

CALCULATION OF POLLUTANT EMISSIONS IN TRANSPORTATION ANALYSIS ZONES AND SPATIAL CORRELATION WITH URBAN PUBLIC SPACE

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ABSTRACT

The urban planning of the past century did not consider the benefits of service distribution and focused solely on the efficiency of mobility in motorized and/or private modes of transportation. This approach has resulted in significant negative externalities, including vehicular congestion, greenhouse gas emissions, air pollution, road accidents, and reduced quality of life. Currently, there is a paradigm shift in urban planning towards accessibility. Accessibility is defined as the ability to reach the opportunities offered by the city in a fair and responsible manner, particularly through sustainable transportation modes. Transportation modes include buses, which have a high transport capacity, as well as streetcars and aerial cables, which are environmentally friendly. Additionally, active transport options such as walking and bicycling, which do not have motors and therefore do not contribute to emissions, are also available. During the initial phase of this research, we calculated the CO₂ equivalent emissions in Manizales' Transportation Analysis Zones (TAZ) by analyzing the current trips generated and attracted by these zones and their respective modal distribution. Additionally, we calculated the Public Space Index for each TAZ. Finally, spatial statistical methods were used to estimate the spatial correlation between CO₂ equivalent emissions and the Public Space Index. This analysis allows for the characterization and clustering of the joint behavior of these two variables within the analyzed territory. It also provides evidence of a statistical trend between the provision of urban green space and atmospheric pollution. This research offers a tool for informed decision-making in urban planning and transportation.

Keywords: 15-minute city; CO₂ emissions; public space; spatial statistics; urban planning