

## **An Analysis on Geomorphological Limitations of Physical Development and Location Finding for Future Development in Sonqor**

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### **Extended abstract**

#### **1. Introduction**

Throughout the 20th century, the rapid growth of urbanization and development of mechanical means of transportation have led to the influx of people to the cities. Urban development, without taking natural hindrances into account, will cause many problems. The present study has been conducted with the aim of identifying Geomorphological limitations of Sonqor's physical development and proper location finding for future development. To this end, topographical, geomorphological and land-use maps together with the data obtained from Meteorological organization, library resources, and field survey have been used.

#### **2. Method**

In the first place, TM and ETM in satellite images in 1978, 2000, 2006, and 2013 were used. After merging the photos in Photoshop, their coordinates were aligned using Georeferencing in GIS. Afterwards, the process of physical development of the city for various periods was extracted using satellite images. In order to identify the approximate location of the region, 6 sheets of topographical maps with a scale of 1:25000 were used. Through creating a Digital Elevation Model of the region using topographical maps, elevation levels, slope and the direction of the slope were extracted. Using geological maps of Sonqor and Mianrahan, with a scale of 1:100000, provided by Geology Organization of Iran, the geological map of the region was created. Through fuzzy logic, the zoning of Sonqor's physical development was done based on eight indicators. In a fuzzy set, the membership of an object or a phenomenon in a set ranges from 0 to 1. Degree of membership, union, intersection, set difference, multiplication, addition and gamma are considered the basic powers of this integrated model. Fuzzy multiplication is one of

the major operations in a fuzzy set, done through merging the layers. In this operation, all the information layers are multiplied, and in the output layer the numbers approach zero, indicating that the multiplication of numbers is smaller than one. Consequently, a much smaller number of pixels can be categorized as very good. In fuzzy addition operation, the result is always greater than or equal to the biggest amount of layer membership and the output map, contrary to fuzzy multiplication, approaches one; thus, more pixels are categorized as very good. In the present research, eight indicators for zoning Sonqor's physical development were used and after preparation and standardization of layers, fuzzy multiplication and addition were conducted.

#### **3. Discussion and Conclusion**

The physical development of the city, from 1988 to 2013, has been toward west and the southern foot of Dalakhani heights, on elevation lines of 1650 up to 1750. This sort of south-bound development has gobbled many of gardens and agricultural lands and its continuation has been met with some limitations such as entering the geological fault boundary, flood-prone areas and slope limitations. With regards to the zoning map, in fuzzy multiplication, nearly 9 percent has been categorized as suitable or mediocre for physical development, and in fuzzy addition, fifty-six percent has been characterized as suitable. At the moment, city development continues northward and southward towards regions which are susceptible to disasters while the suitable regions for the physical development of the city are situated in the west, along the road from Sonqor to Satr and the north-west, toward Haj Amin Castle and Dashlibolagh Village.

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**Key Words:** Geomorphological Limitations, Physical Development, Sonqor.

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