Smart Urban Planning With Eu Space Data: A Pilot Remote Sensing-Based Land Use Model For Owerri Municipal, Nigeria

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SUMMARY

Owerri Municipal, located in the heart of Owerri city in southeastern Nigeria, is experiencing rapid and unplanned urban growth. This expansion has caused land use conflicts, loss of agricultural land, and environmental problems like flooding and poor waste management. However, access to up-to-date and reliable spatial data is still limited for most urban planning authorities. This study aims to create a low-cost, desktop-based model using freely available EU space data to assist sustainable land use planning in Owerri Municipal. The specific goals include mapping land use and land cover for 2016 and 2024, detecting urban expansion patterns, and conducting a suitability analysis to find the best areas for residential development, agriculture, and conservation. The analysis used Sentinel-2 satellite imagery, SRTM elevation data, and OpenStreetMap infrastructure. The data were processed and analyzed with QGIS, SNAP, and Google Earth Engine. The methods focused on image classification, change detection, and multi-criteria spatial analysis. The results showed a significant change from vegetation and agricultural land to built-up areas, especially along major road corridors. The suitability analysis generated zoning maps that can help guide better land allocation decisions in the municipality. Based on the findings, local planning authorities should incorporate satellite-based geospatial tools into their decision-making processes. This approach provides a practical and cost-effective model that can improve land governance and urban resilience, especially in areas with limited resources. The project is developed under the Innovate with EU Space Data Mentorship Programme and supports the Sustainable Development Goals, particularly Goal 11 on sustainable cities and Goal 13 on climate action.