

Review and Analysis of Effective Components for Improvement of Environmental Quality by Analytic Network Process (Case Study: Saqez City)

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Introduction

Cities and neighborhoods in Iran could not adjust themselves to quick changes in the recent decades and they have lost their quality in many aspects. Due to poor planning and governance at the regional and urban design on physical function, rapid growth of large-scale migrations and inefficient policies and procedures in dealing with urban neighborhoods as well as constructive role in promoting social identity, and economic, physical situation of urban areas, the neighborhoods problems have somehow unprecedented appearance. Vision of neighborhood sustainable development strengthened new approach to urban problems that return to the concept that imagined neighborhoods as cells in urban living. One of the approaches that emerged from increasing urbanization is environmental quality: as an approach that seeking "urban favorable living". The present research is based on share point of two topics: "neighborhood sustainable development" and "environment quality". Because of deep study, this research is also based on resident's satisfaction and non-satisfaction about neighborhood quality. Finally, in finding the criteria to neighborhood sustainably assessment, we proposed the process to the decision makers and managers to prioritize actions for improving environment quality consistent with sustainable development process. This paper intends to promote the environmental quality and people satisfaction of living in neighborhood by recognizing and prioritizing the main environmental quality factors which have effects on the satisfaction of living in neighborhood. Neighborhoods of Saqez are selected for this study. Thus, in this paper, the environmental quality of urban planning in neighborhoods of Saqez City was evaluated from resident's perspective. Hence, this study is to pursue the following objectives: evaluation of urban environmental quality of Saqez neighborhoods; identification of the effective factors on quality of urban environment in the neighborhood.

Materials and Methods

According to the research objectives and components, the type of this research is practical and the methodology is descriptive- analytical. A survey was performed of 6 neighborhoods in Saqez, according to the administrative division. The sampling method was multi-stage: stage one was cluster sampling and stage two was simple random sampling. First, the number of samples was specified based on the total population. Cronbach's alpha was used to obtain the reliability of the research instrument. The value of 0.86 for the tool suggests that this tool has very good reliability. To obtain validity of the questionnaire, we used factor analysis by KMO. KMO value of 0.75 for this tool indicates a good level of validity. Some of the information has been gathered from the Population Census of Housing, data from annals, organizations, and institutions concerned. For data analysis, ANP model was used to evaluate the ability of neighborhoods of Saqez City.

The statistical population was 38,749 people according to the 2011 census data. Cochran's formula was used to determine sample size. The sample size was 380 questionnaires with 95% of confidence. This number is collected as a percentage of the neighborhoods population.

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Table 1. Specifications and sample size of neighborhoods elected

Sample Size	Population neighborhoods	Number of households	neighborhoods	area	sample size	Population neighborhoods	Number of households	neighborhoods	area
53	5367	1239	Koshtargah	4	41	4178	1112	Bazar	1
113	11538	2533	Baharestan Pain	5	39	4011	921	Tape Malan	2
41	4270	995	Shahrak Daneshgah	6	93	9385	2102	Shanaz	3
Questionnaires total				380	total population				38749

Results and Discussions

Model of assessment of environmental quality is based on special –physical, social- cultural, economic, environmental, management- governance components in hierarchical methods. Table 2 indicated priority components involved of assessment of environmental quality in the vision of the citizens and city managers. These two groups show the most important issues lower environmental quality neighborhoods Saez City in economic, management- governance aspects.

Table 2. Prioritizing clusters of assessment in Environmental Quality for neighborhoods of Saez City

The inconsistency index is 0.0162. It is desirable to have a value of less than 0.1		
Environmental		0.3644
special –physical (objective)		0.2007
special –physical (Subjective – Functional)		0.2004
social- cultural		0.0939
Economic		0.0588
management- governance		0.0411







Based on the results obtained from the network based model, final weights of the clusters are presented. The cluster environmental factor has the weight of 0.364, and special–physical the weight of 0.220 as more deference compared with other components, and economic cluster has the weight of 0.058, and the management- governance has also the weight of 0.041 as non- suitable situation with relative deference. Accordingly, by comparing results of clusters and nodes priorities for solutions, favorable environment areas were found in the neighborhoods of the Saez City.

As shown in the Table 3, normal column, in fact priority of each option based on the pairwise comparisons is displayed and the most common method is to view the results. Ideal column values by dividing each of the numbers by normal column upon the largest number of columns are achieved. The value number of the selected option is always one. Weak column values are directly received from the super matrix.

According to Table 3, Shahrak Daneshgah neighborhood is has the weight of 0.305 and in the first priority, Shanaz neighborhood with the weight of 0.297 is in the second priority, and Bazar neighborhood with the weight of 0.143 is also in the third priority. Tape Malan neighborhood is on the final priorities by rating the importance in 0.057. It can be deduced that ANP method is more accurate and could be the basis for prioritization purposes. The results of this process are coincident with the results of intuitive insight.

According to the results, central neighborhood (Bazar, Shanaz, Koshtargah) have more suitable and environmental sustainability than marginal neighborhoods (Tape Malan Baharestan Pain, Shahrak Daneshgah), except Shahrak Daneshgah. According to the index Shahrak Daneshgah with ideal weight of 1.000 is in the best situation and high environmental quality than other neighborhoods and Tape Malan with the ideal weight of 0.187 is in the lowest level and environmental quality.

Table 3. Results of the analytic network process for assessments of environmental quality in urban neighborhoods of Saez City

Name	Graphic	Ideals	Normal	Raw
Shahrak Daneshgah		1.0000	0.3057	0.0085
Shanaz		0.9716	0.2970	0.0082
Bazar		0.4681	0.1431	0.0039
Koshtargah		0.3835	0.1172	0.0032
Baharestan Pain		0.2606	0.0796	0.0022
Tape Malan		0.1870	0.0571	0.0015

Conclusions

The results of the comparative analysis in each of the six dimensions of the environmental quality in the neighborhoods suggest that the Shahrak Daneshgah has more suitability condition than Tape Malan. Tape Malan Neighborhood Priority action plan aimed at improving the quality of the environment. On the other hand, environmental quality has direct relationship with satisfaction of living in the neighborhoods. For prioritization of the indicators ANP quotient which was used to show the proportion of each factor on the environment quality. Then, 'by multiplying the ANP quotient by the proportion of each indicator in their factor the impact of each indicator was recognized in the environment quality. In the next step, the arrangement of the priority of indicators for promotion of environment quality can be achieved by living in neighborhoods. At the end, for promotion of the environmental qualities, some solutions were recommended. The main special –physical indicators that should be considered to promote the environmental qualities are including neighborhood that is well-connected with important parts of the city aesthetic aspects of the neighborhood mixed use neighborhood center and sense of central location. The main social indicators are residents' responsibility for social interaction and participation in public activities and interaction with city managers.

Keywords: Analytic Network Process (ANP), environmental qualities, neighborhood sustainable development, Saez city, urban environment.