

Food Security and Agriculture in Central America

Market structure and efficiency in agricultural value chains: Deep dives in El Salvador and the Dominican Republic



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List of Acronyms

ACOPEROERICK	Asociación Cooperativa de Producción, Comercialización y Servicios “Compañero Eric” de RL
ADOBANANO	Dominican Association of Banana Producers
ADOPEXPO	Dominican Association of Exporters
ASAESCLA	Asociación Cooperativa de Producción, Comercialización y Servicios “El Éxito de Santa Clara”
BAM	Measures of Support for the Banana Sector, Dominican Republic
BANELINO	Ecological Banana Association of the Northwest Line, Dominican Republic
BFA	Agricultural Development Bank, El Salvador
CENTA	National Center of Agricultural and Forestry Technology, El Salvador
CIEX	Import and Export Center of El Salvador
CIF	Cost, Insurance, and Freight
CIRAD	French Agricultural Research Centre for International Development
CLAC	Latin American and Caribbean Coordinator for Fair Trade Producers and Workers
CNC	National Council for Competitiveness, Dominican Republic
CONAMYPE	National Commission for Micro and Small Enterprises, El Salvador
DGA	Directorate General of Customs, Dominican Republic
EU	European Union
FIDEAGRO	Agricultural Development Trust, El Salvador
FOB	Free on Board
IDIAF	Dominican Institute for Agricultural and Forest Research
IFPRI	International Food Policy Research Intsitute
INESPRE	Institute for Price Stabilization, Dominican Republic
JAD	Dominican Agribusiness Board
MAG-DEA	Ministry of Agriculture of El Salvador, Directorate General for Agricultural Economy
MAG-OPES	Ministry of Agriculture of El Salvador, Office of Planning, Monitoring, and Evaluation
MARN	Ministry of Environment and Natural Resources, Dominican Republic
PIATEC	Agro-Technological Inputs Program, El Salvador
SDG	Sustainably Development Goal
SMAR	Program for High Yield Maize Production, El Salvador
UK	United Kingdom

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Executive Summary

Hunger and malnutrition remain critical developmental challenges in Central America. Since 2020, rates of moderate and severe food insecurity have risen across the region, while key indicators in early childhood nutrition persist at high levels across both lower- and upper-middle income states. Rising food prices play a key role in limiting access of the populations of these countries to healthy and affordable diets. In 2022 and 2023, food price inflation reached or exceeded 10% in Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua. Across almost all of these countries, white maize remain more than 40% higher than their levels in 2021, while prices for red and black beans rose by 40% to 90% over the same period. Price increases have disproportionately affected poorer and rural households.

High food price inflation rates are associated with a complex set of factors, the most immediate of which include rising fuel and fertilizer costs as well as climatic shocks to domestic production. Rising food prices continue to restrict access to food for many people across the world and in Central America. Curiously, however, recent evidence suggests that a disconnect exists between the movement of international food prices and the movement of food prices in domestic wholesale markets across Central America. A 2024 study conducted by the World Bank found that price return responses at the domestic level carried less than 10% of an initial shock in international prices for a series of important staple foods across Central American countries. The low transmission of international prices for key food products in Central America raises important questions on how efficiently these markets operate for both producers and consumers. Persistent rates of food price inflation may imply distortions in how prices are formed across producers, intermediaries, processors, and wholesalers in food supply chains, and motivate a deeper structural analysis of how these actors interact with one another and the larger policy environment that governs them.

This report represents a context-specific approach to analyzing market structures and dynamics that may contribute to price distortions in two country-commodity pairs in Central America: white maize in El Salvador, and bananas in the Dominican Republic. Both of these sectors present unique case studies in understanding the entry points for

price distortions in domestically produced commodities that are highly relevant for local diets and have a strong traded component. In El Salvador, white maize is the largest caloric contributor to daily diets, and almost one fifth of national consumption is satisfied through imports. As such, asymmetric price transmission from border to local markets, where spikes in international prices are transmitted to consumers faster than price declines, represents a risk to food security through negative effects on poorest consumers who spend a higher share of their incomes on staple foods. In the Dominican Republic, bananas play an important role in local diets, but are produced by a commercial sector that also serves a high-value export market for certified and organic products. At the same time, many smallholder banana producers in the Dominican Republic are food insecure themselves, and imperfect functioning of the markets that impedes communication of price signals and prevents farmers from capturing a larger share of the export prices undermines their access to food. In each case, very little pass-through has occurred from changes in international prices to changes in prices on domestic wholesale markets, and this report seeks to shed light on the underlining drivers which could inform a policy response.

For both commodities, this report analyzes the structures of the value chains through which they are produced and sold, the public policies that govern them, and the distributions of costs and prices across participating actors to answer three guiding questions:



1. How are prices formed on domestic markets and how do these mechanisms compare to the traded track?
2. What do the structures and evolving characteristics of the value chains for these products suggest about market efficiency in the two countries?
3. How do trends in market concentration and public policy implementation contribute to possible price distortions?

First, close analysis of both of these sectors reveals a set of important mechanisms driving price formation on domestic markets. In El Salvador, a complete bifurcation has occurred in the supply chains for domestically produced and imported white maize. Domestically, white maize is grown by approximately 340,000 small farmers who consume a share of their production and sell the surplus through a complex web of informal intermediaries and wholesalers of various sizes. Conversely, white maize is imported through a highly concentrated subsector of agro-processors who do not domestically source their products and who sell through a more formalized set of larger wholesalers and supermarkets. While both domestic and imported maize interact on the consumer market, the mechanisms that guide the costs and intermediate prices in these two supply chains remain wholly separate. In the Dominican Republic, separate pricing mechanisms exist for export-oriented bananas and those that reach the domestic market. Export prices for commercial bananas are determined through futures contracts that are benchmarked to internationally certified standards. The domestic market, in contrast, relies on a fragmented structure of intermediaries through which the primary determinants of prices are the information on available supply and market demand that is transmitted from producers and wholesalers respectively.

Second, the structures of these markets suggest several potential sources of inefficiencies. In El Salvador, the informal nature of production and intermediation prevent both the efficient communication of demand signals to producers, and the efficient integration of domestic products into large-scale agro-processing chains. High concentration and low transparency in the agro-processing sector may allow participating firms to capture a relatively higher share of the value of imported maize, and may expose consumers to greater risks should international prices for white maize grain rise. In the Dominican Republic, export-oriented banana production reflects a disconnect between the internationally determined prices at which producers sell, and their incentives to efficiently structure their activities in a way that could minimize the effects of international price decreases. Domestically, informality in intermediation

prevents the communication of key demand signals and precludes farmers from employing domestically the same strategies that allow them to profitably produce under longer-term futures contracts in the export market.

Third, the policy environments that govern these two value chains present opportunities to improve their efficiency and to reduce potential distortions in the movement of prices from producers to wholesale markets. In El Salvador, public support to the white maize sector has recently prioritized the complete liberalization of imports and a system of producer support that, while better targeting individual producers' needs, may induce a pivot away from maize production. These policies call for a more effective strategic planning process that involves both domestic producers and agro-processors, as well as a stronger focus on improving the transparency of the import-oriented agro-processing sector. In the Dominican Republic, recent policies have focused on investments in plantation renewal to improve productivity, and strengthened coordination between producers' organizations, exporters, and the Ministry of Agriculture. As in El Salvador, however, these policies lack a coherent strategic planning process, and call for the improved communication and management of market information from both domestic and export markets.

These findings provide context for a concrete set of policy recommendations across three key axes: targeted support to producers, targeted support to consumers, and general support to the infrastructure and information systems that govern the agricultural sectors in each country. Direct support programs for producers should focus on implementing more effective sectoral planning exercises, as well as improving the delivery mechanisms for investments and resources towards producers. Producers in both countries would benefit from consultative investment planning exercises, financial resources targeted towards realistic goals in production and sale, and complementary investments in improved technology and technical inputs.

Targeted support programs for consumers should focus on developing efficient mechanisms for anticipating and responding to changes in wholesale and retail prices for these products. Anticipatory measures should be implemented from the point of production onwards, through a focus on making input markets more efficient and through offering cost-effective insurance systems to farmers that can reduce the impacts of and improve the speed of recovery from domestic shocks to production. Direct policies towards supporting consumers should focus on efficiently targeting financial resources towards vulnerable populations, rather than relying on physical food reserves or blanket price subsidy programs.



Finally, the above policies would be made more effective through general services support towards agricultural and commercial activities that comprise these two value chains. More effective physical infrastructure for transportation, storage, and processing would better connect rural farmers to urban and peri-urban wholesale markets, reducing

post-harvest losses as well as the transaction costs that contribute to wholesale and retail prices. More effective information management systems, such as pricing information services, would also significantly reduce the information asymmetries that can lead to distortions in the prices offered to producers and consumers.

Table ES1: Summary of policy recommendations by type of support and timeline

Identified Challenge	Proposed Recommendation	Expected Result	Type of Support	Timeline
Inefficiencies in the supply chain and limited access to credit or markets for smallholders	Facilitate the creation of productive alliances between smallholder organizations and agribusinesses to enhance credit access, reduce risks, and improve market integration. These collaborations should focus on addressing technical, commercial, financial, and social challenges to unlock income opportunities for smallholder farmers.	Strengthened market access, reduced risks for smallholders, improved productivity, and increased incomes.	Producer support	Mid-term
Food price shocks and food availability shortages	Expand cost-effective risk-based insurance systems that cover production risks and price volatility, especially in the face of climate change.	Enhanced resilience of farmers and the food system to external shocks, ensuring more stable food supplies and reducing risks to food security.	Producer support	Mid-term
Lack of effective planning for sectoral development	Strengthen strategic planning through participatory processes involving farmers, government, and private sector stakeholders to align investments and incentives with market needs and conditions.	A more targeted approach to sectoral investments that can respond to current and future market conditions, leading to sustainable productivity growth.	Producer support	Long-term
Limited consumer protection against rising food prices (food affordability)	Implement targeted financial support mechanisms to protect vulnerable populations during food price shocks, while avoiding market disruptions.	Protection of low-income consumers from food price inflation, with more effective use of public resources to reach those most in need.	Consumer support	Short-term
Market fragmentation and lack of information flow	Improved market information systems and communication: Develop mechanisms to collect, analyze, and disseminate pricing and demand information across the value chain, with a particular focus on informal actors.	Enhanced decision-making for farmers, better market access, reduced inefficiencies, and improved price transparency throughout the agricultural value chain.	General services support	Short-term
Lack of knowledge and adoption of efficient farming practices	Provide extension services, technical assistance programs, and access to modern agricultural technologies to improve productivity, product quality, and resilience among farmers.	Increased farm productivity, adoption of sustainable practices, and better integration into formal markets, leading to improved profitability.	General services support	Medium-term
Limited market connectivity and inefficient logistics	Increase investments in general services support to strengthen transportation, market infrastructure, and post-production facilities, alongside soft infrastructure such as producer associations, extension services, and marketing and inspection services to connect rural farmers to urban wholesale markets and processing/storage facilities.	Improved access to markets, reduced inefficiencies in supply chains, and enhanced competitiveness of rural farmers.	General services support	Medium-term





1 Introduction

Background

The Sustainable Development Framework defines the reduction of hunger and malnutrition as key priorities.

Sustainable Development Goal (SDG) 2 establishes a set of targets towards ending hunger and malnutrition, fostering sustainable production systems, and stimulating investments in rural development and the efficiency of global food markets. By referencing multi-sectoral and multi-thematic investments, these targets recognize the important relationships that exist between human nutrition and broader trends in human development (Pérez-Escamilla, 2017; UNSD, 2024) at all times have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (http://www.fao.org/wfs/index_en.htm). These developmental priorities in hunger, nutrition, and human development are made more tangible through the concept of *food and nutrition security*, defined as “a state in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs” (CFS, 2021). Food security is measured through four key characteristics that define the

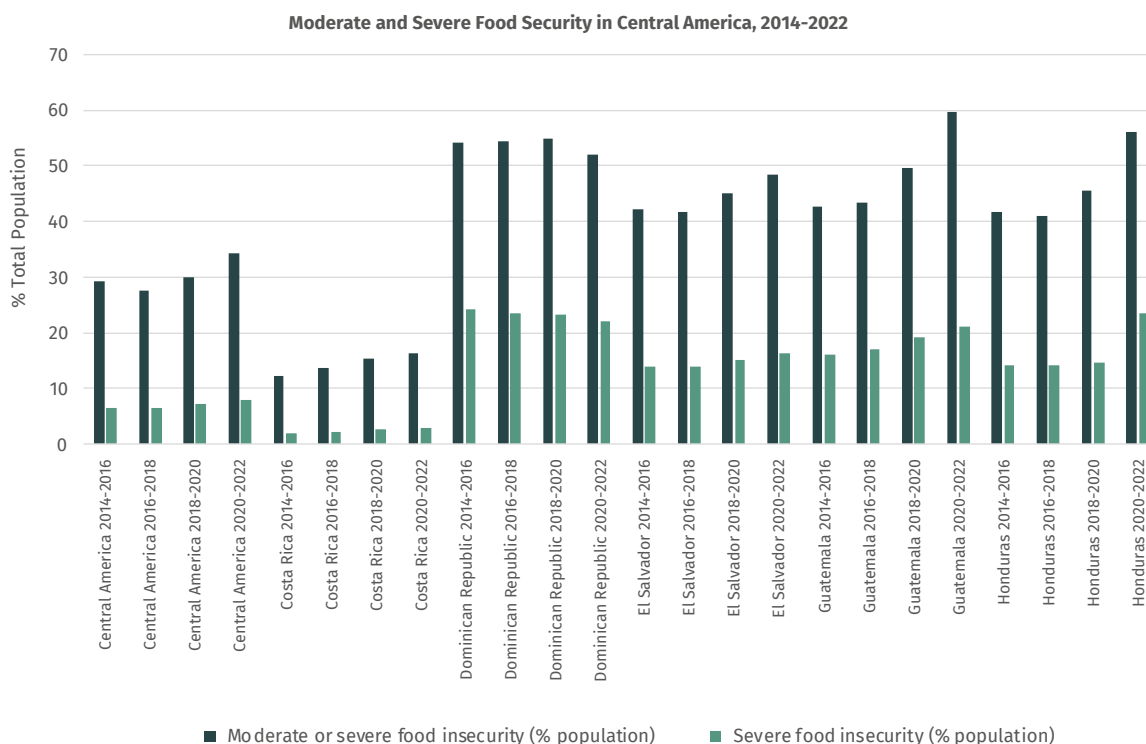
ways in which people interact with food: availability, access, utilization, and stability. *Food and nutrition insecurity* arises when a population faces a shortfall in the quantity and quality of food that is consistently available and accessible. *Moderate* food and nutrition insecurity refers to a recurrent and uncertain availability of and access to this food supply; *severe* food and nutrition insecurity refers to a clear lack of availability and access for a significant period of time, often driven by armed conflict, natural disasters, or price shocks (CFS, 2021; FAO, 2023).

The Central America region remains a critical hotspot for food and nutrition insecurity.¹ In 2022, 34.5% of the region’s population lived in a state of moderate or severe food insecurity, representing an increase of 0.4% (or 1.3 million more people) from 2021. As shown in Figure 1, this trend predates the COVID-19 pandemic across many countries; since 2014, notable increases in both measures have occurred in El Salvador, Guatemala, and Honduras. It also runs counter to the moderate decrease in food security that occurred across Latin America and the Caribbean in aggregate since 2021.

¹ For the purposes of this report, Central America is defined as the community of Spanish-speaking countries within SICA, including Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.



Figure 1: Moderate and severe food insecurity across Central America; countries for which information is available



Source: own elaboration, based on (FAO, 2024b)

Rising levels of food insecurity in Central America associate with persistent trends in undernourishment and poor nutritional outcomes for children. Table 2 shows that the prevalence of undernourishment decreased in aggregate across Central America before stagnating in 2021 and that since that time, notable increases have occurred in El Salvador, Honduras, and Panama. The share of children under 5 who exhibit stunting has gradually

decreased during this period. However, higher levels and lower rates of decline characterize the recent experiences of less food-secure states such as Guatemala, El Salvador, and Honduras. Slow rates of decline, and even reversals, also persist in the higher-income countries that have achieved low absolute levels of prevalence, including Costa Rica, the Dominican Republic, and Panama (FAO, 2024b).

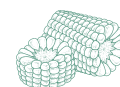


Table 2: The prevalence of undernourishment for the general population, and stunting for children under 5, in Central America

		2016	2017	2018	2019	2020	2021	2022
Central America	Undernourishment (% total pop.)	6.6	6.3	6.1	5.8	5.4	5	5
	Children under 5 who are stunted (%)	17.5	17.5	17.5	17.4	17.2	17.1	16.9
Costa Rica	Undernourishment (% total pop.)	4.2	3.7	3.2	3.1	3.1	3.1	3
	Children under 5 who are stunted (%)	7.7	8	8.3	8.6	8.9	9.2	9.5
Dominican Republic	Undernourishment (% total pop.)	7.4	6.7	6	5.7	6.3	6.3	6.3
	Children under 5 who are stunted (%)	7.2	7	6.8	6.5	6.2	5.9	5.6
El Salvador	Undernourishment (% total pop.)	9.6	8.9	8	7.1	7.2	7	7.7
	Children under 5 who are stunted (%)	12.4	11.8	11.4	11	10.7	10.3	10
Guatemala	Undernourishment (% total pop.)	15.7	14.8	14.4	14.1	14.1	13.5	13.3
	Children under 5 who are stunted (%)	45.8	45.5	45.3	44.9	44.2	43.7	43.5
Honduras	Undernourishment (% total pop.)	15.5	14.9	14.3	14.1	14.5	16.2	18.7
	Children under 5 who are stunted (%)	20.1	19.8	19.4	18.9	18.4	17.9	17.5
Nicaragua	Undernourishment (% total pop.)	19.3	18.3	17.6	17.4	17.5	17.9	17.8
	Children under 5 who are stunted (%)	16.1	15.9	15.7	15.5	15.3	15.1	14.9
Panama	Undernourishment (% total pop.)	7.3	7	6.1	5.2	4.7	4.9	5.3
	Children under 5 who are stunted (%)	17.3	16.6	15.9	15.2	14.6	14.1	13.8

Source: own elaboration, based on (FAO, 2024b)

Rising food prices drive food and nutrition insecurity in the region. Since 2020, consumer prices for food have exhibited higher rates of inflation than general consumer prices across every country in Central America, as shown in Table 3. In 2022, food Price inflation rates surpassed 10% in Costa Rica, the Dominican Republic, El Salvador, Honduras, and Nicaragua. High inflation rates persisted across most countries through 2023, driven by sustained price increases for meat, edible oils, and cereals. For example, white maize prices on average remain 40% higher than their levels in 2021, while prices for red and black beans have risen by 40% to 90% over the same period (FEWS Net, 2023b). In real and purchasing power parity terms, the costs of healthy and affordable diets have also risen consistently across Central America. In 2021, estimates show that 22.2% of

the population of Central America was unable to afford a healthy diet, with particularly high instances in the Dominican Republic (26%), Honduras (45%), and Nicaragua (34%) (FAO, 2024b). Rising food prices disproportionately affect the welfare and food security of poorer and rural households, who face the compounding impacts of increasing agricultural input prices, climatic shocks to production, rising fuel and logistical costs, and reduced ease of accessing social safety nets. Geographically, these difficulties are further concentrated in the region's Dry Corridor, where fluctuations in rainfall have a dual effect on national food supplies and agricultural incomes through availability of opportunities for wage labor during harvest seasons (FEWS Net, 2022; FEWS NET, 2024).



Table 3: Inflation indices for general consumer prices and food prices, annual averages

		2018	2019	2020	2021	2022	2023
Costa Rica	Inflation: General (%)	2.2	2.1	0.7	1.7	8.3	0.5
	Inflation: Food (%)	1.6	0.8	0.5	2.2	15.0	3.4
Dominican Republic	Inflation: General (%)	3.6	1.8	3.8	8.2	8.8	4.8
	Inflation: Food (%)	3.6	3.8	6.4	9.9	10.6	7.8
El Salvador	Inflation: General (%)	1.1	0.1	-0.4	3.5	7.2	4.0
	Inflation: Food (%)	0.5	1.2	1.6	2.3	11.6	10.1
Guatemala	Inflation: General (%)	3.8	3.7	3.2	4.3	6.9	6.3
	Inflation: Food (%)	7.2	7.8	6.4	4.8	8.7	10.9
Honduras	Inflation: General (%)	4.3	4.4	3.5	4.5	9.1	6.7
	Inflation: Food (%)	3.5	2.2	4.7	2.9	12.5	10.9
Nicaragua	Inflation: General (%)	4.9	5.4	3.7	4.9	10.5	9.3
	Inflation: Food (%)	4.2	4.6	5.1	6.4	14.7	3.4
Panama	Inflation: General (%)	0.8	-0.4	-1.6	1.6	2.9	1.5
	Inflation: Food (%)	-0.6	0.5	-0.8	1.6	3.7	7.8

Source: own elaboration, based on (Ha, Kose and Ohnsorge, 2023) food, energy, and core consumer price inflation; producer price inflation; and gross domestic product deflator changes

High inflation rates for food prices in Central America associate with a complex set of factors. The most immediate include variable domestic supply and rising input costs. Cereals and pulses comprise approximately 60% of the annual per capita energy supply across countries in this region, and the majority of consumption is satisfied through domestic production (INCAP, 2021). Since 2021, Central American countries have experienced high annual variation in the domestic supply these staples as a result of rainfall variation across the region's vulnerable Dry Corridor. In 2022 and 2023, droughts disrupted planting and harvest cycles through the first half of each year, and have associated with stagnations and gradual declines in production volumes. Over the past five years, average annual harvest volumes in maize have decreased by 3% for the region as a whole, while demand has risen by 5%; decreases in harvested volume are particularly prominent in Guatemala (6%) and Nicaragua (4%). Over the same period, production

volumes for beans have fallen by 10% at the regional level. Simultaneously, fertilizer prices have risen by almost 50% on average throughout the region since 2022, driven by a constriction in global supplies following Russia's invasion of Ukraine. Simultaneous increases in fuel prices also affected the logistics networks that enable input markets for farmers in the region; both trends associate with a decrease in the use of production inputs, with further effects on yields and harvest volumes (FEWS Net, 2023a, 2023b).

While rising input and fuel costs have affected production and price levels at the domestic level, recent evidence suggests that low rates of pass-through have occurred from international to domestic food prices for key staples across the region. Using data on international commodity prices and domestic wholesale prices across countries in Central America, a study conducted by the World Bank estimated the domestic price return response in wholesale prices after one month to a simulated shock of



one standard deviation in international prices. Using data from approximately 2000 onwards, this study found that price return responses at the domestic level carried less than 10% of the initial shock for a series of important staples across Central American countries, including banana, black beans, and rice in the Dominican Republic, black beans and maize in Guatemala, maize in Nicaragua, and maize in El Salvador (World Bank, 2024).

The low price transmission for key food products across these countries raises important questions on the efficiency of domestic food markets in Central America. Spatial (horizontal) price transmission and vertical price transmission are key characteristics of efficient markets, defined by recent literature through the Law of One Price: that through profit- and arbitrage-seeking behaviors, actors will induce a price equilibrium in which price differences reflect only the costs of “spatial arbitrage”, or the transport and transaction costs that move a good from one market or stage of production to another (Von Cramon-Taubadel and Goodwin, 2021). Recent empirical studies in spatial price transmission have estimated a wide range of transmission levels across countries and food commodities, with a tentative consensus that higher levels of transmission associate with effective trade infrastructure, policies that promote free trade and domestic competition, functioning spot markets, and integrated markets for the consumption of domestic and imported products (Rapso-manikis, Hallam and Conforti, 2003; Bekkers *et al.*, 2017; Ceballos *et al.*, 2017).

Low levels of horizontal transmission in the prices of key staple foods across Central America open the possibility that distortions in domestic food markets are adversely affecting food security outcomes. In the absence of clear pass-through from international price movements to domestic ones, high and persistent rates of inflation in food prices may imply asymmetries in the movement of prices for different actors along a supply chain, from producers to consumers. Studies of vertical price transmission have traditionally identified market concentration, changing transport and search costs, and market control policies as drivers of the asymmetry of price movements across stages of the supply chain. Concentrated markets of agro-processors, wholesalers, or exporters may prevent the transmission of market and pricing signals to producers, while delaying the downward response of consumer prices to lower production and import costs. Simultaneously, a well-documented set of public policies in Central America have historically

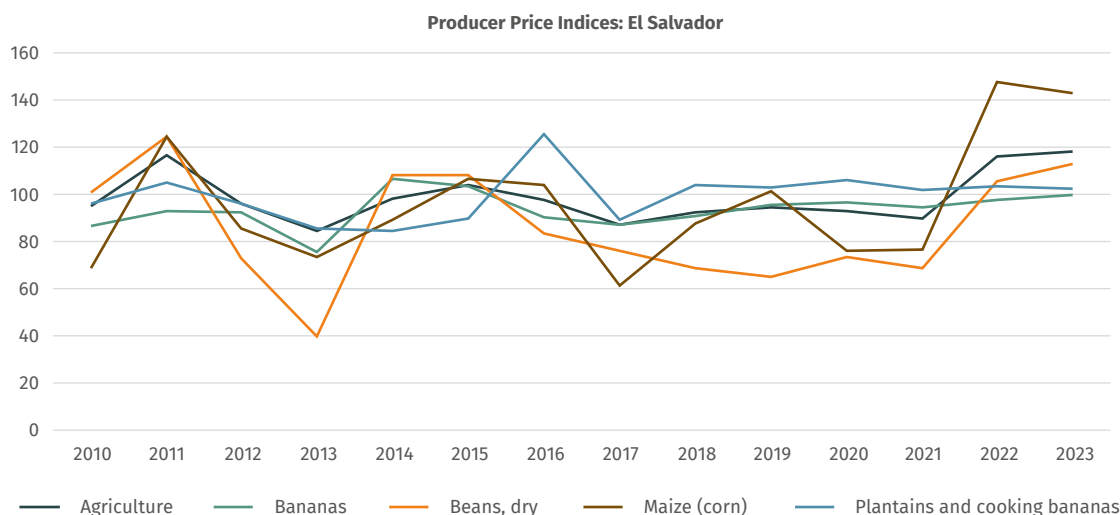
established quantity and price controls that affect import, production, and export activities for larger firms in staple food supply chains (Vavra and Goodwin, 2005; Bakucs, Fałkowski and Fertő, 2014; García-Jiménez and Gandlgruber, 2014; Lloyd, 2017).

However, no consensus exists across these empirical studies that can establish a generalized, cross-country relationship between market structures and the asymmetric transmission of prices. Recent literature reviews emphasize that the lack of standardized pricing data and the abundance of empirical methods have made it difficult to quantify the relationships that might exist between key characteristics of a staple food sector, asymmetries in price transmission, and welfare effects for producers or consumers. In countries where market structures, policy environments, and pricing mechanisms are difficult to measure and incorporate into empirical models, policymakers and development practitioners may benefit from a context-specific analysis for how prices are vertically and horizontally transmitted (Lloyd, 2017; Von Cramon-Taubadel and Goodwin, 2021).

This report adopts this context-specific approach to analyze market structures and dynamics that may contribute to price distortions in two commodity-country pairs in Central America with high relevance for domestic food security. The first pair is that of white maize in El Salvador, a key crop for staple consumption with an imported component. In 2021, white maize was the largest caloric contributor to daily per capita diets (and provided the second highest annual per capita supply of food in El Salvador); in 2022, 16% of the country’s domestic consumption of white maize was satisfied through imports (FAO, 2024b). In 2023, the Salvadorean rate of food price inflation for consumers was double that for general consumption, driven by steep increases in the prices of basic grains (Ha, Kose and Ohnsorge, 2023) food, energy, and core consumer price inflation; producer price inflation; and gross domestic product deflator changes. In the context of a 2.3% decline in white maize production levels between 2022 and 2023, producer prices for that product increased at a rate that has exceeded producer prices in the agricultural sector as a whole, as shown in Figure 2. However, despite increases in international maize prices from 2020 to 2023, little to no transmission of international prices to domestic wholesale markets has been measured for this product in the country (World Bank, 2024).



Figure 2: Producer price indices in aggregate and for key staple crops in El Salvador, 2010-2023

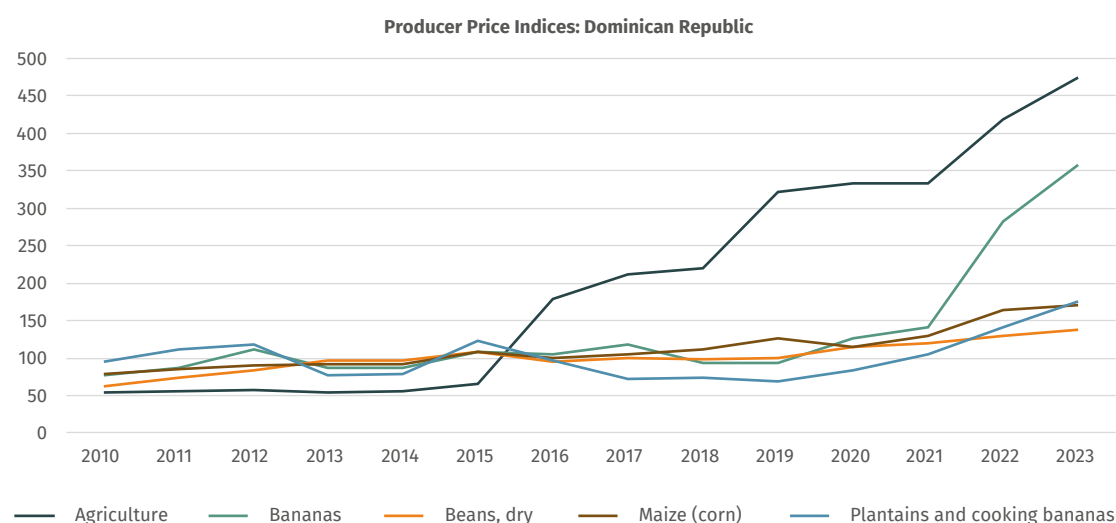


Source: own elaboration, based on (FAO, 2024c)

The second case study of this report, **banana in the Dominican Republic**, offers the opportunity to explore an export-centric sector that also maintains a strong market for domestic consumption.² Bananas represent an important source of calories in the Dominican domestic market, with the third highest per capita food supply in 2022.³ Approximately 21% of total registered production is destined for export markets, but as the Dominican Republic provides only

approximately 2% of global exported supply, it is expected to act as a price-taker in the determination of international prices (Feschet, Pauline *et al.*, 2020; FAO, 2024b). Simultaneously, as shown in Figure 3, in recent years producer prices for bananas have increased at a far greater rate than those for other key staples in the domestic market. Again, however, little to no price transmission was measured from international market to domestic wholesale markets (World Bank, 2024).

Figure 3: Producer price indices in aggregate and for key staple crops in the Dominican Republic, 2010-2023



Source: own elaboration, based on (FAO, 2024c)

² In this case, bananas refer specifically to cultivars in the Musaceae that, as “dessert” fruit, can be cooked in green form or eaten raw in ripe form. It specifically omits plantains. More information can be found in Section 3.

³ This figure does not imply that this full amount is consumed, but that it has been produced and is theoretically available on the domestic market.



This report analyzes the market structures and public policies that contextualize the low transmission of international prices to domestic wholesale markets for white maize in El Salvador and bananas in the Dominican Republic. In doing so, it seeks to answer three guiding questions that can help to identify inefficiencies in how each sector interacts with producers and consumers:

1. Why do these sectors demonstrate low degrees of price transmission from international to domestic wholesale market prices?
2. What do the structures and evolving characteristics of the value chains for these products imply for market efficiency and the transmission of international prices in the two countries?
3. How do trends in market concentration and public policy implementation contribute to possible

price distortions and the lack of measured price transmission?

The report is structured as follows. Section 2 examines the white maize sector in El Salvador, and section 3 examines the banana sector in the Dominican Republic. Each of these commodity-country chapters analyzes the structure of the value chains, the organization and concentration of actors within them, the regulatory framework in which these actors operate, and the costs, prices, and margins that they have recently faced in conducting their operations. Section 4 provides a concluding analysis that answers the three guiding questions of the report. Finally, Section 5 provides concrete policy recommendations that could increase the efficiency of these sectors and improve their contributions towards national food and nutrition security.





2 The white maize sector in El Salvador

2.1 Patterns and trends in production, consumption, and trade

White maize forms a key component of agricultural production and diets in El Salvador. While both white and yellow maize are consumed in-country, yellow maize is almost exclusively an imported product used in animal feed production. White maize represents the principal source of carbohydrates for direct human consumption: in 2021, it was the largest caloric contributor to diets and the food product with the second highest annual per capita supply. Maize flour accounted for 26% of all food supply in calorie terms. It is commercialized mainly as nixtamalized flour for preparation of foods such as tortillas, pupusas, tamales and as a component of processed snacks (FAO, 2024b). To reach consumers, white maize must pass through a chain of activities in domestic production and intermediation – or import and processing – before it is distributed via wholesalers and retailers. This section introduces the sector in aggregate before providing a more detailed analysis of how different actors fit into each specific activity.

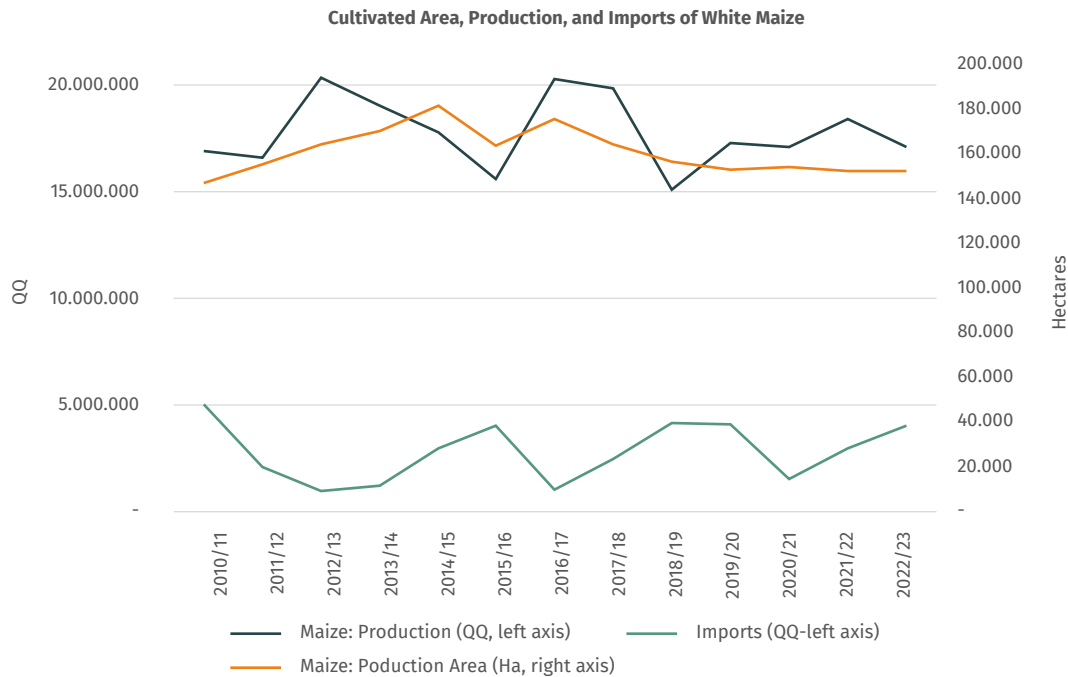
White maize enters the value chain primarily through a smallholder-oriented domestic production system, with imports playing an increasingly important

role. The Ministry of Agriculture (MAG) estimates that annual consumption of white maize reached between 21.1 to 22 million quintals (about 1 million metric tons, or MT) in 2023.⁴ National production supplied 81% of consumption, with the remainder met through imports. Over the past five years, production levels have fluctuated between 15 million and 18.4 million quintals (692,000 and 787,000 MT). Yields have fluctuated consistently around 2.94 MT (45.5 quintals) per hectare, which is above average for the region (IICA, 2014). Approximately 340,000 farmers produce maize across the country, and over 80% of them operate less than 1 hectare each. Recent statistics (shown the figure below) suggest that a decline in total cultivated area is taking place, corresponding to a gradual exit of producers from the sector. Simultaneously, white maize imports have fluctuated in response to the gap between annual domestic production and demand, reaching approximately 4 million quintals (186,000 MT) in 2023 (MAG, 2024b). As discussed later in this chapter, the elimination of tariffs for imported white maize in 2022 has likely contributed to increases in imports.

⁴ Public institutions and private companies in El Salvador measure the production, use, consumption, and unit price of maize in terms of Spanish Quintals (100 lbs, or approximately 45.9 kilograms). This report will thus refer to quintals more commonly than to metric tons or kilograms.



Figure 4: Cultivated area, production, and imports of white maize



Source: authors' elaboration, based on (MAG, 2023a)

Intermediary and processing activities differ widely for domestically produced and imported white maize, particularly in the formality of and coordination between participating actors. The majority of domestically produced maize is either destined for own consumption, or passes through an informal intermediary who brings it via truck to a larger wholesale market. The grain that is brought by these intermediaries is often of varying quality and is then cleaned and packaged in grain form by approximately 200 larger wholesalers in urban or peri-urban areas. Imported white maize passes through a network of companies that negotiate futures contracts with importing brokers. Four importing brokers supply a mix of distributor and agro-processing firms. 95% of imported maize by volume passes through 8 of these firms (BCR, 2024). Nixtamalized maize flour that is processed for mass retail originates entirely from imported white maize, and is destined for processed consumer products. In both grain and processed form, imported products are sold in parallel to domestically produced ones through that network of 200 larger wholesalers who then sell it to across networks of smaller distributors, retailers, or consumers (MAG-DEA, 2024).

Domestic consumption occurs through a diverse set of channels, ranging from own farm consumption to supermarket retail. Demanding up to 30% of the total supply of produced and imported maize, the prevalence of own consumption highlights the critical role that the crop plays in ensuring food security for rural people.⁵ The commercial sale of domestic and imported maize, nixtamalized maize flour, and processed products then occurs through a combination of retailers; information on their activities is limited by the varying degrees of formality at which they operate. There may be up to 7,000 artisanal processors (*tortilleras* or *pupuserías*), 4,000 small food stores, 41,000 corner stores, and approximately 200 supermarkets (Romero *et al.*, 2022). Data on sales by volume of product (whether grain, flour, or processed snacks) is difficult to extrapolate due to the range of weight conversion rates for flour and processed foods. However, interviews suggest that smaller stores buy a mixture of domestic and imported grain, as well as flour produced by the larger agro-processors, while the larger supermarkets buy primarily products of imported origin.

Wholesale and retail prices have fluctuated widely over the past several years, driven primarily by domes-

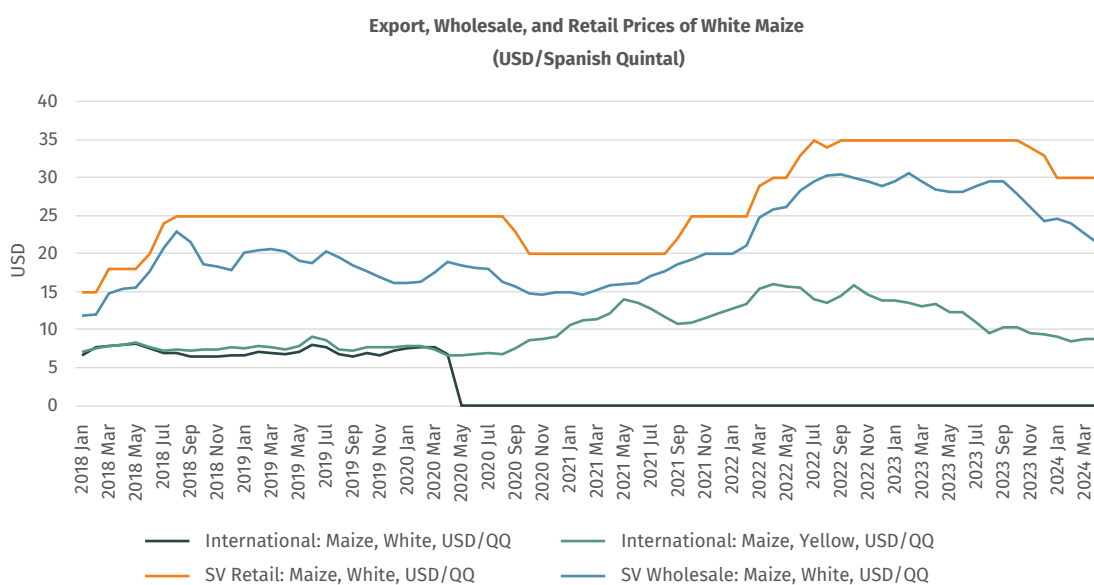
⁵ The importance of own-consumption means that shocks to either input prices or production levels will hit a population that may not otherwise have the resources to purchase an equivalent substitute in the market. Urban populations in El Salvador have more purchasing power, and better geographical access to social protection support programs such as food vouchers.



tic production shocks and changes in input prices. MAG does not systematically collect data on farmgate prices at the regional or national level, and the informality of the intermediary sector complicates efforts to do so. However, the movement of wholesale and retail prices in San Salvador – the largest market for white maize and associated products – reveals a drastic increase in prices after 2020. Wholesale prices increased from approximately \$15 per quintal in January 2021 to a high of almost \$31 per quintal in April 2023, before falling to approximately \$21 per quintal in April 2024. The largest jump in prices corresponds to the onset

of Russia's invasion of Ukraine and its subsequent effects on global fertilizer markets; price spikes in April 2023 also followed from a depletion of lower-than-average domestic supplies in between harvest seasons. According to interviews with technical specialists, climate instability is perceived to drive the increasing variability in annual production that contributed to a mid-year spike in 2023 prices. Production volumes in 2023 fell by 6.9% compared to their 2022 levels, following El Niño-related droughts and heavy rainfall later in the year (MAG, 2023a; MAG-DEA, 2024).

Figure 5: maize prices in international markets, in the domestic wholesale market (San Salvador), and in the retail market (San Salvador)



Source: authors' elaboration, based on (FAO, 2024c)

Note: the international prices refer to US No. 2, Yellow (Gulf) and US No. 2, White (Kentucky). USA has stopped reporting data on white maize that can be integrated into FAO's food price monitoring system.

2.2 The structure of the white maize value chain

This section introduces in greater detail the distribution of activities and actors within the value chain for white maize grain and flour. Figure 6 summarizes the stages, actors, and product flows that comprise the supply chain, beginning with domestic production and imports.

- The chain begins with domestic production (covering approximately 17.1 million quintals, or 80% of total consumption annually) and imports (covering approximately 4 million quintals, or 20% annually). Approximately 6.1 million quintals remain on

farm for own consumption, leaving up to 15.1 million quintals of domestic and imported maize to be distributed nationally.

- Domestically produced maize passes through producers' associations and intermediaries to wholesalers in urban and peri-urban areas, where it is sold in grain form to a wide range of small to medium processors, food establishments, retailers, and less formal neighborhood distributors.

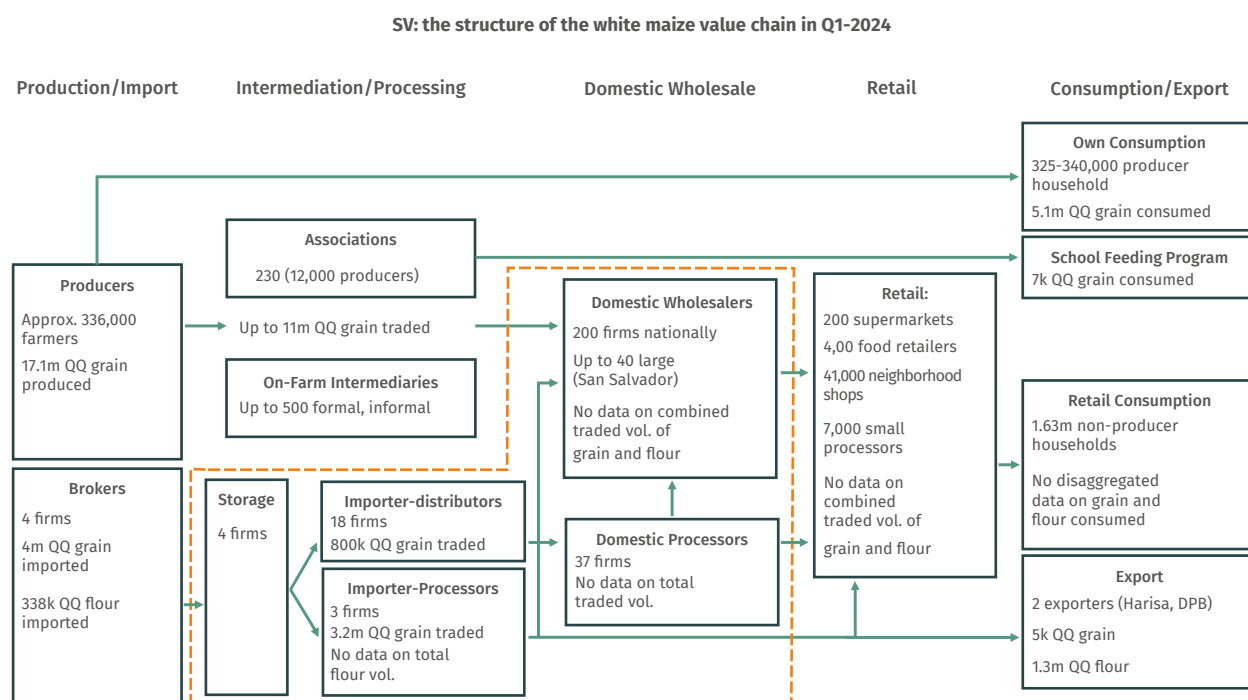


- Imported maize passes from brokers and storage firms to importing firms, of whom 3 are large agro-processors who sell both grain and flour. These firms sell both to wholesalers and to domestic agro-processors, who internally sell flour and prepared foods on a wholesale or retail basis.
- Domestic wholesalers and processors (ranging from small to industrial) act as the primary points of sale to retailers. Large, industrial agro-processors work

exclusively with imported maize grain, while wholesalers and smaller, artisanal processors sell both domestically produced and imported products.

Finally, white maize is sold via a combination of food vendors, small retailers and supermarkets, and a smaller amount of grain and flour are exported to neighboring countries. Interviews suggest that urban consumers primarily buy nixtamalized flour, but that grain is still sold by local stores, and particularly so in peri-urban and rural areas.

Figure 6: An outline of the structure of the white maize value chain in Q1-2024

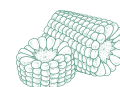


Source: authors' elaboration, based on interviews and (Romero *et al.*, 2022; MAG, 2024b)

Domestic Production

White maize is cultivated across three cycles per year, whose timing has important implications for the downstream market. The first (*primera*) lasts from April to August, accounting for 79% of annual production volume. The second (*postrera*) lasts from August to December and accounts for the remaining 20%. A third smaller harvest (*apante*) lasts from November to March and accounts for approximately 1% of annual production (MAG-DEA, 2024). This cycle generates the largest volume of domestic supply for the market in the fourth quarter of the year, while the second to third quarters present the greatest risk for domestic scarcity prior to the arrival of the *primera* harvest.

Domestic producers of white maize in El Salvador form an important part of the country's rural and agricultural economies. According to MAG-DEA, there are currently approximately 336,000 producers of white maize, representing a decrease from the 365,380 that were last measured in the 2007 Agricultural Census. In 2023, these farmers cultivated a combined 263,450 hectares and produced 17.1 million quintals (787,000 metric tons) of white maize. Since 2010, harvested area has fluctuated between 250,000 to 275,000 hectares, while production has fluctuated from 16.7 million to 20.3 million quintals. Over the past five years, yields have averaged at 44.8 quintals per acre, or 2.98 metric tons per hectare, which are above average for Central America (MAG, 2009, 2023a; IICA, 2014; MAG-DEA, 2024).



Small-scale subsistence farmers predominate in white maize production: they often produce the crop in conjunction with other basic grains such as sorghum and beans, and they are consumers of what they produce before selling the surplus on the market. The last agricultural census suggested that 80% of these producers operated on less than 1 hectare each, with more than 65% of their productive area being located on hillsides and other marginal terrain (MAG, 2009). More recent statistics suggest that

these dynamics have not largely changed: a recent household census in 2018 counted approximately 411,000 rural farmers in total, with many of them producing a mixture of staple crops that included maize. As shown in Table 1 below, almost 90% of these producers operated on 2.1 hectares or less, and MAG-DEA suggests that maize farmers largely comprise the lower end of this distribution (Ministerio de Economía, 2019; MAG-DEA, 2024).

Table 4: Rural Producers by land ownership and location across sub-regions in El Salvador, 2018

Acres	<1	1 to 2	3 to 4	5 to 10	11 to 20	>20		
Hectares	< 0.7	0.8 to 2.1	2.2 to 3.5	3.6 to 7.7	7.8 to 14	>14.1	Total	(%)
Occidental	51 277	39 831	6 532	2 634	705	437	101 416	24.7%
Central	93 060	65 482	9 417	7 559	1 694	2 013	179 225	43.6%
Oriental	60 428	53 514	8 192	5 716	1 317	1 088	130 255	31.7%
Total	204 765	158 827	24 141	15 909	3 716	3 538	410 896	
(%)	49.8%	38.7%	5.9%	3.9%	0.9%	0.9%		

Source: own elaboration, based on (Ministerio de Economía, 2019)

For smallholders, white maize production often involves low levels of chemical and machinery use that is sustained by an input distribution scheme (technical package) provided by MAG. The majority of farmers make use of family labor and informal arrangements for sharing communal labor and machinery, and procure fertilizers and pesticides from the market when prices permit. Almost 100% of the maize producing population – smallholder or not – relies on technical inputs from MAG's *Programa de Insumos Agro-tecnológicos* (Agro-Technological Inputs Program – PIATEC). On an annual basis, PIATEC provides all farmers registered with the Ministry of Agriculture with between 12 to 22 pounds (5.4 to 9.8 kg) of hybrid H-49 maize seeds, 45.5 kg of fertilizer, and one liter of insecticide for seed inoculation. Approximately 10% of producers also receive extension services from the *Centro Nacional de Tecnología Agropecuaria y Forestal* (CENTA), focusing on the adoption of improved maize varieties, improved production technologies, and the implementation of a technical guide that outlines best practices in maize cultivation. Approximately 5% receive financing from the *Banco de Fomento Agropecuario* (MAG, 2023b; MAG-DEA, 2024).

Production is primarily oriented towards self-consumption and informal sales. Recent interviews with specialists in the Ministry of Agriculture (Directorate of Agricultural Economics – MAG-DEA) confirm that in 2023, the

maize-producing population reserved an aggregate of 6.1 million quintals (279,990 tons) annually for this purpose, with 11.04 million quintals (506,736 tons) of surplus maize being sold on the market. At the farm level, each producer stored for themselves an average of 15 to 18 quintals (0.68 to 0.84 tons) of maize per year (representing approximately 55% of their total production by weight), using metal silos with a maximum capacity of approximately 18 quintals (0.9 tons). The large majority of surplus maize was then sold directly to intermediaries at farmgate, with a smaller minority passing through associations that process and sell to the larger commercial market. Sales occur informally via cash transactions without receipts, and intermediary buyers seldom offer any form of formal financing or credit (MAG, 2023a; MAG-DEA, 2024).

Domestic intermediation

Domestic intermediation from producers to wholesalers occurs through two main channels: producers' associations (comprising the minority of commercial sales) and informal intermediaries (*camioneros*, comprising the large majority). There are approximately 230 **producers' associations** across El Salvador, but they only represent approximately 12,960 producers of basic grains (including maize), 4% of



small producers at the national level. Approximately 60 of these associations have invested in infrastructure and equipment for the consolidation and storage of white maize, with support from the *Programa de Agricultura Familiar* that was implemented by MAG from 2009 to 2019. At the national level, there are four federations that represent these associations in policy discussions and in conversations with government: the Mesa Agropecuaria, Cámara Salvadoreña de Pequeños y Medianos Productores CAMPO, Frente Nacional Agrario FNA, and the Federación de Cooperativas Agropecuarias Salvadoreñas FECASAL (MAG-DEA, 2024).

Associations enable better access to markets and market information, but the small share of participating producers limits their effectiveness in transforming the domestic supply chain. These associations buy from their members either with cash and basic receipts or with credit that is repaid after one month. They then sort, clean, and package the grain to be sold to wholesalers. Greater regularity in the quantity and quality of the grain that they deliver allows them to manage formal commercial relationships with buyers. These relationships are often maintained across production cycles; transactions include formal receipts and the use of purchases on credit. Interviews suggest that the relatively low participation rate in associations may relate to difficulties in profitably offering services – particularly in post-harvest processing – to producers in the context of high fluctuations in input and output prices.

Informal intermediaries are the primary channel by which domestically produced maize reaches wholesalers, processors, retailers, and consumers. Intermediaries own one or more trucks that can hold 8, 12, or 24 tons of grain each. They meet producers directly on their farms to purchase grain in cash and without receipts, with prices that correspond to movements in their respective wholesale markets and that are differentiated by quality or cleanliness.⁶ Intermediaries perform minimal cleaning services, and then sell to wholesalers in plazas and on streets in urban and peri-urban markets. Trucks typically arrive between 03:30 and 05:00 in the morning, and negotiate spot prices with wholesalers that vary based on the total quantity of available grain and the number of buyers in the market. Interviews suggest that there may be up to 500 actors who serve as intermediaries for the sector, but the population is highly fluid, with many entries and exits on an annual basis. They are not formally registered, and no centralized record of their transactions exists.

6 According to interviews, quality is differentiated by the two varieties of seeds that are sown: H-59 and Dekal B. Dekal B fetches an additional premium of \$0.50 to \$1.00 per quintal. Cleaner grain can also fetch a premium of up to \$0.50 per quintal.

7 This discrepancy is currently being resolved by the institution that processes phytosanitary receipts (MAG) and the institution that consolidates and publishes aggregate information on volumes and values (BCR).

Imports and processing

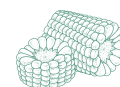
In 2024, imported white maize plays a prominent role in the consumer market in El Salvador, driven by international prices that have fallen since 2023, competition between importing firms, and changing consumer preferences. As shown in Table 5 below, imports dropped significantly at the onset of the COVID-19 pandemic in 2020, and have gradually recovered from 2022 to 2023. In both of those years, it should be noted that there are discrepancies in the volumes of imports that are registered by the Ministry of Agriculture and imports that are reported by the Central Reserve Bank.⁷

Table 5: Imported volumes of maize: comparison of BCR and MAG values

Year	Importing companies (no.)	Volume (MAG, T)	Volume (BCR-CIEEX, T)
2019	39	187 349	188 257
2020	22	180 030	185 653
2021	9	76 581	69 308
2022	26	117 232	133 370
2023	21	144 158	183 499

Source: own elaboration, based on (MAG, 2023a; BCR, 2024)

White maize is brought to El Salvador by brokers, who then sell via portside storage firms to importing companies. Brokers include 4 multinational firms that sell grain under futures contracts that are negotiated 70 to 90 days in advance, almost exclusively from the United States. These firms include Bunge, ADM, Cargill, and Safra; Bunge and ADM represent the majority of sales by volume. White maize is typically transported by these brokers to the port of Acajutla, where it is managed by four **storage providing firms**: Alcasa, Almapac, Gradeca, and Servygran. These firms have a total capacity of 121,578 tons, for which approximately 40% (48,600) is typically devoted to the storage of white maize. Of the two largest brokers, Bunge typically sells directly to larger agro-processors, while ADM sells to wholesalers through Almapac and Gradeca (Defensoría del Consumidor, 2024).



Importers include grain companies who purchase from brokers via the storage providers, and flour importers who buy primarily from neighboring countries either in port or at land borders. In 2023, there were 21 **importers of white maize grain**, whose distribution of imports by volume is summarized in anonymized form in Table 6 below. These firms include both companies that process grain into flour and other products, companies that engage in both processing and repackaging, and companies that purchase solely to repack the grain and sell it to domestic wholesalers. The two largest importers, *Harisa* and *Distribuidora de Alimentos Básicos*, operate primarily as flour processors who then sell the grain itself as a surplus over existing processing capacity or demand.

Table 6: White maize grain importers in 2023 by volume and share of total

Importer	Imports (tons)	% of total
A	61 877	43%
B	49 995	35%
C	6 758	5%
D	5 023	3%
Others	20 505	14%
Total	144 158	100%

Source: own elaboration, based on (MAG, 2024b)

As shown in Table 7, the 4-firm concentration ratio for maize importers has remained above 80% since 2019, and the current Herfindahl-Hirschman Index of 3,104 indicates a high degree of concentration in the sector.⁸ A preliminary interpretation of the patterns observed over time for these indicators could be that the COVID-19 pandemic may have reduced the financial capacity of smaller firms to participate in the import market in 2022 and especially 2021, after which the market experienced a gradual recovery in 2022 and 2023. These trends align with the shared perception from interviews that despite the predominance of two to four firms, barriers to entering the import market are relatively low (Defensoría del Consumidor, 2024). Despite low barriers to entry, the capital-intensive nature of grain importation and processing (including into ultra-processed products) favors larger, historically established companies

that are active across multiple agro-industrial subsectors, have the resources to acquire plants and equipment, and can establish relationships with formal vendors. Smaller entrants exist but cannot yet capture equivalent market shares. The predominance of an informal market for sales and distribution also plays a role in determining market dynamics in the formal sector.

Table 7: measures of market concentration in grain imports, 2019-2023

Year	Importers	4-firm concentration ratio	HH Index
2019	39	81%	2 330
2020	22	92%	2 854
2021	9	95%	5 110
2022	26	88%	3 811
2023	21	86%	3 104

Source: own elaboration, based on (MAG, 2024b)

White maize flour importers represent a smaller volume of commercial activity compared to grain imports. Over the last five years, a total of 8 to 12 firms have imported an average of 17,000 tons of this product annually. In 2023, the white maize flour import market consisted of 11 specialized firms who imported a much smaller total of 15,351 tons. The majority of this flour was imported from Honduras, Guatemala, and Mexico.

Domestic processing, wholesale, and retail

The domestic wholesale market includes two key groups of formally registered firms: **domestic processors** who transform imported grain into flour or other prepared foods, and **domestic wholesalers** who buy both domestic and imported grain and flour, to be sold to smaller distributors, retailers, and consumers across the country.

Domestic processors of white maize in El Salvador include three larger agro-industrial firms who produce flour, and 36 firms that process grain into prepared foods. The **agro-industrial firms** include the two largest

⁸ The Herfindahl-Hirschman Index represents the sum of the squared shares of traded volumes for each importer within the total volume of imported grain. Values below 1,000 indicate low concentration, values between 1,000 and 1,800 indicate moderate concentration, and values above 1,800 indicate a high degree of concentration (Ukav, 2017).



grain importers – *Harisa* and *Distribuidora de Alimentos Básicos* – as well as *Cemersa*, a firm that procures imported grain and transforms it specifically into nixtamalized maize. Information on processed volumes is not available through public sources, but interviews suggest that the two larger companies process between 25,000 to 40,000 tons per year each. The additional **36 smaller food processing firms** procure primarily imported white maize grain and transform it into prepared food such as tortillas, pupusas, tamales, pastelitos, chichas, bread, and others.

All these 39 firms show preferences for imported rather than domestically produced grain. The three large agro-processing firms solely procure imported grain for their operations. Until the mid-2010s, under a “maize agreement” (*convenio de maíz*) overseen by MAG, processing firms had to buy a certain quota of their maize grain domestically before being given import licenses. After the abolition of the agreement, these firms prefer solely to work with imported maize because they can plan more effectively with large brokers to ensure a consistent quality and quantity of maize grain over the course of a given year. Large importer-processors are driven by a preference for grain that can be delivered consistently with precise parameters for size, humidity, and cleanliness. Interviews suggest that smaller firms also rely on imported maize to fulfil consistency and quality standards, with strict parameters for storage humidity and the absence of fungi, aflatoxins, or other foreign substances that are more difficult to meet through domestically procured grain. The distribution of purchases by origin is not available for these firms, but it is likely that most of them now favor imported over domestically produced grain. Actors in this segment of the chain expect that trends in procurement will continue to shift towards imports.

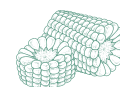
Domestic wholesalers act as the critical link in the supply chain that consolidates maize and maize flour from both domestic and imported sources. These wholesalers are formally registered companies that center their logistical activities in the principal grain markets of San Salvador (Calle Gerardo Barrios), Sonsonate, San Miguel, and San Vicente. There is no consolidated registry of these companies, but interviews suggest that there are approximately 200 firms in total across the country that engage in the wholesale of white maize, among other products. These firms have an average storage capacity of 55 tons (1,200 quintals), with the largest firms storing up to 227 tons (5,000 quintals). On Calle Gerardo Barrios – the largest wholesale market for white maize in the country – firms trade on average 100 to 150 quintals per day.

Wholesalers undertake a range of processing and cleaning activities that varies depending on the origin

of the product. Firms purchase domestic grain daily between 04:00 and 06:00 from intermediaries that bring their trucks to the market; this grain is purchased using spot prices that vary by quality and cleanliness. Depending on these attributes, wholesalers then undertake their own cleaning and packaging processes. For imported grain and processed flour, firms purchase from the larger importing companies – typically *Harisa* and *Distribuidora de Alimentos Básicos* – and then sell it in the same condition in which it was received, with minimal post-processing. Smaller importers also act as wholesalers directly within the major wholesale markets. The consistency and quality of imported grain minimizes additional work and risks that wholesalers undertake; interviews suggest these drive an emerging preference on the parts of wholesalers for imported rather than domestically procured grain in the context of falling international prices.

Agro-processors and wholesalers act as the primary conduits of grain and flour to the retail and consumer sector; they sell through a diverse web of smaller distributors, supermarkets, artisanal processors, and neighborhood stores. The most prominent channels for direct consumer sale include the following:

- **Food stores and neighborhood shops:** as of 2022, there were approximately 4,000 food-oriented stores and market stalls that sold white maize grain, flour, and products. Additionally, there were a maximum of 41,000 neighborhood stores that sold white maize among other food and non-food items. These actors operate along a wide spectrum of formality (Romero *et al.*, 2022).
- **Supermarkets:** in addition to smaller stores, there are approximately 200 supermarkets across El Salvador that are managed by three companies: *Calleja SA de CV* (113 locations), *Operador del Sur CA de CV* (86 locations), and *Pricesmart SA de CV* (2 locations). These stores sell almost exclusively white maize flour and processed products of imported origin.
- **Artisanal processors:** as of 2022, there were approximately 7,000 smaller artisanal processors who procured white maize grain from wholesalers and then prepared flour, tortillas, and pupusas to be sold to consumers. Approximately 3,800 of these are *pupuserías*. Many of these firms are micro-enterprises managed by one or two people, and the high prevalence of informality complicates any census of their activities (Romero *et al.*, 2022). Within this category are also small processors that produce and sell flour to retailers and consumers. In addition to scale, they are differentiated from the medium to large industrial processors primarily by the fact that they do



not formally register many of their activities, for example, with phytosanitary bodies in the Ministry of Health. Information on these firms, including the origin of their purchases, the scope of their activities, and their sales, represents a critical gap in the current understanding of the supply chain.

Consumption and export

The final stage of the value chain includes three distinct channels for the domestic consumption of white maize:

- As mentioned above, approximately 5.1 million quintals (279,990 tons, or approximately 30% of the annual supply) of white maize are destined by maize producers for **own consumption** without leaving the farm.
- **Retail consumption** meets the needs of the approximate 1,649,000 households in El Salvador (up to 92% of the total) who do not produce white maize and instead buy it on the market, primarily in the form of flour or processed foods. Total volumes of purchased grain, flour, and prepared foods are not available, but the grain that is traded through wholesalers and used for these purposes may represent

approximately 10 to 11 million quintals (220,462 to 242,509 tons, or up to 65% of the total).

- **The school feeding program** (*Programa de Alimentación y Salud Escolar*) is implemented by the Ministry of Education and procures food products – including white maize – from associations and wholesalers to be processed at a ministry-owned plant and then be distributed in schools. In 2020, this program received support from the World Food Program to develop a procurement, storage, and distribution system that allows for the consumption of between 16,000 to 23,000 quintals (350 to 500 tons) of white maize grain.

The remainder of the annual white maize supply in El Salvador is exported. Exports of grain have remained almost negligible compared to domestic supply, fluctuating around an annual average of 54,000 quintals (1,180 tons) since 2019. During this time, annual exports of white maize flour have averaged at approximately 1.44 million quintals (65,214 tons). Only two companies participate in the export market: *Harisa* and *Distribuidora de Alimentos Básicos*. White maize flour is sold almost exclusively to neighboring countries in Central America: the largest recipients by volume since 2019 have been Honduras (53%), Guatemala (24%) and Nicaragua (16%).

2.4 Analysis of costs, prices, and margins along the value chain

This section provides a closer analysis of the producer, intermediate, and wholesale prices along the white maize value chain. In the context of the low levels of measured price transition from international to domestic prices for white maize grain, this analysis serves two purposes. First, it defines the key activities and inputs in the value chain that determine the costs faced by actors in both the import and domestic production tracks that were described above. Second, it allows for a more granular understanding of the relationships between these actors that could affect the efficient transmission and formation of prices. The efficiency of key activities in the value chain, as well as the structure of the relationships that exist between these actors, can offer a preliminary understanding of the origins of the lack of efficient price transmissions, the market structures that contribute to them, and potential entry points for policy-based solutions.

This analysis examines the costs and implied margins of key actors along the chain that were introduced in section

3.2. On the domestic production track, the section provides estimates for the chain from producers to intermediaries to wholesalers. On the import track, estimates are provided for the chain from brokers to importing companies to wholesalers. The focus of this analysis is on sales in grain form, with a preliminary summary of margins in the production of maize flour from nixtamalized grain.

These cost and price estimates represent activities that center on the wholesale markets of San Salvador, are given on a per-quintal basis (the market standard), and represent the conditions that value chain actors faced during the first quarter of 2024. They are constructed from official sources on production costs and price movements, as well as interviews with value chain actors and key informants.⁹ As the sample of interviews is relatively small, these estimates should be considered preliminary to further and more systematic research.

9 See Annex 2 for a description of the sample of actors who were interviewed.



The domestic production track

Table 8 below summarizes the movement of prices and the implied activity costs from production, informal intermediation, to wholesale in San Salvador for domestically produced white maize grain. The first line presents the prices at which the product is sold from farmers to intermediaries (A), from in-

termediaries to wholesalers (B), and finally from wholesalers to retailers (C); the second line includes the marginal costs for each key activity (production, transport, and storage/cleaning) as well as the marginal profits to each actor at the point of sale; the third line summarizes the contribution of each element to the final wholesale price. The data sources and methods that inform these values can be found in Annex 2.

Table 8: Accumulated prices, costs, and margins by value chain stage for domestically produced white maize grain

	A Production		B Intermediation		C Wholesale	
	Production	Sale	Transport	Sale	Storage / cleaning	Sale
Price	$c = a+b$ \$16.00		$f = c+d+e$ \$18.50		$i = f+g+h$ \$21.00	
Marginal cost (MC), profit (π)	MC (a) \$12.86	π (b) \$3.14	MC (d) \$1.00	π (e) \$1.50	MC (g) \$1.00	π (h) \$1.50
% final wholesale price	a/i 61%	b/i 15%	d/i 5%	e/i 7%	g/i 5%	h/i 7%

Source: own elaboration, based on interviews and (MAG, 2023b, 2023a). Prices are expressed in USD per quintal.

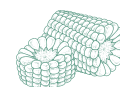
In Q1-2024, the average semi-mechanized maize producer in El Salvador faced production costs of \$12.86 per hectare. These production costs, developed in collaboration with the Directorate of Agricultural Economics in the Ministry of Agriculture, follow from annual analysis of production costs developed by the Directorate for this sector.

In Q1-2024, informal intermediaries purchased maize at approximately \$16 per quintal from farmers, and sold it at between \$17.00 to \$18.00 per quintal to wholesalers in San Salvador. No systematic information exists on the prices and negotiation tactics that informal intermediaries employ when engaging with wholesalers. However, interviews suggest that these intermediaries faced costs for storage and transport of approximately \$0.50 to \$1.00 per quintal at the start of 2024, and that they sought margins of approximately \$1.00 to \$1.50 per quintal. Profit margins thus stand at \$0.50 to \$1.00 per quintal for these actors; variations in costs and prices depend on the quality of the grain that they trade, as well as the distances at which they must transport it. In some cases, intermediaries may store the grain in small warehouses for up to 3 months, but this storage does not incur additional costs that would affect its price to wholesalers.

In Q1-2024, wholesalers in San Salvador bought domestically produced maize at prices of between \$17 to

\$18 per quintal from informal intermediaries, and then sold it at an average price of \$21 per quintal. Wholesalers undertake activities in cleaning, packaging, and storage that cost approximately \$1.00 to \$2.00 per quintal, depending on the initial cleanliness and quality of the grain.

This distribution of prices reported in Table 8 suggests that relatively higher margins exist for producers vis-à-vis actors in other segments of the value chain, but does not adequately convey the level of variation that they face from climatic and input/output market risks. While producers may capture up to 15% of the final wholesale price as a profit margin, this margin obscures a high degree of monthly and annual variability in costs and farmgate prices. For example, between 2022 and 2023, the per-hectare costs for chemical inputs in maize production rose by almost 100%, before falling by 30-40%. This enormous variation greatly constrains farmers in their production decisions, which hurts productivity and adds further uncertainty to their margins. All this taken together means that they operate at a loss in some cycles, and earn a margin in others: interviews show that many producers operated at a loss during the 2022-2023 production cycle. The margins captured by intermediaries and wholesalers, in contrast, remain relatively stable across cycles. These actors assume a lower level of risk on an annual basis than do the producers that they buy from.



The import track

Table 9 summarizes the prices, activity costs, and implied margins for importing companies and wholesalers of white maize grain during Q1-2024 in San Salvador. In this scenario, the importing companies include the 37 distributors

and 3 large agro-processors that were active in 2023. These companies undertake a mixture of import, intermediation, and distribution activities (represented in column B), before selling to domestic wholesalers (represented in column C), including the wholesalers who operate on Calle Gerardo Barrios in San Salvador.

Table 9: Per quintal accumulated prices, costs, and margins by value chain stage for imported white maize grain

USD per quintal	A Brokerage	B Intermediation			C Wholesale	
	CIF Costs	Import Services	Transport / storage	Sale	Storage	Sale
1 Accumulated price				$e = a+b+c+d$ \$18.00		$h = e+f+g$ \$19.00-20.00
2 Marginal cost and profit	MC (a) \$14.82	MC (b) \$1.01 ¹⁰	MC (c) \$1.17	π (d) \$1.00	MC (f) -	π (g) \$1.00-2.00
3 % final wholesale price	a/h 78%	b/h 5%	c/h 6%	d/h 5%	f/h -	g/h ~5%

Source: own elaboration, based on interviews and (MAG, 2023a; BCR, 2024)

Importing companies purchased grain from brokers at an average CIF price of \$14.82 per quintal in February-2024 (the latest date of measurement). This grain was brought almost exclusively from the United States. The CIF price reflects the costs incurred during production, drying, transit to port of exit, maritime transit, and approximately \$1.25 per quintal in taxes at the port of entry of Acajutla. During the importation and intermediation process, importers purchase at the CIF price and incur a services cost of approximately \$1.01 per quintal¹¹ and incur further transport and storage costs of \$1.17 per quintal. Transport and storage include any combination of activities that take the grain from the port to intermediate warehouses to wholesalers and domestic processors.

Importers sell to domestic wholesalers and processors for \$18.00 per quintal. Wholesalers then sell maize in grain form for approximately \$19.00 to 20.00 per quintal, incurring negligible storage fees in the process. When imported white maize arrives at the point of wholesale, it has already been cleaned and packaged in a way that necessitates no further activity from wholesalers. This enables them to sell the grain in the same form as they

receive it from the importers, gaining a margin of 5 to 10%. In 2024, wholesalers on Calle Gerardo Barrios were selling imported products at a final price of \$19-20 per quintal, \$1.00 to 2.00 lower per quintal than the price for domestic products displayed in Table 6.

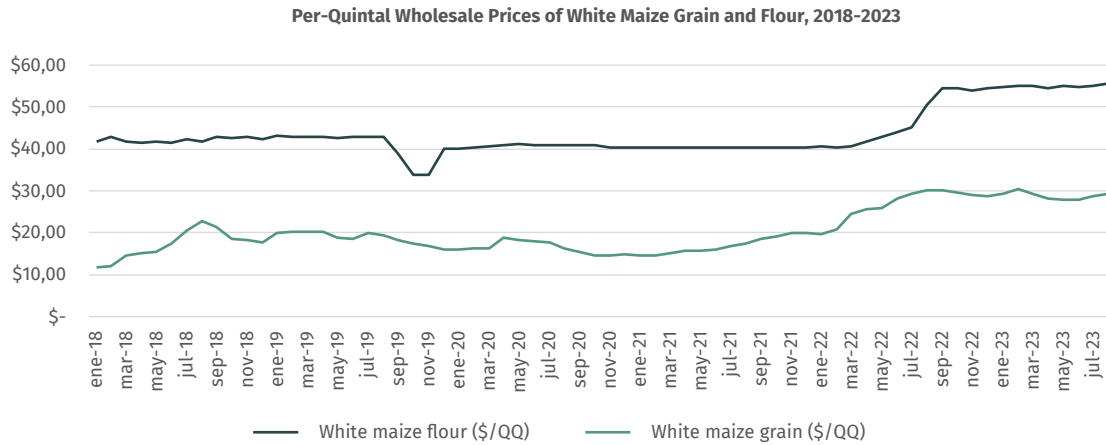
Evidence tentatively suggests that the processed flour subsector holds the highest margins in the value chain for white maize. There are three processing firms who produce nixtamalized flour from imported white maize in El Salvador: *Harisa*, *Distribuidora de Alimentos Básicos*, and *Cemersa*. Interviews suggest that white maize grain is transformed to nixtamalized flour with a 92% weight conversion rate, generating 1 quintal of maize flour per 1.09 quintals of grain. The cost for processing is approximately \$4.00 to \$5.00 per quintal of produced flour. As shown in figure 4, a differential of more than \$20 per quintal existed between white maize grain and flour at wholesale markets in San Salvador, and flour prices have exhibited much more stability over the past five years. More research is needed to identify the approximate margins enjoyed by agro processors for this product: there is the possibility that they are significantly higher than those faced for grain.

¹⁰ Average value reported by the Defensoría del Consumidor

¹¹ Portside services include those provided by one of the four larger storage firms, which generally consist of \$0.13 for unloading, \$0.05 for internal transport, \$0.12 for storage, \$0.19 for cleaning, \$0.05 for fumigation, \$0.15 for packaging, \$0.31 for packaging materials, and \$0.01 as a municipal tax.



Figure 7: A comparison of wholesale prices for white maize grain and flour



Source: own elaboration, based on (MAG, 2024b)

The costs, prices, and margins faced presented in this section are preliminary estimates that reflect the state of the market during the first quarter of 2024; they obscure a high degree of annual variation as well as variation between actors of different sizes and capacities. However, several important conclusions stand out. First, across both the domestic production and import tracks, intermediaries and wholesalers face the most consistent marginal costs, and face relatively fewer risks in periods where production or import costs fluctuate. Second, as entities that undertake almost all of the value-added activities in transporting, processing, or packaging maize, importer-processors capture the overwhelming share of margins in the process of selling imported products. Finally, differences in concentration levels on the domestic production and import

tracks may contribute to their complete bifurcation. Domestic producers, intermediaries, and grain wholesalers remain highly fragmented, which may impede both the productive coordination and the flow of information that are needed to consistently supply the commercial agro-processing and formal distribution networks for white maize. Conversely, the concentrated commercial processor-distributors benefit from a high degree of coordination and information-sharing with the brokers who are able to fulfil the quantities and consistencies that their activities require. As a result of this dynamic, domestic producers do not participate in the larger, formalized processing and distribution systems whose products are now priced more competitively in both supermarkets and smaller wholesale sites as international prices for maize fall.

2.4 The institutional environment: actors and policies

Institutional actors

The institutional environment that supports maize production and trade revolves around the activities of the **Ministry of Agriculture (MAG)**, which coordinates four crucial sets of activities:

- Strategic planning and sectoral coordination are overseen by the Office of Policies and Sectoral Planning (OPPS), which is responsible for planning annual activities and for informing the publication of new development strategies, laws, and policies.
- The collection of information on production, trade, and prices of basic grains is undertaken by the Directorate General of Agricultural Economics (DEA).
- Agricultural trade flows are monitored by the *Plant Health Division*, which receives and verifies phytosanitary information from importers, and which consolidates and publishes trade data with the Import and Export Center of El Salvador (CIEX). Additionally, MAG manages a technical commission with the *Ministerio de Economía* and the Ministry of Finance that determines the annual national surplus or deficit in the supply of white maize with respect to demand, and authorizes imports accordingly.



- Finally, across its operational divisions, MAG implements programs of targeted support and investment for farmers that are mandated through the Master Plan for Agricultural Recovery (*Plan Maestro de Rescate Agropecuario*).

In addition to MAG, several other public institutions serve as key coordinators and implementers of policies that affect the maize sector:

- The **National Center for Agricultural Technology Transfer** (CENTA) is a governmental institution tasked with agricultural research and technology transfer. CENTA plays a key role in evaluating and recommending new seed varieties and genetic material to be delivered in producer support programs such as PIATEC, as well as the provision of technical and advisory services such as the ones offered through the Program for High-Yield Maize Production (SMAR). Apart from these programs, it currently operates under an extension provision model by which 110 regular technicians assist approximately 33,000 producers (300 per technician).
- The **National Commission for Micro and Small Enterprises** (CONAMYPE), within the Ministry of Economy, engages with the population of small and medium enterprises that dominate the wholesale and retail sectors that trade and sell white maize. It manages the collection of information as well as the delivery of financial and technical support to these actors, and thus serves as the main publisher of statistics on their operations.

Limited financial services to white maize production are provided through the Agricultural Development Bank (BFA). Through the Fideicomiso de Desarrollo Agropecuario (FIDEAGRO) program, BFA operates a credit line for white maize producers that offers interest rates of 4% (lower than prevailing rates on the private market), as well as parametric micro-insurance programs that can be contracted on a per-harvest basis to compensate for extreme weather-based and seismic events. This service carries cost of approximately USD 43 to 70 per hectare per harvest (9% to 13% of total per-hectare production costs in 2023), and is used by approximately 15,000 clients, or 5% of the maize producing population.

Policies and support mechanisms

Producer-oriented policies for white maize have historically focused on facilitating access to improved inputs and production methods; recent policies have implicitly

encouraged production diversification. The *Ley de Semillas* (Decreto Legislativo No 530, Tomo 352) was introduced in 2001 and regulates the characteristics and cleanliness of seeds used for inputs. The *Ley de Sanidad Animal y Vegetal* (decreto legislativo No. 524) similarly establishes sanitary standards to be followed during the production and sale of food products, including those derived from maize.

The *Plan Maestro de Rescate Agropecuario* (Master Plan for Agricultural Recovery) was approved in 2021 and serves to guide investments in productivity and producer support for food staples (including white maize) and for coffee. A key provision of this plan is the *Programa de Insumos Agrotecnológicos* (Program for Agro-Technology Inputs – PIATEC), mentioned earlier in this report, which provides producers with agricultural inputs annually at the start of the first production season, for a value of approximately \$110 to all farmers inscribed in the Registry of Agricultural Producers (RUPA), representing near universal coverage of the producing population. White maize producers specifically used to receive seeds, fertilizer (NPK 16-20-0), and pesticides. However, in 2024, the government has replaced PIATEC with a voucher card given to all registered farmers annually at the start of the first production cycle with \$75 to be spent on a combination of inputs of their choice. This shift implies a substantial decrease (by 32%) in the value of support received by maize farmers. On the other hand, the fungibility of the voucher system (in comparison to the receipt of physical inputs) is likely to allow for greater flexibility in production choices on the parts of farmers (MAG, 2024a, 2024d).

Specific to the white maize sector, the Ministry of Agriculture has developed the *Siembra de Maíz de Alto Rendimiento* (High Yield Maize Production – SMAR) project, launched in 2022. Through this program, the MAG has trained 200 technical specialists to provide extension services to maize farmers, and has procured approximately 120 pieces of machinery that can be leased to farmers to pilot intensified production and harvest techniques (CENTA, 2022; MAG, 2024h).

Most recently, the Government of El Salvador (through MAG) has developed the *Ley Integral de Comercialización Agropecuaria* (The Comprehensive Agricultural Marketing Law, Decreto No. 834, octubre 2023) which, as of April-2024, was pending finalization and entry into force. This policy aims to overhaul support to the agricultural sector by focusing on the institutions and mechanisms that govern internal trade, with the goal of reducing transportation costs, transaction costs, and information asymmetries for producers and consumers. For white maize, specifically, the draft law contains provisions for the formalization of



the intermediary sector, the development of wholesale markets, and the creation of public-private entities that offer post-harvest and processing centers, storage centers, and marketing channels for basic grains. The draft law also establishes basic provisions for the creation of a physical grain reserve that could be used to dampen the effects of upwards shocks in international prices for consumers (Government of El Salvador, 2023).

Consumer-oriented policies have focused on providing support to vulnerable populations. The *Ley de Desarrollo, Protección e Inclusión Social* (The Law for Development, Protection, and Social Inclusion), approved in 2014, defines a rights-based approach to improving food security and social protection for the general population. It establishes a legal framework for providing direct support to vulnerable people, and also includes support mechanisms for family farms such as input packages. The *Política Nacional de Seguridad Alimentaria y Nutricional* (The National Food Security and Nutrition Policy), approved in 2018, establishes more specific provisions for achieving goals in food security and nutrition, including targeting strategies for vulnerable populations. Finally, the *Programa de Alimentación y Salud Escolar* (The School Feeding Program – PIASE), developed by the Ministry of Education (National Directorate for Prevention and Social Programs) to provide school meals across the country, provides a basic set of foods to approximately 5,100 schools three times per year, with each delivery sufficient to supplement student meals for four months.

Historically, trade policies have attempted to offer moderate protection to domestic producers through quota-based tariff rate of 20% and a local procurement quota for large agro-processing firms. In 2006, El Salvador's membership to Central American Free Trade Agreement (CAFTA) entered into force. CAFTA stipulated that El Salvador would not apply any tariffs or taxes to a specified quota of imported white maize, after which it would apply a

flat tariff of 20%. In 2006, this tariff-free quota was 35,700 metric tons, and it was increased thereafter by 700 metric tons annually. Simultaneously, from 2004 to 2020, MAG coordinated the **Convenio de Comercialización de Maíz Blanco** (The Trade Agreement for White Maize). This policy mandated that the four largest agro-processing firms in the country procured a minimum of one fifth of their white maize grain domestically. This procurement process was organized annually through a roundtable negotiation, facilitated by MAG, between these companies and producers' associations. At the end of this session, MAG would grant import licenses to the firms for the remainder of the maize that they needed for that year. Since 2020, this policy has no longer been in effect; as mentioned earlier, the participating firms now exclusively import white maize grain (García-Jiménez and Gandlgruber, 2014; Ayala Durán, 2020).

Since 2022, however, the importation of white maize grain has been completely liberalized as part of a larger attempt to stabilize consumer food prices. The *Ley especial transitoria de combate a la inflación de precios de productos básicos* (The Temporary Measure Against Price Inflation for Basic Foods, Decreto No. 309, March 2022) was passed in parallel to the rapid rise in fertilizer and food prices observed in 2022. It temporarily reduced tariffs for basic food products to 0% from any country of origin, removed import quotas for these products, and enabled the Consumer Defense to undertake additional price monitoring activities that would detect and respond to excessive price increases. Throughout 2023 and 2024, verifications of fair prices have been carried out on a more systematic basis in major wholesale markets across the country (MAG, 2023c; Asamblea Legislativa, 2024). Simultaneously, the reductions in tariffs included in this measure have been extended through 2026 (FAO, 2024a). The continued liberalization of maize imports, combined with rising domestic production costs and changing consumer preferences, may significantly affect trends in domestic production over the coming years.

2.5 Synthesis: market structures, potential inefficiencies, and policy options for the white maize value chain

The white maize sector in El Salvador depends on a complex chain of activities that originate both in domestic production and import. The domestic production satisfies approximately 80% of annual demand, facilitated by 336,000 smallholder farmers who consume a large share of their production themselves before selling via associations and informal intermediaries to wholesale markets. The remaining 20% originates with imports that pass through

four large brokers, distributors, and agro processors before arriving to the wholesale and domestic processing sectors. Wholesalers typically sell both domestic and imported grain, which are purchased by artisanal processors, food vendors, and neighborhood shops who convert it to flour, tortillas, or pupusas. Larger processors solely work with imported maize, and sell their products through formal retail markets.



The domestic production track is characterized by low degrees of market concentration, high degrees of information asymmetry, and a pricing system that allows intermediaries and wholesalers to operate with fewer risks than producers. There are a myriad of smaller actors who operate at each stage along this supply chain, over which no single one exerts significant influence. The informality of the intermediary sector, however, hinders the efficient transfer of market information from retailers to wholesalers, to

producers. Most producers continue to sell to intermediaries at farmgate in cash, without receipts or a shared understanding of how demand and prices will change. The margins that producers enjoy from production are highly variable with respect to input costs and production conditions. Conversely, the margins that intermediaries and wholesalers face have remained relatively stable over the past several years, and these actors face lower levels of risk in continuing their activities compared to the producers that they buy from.

Table 10: A summary of implied market concentration along stages in the white maize value chain

	Phase	No. entities	Implied concentration
Domestic Production	Production	140,000	Low Reinforced by weak presence of associations
	Intermediation	500	Low Characterized by small-scale trucking system
Imports	Brokers	4	High 2-firm ratio at least 70%
	Storage	4	High
	Importer-Distributors	18	High 4-firm ratio 85%; HHI 3,104; declining trend
	Importer-Processors	3	High 1 firm captures 70% of processing volume
Wholesale	Domestic Wholesale	200	Low Up to 40 larger firms may capture 40% of total market value for whole grain

Source: own elaboration, based on interviews and official sources

Importers and agro-processors manage a supply of imported white maize that remains wholly separate from domestically produced products until it reaches wholesale and retail in grain and flour form. They exhibit higher levels of market concentration, but face relatively low barriers to entry and exit. Over the past year, importers and wholesalers have enjoyed substantial margins by trading imported maize, with implications for the composition of the market as a whole. The agro-processing sector for white maize consists of only three firms, one of which also presides over more than half of maize grain imports. However, there is a relatively large and fluid population of smaller importer-distributors that sell to wholesalers and domestic processors, facilitated by a reduction in tariffs for the product. The fall in maize prices in 2023 has allowed these actors, as well as wholesalers, to enjoy significant margins in the importation of white maize grain. As of the first quarter of 2024, wholesalers found it cheaper and more convenient to buy imported products rather than

their domestic equivalents. Consistent quality and the reduced need for sorting and post-processing have added to its recent competitive edge in the consumer market. Finally, limited evidence suggests that the market for commercially processed maize flour is highly concentrated, and that the three participating firms enjoy substantial margins that are not yet effectively measured by the public sector.

The public policy environment may be shifting away from supporting maize production, and towards a dual strategy of domestic diversification and price stabilization through import-based food reserves. Maize producers in El Salvador overwhelmingly depend on an input package that they receive annually from the Ministry of Agriculture; in 2024, MAG replaced this package with a voucher that could be spent on inputs for any purpose, and interviews suggest that the fungibility of this support may induce many farmers to diversify their production away from maize. Simultaneously, the government has pursued a



liberalization of imports and the creation of a strategic food reserve that will primarily source from imported grains. The upcoming *Ley Integral* seeks to develop transit, processing, and marketing infrastructure that will allow producers to interact more closely with consumer markets. These policies are likely to have tentatively positive implications for market efficiency: the revised PIATEC system may allow farmers to make more economically efficient production choices, while the market transformations supported by the *Ley Integral* may reduce the search and transaction costs that arise during production and intermediation and lead to the more efficient formation of prices. However, the quality of their implementation remains to be seen, as do their effects on the informality of the intermediaries who dominate the white maize sector.

The low observed international price transmission to domestic markets may result from the historical predominance of local production and own consumption. However, evidence suggests that imports are playing an increasingly important role in wholesale and retail markets. Domestic production remains the principal source of white maize for most consumers, and rural people often produce and consume their own supplies. However, there is evidence that falling international prices and low barriers to entry for importer-distributor firms may be changing the composition of the consumer market. Interviews with wholesalers highlight a growing preference for imported grain. In 2024, while interviewed wholesalers observed that prices for both imported and domestically produced white maize grain fell, international prices fell faster, giving imported products a perceived advantage in the domestic market.

The analysis in this chapter has highlighted the following potential inefficiencies in the supply chain:

- **First**, fragmentation and informality in the intermediary and wholesale markets may generate information asymmetries that reduce the negotiating power of producers as well as the margins that they

receive for their production. Measuring and formalizing the intermediary market would both improve decision-making information that is available to producers, and reduce the potential for price distortions for these producers and consumers.

- **Second**, while the importer-distributor sector remains fluid and currently offers competitive prices to wholesalers and retailers, it remains de facto highly concentrated, and its activities are not fully or effectively monitored by the *Defensoría del Consumidor*. As access to imported grain can lower consumer prices and ensure more consistent quality and phytosanitary characteristics, ensuring that concentration does not lead to distorted prices for consumers is paramount. In addition, as these actors possess substantial storage facilities as well as a strong capacity to coordinate the movement of white maize grain and flour along the supply chain, developing a more transparent and effective method of assessing grain stocks at each stage would provide the public sector with a greater range of information and policy options for anticipating and responding to international and domestic price changes.
- **Third**, almost all large-scale transportation, storage, and processing infrastructure is oriented exclusively towards imported white maize grain. Improving the productivity of domestic maize farmers alone may be insufficient to efficiently integrate them into the segment of the supply chain that coordinates industrial processing and distribution. While the *Ley Integral* may establish a parallel set of market linkages between domestic producers and consumers, there is a need on the part of the public sector to comprehensively assess the implications for maintaining a bifurcated processing and sale system for domestic and imported maize.







3 The commercial banana sector in the Dominican Republic

3.1 Patterns and trends in production, trade, and consumption

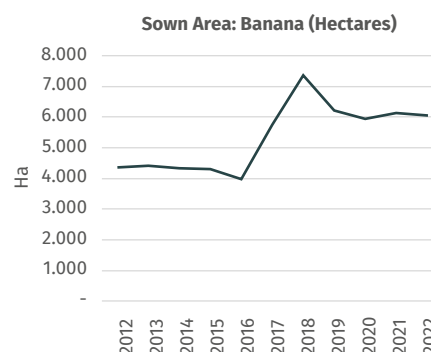
Banana production involves cultivars of the species *Banana spp.* within the Musaceae family. In the Dominican Republic, most production is dedicated to the Cavendish variety, with Johnson and Gros Michel bananas produced in smaller amounts. Banana plants reproduce vegetatively and bear fruit as well as additional plant shoots after approximately one year of growth. To develop effective fruit yields, they require extensive direct sunlight and water; ideal growing conditions include average temperatures of 26° to 30° Celsius and rainfall (or an irrigation equivalent) of approximately 1,200 mm per year. Commercial banana plantations rely on staggered plant and fruit growth, usually by intervals that enable the harvest and consolidation of new batches of fruit once per week. Harvested fruit is then sold in green form, packaged for export, or sent to storage to be ripened before sale. The ripening process takes 10 to 14 days without refrigeration, and more than 21 days with refrigeration (Gonçalves, 2014; Voora, Vivek *et al.*, 2023).

Banana production in the Dominican Republic reflects a wide spectrum of practices, from informal cultivation to internationally certified commercial systems. Banana plants are typically grown across three broad patterns of production: as a component of household-level production systems, as a crop in commercial polyculture that shades cacao and coffee, and as a commercial monocrop whose fruit is sold on domestic and export markets. The commercial banana sector in the Dominican Republic refers to producers who specialize in selling bananas as their primary product; it includes the sale of bananas for export and for domestic consumption via food retailers. The activities of this commercial sector are more easily measurable than is secondary and informal production.

Aggregate figures suggest that the banana sector has served as a stable contributor to the agricultural economy of the Dominican Republic. Since 2018, banana production has comprised 2.5% of the gross real value of ag-

ricultural production and 22% of the total value of agricultural exports annually (FAO, 2024b). Banana production is concentrated in the Northern, Northwest, and Southwestern regions of the country; the commercial sector is most active in the former two regions, centered on the areas surrounding Santa Mao de Cruz (MAG, 2024g). As shown in Figure 1, annual sown area for bananas has decreased and then stagnated from 2018 onwards.

Figure 8: Total sown area for bananas in the Dominican Republic, 2012-2022



Source: own elaboration, based on (MAG, 2024g)

Accurately measuring aggregate activity in the sector is complicated by informal and secondary production systems. FAO and the Ministry of Agriculture both estimate that annual national production volumes for banana have steadily increased to reach 1.4 million metric tons (the 8th highest in Latin America and the Caribbean) in 2022, with implied consumption levels of approximately 1.06 MT. The total number of primary producers, secondary producers, and larger informal producers may total to approximately 47,000 farmers. However, interviews suggest that these figures may overestimate the quantity of bananas entering the market because they assume that all secondary production

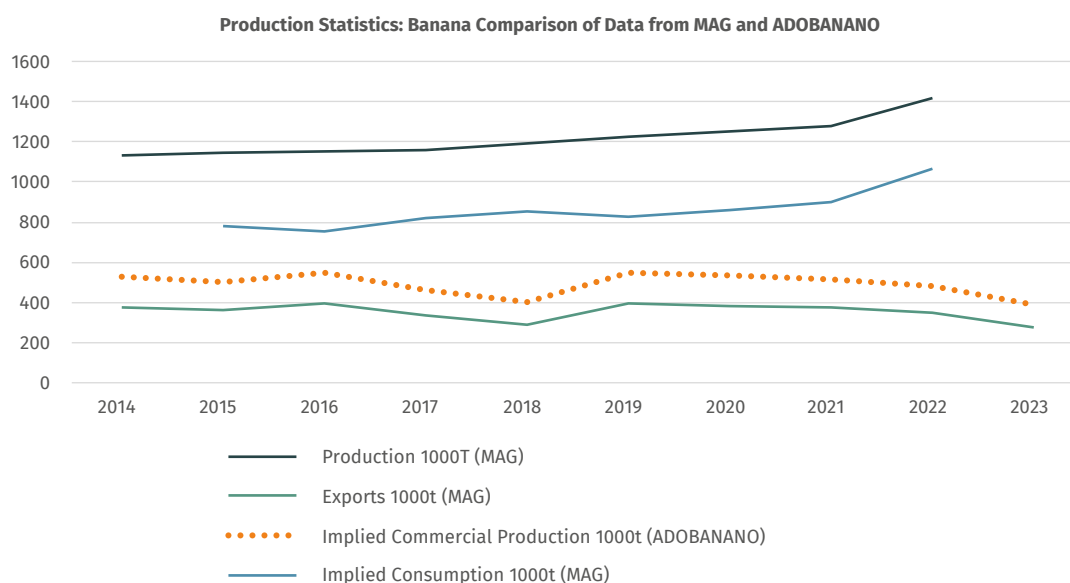


enters the economy for consumption; in reality, bananas that are secondary crops on plantations may not all be intended for either on-farm or market consumption. National statistics in 2022 implied an annual per capita consumption of 81.4 kilograms, far above the figures for Central America (24.8 kg), Europe (12 kg), and North America (20.8 kg) during that year (FAO, 2024b; MAG, 2024f).

This chapter focuses on the commercial banana subsector: evidence suggests that it produces between 390,000 to 550,000 MT annually, with approximately 72% of this production destined for export. The *Asociación Dominicana de Productores de Banano* (ADOBANANO) serves as a federation of producers and producers' associations that consolidates and validates information on formal commercial production. In contrast to the statistics published by MAG, ADOBANANO strictly measures commer-

cially oriented production that is destined either towards exports or domestic wholesale. Their figures suggest that total production in 2022 and 2023 were approximately 480,000 and 390,000 tons respectively; this decline in production appears to have followed from worsening market conditions for producers in 2022. Each year, approximately 10 to 15% of this production volume is destined initially for the domestic market, while 90% is initially destined for export. Up to 20% of export-oriented production is however rejected and eventually sold on the domestic market, so that only 72% of the original total is ultimately sent for export. Over the past five years, commercial producers have exported an average of approximately 355,000 MT of bananas annually, with over 88% of this volume destined for the EU and the UK markets (ADOBANANO, 2024a; MAG, 2024c).

Figure 9: Production statistics compiled by the Ministerio de Agricultura (MAG) and the Asociación Dominicana de Productores de Banano (ADOBANANO)



Note: this graph includes two sources of statistics. Production and consumption from MAG refer to the official published statistics from that Ministry that cover all production, whether destined for commercial consumption or not. Commercial production measured by ADOBANANO refers to the production on the part of their members that is oriented strictly towards export or local wholesale and retail markets.

Source: own elaboration, based on (ADOBANANO, 2024a; MAG, 2024f)

Bananas enter the value chain through producers who generally negotiate with exporters via producers' associations or sell to domestic intermediaries on an individual basis. ADOBANANO estimates that as of end-2023, there are approximately 1,700 commercial producers locat-

ed in the provinces of Valverde and Santiago in the North and Northwestern regions of the country. Almost all of them belong to a producers' association, and over 80% operate on 16 hectares of productive area or less. They produce bananas using a wide range of practices that can be classified

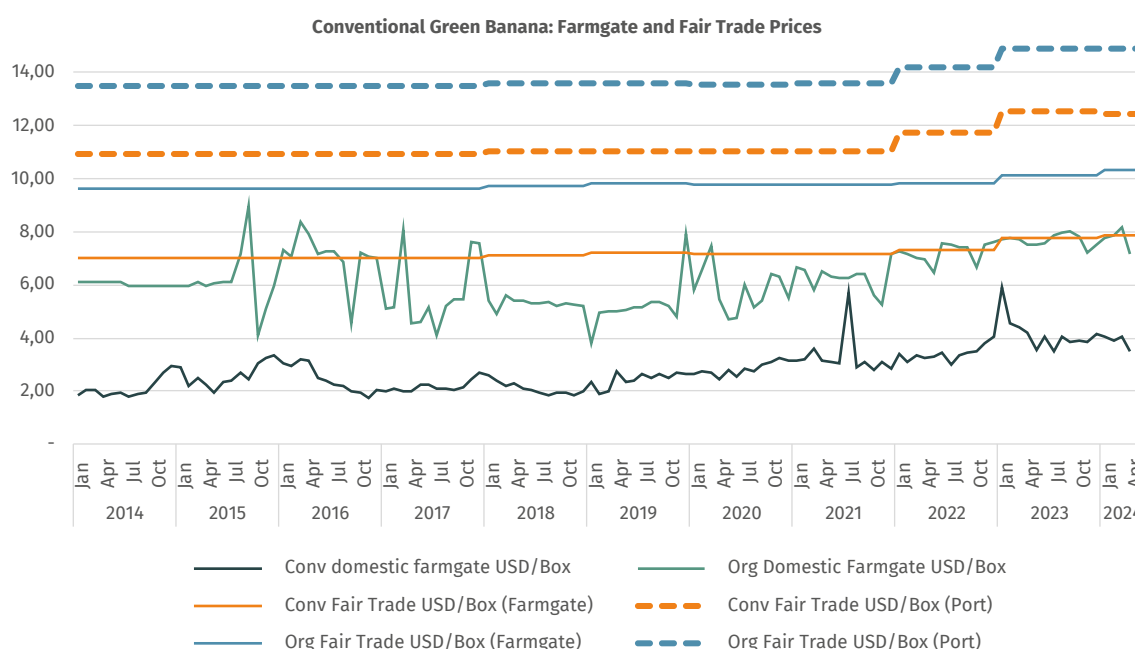


across two sets of distinctions: first, Fair Trade and non-Fair Trade, and second, Conventional and Organic. These practices, and the certifications that verify them, differentiate the prices that farmers receive when selling bananas through exporters. Meanwhile, domestically oriented production generally conforms to conventional standards without any additional premium offered for Fair Trade or organic practices (Fair Trade International, 2023; ADOBANANO, 2024a; Fair Trade, 2024).

The banana export market has historically served as the primary driver of growth in the Dominican banana sector through the premia offered by certified products. The commercial banana sector experienced rapid rates of growth from the 1990s onwards, contextualized by two conditions. First, policies of preferential access on the part of the EU, following from the Lomé Agreement in 1975¹² and revisions of the import regime from 1993 to 2001, allowed the smallholder-dominated industry to compete against

more centralized and vertically integrated exporters (EU, 2010; EU Commission, 2022). Second, the Dominican commercial banana sector oriented itself towards organic and Fair Trade certified products that enabled a higher premium to be sought on the EU and UK markets in the context of preferential access (Vagneron and Roquigny, 2011). A wide range of organic and conventional prices exist, but a common minimum reference point for these prices are those published by Fair Trade International. Shown in Figure 3, they are reconsidered for producers in the Dominican Republic on an annual basis through a consultative process, and are meant to reflect additional compensation for labor costs that may not be considered in conventional production (Fair Trade, 2024).¹³ Annual pricing exercises have not necessarily corresponded to annual price increases; most notably, prices for both conventional and organic bananas were either lowered or remained stagnant from 2019 to 2021.

Figure 10: The comparison of farmgate prices for conventional and organic bananas measured by MAG, and minimum farmgate prices for conventional and organic bananas produced under the Fair Trade regime, 2014–2024



Source: own elaboration, based on (Fair Trade International, 2023; MAG, 2024e)

¹² The Lomé Convention is an agreement signed between the European Economic Community (as a precursors to the governing mechanisms of the EU) and a group of countries belonging to the Organisation of African, Caribbean, and Pacific States (ACP). For The Dominican Republic specifically, the Lomé Agreement (and its renegotiations in the 1980s) allowed for preferential access (exclusion from a common external tariff) to the import markets of European countries for bananas. These terms were renegotiated in 1993.

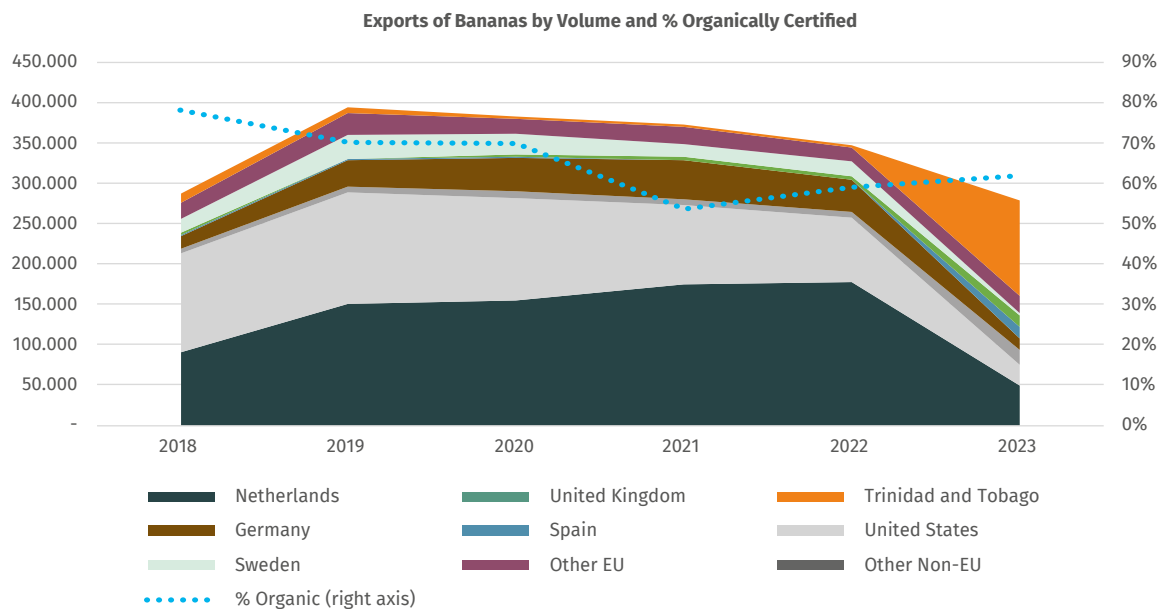
¹³ A full discussion of the differences between the considerations for conventional and organic prices can be found in Annex 2



However, recent trends suggest that the traditional export markets for the Dominican Republic may be declining. As of 2023, the Dominican Republic is perceived to remain one of the largest exporters of organically certified bananas, and almost 90% of total banana exports were oriented towards the UK and the EU (Voora, Vivek *et al.*, 2023; MAG, 2024c). Currently, 16 exporting companies participate in the commercial banana sector, and 61% of exports by volume carry some form of organic certification (ADOBANANO, 2024a; MAG, 2024c). However, in 2023, export volumes to the UK and to the Netherlands fell significantly.

A relative increase in the share of exports to neighboring countries in the Caribbean and Latin America suggests that established exporters in the country are searching for alternative markets, though this reorientation has not counteracted the declining in total export volumes. Interviews tentatively suggest that a narrowing of the price premium for organic bananas, as well as increasing competition from other exporters in Latin America in the conventional banana market, may be negatively affecting the sales of Dominican exporters.

Figure 11: Banana exports by volume, major destination, and % that are registered as organic



Source: own elaboration, based on (MAG, 2024c)

Declining export volumes reinforce a shared perception that the commercial banana sector may be approaching a crisis in productivity. Intensifying export competition, rising costs, and stagnating export prices contribute to a cycle of underinvestment, declining yields, and reduced competitiveness. Both ADOBANANO and MAG confirm that the predominance of environmentally and Fair Trade certified practices has set a maximum productive threshold of approximately 1.9 boxes per acre week¹⁴ (81.17 kg per hectare per week) for the average producer. However, ADOBANANO suggests that due to slow rates of plantation renewal, average yields among its members have been steadily decreasing over the past decade to 1.2 boxes per acre per week (53.79 kg per hectare per week) or less. Simultaneously, labor and fertilizer costs have in-

creased by 21% and 412% between 2022-2024 respectively, with disproportionately strong effects on small producers. Declining cost competitiveness on an increasingly competitive export market has then prevented many farmers from investing in renewal plans that would improve yields, placing them at a further competitive disadvantage (ADOBANANO, 2024a; Fair Trade, 2024). More systematic research is needed to identify the yields and market conditions that would ensure profitability for these producers, as well as the investments that would facilitate better productivity and market access.

Interviews suggest that up to 28% of the annual volume of commercial banana production is destined for domestic consumption, through two channels. First,

¹⁴ Bananas production is commonly measured in 18.14 kg boxes, while productive area is commonly measured in acres

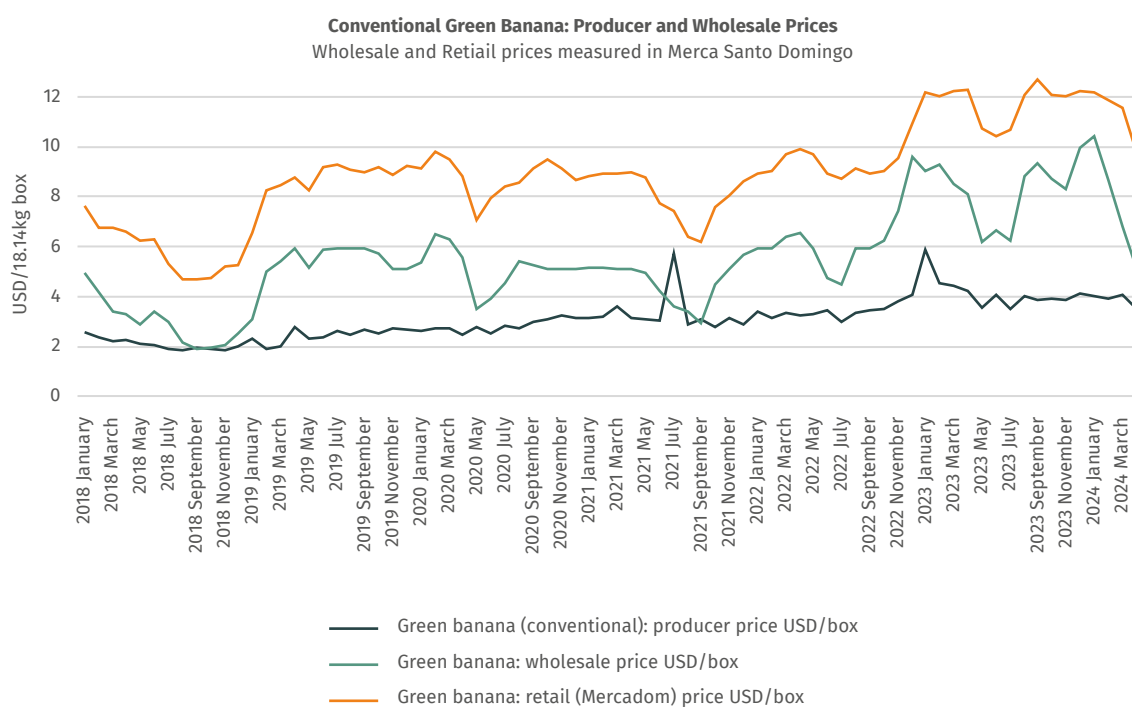


approximately 10% commercial production by volume is produced specifically for domestic consumption. Producers sell these bananas on an individual basis to informal intermediaries for wholesale in green form or to ripening warehouses that will sell to retailers as ripened fruit. A smaller number of larger producers have integrated these ripening facilities into their own operations. Second, approximately, 18% of the volume of bananas destined for export are rejected when packaged to be sent to exporters. These bananas are then sold directly to informal intermediaries on an individual basis for a marked down price (Feschet, Pauline *et al.*, 2020; ADOBANANO, 2024a). Both categories of transaction are not systematically monitored, complicating efforts to characterize the participants and the exact volumes that are sold.

Limited evidence suggests that conventionally produced bananas (i.e. bananas produced with conven-

tional rather than organic practices) are frequently consumed on the domestic market ; a lack of systematic information on the intermediary and wholesale sectors complicates the picture of how domestic supply has responded to demand. Bananas are consumed most commonly in green and ripened form; green bananas are increasingly being consumed as a substitute for plantains. To reach the domestic retail market, commercial bananas pass through one of two channels: a system of informal intermediaries, on one hand, or semi-formalized ripening facilities, on the other. Through the former, green bananas are trucked by those intermediaries to urban and peri-urban points of wholesale (such as Mercado Santo Domingo), before being sold to retailers. Through the latter, ripened bananas arrive to supermarket chains or specialized food retailers who have preexisting arrangements with ripening facilities (ADOBANANO, 2024a).

Figure 12: Domestic farmgate, wholesale, and retail prices for conventional green banana



Source: own elaboration, based on (MAG, 2024e)

The lack of transparency in the domestic chain contributes to a high degree of variability and uncertainty in wholesale and retail price movements. MAG collects weekly information on farmgate, wholesale, and retail prices by sampling these prices at the point of sale; interviews confirm that average farmgate prices exhibit a wide degree of variance and may not fully capture their geographic vari-

ation. As shown in Figure 12, wholesale and retail prices are characterized by a large degree of weekly and monthly variation; between January and April 2024, wholesale prices fell by more than 50% in Mercado Santo Domingo. Interviews suggest that these variations result from two key factors: first, high variability in the quantity of green banana that is brought to market through small-scale and loosely-coor-



minated intermediaries (who do not engage in the type of long term planning that banana plantations are suited for), and second, the substitute relationship that exists between green bananas and plantains. A sharp increase in the supply of plantains on the market has tended to associate with a decrease in green banana prices, and vice versa. This vari-

ability complicates the medium and long-term planning capacities of producers who sell to domestic markets, and has historically discouraged both organic and conventional producers from relying on domestic sales over the export market (Feschet, Pauline *et al.*, 2020; Diario Libre, 2023; ADOBANANO, 2024a).

3.2 Structure of the value chain

This section describes the distribution of activities and actors within the value chain for commercially produced bananas. Figure 13 summarizes the stages, actors, and volume of sales (when available) that comprise the supply chain. The value chain for commercial bananas contains two primary tracks: exports and domestic sales. Within the domestic sale track, bananas are either sold directly to intermediaries and ripeners, or are first passed through a preliminary export check before being rejected and sent to domestic intermediaries as a secondary avenue for sale.

Production

Commercial banana production involves two key sets of actors: **farmers** and **producers' associations**.

Commercial banana farmers in the Dominican Republic have historically structured their operations around the export market, incentivized by the premia offered to organic and Fair Trade certified production.

ADOBANANO estimates that there are approximately 1,700 producers who operate banana plantations specifically for commercial production and sale. Approximately 1,624 of these producers belong to one of 27 producer associations, while 76 produce and sell independently either through export or domestic markets. The distribution of these farmers by size was captured during latest comprehensive census in 2020, as shown in Table 11 below. 81% of these producers operated on less than 16 hectares, while 6% were vertically integrated producer-exporters with plantations of over 400 hectares. The sector is relatively concentrated: the larger producer-exporters occupy 46% of the total area dedicated to commercial banana production, while smaller producers occupy approximately 12%. Interviews suggest that since 2020, a trend in consolidation of productive areas has taken place. The 1,700 producers who are currently active represent a decrease from the 1,900 of the last census, and experts state that it is likely that their land has been incorporated into larger farms (Feschet, Pauline *et al.*, 2020; ADOBANANO, 2024a).

Table 11: The distribution of producers and productive area by farm size, 2020

Plantation size (hectares)	<26.3	26.3-52.6	52.6-64.7	64.7-161.9	>161.9
% of producing population	56.3%	18.2%	6.7%	13.4%	5.4%
% of productive land	12.0%	12.4%	7.0%	22.1%	46.5%

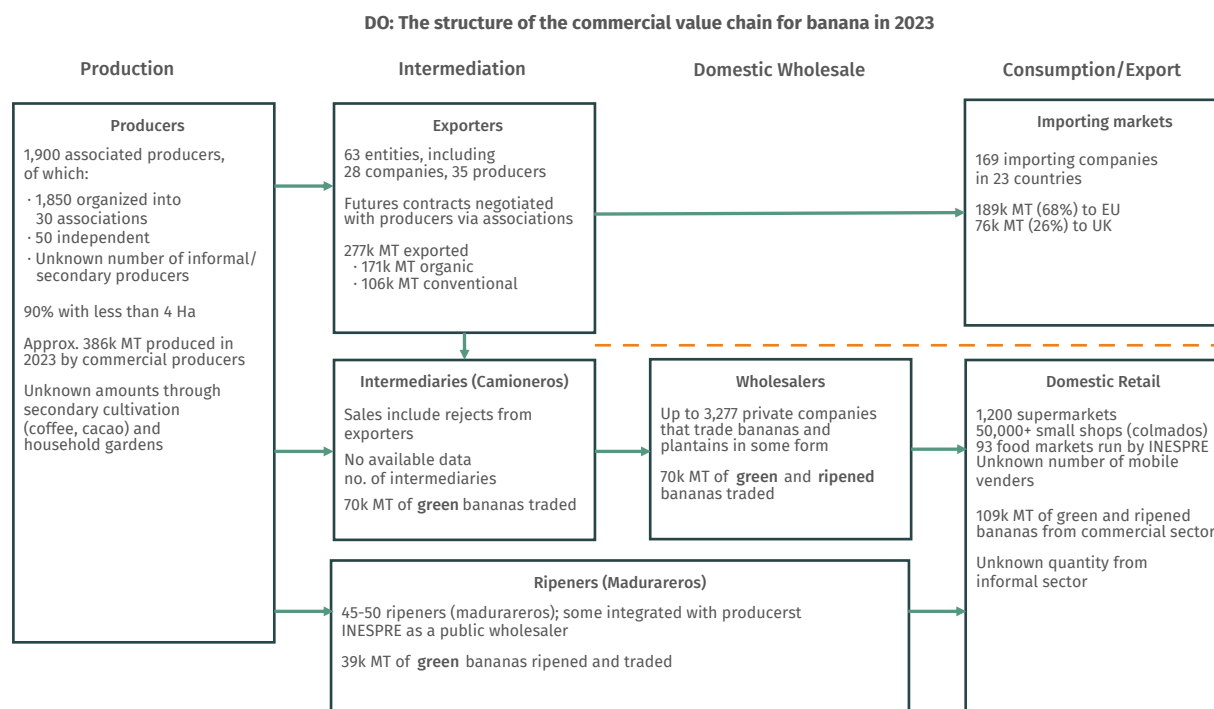
Source: (Feschet, Pauline *et al.*, 2020; ADOBANANO, 2024a)

Fair Trade and environmentally certified practices continue to predominate in export-oriented commercial banana production. ADOBANANO and MAG suggest that in 2023, 90% of exports by volume were Fair Trade certified, and 61% carried some form of environmental certification (including organic). These two sets of certification standards are not mutually exclusive: Fair Trade certifications require a specific set of labor practices and broad environmental standards, while environmentally focused certification systems examine and apply specific

production practices. In 2019, it was estimated that approximately 30 different certifications had been applied to one or more Dominican banana producers, verified by 8 authorized certifiers (FAO, 2017; Feschet, Pauline *et al.*, 2020; ADOBANANO, 2024a). The most common certifications include GlobalGap (necessary for exporting to the EU market), Organic, and Rainforest Alliance. Farmers must pay an average of USD 1,500 annually to certify their production (Fair Trade, 2024).



Figure 13: An outline of the structure of the banana value chain 2023



Source: own elaboration, based on interviews and (Feschet, Pauline *et al.*, 2020)

Production practices most commonly adhere to the parameters recommended by Fair Trade and environmental certification standards, with lower levels of productivity compared to conventional production on the global market. Most commercial producers operate using pumped irrigation systems, relatively low levels of fertilizer, and a labor force that is paid up to 70% of the country's national minimum wage and that primarily consists of undocumented or informally contracted workers. Lower levels of fertilizer use enable compliance with certification standards and a greater premium in export prices. However, labor productivity continues to represent a critical constraint in improving productivity in both organic and conventional contexts. A recent analysis of the value chain estimates that a measure of this productivity across Dominican banana producers (harvested area per person per day) was less than half measured levels in equivalent production systems in Ecuador and Costa Rica, dampened by relatively low levels of training and labor retention (Feschet, Pauline *et al.*, 2020). As shown table 2 below, some variation in yields based on farm size and production practices also exist, with smaller organic farmers exhibiting the lowest yields.

Table 12: Estimated yields (in 18.14 kg boxes per acre per week) by environmental certification and farm size

Plantation Size	Hectares	Boxes / acre / week	
		Organic	Conventional
Small	<26.3	1.1	1.3
Medium	26.3-161.9	1.5	1.5
Large	>161.9	2	1.8

Source: (Feschet, Pauline *et al.*, 2020)

Producers are responsible for cultivation, harvest, and for preparing the fruit to be sold on either the export or domestic markets. In the case of the former, fruit is typically brought to an on-site packing station in which it is sorted, selected, washed, fumigated, and then packed into 18.14 kg boxes to be delivered to exporters. In the case of the latter, the fruit undergoes a less thorough sorting and fumigation process for direct sale to intermediaries or ripeners. For informal intermediaries, fruit may be sold in bulk without being boxed; for ripeners, it is usually packaged into 18.14 kg boxes (ADOBANANO, 2024a).



Producers associations, act as a critical link between small and medium farmers and the export market. As of 2023, ADOBANANO estimates that there are 27 active producers' associations that primarily serve small and medium producers. Membership is mostly concentrated into approximately 4 associations that each have more than 100 members, with the largest (BANELINO) having approximately 200. The gradual decline in small-scale registered banana producers also manifests itself in declining membership to these associations (ADOBANANO, 2024a).

Producers' associations operate as nonprofit entities that play three critical roles for producers and exporters. First, these associations serve as negotiators with the exporting companies to which producers sell. Exporters sign agreements with producers on the quantities and prices for bananas that would be delivered over the subsequent year; both aspects are usually decided on the parts of producers collectively through an association. Second, associations serve as key conduits for the flow of technical assistance, assistance for complying with certifications, and financial services that could facilitate the application of improved practices or renewal plans. Finally, many associations collectively facilitate social investments in the communities to which their producers belong, such as roads, schools, and health services. This is particularly the case for BANELINO, which has been developing a portfolio of social investments and services for over 30 years.

The export track

The export sector for bananas consists of a combination of exporting companies and individual producer-exporters. In 2023, there were 63 entities in total who participated in the export market: of these, 16 represent companies who either procure from other farmers or undertake a combination of self-production and external procurement; remainder represent independent producer-exporters. Historically, the export market evolved through the 2000s from only a handful of larger companies. In the 2010s, a proliferation of firms followed from the availability of premia for certified products (ADOBANANO, 2024a). Recent data from the *Directorate General of Customs* (DGA) allows for a basic estimation of how the current set of exporters and producers distribute their activities. In 2023, 4 firms managed 66% of the total volume of banana exports, with a Herfindahl-Hirschman index of 1,472, representing a moderate degree of concentration that has gradually increased since 2021. Measures of concentration were lower in 2021 than they were in 2023; it is possible that the emerging crisis in producer profitability, and the related decline in total export volumes, are inducing an exit from the sector that favors larger exporting firms.

Table 13: Firm concentration in the banana export sector, 2021-2023

Year	Exporting entities	4-firm concentration ratio	HH index
2021	70	55%	1 153
2022	61	49%	1 058
2023	63	66%	1 472

Source: own elaboration, based on (DGA, 2024)

Exporters function as the primary point of negotiation for product standards and pricing in importing countries, and preside over the collection, final examination, and shipment of the product. From August to December of each year, exporting companies typically negotiate the prices and terms of purchase that are received from importing companies in the destination market. These prices usually follow from agreements between importing companies and retailers, and are determined by the characteristics and certified standards of the products that they purchase. For products under Fair Trade and environmental certifications, these prices must fall within a specific minimum range for both exporters and producers. Following the determination of product characteristics and pricing, exporters establish production and delivery arrangements either with small and medium producers through associations, with larger producers on an individual basis, or internally for their own integrated operations. Bananas are harvested and sent weekly to consolidation centers managed by the export companies, where they are then passed through a final set of checks, are containerized, are sent to port to be passed through customs, and then are shipped.

Exporters purchase bananas directly from producers, or produce them through vertically integrated operations. Production and purchasing arrangements are flexible and often change on a yearly basis; there are relatively low barriers for individual producers to enter or exit the export market. Interviews show that the population of exporting companies and producers is fluid. Firm entry and exit is common, and companies change their relationships with both farmers and importers depending on the specific price and quality conditions that they are able to negotiate. During the 2010s, many of the larger exporters enjoyed margins for certified products that enabled them to purchase from small producers via negotiations with associations. Interviews with key exporters and ADOBANANO now suggest that increased production costs, and competition between a larger number of smaller importers have restricted



the range of options companies employ to procure bananas. In particular, there is evidence larger and more-established firms have reduced the quantities of bananas that they buy from smaller producers, choosing instead to concentrate their procurement from their own integrated operations or from larger sources. Nevertheless, the export market still consists of larger companies that manage hybrid operations of self-production and procurement from smaller producers, and medium to large producers who are technically equipped to export directly rather than through an exporting company.

The domestic consumption track

Bananas pass through two channels to reach the domestic market. First, a subset of producers sell directly to ripener firms (*madurareros*), in which the fruit are ripened before being sold directly to retailers. Second, export-oriented producers sell bananas rejected from the export process to informal intermediaries who purchase them on farm, to be distributed in green form in urban and peri-urban wholesale markets. Approximately 10% of the total volume of commercially produced bananas is destined for the first channel of sale, while 18% is destined for the second.

Ripeners (*madurareros*) are firms that buy green bananas directly from commercial producers, ripen them for a period of 10 to 14 days, and then transport them to retail markets to be sold in ripe form. The most recent census of the sector in 2020 suggests that there are 46 firms that are active in this segment of the value chain; up to 10 of them (such as the large plantation operator Guidom) are directly integrated into the operations of larger independent producers. Little information exists to characterize the concentration of this segment, but evidence suggests that it may be relatively concentrated under Guidom, who could control up to 65% of the volume of sales for ripened bananas domestically (Feschet, Pauline *et al.*, 2020). Interviews suggest that the larger integrated ripeners establish six-month futures contracts with larger retailers that enable them to better structure both

domestic and export oriented production. Meanwhile, independent ripeners operate on a gradient of formality and may engage more frequently with producers through spot prices.

Informal intermediaries serve to buy both green bananas intended for domestic consumption, and rejected bananas to be sold in green form in wholesale markets in major towns and cities. These actors are usually truck owners who operate informally; they purchase from farmers at on-farm packing locations in cash and without receipts for their transactions. Up to 20% of bananas that are destined for export are rejected and sold in this way; interviews suggest that many of the domestically oriented producers also sell a share of their production to informal intermediaries in addition to sending it to ripeners. The informal nature of these operations has prevented any thorough census of the number of intermediaries or how they structure their activities, and represents a critical gap in market information for both the public and private sectors. It is likely that this segment is highly fluid in terms of the number of participants, as truckers modulate in and out of shipping green bananas and other agricultural products, depending on demand from wholesale markets (ADOBANANO, 2024a).

Finally, **wholesalers** and **retailers** operate in urban and peri-urban markets across the country. Statistics compiled by MAG imply that there are up to 3,200 private companies that trade in green bananas and plantains across wholesale markets in the country; the majority of the largest wholesalers are concentrated in Mercado Santo Domingo. These wholesalers buy green bananas from intermediaries and resell them to retailers, mobile vendors, and neighborhood shops with minimal post-processing or storage. The national retail market consists of 1,200 supermarkets, over 50,000 small shops, an unknown number of mobile vendors, and 93 markets managed by the Institute for Price Stabilization (**INESPRE**). No systematic information exists on the volume of sales that pass through these actors, hindering any effort to gauge their level of concentration.

3.4 Analysis of costs, prices, and margins along the value chain

This section provides a closer analysis of the distribution of producer, exporter, and domestic wholesale prices of green bananas along the value chain to better contextualize how producers and exporters interact with both markets. To do so, it provides a broad outline of the costs and implied margins of the key actors along the value chain that were introduced in section 4.2. On the export track, the section provides estimates for the chain from

export-oriented producers to exporting companies, benchmarked by the minimum prices defined by Fair Trade that are applied to approximately 90% of exports by volume. On the domestic consumption track, the analysis provides estimates on the production of green bananas to be distributed to wholesale markets via intermediaries. These estimates should be considered preliminary, and not representative of the conditions under which all value chain actors operate.



The export track

Table 4 summarizes the movement of prices and implied activity costs associated with production and exports under the Fair Trade production and pricing system. Production costs vary depending on farm size and yields, the latter of

which is affected by the choice to use conventional or organic practices. The below cost estimates assume the perspective of a medium-sized producer with yields of 1,575 boxes per year under conventional conditions and approximately 1,100 boxes per year under organic conditions.

Table 14: Per box costs, accumulated prices, and margins by value chain stage for conventional and organic bananas under the Fair Trade pricing system, 2023

Per box (18.14 kg)	Production		Export	
1 FT Conventional 2 FT Organic	Production	Sale to Exporters	Export Services	FOB Sale
		$c=a+b$		$f=c+d+e$
Price		1 \$7.75 2 \$10.10		1 \$12.55 2 \$14.90
Marginal cost (MC), profit (π)	MC (a) 1 \$6.96 2 \$9.46	π (b) 1 \$0.89 2 \$0.64	MC (d) 1 \$4.02 2 \$4.02	π (e) 1 \$0.78 2 \$0.78
% FOB price	a/f 1 55% 2 63%	b/f 1 7% 2 4%	d/f 1 32% 2 27%	e/f 1 6% 2 5%

Source: own elaboration, based on interviews and (Fair Trade International, 2023)

In 2023, the minimum farmgate prices set by Fair Trade for conventional and organic bananas were \$7.85 and \$10.10 per box, respectively. These prices reflect estimate production costs of \$6.96 per box for conventionally produced bananas and \$9.46 per box for organically produced ones. Many organic producers will seek price premia that are higher than this minimum price through certifications that have stringent production and quality requirements, such as Bio Suisse. Non-Fair Trade prices are approximately \$1.50 to \$2.00 below the non-Fair Trade conventional ones, equating to between \$5.85 to \$6.35 per box in 2023. Non-certified producers often incur lower labor costs, allowing them to earn margins at these prices. For all types of producers, in any case, at the point of consolidation exporters reject a certain percentage of packaged products (up to 18% per shipment), which erodes producers' per-shipment margins.

Costs are highly variable with farm size and specific production practices; interviews suggest that many producers sold at a loss in the first quarter of 2024. Two factors drive this trend. First, Fair Trade's minimum prices

are set assuming that plantations achieve certain levels of productivity, typically up to 1.6 to 1.8 boxes per acre per week. Many plantations, and particularly organic ones, have however experienced declines in yields towards 1.2 boxes per acre per week over the past four years, possibly connected to low rates of plantation renewal. Second, drastic increases in labor costs, but especially in fuel and fertilizer prices, have occurred over the past years: according to Fair Trade's estimates, monthly wage rates have increased by 21% in since 2021, and per-bag fertilizer costs have increased by 42% over the same period (Fair Trade, 2024). Interviews show that several larger, more established organic producers sold at the start of 2024 at losses of between \$1 to \$2 per box (7% to 14% of Fair Trade prices at farmgate), contextualizing a perceived exit from the sector on the parts of many farmers.

Fair Trade-centric exporters buy from producers at the minimum prices set by Fair Trade for that year. They then incur a series of logistical expenses that are factored into final FOB prices. Exporters typically incur a cost of \$4.02 per box to bring bananas from collection to



final shipment in the port of Manzanillo.¹⁵ Costs do not vary for conventional or organically certified products.

In 2023, the minimum FOB prices for conventional and organic bananas were set at \$12.55 and \$14.90, respectively. These prices imply minimum margins for conventional and organic production that represent 6% and 7% of the final FOB prices respectively. It should be noted that for organic bananas, many exporting companies seek margins over FOB prices that are closer to 10% in their negotiations with importing companies. Non-Fair Trade conventional bananas may be sold at prices that are \$2 lower than the floor set by Fair Trade, but, prior to 2022, they still implied margins of 10% to 15% due to lower incurred labor costs. As is the case for producers, many exporting companies have faced diminishing margins since 2020, causing a shift towards vertically integrated production and shipment models.

The domestic track

The high variability in wholesale prices (with quarterly increases or decreases of up to 50%) complicate any effort to characterize annual prices and costs within the domestic market for green bananas. Basic information has been made available through farmgate and wholesale prices collected by MAG, as well as interviews with domestically oriented producers. Unfortunately, systematic data on the wholesale and retail prices of ripe bananas is unavailable from official sources, complicating any effort to model the activities of the ripeners (*madurareros*).

The below analysis assumes the perspective of a medium producer who sells green bananas to wholesale markets in Santo Domingo via intermediaries:

- Producers who sell green bananas to the domestic market typically do so at prices of \$3.50 to \$5.00 per box, with slim margins. Bananas that are rejected from the export process are typically sold at between \$3.50 to \$4.00 per box. Bananas that are grown specifically for domestic sale (rather than bananas that are rejected from export) may be sold

for between \$4.00 to \$5.00.¹⁶ However, a large degree of price fluctuation has characterized the spot prices at farmgate over the past two years: in early 2023, there is evidence that per-box prices for green bananas rose to \$6.00 per box. Producers who specialize in selling green bananas to the domestic market often incur lower labor and fertilizer costs, and may earn margins of up to 6 to 8%. Bananas that are rejected at the point of consolidation for export are often sold informally for a loss.

- Intermediaries incur logistical costs of between \$0.30 to \$0.50 per box when transporting bananas from farmgate to points of wholesale, and in 2023 sold to wholesale markets for between \$6.50 to \$7.00 per box. These prices imply that intermediaries capture significant margins when wholesale prices rise.
- The wholesale market in Santo Domingo may incur an average storage and movement cost of \$0.26 per box after purchasing from intermediaries. In 2023, average wholesale prices spiked to a high of \$8.26 per box in response to a shortage of cooking plantains. The low marginal costs for selling bananas implies that, during the price spike of 2023, wholesalers also captured relatively high margins of up to 12%.

Due to the informality of the intermediary sector and the transactions that it undertakes with both producers and wholesalers, there is insufficient information to define the full range of movements of costs and profit margins across the value chain for green bananas. The variability behind these estimates for prices and marginal costs per box is driven by the informality of the intermediary sector as well as the close substitute relationship that exists between green bananas and plantains. Without effective flows of market information from retailers to producers, price increases have historically been met with a subsequent increase in supply and with a shift in consumption towards plantains; both of these trends then carry the potential to lower the spot prices that appear on the wholesale market.

15 These costs include that of the standardized box (\$2.38), the packing system ("Banava", \$0.16), palletization (\$0.45), inland freight (\$0.30), and port charges (\$0.44).

16 When rejects are sold out of the export process, the truckers who pick them up are price-givers, and the producer either sells them for a small value of the export price, or leaves them to spoil. Export-oriented producers do not sell rejects with the intent of earning a margin, but it does help to recoup some of the per-unit loss. In production systems where the growing and packing processes are tailored specifically for domestic sale, prices are a bit higher because the parameters of the product are more known and consistent.



3.3 The institutional environment: actors and policies

Institutional actors

In the **public sector**, support for banana production originates in a collection of line ministries and coordinating institutions that provide extension services, technical advice, and resources to producers. The following line ministries are particularly relevant:

- The **Ministry of Agriculture (MAG)** is responsible for implementing plans, laws, and projects that promote agricultural production and competitiveness, including for banana. MAG engages in both four-year and ten-year planning cycles; the four year plans focus on the internal operations and structure of the Ministry. The current ten-year *Plan Estratégico Sectorial Agropecuario* (Strategic Plan for the Agricultural Sector), valid from 2020 to 2030, references banana production specifically in the improvement of competitive commercial crops for export, but does not reference specific implementation mechanisms or investment channels. Within MAG, the Vice-Ministries of Agricultural Production and Marketing and of Extension and Capacity Building provide sector-specific services to farmers in the banana sector, with a particular emphasis on technology adoption and on the use of best practices in organic production. Additionally, the **Dominican Institute for Agricultural and Forest Research (IDIAF)** plays a strong role as the consolidator and promulgator of innovative practices in the sector (MAG, 2020).
- The **Ministry of Environment and Natural Resources (MARN)** governs the use of land and water resources that surround plantations in the Dominican Republic. In particular, the Vice-Ministries of Environmental Management, of Forest Resources, and of Soil and Water regularly evaluate best practices for implementing resource conservation and recuperation strategies that align with organic production methods.

The current policy environment for banana production also benefits from the activities of coordinating institutions that provide financing, technical assistance, productive resources, or market access services to actors in the sector:

- The **Dominican Agricultural Bank (Banco Agrícola)** remains the primary lender to small banana producers, historically having done so at concessional rates. In 2022, Banco Agrícola became responsible

for overseeing a credit line of USD 6.1 million that was first facilitated through the BAM project.

- The **Dominican Agribusiness Board (JAD)** acts as a public institution that coordinates support to agricultural production through 61 sector-specific committees, including one for banana. In addition to implementing the Measures of Support for Banana Project, it continues to provide productive services, business training, and market access support to producers and producers' associations.
- The **Dominican Export and Investment Center (ProDominicana)**, founded in 2003, enables businesses in the Dominican Republic to access export markets and to connect with importing partners. It coordinates the development of cross-institutional export promotion plans, maintains a digital platform that communicates information on export requirements by importing market, and organizes trade fairs that connect agricultural producers with importers.
- The **Institute for Price Stabilization (INESPRE)** is a public institution that is mandated to promote food security for both consumers and producers through the assessment of price movements and the public procurement of products for basic consumption. INESPRE regularly procures these products at competitive farmgate prices (considered to be slightly higher than prevailing regular market prices), and sells them through its own distribution network of 92 local markets and 205 mobile markets, open to the public, at prices that are 35% to 40% lower than the national retail average.
- In 2023, INESPRE sold approximately 8,000 quintals of bananas through its distribution system, having procured them from farmers associated with ADOBANANO. In 2024, INESPRE further intervened to purchase in bulk from these producers (INESPRE, 2024).

The development of public policies and regulations for the banana sector has also relied on a nucleus of **private sector and civil society organizations**. This group of associations have occupied the most consistent coordinating roles in the sector, around which support programs have been designed:

- **ADOBANANO**, active since 1988, is a federation that represents approximately 1,700 commercial producers through 27 associations, 24 exporting



companies, and 2 plant nurseries. It governs itself through a general assembly that chooses a board of directors every two years. ADOBANANO has served as the primary point of contact for public support to the banana sector through the projects and mechanisms that have been in place since 2006. It also serves as a disseminator of key information on price movements and changes in import policies (ADOBANANO, 2024b).

- **The Dominican Association of Exporters (ADO-EXPO)** is a civil society organization that provides a platform by which exporting companies can access technical support, key market information and investment opportunities. A number of larger banana exporters now participate in ADOEXPO.
- **The Latin American and Caribbean Coordinator for Fair Trade Producers and Workers (CLAC)** is a network that coordinates information-sharing and support activities for producers that export in accordance with the Fair Trade system. In the Dominican banana sector, CLAC collects information on costs and production parameters that inform the export prices that Fair Trade sets for the country and product in November of each year. It also organizes fora and exchanges that enable farmers to better comply with certifications and export requirements.

Policies and support mechanisms

The public policies that govern and strengthen the banana sector have historically adopted a cluster-based approach¹⁷; these policies are formulated with specific reference to public-private initiatives that include both strategy documents and channels for investment. This pattern has its roots in the creation of the first comprehensive producer-exporter federation, **ADOBANANO**, in 1988, as well as the **National Commission for Banana Policy (Comisión Nacional de Política Bananera)** in 1992.

Cluster-based development began with the creation of the **National Council for Competitiveness (CNC)** in 2006; in 2007, it published a systemic plan to improve the national competitiveness of key agri-food industries, including that

of banana, establishing a Banana Cluster that maintained communication between relevant public sector institutions as well as producers' associations (Malla, 2007). In 2009, the CNC coordinated the implementation of the **Strengthening the Banana Value Chain through the Growth of Inclusive Markets Project**. With financing from the MDG Achievement Fund, this project brought together a set of UN agencies, the Ministry of Agriculture, the Ministry of Economy, and producers' associations to implement a set of activities that intensified production and improved access to the EU market for the export of organic bananas.¹⁸ Included in this initiative were financing packages for farmers, as well as the creation of a national strategy for the banana sector in 2012, which called for a series of investments to modernize its operations (MDGIF, 2013).

Between 2014 and 2018, the banana sector then received comprehensive support through the **Measures of Support for the Banana Sector Project (Medidas de Acompañamiento del Banano/BAM)**, which partially responded to the investment needs identified in the 2012 national strategy with financing from the EU and national sources. This project implemented a series of capacity-building and technical assistance programs that would improve productivity and facilitate exports to the EU market. BAM also provided loans to 1,240 producers at concessional rates through a credit facility managed by Banco Ademi (SIBA, 2018; Feschet, Pauline *et al.*, 2020).

The current pattern of support to commercial banana production includes a set of strategic initiatives as well as financial transfers to farmers and associations, including the following:

- In strategic terms, the sector has benefited from an EU and CIRAD-led value chain analysis in 2019 that facilitated a sector-wide discussion on the state of banana production in the country, as well as strategic priorities for supporting producers and exporters. As a follow-up to this analysis and rising economic pressures faced by banana farmers, the government announced the reactivation of the National Commission for Banana Policy in 2023, as well as an a sectoral renovation scheme within the Ministry of Agriculture in 2024 that will include additional cost and price monitoring services (Feschet,

17 An agricultural cluster is "a concentration of producers, agro-industries, traders, and other private and public actors engaged in the same industry and inter-connecting and building value networks, either formally or informally, when addressing common challenges and pursuing common opportunities" (Gálvez-Nogales, 2010). Cluster-based development refers to the coordination of investments across actors within an agricultural cluster that could generate important mutually reinforcing effects on their productivity.

18 The MDG Achievement Fund was established in 2006 as a joint venture between the Government of Spain and the United Nations to coordinate multi-actor investments in development initiatives that could also strengthen national policy frameworks and priorities. For more information, please see the [MDG Achievement Fund's Factsheet on the Dominican Republic](#)



Pauline *et al.*, 2020; Gobierno de la República Dominicana, 2023b).

- Bananas have been considered in the National Export Promotion Plan (Plan Nacional del Fomento a las Exportaciones), coordinated by Pro Dominicana. Active from 2020 to 2030, this plan prioritizes mobilizing investments in productive export sectors, developing physical and financial infrastructure for exports, and developing stronger external relations with importing markets (Pro Dominicana, 2020).
- In financial terms, the credit line established by BAM remains active and was transferred in 2022 from Banco Ademi to the Dominican Agricultural Bank (Banco Agrícola) with a value of approximately DOP 356 million/USD 6.1 million. Additionally, the Ministry of Agriculture transferred DOP 140 million/USD 2.4 million in financial support to ADOBANANO in 2023 to support input procurement and renewal schemes for production. (Diario, 2022; Gobierno de la República Dominicana, 2023a).
- As of 2024, MAG is currently rolling out a set of tangible services and support to farmers through the

Rescue and Short-Term Production Plan within the Cruz de Manzanillo Project, aimed towards improving the productivity of export-oriented and certified banana production through the rehabilitation of approximately 8,800 acres (3,560 hectares). Simultaneously, the Ministry continues to distribute inputs (including banana corms) and implement training programs towards soil and water management as well as the reduction of losses during production.

While new mechanisms of direct support are currently being rolled out in the sector, they do not necessarily reflect strategic coordination between actors that have historically provided support to producers and exporters. The strategies of 2007 and 2012 have not yet been revised to respond to changing export market conditions or to engage more systematically with domestic consumers. The industry remains loosely coordinated through ADOBANANO and the major exporters. In the absence of public support, the capacities of ADOBANANO and these exporters to improve yields, quality, and market access for farmers are threatened by significant exposure to market risk and subsequent losses in income.

3.5 Synthesis: market structures, potential inefficiencies, and policy options for the commercial banana value chain

The commercial banana value chain represents a subset of the larger banana sector in the Dominican Republic, and it is the only segment in which production, intermediation, and sale are currently consistently measurable. This subsector includes up to 1,700 producers of various sizes, 16 exporting companies, and a larger number of informal intermediaries who act as the bridge between farmgate and wholesale transactions. Approximately 72% of production is sold to export markets, 18% is sold through informal intermediaries towards domestic markets after being rejected for export, and 10% is sold specifically to be ripened and

distributed to retailers domestically. Producers historically have enjoyed substantial margins in export sales through premia offered for Fair Trade and environmentally certified production. However, productivity is currently threatened by negative cycle of declining yields, reduced export income, and underinvestment in plantations that hampers productivity and competitiveness. Recent increases in input prices and competition from other exporting countries has induced an exit from the sector on the parts of smaller producers, who are not able to sustain themselves through sales to the domestic market.



Table 15: A summary of implied market concentration along stages in the banana value chain

	Phase	No. entities	Implied concentration
Domestic track	Production	1,700	Medium 5% of producers controlled 46% of productive area in 2020; level of control has increased by 2024
	Intermediation	Unknown	Low Frequent entry and exit of individual truck owners
	Ripening	45-50	Low Characterized by varying degrees of integration into producer operations
	Wholesale	Unknown	Low Up to 200+ participants in Mercado Santo Domingo, for example
Export Track	Exports	63	Medium Exporters: 4-firm ratio 66%, HHI 1472 Importing partners: 4-firm ratio 41%, HHI 603

Source: own elaboration, based on interviews

Moderate degrees of concentration exist among producers and exporters, and low barriers to entry in the export market may be inducing competition between exporters in their negotiations with importing companies, possibly dampening prices. Recent estimates suggest that 6% of larger producers manage 46% of the total land for banana production, and may be gradually consolidating their activities. Similarly, four exporting firms managed over 60% of the volume of exports in 2023. However, sector experts emphasize that, since the early 2000s, there has been a proliferation of firms and individual producer-exporters in the market, accompanied by an increase in the number of certification schemes and channels of sale that they use. Within the sector, this is perceived to have led to increased competition between exporters and a reduction in prices offered to traditional retail markets in the UK and the EU. While Fair Trade's minimum prices have historically sustained high margins for these producers, these margins have been negatively impacted by recent cost increases and productivity declines.

Informality in the intermediary sector may affect the efficient transmission of market information from wholesale and retail to producers; producers have stated that they cannot rely on feasible margins through the domestic sector due to their inability to effectively anticipate and plan for changes in prices. Wholesale prices in the domestic markets for green and ripened bananas are primarily determined by the volume of supply with respect to demand. Variability in demand is amplified by the substitute relationship that green bananas hold with cooking plantains, and fluctuations in the plantain supply may associate with drastic changes in wholesale prices for green

bananas. These fluctuations are largely incompatible with the year-long planning horizons that often define intensified and export-oriented banana production.

The public policy environment has historically supported banana production through cluster-based investment programs that have prioritized improving yields and facilitating compliance with certification programs. However, since 2018, there has been a lapse in coordination between the sector's producer and exporter federation (ADOBANANO) and the public sector institutions that participated in earlier cluster-based programs. Since 2020, declining trends in profitability have revealed the need for a sector-wide strategy and planning exercise that could identify tangible goals for productivity and market access as well as the investments needed to achieve them. Simultaneously, large price fluctuations in the domestic sector highlight a need for a comprehensive mapping and formalization of intermediary and wholesale markets that could enable more effective planning on the parts of producers.

The absence of observed international price transmission to domestic markets may originate from three key characteristics of the value chain. First, the export market is primarily served by organic bananas whose characteristics do not necessarily fetch equivalent premia through domestic sales. Second, banana prices that are observed on international markets follow from annual futures contracts that are set between importers in the destination markets and exporters in the markets of origin. In the case of the Dominican Republic, these futures contracts follow from Fair Trade and environmental certifications whose price determinants differ from those that may affect prices



on the conventional banana market. Third, domestic wholesale prices for green banana in the Dominican Republic depend on the complex interplay between the available supply of bananas (which fluctuates drastically on a monthly basis) and the available supply of plantains (which serve as a close substitute with green bananas on the consumer market)¹⁹. Fluctuations in the supply of green bananas may follow from the information asymmetries that exist for producers who interact with a largely informal intermediary market, in which long-term arrangements for procurement are not as common, and signals of consumer demand are more difficult to communicate. The short-term outlook²⁰ and fragmented nature of communication between intermediaries and producers prevents the yearlong purchasing arrangements that stabilize the export sector. The unique pricing mechanisms that characterize export and domestically oriented production, as well as the differences in product characteristics

between them, may insulate prices on the domestic market from the effects of increased prices on the export market.

More systematic value-chain information is needed to facilitate profitability for banana producers in the Dominican Republic. For many producers, export prices for conventional and organically certified bananas no longer adequately compensate for production costs; as this disconnect may be a function of declining yields, productivity improvements could enable producers to respond to changing conditions on the international market. At the same time, the informality of the intermediate market has thus far prevented a comprehensive accounting of how activities and prices have evolved for the sector, and may generate information asymmetries that hinder annual planning for plantation renewal. More effective information systems are needed to support producers in planning their investment, market access strategies, and resilience mechanisms.

Box 1: A complementary banana value chain assessment in the Dominican Republic

A complementary study evaluated the existing public policy and regulatory framework supporting value chain development in the Dominican Republic, providing recommendations aimed at enhancing smallholder farmer inclusion, expanding market opportunities, and scaling up adaptation and mitigation measures for strategic supply chains. As part of this initiative, a banana value chain assessment outlined key recommendations to enhance climate resilience, promote inclusiveness, and boost competitiveness in the banana sector in the Dominican Republic. The main recommendations of the study are as follows:

1. To improve **climate resilience**, transitioning to renewable energy sources, upgrading irrigation systems, restoring critical water basins, and implementing climate change mitigation strategies like reducing deforestation and forest degradation, plus additional forest-related activities (REDD+) to reduce emissions and adapt to new environmental standards.
2. For **inclusiveness**, providing specialized financing for small-scale producers, revitalizing the workforce through incentives for local employment and legalizing foreign workers, and strengthening institutions like ADOBANANO to better support producers.
3. To increase **competitiveness**, modernizing plantations, encouraging the adoption of sustainable agricultural practices and precision technologies, and offering specialized training for both workers and technicians. Additionally, improving logistics performance and export development to regain lost markets and enter new ones, enhancing agricultural insurance coverage, and establishing early warning systems for biological threats, alongside fostering public-private partnerships to improve port infrastructure and services.

Source: World Bank and FAO. 2024. The Dominican Republic agriculture sector review – Promoting a climate-smart, inclusive, and competitive sector. Towards More Climate-Resilient, Inclusive, and Competitive Value Chains.

19 While they are substitutes in consumption, bananas and plantains are not in production. They have very different agro-ecological parameters and cost structures for production. For instance, in terms of water intake, plantain trees are much hardier and can survive with less rainfall.

20 Intermediaries buy with a short-term outlook on how prices move: if prices go up, they hope to buy more in order to maximize their gains. Anecdotally, this led to an oversupply of bananas on the consumer market in 2024, which caused farmgate prices to crash.







4 Conclusion and policy implications

Central America is currently experiencing a sharp rise in the prevalence of moderate and severe food insecurity. In 2023, 9.1 million people across Central America and the Dominican Republic faced high levels of food insecurity. For many countries in this region, food insecure populations have been increasing steadily since 2016; since the COVID-19 pandemic, these trends have accelerated. Food insecurity in this region results from a complex interplay between climatic and economic factors, and it is characterized in the short term by the inability to afford healthy diets. Most populations vulnerable to food insecurity typically live in rural areas and depend partially or wholly on agriculture as a source of income; across both urban and rural populations, however, food insecurity carries long-term ramifications for human health.

Increasing domestic prices of key food staples have been major drivers of food insecurity in the region, but seem to only be loosely connected to recent international price spikes. Although international and domestic price increases have occurred simultaneously since 2022, recent evidence found low degrees of international to domestic price transmission for a number of key food commodities in the region, and that the recent food price increases observed in Central America may originate primarily with domestic factors (World Bank, 2024). As low levels of price transmission can be a symptom of domestic market distortions, understanding drivers of inefficiencies in local value chains is key to ensuring resilience in the long run.

For food products with a strong traded component, structural aspects of national value chains may be generating inefficiencies for consumers and producers. Several key domestic factors may distort the movement of domestic prices. First, high levels of market concentration may allow firms in that segment of the supply chain to influence the movement of prices in a way that runs counter to market conditions for production and consumption. Second, information asymmetries for producers and consumers – most often related to the informality of operations in segments of the supply chain – may prevent the effective flow of market and pricing information, and may distort decision-making processes for production and consumption.

Finally, public policies in the region have provided targeted support to consumers and producers, but also have resorted to blanket subsidies and accumulations of food reserves that may distort the market value of important food commodities and the distribution of welfare gains that was originally intended through the formulation of support mechanisms.

This report has explored the domestic market structure of two key value chains in the region that exhibit low levels of price transmission: white maize in El Salvador, and commercially grown bananas in the Dominican Republic. The white maize sector provides a significant share of daily calories to El Salvador's population, and a growing share of national supply is imported. In the Dominican Republic, the banana sector has evolved into a key component of the country's portfolio of agricultural exports, while retaining a significant domestic market for consumption both in green and ripened form. In both of these cases, the elasticity of price transmissions from international to domestic wholesale markets is less than 10%. The report has provided an analysis of aggregate trends, market structures, and the distribution of costs and prices in each value chain, to respond to three guiding questions on price formation and market efficiency. Each of the guiding questions is reported below, together with the related evidence uncovered by this report.



1. How are prices formed on domestic markets and how do these mechanisms compare to the traded track?

The value chains discussed in this report present distinct processes of price determination.

In **El Salvador**, there is a clear bifurcation of the production and consumption chains for domestic and imported grain. Domestically, white maize is produced by approximately 340,000 small subsistence farmers who consume a share of their production and sell the surplus to informal intermediaries; these intermediaries then sell to a series of wholesalers in urban and peri-urban areas, at prices that are determined by daily fluctuations in supply and demand. Imported white maize enters the market via the coordination between large brokers and a highly concentrated group of agro-processing companies. These companies procure grain through futures contracts and sell it both in original and processed form to urban and peri-urban wholesalers as well as formal supermarkets. These two supply chains remain entirely separate until they arrive at common points of wholesale, and often remain geographically separated across different points of retail. For example, imported white maize grain is most commonly found in supermarkets and larger wholesale sites, but maintains a limited presence in smaller neighborhood stores and rural markets.

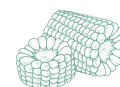
In the **Dominican Republic**, export-oriented bananas and those that are produced for domestic consumption follow separate pricing determinants and pricing mechanisms. Most export prices for commercial bananas are determined through annual futures contracts that adhere to specific quality and production standards, such as those dictated by Fair Trade International. Prices that result from these contracts respond to factors that do not necessarily impact prices on the conventional banana market, as they rely on annually fixed estimates for production costs or on the internalized value of specific environmental practices. They are also negotiated through a highly coordinated chain of exporters and importing companies that maintain year-to-year relationships. Conversely, the domestic market for bananas relies on sales from farmers to informal intermediaries who bring them to wholesale markets, where wholesale prices vary daily by local supply and demand. The market for domestic consumption does not differentiate based on product or production characteristics, and instead shares a close relationship with price movements for domestically produced plantains.

2. What do the structures and evolving characteristics of the value chains for these products suggest about market efficiency in the two countries?

Market structures help explain price movements on the domestic market, and may point to potential inefficiencies for both producers and consumers.

In **El Salvador**, the informal nature of production and intermediation prevent both the efficient transmission of consumer preferences to producers, and the efficient integration of domestic products into large-scale agro-processing, distribution, and retail systems. Producers' associations have attempted to reduce transaction costs with downstream buyers and to increase the quality and consistency of grain deliveries to wholesale markets. However, the majority of smallholders lack access to lucrative markets or credit lines that could facilitate effective investments in productivity. Simultaneously, high concentration in the import and agro-processing sector, as well as relatively low transparency in the scope of their activities and the determination of wholesale prices, may expose the consumer market to higher levels of risk in the future, should international prices rise.

In the **Dominican Republic**, informality in domestic intermediation also prevents any annual planning on the part of producers that could efficiently incorporate market information into medium or long term production decisions. There may also be a disconnect between the internationally determined prices for certified banana production, and the incentives to efficiently structure the production process on the parts of farmers. Fair Trade and Organic banana export prices have increased gradually but consistently over the past decade: while at the start of that period, farmers enjoyed substantial margins, these margins did not facilitate increases in productivity or improvements in plantation renewal processes. Now that costs have increased, farmers occupy a precarious position in the market with low yields, high investment needs, and reduced competitiveness. The lack of transparency in the movement of domestic demand and the formation of domestic prices limits the capacity of the domestic market to compensate export-oriented producers as they search for financial resources that could facilitate effective plantation renewal.



3. How do trends in market structures and public policy implementation contribute to possible price distortions?

The current policy environments that govern the two value chains analyzed present important opportunities to improve the efficiency of public support to agriculture.

In **El Salvador**, public support for the white maize sector has focused on three areas: the liberalization of imports, the diversification of smallholder production, and the stabilization of domestic supply through a physical grain reserve and the development of a public agency for domestic intermediation and wholesale (via the *Ley Integral*). Recently, moreover, important steps have been taken in improving the efficiency of existing input subsidy schemes. These policies, however, do not identify strategic actions for supporting the transformation of the domestic sector, its capacity to compete with low-priced imports, and its agility in responding to domestic demand when import prices increase. Nor do

they properly identify a vision for how to effectively guide the agricultural sector as farmers cease to produce staple foods and turn to more lucrative crops or economic opportunities outside agriculture.

In the **Dominican Republic**, the cluster-based approach to the development of the banana sector has not led to a systematic improvement in productivity, and there now exists a lapse in strategic coordination between the sector's federation of associations and the Ministry of Agriculture. Simultaneously, the intermediary market for domestic banana sales has not yet been comprehensively measured or regulated in a way that could efficiently transmit market information to producers. Recent investments in plantation renewal, in price information systems, and in a coordinating body that can liaise between the public and private sectors, represent strong initial attempts to improve support for the sector. Future support policies require a deeper process of strategic planning to identify the productive and organizational conditions under which the banana sector could remain profitable, and the investments needed to achieve them.

4.1 Policy implications

The findings of this report suggest a series of general recommendations for responding to the challenges identified in this study. The white maize and banana sectors in El Salvador and the Dominican Republic are unique in their structures, policy environments, implied inefficiencies, and specific investment needs. Recommendations are provided within the framework of the standard OECD classification of producer support, support to consumers, and general services support to the agricultural sector.²¹

Producer Support policies

In terms of policy recommendations that support maize and banana **producers**, there are clear opportunities for more effective **planning exercises** and **delivery mechanisms** to target more efficient use of technical and financial resources. In particular, governments should consider orienting sectoral investments and policy planning exercises that enable producers to respond to current and predicted market conditions. The example of the white maize sector in El Salvador demonstrates a move in this direction: the reform of

El Salvador's PIATEC input subsidy scheme transitioned to a voucher system and could therefore allow for greater flexibility and market responsiveness in production choices²². It should be noted, however, that while voucher systems represent a good practice for input subsidy programs, subsidy programs in general create a number of inefficiencies in the long term, and the overall policy framework for the sector should be built around a market-oriented long term vision for supporting a sustainable and profitable transformation. In the Dominican Republic, recent increased investments targeted at producers for banana plantation renewal, price information systems, and institutional coordination are a promising development but, at the same time, the cluster-based approach adopted for decades has not led to a systematic improvement in productivity. Moreover, the 2007 and 2012 sectoral strategies have not yet been revised to respond to changing market conditions at domestic and international levels, and the banana industry remains loosely coordinated by a single body (ADOBANANO) and few bigger exporters that do not have the capacity to support farm productivity and commercialization effectively.

21 Cf. OECD. (2016). OECD's producer support estimate and related indicators of agricultural support. Concepts, calculations, interpretation and use (The PSE Manual). Trade and Agriculture Directorate. Paris: Organisation for Economic Cooperation and Development.

22 Ley integral de comercialización agropecuaria. <https://www.fao.org/faolex/results/details/fr/c/LEX-FAOC223576/>.



A deeper **strategic planning** is needed to identify and put in place incentives and investments needed to sustain profitability of these two sectors. In addition, the majority of farmers, and in particular smallholders, lack access to lucrative markets or credit lines that could facilitate effective investments in productivity to ensure more stable domestic supplies. To tackle risks of supply shortages and food price shocks, on the production side it would be critical to **improve access** to efficient input markets, support integration of farmers into the supply chain of the industrial processing and distribution, and expand risk-based **insurance systems** that can respond to weather or market events. In particular, the expansion of cost-effective insurance systems is vital to respond to increasing climatic and weather variability.²³

Additionally, to align priorities and actions within the sector, policy design and implementation would benefit from a more participatory and **consultative processes that could facilitate the coordination of investments in improved productivity**. The sectors analyzed in this study share important relationships with rapidly evolving international markets, and the farmers who participate in them also face changing production environments that pose key challenges for continued profitability. Each sector would benefit from stronger channels of dialogue and communication between farmers and the public sector to identify achievable goals in improving productivity and the investments needed to facilitate them. In El Salvador, this could leverage the PIATEC and its use of vouchers by pairing it with ancillary investment activities such as mechanization and the rollout of improved seed varieties. In the Dominican Republic, joint investment planning exercises involving farmers, ADOBANANO, and the Ministry of Agriculture could better tailor inputs and investments in plantation renewal that are currently being considered by the government.

Consumer support policies

As regards **consumer support**, policies should focus on efficiently responding to food price shocks and **curbing food inflation using targeted mechanisms** that do not unduly disrupt the domestic markets and **that prioritize reaching poor and remote populations**.

Analysis of the recent high food inflation found it was driven by sustained price increases for meat, edible oils, and cereals, due to different factors, including highly variable domestic supply and rising input costs. In El Salvador, for example, in 2023, food price inflation was double that for general consumption, driven by steep increases in basic grains prices. The analysis of the maize sector in the country highlighted important factors that could have contributed to these dynamics, including fragmentation and informality in the domestic supply chain, which generates information asymmetries and distortions that can ultimately affect consumers. The high concentration in the import and agro-processing sector, as well as relatively low transparency in the scope of their activities, may also expose consumers to higher risks of increasing food prices and ultimately jeopardize their food security.

Policies to counter high prices should be well-tailored and prioritize **support that does not interfere with market dynamics**. El Salvador increasingly relies on white maize imports to meet consumer demand and as part of a larger attempt to stabilize consumer food prices. Since 2022 white maize imports have been fully liberalized, but the country is also exploring the possibility to create food reserves primarily sourced from imported grains. However, benefits of these measures may not reach the most vulnerable populations and create costs related to maintaining physical grain stocks. Targeted financial support mechanisms towards these segments could be a more efficient option.

General services support policies

Finally, governments should consider **increasing investments on general services support** towards agriculture and commerce **to address inefficiencies in the supply chain**. El Salvador's expenditure on general services support as a percentage of Agriculture Gross Production Value is higher than the average in Central America, while in the Dominican Republic this value is substantially lower: that said, in both countries the percentage is significantly lower than in the United States or in Europe (Table 16).

23 For a recent discussion of the opportunities and technical considerations implementing disaster-based risk insurance products in the agricultural sector of El Salvador, see: World Bank. 2024. *Feasibility Study - Disaster Risk Finance and Insurance (DRFI) Solutions for Family Farmers in El Salvador, Guatemala, and Honduras*

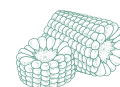


Table 16: General Support Services Estimates
Dominican Republic and El Salvador, 2017.

	GSSE/Ag. GPV
Dominican Republic	0.90%
El Salvador	1.53%
Central America avg.	1.23%
US	3.04%
EU	2.26%

Note: GSSE: General Support Services Estimate; Ag. GPV: Agriculture Gross Production Value. Source: Own elaboration, based on FAOStat and Agrimonitor data.

General services support – or public goods - in the agriculture sector include several dimensions: knowledge and innovation, technical services, market promotion and infrastructure. The analysis pointed to the presence of several bottlenecks and inefficiencies along the two sectors where increased public goods investments could make a difference. The white maize domestic market in El Salvador is characterized by fragmentation and widespread informality that prevent price transmission, and a pricing system that favor intermediaries over producers. On the contrary, the commercial import market is ruled by few processors and distributors that fetch high power concentration and coordination but whose operations often lack transparency. Poorly organized intermediaries, information asymmetries and price disconnection also affected the competitiveness of the banana sector in Dominican Republic.

Above all, there is an urgent need for mechanisms that could **improve market information sharing** across the entire value chain, and especially for farmers. In both coun-

tries, evidence suggests that the lack of effective communication and information on domestic demand and prices prevents producers from engaging with specific domestic markets in the long term. Pricing information must be effectively collected and communicated at each stage of the chain, with particular focus on stages that involve informal actors.

The analysis also highlighted how lack of market information, in part determined by the large informality that characterizes both sectors, limits planning and policy making processes that could help farmers preparing for or adapting to changes in production conditions, costs, and prices. Scenario modeling, sensitivity analyses, and risk-based investment options should be more seriously incorporated into **sectoral development plans**, alongside the development of more effective farmer insurance programs. However, to run these analyses and design such interventions, more and better data need to be systematically collected and updated.

Overall, more effective **transportation and market infrastructure**, including on post-production facilities, and investments in **soft infrastructure** (e.g. producer associations, extension systems, inspection and marketing services etc.) are needed to connect rural farmers to urban and peri-urban wholesale markets and to processing or storage facilities that could efficiently procure their products. Equally important is the provision of comprehensive technical assistance, which would enable farmers to enhance their productivity, improve product quality, and adopt more efficient and resilient practices. Through **targeted extension services, training, and access** to modern farming technologies, producers could better integrate into these markets, reducing inefficiencies and increasing their competitiveness. El Salvador's launch of a maize-specific extension program in 2022 is one such example that could be expanded.



Table 17: Summary of policy recommendations by type of support and timeline

Identified Challenge	Proposed Recommendation	Expected Result	Type of Support	Timeline
Inefficiencies in the supply chain and limited access to credit or markets for smallholders	Facilitate the creation of productive alliances between smallholder organizations and agribusinesses to enhance credit access, reduce risks, and improve market integration. These collaborations should focus on addressing technical, commercial, financial, and social challenges to unlock income opportunities for smallholder farmers.	Strengthened market access, reduced risks for smallholders, improved productivity, and increased incomes.	Producer support	Mid-term
Food price shocks and food availability shortages	Expand cost-effective risk-based insurance systems that cover production risks and price volatility, especially in the face of climate change.	Enhanced resilience of farmers and the food system to external shocks, ensuring more stable food supplies and reducing risks to food security.	Producer support	Mid-term
Lack of effective planning for sectoral development	Strengthen strategic planning through participatory processes involving farmers, government, and private sector stakeholders to align investments and incentives with market needs and conditions.	A more targeted approach to sectoral investments that can respond to current and future market conditions, leading to sustainable productivity growth.	Producer support	Long-term
Limited consumer protection against rising food prices (food affordability)	Implement targeted financial support mechanisms to protect vulnerable populations during food price shocks, while avoiding market disruptions.	Protection of low-income consumers from food price inflation, with more effective use of public resources to reach those most in need.	Consumer support	Short-term
Market fragmentation and lack of information flow	Improved market information systems and communication: Develop mechanisms to collect, analyze, and disseminate pricing and demand information across the value chain, with a particular focus on informal actors.	Enhanced decision-making for farmers, better market access, reduced inefficiencies, and improved price transparency throughout the agricultural value chain.	General services support	Short-term
Lack of knowledge and adoption of efficient farming practices	Provide extension services, technical assistance programs, and access to modern agricultural technologies to improve productivity, product quality, and resilience among farmers.	Increased farm productivity, adoption of sustainable practices, and better integration into formal markets, leading to improved profitability.	General services support	Medium-term
Limited market connectivity and inefficient logistics	Increase investments in general services support to strengthen transportation, market infrastructure, and post-production facilities, alongside soft infrastructure such as producer associations, extension services, and marketing and inspection services to connect rural farmers to urban wholesale markets and processing/storage facilities.	Improved access to markets, reduced inefficiencies in supply chains, and enhanced competitiveness of rural farmers.	General services support	Medium-term







Annexes

Annex 1: References

- ADOBANANO (2024a) 'Roundtable Discussion: ADOBANANO'.
- ADOBANANO (2024b) *Sobre Nosotros, ADOBANANO*. Available at: <https://adobanano.org.do/adobanano/>.
- Asamblea Legislativa (2024) *Productos de la canasta básica mantendrán precios accesibles para la población / Asamblea Legislativa de El Salvador, Noticias*. Available at: <https://www.asamblea.gob.sv/node/13128> (Accessed: 9 June 2024).
- Ayala Durán, C. (2020) 'El Salvador, comercio internacional y productos agrícolas: el caso del maíz dentro del Tratado de Libre Comercio con Estados Unidos', *Revista Relaciones Internacionales*, 2(1), pp. 93–116.
- Bakucs, Z., Fałkowski, J. and Fertő, I. (2014) 'Does Market Structure Influence Price Transmission in the Agro-food Sector? A Meta-analysis Perspective', *Journal of Agricultural Economics*, 65(1), pp. 1–25. Available at: <https://doi.org/10.1111/1477-9552.12042>.
- BCR (2024) 'Base de Datos de Comercio Exterior'. San Salvador: Banco Central de Reserva de El Salvador. Available at: <https://www.bcr.gob.sv/bcrsite/?cat=1012&lang=es>.
- Bekkers, E. *et al.* (2017) 'Local Food Prices and International Price Transmission', *World Development*, 96, pp. 216–230. Available at: <https://doi.org/10.1016/j.worlddev.2017.03.008>.
- Ceballos, F. *et al.* (2017) 'Grain Price and Volatility Transmission from International to Domestic Markets in Developing Countries', *World Development*, 94, pp. 305–320. Available at: <https://doi.org/10.1016/j.worlddev.2017.01.015>.
- CENTA (2022) 'Inician capacitaciones enfocadas en el proyecto Cultivo de maíz de alto rendimiento', *CENTA - Noticias*, 17 October. Available at: <https://centa.gob.sv/inician-capitaciones-enfocadas-en-el-proyecto-cultivo-de-maiz-de-alto-rendimiento/>.
- CFS (2021) *Global Strategic Framework for Food Security and Nutrition (GSF)*. Committee on World Food Security, p. 36. Available at: https://www.fao.org/fileadmin/templates/cfs/Docs2021/GSF/NF445_CFS_GSF_2021_Clean_en.pdf.
- Defensoría del Consumidor (2024) 'Interview: Defensoría del Consumidor'.
- DGA (2024) 'Datos de Exportación'. Santo Domingo: Dirección General de Aduanas (DGA).
- Diario, L. (2022) *Gobierno transfiere fondos del sector bananero al Banco Agrícola, listindiario.com*. Available at: <https://listindiario.com/economia/2022/07/14/730154/gobierno-transfiere-fondos-del-sector-bananero-al-banco-agricola.html>.
- Diario Libre (2023) *Guineos verdes, entre alternativas de consumidores ante altos precios del plátano, Diario Libre*. Available at: <https://www.diariolibre.com/economia/agro/2023/01/04/compran-guineos-verdes-en-sustitucion-de-los-platanos/2187454>.
- EU (2010) *The EU Banana Regime: Evolution and Implications of its Recent Changes*. Brussels: EU Parliament: Directorate General for External Policies of the Union. Available at: [https://www.europarl.europa.eu/RegData/etudes/etudes/JOIN/2010/433852/EXPO-INTA_ET\(2010\)433852_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/JOIN/2010/433852/EXPO-INTA_ET(2010)433852_EN.pdf).
- EU Commission (2022) *REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the situation of the Union market for bananas and the state of Union banana producers after the expiry of the stabilisation mechanism for bananas including a preliminary assessment of the functioning of the 'Programme d'Options Spécifiques à l'Éloignement et l'Insularité' (POSEI) in preserving the banana production in the Union*. Council of the European Union. Available at: <https://data.consilium.europa.eu/doc/document/ST-11960-2022-INIT/en/pdf> (Accessed: 11 June 2024).
- Fair Trade (2024) 'Interview: Fair Trade International'.



Fair Trade International (2023) *Banana price announcement from Fairtrade International Standards & Pricing*. Bonn: Fair Trade International. Available at: https://files.fairtrade.net/standards/2023-10-02_Banana-Price-Announcement-Banana_EN.pdf (Accessed: 8 May 2024).

FAO (2017) *Fair trade standards for bananas, World Banana Forum*. Available at: <https://www.fao.org/world-banana-forum/projects/good-practices/fair-trade-standards/en/>.

FAO (2023) *Latin America and the Caribbean - Regional Overview of Food Security and Nutrition 2023*. Rome: FAO; IFAD; UNICEF; WFP; PAHO; Available at: <https://doi.org/10.4060/cc8514en>.

FAO (2024a) *El Salvador seguirá importando alimentos básicos y fertilizantes sin aranceles hasta marzo de 2026, Seguimiento y análisis de los precios alimentarios (FPMA)*. Available at: <https://www.fao.org/giews/food-prices/food-policies/detail/es/c/1680678/>.

FAO (2024b) 'FAOSTAT'. Rome: FAOSTAT. Available at: <https://www.fao.org/faostat/en/#home> (Accessed: 2 February 2024).

FAO (2024c) 'FPMA Tool'. Rome: Food Price Monitoring and Analysis (FPMA). Available at: <https://fpma.fao.org/giews/fpmat4/#/dashboard/home>.

Feschet, Pauline et al. (2020) *Análisis de la cadena de valor del banano en la República Dominicana*. FH, CIRAD, Wageningen University & Research.

FEWS Net (2022) *Rising prices limit access to food for poor households | FEWS NET, Key Message Update: El Salvador, Honduras, and Nicaragua*. Available at: <https://fews.net/latin-america-and-caribbean/el-salvador-honduras-and-nicaragua/key-message-update/january-2022>.

FEWS Net (2023a) *Central America: Regional Supply and Market Outlook Update: April 2023*. Rome: FEWS Net. Available at: https://fews.net/sites/default/files/2023-06/CentAm%20SMOU%20202304_EN.pdf (Accessed: 23 June 2024).

FEWS Net (2023b) *Central America: Regional Supply and Market Outlook Update: December 2023*. FEWS Net. Available at: https://fews.net/sites/default/files/2023-12/CA_SMO_202312.pdf (Accessed: 23 June 2024).

FEWS NET (2024) *Central America and the Caribbean Price Bulletin*. USAID. Available at: https://fews.net/sites/default/files/2024-04/PB_LAC_202404_EN_0.pdf (Accessed: 28 May 2024).

García-Jiménez, H. and Gandlgruber, B. (2014) *Gobernanza y acuerdos institucionales en las cadenas del frijol y del maíz en Centroamérica*. CEPAL, FAO.

Gobierno de la República Dominicana (2023a) *Agricultura entrega RD 140 millones para desarrollo del sector bananero | Presidencia de la República Dominicana, Presidencia de la República Dominicana*. Available at: <https://presidencia.gob.do/noticias/agricultura-entrega-rd-140-millones-para-desarrollo-del-sector-bananero> (Accessed: 20 May 2024).

Gobierno de la República Dominicana (2023b) *Presidente Abinader dispone la reactivación de la Comisión Nacional de Política Bananera, Presidencia de la República Dominicana*. Available at: <https://presidencia.gob.do/noticias/presidente-abinader-dispone-la-reactivacion-de-la-comision-nacional-de-politica-bananera> (Accessed: 20 May 2024).

Gonçalves, A. (2014) 'Banana production methods'.

Government of El Salvador (2023) *LEY INTEGRAL DE COMERCIALIZACIÓN AGROPECUARIA*. Available at: <https://foalex.fao.org/docs/pdf/els223576.pdf>.

Ha, J., Kose, M.A. and Ohnsorge, F. (2023) 'One-stop source: A global database of inflation', *Journal of International Money and Finance*, 137, p. 102896. Available at: <https://doi.org/10.1016/j.jimonfin.2023.102896>.

IICA (2014) *Cadenas de valor de maíz blanco y frijol en CentroAmerica: Actores, Problemas y Acciones para su Competitividad*. San Jose: Instituto Interamericano de Cooperación para la Agricultura (IICA).

INCAP (2021) *El Libro de las Legumbres de Centroamerica y Republica Dominicana*. Guatemala: Instituto de Nutrición de Centro América y Panamá (INCAP). Available at: <https://www.incap.int/index.php/es/publicaciones-incap/984-las-legumbres-y-el-potencial-de-una-semilla-el-libro-de-las-legumbres-de-centroamerica-y-republica-dominicana/file> (Accessed: 23 June 2024).

INESPRE (2024) *Gobierno adquiere 13 millones de guineos de Adobanano para venta a través del Inespre, El Nuevo Diario (República Dominicana)*. Available at: <https://elnuevodiario.com.do/gobierno-adquiere-13-millones-de-guineos-de-adobanano-para-venta-a-traves-del-inespre/> (Accessed: 10 May 2024).

Lloyd, T. (2017) 'Forty Years of Price Transmission Research in the Food Industry: Insights, Challenges and Prospects', *Journal of Agricultural Economics*, 68(1), pp. 3–21. Available at: <https://doi.org/10.1111/1477-9552.12205>.

MAG (2009) *IV Censo Agropecuario 2007-2008*. San Salvador: Ministerio de Agricultura y Ganadería. Available at:



https://www.mag.gob.sv/wp-content/uploads/2021/06/iv_censo_agropecuario_resultados_departamentales_y_municipales.pdf.

MAG (2020) *Plan Estratégico Sectorial Agropecuario de la República Dominicana 2020/2030*. Santo Domingo: Ministerio de Agricultura. Available at: <https://agricultura.gob.do/transparencia/wp-content/uploads/2022/12/Plan-Estrategico-Sectorial-Agropecuario-2020-2030-RV21-05-2020.pdf> (Accessed: 19 May 2024).

MAG (2023a) *Anuario de Estadísticas Agropecuarias 2022-2023*. San Salvador: Ministerio de Agricultura y Ganadería, Dirección General de Economía Agropecuaria. Available at: <https://www.mag.gob.sv/wp-content/uploads/2024/02/1-Anuario-de-Estadi%CC%81sticas-Agropecuarias-2022-2023-final-1.pdf> (Accessed: 9 April 2024).

MAG (2023b) *Costos de Producción de Cultivos Agrícolas: Ciclo Agrícola 2021-2022*. San Salvador: Ministerio de Agricultura y Ganadería.

MAG (2023c) *GOBIERNO VERIFICA PRECIOS DE GRANOS BÁSICOS PARA PROTEGER LA ECONOMÍA DE LOS SALVADOREÑOS*, Ministerio de Agricultura y Ganadería. Available at: <https://www.mag.gob.sv/2023/01/30/gobierno-verifica-precios-de-granos-basicos-para-proteger-la-economia-de-los-salvadorenos/> (Accessed: 9 June 2024).

MAG (2024a) *EL BONO AGRÍCOLA LLEGA A TODO EL PAÍS, EN MENOS DE UN DÍA SE ENTREGARON MÁS DE 35,000 TARJETAS EN OCHO DEPARTAMENTOS*, Ministerio de Agricultura y Ganadería. Available at: <https://www.mag.gob.sv/2024/05/29/el-bono-agricola-llega-a-todo-el-pais-en-menos-de-un-dia-se-entregaron-mas-de-35000-tarjetas-en-ocho-departamentos/>.

MAG (2024b) 'Estadísticas Agropecuarias'. San Salvador: Anuarios de estadísticas Agropecuarias.

MAG (2024c) 'Exportaciones Agropecuarias'. Santo Domingo: Estadísticas Agropecuarias. Available at: <https://agricultura.gob.do/category/estadisticas-agropecuarias/precios-de-productos-agropecuarios/>.

MAG (2024d) *LA DIVERSIFICACIÓN DE LOS CULTIVOS ESTÁ LLEGANDO AL OCCIDENTE Y CENTRO DEL PAÍS CON EL BONO AGRÍCOLA*, Ministerio de Agricultura y Ganadería. Available at: <https://www.mag.gob.sv/2024/05/22/la-diversificacion-de-los-cultivos-esta-llegando-al-occidente-y-centro-del-pais-con-el-bono-agricola/>.

MAG (2024e) 'Precios de Productos Agropecuarios'. Santo Domingo: Estadísticas Agropecuarias. Available at: <https://agricultura.gob.do/category/estadisticas-agropecuarias/precios-de-productos-agropecuarios/>.

MAG (2024f) 'Producción Agrícola'. Santo Domingo: Estadísticas Agropecuarias. Available at: <https://agricultura.gob.do/category/estadisticas-agropecuarias/produccion-agropecuaria-2012-2018/>.

MAG (2024g) 'Siembra, Cosecha, Producción y Rendimientos'. Santo Domingo: Estadísticas Agropecuarias. Available at: <https://agricultura.gob.do/category/estadisticas-agropecuarias/1-pib-y-valor-agregado-del-sector-agropecuario/>.

MAG (2024h) *SMAR ES INNOVACIÓN TECNOLÓGICA PARA INCREMENTAR EL RENDIMIENTO Y LA RENTABILIDAD DEL CULTIVO DEL MAÍZ*, Ministerio de Agricultura y Ganadería. Available at: <https://www.mag.gob.sv/2024/04/10/smar-es-innovacion-tecnologica-para-incrementar-el-rendimiento-y-la-rentabilidad-del-cultivo-del-maiz/>.

MAG-DEA (2024) 'Roundtable Discussion: Dirección General de Economía Agropecuaria'.

Malla, M.V.A. (2007) *Clusters de Agronegocios Estratégicos en la República Dominicana, de acuerdo al Plan Nacional de Competitividad Sistémica (PNCS)*.

MDGIF (2013) *República Dominicana: Fortalecimiento de la Cadena de Valor del Banano mediante el Crecimiento de Mercados Inclusivos*, MDG Fund. Available at: <http://mdg-fund.org/es/node/765>.

Ministerio de Economía (2019) *Encuesta de Hogares de Propósitos Múltiples 2018*. San Salvador: Ministerio de Economía.

Pérez-Escamilla, R. (2017) 'Food Security and the 2015–2030 Sustainable Development Goals: From Human to Planetary Health', *Current Developments in Nutrition*, 1(7), p. e000513. Available at: <https://doi.org/10.3945/cdn.117.000513>.

Pro Dominicana (2020) *Plan Nacional de Fomento a las Exportaciones de la República Dominicana*. Santo Domingo: Pro Dominicana. Available at: <https://adoexpo.org/wp-content/uploads/2022/06/PD-PNFERD-190321.pdf> (Accessed: 22 May 2024).

Rapsomanikis, G., Hallam, D. and Conforti, P. (2003) 'Market Integration and Price Transmission in Selected Food and Cash Crop Markets of Developing Countries: Review and Applications', *Commodity Market Review 2003-2004*, pp. 51–75.

Romero, T. et al. (2022) *Cadena de Valor para Biofortik in El Salvador, con enfoque en la sub-cadena de compras públicas del Programa de Alimentación y Salud Escolar (PASE) para la elaboración de Biofortik y la sub-cadena del convenio de maíz blanco con la Industria de Alimentos*. San Salvador: Bioversity International and CIAT.



SIBA (2018) *Proyecto BAM, SIBA*. Available at: <https://siba.org.do/proyecto-bam/> (Accessed: 20 May 2024).

Ukav, I. (2017) 'Market Structures and Concentration Measuring Techniques', *Asian Journal of Agricultural Extension, Economics & Sociology*, 19(4), pp. 1–16. Available at: <https://doi.org/10.9734/AJAEES/2017/36066>.

UNSD (2024) *Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture — SDG Indicators, Sustainable Development Goals Overview*. Available at: <https://unstats.un.org/sdgs/report/2016/goal-02/>.

Vagneron, I. and Roquigny, S. (2011) 'Value distribution in conventional, organic and fair trade banana chains in the Dominican Republic', *Canadian Journal of Development Studies*, 32, pp. 324–338. Available at: <https://doi.org/10.1080/02255189.2011.622619>.

Vavra, P. and Goodwin, B.K. (2005) *Analysis of Price Transmission Along the Food Chain*. Paris: OECD. Available at: <https://doi.org/10.1787/752335872456>.

Von Cramon-Taubadel, S. and Goodwin, B.K. (2021) 'Price Transmission in Agricultural Markets', *Annual Review of Resource Economics*, 13(1), pp. 65–84. Available at: <https://doi.org/10.1146/annurev-resource-100518-093938>.

Voorra, Vivek et al. (2023) *Global Market Report: Banana prices and sustainability*. Global Market Report. International Institute for Sustainable Development.

World Bank (2024). Perego, V.M.E.; Brown, M.; Ceballos, F.; Hernandez, M.; Berrospi, M.L.; Flores, L.; Mora, E. *International Prices and Food Security: an Analysis of Food and Fertilizer Price Transmission in Central America*. Washington, D.C.: World Bank.

Annex 2: Methodological Note

This annex describes in greater detail the data sources that were used to develop the analyses of the market structures and price analyses of the white maize sector in El Salvador and the banana sector in the Dominican Republic.

1 The white maize sector in El Salvador

Data sources for the analyses of market structures, costs, prices, and margins follow from interviews and exchanges with a key set of public and private actors. Information on market structures was collected through datasets and interviews provided by the Directorate General for Agricultural Economy of the Ministry of Agriculture (*Dirección General de Economía Agropecuaria, MAG-DEA*) and Consumer Defense (*Defensoría del Consumidor*). Information on pricing and margins were collected through interviews and correspondences with a sample of 2 producers' associations, 5 wholesalers, and 4 importers and processing companies. This information was supplemented with the results of recent preparatory studies for the World Food Programme-financed *Programa de Alimentación y Salud Escolar* (Romero et al., 2022). It should be noted that the analyses of market structures and price movements are limited by the lack of official data sources for the aggregate flows by volume of white maize and maize flour.

1.A The Domestic Track for white maize

The estimation of **prices and margins along the domestic production chain** for white maize correspond to the activities that center on the wholesale markets of San Salvador. They are provided on a per-quintal basis (the market standard) and represent the conditions that value chain actors faced during the first quarter of 2024. Separate estimations were developed for operational costs and prices at **farmgate, intermediation, and wholesale**.

Estimations for farmgate costs and prices were developed in close consultation with MAG-DGEA. Official cost data on semi-intensive maize production, compiled by MAG-DEA, provides a starting point for this exercise, supplemented by preliminary information collected on producer prices. 7 for recent cycles up until 2023, these estimates represent the monetary value of all costs implied in production if the producer were to purchase all inputs on the market. The costs shown in (A) are representative of those faced by semi-intensive maize production systems, which cover the vast majority of the land used for maize production in El Salvador. In the 2021-2022 and 2022-2023 cycles, production costs rose by 47%, driven by steep increases in input prices (69% increase from one period to the next), increases in labor costs (49%), and a stagnation in average yields. The prices shown in (D) represent averages of monthly prices from August (the beginning of the agricultural cycle) to July of the following year. For the 2022-2023 cycle, prices were taken from August to December 2022.



Table 18: Production costs, yields, and profit margins implied for producers, 2020-2023

Cycle		2020-2021	2021-2022	2022-2023
A	Production Cost (Total USD/Acre)		\$862.02	\$1,247.97
	% change from prior cycle	\$780.85	10%	45%
	Inputs		\$357.33	\$605.21
	% change from prior cycle	\$326.75	9%	69%
	Labor		\$190.68	\$283.85
	% change from prior cycle	\$166.46	15%	49%
	Harvest and Post-Harvest		\$190.61	\$197.99
	% change from prior cycle	\$178.24	7%	4%
	Indirect Costs		\$123.40	\$160.92
	% change from prior cycle	\$109.40	13%	30%
B	Yields (QQ/Acre)		58.93	58.22
	% change from prior cycle	60.64	-3%	-1%
C = A/B	Unitary Production Cost (USD/QQ)		\$14.63	\$21.44
	% change from prior cycle	\$12.88	14%	47%
D	Producer Prices (USD/QQ)		\$19.76	\$29.36
	% change from prior cycle	\$13.09	51%	49%
E = (D-C)/D	Implied Profit Margin (%) [(D-C)/D]	2%	26%	27%

Source: own elaboration, based on interviews and (MAG, 2023b, 2023a)

Second, per-quintal production costs were adjusted to reflect the production conditions and practices that producers faced during the first quarter of 2024. These adjustments appear in below First, the per-hectare costs for maize production shown in were adjusted to reflect the per-quintal prices of fertilizers (NPK 15-15-15, ammonium sulfate, and urea) published at the start of the 2023-2024 production cycle (MAG, 2023c). A reduction in per-quintal costs for these fertilizers reflects a total per-hectare cost to production of \$1,099.37 during the 2023-2024 season (line 1). Second, the technological package provided by PIATEC²⁴, valued at \$139.55 during the 2023-2024 cycle, was deducted (line 2). Third, a reduction of 60% of the person-days needed for cultivation, harvest, and post-harvest was applied (line 3).

This reduction follows from the technical budgets for production that are maintained by MAG-DGEA, who assume that a maximum of 40% of person-days would be supplied by paid labor for any given small maize producer. Fourth, administrative fees, contingencies, and interest payments were deducted to account for the farmer's own labor, the general absence of contingencies in budgets, and the fact that approximately 90% of producers do not make use of credit services (lines 4, 5 and 6).

This adjusted cost per acre (line 7) implies that maize farmers in Q1-2024 faced average unitary costs of production of approximately \$12.86 per quintal. It should be noted that these average costs obscure the variation between the use of paid labor and additional fertilizers.

24 This package includes 11.4 kg of seeds, one quintal (45.4 kg) of NPK 15-15-15 fertilizer, and one liter of foliar fertilizer or seed treatment



Table 19: Production costs during the 2022-2023 cycle, adjusted to reflect the receipt of inputs and the use of family labor

	Item	Value (USD)
1	Cost per acre (2022-2023) (+)	\$1,099.37
2	Input Subsidy (-) ²⁵	\$139.55
3	Family labor (60%) (-)	\$307.24
4	Administration (-)	\$28.52
5	Contingencies (-)	\$19.01
6	Interest (-) ²⁶	\$20.00
7	Adjusted costs per acre (=)	\$585.04
8	Yields (quintals per acre) ²⁷	45.5
9	Unitary Production Cost per quintal (=)	\$12.86
10	Price paid by intermediaries	\$16.00
11	Profit margin	24.4%

Source: own elaboration, based on (MAG, 2023b, 2023a)

Estimates for operational costs and prices during intermediation and wholesale during quarter 1 of 2024 were developed through consultations with the price-monitoring unit of MAG-DEA and interviews with 5 wholesalers

on Calle Gerardo Barrios. The pricing unit of MAG-DGEA carries out weekly interviews and consultations that inform the process of identifying prices offered by wholesalers, the implied prices at which intermediaries procured the maize that they sold on Calle Gerardo Barrios, and the operational costs that contextualize the prices and margins reported by actors in the market. The information collected for this report coincides with the consultation performed by MAG-DEA during the week of 28-April 2024. Information on costs during intermediation refer to the per-quintal costs of transporting maize, including vehicle costs, fuel, and labor costs for the drivers. Information on the costs faced during the wholesale process refer to the per-quintal costs of cleaning, storing, and repacking domestically sourced maize, reported directly from the wholesalers. Per quintal operational costs and prices during intermediation and wholesale are represented as averages of the reported values from interviewees.

The average operating costs, prices, and implied margins during production, intermediation, and wholesale are thus summarized in the table below. In the first quarter of 2024, producers faced average prices of \$12.86 per quintal. They sold to intermediaries at approximately \$16.00 per quintal. Intermediaries faced transportation costs of \$1.00 per quintal, and sold to wholesalers at \$18.50 per quintal. Finally, wholesalers also faced storage and cleaning costs of approximately \$1.00 per quintal, and sold at the market on Calle Gerardo Barrios at \$21.00 per quintal.

Table 20: Accumulated prices, costs, and margins by value chain stage for domestically produced white maize grain

	A Production		B Intermediation		C Wholesale	
	Production	Sale	Transport	Sale	Storage / cleaning	Sale
Price	$c = a+b$		$f = c+d+e$		$i = f+g+h$	
	\$16.00		\$18.50		\$21.00	
Marginal cost (MC), profit (π)	MC (a)	π (b)	MC (d)	π (e)	MC (g)	π (h)
	\$12.86	\$3.14	\$1.00	\$1.50	\$1.00	\$1.50
% final wholesale price	a/i	b/i	d/i	e/i	g/i	h/i
	61%	15%	5%	7%	5%	7%

25 The input subsidy includes the costs of seeds, 1 quintal of fertilizer, and one liter of herbicide inoculant or fertilizer treatment for the seeds.

26 According to MAG-DEA, the average loan amount is \$500, with an annual interest rate of 4%

27 Yields have been adjusted to reflect the actual value recorded for 2022-2023, and not the predicted value at the time at which these costs were published by MAG.



1B The import track for white maize

The estimation of **operational costs, prices and margins along the import chain** for white maize correspond to the activities undertaken by brokers, importers, processing companies, and domestic wholesalers active from the port of Acajutla to San Salvador. They are provided on a per-quintal basis and represent the conditions that value chain actors faced during the first quarter of 2024. Estimates of operational costs and prices were developed at the point of **importation** (brokerage), **intermediation** on the parts of importing companies, and **wholesale**.

At the **point of importation**, the per quintal cost of imported maize is represented by its CIF price. Information on CIF prices follows from data published by the Central Reserve Bank of El Salvador (BCR). During the first quarter of 2024, the average CIF price for imported white maize grain was \$14.82.

Estimates of operational costs and prices that follow from **intermediation** were developed from information from two sources. First, per quintal estimates for the costs of import services, transportation, and storage, as well as the basic prices for grain offered by importers to wholesalers, were provided through consultations with Consumer Defense, which regularly monitors these costs and prices. Second, additional information on the activities central to storing and transporting imported grain, as well as informa-

tion on prices offered to wholesalers, was collected through consultations with four importer-processing companies.

Estimates of the operational costs and prices that follow from **wholesale** were developed from the consultative process that was carried out with five domestic wholesalers on Calle Gerardo Barrios, who sell grain of both domestic and imported origins.

Finally, a preliminary estimate of the production costs and wholesale prices for white maize flour were collected from two sources. First, information on production costs follow from interviews with two processing companies. Second, information on wholesale prices for white maize flour was collected from the price data maintained by MAG-DEA.

However, detailed information on operating costs and prices are only available throughout the entire chain for white maize grain. These figures during importation, intermediation, and wholesale are thus summarized in the table below. In the first quarter of 2024, brokers sold white maize grain to importing companies at an average price of \$14.82 per quintal. Importing companies faced costs for import services and transport/storage of \$1.01 and \$1.17 per quintal respectively, and sold to wholesalers at a price of approximately \$18.00 per quintal. Because this grain arrives to wholesalers without any need for cleaning and packaging, they consider their operational costs in these areas to be negligible, and they sold it at between \$19.00 to \$20.00 per quintal.

Table 21: Per quintal accumulated prices, costs, and margins by value chain stage for imported white maize grain

USD per quintal	A Brokerage	B Intermediation			C Wholesale	
	CIF Costs	Import Services	Transport / storage	Sale	Storage	Sale
1 Accumulated price				$e = a+b+c+d$ \$18.00		$h = e+f+g$ \$19.00-20.00
2 Marginal cost and profit	MC (a) \$14.82	MC (b) \$1.01 ²⁸	MC (c) \$1.17	π (d) \$1.00	MC (f) -	π (g) \$1.00-2.00
3 % final wholesale price	a/h 78%	b/h 5%	c/h 6%	d/h 5%	f/h -	g/h ~5%

Source: own elaboration, based on interviews and (MAG, 2023a; BCR, 2024)

28 Average value reported by the Defensoría del Consumidor



2 The banana sector in the Dominican Republic

Data sources for the analyses of market structures, costs, prices, and margins follow from interviews and exchanges with a key set of public and private actors. Information on market structures was collected through consultations with specialists in two key institutions: first, Ministry of Agriculture (specifically, the Vice ministries of Extension and Sectoral Planning), and second, with the Dominican Association of Banana Producers (ADOBANANO). Information on market concentration and the structure of the export market was provided by the Directorate of Customs (DGA). Finally, information on costs, prices, and margins was collected through consultations with the Institute for Price Stabilization (INESPRE), with producers associated with ADOBANANO, with representatives of Fair Trade International in the Dominican Republic, with three exporting companies, and with one producers' cooperative. Finally, this information was supplemented with the findings that proceeded from a comprehensive value chain analysis and consultative process supported by the European Union and the Value Chains for Development (VC4D) initiative (Feschet, Pauline *et al.*, 2020).

These estimates should be considered preliminary, and not representative of the conditions under which all value chains actors operate. Exact information on the range of costs, prices and margins associated with production, intermediation, export, or domestic sale are limited to the responses of available interviewees. They represent the average values faced by these actors in 2023, prior to further increases in production costs and decreases in domestic prices.

2A: The export track for bananas

The estimations of **operational costs, prices, and margins along the export-oriented chain** for banana correspond to the activities undertaken by producers and exporting companies, ending with the shipment of bananas at FOB prices to brokers. They are provided per 18.14 kg box, and represent the conditions that value chain actors faced during 2023. These estimates carry several important assumptions. First, they assume that the producer and exporter are operating under the Fair Trade pricing regime for conventional and organic bananas, which represents the majority of banana exports from the Dominican Republic by volume. Second, they reflect the activities of an independent producer with yields of 1,575 boxes per year under conventional conditions, and 1,100 boxes per year under organic conditions. Finally, they assume an established relationship between the independent producer and an exporter who buys from

multiple producers to sell to brokers under the minimum prices set by Fair Trade.

Estimates for **producer costs** follow from the price benchmarking system established by Fair Trade, confirmed by consultations with producers associated with ADOBANANO. Producer costs are estimated annually for producers in the Dominican Republic by Fair Trade International in order to define minimum farmgate and FOB prices for bananas. Cost estimates consider items across four categories: labor, fertilizers, fuel and administrative costs/contingencies. Labor comprises the bulk of productive costs; it is set to 70% of the country's minimum wage, plus an allocated amount for workers' benefits. Fertilizer costs follow from applications that are recommended under common conventional and organically certified production practices. Fuel costs result from the use of engines for irrigation pumping. It is assumed that these three cost categories represent 85% of the total production costs faced by a farmer, with the remaining 15% spent on administration (including certifications) and contingencies. Organic costs exceed those of conventional production by approximately \$2.50 to \$3.00 per box (up to 42%), primarily as a function of the lower yields that result from most organic practices. In particular, these higher costs are reflected through relatively lower labor productivity (Fair Trade, 2024).

Table 22: Estimated conventional producer costs per 18.14 kg box in 2023, in USD

Per 18.14 kg box	Conventional Production (1,575 boxes per ha per year)
Labor	\$4.20
Fertilizers	\$1.42
Fuel	\$0.30
Administrative	\$1.04
Total	\$6.96

Source: own elaboration, based on (Fair Trade, 2024)

Estimates for **exporter costs** also follow from the price benchmarking system established by Fair Trade, which calculates the per-box costs for the use of inputs (boxes and pallets), the use of transportation methods (banavac), for freight services, and for port charges. These costs are assumed to be uniform across conventional and organic bananas, and are summarized in the table below.

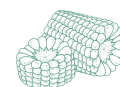


Table 23: Estimated conventional producer costs per 18.14 kg box in 2023, in USD

Per 18.14 kg box	Costs for services borne by exporters
Box	\$2.55
Pallet	\$ 0.56
Banavac	\$ 0.16
Port freight	\$0.34
Port Charges	\$0.41
Total	\$4.02

Source: own elaboration, based on (Fair Trade, 2024)

Finally, estimates for the minimum **prices at farmgate and point of export** are based off these production and export costs. Fair trade updates these prices annually through a consultative process, publishing them in October of each year. Recent prices under this methodology are shown in the table below.

Table 24: Minimum farmgate and export (FOB) prices for conventional and organically produced bananas under the Fair Trade pricing regime, 2020-2024

Year	Conventional Banana Farmgate \$/Box	Conventional Banana Port FOB \$/Box	Organic Banana Farmgate \$/Box	Organic Banana Port FOB \$/Box
2020	\$7.15	\$11.00	\$9.75	\$13.55
2021	\$7.15	\$11.00	\$9.75	\$13.60
2022	\$7.30	\$11.70	\$9.80	\$14.20
2023	\$7.75	\$12.55	\$10.10	\$14.90
2024	\$7.85	\$12.45	\$10.30	\$14.90

Source: own elaboration, based on (Fair Trade International, 2023)

Consolidated costs, prices, and margins for producers and exporters are shown in the table below. In 2023, conventional and organic producers incurred operational costs of \$6.96 and \$9.46 per box, respectively, with minimum sale

prices at farmgate of \$7.75 and \$10.10. Exporters incurred operational costs of \$4.02 per box for both conventional and organic bananas, and sold to brokers at minimum FOB prices of \$12.55 and \$14.90.



Table 25: Per box costs, accumulated prices, and margins by value chain stage for conventional and organic bananas under the Fair Trade pricing system, 2023

Per box (18.14 kg)	Production		Export	
1 FT Conventional	Production	Sale to Exporters	Export Services	FOB Sale
2 FT Organic				
		$c=a+b$		$f = c+d+e$
Price		1 \$7.75		1 \$12.55
		2 \$10.10		2 \$14.90
	MC (a)	π (b)	MC (d)	π (e)
Marginal cost (MC), profit (π)	1 \$6.96	1 \$0.89	1 \$4.02	1 \$0.78
	2 \$9.46	2 \$0.64	2 \$4.02	2 \$0.78
	a/f	b/f	d/f	e/f
% FOB price	1 55%	1 7%	1 32%	1 6%
	2 63%	2 4%	2 27%	2 5%

Source: own elaboration, based on interviews and (Fair Trade International, 2023)

2b: The domestic sale track for bananas

The estimation of **operational costs, prices, and margins in the domestically oriented chain** for banana production are complicated by the systematic lack of data collected in the sector. Basic information has been made available through the farmgate and wholesale prices collected with MAG, as well as interviews with two producers that specialize in domestic production. Systematized data on operational costs for producers, intermediaries, and wholesalers in the domestic sector is not collected by official sources, complicating any effort to model their activities. The below analysis assumes the perspective of a medium producer who sells green bananas to wholesale markets in Santo Domingo via intermediaries

Producers who sell green bananas to the domestic market typically do so at prices of \$3.50 to \$5.00 per box, with slim margins. Bananas that are rejected from the export process are typically sold at between \$3.50 to \$4.00 per box. Bananas that are grown specifically for domestic sale (rather than bananas that are rejected from export) may be sold for between \$4.00 to \$5.00. However, a large degree of price fluctuation has characterized the spot prices

at farmgate over the past two years: in early 2023, there is evidence that per-box prices for green bananas rose to \$6.00 per box. Producers who specialize in selling green bananas to the domestic market often incur lower labor and fertilizer costs, and may earn margins of up to 6 to 8%. Bananas that are rejected at the point of consolidation for export are often sold informally for a loss.

Intermediaries incur logistical costs of between \$0.30 to \$0.50 per box when transporting bananas from farmgate to points of wholesale, and in 2023 sold to wholesale markets for between \$6.50 to \$7.00 per box. These prices imply that intermediaries capture significant margins when wholesale prices rise.

Finally, the wholesale market in Santo Domingo may incur an average storage and movement cost of \$0.26 per box after purchasing from intermediaries. In 2023, average wholesale prices spiked to a high of \$8.26 per box in response to a shortage of cooking plantains. The low marginal costs for selling bananas implies that, during the price spike of 2023, wholesalers also captured relatively high margins of up to 12%.



Annex 3: Meetings and Interviews

El Salvador

Meeting	Date	Participants
Departamento de información de precios de mercado-Ministerio de Agricultura y Ganadería	18/04/2024	Néstor Martínez, Jefe Departamento de información de precios Fernando Palacios, Técnico de precios
Asociación Cooperativa de Producción, Comercialización y Servicios "Compañero Eric" de RL (ACOPEROERICK de RL)	18/04/2024	Francisco Peña, Socio Dennys González, Socio Juan Rodríguez, Presidente
Asociación Cooperativa de Producción, Comercialización y Servicios "El Éxito de Santa Clara" de RL (ASAESCLA de RL)	19/04/2024	Emerson Hernández, Administrador Marcos Martínez, Socio
FAO El Salvador	29/04/2024	Luca Gilardone, especialista legal
Ministerio de Agricultura, Oficina de Planeación Estratégica y Seguimiento MAG-OPES	29/04/2024	Ricardo Iraheta, Director Christofer Valladares, Coordinador de política comercial Juan Santos Fuentes, Jefe de políticas y planificación
Ministerio de Agricultura, Dirección General de Economía Agropecuaria – MAG-DEA	29/04/2024	Johanna Duke, Jefa División Estadísticas Agropecuarias Néstor Martínez, DGEA Fernando Palacios, DGEA
Mayorista	30/04/2024	Antonio Ayala, propietario
Mayorista	30/04/2024	Miguel Piloña, propietario
Mayorista	30/04/2024	José Antonio Torres, Administrador
Importador/procesador: Centroamericana de Mercadeo SA de CV (CEMERSA)	30/04/2024	Omar Salazar, Propietario María Fernanda Amaya, Gerente Calidad
Superintendencia de Competencia	30/04/2024	Gerardo Henríquez, Superintendente Pedro Nubleu, Coordinador de estudios Rebeca Hernández, Intendente económica
Intermediario/comercializador	01/05/2024	Enrique Bermúdez, Propietario
Defensoría del Consumidor	02/05/2024	Ricardo Salazar, Presidente Diana Burgos, Directora de vigilancia de mercados
Importador/procesador: Global Alimentos SA de CV	03/05/2024	Imed Rodríguez, Jefe Planta de Producción Harina Johanna Umaña, Directora de operaciones
Importador/procesador: Groupersa SA de CV	03/05/2024	Otoniel Perla, Propietario Abigail Perla, Propietario
Importador de fertilizantes: CADELGA SA de CV	03/05/2024	José Manuel Moreno, Gerente de Ventas



Dominican Republic

Meeting	Date	Participants
FAO República Dominicana – Introducción al sector bananero	13/05/2024	Lorena Catrain, FAO Carlos Avila, FAO Andres Sedano, FAO Bélgica Núñez, CNC, asesora agrícola Juan José Pinal, especialista en la gestión de proyectos Javier Tavares, economista, Min. De Economía
Instituto de la Estabilización de Precios (INESPRE)	13/05/2024	Antony Arzeno, Director de Comercialización Roberto Jiménez, dirección de Comercialización
Dirección General de Aduanas (DGA)	13/05/2024	María Marmolejos, Encargada, Departamento de Estadísticas
Ministerio de Agricultura, Viceministerio de Extensión y Capacitación Agropecuaria	14/05/2024	Darío Vargas, Viceministro
Ministerio de Agricultura, Viceministerio de Planificación Sectorial	14/05/2024	Rafael Paulino, Viceministro Ernesto Pérez Cuevas, Asesor
Ministerio de Industria, Comercio, y MIPYMES, Viceministerio de Comercio Interno	14/05/2024	Claudio Fernández, director, Dirección de Comercio Interno Yonaira Mejía, encargada, Dirección de Comercio Interno Emmanuel Heredia, analista, Dirección de Comercio Interno Miguelina Estévez, encargada, Departamento de Comercio Interno
Asociación Dominicana de Exportadores (ADOEXPO) y exportadores asociados	14/05/2024	Karel Castillo, presidente, ADOEXPO Roselyn Amaro Bergés, vicepresidente ejecutiva, ADOEXPO Claudia Chez, consejo ejecutivo, ADOEXPO Salvador Estévez, presidente, Grupo Banamiel Gian Ferreira, director de comercialización, Cana Group Corp. Michelle Castillo, COO, Cana Group Corp. Dennis Hoffart, Cana Group Corp.
Asociación Dominicana de Productores de Banano (ADOBANANO)	15/05/2024	Hilario Pellegrini, presidente Domingo López, vicepresidente Gladis Almánzar, secretaria Humberto Dionicio Matlas, Tesorero Gil Blaz Martínez, Vocal Aquiles REwe Morel, Vocal Ramón Antonio Faña, Vocal Osvaldo Tineo, Vocal Cristian Flores, Vocal
Asociación Bananos Ecologicos de la Linea Noroeste (BANELINO)	15/05/2024	Gustavo Gandini, vicepresidente Rosalba Gomez Jaquez, gerente del Departamento de Desarrollo social y Medio Ambiental
Savid Dominicana	16/05/2024	Helen Nicolás, director de certificaciones
Comercio Justo	16/05/2024	Marika de Peña, presidente, Latin American and Caribbean Network of Fair Trade Small Producers and Workers (CLAC)
Centro de Exportación e Inversión de la República Dominicana (Pro Dominicana)	22/05/2024	Euclides Paulino, especialista económica Eloy Alvarez, coordinador de la gestión de información Carolina Perez, directora, departamento inteligencia de mercados Patricia Cano, gerente de relaciones interinstitucionales

