Assessment of Urban Forests by Using Spatial Decision Support System

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SUMMARY

As a result of today's increasing urbanization, the interest towards green fields and forests within and near the cities has increased, and the expectations of people from nature has differentiated and diversified. In parallel with gradual enlargement of urban areas worldwide, the concept of urban forest has arisen from the locals' need for green fields. In a study carried out by World Health Organization, it was recommended that minimum 9 m2 green field per capita is needed for a healthy society. The positive effects of forests on individuals' mind and body health are remarkably important. In the project developed in Turkey, it was aimed to enable people to be alone with the nature by transforming the forests near or adjacent to urban areas into urban forests. In this project started in year 2003, totally 103 forests have been established until the end of year 2008, and 63 urban forests have been put into service in 54 cities and 9 districts.

It is a long and difficult process to evaluate the urban forests in details and to make certain decisions. But, the evaluations might be made via main factors determined by the specialists. These factors (criteria) can be listed as location, plant diversity (flora), animal diversity (fauna), natural and artificial resources, and contribution to the environment.

The Analytical Hierarchical Process (AHP) has been developed by Saaty and is a well-known multi-criteria decision-making model for decision support systems. This process is a multi-criteria decision-making methodology that is capable of solving a complex problem within a hierarchy according to a criterion or multiple criteria. Besides that, also the Geographical Information System (GIS) developed based on location and the spatial decision support systems combining decision-making methods are widely utilized. Weighted Linear Combination (WLC) is based on the concept of a weighted average in which continuous criteria are standardized to a common numeric range, and then combined by means of a weighted average. The suitability of each alternative is

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obtained by multiplying the importance weight determined for the criteria with the score values obtained from the scale.

In this study, 5 main criteria were analyzed using AHP method, and the weights were obtained within the frame of method formulation by preparing the pairwise comparison matrices. And then, for each criterion related with 64 urban forests, WLC score values were calculated. 63 urban forests were landmarked on Turkish map by using ArcGIS software. The information of 5 main criteria related with 63 urban forests were entered into attribute table. Raster maps were prepared for each of criteria by using WLC method, and the suitability values of WLC method were obtained by entering the weighting values. In this method, the values closer to 1 indicate the suitability values for decision-makers, whereas the values closer to 0 indicate unsuitability values.

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