Agricultural Risk Management in Brazil

Geneva, 9th November 2016
• Overview
• Risk management in Brazil
• Crop Insurance Program (PSR)
• Key Issues & Challenges
### Agricultural Production in Brazil

Large territory, with great diversity of climates, biomes and agricultural production

<table>
<thead>
<tr>
<th>Area</th>
<th>Million ha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon Forest</td>
<td>360</td>
<td>42%</td>
</tr>
<tr>
<td>Pasture</td>
<td>162</td>
<td>19%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>68</td>
<td>8%</td>
</tr>
<tr>
<td>Other protected areas</td>
<td>52</td>
<td>6%</td>
</tr>
<tr>
<td>Others</td>
<td>209</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>851</td>
<td>100%</td>
</tr>
</tbody>
</table>

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**Mapa BRASIL**
To produce the same amount of grain in 2015 with 1976 yields, it would take 151 million hectares, or 2.6 times the current planted area.
Short review of agricultural risk management in Brazil (very broad scope), in order to find gaps and opportunities for policy improvements.

<table>
<thead>
<tr>
<th>Risk groups</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production risks</strong></td>
<td>Weather/climate</td>
</tr>
<tr>
<td></td>
<td>Animal health</td>
</tr>
<tr>
<td></td>
<td>Plant health</td>
</tr>
<tr>
<td></td>
<td>Production management and natural resources</td>
</tr>
<tr>
<td><strong>Market risks</strong></td>
<td>Marketing (inputs and outputs prices) and credit</td>
</tr>
<tr>
<td></td>
<td>Foreign trade</td>
</tr>
<tr>
<td><strong>Business environment risks</strong></td>
<td>Logistics and infrastructure</td>
</tr>
<tr>
<td></td>
<td>Regulatory framework, policies, institutions and interest groups</td>
</tr>
</tbody>
</table>

Typology of agricultural risks in Brazil. World Bank, MAPA e EMBRAPA (2015)

Work in progress (2017): Policy Note for Strengthening the Agricultural Insurance Market in Brazil (World Bank)
Agricultural Risk Management in Brazil

- Over the last decades, the government of Brazil has developed a risk management strategy with the goal of reducing the volatility of cash flow in the agricultural sector.
- The risk management strategy has mainly consisted in designing policies and programs that finance the implementation of a series of ex-ante financing instruments (i.e. PSR, PROAGRO).
- The responsibility for the operation of such risk management programs is currently fragmented among federal institutions, including several ministries and Central Bank (BACEN).

Different schemes, target groups, legal framework and source of funding.
Agricultural Insurance Timeline

- **30's**: Proagro (1973) Guarantee Program for Agricultural Activities
- **70's**: Beginning of private rural insurance (1996)
- **80's**: Proagro Mais (2004): Guarantee Program for Agricultural Activities of Family Farms
- **90's**: PSR (2006): Premium Subsidies Program for Agricultural Insurance
- **2000's**: USA: FCIC (1938), Subsidy Program (1980)

2016:
- US$ 125 mm
- US$ 10,000 mm

Tax rate (31/10/16): R$ 3.18/US$
Crop Insurance Program (PSR)

Summary

• Launched in 2003 (Law No. 10.823 and subsequent regulations)
• Operations **started in 2006**
• **Rapid growth** over the last years
• Subsidies to premium (35% - 45%)
• All subsectors (crops, livestock, forests, aquiculture)
• Still **low penetration rate** compared to Brazilian planted area
• **Budget constraints** (2015)
Crop Insurance Program (PSR)
- Premium Subsidies Program for Agricultural Insurance -

Federal Government support to farmers through economic subsidies for the purchase of agricultural insurance policies.

Objectives

✓ Reduce the cost of insurance premium to farmers
✓ Increase the penetration rates of agricultural insurance products (area and beneficiaries)
## Crop Insurance Program (PSR)

- Premium Subsidies Program for Agricultural Insurance -

<table>
<thead>
<tr>
<th>Insurance Modalities</th>
<th>Groups</th>
<th>Coverage type</th>
<th>Coverage level</th>
<th>Subsidy (%)</th>
<th>Annual limits (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>Wheat</td>
<td>MPCI</td>
<td>&gt; 60%</td>
<td>55%</td>
<td>US$ 22,650</td>
</tr>
<tr>
<td></td>
<td>Other grains</td>
<td>MPCI</td>
<td>60% - 65%</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>70% - 75%</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt; 80%</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nominated risks</td>
<td></td>
<td></td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fruits and others</td>
<td>---</td>
<td>---</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>Forests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>US$ 7,550</td>
</tr>
<tr>
<td>Livestock</td>
<td></td>
<td>---</td>
<td>---</td>
<td>45%</td>
<td>US$ 7,550</td>
</tr>
<tr>
<td>Aquaculture</td>
<td></td>
<td>---</td>
<td>---</td>
<td>45%</td>
<td>US$ 7,550</td>
</tr>
</tbody>
</table>

**Maximum amount of subsidy (beneficiary/year)**

- US$ 45,300

- Subsidies to premium range: 35% - 45%
- Available for approximately **70 crops**
- Range of **coverage levels** (average 65%)
- Coverage types: Loan (MPCI), Yield (MPCI/Nominated risks), Revenue

Tax rate (31/10/16): R$ 3.18/US$
Approved Insurance Providers (AIP) for PSR: 10

AIP roles

- Product design and pricing
- Risk assumption
- Loss Adjustment
- Claims payment
**PSR: Program management**

- Ministry of Agriculture (2x) - MAPA
- Ministry of Finance (2X) - MF
- Ministry of Agrarian Development - MDA
- Ministry of Planning and Budget - MPOG
- Superintendence of Private Insurance - SUSEP

**Government roles**

- Establish PSR regulations
- Provision of subsidies
- Maintain, monitor and administer database
National Congress sets the annual program budget

Producers buy insurance policies from AIP

AIP send the policies through electronic system

Having met the necessary requirements, the policy is accepted and the budget is used.
## PSR: Program Performance from 2006-2015 and 2016 outlook

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>SUBSIDY (US$ million)</th>
<th>SUBSIDY RANGE (%)</th>
<th>AVERAGE SUBSIDY</th>
<th>AREA (million ha)</th>
<th>POLICIES (un)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>$ 9,78</td>
<td>30 – 60%</td>
<td>43,8%</td>
<td>1,56</td>
<td>21.779</td>
</tr>
<tr>
<td>2007</td>
<td>$ 19,18</td>
<td>30 – 60%</td>
<td>47,7%</td>
<td>2,28</td>
<td>31.637</td>
</tr>
<tr>
<td>2008</td>
<td>$ 49,53</td>
<td>30 – 60%</td>
<td>48,6%</td>
<td>4,76</td>
<td>60.120</td>
</tr>
<tr>
<td>2009</td>
<td>$ 81,64</td>
<td>30 – 60%</td>
<td>54,3%</td>
<td>6,67</td>
<td>72.737</td>
</tr>
<tr>
<td>2010</td>
<td>$ 62,35</td>
<td>30 – 70%</td>
<td>53,8%</td>
<td>4,79</td>
<td>52.880</td>
</tr>
<tr>
<td>2011</td>
<td>$ 79,70</td>
<td>30 – 70%</td>
<td>54,3%</td>
<td>5,58</td>
<td>57.885</td>
</tr>
<tr>
<td>2012</td>
<td>$100,05</td>
<td>40 – 70%</td>
<td>56,0%</td>
<td>5,24</td>
<td>63.328</td>
</tr>
<tr>
<td>2013</td>
<td>$175,42</td>
<td>40 – 70%</td>
<td>55,7%</td>
<td>9,60</td>
<td>101.850</td>
</tr>
<tr>
<td>2014</td>
<td>$218,09</td>
<td>40 – 70%</td>
<td>56,1%</td>
<td>9,96</td>
<td>118.204</td>
</tr>
<tr>
<td>2015</td>
<td>$ 88,77</td>
<td>40 – 70%</td>
<td>59,8%</td>
<td>2,88</td>
<td>40.512</td>
</tr>
<tr>
<td>2016¹</td>
<td>$125,79</td>
<td>35 – 45%</td>
<td>45,0%</td>
<td>6,40</td>
<td>80.000</td>
</tr>
</tbody>
</table>

Note:
1. Estimates
# PSR Penetration rate
(Gross Production Value - 2014)

<table>
<thead>
<tr>
<th>REGION / CROP</th>
<th>SOYBEAN</th>
<th>WHEAT</th>
<th>MAIZE</th>
<th>APPLE</th>
<th>GRAPE</th>
<th>COFFEE</th>
<th>RICE</th>
<th>CANE</th>
<th>AGRICULTURE</th>
<th>LIVESTOCK</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAZIL</td>
<td>8.3%</td>
<td>40.6%</td>
<td>4.9%</td>
<td>13.5%</td>
<td>15.6%</td>
<td>6.7%</td>
<td>10.7%</td>
<td>1.6%</td>
<td>5.4%</td>
<td>0.4%</td>
<td>3.6%</td>
</tr>
<tr>
<td>SOUTH</td>
<td>9.9%</td>
<td>39.5%</td>
<td>8.2%</td>
<td>13.5%</td>
<td>30.6%</td>
<td>4.9%</td>
<td>14.1%</td>
<td>0.4%</td>
<td>9.8%</td>
<td>0.5%</td>
<td>6.0%</td>
</tr>
<tr>
<td>SOUTHEAST</td>
<td>18.6%</td>
<td>51.5%</td>
<td>9.1%</td>
<td>16.7%</td>
<td>20.6%</td>
<td>7.3%</td>
<td>4.3%</td>
<td>1.8%</td>
<td>4.9%</td>
<td>0.6%</td>
<td>3.4%</td>
</tr>
<tr>
<td>MIDWEST</td>
<td>6.8%</td>
<td>2.2%</td>
<td>2.7%</td>
<td>n/d</td>
<td>n/d</td>
<td>0.7%</td>
<td>n/d</td>
<td>1.6%</td>
<td>4.1%</td>
<td>0.2%</td>
<td>2.9%</td>
</tr>
<tr>
<td>NORTHEAST</td>
<td>7.2%</td>
<td>n/d</td>
<td>2.5%</td>
<td>n/d</td>
<td>n/d</td>
<td>3.2%</td>
<td>n/d</td>
<td>0.9%</td>
<td>2.4%</td>
<td>0.6%</td>
<td>1.9%</td>
</tr>
<tr>
<td>NORTH</td>
<td>4.5%</td>
<td>n/d</td>
<td>0.5%</td>
<td>n/d</td>
<td>n/d</td>
<td>n/d</td>
<td>n/d</td>
<td>n/d</td>
<td>1.5%</td>
<td>0.1%</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

Agricultural Insurance Atlas, MAPA
Agricultural Insurance Atlas

Atlas do Seguro Rural

- Database of agricultural insurance underwriting data since 2006
- Allows customized search
- Several levels of aggregation: year, state, county, culture, private insurer
- Different parameters: beneficiaries, area, value, yield, rate, etc.

http://indicadores.agricultura.gov.br/atlasdoseguro/index.htm
Key Issues & Challenges

- How to **finance the program expansion** and ensure greater **budgetary stability**?
- How to **improve** the agricultural risk programs **governance**?
- How to **increase competition** among insurance companies?
- How to increase the **farmers bargaining** power?

FUTURE AGENDA

- **Legislation review** to set out the roles (private insurers, government) for a national risk management policy
- **national data base** (crop insurance underwriting and claims results)
- Draw up a **long term/plurennial plan** and budget for agricultural risk management programs
Thank you!

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Rural Insurance Coordination

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PROAGRO (Guarantee Program for Agricultural Activities)

- Administered by the Central Bank of Brazil (BCB) targets small- and middle-sized crop and livestock producing units.
- The aim was to set up objective parameters upon which beneficiaries could receive compensation payouts in the case of an extreme weather event. (Exempt farmers from paying agricultural loans in the event of an extreme climatic and natural related event that reduce farmers payment capability)
- In 2015, the maximum amount of protection (limit of indemnity) set for any farmer was R$300,000 (about US$94,300).
- In order for a farmer to benefit from PROAGRO's protection, a field inspection shall be made by an Agent who should verify if the loss was due to covered causes(s).
- Emergency program, wrongly labelled as “insurance schemes”
- the program is not under the supervision of the Superintendence (SUSEP), the insurance sector is not involved in their current operation, and the cost of contributions (rate) made by stakeholders is not based on actuarial calculations (risk pricing methodology).
- PROAGRO carries flat premium rates that ranges from 3% to 4% depending on farmers’ production system and the regions where the crop are located.
- PROAGRO “Mais” / SEAF: This is a financial protection coverage designed for smallholder farmers. The program covers financial liabilities plus a share of the expected revenues in the case of an extreme weather event. Field/loss adjusters respond to loss claims and corroborate whether a farmer is entitled to receive a compensation payout.
- Programa “Garantia Safra”: The Ministry of Agrarian Development (MDA) designed this income compensation mechanism for family farmers who plant maize, beans, cassava, cotton and rice in the semi-arid region of Brazil. The target population is estimated to be 1.4 million farmers.

- The Garantia Safra disburses a fixed amount (currently R$ 850/ US$267) to farmers when the occurrence of a severe drought or excess of rainfall has caused crop losses above 50% of the expected yield. The crop losses are defined based on a mixed trigger mechanism: On the one hand, the National Meteorological Institute (INMET) calculate an agro-meteorological model to calculate theoretical crop losses at the municipality level. On the other hand, the compensation payout mechanism also relies on the involvement of state extension officers to carry out field loss assessments.

- The Garantia Safra is funded by the financial contribution from farmers, the municipalities, the nine state governments of the Northeast and the Federal Government.

- “Bolsa Estiagem”: This is an income compensation program for small-sized farmers who are not enrolled in Garantia Safra. Farmers are entitled to receive fixed monthly amount of R$ 80 per month per producer in five instalments (cap R$ 400 / US$ 125 per year) in the event there is a situation of emergency of public calamity triggered by an extreme drought. In November 2014, Bolsa Estiagem had presence in 599 municipalities and it benefited around 199,538 farmers.

- Bolsa Estiagem is funded in full by the federal government and its operation is under coordination of the Ministry of Integration (MI).
The combination of insurance subsidies and the agro-climate zoning are the tools available to farmers to deal with risks in Brazil. The risk rating methodology was developed by EMBRAPA.

Risk management tool
- Defines most recommended planting/sowing calendar by county, correlated to the soil type and seeds cycle, associated with lower exposure to climate risk for each crop
- Use of statistical models to determine the probability of success: at least 80%. A minimum value that represent a satisfactory water supply during all the crop cycle.
ZARC Simulations

1 ponto

Crop cycle

sowing

1 sowing simulation for each 10 days in a year

1 year

36 simulations

1080 simulations/point

Approximately 3.500 points

1 serie (30 years)

36 sowing simulations x 30 years