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URBAN GREEN AREAS, TYPOLOGY AND DISTRIBUTION: DOURADOS, MATO GROSSO DO SUL

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Abstract: As urban environmental problems take on greater proportions, concern has arisen about the natural environment and the real needs of human beings, in all aspects, from land for housing use to food production and biodiversity conservation. The benefits generated by urban green areas are essential for climate control, eliminating atmospheric pollutants, providing leisure, tourism, carbon sequestration, seed dispersal and minimizing negative impacts such as siltation and flooding caused by anthropization. This article provides a typology and quantification of vegetation in the city of Dourados, Mato Grosso do Sul. The mapping of urban green areas in Dourados was carried out using remote sensing and geoprocessing techniques, which made it possible to identify these areas spatially, as well as quantifying them in relation to the various urban sectors of the city. Based on the data collected, it was possible to differentiate the green areas into two classes of vegetation cover: Tree/Shrub Vegetation and Herbaceous Vegetation. Based on the analysis of the results obtained in this study, the municipal government can draw up strategic planning and direct urban management actions aimed at re-establishing vegetation cover in neighborhoods with little or no green areas.
Keywords: Urban Mesh; Green Areas; Geoprocessing; Environmental Public Policies; Mato Grosso do Sul.

INTRODUCTION

The search for an understanding of the diversity of aspects of urban space related to its physical-territorial dimensions and its inhabitants has become a concern for urban planning and management (BARGOS; MATIAS, 2012). Lima and Amorim (2006) consider green areas to be an indicator in assessing urban environmental quality. As well as being an important factor in quality of life, due to their vegetation, they also present conditions considered good for the real estate sector, as they are places of leisure and recreation for the population.

According to Art. 8, § 1 of CONAMA Resolution 369/2006: "A green area in the public domain is considered to be a space in the public domain that performs an ecological, landscape and recreational function, improving the aesthetic, functional and environmental quality of the city, with vegetation and spaces free of waterproofing".

The New Brazilian Forest Code, established by Federal Law 12.651 of May 25, 2012 - "Provides for the protection of native vegetation". According to Article 25. The municipal government shall use the following instruments to establish urban green areas: Item II. When legal reserves are inserted into the urban perimeter, they have the legal protection to be transformed into Urban Green Areas.

Geotechnologies, especially Geographic Information Systems (GIS), orbital remote sensing, GPS (Global Positioning System) and geoprocessing, provide means and techniques for processing spatial information, allowing it to be visualized in the form of maps, reports and tables, constituting a tool for analysis and supporting decision-making (SILVA and ZAIDAN, 2004). Geoprocessing is a set of techniques linked to spatial information, ranging from the collection, processing, manipulation and analysis of spatial data aimed at a specific objective (Rosa, 2013).

MATERIALS AND METHODS

The municipality of Dourados, Mato Grosso do Sul is located 220 km from the state capital. The municipality covers 4,086.237 km² and has around 222,949 inhabitants (Source: IBGE/2019). The vegetation of the study area is made up of two biomes: Atlantic Forest and Cerrado. The predominant biome is the Atlantic Forest, which covers the largest area of urban concentration and consequently the largest population. The Cerrado biome occurs in the southwestern portion of the study area and contains a smaller portion of the population (SISLA, 2019).

This work uses geotechnological resources involving techniques for acquiring, processing, storing and spatially analyzing data extracted via GIS using ArcGis ® 10.5 software.

Initially, shape files were obtained for the urban perimeter, urban sectors, squares, parks, flowerbeds and traffic circles, walkways, woods, special zones of environmental interest (ZEIA), made available by the Dourados City Hall. The conservation units and biomes were obtained from the shape files available on SISLA (Interactive Environmental Licensing Support System) MS. To gather data on the public green areas located in the urban area, we used information obtained from remote sensing images generated from digital aerophotogrammetric coverage with a GSD of 10 cm provided by the Dourados SEPLAN (SEPLAN, 2019). Based on the shape file of the 41 urban sectors established by the Dourados City Hall, the aerial image was cropped accordingly, enabling better efficiency in data processing. For each urban sector, the green areas were mapped, classified and quantified using the Supervised Classification technique in the ARCGIS environment. To this end, samples were collected to create spectral signatures for the two classes considered in the mapping: Tree/Shrub Vegetation and Herbaceous Vegetation. As a result of this classification, files were generated in raster format referring to urban green areas, in terms of tree/shrub vegetation and herbaceous vegetation, in each urban sector. The raster product was then converted into vector files in shape format, containing the interpreted classes

Based on this processing, the green areas and their vegetation classes were quantified by urban sector. The databases generated in a geoprocessing environment were used to calculate these areas, using EXCEL software, which allowed the graphs showing this quantification to be constructed.

RESULTS AND DISCUSSIONS

Processing the information considered in this study using geoprocessing and remote sensing techniques enabled the spatial distribution of urban green areas in the municipality of Dourados to be mapped according to the 41 urban sectors. The mapping showed great variation in the amount of green areas in the different sectors. While in some it is greater, in others it is reduced or even non-existent, as can be seen in Figure 1.

The mapping generated made it possible to identify and quantify the two classes of vegetation, considering the area of green areas in each sector, as shown in Figure 2.

It can be seen that some sectors have no green areas, such as sectors 9, 21, 32 and 37. With regard to the variation between the predominance of the vegetation class, it can be seen that sector 22 has a greater amount of tree/shrub vegetation, with a total of 77.21 % and 22.79 of herbaceous vegetation, while sector 38 has a greater amount of herbaceous vegetation, with 84.44 % and 15.56 of tree/shrub vegetation.

Information on vegetation classes can also be assessed by considering the total area of each urban sector, as illustrated in Figure 3.

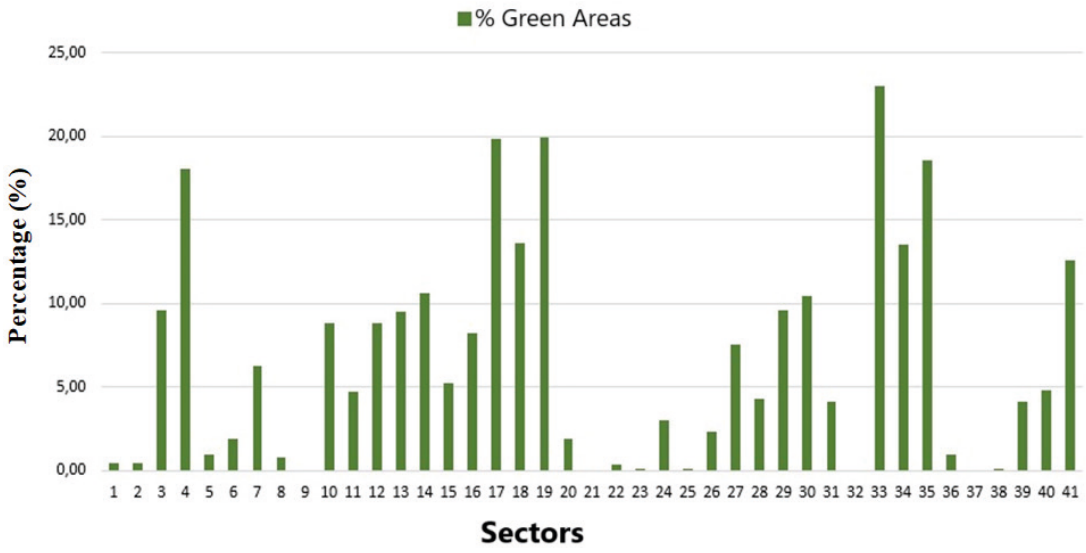

Figure 1: Green areas distributed across the different urban sectors of Dourados.

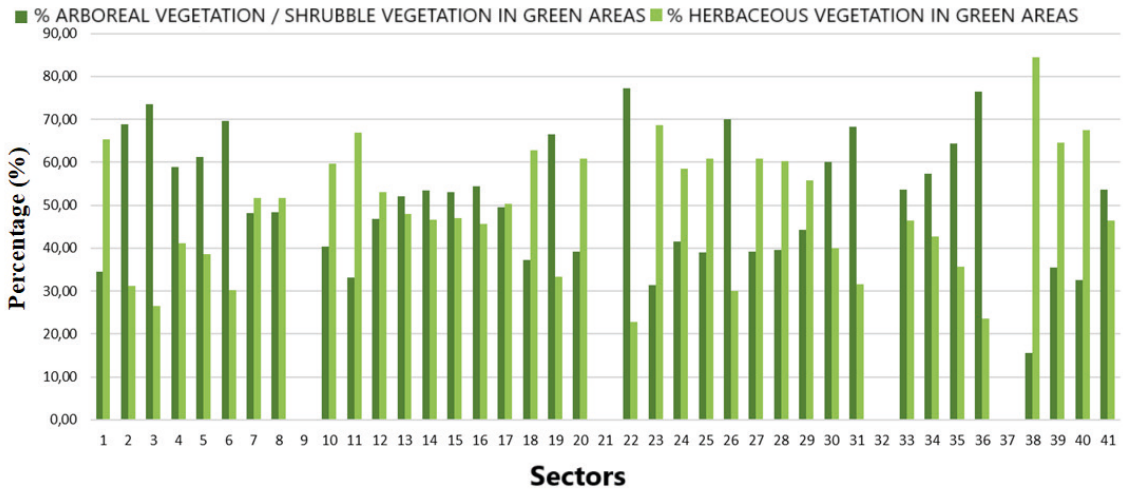

Figure 2 - Tree/shrub vegetation and herbaceous vegetation by urban sector in relation to green areas.

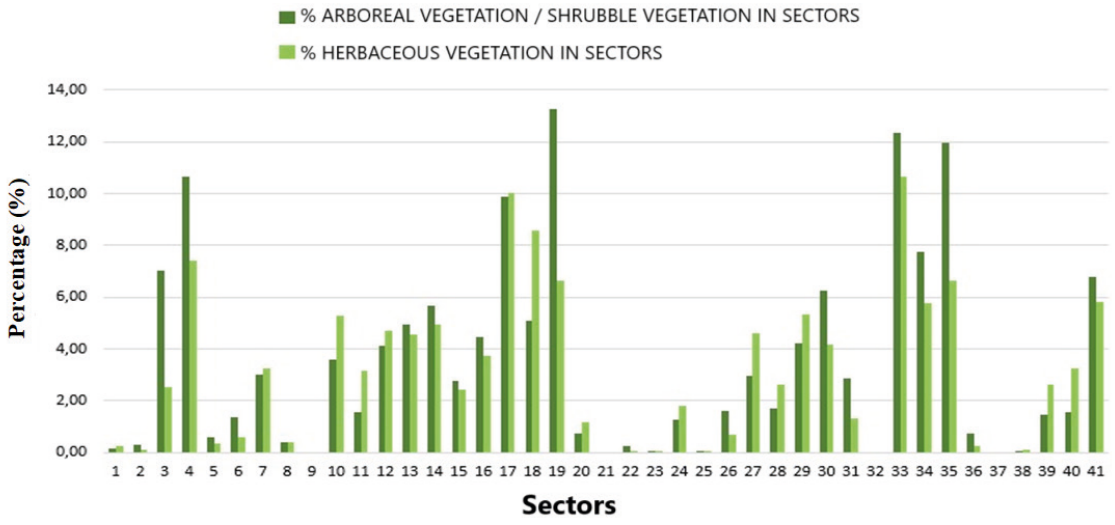

Figure 3: Tree/shrub vegetation and herbaceous vegetation by sector in relation to the areas of the sectors.

According to the 3 Figures presented, it was possible to observe that the percentage of Tree/Shrub Vegetation is 49.54%, considering the total area of urban green areas, and 3.31% in relation to the total area of urban sectors.

Herbaceous vegetation is equivalent to 50.46%, considering the total area of urban green areas, and 3.36% in relation to the total area of urban sectors. Urban Green Areas therefore occupy 6.67% of the territory.

CONCLUSIONS

The mapping of urban green areas in Dourados was carried out using remote sensing and geoprocessing techniques, which made it possible to identify these areas spatially, as well as quantifying them in relation to the various urban sectors of the city. Based on the data collected, it was possible to differentiate the green areas into two classes of vegetation cover: Tree/Shrub Vegetation and Herbaceous Vegetation. Based on the analysis of the results obtained in this study, the municipal government can draw up strategic planning and direct urban management actions aimed at re-establishing vegetation cover in neighborhoods with little or no green areas.

Considering that green areas have an impact on ecological, aesthetic, leisure, health and education aspects, it can be concluded that the need to increase these areas is an essential strategy for improving the population's quality of life.

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