



**BRAZILIAN  
AMERICAN**  
CHAMBER OF COMMERCE, INC.

**BRAZILIAN AGRIBUSINESS:  
A SUCCESS STORY THAT KEEPS ON GIVING**

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## **INTRODUCTION**

Brazil is the fifth largest country in the world in terms of territorial area, and the most populous country in South America, with approximately 200 million people. Additionally, Brazil has one of the biggest reserves of natural resources and an economy that surpasses all of its South American neighbors, with a well-developed agribusiness, advanced mining industry, as well as manufacturing and services sectors, in comparison to the other South-American countries.

Brazil's potential in agribusiness is enormous. Despite the sector already accounting for approximately 22% of the country's total GDP, it continues to increase its importance to Brazil and to the international commodities markets. Currently, the country is the world's largest producer of sugar cane, coffee and tropical fruits, the world's largest commercial cattle herd and the world's largest exporter of soybeans. Roughly, 176 countries import Brazilian livestock. Nevertheless, only 9% of the territory is occupied by crops, while 13,2% represent pastures.

Growth in Brazil's agricultural products market is accelerating. From 2012 to 2016, the domestic market's volume grew by 12,6% annually, and reached a value of \$ 113.5 billion (See Figure 1). In 2017 the country's agricultural export surplus was equivalent to \$81.8 billion, while the other sectors had a combined deficit of \$14.8 billion. Therefore, the country's total surplus of \$ 67 billion was achieved due to the agribusiness' sector contribution.

Plus, in addition to increasing its fibers and grains output by more than 400%, the outlook for the near future is also very positive, with agricultural products market expected volume of 1,129.4 million tons by 2021, a 7,7% compounded annual increase over 2016. The projected growth is expected to occur from the combination of incorporating degraded pasture lands into cultivated acreage, extensive improvements in technology and use of new technologies such as GMO's, in addition to the growing global demand for food, especially proteins.

Despite the promising outlook for agribusiness in Brazil, the country still faces some challenges in order to take full advantage of this dynamic sector of the economy. The primary challenge is

the structural deficiency in its infrastructure, especially logistics, which negatively impact the country's competitiveness by increasing freight costs. Despite the efforts made to minimize the infrastructure bottlenecks, such as the Growth Acceleration Program (PAC in Portuguese), undertaken during the Lula and Dilma administrations, the results are far from satisfactory.

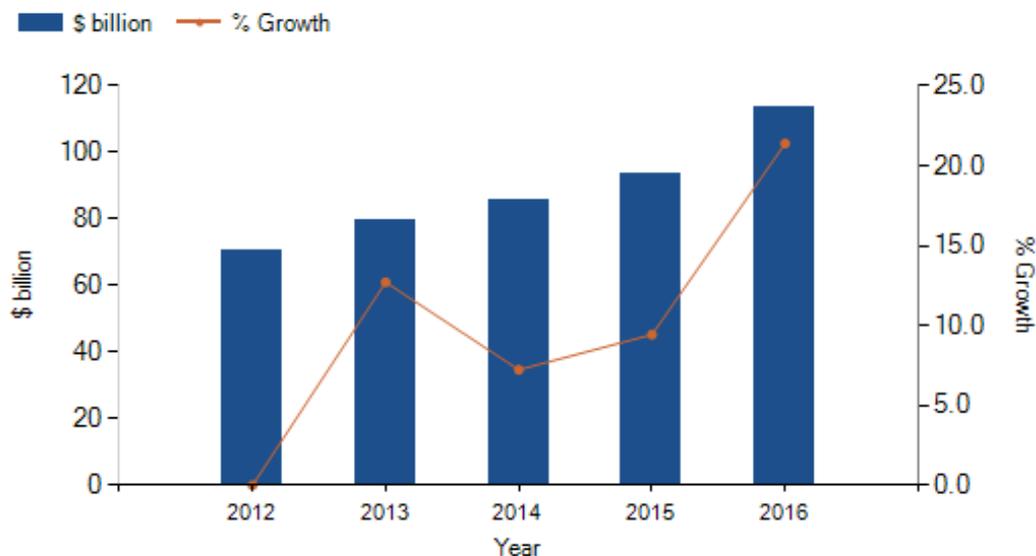
In response to the shortcomings of the PAC, the current administration under President Temer launched a revised infrastructure development program, referred to as PPI (Program of Partnerships and Investment). The PPI assigns to the private sector the principal responsibility for developing needed investments in highways, railways, energy, air transportation, telecommunications, housing, water and sanitation. By streamlining the bureaucratic process and making needed infrastructure investments more economically attractive, Brazil hopes to overcome some of the challenges that reduce productivity and slow the country's growth.

## **BRAZILIAN AGRICULTURE**

### **Market Overview**

In recent years, the Brazilian agricultural products market has experienced double digit growth due to a favorable export market and a growing global demand for commodities, specifically agricultural goods, mineral resources and protein. In 2016, Brazilian domestic agricultural products market represented \$ 113,5 billion in market value (See Figure 1), corresponding to a compounded annual growth rate (CAGR) of 12,6% from 2012 to 2016. In comparison, the US and Canadian markets declined by a CAGR of -3% and -2,9% respectively. In addition to that, Brazil's agricultural products exports produced an inflow of capital of \$ 84,9 billion in 2016, 45.9% of all exports revenues, and it helped creating 32% of all Brazilian jobs, demonstrating the importance of the sector to the country's financial stability.

**Figure 1: Brazil's domestic agricultural products market value: \$ billion, 2012–16**



SOURCE: MARKETLINE

Going forward, Brazil's agricultural production is projected to grow at a CAGR of 4.6% from 2016 to 2021 (See Table 1). For the 2029/30 grains crop, productivity is expected to grow by 33%, in comparison to 2016/17, while the planted area is expected to grow by 22%. Similarly, poultry, beef and swine production are expected to grow by 41.1%, 26.3% and 37.4% respectively. These productions increases will be motivated by a boost in exports, which have a projected increase of 46% for chicken, 45.1% for beef and 54.4% for swine.

**Table 1: Brazil agricultural products market value forecast: \$ billion, 2016–21**

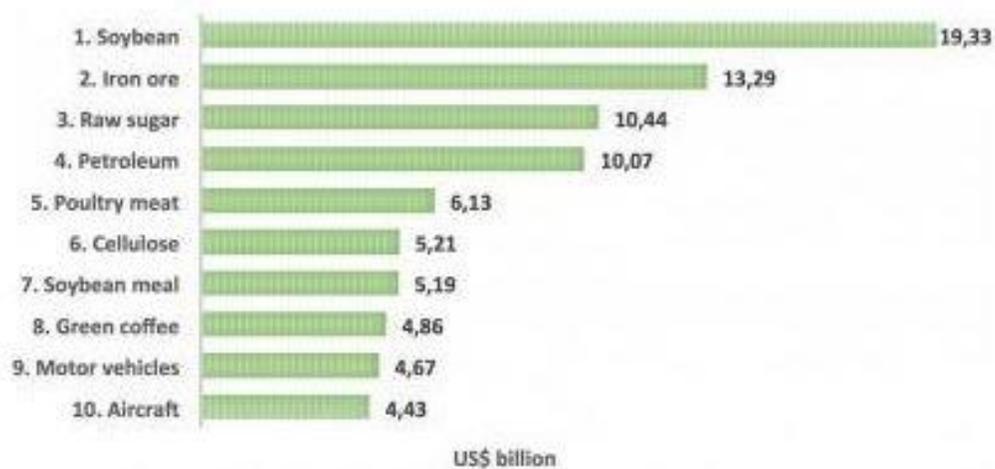
Year	\$ billion	BRL billion	€ billion	% Growth
2016	113.5	396.0	102.6	21.4%
2017	118.0	411.6	106.7	4.0%
2018	121.0	422.1	109.4	2.5%
2019	127.3	443.8	115.0	5.2%
2020	133.6	465.8	120.7	5.0%
2021	142.3	496.2	128.6	6.5%
CAGR: 2016–21				4.6%

SOURCE: MARKETLINE

MARKETLINE

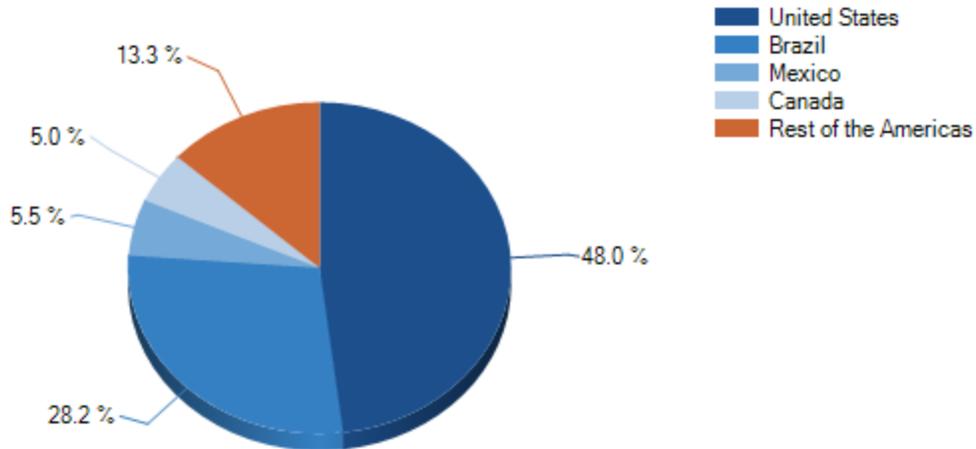
Despite the increases in meat production, soybeans are still the dominant segment for exporting purposes, accounting for 10% of the country's international sales and bringing in \$ 19.33 billion to the country (See Figure 2). Among the 1497 products exported by Brazilian agribusiness, 10 of them correspond to 70% of the exported value, demonstrating the lack of diversification of its agricultural exporting portfolio.

**Figure 2: Brazil's top-ten exports**



Today, the market value produced by Brazilian agriculture is the second in the Americas (28,2%), only behind the US (See Figure 3). Unlike the US, Brazil's agricultural activity still has enormous potential to continue expanding due to the remaining availability of land, the development of new techniques to improve land use efficiency and the efforts underway to resolve some of the country's most important bottlenecks. Therefore, the agriculture outlook in Brazil is very bright, with analysts forecasting a 17,6% CAGR in market value from 2018 to 2021.

**Figure 3: Brazil agricultural products market geography segmentation: % share, by value, 2016**



SOURCE: MARKETLINE

The country’s advanced approach to agribusiness has led to Brazil becoming the world’s second largest user of genetically modified crops, behind only the US, resulting in better yields, due to insect and disease resistant plants. Additionally, the high levels of innovation and technology allows the country to use fewer agrochemicals than other leading agricultural producers (See Figure 4). Unfortunately, the pace of implementing the new technologies has slowed in the past recent years, as investments have sharply declined due to the country’s weak economic and fiscal conditions. However, as the economy emerges from the recent recession, investment flows to these important segments are expected to rebound.

**Figure 4: Comparing agrochemical usage in key agricultural markets**



Thanks to innovation and technology Brazil uses fewer agrochemical than the other leading agricultural producers.

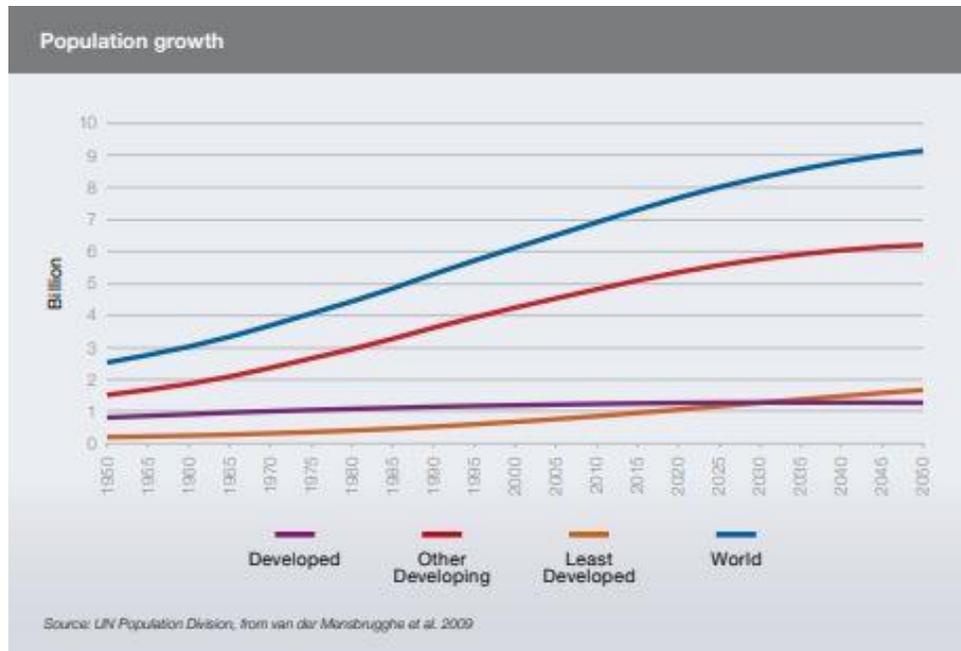
Source: World Bank and Food and Agriculture Organization of the United Nations (FAO).

These advancements are extremely important since agriculture is one of the bases of the Brazilian economy. These investments help farmers to reduce their planting risks, which combined with federal incentives, contribute to lower entry costs for small producers. Small farmers play a key role in the Brazilian agricultural sector, representing more than 80% of the production units available in the country and responsible for 38% of the gross value of agricultural production.

### **Brazil's Abundance of Land and its Importance in Meeting World Demand for Food**

The Food and Agriculture Organization of the United Nations (FAO) predicts the world population will reach almost 9 billion people by 2050 (See Figure 5). Additionally, increasing global income, has been creating an upward movement in global food demand, especially for meat and cereals. To meet growing demands caused by population and income growth, the production of cereals will need to increase from 2,1 billion tons to 3 billion tons, while meat production will have to increase from 200 billion tons to 470 billion tons. Overall, food production would have to grow by 70%. This represents a major challenge due to the high rates of urbanization, with more people flowing to the cities and less workers in the farms. Brazil's land availability is expected to be an important factor in sustaining the rapid population growth in the following years and the country is expected to grow its production by 40% to meet the world food demand.

#### **Figure 5:**



## Brazil's Comparative Advantage

Brazil has approximately 70 million hectares of degraded pastures and grasslands (an area the size of Texas) which represent a clear alternative to expanding the country's agriculture, without deforestation. This is one of the biggest competitive advantages that Brazil possesses against its traditional competitors. In comparison to other major producers like the EU and the USA, Brazil is the one with the biggest potential to expand its planted lands, which can boost productivity and attract more investments and revenues.

Nevertheless, Brazil faces big inequalities in terms of productivity, even in locations with similar soil and climate features. These differences represent a huge opportunity, since poorly performing lands could deliver a much bigger productivity if submitted into more efficient rural techniques.

## Sustainable Growth

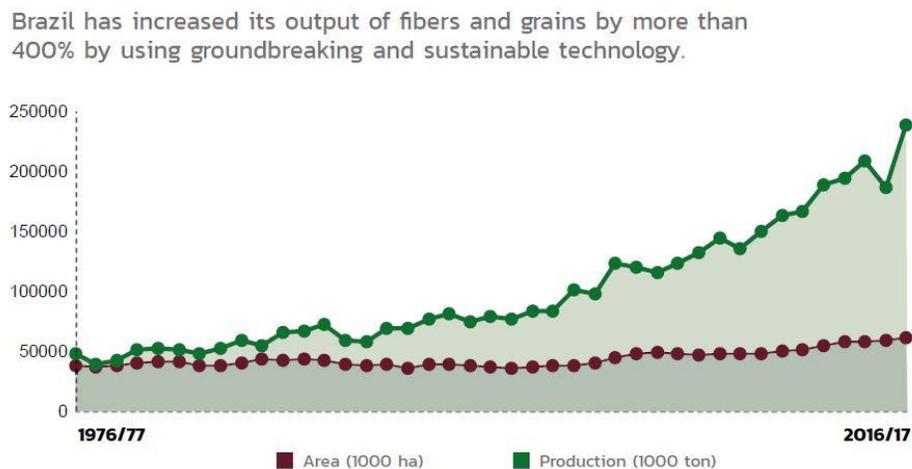
The challenge within Brazil will be to increase the level of technology diffusion and decrease the inequalities in productivity, through the dissemination of information and education of farmers about new agricultural techniques. Additionally, more secure land rights, and effective conflict

resolution methods can definitely improve land use efficiency, by boosting land market's activity and placing skilled operators on previously unproductive lands.

Another factor that improves land productivity and innovation is the availability of credit and insurances in the agricultural sector. Research suggests that nearly 20% of the regional variation on agricultural productivity in Brazil is explained by differences of credit availability. Finally, the infrastructural issue in Brazil, is another major barrier to productivity. The country's infrastructure development was ranked in a poor position by the World Economic Forum (WEF) and the effects can be felt in increased costs, which, sometimes, can be twenty times higher than comparable costs in other countries.

These changes will shape agricultural markets for many years to come. Farmers will have to increase their outputs by increasing the amount of land used. Most of the food production increase is expected to come from Latin America, since it is the place that combines the agricultural technology to increase productivity with land availability. Brazil's unused land, for example, corresponds to 65% of China's total arable land. However, increasing land use in such a big rate could bring negative ecological and social impacts. Therefore, the alternative is to extract greater efficiency from the land that is currently being used, through fertilizers and more precise irrigation methods. From 1976/77 to 2016/17, new techniques allowed Brazil to increase its output of fibers and grains by more than 400%, without significant increases in land usage (See Figure 6).

**Figure 6: Fibers production increase X Increase in land usage**



Those techniques, called “sustainable intensification”, help to increase the precision of farming techniques. Some examples are GPS fertilizer dispersion, more advanced and efficient irrigation systems, and environmentally optimized crop rotations. Overall, 90% of the crop production increases are expected to come from developing countries, where 80% will come from higher yields and increased cropping intensity, and only 10% will be originated from land expansion, primarily in Sub-Saharan Africa and Latin America. The implementation of these techniques increases crop yields and decrease negative environmental impacts by decreasing waste of water and avoiding groundwater depletion. Since the beginning of the 1990s, the planted areas designated for grains increased by 62%, while the overall production increased by 302%. Similar movements were observed in the production of poultry (462%), swine (255%) and beef (89%).

On top of that, climate change will also significantly impact crop yields due to higher global temperatures and extreme weathers. One alternative to conciliate food production increases and global warming containment would be the development of supply chains free of deforestation, which would require a commitment from farmers and food processing groups. In addition to containing global warming, such a measure would also help reducing biodiversity losses and GHG emissions.

Additionally, the fact that the world population is growing in a significantly high rate also has the impact to influence international trade. In general terms, the international trade of agricultural goods, such as cereals is expected to grow substantially, both in the form of grains, but also in the form of meat, since the grains are used to feed the animals. The higher population growth rate in developing countries would make them important cereals importers, with those accounting for 14% of their cereal consumption, in opposition to the current 9.2%. The origin of those imports would be, primarily, South America and the Caribbean, reflecting the surplus production potential of important countries in the region, like Brazil.

### **Embrapa – A Key Contributor to Brazil’s Agricultural Success**

An important reason for the successful application of technology to agriculture is the Brazilian Agricultural Research Corporation (Embrapa). Since it was created, in 1972, this organization has invested heavily in the development of Brazil’s agriculture through scientific research.

Today, Embrapa is a benchmark, not only in Brazil, but worldwide, in agribusiness science and technology. Embrapa is composed by 47 research units, present in nearly all Brazilian states, and focuses on Brazil's most important crops, such as corn, cane, soybeans and vegetables.

Embrapa's success in sustaining the development of Brazilian agriculture is largely explained by its huge network of partners, which allows the organization to engage in the exchange of ideas, access the most successful practices used in technology leader countries and adapt those techniques to the Brazilian context. Embrapa has more than 100 research institution partners, ranging from universities to State Organizations of Agricultural and Livestock Research, national and international research institutes and private companies.

One of the most important activities performed by Embrapa has to do with the creation of varieties, hybrids and clones of several plant species, which can generate crops with superior features, like resistance to diseases. These research efforts have generated a series of positive outcomes that boosts Brazil's competitiveness in the agricultural markets. Some of these advantages are: the increase in yields and quality; the possibility of adapting crops to different geographical locations; the improvement of nutritional features of feedstocks, which can help government programs in eliminating hunger and sub-nutrition; development of new supply chains and diversification of production techniques; opening of new markets by developing new products; conservation of natural resources and reduction of environmental impacts; and reduction in production costs.

One of the great success stories of Embrapa and its partners is the development of the "cerrado" into one of the most important agricultural lands in Brazil. This area, comprising 204 million hectares, was only open to agriculture upon addressing the high levels of acid soil. By introducing a new line of genetically modified seeds that are capable of growing in these soil conditions, Embrapa enabled the production of soybeans, corn, cotton, rice and other agricultural varieties in the region.

Another success story was the impact of the Plant Variety Protection Law (PVP), which stimulate private seed companies to increase their investments in the Brazilian agricultural market, resulting in diverse feedstocks that are adaptable to Brazil's wide range of environmental conditions and production systems. Thus, this movement in the Brazilian agricultural market

allowed Emprapa to diversify its operations, establishing an important role as licensor of cultivars and development of new partnerships with the private sector with the goal of developing conventional and GMO products.

The several advances in the agricultural field have also impacted the economic and social fields in Brazil. One important outcome of this process is the assurance of quality and low cost food to the population, which mostly benefits the lower-income people of the Brazilian society and helps to mitigate inequalities. Due to the improvements in productivity, Brazilians today spend only half as much of their income on food as compared to what they spent thirty years ago.

Despite the several advances, the fertilizer industry is still one of the bottlenecks of Brazil's agribusiness industry. Regardless of all the efforts made to decrease its dependency on imported fertilizers, which was expected to drop from 70% to 59% by 2018, the domestic and international growing demand for food is forcing the country to make up the difference by turning to imports once again. At this pace, the São Paulo State Industry Federation (FIESP) expects that imported fertilizers will represent 63% of all fertilizers used in Brazil by 2023.

As FIESP projects, the domestic production of Phosphorus fertilizers will double by 2023, reducing imports from 57.4% to just 22.2%. Meanwhile, the production of Nitrogen fertilizers will not experience significant changes and 93% of the product will continue to be imported.

## **INFRASTRUCTURE AND AGRICULTURE**

### **A necessary condition if the country is to develop**

If Brazil is to continue growing, it must improve its infrastructure to transport crops to market. Currently, the cost of transporting soybeans to China versus that of the U.S. is more than double. Highlighting Brazil's infrastructure problems are its dependence on its highway network, which is responsible for moving 54% of the country's freight. Making matters worse, according to a 2012 World Bank study, only 18% of Brazil's highways are paved. The World Bank predicts that investments equivalent to, approximately, 6% of the GDP are required if Brazil is to catch up with developed countries, yet only the equivalent of 1% is spent at the present. All these factors combined, contribute to a high transportation cost, representing about 15.4% of Brazil's GDP, while in developed countries this number is ranging from 8% to 10%.

Brazil also faces problems with its railway infrastructure. The extent of the country's railway sector is about fifty times smaller than its highways sector. For purposes of comparison, Brazil has only 3.4km of rail per 1000 square km, while the US has 14.7km per 1000 square km.

In terms of ports infrastructure, Brazil suffers with quality and capacity limitations, which is surprising, given the economy's dependence on natural resources exports. Those elements contribute to increase the country's cost of transportation. As an example, while Brazilian ports can handle 34 containers per hour per ship, ports like the one in Hamburg can handle 66 containers and Singapore 100 containers.

The efforts made to solve Brazil's infrastructural problems became front and center during President Lula's second tenure (2007-2011). The result was the creation of PAC (Programa de Aceleração do Crescimento), which was divided into two phases, the first one (PAC 1) being from 2007 to 2010 and the second one (PAC 2) from 2010 to 2014, under Dilma Rousseff's first administration. The goal was to increase capital expenditures in critical and growth-sensitive areas and address infrastructural quality and durability issues. During the first phase of the PAC, the logistics sector, indispensable to handling the country's agricultural exports, received approximately R\$ 75 billion (14.9% of the program's total budget) in investments, and on the second phase, the same sector received, roughly, \$ 69 billion (7.2% of the program's total budget) in investments.

Despite the resources of the central government, the program was not able to meet its targets because it didn't have the managerial or technical skills to run these projects by itself, or the financial strength to complete the projects. The solution was announced in mid-2016, under the name of Programa de Parcerias e Investimentos (PPI), which increased the reliance on the private sector and recognized the need for less state participation. With the introduction of the new program, the Brazilian government expects to attract private investors to crucial projects, including infrastructure, that would help to eliminate the current bottlenecks of the country's economy and facilitate the flow of its agricultural products to the international markets.

## CONCLUSION

In the past recent years, agriculture has been the sector of the Brazilian economy that experienced the highest growth rates, contributing to put the country at the 2<sup>nd</sup> place in terms of agricultural market value in the Americas, regardless of the several competitiveness problems the country faces because of infrastructural bottlenecks.

Despite the infrastructural problems, the country has been able to grow its agricultural market because of research institutions like Embrapa, who has been investing in the development of hybrid species, which can result in crops with improved resistance to diseases and plagues, increased yields and the possibility of planting crops in certain areas that were not fertile in the past etc.

Those initiatives are indispensable in a context where analysts expect a significant growth in the world population and food consumption. As FAO predicts, in order to feed the 9 billion people that should be living in the world by 2050, cereals production would have to increase by approximately 43%, while meat production would have to grow by 135%, and Brazil will play a key role in this process, due to its advanced agricultural technology and land availability.

In order to solve this issue, improving land efficiency is crucial, but also incorporating new lands to the production process. In comparison to its largest agricultural competitors, Brazil has the biggest potential to increase its productivity. The country has, approximately, 70 million hectares of degraded pastures and grasslands that could be used to produce crops with no environmental damages.

On the other hand, despite Brazil's promising outlook in the agribusiness sector, the infrastructural issues need to be resolved if the country wants to maintain its key role in the world agricultural markets. A study made by the World Economic Forum ranked the country's infrastructure network on the 114<sup>th</sup> place. In addition to the poor quality of its infrastructure, Brazil is too reliant on highways, which are responsible for moving 54% of the country's merchandise. This exposes the country to events like the recent truck drivers' strike, resulting in scarcity of goods and food for the population and accelerated inflation. The precarious conditions

of highways aligned with the lack of other transportation alternatives contribute to higher freight costs and lower competitiveness.

Despite the previous attempts made by the federal government to create infrastructural development programs with state-directed investments, the lack of managerial and technical skills of the public sector, combined with its lack of financial strength to complete the projects led these programs to failure. The necessity of pushing the country's infrastructural development forward led to a revision of the model. In mid-2016, the Temer administration created the PPI program, which increased the role of the private sector in infrastructure projects in detriment of the participation of public institutions, like the BNDES, alleviating public accounts and increasing projects' efficiency. This new program represents Brazil's hopes of promoting an era of sustainable growth by extracting the maximum capacity of its agricultural potential, which represents slightly less than 50% of all revenues originated from international trade.

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