. Cocoa is not a staple, not an energy source, not a critical medicine. The question is not survival. It is who writes the rules, and whether the substrate remains essential or becomes optional.

*The power is real. The understanding is the first step. The protocols are the mechanism. And the actors are two.*

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