

Typifying beef cattle producers in Brazilian biomes

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Introduction

According to the 2006 Agricultural Census, Brazilian cattle production encompasses over 170 million heads on approximately 150 million ha of grasslands (IBGE, 2015), placing the country as the second largest bovine herd worldwide. The objective of this study was to show the variability of beef cattle in the country, grouping producers into homogeneous groups according to their production characteristics. Knowing these groups and the differences among them is essential for research, development, technology transfer and appropriate public policies.

Material and Methods

Special tabulations were performed by IBGE to meet the objectives of the study. Data from holdings in the Agricultural Census 2006 were filtered for holdings with beef cattle herd of over 500 heads for the Pantanal and over 200 heads for all other biomes. The selected data used for the analysis cover a large proportion of the national beef herd, including 88% of the “Cerrado”, 86% of the “Amazônia”, 77% of the “Mata Atlântica”, 82% of the “Pampa” and 95% of the “Pantanal”.

Fifteen variables from Census questionnaire were created covering the following production aspects for each holding: main activity (cow-calf, stocker, finishing and combinations); technological and intensification levels (stocking rate, natural and sown pastures, fertilization of pastures, use of concentrated feed, feedlot, insemination and technical assistance); degree of diversification (percentage of the holding used land area allocated to pastures, crops, planted forests and agroforestry systems); economic importance of beef cattle (share of the total production value) and herd size (live weight). The holding used land area was defined as the sum of areas for crops (temporary and permanent), pastures (natural and sown), planted forests and agroforestry systems. In some cases, other variables were added to represent a biome specific characteristic.

Factor analysis was applied to the variables selected in order to identify unobservable factors that represented the diverse characteristics of producers from each biome. Then, the factors with the most significant contributions to explain the total variability of the information were used as the classification criteria of producers in relatively homogeneous groups by cluster analysis.

Results and Conclusions

The clusters found for beef cattle producers in each biome are described below.

Cerrado: In 2006, 33% of Brazilian beef cattle holdings were in the Cerrado biome, occupying 43% of the Brazilian area of pastures with 40% of the Brazilian beef cattle. Six groups were identified, four of them specialized in beef cattle with the following characteristics: i) holdings with a full cycle on grass, with some sale of calves and steers and intermediate technological level (46% of the holdings, 43% of the pasture area and 42% of the herd of this biome); ii) holdings with predominance of stocker and finishing phases on grass, low technological level (25% of holdings, 20% of the pasture area and

19% of the herd); iii) mostly holdings for cow-calf, low technological level (16% of holdings, 13% of pasture area, 11% of the herd); iv) large holdings for full cycle process on grass, with higher technological level (5% of the holdings, 20% of pasture area, 22% of the herd). The holdings non-specialized in beef cattle (full cycle production) shared their area between grass and crops or forestry, accounting for just over 8% of the holdings, 4% of the pasture area and 6% of the herd.

Pantanal: The Pantanal was responsible for 1% of Brazilian holdings for beef cattle, 7% of the pasture area and 3% of the herd, according to the 2006 Census. Seven groups were found, two of them dedicated to extensive cow-calf and stocker, representing together 66% of the holdings, 64% of pasture area and 52% of the herd. Three groups were identified as full cycle holdings and showed marked technological gradient, especially in regard to pasture management: i) large extensive holdings, with a predominance of natural pasture and some sown pastures, but without the use of fertilizers (7% of the holdings, 21% of the of pasture area, 29% of the herd); ii) holdings with predominance of sown pasture not degraded and fertilizer use (3% of holdings, 2% of the pasture area and 3% of the herd); iii) smaller holdings that combine a full cycle production with crops, forests and agroforestry systems (2% of holdings, less than 1% of the pasture area and 1% of the herd). There was also holdings dedicated to stocker-finishing and finishing on grass that accounted for 20% of the holdings, 12% of the pasture area, and 14% of the herd. The presence of stocker and finishing or full cycle beef systems in the Pantanal is linked to higher elevation areas (the "Pantanal plateau"), which concentrate the sown pastures, most of which is in transition zones for the Cerrado. Analysis of geomorphology (ASSINE *et al.*, 2015) and vegetation (SILVA *et al.*, 2007) maps combined with the IBGE's map of the Pantanal biome supported the results of the typology.

Amazônia: This biome holds 25% of beef cattle holdings, which held 24% of the pasture area and 28% of the herd for this activity in 2006. For this biome six groups were considered representative: i) low-tech

holdings dedicated to full cycle with some selling of calves (61% of the holdings, 60% of the pasture area and 60% of the herd); ii) low-tech holdings for finishing on grass (19% of the holdings, 18% of the pasture area and 14% of the herd); iii) full cycle production on holdings with diversified production, areas of equivalent size for crops and pastures, with the presence of planted forests and agroforestry systems (7% of the holdings, 3% of the pasture area and 5% of herd); iv) full cycle, low technology, smaller herd (9% of the holdings, 6% of the pasture area and 6% of the herd); v) full cycle with higher technological level, especially fertilization of pastures and technical guidance of producers (5% of the holdings, 10% of the pasture area and 10% of the herd; and vi) large holdings with intermediate technology, full cycle, buying calves (0.2% of the holdings, 4% of the pasture area and 5% of the herd).

Mata Atlântica: This biome holds 29% of the holdings, 16% of the pasture area and 21% of the Brazilian herd in 2006. Seven groups were found: i) full cycle on grass, lower technology (34% of the holdings, 39% of the pasture area and 37% of the herd); ii) full cycle on grass with higher technological level and larger herds (5% of the holdings, 14% of the pasture area and 15% of the herd); iii) holdings with full cycle and diversified production, combining crops and beef cattle (12% of the holdings, 6% of the pasture area and 9% of the herd); iv) holdings with diversified production combining planted forests and the full cycle (0.5% of the holdings, 0.3% of the pasture area and 0.4% of the herd); v) cow-calf and stocker production systems, lower technological level (22% of the holdings, 18% of the pasture area and 16% of the herd); vi) low-tech finishing systems on grass (24% of holdings, 22% of the pasture area and 20% of the herd); vii) finishing with feedlot (3% of the holdings, 2% of the pasture area and 3% of the herd).

Pampa: The Pampa represented 6% of the holdings, 6% of the pasture area and 5% of the Brazilian beef cattle herd in 2006. All the groups for this biome included the presence of crops, characteristic of

production systems of this biome. On average, 13% of the areas were designed to crops. Three groups were more representative, all with a predominance of natural pasture and total area of pasture about 90% of the holding used land area: i) full cycle on grass, with intermediate technology (41% of the holdings, 52% of the pasture area and 52% of the herd); ii) low-tech holdings for cow-calf and cow-calf - stocker on grass (25% of the holdings, 23% of the pasture area and 22% of the herd); iii) finishing on pasture, low-tech (15% of holdings, 13% of pasture area and 11% of the herd). A fourth group (full cycle and finishing) presented crop area similar to pasture area (46% and 48% of the holding used land area, respectively) and better technological level compared to the groups above (12% of the holdings, 7% of the pasture area and 9% of the herd). Three smaller groups had the highest technological levels: i) holdings with full cycle and diversified production, with crops, planted forests and agroforestry systems (2% of the holdings, 2% of the pasture area and 2% of the herd); ii) finishing with feedlot (2% of the holdings, 1% of the pasture area and 2% of the herd); and iii) production of full cycle with a significant presence of fodder for cutting (2% of holdings, 0.5% of the pasture area and 1% of the herd). The last group was composed by holdings performing full cycle with degraded pastures that would require greater efforts for fertilization (1% of the holdings, 1% of the pasture area and 1% of the herd).

Experts considered that this typology represented the Brazilian beef cattle production systems appropriately.

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