# The Evolving Morphology of Pool Malebo, Congo River: A Remote Sensing-Based Assessment of Land Use Land Cover Impacts

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**Abstract**

Pool Malebo, a critical section of the Congo River, is vital for Central Africa's economy. It enables trade and development by transporting goods and people. However, its shape is changing in concerning ways. Environmental factors are suspected, but the specific role of land-use changes (deforestation, urbanization, agriculture) in the surrounding area is unclear. Understanding this is crucial to maintaining navigability, essential for the region's well-being. This study uses remote sensing to investigate these connections. We aim to: 1) quantify changes in Pool Malebo's shape (width, centerline, migration rate) using Google Earth Engine; 2) assess land-use changes in the watershed; 3) analyze relationships between land-use and morphological changes. Our findings align with previous studies, revealing increased deforestation and agriculture, leading to higher erosion and sediment entering the river. This causes sandbar buildup, potentially affecting navigation depths. Additionally, urbanization trends correlate with channel morphology changes, possibly due to infrastructure or drainage alterations. Understanding these impacts is vital for developing effective river basin management strategies and ensuring future navigation on the Congo River, safeguarding the region's economic prosperity.