Application of urban growth model to project slum development and its implications on water supply and sanitation planning

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ABSTRACT

The proliferation of slums is becoming the main problem associated with the expansion of cities in developing countries, coupled with poor water supply and sanitary facilities which ultimately cause pollution to the environment. This research therefore, addresses the projection of slum development using urban growth model and ascertain implications on water supply and sanitation planning.

Lagos, Nigeria was used as a case study area. A cellular automata based urban growth simulator called Dinamica EGO was used to obtain growth predictions. Land cover maps derived from Landsat 7 images were used to calibrate the model. The resulting slum developments were used as input data for further analyses. The drainage system of the area used was based on the digital elevation model and was delineated using GIS software to create different watersheds which were used as sanitary pollution catchments. Analytical results suggest that sanitary pollution is one of the environmental pollutants as a result of slum growth.

The research broadened the understanding of urbanization in terms of direction and time which can be used by authorities both in the planning office and policy makers to have "smart solutions" in planning for slums by forcing the growth of slums in a specified direction and thereby plan for the water supply and sanitary infrastructure to control environmental pollution.

Since developing countries are experiencing rapid population growth and urbanization coupled with inadequate water supply and sanitation infrastructure, together with the assessment of filthy conditions that might arise, this model can assist decision makers and planners in planning purposes to anticipate calamities

like environmental pollution, over crowdedness, etc. This can be used as a seed to anticipate the challenges ahead of us especially in developing countries.

KEYWORDS

Cellular Automata, Landcover, Pollution, slums, sanitation, urban growth