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ABSTRACT

Senegalese cities have undergone rapid urbanisation, resulting in significant landscape transformations. Dakar, one of Senegal's fastest-growing cities, is experiencing rapid urban expansion, leading to a substantial reduction in green spaces. These green spaces, essential for urban sustainability and resilience, are becoming increasingly scarce, negatively impacting the city's environment and the quality of life for its inhabitants. In this context of climate change, this study aims to assess the impacts of changes in the region's public green spaces on urban ecosystem services. To collect the data, several approaches were employed. These included a combination of methods, such as an itinerant inventory of public green spaces, surveys with questionnaires, and semi-structured interviews. Secondary data, such as Landsat satellite images, were also collected. Data analysis involved approaches such as geographic information systems, remote sensing, descriptive statistical analysis, and content analysis. This study also utilised new methods for evaluating ecosystem services, such as the InVEST model. The results obtained in this study revealed an interesting typology of public green spaces, characterised by low diversity, with Shannon and Evenness indices equal to 1.44 and 0.56, respectively. Furthermore, green spaces are unevenly distributed in the region, as revealed by the Gini coefficient of 0.59. In terms of quantity, the green spaces showed low density, with only 2 green spaces per square kilometre, a low coverage rate of 3.5 %, and a low ratio of 4.69 square metres per inhabitant. Qualitatively, the NDVI values are also relatively low for most green spaces. The spatiotemporal analysis from 1990 to 2022 showed a downward trend, with the total green space coverage decreasing from 13.36 % in 1990 to 9.54 % in 2022. This study also examined the three major green spaces in Dakar, revealing substantial changes in vegetation cover, accompanied by significant losses despite some observed gains. The primary factors contributing to these changes were anthropogenic, primarily due to the city's rapid urban expansion. The dynamics of green spaces directly impacted the selected regulatory services, particularly in the forest. The reduction in vegetation cover led to a decrease in carbon stocks, urban cooling capacity, and flood control. However, in the park and the reserve, the correlation was negative, suggesting that other factors influence ecosystem services. In light of this, this study conducted a suitability analysis to identify areas suitable for green space development. The results revealed significant potential for green space development in the Dakar region, with over 90% of the area being suitable, and moderately suitable being the most prevalent type. Consequently, this study highlights a critical issue with the integration of public green spaces in urban planning in Dakar, which has resulted in substantial loss of these spaces and the services they provide. To address this issue, this study recommends the expansion of green spaces and the implementation of a robust management policy for their proper conservation.