

Site selection of the suitable areas for the physical development of Tehran megalopolis based on the climatic elements and geographic factors

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Extended abstract

1- Introduction

Developing the cities and its influences on the spatial structure of megalopolises has always been one of the most important factors for the planners. Among the most important factors directing the development of the cities, are natural factors such as climatic ones which have been less considered in the country as yet because of various factors like economic benefits resulting from immethodical construction of the buildings. Since this carelessness has caused an unwise and easy-going development of Tehran megalopolis in unsuitable geographic directions, so this research intends to accomplish the optimum site selection for physical

development of Tehran megalopolis based on climatic elements and geographic factors.

2- Methodology

Topographic maps of the region which mainly consist some parts of Tehran and Alborz provinces on a scale of 1:250,000 were prepared and the region boundary was defined on them. In the next step, the climatic data of six meteorological stations was taken from the Iranian Meteorological Organization and, after reconstruction, was considered through the similar time range of 1984 to 2005. Then, using ArcGIS software and on the basis of the climatic and geographic factors, various layers affecting the site selection including topography, digital elevation model (DEM), slope percent and aspect, solar radiation angle, temperature means (minimum, maximum and daily), mean diurnal temperature difference, 24 hrs. maximum precipitation, and mean wind

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speed were made and entered into the software. Pixels' values in the climatic layers were calculated via spline interpolation method or regression equations. Then the resulted raster layers, after the reclassification of their pixels' values, were weighed and overlaid using Spatial Analyst (SA) and Spatial Analytical Hierarchy Process (SAHP) models and thus the final maps of the physical development suitability of these two models were obtained.

On the other hand, two Landsat ETM-7 images prepared from Iranian Space Agency and some geometric corrections were made on them using PCI (Geomataica) software in UTM WGS84 projection. Before geometric corrections, because of temporal differences of images, radiometric corrections were made on them too. radiometric correction or normalization means the reconstruction of image values so that there is a linear and similar relation between pixels and their real radiations in the whole imaging area. The result was the Normalized Difference Vegetation Index (NDVI) map and the land use map. As the last step, the final site selection maps were presented via overlaying the NDVI and the land use maps with final maps of each two SA and SAHP models.

3– Discussion

Based upon the distribution of the development suitability zones in the site selection maps, the most unfavorable areas have been developed in the high slope sections of the north of the region in the SA model. According to this model, about 8500 km² of the region has not any special limitation for the development. In

the SAHP model too, the most important limitation in the way of the development is the high slope sections of north of the region. The most suitable areas with almost 1400 km² area stands in the south, west and the submontanes of north and northwest of the region. Partly suitable areas with the area equal to 5300 km² have been developed in the central and southern parts of the region. The comparison of the final maps of two models reveals that the most suitable areas in the SAHP model have lesser extent than in the SA model.

4– Conclusion

Considering the bare land expansion which is mainly developed in the south of region and overlaying it with suitability zones of the SA and SAHP models and in order to protect the vegetation cover specially in the western parts of the region, among the three suitable zones for physical development of the city, the south direction is the most favorable direction and the western and southwestern regions respectively stand in the next precedences. In order to get a more comprehensive study in this regard, the other natural factors such as geologic, geomorphologic, hydrologic and human factors must be taken into account too.

Key words: site selection, physical development, Tehran, climate, GIS

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