Suitable Areas for Urban Physical Expansion Emphasizing on Geomorphologic Factors (Case Study: Dezful City)

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Extended Abstract

Introduction

Cities are the areas for population concentration all over the world. Urbanization and urban growth are accounted as main indicators of economic growth and development of countries. As the population is increased, the cities experience rapid physical growth. To determine suitable areas for urban development, geomorphological indicators have always been of great importance. Initial site selection of cities has been conducted in the shade of geomorphologic units and geomorphologic processes. Certainly, expansion and development of cities can be confined to geomorphologic features. In fact, geomorphologic attributes of a geographic place not only affect distribution or concentration of human activities, but they are also accounted as effective factors to shape spatial constructions. Overall, the effects of geomorphologic features on a city may be categorized in site selection, urban physical expansion, urban growth directions, urban morphology and urban constructions. Thus, planning for development of rural and urban settlements regardless of geomorphologic indicators and identifying natural environment potentials will not be practically successful.

Dezful city such as many cities of Iran is continuously encountered with population growth. Population of this city from 52121 in 1956 has increased to 264709 in 2016; in other words, during this period of 55 years, annual average population growth rate was 2.88 percent. Regarding continuity of population increase in Dezful city and inevitable urban physical development, it is of great importance to find suitable areas for future development. In the way to determine suitable directions for urban development, a main job is to study geomorphologic indicators. Hence, present research has investigated geomorphologic indicators in Dezful City and its surrounding areas to map suitable directions for future urban development.

Methodology

To identify potentials and limitations of urban physical development of Dezful in surrounding areas of the city in respect of geomorphological parameters, we selected eight main geomorphological indicators including slope, fault, lithology, height, river, land use, slope direction, and distance from other main settlements. At first, the condition and attributes of these indicators were considered in sub-province and city scale, and related maps were produced using GIS. The comparative importance of the mentioned geomorphological parameters was calculated based on experts' viewpoints. Then, suitability of lands in surrounding areas of the

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city in eight geographic directions including north, northeast, east, southeast, south, southwest, west and northwest was comparatively analyzed in respect of each geomorphologic indicator. These comparative analyses were done through pairwise comparisons using Analytical Hierarchy Process (AHP) and Expert Choice software. In this way, the comparative suitability of each geographical direction for urban physical development relative to each geomorphological criterion was calculated. Then, the scores were combined to gain all scores of geomorphological parameters for each direction and calculatethe composite scores for geographical directions. Based on these composite scores, the geographical directions were ranked and, finally, the most suitable directions for future urban physical development of Dezful city were determined in terms of geomorphologic indicators.

Results and discussion

Among the eight geomorphologic indicators, two indicators of 'slope' and 'fault' gained the highest importance coefficients. The lowest coefficients belonged to the indicators of slope direction and land use. The result of comparative analyses of geographic directions in terms of geomorphologic indicators showed that directions of east, west and northwest are more favorable than other alternatives with regard to slope. In the indicator of fault, direction of northeast and east are more suitable. The directions of west and northwest are preferred directions with regard to lithology. Comparison of alternatives in respect of height showed priority of northeast and northwest directions. In the indicator ofdistance from other main settlements showed priority of east, south and southeast for urban development. In indicator of land use, directions of east and northeast were determined as suitable development directions. Comparative evaluation of eight alternative directions based on indicator of distance from river showed that the axes of south and southeast have better condition and, finally, in indicator of aspect, southeast area is more suitable direction.

To determine preference values of criteria and relative scores of alternatives for each criterion, the pripority scores of alternatives synthesized based on Analytical Hierarchy Process (AHP); then, the scores of each geographic direction was resulted as follows: east 0.189, northwest 0.158, west 0.149, northeast 0.135, north 0.121, southeast 0.097, south 0.085, and southwest 0.065. The inconsistency ratio of comparative analyses was at acceptable range.

Conclusion

As mentioned, we analyzed surrounding areas of Dezful city in terms of geomorphological indicators including slope, fault, lithology, height, river, land use, aspect, and distance from other main settlements to determine suitable areas for future urban physical development; using experts' viewpoints, comparative analyses were done by applying AHP. The preference values of these criteria are 0.312, 0.312, 0.118, 0.076, 0.049, 0.033, 0.024 and 0.076, respectively. Therefore, among the geomorphological indicators of this research slope and fault acquired the highest preference values. Then, urban peripheral areas in all directions were analyzed in terms of the geomorphological indicators. The best directions for future urban physical development in each criterion based on pairwise comparisons are as follows; slope: east, west and northwest; fault: northeast; lithology: west and northwest; height: northeast and northwest; distance from other main settlements; east, southeast and south; river: southeast and south; land use: northeast and east; aspect; southeast.

We have combined preference values of the criteria and those of geographical directions in each geomorphological criterion in order to calculate overall preference values of geographical directions for urban developments. In this regard, directions of east, northwest and west gained the scores of 0.189, 0.158 and 0.149, respectively. Thus, these directions are determined and proposed as preferred areas for urban development.

Keywords: urbanization, urban physical development, geomorphology, Dezful city.

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