Using Remote Sensing and Geographic Information Systems (GIS) to Determine Appropriate Locations of Urban Forest and Designing Urban Forest in Banyuwangi Sub-District.

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Abstract

Forest area has been decreasing over time and this has been come along with other problems such as climate change, water security and heat island phenomena. Most people are not concerned about the decreasing forest as they are not aware of its full potentials and functions, and they might also not be directly connected to it. We had an idea to integrate the forest with the people's life in order to change the paradigm of people about forest by representing its nuance in daily life. An urban forest was one of the concepts that could accommodate our idea about connecting the forest to the people's life. The aims of this study were classified parameters to determine appropriate locations, mapped appropriate locations and create a design of urban forest.

This study was conducted in Banyuwangi Sub-District. We defined and analyzed some appropriate parameters, such as surface temperature derived from a satellite imagery, slope inclination derived from ASTER GDEM, settlement buffer based on satellite imagery classifications and soil types. Each parameter was measured, scored, classified and verified using GIS. The parameters were analyzed by overlaying techniques and converted to spatial data.

The parameters had been decided and the results were converted to become thematic maps. The appropriate locations for an urban forest were any location which included criteria such as: having surface temperature above confortable temperature ($24^0 \pm 2^0$C), having a relative flat slope, easily reached by human and having unstable soil or less fertile soil. The GIS analyses showed that 5.494% (303.466 Ha) of Banyuwangi Sub-District's area could be categorized as high priority locations for urban forest; 45.762% (2,527.465 Ha) could be categorized as medium priority locations; and 48.744% (2,692.175 Ha) could be categorized as low priority locations. We verified the locations by ground check method and we included extra parameters, historical value and social value, to accomplish the locations for developing urban forest.

The boom beach was defined as our urban forest site. Mangrove and coastal forest characteristics were applied as a baseline design to build the urban forest. Building urban forest is a long term project, because the main landscape element is trees and trees need 10-15 years to become a "real tree". This means that the most important point is that government policies should ensure the urban forest project in the future.

Keywords: urban forest, remote sensing, geographic information system (GIS), spatial planning.