Mangrove browning trends in the semi-arid Southern Caribbean

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Mangroves are tropical coastal ecosystems threatened mainly by land cover change due to commodities. The effect of urbanization on mangroves has been overlooked due to the low percentage of area loss globally. However, it can be an important driver of mangrove loss at local scales. Besides, highly fragmented mangrove areas dominated by small patches might be more sensitive to natural and anthropogenic stressors as occur in terrestrial forests, specially in highly modified systems such as cities. However, little is known about the interactive effects of these drivers of mangrove loss and degradation, namely urbanization and fragmentation. Our objective is to analyze the mangrove ecosystem's response in terms of the greenness trend to urbanization and patch fragmentation metrics in the semi-arid Colombian Caribbean. To do so, our specific objectives are: i) Calculate the greenness trend from 2017 to 2023 during the dry season by analyzing the Normalized Difference Vegetation Index (NDVI) derived from Sentinel-2 satellite images; ii) Correlate the greenness trend in mangrove patches with fragmentation metrics at the patch level; iii) Evaluate the patch greenness trend along an urban-to-rural gradient, specifically focusing on Cartagena city. The objectives are achieved using remote sensing and GIS tools. This study emphasizes the significance of understanding the impact of urbanization and fragmentation on mangrove forests, as it is crucial for their persistence and for informing conservation efforts, especially in relation to vulnerable species and areas at risk.

Keywords
Urbanization; Fragmentation; Colombia