

DYNAMICS OF COMPETITION IN THE CHOCOLATE COATING AGROINDUSTRY PRODUCTION CHAIN

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ABSTRACT - This paper discusses the dynamics of competition among the economic agents that make up the chocolate coating agroindustrial production chain in Brazil. It suggests the causative factors of the crisis besetting Brazilian cocoa farms and possible solutions, the strategies used in the segments studied, the interrelations among the different stages of the productive chain, the market opportunities, and the tendencies found in this chain.

Key words: Agribusiness, production chain, competitive advantage, chocolate.

INTRODUCTION

For many years, cocoa has been one of Brazil's main income earning products. According to Nascimento (1994), cocoa was the driving force behind the economy of the state of Bahia in the 1970s, representing 35% of northeastern Brazil's total exports during this period. That era's excess cocoa revenue constituted one of the principal resource sources used to finance the country's industrialization.

Today, however, Brazilian cocoa plantations face serious difficulties. There has been a drastic fall in the volume of cocoa seed

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produced in Brazil despite worldwide output growth. Brazilian 1984/85 seed production of approximately 407,000 tons dropped to only 120,000 tons by the 1994/95 harvest. (ICCO, 1996). This drop reflects the crisis the sector is experiencing today. A large number of the country's cocoa farms have fallen into deep debt or entered into bankruptcy. The segment's financial problems have arisen from low international prices, some of the government's economic plans, and other structural and circumstantial factors that will be highlighted throughout this article (Menezes & Carmo-Neto, 1993). The farmers economic difficulties caused a reduction in soil fertilization and other cultivation treatments, with a resulting drop in productivity. Within this context, one must point out the appearance of new diseases, the most important of which is "vassoura-de-bruxa" – the witch's broom, in the region's cocoa plantations

To give an idea of the gravity of these changes, suffice it to mention that the average productivity of the cocoa farms dropped from 47@ha in 1980 to the current 31 @ha. For the sake of comparison, the level of production at some Malaysian experimental farms exceeds 200@ha (Nascimento, 1994).

On the other hand, the chocolate market, part of the same production chain, has enjoyed systematic growth. According to the Brazilian Association of the Chocolate, Cocoa, Hard Candy, and Byproducts Industry (ABICAB), the market generated approximately US\$ 1,5 billion and had 244 thousand-tons of production in 1995, making Brazil the world's fifth largest chocolate producer (Gallucci, 1995). In 1996, total chocolate consumption in Brazil was 1,885 kgs *per capita* (Bastos, 1996), far below the annual *per capita* consumption in other countries, such as Argentina (3.8 kgs), the United States (4.6 kgs), and Switzerland (9.9 kgs). The low Brazilian consumption figures indicate that there are excellent prospects for this market's growth in the domestic economy over the coming years.

The main objective of this study is to analyze the dynamic of competition in these two segments, cocoa growers and chocolate producers, of the agroindustrial cocoa complex as a method of evaluating existing problems and defining possible solutions for the Brazilian cocoa agribusiness.

THEORETICAL FUNDAMENT

This study was conducted using different, albeit complementary, approaches to the investigation of agroindustrial production chains and their dynamic.

The first investigative approach we focus on is linked with the concepts of intermediate and systemic analysis. Intermediate analysis lies midway between the boundaries established by the objects of micro and macroeconomic studies. This area of analysis fits in perfectly with the ideas of *filière* and the *commodity system approach*, that are also explored in this article and briefly discussed below. The area of analysis demarcated by this approach can be investigated from a systemic point of view, centering on the structural and functional analysis of subsystems and on the interdependencies that form within this integrated system (Batalha, 1997).

The concept of the agroindustrial production chain (or agroindustrial chain) comes from two different methodological and analytical branches. One of them, originating from the French industrial economy, rests on the concept of *filière* (Batalha, 1993). The second is associated with North American studies using the *commodity system approach* (Davis & Goldberg, 1957). At the cost of omitting a few nuances, one can say that these two schools of thought consider an agroindustrial chain to be a succession of independent transformation operations connected by a given technological chain that allows a given raw material to go through the production process until it reaches the final consumer. Besides this purely technological approach, an analysis of the production chain must also consider the combinations of commercial, financial, and economic relationships that are established among the economic agents directly or indirectly involved in the operations that comprise the chain's technological structure (Arena, 1983).

This was the approach used to delimit the boundaries of this article's analysis. Based on the concepts presented above, the authors have sought to characterize the segments that make up the chocolate production chain by researching the chain's technological and economic characteristics.

Classic concepts connected to Industrial Organization were used

to gain a better understanding of how the market structure present in each of the chain's segments contributes toward an understanding of the competitive dynamics established throughout the entire chain. The Structure – Behavior – Performance paradigm (Scherer, 1971), the seminal idea of classic industrial organization, permeates the strategic studies and competitive forces acting in the chain's segments.

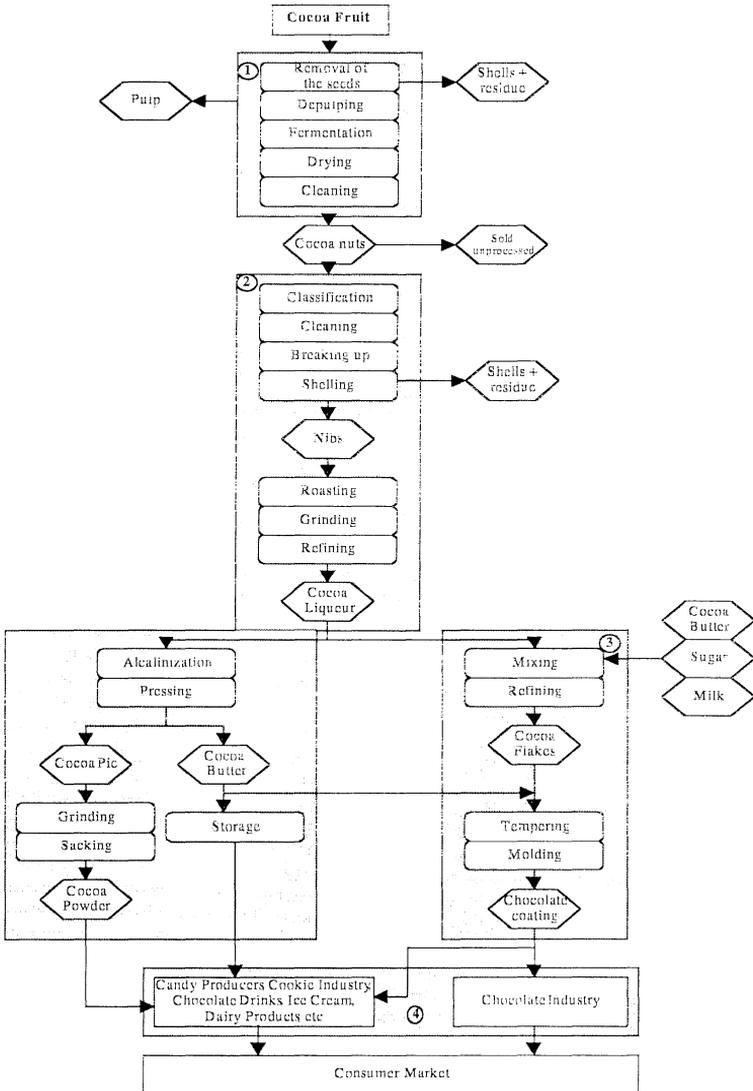
The concept of competitive advantage (Porter, 1992), defined as the capacity of a given company to be more efficient than its competitors in controlling the critical success factors of the segments analyzed, is also widely employed in this research. Our objective is to contribute toward the study of the strategic behavior of the actors in the chain.

Another aspect that deserves to be highlighted in connection to this research's theoretical base is connected with the mechanisms of coordination that are established along the production chain under analysis. Several authors link the agents' coordination mechanisms to the degree of efficiency achieved by the system as a whole, in this case represented by the production chain (Zylberstein, 1996).

DEMARICATION OF THE BOUNDARIES OF THIS ANALYSIS

Our characterization identified four main segments of the Brazilian chocolate production chain (Nagai, Sproesser & Batalha, 1996) (see Figure 1).

Figure 1 – The chocolate production chain



Source: Adapted from Unctad/GATT, 1987; Nascimento, 1994.

This study covers the following segments of the cocoa production chain: the cocoa plantations, the cocoa processing industry, and the chocolate coating industry, represented respectively by blocks 1, 2, and 3 in Figure 1. The study of the chocolate industry sector, the last link in the agroindustrial macrosegment of the cocoa production chain, is not included in this research. To embark on a study of this segment, though interesting, would be to deviate from the initial objective of this work and require efforts, in terms of time and financial resources, incompatible with those available to the research team. It should be noted that every type of chocolate produced uses one basic raw material exclusively, i.e., chocolate coating. Chocolate coating, on an average, makes up 70% of the total ingredients contained in chocolate destined for final consumption.

Our study of the production chain uncovered the fact that the chain's cocoa farm segment is highly fragmented. Most of the farms are tiny and operate using outdated, ineffective management and production structures.

To make up the sample area under analysis, we selected cocoa farms located in the state of Bahia's southern region. This region is responsible for the 85% of the cocoa seeds produced in Brazil (Nagai, 1997). According to CEPLAC, there are 27,070 farms in the state of Bahia, classified as shown in Table 1.

Table 1 - Classification of cocoa producers by income and area planted

Year	Classification of Producer	Revenues (R\$ / year)	Area of Cocoa		Producers	
			(ha)	(%)	(no.)	(%)
1981/82	mini	*	45.808	10,8	8.367	48,2
	small	*	117.283	27,7	5.766	33,2
	medium	*	175.603	41,5	2.833	16,3
	large	*	84.144	20,0	401	2,3
	TOTAL	*	422.838	100	17.367	100
1995/96	mini	up to 22.000	204.000	32,6	21.000	77,6
	small	22.000-48.000	151.000	24,2	4.000	14,8
	medium	48.000-362.000	70.000	11,2	2.000	7,4
	large	above 362.000	200.000	32,0	70	0,2
	TOTAL		625.000	100	27.070	100

* Data not available

Source: Adapted from Nascimento, 1994; CEPLAC/CENEX, 1996

For the purpose of analyzing the cocoa seed grinding industry, our sample was limited to the four companies responsible for 96% of the cocoa seed processed in Brazil and 100% of the seed processed in the state of Bahia. The companies are Cargill Cacau Ltda., Chadler Industrial da Bahia S/A., Joanes Industrial S/A. and the Companhia Brasileira de Alimentos, a property of the Nestlé group. Cargill is the industry leader in this segment, responsible for approximately 36% of the cocoa seed ground in the state of Bahia, followed by Joanes with 31%, Nestlé with 17%, and Chadler with 16% (Nagai, 1997).

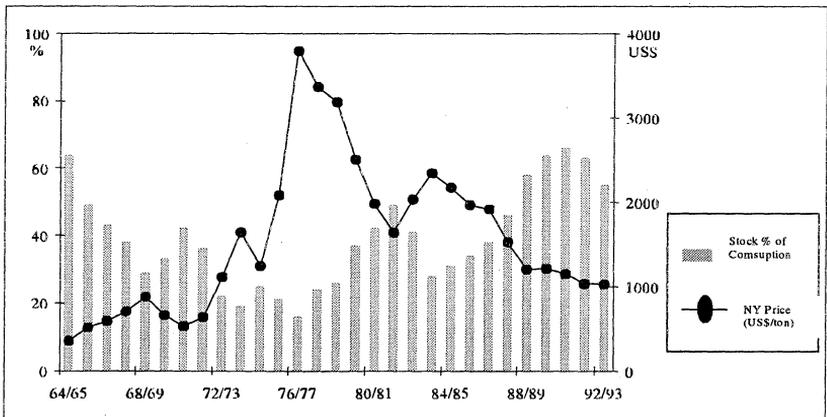
In the case of the chocolate coating industry, this study is based on three companies that, according to ABICAB, represent over 90% of the national chocolate coating market. These companies are Chocolates Garoto S/A., Indústria de Chocolates Lacta S/A., and Nestlé Industrial e Comercial Ltda. (Nagai, 1997).

ANALYSIS OF THE SEGMENTS

Preparation of the cocoa seed

Brazil is, traditionally, a cocoa seed producer, and has stood out as one of the main producing seed countries since the 19th century. Fluctuations in the world market's cocoa price have led Brazil through several historical crises and periods of prosperity. The last prosperous period extended through the 1970s and 1980s. It was during that period, according to Sant'Ana (1994), that worldwide cocoa prices reached the unprecedented high of approximately US\$ 4,000/ton, which led several countries to rush into cocoa production (see figure 2). During this period, contributed to the industrialization of both the state of Bahia and of Brazil.

Figure 2 - Evolution of worldwide cocoa prices (price vs. stock)



Source: Agriannual 1996.

Following that era's worldwide trend toward the establishment of cocoa plantations, Brazil began to expansion into what are now its cocoa growing regions. Brazil's goal was to become the world's largest cocoa producer; a goal it never achieved. The quest for increased cocoa

seed production by several countries generated a worldwide glut that caused a systematically drop in world prices, as can be seen in Figure 2. Thus, the high international prices that had originally heralded a period of prosperity for producers, became the principal determining factor of the current crisis faced by this market segment in Brazil.

However, according to Nagai (1997), the crisis is affecting not only production but also product quality. Although the quality of Brazilian cocoa has never been highly regarded on the international market, today it has deteriorated even further owing to the addition of disease-contaminated seeds during cocoa preparation. Moreover, the growers' need for immediate capital to finance operations leads them to neglect seed preparation activities. They do not allow enough time for ideal seed fermentation, as each day that cocoa seeds are left in the field elevates producer costs. This results in both a lack differentiated pricing determined by product quality and the entire harvest's sale on the domestic market regardless of product quality.

Some attempts have been made to overcome the crisis by opening the Brazilian cocoa-growing region to alternative types of economic development. One of these alternatives is crop diversification. According to the National Center of Cocoa Producers (CNPIC), bananas, acerola, coffee, papayas, cattle breeding, and palm trees (grown for their edible hearts) are among the principal varieties of crops types grown in an attempt to diversify the regional farming economy. In another move to vary the regions economic mix, attempts have been made to market fruit pulp. However, these attempts have just begun and have, so far, not brought any significantly satisfactory results.

The cocoa grinding industry

Cocoa processing is a more recent endeavor in Brazil. According to Nascimento (1994), the first processing units were established during World War II to take advantage of the warehouse space left by departing European companies. It was a tentative beginning; only after the arrival of the high international cocoa prices and government incentives in the 1970s, was this industry able to speed development and lead Brazil to its position as one of the world's major cocoa seed grinding countries.

At that time, due to low levels of Brazilian domestic chocolate consumption and high international prices, practically the entire Brazilian production volume was destined to the export market. Exports have decreased over the last few years as Brazilian chocolate consumption increased and domestic cocoa seed production fell. Today, the domestic market consumes from 70% to 80% of Brazil's production (Nagai, 1997).

It can be observed that there is no significant product differentiation in the industry, which generally regards its products as *commodities*. Company strategies focus mainly on expanding production capacity to supply growing downstream demand within the production chain, thus guaranteeing part of the domestic market. It should be noted that the companies situated immediately below the grinding segment are supplied exclusively with cocoa byproducts produced in Brazil. This strategy, as expressed by the companies that were interviewed, aims to "prevent the entry of competitors in the market and the competition of imported products."

It is interesting to note that the companies interviewed did not consider the quality of their products as a competitive advantage. One explanation for this could be related to the homogeneity of the raw material used and the similar production process employed by all the competitors. Our research discovered that the segment's main competitive advantages were differentiated customer service (relationships of partnership and trust), brand name recognition, and the mechanisms that govern raw material purchases.

The chocolate coating industry

Brazilian chocolate consumption remained low for a long time. This may be explained not only by high product prices but also by the fact that chocolate was seen by the population as superfluous: a product to be consumed only on special occasions or to be bought as a gift (Nascimento, 1994).

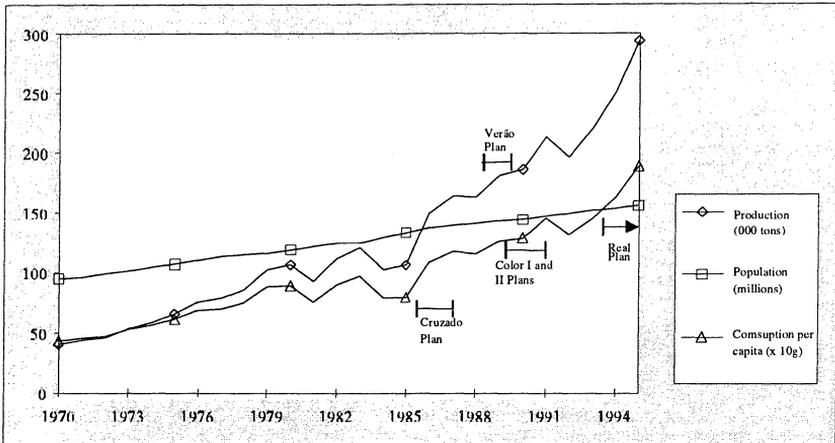
In 1970, a nationwide campaign was begun to change this image and increase domestic chocolate consumption. This campaign lasted from 1970 to 1983 and was the main factor responsible for the

195% increase in chocolate consumption during those years. However, even after the end of the campaign, chocolate consumption continued its upward trend. There was an even more accentuated increase in consumption whenever the government announced plans to stabilize the country's currency, (see: Figure 3). This fact can be attributed to the circumstantial increase in the domestic population's purchasing power. During those periods, Brazilians could afford to consume more value added products, which would have been considered superfluous in more austere times. The substitution effect among food products is exhaustively discussed in the literature (Malassis, 1992). Today, total chocolate consumption in Brazil is 1,885 kgs *per capita*, with a total production volume of 293,7 thousand tons (Bastos, 1996).

Unfortunately, because no recent exact figures for chocolate coating product production are available, the list furnished by Nascimento (1994) was used here. According to this author, chocolate coating represents an average of 70% of the final composition of chocolate. Thus, domestic production volume of chocolate coating should be approximately 205,6 thousand tons.

A particularly interesting aspect marks this industrial segment in Brazil. The companies that dominate the sector also act upon and dominate the sector immediately below. This is due mainly to the strong synergy that exists between the two, in addition to the large amount of chocolate coating used domestically. The companies that dominate this market segment are Garoto, Lacta and Nestlé. The market structure of this production segment can be characterized as a homogeneous oligopoly.

Figure 3 - Evolution of Brazilian consumption of chocolate in every form

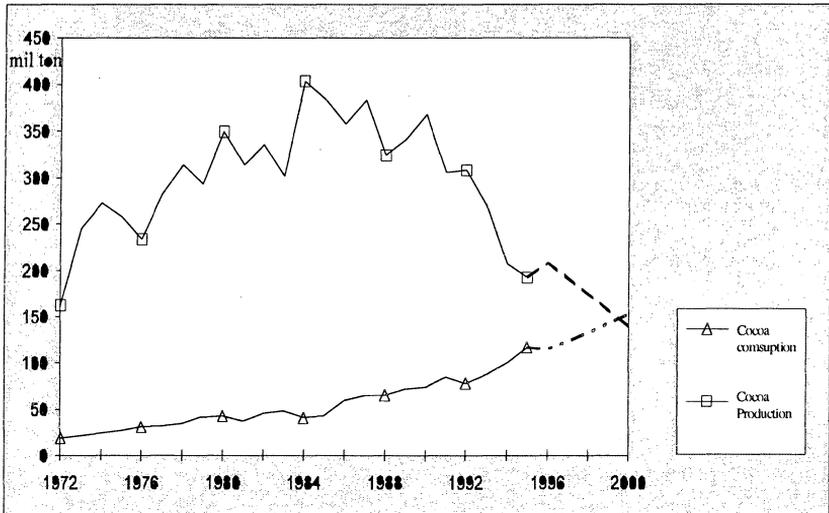


Source: SICAB, 1996; Bastos, 1996.

There are no official figures of market share per company in this segment. For the sake of approximation we have used overall chocolate market data compiled by the Instituto Nielsen. For the period from December 1995 to January 1996, the market was divided as follows: Lacta, the market leader, held 32%, Garoto and Nestlé held 29% each, and the remaining companies held 10% of the market (Brandão Jr., 1996). It is believed that these companies hold an even larger share of the chocolate coating market in view of the fact that, besides producing for their own use, they also supply other chocolate manufacturers.

This brief characterization of the production chain leads one to foresee that, if the growing demand for cocoa continues to be accompanied by the drop in domestic production, Brazil will soon find itself in the position of importer rather than exporter of cocoa beans, as shown in Figure 4. Extrapolation of the trends illustrated in Graph 3 was carried out using Statgraphics software. The exponential adjuster ($R = 0,982$) was used for the consumption variable while the linear adjuster ($R = -0,912$) was used for the production variable.

Figure 4 - Cocoa seed production and consumption trends in Brazil



Source: adapted from SICAB; Gill & Duffus; ICCO, 1996.

It is estimated that Brazilian imports of cocoa seed will steadily increase through the year 2000, in line with the inversion of the demand and production curves. However, there is no reason to suppose that Brazil may not have to resort heavily on the international market to supply its cocoa requirements before the year 2000 (Nagai, 1997).

Our research found different historical periods that characterized the Brazilian cocoa agribusiness during this century. The results are condensed in Table 2.

FINAL COMMENTS

Cocoa grinding companies have also been experiencing financial difficulties due to low prices in the international markets. This has led grinding companies to adopt strategies to increase production and generate savings, thereby increasing their competitive position through cost effectiveness (Porter, 1992). This basic strategy is also observed in

the segment responsible for the production of chocolate coatings. However, the degree of differentiation in this production segment, as well as the value added to the raw material, is higher than that found in the cocoa grinding sector.

Table 2 - Phases of the cocoa agribusiness in Brazil

Phase	Duration	Description	Characteristics
1	Up to World War II	<ul style="list-style-type: none"> - Increasing production of cocoa seed; - No processing industry for cocoa seed grinding; - Low consumption of chocolate on domestic market. 	<ul style="list-style-type: none"> - Practically the entire cocoa production is exported.
2	World War II up to 1990s	<ul style="list-style-type: none"> - Increasing production of cocoa seed; - Establishment of cocoa seed processing plants in Brazil; - Growing, but still low, consumption of chocolate. 	<ul style="list-style-type: none"> - Practically the entire cocoa production continues to be exported; - Now, however, both cocoa seed and byproducts are exported.
3	1990s	<ul style="list-style-type: none"> - Drop in crop production; - Increase in chocolate consumption. 	<ul style="list-style-type: none"> - Drop in cocoa seed exports; - Practically the entire production of cocoa byproducts is consumed on the domestic market
4*	End of 20 th century Beginning of 21 st century	<ul style="list-style-type: none"> - Drop in crop production; - Increase in chocolate production. 	<ul style="list-style-type: none"> - Consumption of cocoa seed by the industry exceeds crop production; - Brazil's position of exporter of cocoa seed will be inverted to that of importer. - New actors enter the industrial macrosector of the production chain.

Note: * Tendência.; Source: Nagai, 1997.

The constant growth of chocolate consumption in Brazil over the past few years has made the Brazilian market very attractive to some of large multinational companies. The entrance into the domestic market

of companies such as M&M, Mars, and Ferrero is an example of this attraction. Thus, the integrated production structure of successful companies already established in the initial segments of Brazil's chocolate production chain will not be overlooked by new companies entering the market.

The following factors can be cited as the principal barriers for entry into the cocoa seed grinding industry: production scale, access to distribution channels, and control over the purchase of raw material. The lack of raw material itself can also be considered a barrier to market penetration. In the chocolate coating industry, access to distribution channels and, principally, lack of brand name recognition are the barriers to large scale production.

Our study found that there is room for much improvement in the partnership and strategic alliance relationships between the segments of the production chain. We also noted that some attempts are being made to improve this situation. Growers and the grinding industry have coordinated their research in the battle against "vassoura-de-bruxa" (witch's broom) disease. Another example of cooperation between the industrial segments can be found in the supply of liquid cocoa liqueur from a grinding company to a producer of chocolate coatings.

The strengthening of joint actions in the markets that demarcate these segments could lead to a focused strategy. A coordinated strategy developed among the actors within the production chain could result in cost reductions and/or product differentiation, with potentially important competitive advantages coming to the participants. The companies operating in the two stages of the industrial segment (cocoa processing and chocolate coatings) have particularly promising characteristics which would facilitate joint action. The market that encompasses these two stages is characterized by the participation of highly concentrated, large companies and involves the transfer of very large product volumes.

This study also allows one to conclude that the dominant segment in the chocolate production chain is the chocolate industry, of which the chocolate coating industry is a part. This is due to several structural factors: it is the only segment of the chain whose product is not a *commodity*, its products have a high added value, and the market structure has the characteristics of a differentiated oligopoly. All these

factors point toward this segment as being the most innovative of the chain.

Our study confirmed that the revitalization of cocoa cultivation is fundamental if the entire chain is to work in a harmonious and efficient manner. As discussed earlier herein, there is a real possibility that Brazil will suffer from a shortage of cocoa seed in the short term. What makes this prospect of even more concern is that the shortage of cocoa in Brazil may coincide with the International Organization of Cocoa and Chocolate's forecast of a worldwide cocoa shortage. Brazil may have to import cocoa at exactly the time that international prices are high.

Therefore, a joint effort must be made by government, labor unions, and companies that operate in the last stages of the production chain to assist in the cocoa plantations' recovery. Revitalized cocoa plantations would prevent the dynamic of the production chain from future jeopardy arising from a shortage of raw material; this is essential if the production chain is to efficiently and prosperously develop.

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