A new era has been revolutionizing the field. New technologies are accelerating the application of robotics, artificial intelligence, stand-alone machines and biotechnology. It is the biggest revolution in the rural sector.
Countries with greatest area available for agriculture (million hectares - referring to the 2012/13 harvest)

<table>
<thead>
<tr>
<th>Country</th>
<th>Available Area</th>
<th>Utilized Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>170</td>
<td>86</td>
</tr>
<tr>
<td>Brazil</td>
<td>261</td>
<td>53</td>
</tr>
<tr>
<td>Argentina</td>
<td>108</td>
<td>37</td>
</tr>
<tr>
<td>Russia</td>
<td>124</td>
<td>93</td>
</tr>
<tr>
<td>China</td>
<td>112</td>
<td>45</td>
</tr>
<tr>
<td>India</td>
<td>171</td>
<td>8</td>
</tr>
<tr>
<td>Australia</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>India</td>
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</tr>
<tr>
<td>United States of America</td>
<td>170</td>
<td>86</td>
</tr>
</tbody>
</table>

Brazil is the country with the greatest area available, **261 million hectares** that can be used for agribusiness. Aggregated to all other continental areas, there are ~**315 million hectares**. In other words, only Brazil represents **45% of the total of 576 million hectares**.

Source: USDA. Elaboration: TCP Latam. Note: Data referring to the 2012/13 harvest
### Giant Brazil: The potential of the Brazilian Agricultural Machinery Market

<table>
<thead>
<tr>
<th>Hectares</th>
<th>Agricultural Machinery Fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2017) 80,000,000</td>
<td>(2017) 969,000</td>
</tr>
<tr>
<td>(Available)</td>
<td>(Potential) 2,834,324</td>
</tr>
</tbody>
</table>

Considering the same proportion between the current amount of utilized hectares and the existing agricultural machinery fleet, a fleet of ~2.8 million agricultural machines for the available 234 million hectares would be needed.

Source: USDA. Elaboration: TCP Latam
The “MATOPIBA” region - The new barn of the world

23.22 million tons is equivalent to the agricultural production of the “MATOPIBA” region in 2016/17

Migratory route to the “MATOPIBA” region

Source: Conab. Elaboration: TCP Latam
Ricardo Jacomassi

• Partner of TCP Latam;
• Expert on the 13 most important sectors in the Brazilian Economy;
• Chief Economist reporting to the Board of Sindipeças, constituted of over 500 domestic and foreign automotive parts companies;
• Worked at Moody's and Link Corretora;
• Experience in the development of economic analysis, M&A transactions, turnarounds, corporate governance and advisory to the Management Board;
• Graduated in Economics from PUC-SP/Brazil and Production Engineering from Univest-SP/Brazil (currently studying). Specialization in Econometrics/FIPE, Macroeconomics Cepal/ONU, Valuation/Saint Paul, Turnaround/FGV and Leadership for Young Talents/FGV.

Nathielle Trevisol

• TCP Latam Analyst;
• Economic Research (macro and micro);
• Active in Administrative/Financial and Controller sectors focusing on financial planning;
• Experience in Public Relations and Commercial Department Team Motivation;
• Graduating in Economics from PUC - SP/Brazil.
The tractor “pulls” the Brazilian economy!

The agricultural sector represents the largest production chain of the Brazilian economy, being a great consumer of inputs and capital goods, like agricultural machinery. In this sectorial study, TCP Latam’s Economics Team innovates by developing indicators that show the extent of the sector for the competitiveness of the Brazilian agribusiness

The report’s storyline starts with the Brazilian agricultural harvest that, during 2000-2017, presented an Annual Average Growth (CAGR) of 5.21%. Approximately 238 million tons of grain were produced in the 2016/17 harvest, presenting an increase of 27% compared with the previous harvest. The main drivers of this growth were the cultivation of maize, bean, sunflower and sorghum. Never before in history has been seen a growth of this magnitude. For the 2018/19 harvest, 226 million tons are expected, despite a 6% drop compared to the previous years, it is still the second largest in history.

Agricultural Machinery: From torque to the new technologies

Due to the expansion of the farming sector and the need for renewal of the fleet to maintain the productivity, the market of agricultural machinery has returned to production and internal consumption growth. TCP Latam’s forecast is that combine harvester’s and tractor’s sales will be growing until 2020, at an average annual rate of 5.8%. In 2017 approximately 37.3 thousand tractors and 5.3 thousand combine harvesters were sold; in the 2018’s forecast the totals are: 38.9 thousand and 5.8 thousand, respectively. In 2017, revenues closed at $13.3 billion, na increase of 11% compared to the previous year.
Data developed by the TCP Latam’s economics team, calculated on the basis of the 2017’s agricultural production (238 million tons of grain) and the total sales of machinery, has shown that 5,769 tons of grain were produced by each agricultural machine, a reduction of 6% in relation to 2016. Comparing the Brazilian fleet of agricultural tractors, there are 233 tons for each tractor running. See the historical series: page 13.

Through the correlation matrix (page 14), elaborated by TCP Latam, it was possible to identify the correspondence between the drivers that affect the agricultural machinery sector. By reading, it is possible to observe that the rural credit (resources available for financing of costs, commercialization and agricultural industrialization) presents a correlation of 76% with the machine sales. Regarding the planted area and the agricultural GDP, the correlation with the machine sales is of 77% and 60%, respectively.

**Rural Credit and Planted Area: The perfect correlations for the machine sales**

In 2017, R$23 billion of the rural credit were directed to the investment programs in the agricultural sector. Out of this amount, 40% was made available for the “Moderfrota”, the modernization program of the agricultural tractor´s fleet, Associated Implements and Combine Harvesters.

The other 60% is divided in programs like: Pronamp, Procap-Agro, ABC, among others. According to the Brazilian Institute of Geography and Statistics (IBGE), the cultivated area in the harvest of 2016/17 was of approximately 80 million hectares and presented a ~6% increase compared to the previous one. For the 2018/19’s harvest, practically the same area is expected. The new agricultural frontiers, like “MATOPIBA” and the ones of the Central West region should continuously increase the total of the planted area in the next 20 years.
MATOPIBA: A new agricultural frontier that will feed the world

The diversity of the Brazilian biomes can be considered a natural *hedge* for the agribusiness, just by the non-uniformity of the climate. The three great grain producing regions (South, Central West and “MATOPIBA”), present private water regimes that require non-linear productive and commercial strategies. Since the 80/90’s, the “MATOPIBA” region (Maranhão, Tocantins, Piauí and Bahia) has been outstanding as the new production frontier. In the first half of 2018, TCP Latam visited the region and found the accelerated process of expansion of the regional economy, that produced 22.2 million tons of grain.

Tends

The agricultural machinery sector has been gradually incorporating the main technological innovations, in particular the stand-alone machines with high operational capacity. After having spoken with companies of the productive chain, we have selected the main trends:

- Annual Growth Rate (CAGR) of the planted area at 2.2% (2012-2017);
- Intensification of the factory automation;
- Incorporation of the robotics in crop production;
- Professionalization of family businesses that produce components for agricultural machines, dealers and rural producers;
- More efficient motors in terms of consumption and with greenhouse gas emission reductions.
Introduction

Challenges

In the last five years, the sector faced challenges related to the decrease of consumption, motivated by the reduction in credit and climate impacts. Many dealers became highly leveraged, mostly, due to the default of the farmers. The Economics team has spoken with the main actors in the chain and identified the current challenges:

Assemblers:
- Financial weakness of the supply chain of components and dealers;
- High investments in new technologies;
- Idleness.

Manufacturers of Parts:
- Difficulty in passing the prices of raw material;
- Scarcity of credit;
- Idleness;
- High investments for the technological update of the companies Tiers 2 and 3.

Concessionaires:
- High interest rates of the working capital;
- High indebtedness;
- Default of farmers;
- Inefficient and non-professional management.
Opportunities

After TCP Latam having met with companies (Assemblers, Distributors, Dealers and Manufacturers of components), the following opportunities for the sector were identified:

- Mergers and Acquisitions;
- Export to Latin American countries;
- Alliances for the development of new technologies;
- Automation of operational processes;
- Expansion of the private financing lines, throughout new actors like “Sicredi”;
- Fleet-sharing systems.

The TCP Latam’s Economics Team makes itself available to clarify doubts and detail information.

Enjoy your reading.
Challenges of the Agricultural Machinery Production Chain

**Raw Material Supplier**
- Currency Volatility
- Indebtedness
- Idleness
- Protectionism

**Automotive Components Industry**
- Onlending of raw material prices
- Scarcity of credit
- Indebtedness
- Low technological update of the “Tiers 2 and 3”

**Assembler**
- Financial Fragility of manufacturers of components and dealers
- Investments in new technologies
- Idleness

**Dealer**
- Working Capital
- Indebtedness
- Default by the farmers
- Inefficient Management

**Farmer**
- Currency Volatility
- Indebtedness
- Low Professionalization
- Inefficient Management
- Slow Technological Update

Elaboration: TCP Latam
Great Figures of the Agricultural Machinery Sector

**Production (x1000)**
- 2015: 55.9
- 2016: 54.0
- 2017: 53.0

**Domestic Sales (x1000)**
- 2015: 45.7
- 2016: 43.7
- 2017: 42.4

**Tractor Fleet (x1000)**
- 2016: 950
- 2017: 969
- 2018e: 989

**Exports (US$ billion)**
- 2015: 1.70
- 2016: 1.78
- 2017: 3.02

**Domestic Sales (x1000)**
- 2015: 45.7
- 2016: 43.7
- 2017: 42.4

**Tractor Fleet (x1000)**
- 2016: 950
- 2017: 969
- 2018e: 989

**Employment (thousand people)**
- 2015: 15.4
- 2016: 16.8
- 2017: 18.4

**Sector’s Companies**
- Dealer: 1248
- Supplier: 160
- Assembler: 7

Source:
- ANFAVEA
- TCP Latam
- Fenabrave
Even with the Economic Crisis, the manufacturers of agricultural machinery have had price adjustments of the main production costs. The steel price for assemblers has suffered a readjustment of approximately 23% in 2018. The salaries had a growth of 6% in 2017, while the average industrial energy price has increased by 2.8% in 2018. The addition to the average components price for 2018 is about 6.5%.
Heart of the TCP Latam’s Analysis: Correlation matrix between the main drivers of the sector

Through the correlation matrix (see below), elaborated by TCP Latam, it was possible to identify the correspondence between the drivers that affect the agricultural machinery sector. It can be observed that the rural credit (resources available for financing of costs, commercialization and agricultural industrialization) presents a correlation of 76% with the machine sales. Regarding the planted area and the agricultural GDP, the correlation with the machine sales is of 77% e 60%, respectively.
The income of the sector is expected to grow by 5.1% in 2018, influenced by the increase of the sales of new machines and also by the high prices of the new machineries, which in turn reflect the high cost of steel production, energy and imported components.
Based on the analysis of the correlation matrix, it has been possible to estimate a growth of the sales potential of 6.2k and 6.9k for combine harvesters in 19’ and 20’

For wheeled tractors, the correlation matrix point to a growth of the sales potential of 41.7k and 46k in 19’ and 20’
Applying the basis=100 to the production and foreign trade variables, it is possible to identify that the exports have become strategic for the assemblers based in Brazil.
In 2017, the amount of internal sales of agricultural machinery in Brazil, totaled **44,549 machines**, whereas the agricultural production reached 237.7 million tons of grain. That means that by each machine sold, **5,094 tons of grain** were produced. Considering the tractor fleet (969 thousand in 2017), by each agricultural tractor **233 tons of grain** were produced.
The **Renewal Fee of Agricultural Machinery** has decreased since 2013, when it reached its peak of 7%, result of the PSI stimuli. In 2017, the **renewal fee of the fleet was of 3.8%**. According to the **TCP Latam’s study**, the **natural renewal fee** of the sector is of ~5.3%, which means ~52 thousand machines sold per year. This indicator is important for the companies that act in the **parts replacement** market. With the reduction in sales of new machines, there is a circulating agricultural fleet that consumes many spare parts. The **margins** of those parts are generous but require prompt delivery and implementation services from the companies. TCP´s interpretation is that this market will have a **sequential growth** in the next years.
Compound Annual Growth Rate (CAGR):
• Defrayal and Commercialization: **11.8%**
• Investment: **15.7%**

Between the 2007/08 and 2017/18 harvests, the resources directed to the agricultural harvest were relevant and led to an annual average growth (CAGR) of **11.8%**, regarding the defrayal and commercialization, however, it is worth noting that the investment rates were of **15.7%**.
Composition of the Rural Credit (2017)

Resources of the rural credit directed to investments

- Funding Programs
- Credit Lines

<table>
<thead>
<tr>
<th>Funding Programs</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA: Program for the Construction and Expansion of Warehouses</td>
<td>9%</td>
</tr>
<tr>
<td>ABC: Greenhouse Gas Reduction Program</td>
<td>16%</td>
</tr>
<tr>
<td>Procap-Agro: Capitalization Program of Agricultural Cooperatives</td>
<td>18%</td>
</tr>
<tr>
<td>Pronamp: Medium Scale Agricultural Producer Support Program</td>
<td>40%</td>
</tr>
<tr>
<td>Others</td>
<td>60%</td>
</tr>
<tr>
<td>Modernfrota: Modernization Program of the Agricultural Tractor Fleet and Associated Implements and Combine Harvesters</td>
<td>7%</td>
</tr>
</tbody>
</table>

Source: MAPA. Elaboration: TCP Latam
The gigantic Brazilian harvest requires high technology, sophisticated logistics, advanced input and the best management practices.

Check the data:
The **Agricultural Harvest** presented an annual average growth (**CAGR**) of **5.21%** in the period of 2000-17.
Approximately 238 million tons of grain were produced in the 2016/17 harvest. This means a variation of 27% compared to the previous harvest.
In 2017 the Agricultural Production increased by 27% compared to the previous harvest. The crops that contributed most to this positive result were mainly: Soy, maize, cotton.
In the 2016/2017 harvest, the cultivated area was of approximately 80 million hectares, which means an increase of ~6% compared to the previous year.
In the 2016/2017 harvest, the crops that most occupied field were: Soy, maize and cotton. Rye and sunflower presented an increase of 20% compared to the previous harvest.
Recent Mergers and Acquisitions of the Agricultural Machinery Market
## Operations of mergers and acquisitions

<table>
<thead>
<tr>
<th>Date</th>
<th>Buyer</th>
<th>Buyer Country</th>
<th>Target</th>
<th>Target Country</th>
<th>Value R$ MM</th>
<th>% Acquired</th>
<th>Sinopse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun-18</td>
<td>JSL</td>
<td>Brazil</td>
<td>Vamos Leasing of Trucks, Machinery and Equipment</td>
<td>Brazil</td>
<td>68.12</td>
<td>9.00%</td>
<td>Brazil-based JSL [BVMF:JSLG3], an integrated logistics solutions provider, has acquired the total shares issued by Vamos Locação de Caminhões, Máquinas e Equipamentos held by Borgato Máquinas, Borgato Serviços Agrícolas, and Borgato Caminhões, representing approximately 9% of the company's total share capital. The deal value is BRL 68m. The Sellers will also receive 3,202,374 shares issued by Movida Participações [BVMF:MOVI3] held by JSL and 3,037,500 shares to be issued by JSL through the incorporation of a non-operating company to be constituted by the sellers. The transaction is part of JSL’s acquisition of the Borgato group for BRL 100m (see related transaction). With the operation, JSL will hold 100% of Vamos.</td>
</tr>
<tr>
<td>Oct-17</td>
<td>JSL</td>
<td>Brazil</td>
<td>Borgato</td>
<td>Brazil</td>
<td>100.00</td>
<td>100.00%</td>
<td>JSL [BVMF:JSLG3], an integrated logistics solutions provider, has completed the acquisition of the companies Borgato Máquinas, Borgato Serviços Agrícolas, and Borgato Caminhões. The deal value was BRL 100m in cash, plus 9% stake in JSL Locação de Máquinas e Veículos Pesados. Borgato Group was founded in 1987 and is headquartered in Ribeirão Preto, state of São Paulo. It operates in the segment of leasing and marketing of heavy trucks, machinery and equipment for the agricultural sector. Borgato companies also have 18 stores, among truck and machinery dealers, located in the states of São Paulo, Goiás, Mato Grosso and Minas Gerais. In 2016, the companies presented combined net sales of BRL 186m.</td>
</tr>
<tr>
<td>Jun-14</td>
<td>Acionistas Particulares I</td>
<td>-</td>
<td>Fankhauser</td>
<td>Brazil</td>
<td>3.34</td>
<td>75.00%</td>
<td>Agrometal, an Argentina-based manufacturer of precision sowing agricultural machinery, acquired a 75% stake in Fankhauser to Brazilian entrepreneur Pedro Augusto Fankhauser. The deal value was USD 1.5m. With this deal Pedro Augusto will attain 100% of the capital, since he already holds 25%. Fankhauser, based in Tuparende (Brazil), is a distributor of tractors and agricultural equipment. This deal is part of Agrometal's impossibility of freeing Fankhauser from its financial difficulties.</td>
</tr>
<tr>
<td>Aug-12</td>
<td>Imasa</td>
<td>Brazil</td>
<td>Fuchs</td>
<td>Brazil</td>
<td>0.02</td>
<td>4.17%</td>
<td>Imasa held a public tender offer for the acquisition of all outstanding shares in the market of its subsidiary Fuchs, for subsequent cancellation of the publicly-held company. The outstanding shares in the market correspond to 4.17% of the share capital of Fuchs. The price per share will be BRL 3.43, allowing the value of the transaction to reach BRL 18,500. Fuchs, which manufactures agricultural machinery, posted a revenue of BRL 23.84m and a loss of BRL 2.4m in 2011.</td>
</tr>
</tbody>
</table>
### Operations of mergers and acquisitions

<table>
<thead>
<tr>
<th>Data</th>
<th>Comprador</th>
<th>País Comprador</th>
<th>Vendedor</th>
<th>País Vendedor</th>
<th>Valor R$ MM</th>
<th>% Adquirido</th>
<th>Descrição</th>
</tr>
</thead>
<tbody>
<tr>
<td>oct-12</td>
<td>A.T.Q.S.P.E.</td>
<td>Brazil</td>
<td>Pedertractor</td>
<td>Brazil</td>
<td>-</td>
<td>50.00%</td>
<td>A.T.Q.S.P.E. and Tractorcomponents acquired a 50% stake in Pedertractor, a Brazilian company dedicated to the production and sale of tractors and parts for agricultural machinery. The value of the operation was not disclosed.</td>
</tr>
<tr>
<td>jun-12</td>
<td>IES International</td>
<td>United States</td>
<td>SIAC</td>
<td>Brazil</td>
<td>-</td>
<td>100.00%</td>
<td>IES International Equipment Solutions, which is controlled by private equity firm KPS Capital Partners, acquired the entire capital stock of SIAC do Brasil, a subsidiary of Italy’s SIAC. The transaction’s financial details were kept confidential. According to Steve Andrews, the company’s chief executive, this acquisition represents an important step in the company’s globalization strategy as well as giving access to an important market that is expanding. SIAC do Brasil is one of the main Brazilian manufacturers of cabins for locomotives and agricultural machinery.</td>
</tr>
<tr>
<td>jul-11</td>
<td>BSPAR - BSBIOS</td>
<td>Brasil</td>
<td>Permission to resell and distribute products</td>
<td>Brasil</td>
<td>-</td>
<td>100.00%</td>
<td>BSPAR - BSBIOS Participações acquired the right to resell and distribute John Deere Brasil products. The value of the transaction was not disclosed. John Deere Brasil is a company dedicated to the manufacture of agricultural machinery and implements, construction equipment and forestry machines. John Deere’s resale concession areas are located in the regions of Erechim, Carazinho and Espumoso, in the state of Rio Grande do Sul.</td>
</tr>
<tr>
<td>dec-97</td>
<td>AGCO</td>
<td>United States</td>
<td>Iochpe-Maxion Agricultural Equipment Division</td>
<td>Brazil</td>
<td>-</td>
<td>100.00%</td>
<td>AGCO, an agricultural machinery manufacturer, acquired the agricultural equipment division of Iochpe-Maxion in Brazil. The deal value was USD 260m. Iochpe-Maxion is dedicated to the tractors segment with Massey Ferguson brand.</td>
</tr>
</tbody>
</table>
THANK YOU!

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