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## A b s t r a c t

Title	A Cellular Automata Model Incorporating Incentive-Disincentive Land Tax for Urban Growth Control Simulation
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(800 words)

Makassar City has been experiencing high population growth which has resulted in unbalanced high density levels in some urban quarters leading to deterioration in the living environment. With still no power for implementing zoning regulations, one option for controlling and directing population growth would be the use of progressive property tax on land and buildings in the form of incentives and disincentives.

As a first step, this study aims to discover opportunities towards introduction of such a tax based control mechanism. It examines the characteristics of urban area in Makassar City based on factors such as population, land, infrastructure, and the availability of various public facilities. The influence of these factors on land price is examined through regression analysis. Based on the results, it is shown that there is still some mismatch in the amount of infrastructure and services being provided in certain parts of the city which could be taken up as opportunities for the utilization of property tax as an instrument for steering population densities in the urban areas.

Next, this study looks at the possibility of developing a Cellular Automata model incorporating tax and geographic conditions for simulating urban growth process with a view of using it in the future as a tool for directing growth in Makassar City, Indonesia. The developed model uses land tax values in addition to geographic condition constraints such as rivers, flood prone areas and nature conservation areas. The CA model with incorporated tax constraints is examined together with a model with only the geographical constraints. Their performance is tested using the multi-scale goodness of-fit. The CA model incorporating the land tax constraints produced slightly better simulation results when compared with the geographic conditions. A calibrated model with an average prediction accuracy of over 75% becomes the basis for predicting the growth of urban areas in the city of Makassar until the year 2025.

In the last step, the specific objectives are to propose a method of controlling urban growth using tax-based incentive and disincentives in Makassar City and to evaluate the effectiveness of these mechanisms through a specially developed CA model that incorporates tax variables in the urban growth simulations. Use of tax variables as an incentive and disincentives mechanism that affects urban growth processes in Cellular Automata (CA) simulation is a new attempt in CA modeling. The tax variables in this study are based on land and building property tax and are introduced into the CA model in the form of incentives and disincentives. Several simulations based on the tax incentives and disincentives are performed to see the urban growth patterns that result focusing on the urbanization promotion zones and urbanization control zones. The results obtained from these simulations provide a basis for making proposals for setting tax incentives and disincentives values that can effectively guide desirable urban growth patterns in Makassar City.