Spatiotemporal Dynamics of Urban Growth and Agricultural Land Use Change in Ibadan, Oyo State, Nigeria

Uthman Akorede and Damilare Adekilekun (Nigeria)

SUMMARY

Urban sprawl in Ibadan, Oyo State, in Nigeria, has recently escalated in the last two decades, placing immense pressure on peri-urban agricultural lands. The challenge prompted concerns over food security, sustainability, and land governance. This research utilized remote sensing and GeoAI in an ArcGIS Pro environment to investigate and project land use/cover (LULC) change for 2015, 2020, 2025, and 2035 from the use of Sentinel-2A satellite images, which served as the main source for the investigation. Pre-classification multi-temporal images were classified using machine learning algorithms to estimate the rate of urban sprawl and conversion of agricultural land. As an augmentation tool for the research, NBS population statistics were combined with land use to emphasize the challenge posed by urban sprawl associated with population increase.

Analysis of the outcome indicates a trend of degradation in agricultural land, especially in areas where transportation corridors pass and in peri-urban areas, with projections from predictive models indicating a high possibility of loss in agricultural land by 2035 if the trend continues. The implications for social-economic factors associated with the loss of agricultural land highlighted in the research highlight the issue of governance in relation to the preservation of agricultural land in light of urban development.

By showcasing the capabilities of GeoAI-driven remote sensing analyses within the ArcGIS Pro software, the research work sets the stage for evidence-based planning and decision-making. There is need for an integrated land governance strategy that syncs urban development with agricultural sustainability so that the development path of Ibadan is aligned with economic development and food sustainability.

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