The Analysis of the Impact of Demographic Factors and Land Development on the Sprawl in the City Region of Mazandaran (Case Study: Sari, Babol, and Ghaemshahr)

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1. Introduction
After the Islamic revolution, the urban population increase resulted in the striking expansion of cities along with the higher extent of land development in many cities and regions of the country. In the recent years, taking a decrease in population into consideration, the land expansion in the urban regions such as Mazandaran has gone through a dramatic increase, therefore, presenting services and infrastructures more than demands of the population as well as the change in the inhabitation style are considered as the major consequences of this trend. Regarding this issue, the tendency to the land expansion within the urban region has decreased in favor of the expansion toward outer regions of the cities with less density which leads to the house sprawl on the outskirts of the urban areas. This paper aims to analyze the effect of population factors and land development on the spatial sprawl pattern. The scope of our study is important due to the population concentration, services, labor, and management in Mazandaran province. While the land development on the suburbs has increased, small population changes have been noticed. Because of the importance of the urban regions and its developmental trend to the study attempts at analyzing the impact of demographic factors and land development on sprawl.

2. Theoretical Framework
The sprawl is the unplanned, uncontrolled and uncoordinated development that is low in-density and has caused different patterns. In the dictionary, sprawl is defined as "the development of undeveloped land near the city and region". This means that the pattern of development has led to the decentralization of commercial and residential land to the external areas that have been recently developed. However, some theorists take sprawl as an inappropriate issue.

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increasing the economic development, social, environmental, and physical-space disadvantage. People like Lee (2011), Richard (1993), Ewing (1997), the Association of Sierra (1998), Dawn (1998), Burchel and Shade (1999), Fulton et al. (2001), and Kolankiewicz and Beck (2001) defined sprawl with the development indicators such as low population and building density. In continue more people like Ewing (1994), Ahmad et al. (1389), Luser and Huber (1997), Armor et al. (1994), Torrance (2006), Loybel and Tozer (2003), and Hoyman (2010), and Bhata (2010) as they insisted on the physical factors such as the physical development, inefficient development, spatial patterns of low-density, and the land contribution.

3. Methodology
The paper uses a prescriptive-analytical as the method of analysis. For classification of Landsat imagery during 1365 to 1390 we used the order of classification via ENVI4.8 software. Then, by using Arc GIS satellite images were overlaid to detect the sprawl trend. Afterwards, black and white methods were applied to compare the population growth rate in the spatial units. This comparative study showed that the areas which had a higher land development than the rate of population growth had a lower population density. Finally, by using density equilibrium factor changes in population density ratios are discussed to analyze the sprawl pattern in the urban regions. Besides, we used some factors such as the variables change and the population growth rate as well as the population density and the land development changes between 1365 and 1390.

4. Results & Discussion
Result of black-white hypothesis shows that in 1365 to 1375 land development has been increased for about one hundred percent, however, the population increase in terms of the land development is not appropriate. In the period from 1375 to 1385 the sprawl has increased for about 1.35 percent and the population growth was at the same rate as the previous decades, therefore, it led to the reduce in the rate of sprawl. In fact, the trend repeat during1385 to 1390 but the sprawl rate decreased. The result of the density equilibrium factor also highlights the process variable between 1365 to 1390. During 1365 to 1385 this factor was 10.9 which shows the highest sprawl in the study. This may be because of the land development in 1365 and the significant increase in the land purchase and sale in 1385. But in 1375 and 1390 this indicator was equal to 4. This implies that the sprawl process has decreased compared to the years 1365 and 1385. This method takes sprawl as not a steady decrease or increase, respectively. Thus, it can be said that the sprawl from 1365 to 1390 increased but not in a constant manner.
5. Conclusion & Suggestions
The analysis revealed that change variables, population density, and land development are the great significant indicators impacting the sprawl trend. Hence, it confirms the present study’s hypothesis. Depending on the results gained through the two mentioned methods, the sprawl during 1365 to 1385 was greater than the other years. The compelling reason might be the province history. Population, population density, and the land development in 1365 has had a high growth rate. Moreover, housing location and spatial distribution of population has also increased to meet the needs of the people in years 1375 and 1385. But the reduced sprawl in 1385 to 1390 is was against our initial expectations. It should be noted that sprawl is an issue which is likely to increase in future as it is unpredictable due to its transition trend. As a result, all the urban regions of the cities must be planned in a way to avoid unsuccessful policies such as Failure to permit for the change in the land use from agricultural to residential, Codification rules and regulations for the construction on the non-agricultural land outside the city, zoning in population and building density within the city boundaries to prevent the single-family housing, owning agricultural land, gardens, and the natural environments in the suburbs, developmental plannings not in proportion to the rate of development instead of emphasizing on the preservation of natural landscapes.

Key Words: Sprawl, Changing population, Built-up area, Population density, City region, Mazandaran.

References


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