Population Dynamics and Land Cover Patterns in Tehran Metropolitan Region

Hossein Mansourian*

Assistant Professor, Department of Geography and Urban Planning, University of Tehran, Iran

Received: 21-7-2016 Accepted: 19-12-2016

Extended Abstract

Introduction

Since Industrial Revolution in late 18th century, the world population has increased exponentially in an astonishing rate. Human population from 1 billion in 1830 reached around 7 billion in 2010. Importantly, the world's urban population has increased much faster than the rural one, rising from 14% in 1900 to 47% in 2005, and will be about 61% by 2030. Furthermore, future population growth will occur primarily in urban areas. Although urbanized areas cover only about 3% of earth's land surface, they cannot be ignored as urban growth causes very large changes in environmental conditions.

Since 1950s, with the establishment of capitalist system in Iran, a new era began in urbanization and urban development in Iran, especially in Tehran. Rural land reforms were implemented in 1962, and consequent changes occurred in relation between rural and urban areas. Rural population migrated to urban areas. Rapid increase in oil revenues, increase in the needs for urban services, developments in economic and communication infrastructure, rapid increase in establishment of major industries and assembling industries, and broad growth of administrative organizations increased the role and functions of Tehran as the capital city and as the center of new changes. Therefore, Tehran was expanded and became more complex. In the years after the Islamic Revolution, urban sprawl and discontinuous expansion have been the dominant form of urban growth. Tehran's discontinuous growth dynamics emerged in different forms, such as enlargement of the surrounding towns, transformation of villages to towns, physical development of the villages, and establishment of new towns and cities. As a result, the first urban centers around Tehran were rapidly expanded and, consequently, with the vast development of Tehran suburban network, economic, and social and physical relations between Tehran and her neighboring towns entered a new phase that eventually led to the formation of TMR, a phenomenon that extends and transfers the problems of Tehran throughout the surrounding regions in wider dimensions. In the process of discontinuous expansion around Tehran, profound changes in the status of lands, settlements and activities developed in the region. The result was the physical growth of the city and the creation of new urban suburbs at the time. With this regard, many rural areas were under the influence of new urban relations, thus losing their former functions.

* Corresponding Author: h.mansourian59@ut.ac.ir

Methodology

The data used to analyze population evolutions in TMR were derived from general population and housing census of Iran that was conducted from 1956 to 2006 every ten years and recently every five years. In order to analyze spatial-temporal evolutions of urban population growth in TMR, ArcGIS 10.2 has been used. Land cover maps have been prepared by use of the satellite images MSS, TM, and ETM+ in 1973, 1985, 2000, and 2013. Object-Oriented classification and eCognition were used to generate land cover maps which is not confined with spectral reflection of the phenomena on earth. But this employs shape, patterns, and area of the phenomena as well.

Discussion and Results

Urbanization and urban growth in Iran stepped in the road to concentration, under the influence of the country centralized structure performance and in line with the expansion of surrounding capitalist relations since 1922. The process is indicated as the first urban pattern. In this pattern, Tehran City has more than a quarter of Iran's urban population, as a result of economies of aggregation until 1977. As these economies of aggregation is decreased and the problems from the urban primacy pattern rise, necessary policies were made to confront the urban primacy and increasing urban growth in Iran. Therefore, from 1977 on, Iranian urbanization and urban growth appeared as de-concentration. But like other developing countries, de-concentration in Iran appears as reversal polarization. In this case, de-concentration does not happen far from the country or region's main metropolis, but immigration flows transfer towards middle and small towns, close to the main metropolis. Accordingly, TMR formation is the result of de-concentration of Iran's main metropolis. Studying spatio-temporal changes of urban population growth in TMR shows a transition from centralized and semi-centralized patterns and entry to non-centralized pattern in form of concentration, polarization reversal and de-concentration process. Yet the main point is to know land use and land cover patterns in TMR in each stage of population growth.

Until early 1970s, urban growth pattern in TMR was centralized and more than 90% of build-up areas belonged to Tehran Metropolis. Main shaping factors of this spatial centralized urban pattern can be summarized as site selection of industries and services as well as no development of connective road network in the region. Based on the fact that the main factor of growth in this stage was immigrations with the aim of searching better economic status, localization of industries and services did result in the concentration of such immigrations to Tehran Metropolis and the formation of centralized urban growth in TMR. From late 1970s, urban growth pattern in the region tended towards semi-centralized one. The most important factors to shape this pattern in TMR are the development of connective roads in the region as well as the localization of industries, and, consequently, services. From 1973 to 1985 more than 36% of new build-up areas located 3km off the main roads of the region, which rose to 88% in the next period, i.e., between 1986 to 2000.

Conclusions

These results clearly show that the development of connective roads in TRM was one of the most important factors to shape urban growth patterns. In this period, the range of industries spread as far as 100 km from Tehran City. Nonetheless, one should not ignore the role of planning in the form of such policies as prohibition of establishing industries within 120 km of Tehran City. Since early 2000s, as time passes and decentralization process intensifies, semi-centralization pattern tends to non-centralized and, specifically, multinuclear pattern. Spatial reflection of this pattern is the formation of residential poles, which have been created from joining many individual settlements in the region. The best examples of such poles are Karaj as well as its surrounding cities along with Islam Shahr-Robat Karim pole. In this area big cities such as Nasim Shahr and Golestan have enabled the spatial link between the two points of this pole, i.e., Islam Shahr and Robat Karim. Between 2000 and 2013, connective roads also played a very important role in the formation of growth pattern in the region. Thus, more than 80% of

new build-up areas are located within 3 kilometers of the region main axes. In this period, the average distance of industries from Tehran City has also increased, counting up to 57 km. However, in case of other settlements of the region, the average of new industries is just 11 km.

Keywords: land cover patterns, population dynamics, Tehran metropolitan region.

References

1. Andersen, H.T., Møller-Jensen, L. and Engelstoft, S. (2011). **The End of Urbanisation? Towards a New Urban Concept or Rethinking Urbanisation**, European Planning Studies, Vol. 19, No. 4.

2. Cuberes, D. (2011). **Sequential City Growth: Empirical Evidence**, Journal of Urban Economics, pp. 229-239.

3. Ghamami, M. (2004). **Tehran Conurbation: Strategic Plan of Physical Development**, Center for Urban Studies and Architecture of Iran, Tehran.

4. Geyer, H.S. (1996). **Expanding the Theoretical Foundation of the Concept of Differential Urbanization**, Tijdschrift voor Economische en Sociale Geografie, Vol. 87, No. 1, pp. 44-59.

5. Geyer, H. (2002). **The Fundamentals of Urban Space**, In International Handbook of Urban Systems: Studies of Urbanization and Migration in Advanced and Developing Countries, Cheltenham: Edward Elgar Publishing Limited, pp. 3-17.

6. Geyer, H.S. (2006). **Introduction: The Changing Global Economic Landscape**, in H.S. Geyer (ed.), Global Regionalization: Core–Peripheral Migration and Economic Trends, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, pp.178–224.

7. Geyer, H.S. and Kontuly, T. (1993). **A Theoretical Foundation for the Concept of Differential Urbanization**, International Regional Science Review, Vol. 15, No. 2, pp. 157-77.

8. Geyer, H. and Kontuly, T. (2008). **Historical Perspectives on Differential Urbanization**, G. Pomeroy & G. Webster, In Global Perspectives on Urbanization, Lanham, Maryland: University Press of America, pp.1-24.

9. Mahdizade, J. (2003). **City and History**, Third part, Jostarhaye shahrsazi, 4, pp. 37-43.

10. Mansourian, H. (2014). **Explanation of Urban Growth Patterns in Tehran Metropolitan Region**, Ph.D. Thesis, University of Tehran, Iran.

11. Pacione, M. (2011). Introduction: urban growth patterns – trends and policy issues. H. Geyer, **In International Handbook of Urban Policy: Issues in the Developing World**, Vol. 3 Cheltenham: Edward Elgar Publishing Limited, pp. 3-36.

12. Richardson, H.W. (1980). **Polarization Reversal in Developing Countries**, Papers of the Regional Science Association, Vol. 45, pp. 67-85.

13. Seto, K.C. and Fragkias, M. (2005). **Quantifying Spatiotemporal Patterns of Urban Land-Use Change in Four Cities of China with Timer Series Landscape Metrics,** Landscape Ecology, Vol. 20, pp. 871-888.

14. United Nations (2010). World Urbanization Prospects: the 2009 revision.

15. Wu, J.G. (2008). **Making the Case for Landscape Ecology: an Effective Approach to Urban Sustainability**, Landscape and Ecology, Vol. 27, pp. 41-50.

16. Wu, J.G., Jenerette, G.D., Buyantuyev, A. and Redman, C.L. (2011). **Quantifying Spatiotemporal Patterns of Urbanization: The Case of the Two Fastest Growing Metropolitan Regions in the United States**, Ecological Complexity, Vol. 8, No. 1, pp. 1-8.

17. Zebardast, E. and Hajipour, Kh. (2009). **Explanation of Formation, Evolution and Transformation Process of Metropolitan Regions**, Human Geography Research Quarterly, pp. 105-121. [in Persian]