

REGIONAL ISSUES ABOUT THE SOUTHERN BRAZIL'S AGRICULTURE AND LIVESTOCK EVOLUTION

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Abstract:

Despite the historical trend toward a declining share of agriculture and livestock in a country GDP and total employment, this sector continues to play a crucial role in Brazil's economic development and growth. In 2024, for instance, agriculture and livestock accounted for 6.5% of the country's GDP. Exports of agricultural and agro-industrial products answered for 43.9% of Brazil's total exports in 2023, while agriculture and livestock alone accounted for 7.3% of total employment in the country in 2024, employing nearly 8 million people. However, agriculture sector (comprising agricultural, livestock, and forestry production) are not distributed homogeneously across the national territory. Among Brazil's 27 states, the Southern Region, comprised of three states, Paraná, Santa Catarina, and Rio Grande do Sul, layout over only 6.8% of the Brazil's territory but accounted for 26.4% of the national Gross Value of Agricultural Production (GVAP) in 2017.

Nevertheless, even within this region, agricultural and livestock production does not grow uniformly among or within its three states. For instance, between 1995/96 and 2017, the Southern Region faced a real increase of 71.6% in its GVAP, with growth rates of 90.4% in Paraná, 83.4% in Rio Grande do Sul, and only 20% in Santa Catarina (a difference of 4.5 between the first and third states mentioned). These states are leaders in different agricultural and livestock activities. In 2021, the state of Paraná rose to second place nationally in terms of Gross Value of Agricultural Production and, in 2023, became the country's leading producer of rye, barley, yerba mate, beans, wheat, and poultry. In the same year, Santa Catarina led national production of onions, tobacco, apples, and pork, accounting for 28.8% of national pork production in 2020. Rio Grande do Sul stands out in national production of rice, oats, olives, tobacco, pears, peaches, grapes, and honey. Paraná and Rio Grande do Sul are also major Brazil's producers of other grains, such as soybeans and corn.

These leadership positions in distinct crops and livestock activities result in national concentrations of these products within these states, yet production is not evenly distributed within their territories. Several studies have examined the concentration and inequality of agricultural production distribution in the southern Brazilian states, but little attention has been paid to their spatial agglomeration and association, as well as their evolution from the last decade of the twentieth century through the first two decades of the twenty-first century.

In this context, the objective of this article is to analyze the evolution of concentration, inequality, agglomeration, and spatial autocorrelation of the Gross Value of Agricultural Production, using municipalities in Southern Brazil as the unit of analysis for the years

1995/96, 2006, and 2017, corresponding to the three most recent Agricultural Censuses available at the time of this study. To carry out this analysis, sixteen key indicators were employed to measure these effects, three of them refer to agglomeration, in addition to Moran's I, used to assess the spatial association of total GVAP per municipality and per hectare.

The results indicate that the intensity and trends of concentration, inequality, agglomeration, and spatial association of GVAP between 1995 and 2017 are not necessarily similar across different indicators, as demonstrated throughout the study. Nevertheless, the existence of concentration and inequality in the distribution of agricultural production within Southern Brazil during the analyzed period is unequivocal. The spatial distribution of GVAP per hectare reveals a persistent pattern of concentration, forming a high-productivity "arc" encompassing northern, western, and southeastern Paraná, western Santa Catarina, and northern and northwestern Rio Grande do Sul, creating a "strip" whose spatial extent changed between 1995/96, 2006, and 2017.

Despite the expansion of productive areas, some municipalities in Southern Brazil remain in lower productivity ranges, highlighting the uneven growth of this sector, as also measured by inequality indicators such as the Gini and Theil indices. The location quotient (LQ), the diversified agglomeration measure (ID, the inverse of the Herfindahl–Hirschman Index), and the agglomeration measure proposed in this study (referred to as IAD) confirm the existence of agglomeration phenomena in the region's agricultural sector. Finally, Global Moran's I proved statistically significant in all analyzed years, indicating strong spatial dependence among municipal GVAP values. The LISA analysis identified persistent clusters of high and low GVAP performance per hectare, reinforcing the existence of relevant spatial patterns in this variable.

These findings suggest that the dynamics of agriculture and livestock production in Southern Brazil combine regional specialization, productive concentration, and spatial interactions that influence productivity, efficiency, and the territorial organization of the sector. Such phenomena must be taken into account in the formulation of agricultural policies, particularly through their regionalization.

Keywords: Concentration; inequality; agglomeration; spatial autocorrelation.