The Brazilian Agricultural System

FarmSmart Conference 2015
Rozanski Hall University of Guelph
By Nadiel Pacheco Kowalski
Director of NPKConsultoria, Brazil
Filadélfia Farm – Mato Grosso State
Countries with nominal GDP over US$ 600 billion

Countries with area over 2 million km²

Countries with population over 100 million

B.R.I.C.S. in evidence

Sources: IMF(GDP), UN
Brazil: South America’s Powerhouse

Brazil represents 50% of South America’s total GDP

Brazil 2014
GDP: US$ 2.24 tri
GDP per capita: US$ 11,067

Sources:
Brazil - Banco Central do Brasil
Size is also a problem

Source: J.L. Coelho, John Deere, 2001
A Country of Contrasts

- Opposite HDI in different regions – HDI (Human Development Index) of Norway and Africa.
- Country of contracts: One of the highest Gini coefficient.
- “Rich spends in three days what the poor spends in a year”
- 30% of population with 72% of total disposable income.
- 5% with less than $1.25/day

POP=Population
PP=Purchasing Power

Globo presentation to MBAs
The State of São Paulo

Brazil
- Territory (1,000 km²): 8,515
- Population (millions): 191
- Nominal GDP (US$ bln): 2,143
- GDP per capita (US$): 11,093

São Paulo
- Territory (1,000 km²): 248
- Population (millions): 41
- Nominal GDP (US$ bln): 690
- GDP per capita (US$): 16,757

- 21% of the population
- 32% of Nominal GDP
- 1.5X of GDP per capita

Sources: IBGE, Brazilian Central Bank and SEADE.
Canada & Brazil
Brazil: Canada’s 13th Largest Export Market

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>US Mi</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>United States</td>
<td>358,534.6</td>
</tr>
<tr>
<td>02</td>
<td>European Union</td>
<td>35,290.8</td>
</tr>
<tr>
<td>03</td>
<td>China</td>
<td>21,774.2</td>
</tr>
<tr>
<td>04</td>
<td>United Kingdom</td>
<td>14,751.7</td>
</tr>
<tr>
<td>05</td>
<td>Japan</td>
<td>10,937.0</td>
</tr>
<tr>
<td>06</td>
<td>Mexico</td>
<td>6,762.9</td>
</tr>
<tr>
<td>07</td>
<td>Hong Kong</td>
<td>4,689.8</td>
</tr>
<tr>
<td>08</td>
<td>Germany</td>
<td>4,073.1</td>
</tr>
<tr>
<td>09</td>
<td>Netherlands</td>
<td>3,677.2</td>
</tr>
<tr>
<td>10</td>
<td>South Korea</td>
<td>3,666.7</td>
</tr>
<tr>
<td>11</td>
<td>France</td>
<td>3,320.7</td>
</tr>
<tr>
<td>12</td>
<td>Belgium</td>
<td>2,643.0</td>
</tr>
<tr>
<td>13</td>
<td>Brazil</td>
<td>2,586.0</td>
</tr>
</tbody>
</table>
Top 10 Canadian Exports

- Potassium Chloride, 31%
- Bituminous Coal, 15%
- Newsprint, 8%
- Copper Ores, 2%
- Motor Cars, 1%
- Turbojets, 1%
- Turbopropellers, 3%
- Parts Machinery, 1%
- Aircraft, 1%
- Launching Gear, 1%
- Harvest Machines, 1%

Source: Statistics Canada
Top 10 Canadian Imports

Source: Statistics Canada
Canada & Brazil Bilateral Investments

CDI
C$ 9.8 billion

Sectors:
Agriculture, Mining, Shopping Centres, Telecommunications, Software, Environmental Ind. Automotive Parts

Brazil is the 12th largest destination for Canadian outward investment

FDI
C$ 15.8 billion

Sectors:
Mining, Steel, Beverages, Cement, Software

Canada is the 7th largest destination for Brazilian outward investment

Source: Statistics Canada.
Rural Investments in Brazil

- Would you like to invest in Brazil, maybe buy 10 or 20 thousand hectares in the Central West Region by yourself or with 5 or 6 partners and organize a rural condominium?
- You’ll need a local administrator;
- A Brazilian partner;
- There are always good opportunities!
Brazilian Agribusiness System
“Cerrados”
diversification from the beef and soy model to corn, cotton, poultry, pork, sugarcane, dairy and coffee

Brazil
(850 million ha)
• Not available*: 460 million ha
• Agriculture: 60 million ha
• Pastures: 230 million ha
• Available land: 100 million ha

(*) Not Available for agriculture/grazing: Amazon region, other forests, national and state parks, urban areas and water resources.
Brazil – Territorial Division

Divided in 5 different regions
(by the Brazilian Institute of Geography and Statistics)

1) North Region
2) Northeast Region
3) Central-West Region
4) Southeast Region
5) South Region
Biomes

Source: MAPA / Biomes MMA 2006 / ABRAF
Current land use in Brazil

Total area: 851 M ha

Land suitable for agriculture (65%): 555 M ha

Land in use (39%): 330 M ha

Area of rural properties INCRA 2010 (67%): 572 M ha

Conservation Units + Indigenous Lands (26%): 220 M ha

Legend
- Limit states
- Amazon biome
- Pantanal biome
- Alto Paraguai river basin
- Areas planted with pasture
- Areas used for crops/livestock
- Areas used for agriculture
## Current land use in Brazil

<table>
<thead>
<tr>
<th>DISTRIBUTION</th>
<th>AREA (million/ha)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon rainforest</td>
<td>350</td>
<td>41,1</td>
</tr>
<tr>
<td>Pasture</td>
<td>220</td>
<td>25,9</td>
</tr>
<tr>
<td>Protected areas</td>
<td>55</td>
<td>6,5</td>
</tr>
<tr>
<td>Annual crops</td>
<td>47</td>
<td>5,5</td>
</tr>
<tr>
<td>Permanent crops</td>
<td>15</td>
<td>1,8</td>
</tr>
<tr>
<td>Cities, rivers, lakes, roads, etc</td>
<td>20</td>
<td>2,4</td>
</tr>
<tr>
<td>Reforestation areas</td>
<td>6</td>
<td>0,7</td>
</tr>
<tr>
<td>Total</td>
<td>713</td>
<td>83,8</td>
</tr>
<tr>
<td>Other uses</td>
<td>37</td>
<td>4,3</td>
</tr>
<tr>
<td>Available area for agriculture</td>
<td>101</td>
<td>11,9</td>
</tr>
<tr>
<td>Total</td>
<td>851</td>
<td>100,0</td>
</tr>
</tbody>
</table>

Fonte: IBGE, com adaptação do MAPA / ABRAF 2013
Most of recent expansion in agricultural area is on pasture land.

MAIN CROPS - Area

Source: Conab / MAPA and IBGE (pastures – 2013)
Let’s Compare Agricultural Land Use

Data from FAO, except for Brazil (IBGE), elaboration G.B.Martha.
Let's Compare Agricultural Land Use

Uso da Terra no Brasil

- 554 Mha de vegetação nativa
- 354 Mha Florestas
- 135 Mha APPs (16%)
- 60 Mha – Agricultura
- 200 Mha Cerrado e outras vegetações não-florestais
- 38 Mha – Urbanização e outros usos
- 198 Mha – Pastagens

Mha = milhões de hectares
Let’s Compare Agricultural Land Use

- Vegetação natural (florestas e outros): 23%
- Pastagens: 4%
- Agricultura: 65%
- Urbanização e outros usos: 7%

Fontes: Ministério do Meio Ambiente - MMA; IBGE – PAM (2010) e Censo Agropecuário (2006); INPE – TerraClass; Agricultural Land Use and Expansion Model Brazil - AgLUE-BR (Gerd Sparovek, ESALQ-USP).
45.27% of the Brazil land area.
- Lowest populational density
- 2% of GDP.
- Key city to region development and trade – Manaus (Zona Franca).
- Most of the Amazon Rainforest and indigenous tribes (2% of population).
- Main industry: lumber, mining (iron, aluminum and gold), agriculture, oil and gas and ecotourism.
The Northeast Region

- 30% of Brazil’s population.
- Poorest region of Brazil (12% of GDP).
- Main cities: Salvador, Recife and Fortaleza.
- Economy: sugar, cocoa and cotton and tourism.
- Semi-arid climate: Suffers from long droughts.
- Major industries: tourism, agriculture (sugar cane and cotton, coffee, soy) and extensive cattle breeding.
The Central-West Region

☑ Low demographic density (just 6.4%).
☑ Pantanal - world’s largest wetland area.
☑ Cerrado (the world largest savanna).
☑ Host of the capital city (Brasilia).
☑ Contributes with 8% of the GDP.
☑ Key industries: cattle breeding, mining, lumber, agriculture, services and ecotourism
The South-East Region

- 38% of the population.
- 58.5% of total GDP.
- Economy: mining, manufacturing (machinery, electronics, automobile and aviation), energy production, agriculture (coffee, sugar, dairy, eggs, rubber, fruits) tourism, petroleum, textiles, etc.
- Business economic centers of Brazil: largest cities and companies - Sao Paulo and Rio de Janeiro.
The South Region

- Wealthiest region by GDP per Capita: highest standard of living in Brazil.
- 12.5% of Brazil’s population.
- 16.5% of the GDP
- Main industries: agriculture (dairy, pigs, chicken, soy, corn, coffee, sugarcane) machinery and automobile, textiles, tourism, energy.
- Coldest region of Brazil
Brazilian Agribusiness Evolution
Brazilian Agriculture before 1970

- Low Ag production and low yields
- Production concentrated in South/Southeast
- Food supply crisis
- Rural poverty
- Lack of specific knowledge on Tropical Agriculture
- Poor research
- Institutional void (ag research, education, markets, media and governmental agencies, etc.)

The challenge: To move from very traditional European model agriculture to tropical agriculture based on science and with intensive use of technology
Fibers and wood (cotton, Eucalyptus)
Tropical (African) grasses (Brachiaria, etc.)
Sugarcane and ethanol
No-tillage practices
Cerrado Agriculture
Biological control
N fixation
Poultry / pork
Zebu cattle
Soybean (photoperiodism)
Tropical plants and animals:
Horticulture
Acquacultue (fresh water)
Evolution of the Grain Production

**Production**

Million tons

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>96.8</td>
<td>123.2</td>
<td>119.1</td>
<td>114.7</td>
<td>122.5</td>
<td>131.8</td>
<td>144.1</td>
<td>135.1</td>
<td>149.3</td>
<td>162.8</td>
<td>149.2</td>
<td>188.7</td>
<td>193.5</td>
<td>201.6</td>
</tr>
</tbody>
</table>

**Area**

Million ha

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>37.8</td>
<td>40.2</td>
<td>47.4</td>
<td>49.1</td>
<td>47.9</td>
<td>46.2</td>
<td>47.4</td>
<td>47.7</td>
<td>47.4</td>
<td>49.9</td>
<td>49.9</td>
<td>53.6</td>
<td>57.0</td>
<td>57.8</td>
</tr>
</tbody>
</table>

**Yield (kg/ha)**

|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|

Evolution of the grain and area production

Production + 238%
Area + 46%

Source: CONAB
Cultivated area under no-tillage systems around the world (1000 ha)

Source: Brazilian Federation of No-Till cropping system – FEBRAPDP, 2006
Economy of Scale and Double Crop Advantages

Fazenda Filadélfia - MT
## Brazilian Grain Production State Ranking
(Crop 2014/2015)

<table>
<thead>
<tr>
<th>Ranking</th>
<th>State</th>
<th>Production (mil tons)</th>
<th>Participation %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Mato Grosso</td>
<td>49.794,0</td>
<td>24,7</td>
</tr>
<tr>
<td>2nd</td>
<td>Paraná</td>
<td>36.647,2</td>
<td>18,2</td>
</tr>
<tr>
<td>3rd</td>
<td>Rio Grande do Sul</td>
<td>29.145,9</td>
<td>14,5</td>
</tr>
<tr>
<td>4th</td>
<td>Goiás</td>
<td>18.795,5</td>
<td>9,3</td>
</tr>
<tr>
<td>5th</td>
<td>Mato Grosso do Sul</td>
<td>15.752,3</td>
<td>7,8</td>
</tr>
<tr>
<td>6th</td>
<td>Minas Gerais</td>
<td>12.647,7</td>
<td>6,3</td>
</tr>
<tr>
<td>7th</td>
<td>Bahia</td>
<td>8.443,8</td>
<td>4,2</td>
</tr>
<tr>
<td>8th</td>
<td>São Paulo</td>
<td>6.524,9</td>
<td>3,2</td>
</tr>
<tr>
<td>9th</td>
<td>Santa Catarina</td>
<td>6.321,0</td>
<td>3,1</td>
</tr>
<tr>
<td>Other states</td>
<td></td>
<td>17.472,4</td>
<td>8,7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>201.544,7</td>
<td>100,0</td>
</tr>
</tbody>
</table>

# Brazilian Corn Production State Ranking

(1\textsuperscript{st} and 2\textsuperscript{nd} crops) (Crop 2014/2015)

<table>
<thead>
<tr>
<th>Ranking</th>
<th>State</th>
<th>Production (million tons)</th>
<th>Participation %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st}</td>
<td>Mato Grosso</td>
<td>18.626,4</td>
<td>23,7</td>
</tr>
<tr>
<td>2\textsuperscript{nd}</td>
<td>Paraná</td>
<td>14.504,2</td>
<td>18,4</td>
</tr>
<tr>
<td>3\textsuperscript{rd}</td>
<td>Mato Grosso do Sul</td>
<td>8.401,8</td>
<td>10,7</td>
</tr>
<tr>
<td>4\textsuperscript{th}</td>
<td>Goiás</td>
<td>7.686,3</td>
<td>9,8</td>
</tr>
<tr>
<td>5\textsuperscript{th}</td>
<td>Minas Gerais</td>
<td>7.340,4</td>
<td>9,3</td>
</tr>
<tr>
<td>6\textsuperscript{th}</td>
<td>Rio Grande do Sul</td>
<td>5.103,5</td>
<td>6,5</td>
</tr>
<tr>
<td>7\textsuperscript{th}</td>
<td>São Paulo</td>
<td>3.649,5</td>
<td>4,6</td>
</tr>
<tr>
<td>8\textsuperscript{th}</td>
<td>Bahia</td>
<td>3.309,7</td>
<td>4,2</td>
</tr>
<tr>
<td>9\textsuperscript{th}</td>
<td>Santa Catarina</td>
<td>3.088,3</td>
<td>3,9</td>
</tr>
<tr>
<td>Other states</td>
<td></td>
<td>6.979,1</td>
<td>8,9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>78.689,2</strong></td>
<td><strong>100,0</strong></td>
</tr>
</tbody>
</table>

## Brazilian Soybean Production State Ranking
*Crop 2014/2015*

<table>
<thead>
<tr>
<th>Ranking</th>
<th>State</th>
<th>Produção (mil toneladas)*</th>
<th>Participation %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Mato Grosso</td>
<td>28.216,4</td>
<td>29,5</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Paraná</td>
<td>17.096,6</td>
<td>17,8</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Rio Grande do Sul</td>
<td>13.775,7</td>
<td>14,4</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Goiás</td>
<td>9.900,7</td>
<td>10,3</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Mato Grosso do Sul</td>
<td>7.044,1</td>
<td>7,4</td>
</tr>
<tr>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Bahia</td>
<td>3.979,7</td>
<td>4,2</td>
</tr>
<tr>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Minas Gerais</td>
<td>3.909,0</td>
<td>4,1</td>
</tr>
<tr>
<td>8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Tocantins</td>
<td>2.335,8</td>
<td>2,4</td>
</tr>
<tr>
<td>9&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Maranhão</td>
<td>2.123,1</td>
<td>2,2</td>
</tr>
<tr>
<td>Other States</td>
<td></td>
<td>7.423,6</td>
<td>7,7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>95.804,7</td>
<td>100,0</td>
</tr>
</tbody>
</table>

Crop Livestock Forest Integration - CLFI

Source: MAPA, 2010 – Photos by Votorantin Metais
Biological Nitrogen Fixation

Brazil has become the world leader in replacing N fertilizers by biological N\textsubscript{2} fixation (BNF)

Source: Contini and Martha Jr., 2010
Production Areas

Sources: Brazilian Ministry of Agriculture
Evolution and expansion of soybean in Brazil

- 1960
- 1975
- 2005
Soybeans

Large scale farmers

Small scale farmers and cooperatives
Main Corn Producing Regions

Main Poultry & Pork Regions
Beef Cattle

Main beef production & export Regions
Main dairy cattle & dairy industries production regions
Poultry, pork

Majority of Integrated Producers

Majority of Independent Producers
Domestic Consumption and Exports

Sources: Conab, IBGE, MAPA
Brazilian Production - World Ranking - 2013

<table>
<thead>
<tr>
<th>Product</th>
<th>Export</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.J.</td>
<td>1st</td>
<td>1st</td>
</tr>
<tr>
<td>Sugar</td>
<td>1st</td>
<td>1st</td>
</tr>
<tr>
<td>Coffee</td>
<td>1st</td>
<td>1st</td>
</tr>
<tr>
<td>Beef</td>
<td>1st</td>
<td>2nd</td>
</tr>
<tr>
<td>Poultry</td>
<td>1st</td>
<td>3rd</td>
</tr>
<tr>
<td>Soybean</td>
<td>2nd</td>
<td>2nd</td>
</tr>
<tr>
<td>Corn</td>
<td>2nd</td>
<td>3rd</td>
</tr>
<tr>
<td>Pork</td>
<td>4th</td>
<td>4th</td>
</tr>
</tbody>
</table>

- **Export**:
  - O.J.: 80%
  - Sugar: 46%
  - Coffee: 27%
  - Beef: 20%
  - Poultry: 34%
  - Soybean: 27%
  - Corn: 18%
  - Pork: 9%

- **Production**:
  - O.J.: 53%
  - Sugar: 22%
  - Coffee: 35%
  - Beef: 16%
  - Poultry: 15%
  - Soybean: 22%
  - Corn: 7%
  - Pork: 3%

Source: USDA (fev/2011)  Note: 2010 (meat) and harvest 2009/10 (other products)
Agribusiness: “Green Anchor” of the Trade Balance

Source: CONAB
We do have challenges
Bottlenecks

✓ Country size;
✓ Infrastructure;
✓ Dollar rate;
✓ Rocket interest rate;
✓ Increasing inflation;
✓ Governmental bureaucracy;
✓ Inputs importation;
✓ Storage capacity;
✓ Environmental restrictions;
✓ Closed markets abroad and high subsidies.
Brazil is the country with more restrictive environmental laws in the world.
Environmental Issues

Permanent Protected Area

* Rivers with less than 50 meters of width

Fonte: Aprosoja
Environmental Issues

- Legal Reserve: ZERO
- Cerrado: 35%
- Amazon Biom: 80%
Soy Logistics (Mato Grosso)
Campo Novo do Parecis to Sapezal - MT
Access to Port of Santos
Soybean Logistics in Brazil

Short Distances to Port
Transportation Costs Benchmarking

- **Sorriso, Brasil**: US$ 125/Ton (Road)
- **Santos, Brazil**: US$ 45/Ton (Ship)
- **Córdoba, Argentina**: US$ 36/Ton (Road)
- **Santos, Brazil**: US$ 66/Ton (Ship)
- **Illinois, USA**: US$ 25/Ton (Barge)
- **New Orleans, USA**: US$ 46/Ton (Ship)

Source: Centrogrãos, Caramuru and Soy Transport Coalition, Aug 2010, BCR Rosário
Soybean Logistics in Brazil

50% 50%

Soybean Production

5% 2% 2% 25% 15%

Soy Complex Exports

15% 85%

Fonte: MDIC, CONAB / Elaboração: Aprosoja
Highlights

- Natural advantages (water, land availability, climate)
- Double crop/year;
- Large areas available for expansion;
- Science, tropical ag research & technology
- Agriculture is the “green anchor of economy”;
- Improvement of managerial capabilities
- Market deregulation and elimination of subsidies
- Bio-energy potential (ethanol and biodiesel)
- Vision of future;
- Farmer age and family administration.
Estimated World Grain Production Increase by 2020

Prevalence of Undernourishment in Total Population (%)

- < 5
- 15
- 25
- 35
- 50
- > no data

Legend:
- Aumento estimado da produção até 2020,

(OECD, 06.15.2010)
Think It Over

Will there be enough food to feed the world in 2020?
Once the peasants decided to meet in the center of the village to pray after a long drought period... but only a young boy brought his umbrella...

This is FAITH
Final Message

• When you throw a baby into the air he smiles because he knows you will hold him on the way down…

• This is TRUST
Final Message

• Every night when you go to sleep you never know if you will wake up tomorrow morning but you set the alarm clock anyway…

• This is HOPE
Tks a lot!

Nadiel Pacheco Kowalski
Director of N.P.Kowalski & Cia Ltda
www.npkconsultoria.com
nadiel.kowalski@npkconsultoria.com

Invite your friends and come for an agricultural technical tour in Brazil
I can take care of everything!

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