

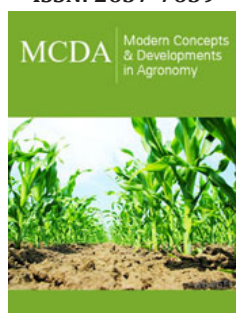
Fruticulture in Pará: A Space analysis to Guide Government Actions

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Abstract

This work aims to identify where the best and worst productive conditions occur in order to define priority areas to implement intervention strategies that can maximize local economic growth. For this purpose, secondary data and exploratory spatial analysis were used. The results showed that fruit production is concentrated in the metropolitan region of Belém, as it is the largest market in the state, as well as having better infrastructure conditions for export and has a consolidated production structure, unlike other regions that need to promote fruit production. It is concluded that it is necessary to think of strategies to boost production in other municipalities in the state.

Keywords: Territorial development; Economic growth; Value addition

Introduction

The production of fruit in the state of Pará occurs in large quantities, but only in small areas despite the size of the state. Pará fruits have great potential for exploitation, especially for the production of jams, sweets, pulps, oils, and essences, which are still underexplored by companies involved in the processing of these products.

However, a mapping of productive conditions is not given due importance, and as a result, there are no necessary indicators to support public intervention policies [1-4]. Therefore, the present work aims to identify where the best and worst productive conditions occur and define priority areas for implementing intervention strategies that can maximize local economic growth. In addition to this introduction, the work presents the methods, results, discussions, and final considerations sections.

Methods

The work has a descriptive character. For this purpose, secondary data from the Agricultural Census IBGE [5] were used to assess the area allocated for production, the quantity harvested, and the value obtained. The data were analyzed using the Terraviews software to calculate Moran's Index. This index serves to identify the presence of spatial autocorrelation that gives rise to four patterns of spatial associations or clusters [6]. The High-High cluster presents the highest averages, while the Low-Low cluster presents the lowest averages. In contrast, the High-Low and Low-High clusters represent transitional areas Câmara et al. [7], the former for the better and the latter for the worse. Finally, the Kruskal-Wallis test was used to determine if there were differences between the clusters.

Result and Discussions

In conducting the analyses, a Moran's Index of 0.31 was obtained at a significance level of 0.01, leading us to reject the hypothesis of no spatial autocorrelation. It can be stated that

the fruit chain exhibits spatial dependence among neighboring municipalities. This means that an increase of one point in the production of one municipality impacts the average production of its neighbors by 0.31. However, for this impact to occur, public managers must adopt strategies to promote the production chain, given that the distribution of production is not homogeneous within the state [2,3]. There is a predominance of municipalities with low production indicators among the clusters. In these municipalities,

production is higher, consequently leading to a higher value than in other municipalities, as shown in Table 1. In general, it was observed that the Low-Low and Low-High clusters, indicated by the colors red and yellow, are in the majority. In contrast, the High-High and High-Low clusters form islands of excellence, as they comprise a small number of municipalities compared to the others, as shown in Figure 1.

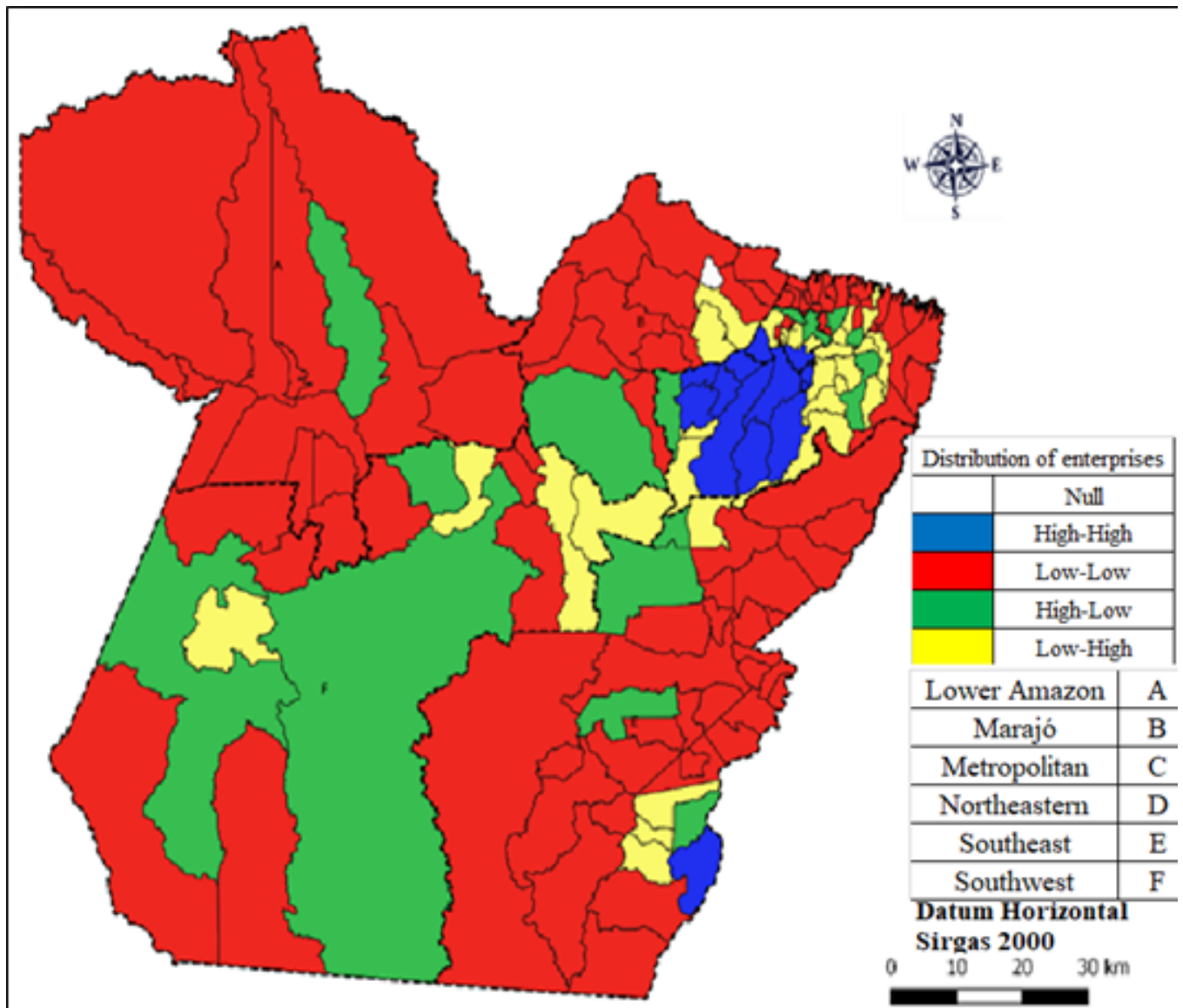


Figure 1: Distribution of fruit production in the territory of Pará.
Source: Research results.

Table 1: Characterization of the clusters.

Variáveis	High-High	Low-Low	High-Low	Low-High
Nº Municipalities	12	86	15	30
Production (Tol)	175619,5	4611,5	89748,5	9602,4
Value (Thousand Reais)	387334,8	10505	147535	18329,9

Source: Research results.

In the territory of Pará, the incidence of fruit production concentration is higher in the areas highlighted in blue (High-High) on the map, which are the regions closest to the metropolitan area of Belém. The main producers are Castanhal, Barcarena, and Bujaru. These municipalities find the largest consumer market in the region. Moreover, the metropolitan region favors export due to the logistical infrastructure that allows producers to transport their fruit production more efficiently than those farther from major centers. These elements make the region an island of excellence, especially in the metropolitan area of Belém, which is surrounded by municipalities in transition [2,3]. Meanwhile, in the Southwest mesoregion of the state, there is another island, but it is surrounded by inefficient municipalities.

In the red clusters (Low-Low), we have the largest number of municipalities, which are the furthest from the potential consumer market. In this cluster, producers often face various difficulties in bringing their products to market. Similarly, exporting these fruits becomes challenging, as their storage is delicate, and in distant locations, they do not last long due to their sensitivity. On the other hand, the green cluster (High-Low) groups municipalities with the second-best productive conditions in the state. In these municipalities, productive conditions are not as good compared to the blue cluster. Like the High-Low cluster, the yellow Low-High cluster highlights transitional areas. In general, the incidence of spatial dependence is concentrated in the metropolitan region and northeastern Pará, as shown in Figure 2.

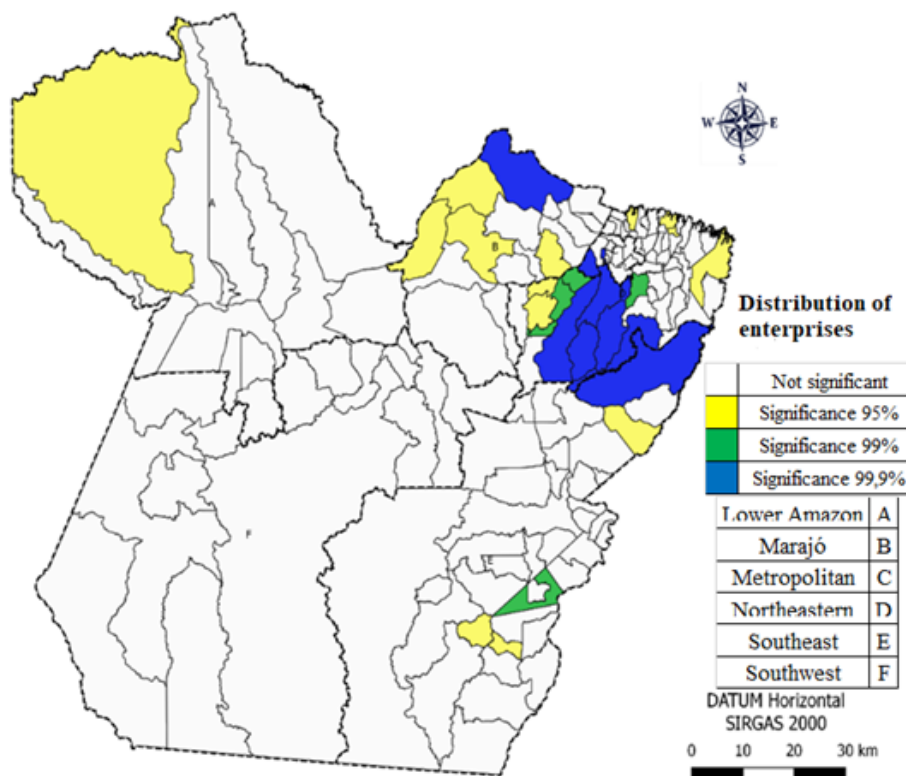


Figure 2: Significance level of spatial dependence.
Source: Research results.

In the metropolitan and northeastern regions of Pará, the significance of spatial dependence was 99.9%, shown in blue, indicating areas with greater similarity in fruit production. The green areas present significance levels of 99% and 95%, respectively. Together, these areas constitute a small portion of the state.

When conducting the Kruskal-Wallis test to determine if there is a difference between the clusters, it was observed that, statistically, there is a difference among them. It was noted that the averages are higher in the blue and green clusters, while they are lower in the red and yellow clusters. Therefore, through this test, the blue and green areas represent groups of municipalities that can serve

as references for the other clusters. These clusters can serve as examples of success cases to support intervention strategies.

Final Considerations

We can then observe that, in general, fruit production in the state is concentrated in the metropolitan region of Belém and its surroundings. In the Belém region, there are favorable conditions for producers' sales since this region contains the potential consumer market and has the necessary infrastructure for export. Additionally, it presents market conditions that foster the growth of the production chain. It is concluded that there is a difference between the municipalities, primarily caused by the presence of a consolidated consumer market and the infrastructure for the

distribution of production. Therefore, the municipalities in the metropolitan region serve as successful examples to promote strategies to foster the production chain in other regions of the state.

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