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Analysis of bovine production dynamics related to soybean, sugar cane and corn production in Brazil

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Objectives: The objective of this study was to analyze the spatial-temporal dynamic in Brazil's cattle production during the period from 1978 to 2012 related to soybean, sugar cane and corn production national. In addition, we analyzed the substitution and association processes between these systems using correlation analysis between the temporal series of production.

Materials and Methods: In the present study were considered Municipal production data of the effective cattle herd in period between 1978 to 2012 and the amount produced in tons of soybean, sugar cane and corn from 1993 to 2012, both acquired from Brazilian Institute of Geography and Statistics web page. Temporal series were used to calculate growth and acceleration rates for each production, as well as the direction tendencies and inverse correlations between the soy and beef production, as also the sugar cane and beef production in Brazil. The production data was organized in a table and spacialized on map of Brazil from ArcGIS® program.

Results: The results showed high growth rate and acceleration of soybean and corn production in the South, Midwest and the western of the Northeast region, with a tendency of these productions moving to the northeast of the country. The South-Central region achieved high growth rates and acceleration of sugarcane production, also was observed the displacement of sugarcane production from the Northeast region to the South-Central region, indicating the loss of participation in the Northeast over the analysis period. Meanwhile, in the recent period from 2003 to 2012, the cattle production showed high growth rate and acceleration of production in the Legal Amazon area. The inverse correlation between cattle production and sugarcane production from 2002 to 2012 was seen in municipalities in the South-Central region. Moreover, most of the municipalities that showed an increase in sugarcane production and decreased in cattle production were in this region. The inverse correlation between the production of soy and beef production was seen mainly in municipalities in the Midwest, Southeast and South. The entry of flex-fuel cars in the Brazilian market in 2003 and the rise of commodity prices in the international market can explain the recent decline in beef production in the Midwest, South, Southeast, led by increased production of soybean and sugarcane in those regions, shifting beef production to areas further north, The causes of displacement of these productions are complex, which may be linked to climatic, topograph, access to credit and technical assistance as well as market issues.

Conclusions: The methodology used was efficient in multi-temporal analysis of sugarcane, corn, soybean and cattle production, promoting the understanding of the dynamics of the productions in Brazil, which can be used as a subsidy to public policies. Long-term public policies are necessary to understand these dynamics in an integrated management to generate improvements toward sustainable practices intensification of land use, taking into account regional disparities and promoting science and innovation in Brazilian agriculture.

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Regional Changes in Brazilian Beef Cattle Production

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Objectives: The objective of this study was to analyze the dynamics of cattle production in Brazil on a municipal scale and to identify potential areas of strangulation for continued growth and variables that could limit the increase in production and productivity.

Materials and Methods: This study considered all municipalities in five regions of Brazil (5561). Data on cattle production in Brazil were obtained from the website of the Brazilian Institute for Geography and Statistics from 1977 and 2011. The spatial midpoint of production in the country was calculated for each year to assess the direction of production in the country. Changes in the relative production and acceleration of production were calculated, and these data were spatialized using ARCGIS®. Cluster and canonical discriminant analyses were performed to further highlight differences between regions in terms of cattle production.

Results: Currently, the mean production point has moved from the Center of Minas Gerais State (in the southeast region) to the North of Goiás State (in the midwest region). These data generate a reflection of changes in environmental factors, such as pasture type, temperature and humidity. The relative increase in production in the midwest and northern regions is evident, which is considerably higher compared to other regions. In the northern region, because the original herd was small, the initial acceleration (1980-1990) was high with the migration of cattle production from other regions, but in numeric terms, the herd size has only become expressive within the last 10 years. Recently, "traditional" cattle-rearing regions, such as the south and southeast, showed a reduction in growth rates as well as a reduction in herd size or internal migration over the period studied. Regardless of the slowing growth and significant reduction in herd numbers, the states of São Paulo, Minas Gerais, Mato Grosso do Sul, Mato Grosso and Goiás, still represent the majority of beef exports in Brazil. These states are where the main structure for export of slaughtered animals is located, and they are also the main centers for completing feed-lots, which explains the fact that even with a reduction of the herd, they remain the leading exporters of meat. However, with the technological improvements in the agricultural sector, soils that are currently limited for farming should, in the future, present economic viability and force livestock production to new regions of the country.

Conclusions: Changing the configuration of a production system for beef cattle production from one region to another requires skills and expertise as it passes through a redefinition of farming objectives, as well as strategies and processes to achieve better results. Future studies should incorporate variables related to the expansion of crops, income from plant products, average area of farms, different specializations in cow-calf, growth and completion of production systems and density of cattle in different regions of Brazil.