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Recognition of urban unsustainability in Iran (case study: Sanandaj city)

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ABSTRACT

Rapid urban growth and urbanization in recent decades have caused changes in the structure of human habitations such as social and economic changes that would further clarify the importance of sustainable development and urban sustainability. Urban sustainability should create a balance between different aspects of economic, environmental, and social development. Therefore, this study aimed to determine various aspects of unsustainability in Iranian middle-large cities in order to provide strategies to improve the indicators and to achieve sustainability by finding the causes of failure to develop these indicators. Accordingly, first, urban sustainability indicators in four social, economic, physical and environmental aspects were presented. Then, the process of changing was determined through the study of these indicators in Sanandaj during two different periods; and indicators such as jobs, green urban economics, housing, nongovernmental organizations (NGOs), social participation, culture, public services and facilities, transportation, leisure, and medical care and health services were specified as unsustainability indicators in Sanandaj and other similar cities. Then, the following strategies are provided to improve urban sustainability in order to analyze the reasons for the decline or stagnation of these indicators: (1) strategies to revise the urban planning system in Iran; (2) strategies to improve the city's economy; and (3) strategies to improve the condition and status of poor people. The declining trend of unsustainability indicators could be reversed by applying these strategies. Furthermore, with the promotion of indicators, sustainable cities could be achievable.

1. Introduction

Today, the majority of the world population is living in urban areas. If the current trends prevail, then the proportion of urban dwellers will reach two-thirds of the world population, and the land converted to urban areas will triple by 2030 (DESA, 2012; Luederitz, Lang, & Von Wehrden, 2013). "Asian cities will double in size over the next 20 years, with more than 40 million people added each year. Hence, the 21st century will undoubtedly be the century of urban development for Asia. The challenge for Asia will be to provide the basic amenities such as food, water, shelter, transportation, education and sanitation for its urban and rural population, without disturbing the ecological balance" (UN-Habitat, 2012, p. 11). Therefore, moving toward sustainability is considered a fundamental necessity for all the cities of the world, especially Asian cities.

Sustainable development, through long-term appropriate strategies, can respond to human's fundamental needs and ensure a better future (Russo & Comi, 2012). Sustainable development has been a much debated topic in recent years, especially in developing countries (Yakob, Yusof, & Hamdan, 2012). Sustainability refers to the optimal use of available resources for the purpose of meeting human's needs such that the accessibility of the future generation to these resources would be least harmed (Huang, Yeh, Budd, & Chen, 2009). Since 1987, sustainable development has turned into an elevated and common concept such that all human's thoughts and activities are currently evaluated in terms of their conformity to this way of development. Therefore, different levels of planning, including spatial planning, should be attempted for achieving sustainable development (Persson, 2013).

The urban sustainability is an important aspect of sustainable development which cannot be achieved unless the sustainability of the community of urban areas is considered in planning and assessment (Saadatian, Sopian, & Salleh, 2013). One of the main challenges in urban sustainable development is considering the environmental dimensions in the process of planning for urban development (van Stigt, Driessen, & Spit, 2013). Reaching the goals

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of urban sustainability should be taken as one of the major duties of the world community, even among those countries which are under pressure due to their low income (Zhu, 2012).

"With the spread of the Sustainable Development paradigm, and the implementation of Local Agenda 21, the use of more comprehensive indicators has been promoted to measure the incorporation of social and distributive aspects together with intergenerational equity, Earth's carrying capacity, negative external shocks (such as global warming), and cities' ecological footprint, among other aspects" (Rosales, 2011, p. 642). To achieve urban sustainable development, cities should improve their economic, social and environmental structures such that the balance between human and the natural resources would not be disturbed (Rasoolimanesh, Badarulzaman, & Jaafar, 2012).

Despite the fact that urban development plans were prepared over five decades ago in Iran, all Iranian cities suffer unsustainability. As unsustainable aspects of various cities differ and are influenced by multiple factors, the first and most fundamental step in attaining urban sustainability is to identify unsustainable causes and factors, followed by planning to reform and remove such factors, and providing infrastructures to attain urban sustainability. Thus, the present paper aims to answer the following two questions by studying sustainability indicators accepted worldwide regarding Iranian middle-large cities:

What are the obstacles of achieving urban sustainability indicators in Iran?
How can we remove unsustainability causes and factors in Iranian cities so that the infrastructure of movement toward urban sustainability is provided?

The present paper first defines indicators based on global sustainability standards matched with the conditions and characteristics of Iranian cities, and then it examines the indicators in a 10-year period (2001–2011) in Sanandaj, and studies the process of relative changes of these indicators. Afterwards, the unsustainability indicators of the city are identified by examining the indicators that were degraded in this period. Then, the causes for failure to attain urban sustainability are identified by examining causes and factors influencing the degradation or declination of the indicators, so that the process of attaining urban sustainability is facilitated by providing strategies.

2. Methods

2.1. Context review

Sanandaj is the capital town of Kurdistan Province with geographical coordinates of 35°20′ north, 47°18′ east of Greenwich meridian, and 15° west of Tehran meridian (Fig. 1) (Statistical Center of Iran, 2011b). According to the latest national census in 2011, its population was 373,987 (Statistical Center of Iran, 2011a). The population growth rate was 3.7%, compared with that in 2006, and 9.2%, compared with that in 1956, when the first census was done. However, the urbanization ratio, which was 15.23% in 1956, increased to 83.36% in 2011. These figures indicate the rapid growth of urbanization, urban expansion, overuse of resources, and the lack of balance and equilibrium in urban development. The first urban guide plan was prepared in 1959 with a physical approach, followed by the first urban master plan in 1973, which proposed gridiron plan for urban physical development by creating new neighborhoods. The second master plan was prepared in 1984, and it was revised in 2006. The aforementioned plans had merely a physical view, and they were not much successful in attaining sustainable development purposes.

2.2. Sampling

Considering Zipf's rank-size rule, based on the populations of Iranian cities, middle-large rank cities refer to cities with a population of 250–500,000. However, urban division hierarchy in Iran is based on population. Therefore, urban planning and management and facilities allocation conditions are similar in these cities. Hence, inhabitance and environmental conditions of these cities are almost similar. Considering the fact that Sanandaj has a population of 373,987 based on the 2011 census and with regard to the given definitions, it is a middle-large rank city, and thus the unsustainability causes and factors specified for this city are generalizable to other similar cities in Iran.

The present paper used statistical data and field studies for data collection. Statistical data include the 2011 national census and the statistical annuals of 2001, 2006, and 2013. The field studies were collected by questionnaires filled by samples within the city. Sampling was done by systematic probability method using the following formula (Hafeznia, 2014):

$$n = \frac{\frac{t^2pq}{d^2}}{1 + \frac{1}{N}\left(\frac{t^2pq}{d^2} - 1\right)}$$

where "n" is number of questionnaires, "t" is the variable value in the normal distribution (Gaussian curve normal distribution), "p" is the ratio of the people who have the studied characteristic, "q" is the ratio of the people who do not have the characteristic, "d" is the researcher's error coefficient for the existence of that characteristic in society, and "N" is the size of the studied statistical population. Based on this formula, 248 questionnaires were distributed to the people of Sanandaj.

2.3. Urban sustainability

"At the 1972 United Nations Conference held in Stockholm, the concept of sustainable development regarding human environment was first expressed, and later in 1992, the United Nation Conference on Environment and Development held in Rio De Janeiro approved Agenda 21 in order to promote sustainable human settlement development. Then, in 1996 at the Habitat II Conference, the United Nations tried to present a statement to Localize Agenda 21 (LA21) in urban areas" (Rasoolimanesh et al., 2012, p. 626). The concept of sustainable development is relative, with different interpretations of it (Persson, 2013). The review of definitions of sustainable development often presents the problems that sustainable development should respond to, but the endpoint seems so broad that holds no specific point (Saha & Paterson, 2008). Sustainability should conform to all conditions and levels of planning (Persson, 2013, p. 302). The establishment of the design framework for a sustainable development has to be within a balanced structure of 'Top-Down' and 'Bottom-Up' dialoguing, the reflection of the various components of a society as well as the composition of the natural environments at both micro and macro levels (Alshuwaikhat & Nkwenti, 2002). Cities, due to their economic and social activities, use the most world resources and if they continue to do so, they inflict the biggest damage to the environment (Turcu, 2012).

With the quick growth of cities, urban planning can play an important role in policy-making. So the directions of urban planning should go beyond national urban development and supranational strategies should be adopted (UN-Habitat, 2009). Hence, a universal view related to sustainability could be defined as follows: planning for all economic, social, cultural, physical, and environmental levels in order to increase the efficiency of urban communities and to reduce the use of nonrenewable resources to enhance the welfare of all stakeholders in the community.