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## Socioeconomic Contrasts of Colonization and Utilization of the Brazilian Cerrado

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### Abstract

*The Brazilian central region has an agricultural potential of more than 40 million hectares. This potential is concentrated in the Cerrado. The intensive colonization of this biota started in the seventies. At that time, the soils of the Cerrado were considered as inadequate for cultivation of most of the crops of commercial interest. During 2003 crop season, considering only the continuous Cerrado region, or either, without the Cerrado strips located in the States of São Paulo, Paraná, Piauí and others, considerably amounts of agricultural products came from this region. The produced amounts reached 27.15 million tons of soybeans (48.1%), 13.81 million tons of maize (27.5%), 2.03 million tons of rice (19.6%), 0.83 million tons of beans (28.2%), 2.40 million tons of cassava (10.9%) in 2003 cropping seasons. Additionally, there were stocks of 7.51 million of cattle (3.8%), and there were produced 44.3 million liters of cow milk (33.7%). The percentages in parentheses represent the participation in national production. This development of production in the region was obtained with the adoption of technology adapted to the region and brought benefits like the development of the Cerrado. However, in its course there occurred some undesirable effects like increasing in land prices and coming up of social conflicts and environmental imprudences. Secondary data on rice production and cultivation area for 1990 to 2003 in the municipalities located in the Brazilian Cerrado were obtained from the Brazilian Institute of Geography and Statistics and statistically analyzed. In this study three different situations were identified: (a) areas of strong agriculture enterprises, with higher production density and high yield levels; (b) areas with traditional agriculture, which is getting under pressure of the strong agricultural enterprises; and (c) less developed areas, where extensive ranching and cropping at low technological level are being practiced. A zoning of these three situations was done with geographic information system tool MapInfo Professional<sup>®</sup> 8.0. Finally, the study points out some social and environmental threats and present proposals and challenges for agricultural research and public policies to seek for a more equilibrated development for the Brazilian Cerrado region.*

**Key words:** rural development, agribusiness, environmental aspects

## **2 Background and Aim of the Study**

Cerrado is the regional name of the Brazilian savannah. It represents the second largest vegetation type in Brazil, covering 196.7 million hectares or about 20% of the country's surface. In the early seventies the Cerrado clearing was intensified. In 1975 the Program of Development of the Cerrado – POLOCENTRO was launched. It foresaw public investments on infrastructure followed by subsidized agricultural credit, minimum prices and agricultural insurances. The priorities of these policies were the clearing and occupation to give a higher economic density to the Brazilian central region. The Program reached its objectives, inducting to an expansion of commercial agriculture in the Cerrado. From this expansion of agriculture they had appeared three types of farmers: (i) those who got extraordinary results in their business turning themselves to large enterprises; (ii) an intermediary group formed by farmers who were not able to manage their business in an efficient way; and (iii) the small scale farmers located in those areas where the more successful farmers were not interested in, mainly because of its limitations to mechanization. Many analysis based only on competitiveness consider this fact as normal, as a kind of selection, where only the more competitive survived. There are two aspects that need to be considered. First, many farmers had no access to the mentioned programs and, second, the small scale farmers were in highest disadvantage. Many of those small scale farmers did not leave their areas yet because of lack of conditions and options.

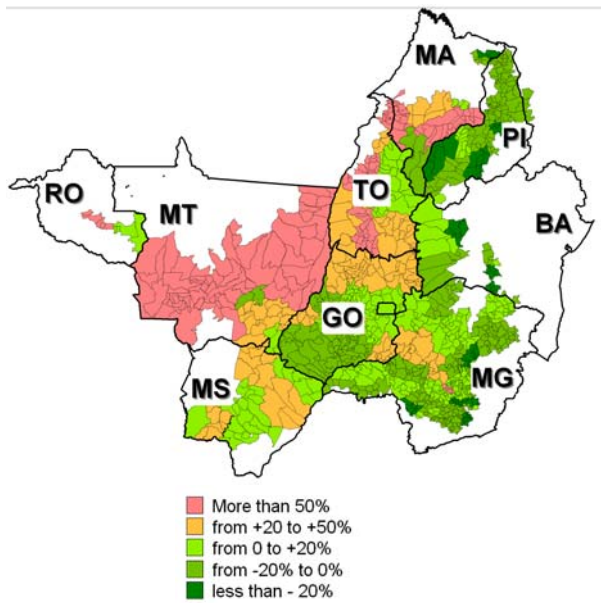
## **3 Methods**

Data on production of rice, soybeans, maize, cotton, beans and cassava as well as cattle stocks of each municipality localized in the Cerrado region for the period 1991-2004 were obtained from IBGE (2005). In this study only the continuous Cerrado areas were considered, or either, the Cerrado strips in São Paulo, Paraná, Piauí and other states were not analyzed. Afterwards, the increasing rates of cultivation area and cattle stocks were calculated for each microregion. For cultivation area five levels of increasing rates were established: level (1), which considers the regions with an increasing rate above 400% in the analyzed period; level (2), 200% to 400%; level (3), 100% to 200%; level (4), 25% to 100%; and level (5), less than 25%. For cattle also five levels of increasing rates in stocks were established: level (1), with those regions with an increasing rate above 50%; level (2), 20% to 50%; level (3), 0% to 20%; level (4), -20% to 0%; and level (5), less than -20%. The characterization was plotted into maps using MapInfo Professional<sup>®</sup> 8.0. The generated maps were compared, bringing up the final result, which is a typology composed by 6 types of behavior regarding the increasing rates of agricultural and livestock activities in the Brazilian Cerrado. To validate the typology interviews were carried out with key persons of agriculture and livestock in the states of Mato Grosso, Goiás and Bahia.

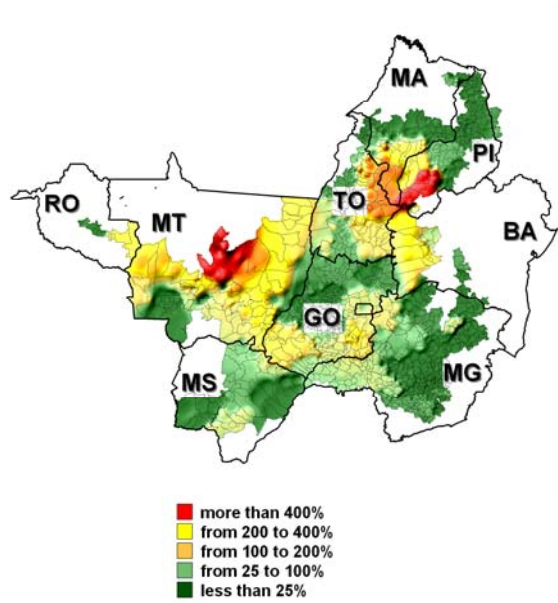
## **4 Results and Discussion**

The behavior of livestock and agriculture is shown in Figures 1 and 2, respectively. Table 1 characterizes the typology and Figure 3 shows the behavior typology of livestock and agricultural production in the Cerrado region. In the Cerrado there are zones with predominance of commercial enterprises, with higher production density and yields. In these areas there still exist traditional farmers, but they are under pressure of commercial enterprises. There are also regions with extensive livestock production as well as crop production under low technological level. The two last situations are considered as disfavored or fragile, or either, areas where livestock and agricultural production has been reduced in the considered period. In these areas, the farmers' income is low and farmers have difficulties in finding alternative productive activities. Usually, they leave lands and migrate to towns. Therefore, in these regions farmers need special political

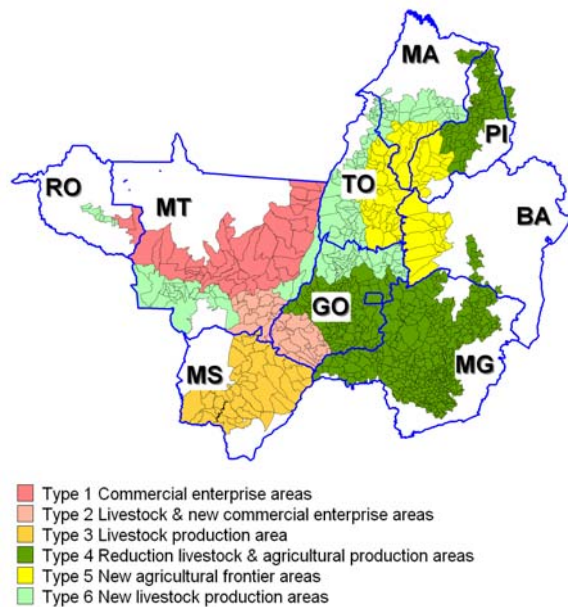
measures in order to keep their activities running, to protect the environment and natural landscape and, over all, to integrate them into markets.



**Figure 1. Increasing rates of livestock production in Brazilian Cerrado from 1991 to 2003.**  
 Source: IBGE (2005), adapted by the authors



**Figure 2. Increasing rates in grain crops cultivation area in the Brazilian Cerrado from 1991 to 2003.**  
 Source: IBGE (2005), adapted by the authors



**Figure 3. Typology of livestock and agricultural production in the Cerrado region, considering the period from 1991 to 2003.**  
 Source: IBGE (2005), adapted by the authors

**Table 1. Typology of the main regional situations in the Cerrado areas.**

Type/Characterization	Localization
1) Region where commercial enterprises and livestock have positive increasing rates.	Western and central region of Mato Grosso State as well as the areas near to deforestation line*.
2) Regions with predominance of livestock production, but with reduction of its increasing rates. Commercial agricultural enterprises have positive increasing rate.	Southern region of Goiás state.
3) Regions where livestock is maintained and agriculture is being reduced.	Cerrado region in Mato Grosso and Mato Grosso do Sul States.
4) Regions with reduction of livestock and agriculture, with predominance of family farm enterprises.	Western and Northern surroundings of Distrito Federal, Minas Gerais and Piauí States.
5) Regions of new agricultural frontiers, where extensive livestock production has been replaced by commercial enterprises.	Southern region of Maranhão and Piauí State.
6) Regions where livestock production is increasing and agriculture is decreasing.	Northern region of Goiás, central region of Maranhão and southwestern region of Mato Grosso States.

\* Surroundings of the Amazonian rain forest which were recently deforested and turned into farm land.

In those regions where commercial enterprises are more present there is higher pressure on natural resources and on activities carried out by small scale farmers. In those regions where agricultural and livestock activities were reduced, farmers face difficulties in commercializing their production. As a consequence, there is a tendency of speeding up the rural-urban migration. It was also observed, that there are no significant steps toward integration of small and large scale agriculture. Other facts that were verified are: (a) the necessity to consider sustainability criteria; (b) the need for viable options for traditional agriculture and/or of low technology, with or without pressure of commercial farm enterprises, which reached high economic competitiveness, but start showing signs of weak economic and environmental sustainability.

## 5 Conclusions

The region of the Brazilian Cerrado is quite homogeneous considering soil, climate and vegetation conditions but is quite heterogeneous regarding social and economic issues, as well as dynamics of its colonization. Three main strategies to develop the Cerrado area are suggested: first, the use of more sustainable agricultural practices; second, actions focusing the marketability of the products of traditional agriculture, because only access to technology and extensions services are not enough; and third, the necessity to integrate and search for complementarities of the activities carried out by small scale and large scale enterprises.

## 6 References

IBGE. Produção agrícola municipal. Culturas temporárias e permanentes. 1991-2003. Available at: <<http://www.sidra.ibge.gov.br>>. Accessed December 2005.