

Mapping land cover changes in the city of Ziguinchor (Southern Senegal) from 2004 to 2025

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1 SUMMARY

This study aims to analyse changes in land cover in the city of Ziguinchor over a 21-year period (2004-2025), identifying spatial changes and transformations in land use in this Senegalese urban area. The methodology relies on the use of satellite images and remote sensing techniques to map land use and detect changes over a total area of 4,295 ha. The Normalized Difference Building Index (NDBI) was determined. The results reveal major changes in land use. Housing has expanded dramatically, from 1,035.05 ha in 2004 to 2,359 ha in 2025, an increase of 128% (1,323.95 ha). This urbanization has mainly been at the expense of vegetation, which has fallen by 67.5% (from 1,448.92 ha to 470.68 ha, or 978.24 ha) and agricultural areas, which have been reduced by 41.3% (from 1,179.61 ha to 692.47 ha, or 487.14 ha). Bare land also fluctuated significantly, peaking at 488.57 ha in 2016 before stabilizing at 233.16 ha in 2025. The transition matrix indicates that 2,223.35 ha (51.8%) of the territory remained stable, while 2,071.65 ha (48.2%) underwent land use conversion. This research demonstrates intense urbanization in Ziguinchor, characterized by a doubling of inhabited areas for over two decades. This rapid urban expansion reflects strong demographic pressure and uncontrolled urban growth, resulting in the massive artificialization of natural spaces. The drastic reduction in vegetation cover (67.5%) and agricultural land (41.3%) raises major environmental and food security concerns. The results serve as a warning to local decision-makers and urban planners, highlighting the urgent need to implement sustainable urban development policies. The study recommends the immediate development of controlled urban densification strategies, the protection of peri-urban agricultural areas, and the preservation of remaining vegetation. A system for continuously monitoring changes in land use is essential in order to anticipate and regulate future territorial transformations in Ziguinchor.