

Agribusiness in Mercosur: transformations of the past and promises for the future

Fernando Martins Luís Renato Oliveira



Agribusiness in Mercosur: transformations of the past and promises for the future

Over the last thirty years, Brazil and its neighbours ceased to import food and became some of the world's major exporters of agricultural crops. Understanding what drove this transformation is necessary if one wishes to participate in future business opportunities in South American agriculture. The following pages contain a brief summary explaining the major changes and their implications.

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Executive summary

South America, and specifically the Mercosur member nations, is one of the most important agricultural exporting regions in the world today. However, the region's role as a "granary of mankind" was neither natural nor obvious. Although Argentina has produced and exported wheat for more than a century, other Mercosur nations, such as Brazil, Paraguay, and Bolivia, have only been large food importers since 1980. The dramatic change in the region's agricultural balance occurred over the last thirty years despite few technological resources, somewhat unstructured governments, and limited availability of capital for investments.

Mercosur's agricultural transformation is due to the efforts of research entities such as the Brazilian Agricultural Research Agency *Embrapa*, seed producers who developed both seed and soil preparation and planting methods, and most importantly, the entrepreneurial fortitude of Brazilian and Argentinean farmers who dedicated their lives, often across generations, to unleash the Brazilian *cerrado*, the Argentinean *pampas*, and the Paraguayan and Bolivian fields for high productivity agriculture. These efforts in tandem with rising global demand for the major food crops produced in the region¹—soybeans, corn, rice, wheat, and sugar—set the stage for Mercosur's rapid growth.

Global demand for these crops will continue to grow in a fairly predictable way due to expected population and income growth; however, predicting global supply with precision is more difficult. What is clear is that Mercosur's importance as a global agricultural commodity supplier will increase further through the middle of this century, which will provide continued tailwind to the sub-continent's agribusiness industries. Recent appreciation of Brazil's agricultural land already reflects this growth expectation: agricultural landowners in both prime areas and agricultural frontiers have seen significant value gains over the past decade. The region's growing global importance, however, will also increase the need to overcome technical and logistical challenges, such as investment in logistics corridors and the continued development of seed and planting techniques more suited to hot and dry climates.

In contrast to Argentina where significant tenant farming exists, Brazilian soybean and corn farming occurs primarily on farmer owned land. This difference seems to be structural: when compared to Argentina, Brazilian agricultural activities have smaller profit pools, which dissuade the separation of land ownership and cultivation.

Bain believes there are still significant opportunities for value creation and appreciation of agricultural land in Brazil and throughout the farming frontiers of the region. Technical improvements to increase land productivity, as well as improvements in logistics infrastructure (which, although slow, are progressing) will drive further land appreciation. Unfortunately, recent restrictions in land acquisition by foreign entities—in both Brazil and neighboring countries—may hinder the pace of development in the near term.

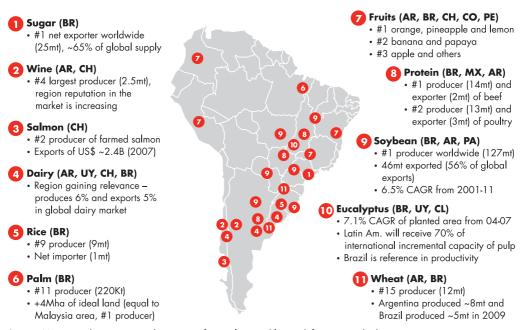
I Other important commodities include potatoes and manioc in their various forms; oats; barley; beans; sorghum, and several others. Not all of them are marketed globally.

Mercosur's evolution in the agricultural crops market

South America, and specifically the Mercosur member nations, is one of the most important agricultural exporting regions in the world today. However, the region's role as a "granary of mankind" was neither natural nor obvious. Although Argentina has produced and exported wheat for more than a century, other Mercosur nations, such as Brazil, Paraguay, and Bolivia, have only been large food importers since 1980. The dramatic change in the region's agricultural balance occurred over the last thirty years despite few technological resources, somewhat unstructured governments, and limited availability of capital for investments.

South America has great diversity in soil and climate conditions, which enables the production of a broad base of agricultural crops and animal proteins. The main agricultural products in the region, those that go beyond internal consumption and generate earnings from exports, range from wine production in temperate regions of Chile and Argentina, to farmed salmon in southern Chile, to milk in Uruguay, to corn, fruits and nuts in subtropical areas. **Figure 1** highlights primary production regions for key products.

Figure 1: Production of agricultural, livestock and forestry cultures in South America



Source: Ministries, departments and agencies of agriculture and livestock from researched countries

For the five major global food crops—soybeans, corn, rice, wheat, and sugar—Mercosur is the world's third largest producer. In the 2009/10 harvest year, Mercosur produced about 319 million metric tons, or 11% of world production of these crops. **Figure 2** shows regional production of each of these five crops.

Total production (2010, B mt) 0.07 0.20 0.15 0.13 0.52 0.32 0.32 0.43 0.24 Total = 2.4B mt 100% 0.08 0.07 0.06 0.11 0.04 80 0.07 0.09 0.07 60 0.08 0.09 0.11 40 0.14 0.34 Soybean Sugar 0.13 20 0.16 0.11 Wheat Rice Corn 0 USA/ China Brazil/ India EU Pacific Others Canada Argentina/ Rim Paraguay Black Sea ^LMENA

Figure 2: Mercosur is the 3rd largest aggregated producer of five major global crops

Source: Food and Agriculture Organization, FAPRI (Food and Agriculture Policy Research Institute)

Mercosur's dominance in soybean production is recent. In 1979, global soybean production was about 89 million tons, and Mercosur accounted for only 17% of the total. The global production balance shifted gradually, and by the 2009/10 soybean harvest, the Mercosur countries produced 133 million tons, or 43% of world production. Growth in Brazilian production was the main contributor to Mercosur's growth, but Argentina also saw significant soybean volume growth over the period. **Figure 3** illustrates soybean production growth around the world over this period.

Brazil's rapid growth in soybean production over the last thirty years occurred in the previously unexplored northern states, mostly within the *cerrado* biome—Mato Grosso do Sul, Mato Grosso, Goiás, Bahia, and the MAPITO (Maranhão, Piauí and Tocantins) region. Agricultural expansion into the *cerrado* lands was possible because of intensive research into

soil varieties and the development of soil preparation techniques (e.g. acidity correction) suitable to the region's climate characteristics.

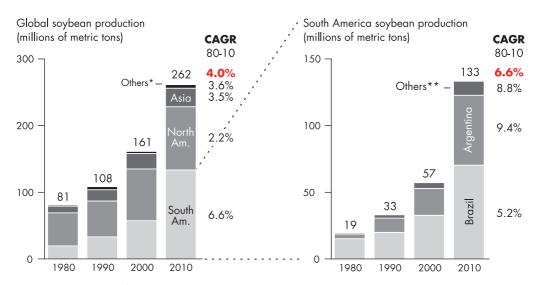


Figure 3: World soybean production 1979-2009

In the 1970s, soybeans were primarily produced in Argentina and Brazil's southern states of Rio Grande do Sul, Paraná, and the southern part of Mato Grosso do Sul. At the time, the production in Rio Grande do Sul and Paraná exceeded Argentina's total output, as Argentina was still very focused on wheat and livestock.

As soybean demand grew in the 1980s, production spread to other regions and countries. Argentinean production reached 7 million tons, and Paraguay began to gain relevance in the marketplace. Soybean production also increased in Mato Grosso and Goiás, and these states became important growing grounds for the oilseed.

Argentina continued to grow its output throughout the 1990s and reached 10 million tons of annual soybean production. At the same time, Uruguay entered the market on a large scale, while agricultural frontiers in Brazil expanded to include the states of Minas Gerais and Bahia. Mato Grosso and Paraná consolidated to be the two most important growing states in the late 1990s.

In the first decade of the 21st century, Bolivia began producing soybeans, while Brazilian production continued to expand to some areas of São Paulo and Santa Catarina (there are no signs, however, that these two states will ever become scale producers). Further growth can be expected in Brazil's MAPITO region due to large amounts of arable land at competitive acquisition costs. Soil and climate challenges will, however, be even larger than those already

^{*}Others include Europe, Africa and Oceania

^{**}Others include Paraguay, Bolivia, Uruguay and other South American countries Source: FAO statistics; FAPRI; CONAB (National Supply Company)

overcome in Mato Grosso (e.g. water deficiencies). **Figure 4** shows the evolution of South American soybean production over time.

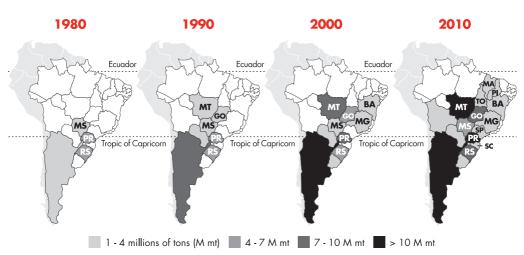


Figure 4: Evolution of soybean planting over four decades

Source: Ministries, departments and agencies of agriculture and livestock from researched countries

In the article "The Miracle of *Cerrado*," *The Economist* reaffirms Brazil as a major food producer: "In less than 30 years, Brazil has gone from a food importer to one of the largest granaries in the world. It is the first country to reach the traditional big five grain exporters. It is also the first tropical food giant; the others are all temperate producers."²

This result was possible only with investments in research and development. These efforts not only made land with high soil acidity amenable to extensive agriculture (not a small feat in itself), but also allowed for incredible productivity gains—Mato Grosso's soybean productivity has already surpassed the more traditional soybean regions of Argentina and Paraná.

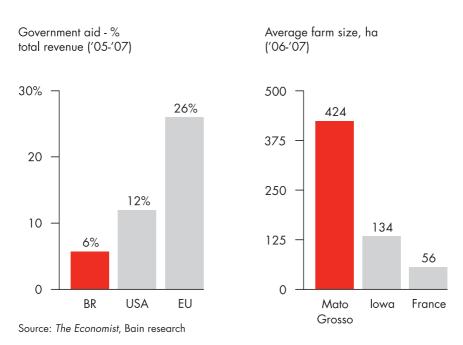
Furthermore, such productivity gains often took place despite relatively disadvantageous government policies, especially in Brazil, a country that employed comparatively very low subsidies to agriculture (these low subsidies were not intentional, but rather caused by the severe disorganization of Brazilian public finances in the 1980s and early 1990s). The lack of subsidies forced the agricultural development of new regions to be very focused, cost conscious, and lean in order to be profitable from the onset.

Compared to other large global producers such as the United States and Europe, Brazil still operates under the lowest effective subsidy system: approximately 6% of farmer revenues emanate from subsidies compared to 12% in the United States and 26% in the European Union.

² Free translation. "The Miracle of the Cerrado", August 26th, 2010. The other big five are: the United States, Canada, Argentina, Australia, and the European Union.

In order to be competitive in such a context, Brazilian farmers had to aggressively create economies of scale by consolidating into having average farm sizes larger than European or American producers. In the *cerrado* region, for example, each farm ranges from 5,000 to 20,000 hectares. Large corporate farms in MAPITO start production with at least 20,000 hectares and can be as large as 100,000 hectares. This makes it possible to amortize costs and capital invested in human resources, machinery, and irrigation equipment much more efficiently than in other parts of the world. **Figure 5** illustrates these points.

Figure 5: Brazilian agriculture has a large scale and survives with fewer subsidies



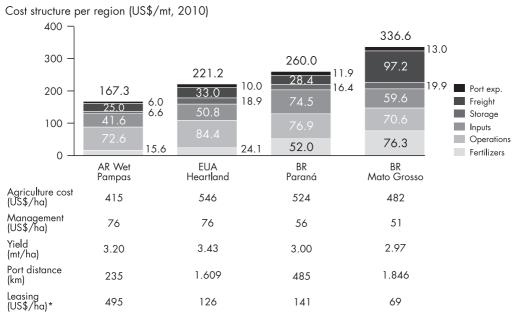
In addition to the scale advantages of very large farms, implementing innovative agricultural research has been essential to competitive soybean production in the *cerrado*. Originally from China, soybeans are a crop best suited to temperate climates. The Brazilian *cerrado* has a warm and dry climate with natural soil conditions unsuitable for most agriculture—high acidity and low levels of nutrients. *Embrapa* has played a key role in opening up the *cerrado* for soybeans by developing seeds adapted to the climate and devising or adopting soil correction and planting techniques to allow for the commercial introduction of crops in the region.

When the Brazilian government founded *Embrapa* as a state-owned company in 1973 to conduct research in agricultural production, the focus was primarily on establishing a secure food supply given the country's reliance on imports. Since then *Embrapa* has studied a number of agricultural issues including, for example, increasing the productivity of Brazilian beef cattle. In this case, *Embrapa* genetically modified an imported African grass,

which was renamed *Braquiarão*, and helped reduce the raising time for cattle from four years in 1980 to 12-18 months in 2010.

Despite the *cerrado*'s rapid soybean output growth, it is important to highlight that the region does not have a low relative cost position. In microeconomic terms, the *cerrado* would be what is called the "marginal producer" (i.e. the highest cost producer). The reasons for this are many: significant usage of limestone for soil correction; greater need for fertilization and longer distances to port when compared to Argentina; and fewer, less developed, export corridors that compensate for the greater distances (e.g. the waterways used by American Midwest growers to haul production to the gulf). **Figure 6** compares soybean production and delivery costs for selected regions (Paraná, Mato Grosso, Wet Pampas of Argentina and Midwest American).

Figure 6: Production cost of soybeans delivered to ports for selected regions



^{*} Leasing not included in the picture above; Argentina production cost does not include export taxes
Note: Considered historical exchange rate = 1.71 R\$/US\$ (01/01/08 - 10/14/08); 4.00 AR\$/US\$
Source: Agrianual; Ministry of Agriculture, Ganadería y Pesca de la República Argentina; Expert interviews; Clippings;
USDA (United States Department of Agriculture); Bain analysis

What does this mean for Brazilian farmers? It means that the Brazilian farmers are less profitable than others, given that prices are principally set globally and not regionally. This also means that Brazilian producers would be the first forced to decrease production in the case of a strong retraction in global demand (due, for example, to a recession in Asia, the main importer

of Brazilian soy). Fortunately for the industry and for the Brazilian economy, the base scenario for the decades to come continues to show vigorous demand growth.

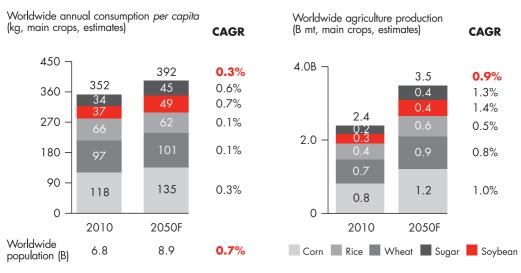
Demand for major food crops will continue to grow and must be supplied mainly by Mercosur

Food production growth will be driven by both the growing world population and by income growth. According to the United Nations Organization, the global population is expected to increase from 6.8 billion today to 8.9 billion by 2050—an average annual growth rate of 0.7%.

Developing economies—those where growing incomes are driving important changes in consumption and feeding habits—will account for the majority of global population growth. Populations in these countries will be larger, but also richer. This means they will, on average, consume a greater number of calories each year. Furthermore, populations in these countries will also likely diversify and enrich their diets by replacing or complementing vegetable protein with animal protein. This puts greater pressure on the global agricultural system that produces soybeans, and also increases pressure on corn and feed wheat producers, as larger quantities of multiple commodities will be required to feed growing livestock herds.

Considering all these factors, Bain & Company's Agribusiness Practice (with regional centers in São Paulo, Chicago, and Singapore) expects world demand for the five food crops discussed in this paper to grow from an estimated 2.4 billion tons in 2010 to around 3.5 billion tons in 2050 (**Figure 7**).

Figure 7: Factors for consumption growth of five main commodities from 2010 until 2050



Source: Fapri, Sage (Advanced Systems Laboratory of Production Management), FAOStat, CONAB (National Supply Company), Bain analysis

But who will supply this demand? Predicting production is far more difficult than predicting demand. There are many variables that cannot be predicted with precision, such as the chances of pest infestation or disease, varietal declines, or regional and global climate change. Moreover, it is difficult to assess the production potential of new areas. Both the African Savanna and Colombia, for example, have areas favorable to extensive farming of soybeans and corn. It is also possible that Cuba will again become a major sugar producer at some point in time—an unlikely development in the near term, but quite possible and even likely within a forty year horizon.

In our forecasts, the Bain agribusiness group assumed these new regions would not be developed to an impactful degree during the forecast horizon (i.e. a conservative vision—or optimistic, depending on your point of view). We believe the I.I billion tons of new global food demand will be supplied largely by the New World: Mercosur will see the largest absolute growth in production followed by North America, and these two regions will account for nearly half of global growth in supply. The growth in Mercosur will be driven by soybeans and sugar, while corn will drive the increase in North America. **Figure 8** shows the detailed forecast.

In deriving these growth forecasts, we must carefully consider the production growth levers available in each region to achieve these supply increases. While in North America incremental growth will be driven by the use of technology to extract more output from the

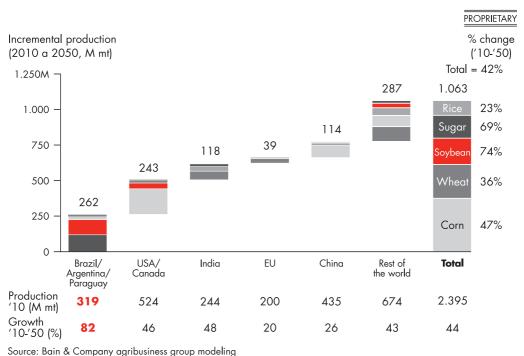


Figure 8: Production increase by region (2010 to 2050)

Source. Balli & Company agribusiness group modeling

same land (i.e. increase earned revenue per hectare), there is a large opportunity to introduce new agricultural land in Mercosur. **Figure 9** provides more details.

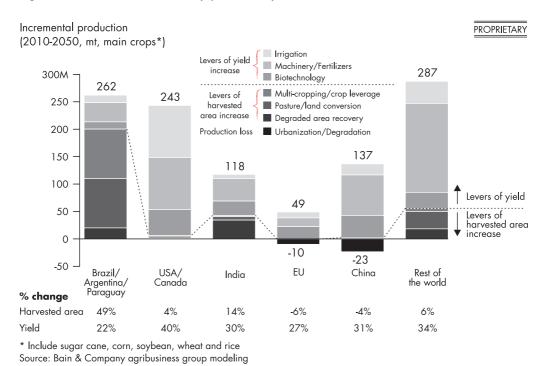


Figure 9: Production increase by productivity and area from 2010 to 2050

In the rest of the world, there is some potential for both levers—productivity gain and growth in land devoted to agriculture; however the total production upside is far more limited. As previously mentioned, while Africa has significant production potential and has land and climatic characteristics similar to those in the Brazilian *cerrado*, there are technical, human, and institutional challenges that make it very difficult to assess whether the African continent will become a relevant global producer beyond the predictions herein.

African potential

Parts of Africa have soil and climate characteristics similar to the *Cerrado* and could benefit from the research completed in Brazil (*Embrapa* has research offices in Africa). Some traders and large farmers are beginning to study the continent. Several countries are studying the introduction of biofuels programs, some of them with Brazilian support. The continent can become a relevant producer, but significant barriers exist.

The dynamics of land appreciation

To date, Brazil has successfully pulled both levers to fuel its output growth: productivity gains on existing lands and the expansion of the agricultural frontier. Existing lands become more productive through measures like genetic improvements in crops, optimal irrigation and fertilization practices, cumulative learning, and *conditioning*—the notion that land, if well tended every year, becomes more, not less, productive. While physical assets in other value chains typically depreciate and lose value over time, land can and typically does appreciate in the long run.

In some of the most established soybean and sugar lands in Brazil, the combined cash earnings from annual crops and the nominal land appreciation were between 9% and 20% annually between 2005 and 2010, as shown in **Figure 10**. Gains for the most established regions of Argentina were similar.

Part of that appreciation is certainly due to improvements in Brazilian macroeconomic conditions and not to agriculture itself; therefore, we at Bain do not expect that this level of appreciation will be sustained in the future—or at least not in well established agricultural regions. In the agricultural frontiers, however, similar patterns of appreciation are still quite possible.

Total land return NOMINAL APPRECIATION ('05-'10%, p.a.) 25% ■ Land appreciation ('05-'10), % p.a. 20.4 Annual leasing (% land value) 20 16.9 15.5 14.3 15 13.5 12.1 10 9.2 8.5 3.2 5 7.1 6.9 6.0 59 5.4 5.1 0 Ituiutaba Itumbiara Ourinhos Piracicaba Araraquara Bauru Leasing 552 635 895 1.054 896 1.073 (R\$/ha/year) Land value 16.500 7.800 9.167 15.000 18.000 21.000 (R\$/ha)

Figure 10: Total land income in some selected established regions

Source: Agrianual (Brazilian Agriculture Yearbook), Bain research

Agricultural lands appreciate in stages, due to very well-defined triggers.

The first stage of land appreciation is initiated by the conversion of a tract of land for agricultural use (e.g. from a pasture). Pasture lands or degraded pastures are usually worth a fraction of the productive agricultural land value in the same region. The farmer or investor acquires that land and then makes the necessary investments to "open the farm": he or she builds internal roads, silos, sheds, bridges; spends heavily on limestone for soil correction; and seeds the first crop; even while knowing that the proceeds will not be enough to cover seeding costs until year 3 or 4. Fertility and productivity increase with each cycle, as soil acidity is further corrected, nitrates are fixed into the soil by the soybeans in the main harvest, and the corn harvested as second crop leaves behind a bed of organic material on which to seed the soy.

At the end of this process, usually about five or six years after the first seed, the farm will be highly productive, and the land will have appreciated to its full agricultural value. Subsequent extraordinary appreciations may still occur, but this will depend on external factors or triggers—for example, the opening of railways or roads that reduce the production costs and consequently increase the production value, the arrival of a new "richer" crop, such as sugar cane, or even the industrialization or urbanization of the surrounding area (**Figure 11**).

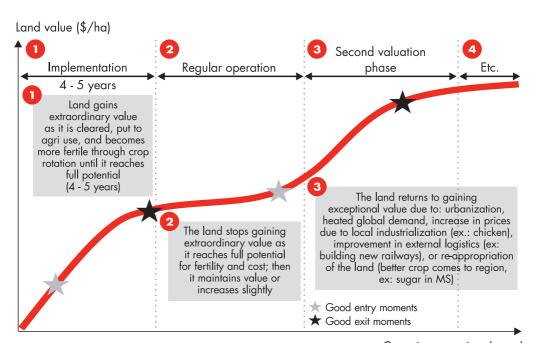


Figure 11: Phases of land appreciation (conceptual)

Cropping over time (years)

Brazil and Argentina – distinct value chain structures

A would-be farmer can either buy land or lease it from a landowner to farm (or, alternatively, a landowner may lease the land to third parties or cultivate it him or herself). Argentine farmers tend to lease their land while Brazilian farmers tend to own the land they farm. We hypothesize this difference is due largely to lower profit margins in Brazil: the production margins are not yet large enough to justify the separation of land production and ownership as securely in Brazil as they are in Argentina.

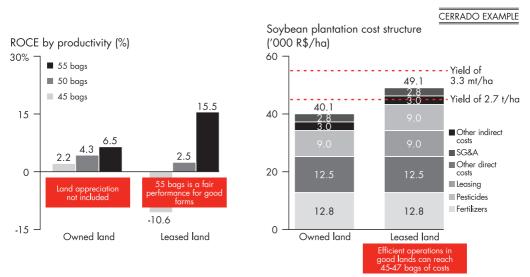
In addition, Brazil does not yet have a class of small rural service providers that usually have machines and provide labor for planting and harvesting. In contrast, this class of worker is quite developed in Argentina—there are approximately 15,000 contractors, mostly small family businesses, which account for 75% of harvesting labor in the country. They travel up to 2,000 kilometers from North to South, following the harvest calendar to work in different regions. This system guarantees very high asset utilization and dilutes capital costs. This system also allows producers to focus their efforts on increasing land productivity without spending energy on agricultural equipment fleet management.

Take, for example, the situation of the Brazilian *cerrado*. By comparing the margins and returns on capital employed between using owned and leased land, one can draw some important conclusions. Since profit margins are low in Brazil, fixed leasing costs become very relevant and can determine whether the farmer will be profitable. In good or even average years, this operating leverage produces a very good "cash" return from the leased land; however, even in a situation of modest crop failure (or alternatively, a poor decision when locking in prices), the cost exposure becomes too large for the tenant farmer. In **Figure 12**, we illustrate this point with the hypothetical economics of two farmers in the *cerrado*: one who owns lands and the other who leases.

Since the Brazilian farmer usually depends on funding from agricultural traders or banks, we should add the impact of financial leverage to the analysis presented in Figure 12. This would further increase the risk exposure. As we saw before, the farming margins are healthier in Argentina, which naturally enables both greater leeway and higher tolerance for risk.

The growth of the leasing model in Brazil is further hampered by the cost of developing agriculture on new lands. As we mentioned, new agricultural land must undergo a lengthy

Figure 12: Production economics for owned and leased lands



Note: Considering soybean at R\$35 per bag, and leasing contracts of nine bags per hectare (MT, Mapito and BA work with 8-12 bags). ROCE = Return On Capital Employed

*Considering land price agual to 22 times the leasing cost (market applies 20.25) Ponted equipments. It

*Considering land price equal to 22 times the leasing cost (market applies 20-25). Rented equipments, IC = KG+Land Source: Bain analysis with Agrianual gross data

process of 'conditioning' to make it more suitable for intensive farming. The yield of the first few harvests is poor, sometimes not enough to pay production costs, but grows as land conditions improve (i.e. the agriculture is done responsibly with the aim of long-term yield gain). In addition, soil correction costs can be quite high in the early years. **Figure 13** outlines the soybean example.

Conventional wisdom holds that completing these heavy conditioning processes on leased lands is foolish, as all the investment would be carried by the tenant, while the upside of land appreciation would revert to the rent-seeker, the landlord. Smart leasing contracts can be created to share the gains and the risks between parties, but they are rather the exception than the norm.

Furthermore, Brazilian farmers tend to own all or most assets required for farming—including machinery and implements for planting and harvesting. This business model increases employed capital, thus reducing the return on investment. As we have seen, the

outsourcing model practiced in Argentina decreases the employed capital and costs in Argentina, facilitating the practice of leasing agricultural land.

Soybean yield curve (bags) Higher costs in 60 initial years 58 60 (fertilizer and limestone) 53 speed up yield 48 50 43 High cost Excl. leasing 38 40 Low cost Excl. leasing 30 Lower costs leveraged by operational 20 excellence, crop otation and purchasing 10 ability ■ High Moderate Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Source: Agrianual

Figure 13: The adaptation process of new lands

The advent of corporate farming

Several international and Brazilian companies have bet on agriculture in Mato Grosso, MAPITO, and some parts of Argentina, with many of them betting not only on profits from crops but also on land appreciation. We chose to call them 'corporate farmers', to set them apart from farmer individuals or families, which tend to be the norm in other countries—and also elsewhere in Brazil and Mercosur.

Large companies investing in agricultural development can be divided into three groups: I) those interested in the cash return of the crops that tend to lease their land; 2) those interested both in agricultural production and land ownership; and 3) those that seem to value land development for future sale and appreciation.

Agricultural production through corporate farms is not a new phenomenon. During the late 19th and early 20th centuries in the American Midwest, the opening of the railways provided the economic viability for agricultural production on vast areas of prairie lands. Entrepreneurs hurried to raise capital and develop these lands—some were involved in railway construction and leveraged the benefits of information asymmetry as they acquired the land. Eventually these large farms were fractioned and divested, usually with good returns for entrepreneurs.

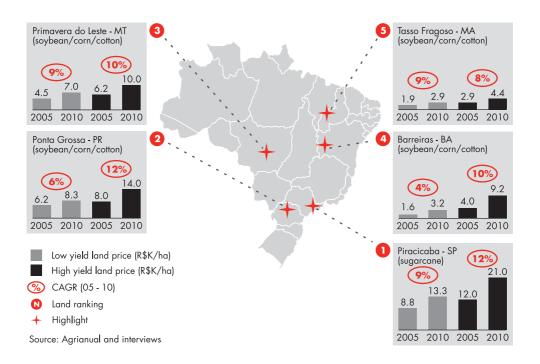
A century later, the phenomenon is repeating itself in Brazil and Argentina, as well as in Africa and tropical Southeast Asia. The question, however, is whether the cycle will be completed or if the properties will remain on the balance sheets of corporations and sovereign wealth funds worried about the food security of their respective populations.

Appreciation of MAPITO lands

Traditional agricultural regions, such as São Paulo and Paraná in Brazil or the Wet Pampas in Argentina, have high land values, while the new frontiers have the lowest values, mainly due to factors such as high land quality and fertility, good moisture and acidity, and access to more evolved logistics infrastructure. The states of São Paulo and Paraná have superior roads and railways than the rest of Brazil, are closer to both ports and consumption centers, and additionally have more accumulated experience in land cultivation.

Recalling that land appreciation happens in waves, **Figure 14** describes five representative micro-regions numbered in chronological order of agricultural development, from I for Piracicaba (one of the earliest areas where extensive agriculture was practiced in Brazil) up to 5 for Tasso Fragoso, Maranhão (the "MA" of MAPITO, perhaps the newest agricultural frontier). There is a clear and consistent pattern of land price appreciation within each region and also among them.

Figure 14: Brazilian land appreciation



It is still unclear how expensive land will become in the MAPITO (#5). It will be fairly close to ports once the infrastructure is in place (much closer than Mato Grosso (#3)). On the other hand, rain regime and fertility are significantly lower in MAPITO. Despite these factors, it is fair to assume valuations will still increase.

Last word: the logistical imperative

The main restriction on production and land appreciation in the agricultural frontiers is an inefficient and incomplete logistics infrastructure that increases transportation costs and makes the region less competitive. Transportation to the ports still depends excessively on trucks or equally expensive trains. Brazil's potential waterways are rarely used for agricultural outflow (with few exceptions such as the Tietê-Paraná and Madeira River waterways), and land routes from the *cerrado* to Brazilian northern ports—Belém, Santarém, São Luís—have only recently started being seriously considered.

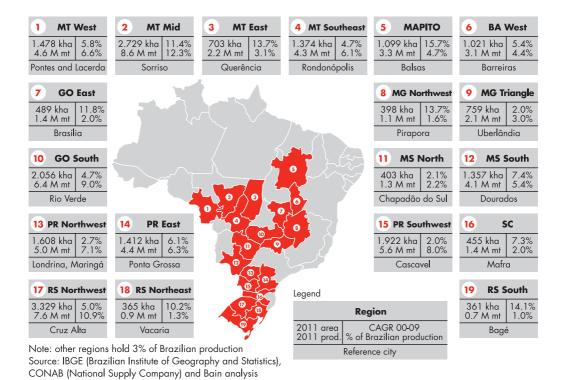
Figure 15 shows this phenomenon in stark relief, comparing almost equidistant freight costs in two very different exporting realities, Mato Grosso and Iowa.

It is worth remembering that the agricultural production in Mato Grosso could also reach a port at an expense of around US\$ 32/ton, if the Araguaia-Tocantins or Telles Pires-Tapajós waterways, with red marks on the map below, were properly dredged and developed.

Soybean freight (US\$/mt) Internal freight cost (US\$/mt) 125 From Davenport (IA) to Mexican 105 Gulf ports (~1.000 miles) 100 Transportation type: waterway Freight cost: US\$ 33/mt 75 50 Internal freight cost (US\$/mt) 35 33 From Sorriso (MT) to Santos and 25 Paranaguá ports (~1.200 miles) Transportation type: truck 0 USA MT RS Freight cost: ~US\$ 100 to 110/mt **Brazil** Source: Bain research Operational waterway
 Non operational waterway

Figure 15: Comparison of routes and freight costs between Brazil and the United States

Appendix: The regions of soybean production in Brazil



Bain's agribusiness experience

Bain & Company has unique experience in Mercosur agribusiness. We have worked across the value chain: from raw materials (e.g. seed, pesticides and fertilizers); to land ownership; to a range of farming crops; and to industrial processing, transport and going to market, whether local or exports.

Our deep knowledge about the changes in South American agribusiness over the last thirty years, combined with unparalleled experience across the value chain, accredit us to help ambitious entrepreneurs and executives who want to play a central role in the important transformations ahead.

Bain & Company experience in agribusiness

Crop financing strategy and financial services growth

Financing to farmer					
Agricultural supplies	Tillage and extraction	Origination	Local logistic	_ Trading and	Finished products
			Local processing	export	
Agriculture defensives • Herbicides • Pesticides Fertilizer blenders Animal nutrition Seed growers	Ethanol and sugar Soybean, corn and cotton Commercial forests Palm Poultry and pigs Orange Milk Tomato	Soybean and corn Sugar Cotton Coffee Milk Wheat		 Cerealistas Global and local Traders 	Fresh and processed meat Wheat blends Milk Biscuits Coffee Chocolate Food ingredient
Investment due Performance ir Strategic plann	nprovement	Origination positioning Strategic planning	Market evaluation growth strategy Strategic planning employment and Investment due di Operational impr	g/inventories reallocation lligence	Operational full potential Market strategy; distribution Operational improvement

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