From Bean to Bar: Trends and Opportunities in Cocoa Supply Chain Transparency

Amelia Shister, Office of Industries
amelia.shister@usitc.gov, (202) 205-2047

This Executive Briefing on Trade provides a brief overview of the cocoa supply chain, addresses why supply chain transparency is important for issues like sustainability and combating labor abuses, and highlights current traceability efforts. Cocoa beans are part of a global supply chain and the production process has created potential for the exploitation of child labor and deforestation. This is driving firms to utilize digital technologies to trace their supply chain from bean to bar.

The Cocoa Supply Chain: From Bean to Bar

Cocoa beans are grown on plantations in tropical climates. The beans are first harvested from their pods, cleaned, and roasted before they are processed to create cocoa liquor. Next, the cocoa liquor may be pressed to extract some or all of the cocoa butter, leaving behind cocoa presscake. Cocoa presscake is then pulverized to create cocoa powder. These intermediate cocoa products are further refined and sometimes combined with other ingredients like sugar and dairy before being packaged for final sale.

Table 1: Cocoa Production and Consumption 2017-18

Production		Consumption	
Country/ Region	Quantity (1,000 tons)	Country/ Region	Quantity (1,000 tons)
Cote d'Ivoire	2,000	Europe	1,852
Ghana	900	United States	732
Rest of Africa	618	Brazil	189
Ecuador	270	Rest of Americas	333
Brazil	165	Japan	176
Rest of South America	317	China	82
Indonesia	280	India	46
Rest of Asia	88	Rest of Asia	351
		Australia	76
Source: ICCO 2018, Table 2, 40			

Cocoa beans are typically grown between 10°N and 10°S of the equator and the largest global suppliers of cocoa beans are in Western Africa, Central and South America, and Southeast Asia (table 1). The largest exporter of cocoa beans is Cote d'Ivoire, with exports of over 1.5 million tons in 2018, and accounts for roughly 45 percent of global cocoa bean exports. Ghana is the second largest exporter. The Netherlands and Belgium are also top exporters of cocoa beans, though this reflects their re-exports. Because of its large cocoa processing industry, the EU is the largest importer of cocoa beans, with the Netherlands (1.2 million tons) and Germany (469 thousand tons) taking top individual country spots, followed by the United States.

Intermediate cocoa products, which include cocoa powder, liquor, butter, and syrup, are used as ingredients in confectionery products and a variety of other foods.[1] The Netherlands is the largest exporter of these products, primarily cocoa powder, with exports of 699,000 tons in 2018. Indonesia and Cote d'Ivoire export the second and third largest volumes of intermediate cocoa products. The United States is the largest single country importer of intermediate cocoa products, followed by Germany, Netherlands, Belgium, and France. These countries are major manufacturers of finished chocolate confectionary products.

Cocoa-producing countries are experiencing significant investment in cocoa processing capacity, in an effort to move further up the cocoa value chain. This increase in processing capacity is the result of investment from U.S. and EU-headquartered cocoa companies as well as cocoa countries' efforts to develop processing capabilities in order to capture more of the value added from cocoa products. In March 2019, Barry Callebaut began processing capacity expansion in Cote d'Ivoire. Ghanaian exports of intermediate cocoa products increased 156.2 percent

[1] Intermediate cocoa products are traded under HS headings 1803, 1804, and 1805. This analysis excludes products under HS subheadings 1806.10 and 1806.20 which contain sugar and/or dairy and may be subject to WTO TRQs.

from 2017 to 2018 following government investment in its cocoa processing industry. As discussed further below, a desire to manage their supply chains more closely could contribute to large multinational chocolate confectionary firms supporting intermediate cocoa processing in cocoa growing countries.

Supply Chain Transparency

Over the course of the last few decades, chocolate confectionary firms have become more invested in monitoring their supply chains and working with cocoa farmers and processors to implement supply chain transparency measures. Cocoa farming practices have generated concerns over deforestation and child slavery, and consumers are demanding supply chain transparency to ensure the cocoa they are purchasing is both sustainable and ethical. The rise of certifying NGOs and government labeling regulations has further incentivized large chocolate companies' efforts in supply chain transparency. Similarly, transparency is important to companies in order to comply with local and national laws where products are sold (such as the California Transparency in Supply Chains Act of 2010, the repeal of the "consumptive demand" clause in 19 U.S.C. § 1307, and the UK Modern Slavery Act).

Firms may have an economic incentive to promote supply chain transparency. The IBM Food Trust ("IBM") has noted that supply chain inefficiencies across the entire food industry cost firms roughly $60 billion annually by increasing prices, carbon footprint, and food waste while delivering inferior products. As a result of these developments, in March 2019, The Hershey Co. and Mars Wrigley Confectionery released supply chain action plans against deforestation in an effort to develop more environmentally sustainable and ethical labor practices in cocoa farming.

Large multinational chocolate confectionary firms and NGOs are increasingly turning to new technologies to trace cocoa through each step in the supply chain. The Rainforest Alliance uses a digital platform to verify the sustainability of the suppliers seeking certifications. Using a federated ledger,[2] the platform allows the Rainforest Alliance to audit each step in the supply chain for compliance with sustainability standards. As an alternative, IBM is working with chocolate confectionary firms to utilize new technologies like blockchain for this purpose.[3]

Smaller firms are also influencing how chocolate companies utilize technology for supply chain transparency. Tony's Chocolonely created a pilot program in 2018 using blockchain technology in their supply chain tracing instead of a federated ledger. The pilot showed potential for blockchain in cocoa supply chain transparency, but also highlighted the largest issue around cocoa supply chain transparency: obtaining reliable data in a timely fashion. Blockchain is easy to adopt with a virtual product like Bitcoin, but is more challenging with a physical value chain. According to some analysts, there is the potential in the next 10 years for blockchain to be fully integrated into current global cocoa supply chain tracking systems industry-wide. Regardless of the final technology utilized, transparency appears to be the ultimate tool in addressing labor and environmental sustainability concerns in cocoa.

Sources: Barry Callebaut Company Information, Barry Callebaut expands its cocoa processing capacities in Côte d'Ivoire; Candy Industry, Hershey releases action plans against deforestation in Ghana, Ivory Coast; Candy Industry, Mars Wrigley Confectionery takes new actions to move toward deforestation-free cocoa supply chain; ChainPoint, Tony's Chocolonely; Global Trade Atlas, accessed April 15, 2019; Hershey, Responsible Sourcing; IBM, IBM Food Trust: adding trust and transparency to our food; ICCO, About Cocoa; R. Janssen, How we used blockchain to make supply chains transparent and traceable; H. P. Levy, The Reality of Blockchain; Mars, Saving Tomorrow's Cocoa, Today; Tony's Chocolonely, Where blockchain and slave free chocolate come together; U.S. Customs and Border Protection, Forced Labor; P. Whoriskey, R. Siegel, Cocoa's child laborers.

[2] A federated ledger is a mutable centrally maintained digital ledger with inputs from multiple sources.

[3] Blockchain is an immutable distributed ledger made up of digital data blocks of transactions not maintained by any central authority. It allows all supply chain participants to have access to all the data in real time.