J. Basic. Appl. Sci. Res., 2(9)8758-8769, 2012

ISSN 2090-4304
Journal of Basic and Applied Scientific Research
www.textroad.com

Spatial Analysis of the Development Status in Rural Regions of Saravan

A.Sepahi, Ramaezan Ali Naderi Mayvan, Mohammad Amin Hounakzahi, Ezzatolah Mafi

Ferdowsi University of Mashhad, International Branch, Mashhad, Iran

ABSTRACT

The main goal of present research is to determine the rural development level in Saravan city, regarding the fundamental, hygienic and medical, educational and cultural, economical, and social indexes. We have made use of taxonomy method. To better validate the quantitative results, comparison of results was performed using the United Nation's method of human development, which led to same results in both approaches. The obtained results indicate that development index has serious difference and inequality among rural regions of Saravan. Medium level of development was not observed in any of the regions. With the aim of applying strategic model of predicting the regional development priorities, this task was accomplished using the statistical software SPSS and factor analysis technique, accompanied by multi-variable regression model. In predicting the priorities of rural regions in Saravan using regression relationship between effective factors and rural development index (RDI), the first factor calculates and explains 63.51% of the variance by its own. Next factors can calculate and express 17.43% and 11.67% of the existing variance, respectively. So, the suggestions are presented with higher priority of low development regions considering the priority of effective factors.
KEYWORDS: Spatial analysis; taxonomy method; rural regions; Saravan

1. INTRODUCTION

Spatial analysis is considered a kind of geographical analysis which aims to give explanation about the human spatial behavior pattern (Mayhew, 2004). This technique is a quantitative method accompanied by local analysis. It is a modern method which determines how to optimally distribute the facilities in planning based on quantitative data.

The first basic theories in the field of economic development and under-development were established during 1950s (DHV consultant engineers, 1371). From the beginning of proposing these topics, different schools and approaches have been presented, including the school of development evolution, reconstruction theories, Marxist views of development, and dependence theory (Azkia, 1381). In general, the policies to increase the development rate of third world countries and rural regions have been without considering temporal, spatial, and social conditions. This means that an a priori prepared version has been regarded whose results are obvious in reaching the development in these countries.

There exist various quantitative techniques for evaluating and determining the development levels, which are used for organizing and assessment of information regarding the accessible validity and available data, together with the programmers' skills. These methods can be roughly categorized into two classes, namely the classic methods of development evaluation and modern methods. As instances of these techniques, one can mention taxonomic analysis, factor analysis, cluster analysis, hierarchical analysis, Morris model, and neural networks model (Badri, 1369). In a classic example, Parahamasa used a classic method, i.e. scallogram model, in order to evaluate the available facilities (Parahamasa, 1971). The advances in geographical information system have provided the possibility of spatial modeling and information analysis (Faraji Sabokbar, 1384). Theoretical background of this topic pertains to works of Myrdal, Hirchman, and Perroux, but development evaluation was globally initiated by the United Nations in 1991 (UNDP, 1991).

Presenting the theory of "center-periphery" in 1975, John Freedman considered center as the development origin and believed that, development progresses from center towards periphery (Clark, 2000). In another growth theory, endogenous growth is more emphasized than exogenous growth (Hader, 2000).

The main goal of development is the growth and multidimensional ascendency of human societies. Accordingly, in the planning process for reaching development and being in its pathway, it is essential to be familiar with conditions and requirements of human societies in materialistic and spiritual dimensions (Rezvani, 1383).

*Corresponding author: A. Sepahi, Ferdowsi University of Mashhad, International Branch, Mashhad, Iran
E-mail: ab.sepahi@gmail.com.

Success in change and advance of villages and their spatial organization is dependent upon the process of development programs in all parts of a country and consistent and pre-assessed activities for creating balance between rural and urban regions and removing the existing inequalities regarding the qualitative standards of life (Saeedi, 1377).

What the programmers consider in rural development is the integrated rural development regarding all aspects of rural life. Therefore, this integrated rural development is dependent on production increase, improvement of the level of knowledge and motivation, providing various services, improvement and modification in connection and transport network, reformation of rural houses, creating variety in occupational facilities, and modification and organizing of local-spatial network of rural residences (ibid).

Expressing the spatial status of development regarding the programming for effective services to mentioned villages, together with determining the position of rural regions regarding the development facilities, are two significant factors in planning. Considering this, we evaluated the rural regions of Saravan using taxonomic methods and the human development index of the United Nations, with seven indexes of population and employment, official and political index, water and electricity and gas utilities, hygienic and treatment facilities, the broadcasting status of radio and television waves, telecommunication, and communication.

2. Statement of the problem

Due to being located in south-east of Iran in a boundary situation, the province of Sistan and Baluchestan has different characteristics compared to other regions of the country, which has resulted to creation of some different properties in comparison with other provinces. The villages of this province are faced with special problems considering the stated conditions and lying near the border. So the distribution of facilities and services drastically influence the social, economic, and even political processes there. On the one hand, the low level of employment and on the other hand, the cultural poverty accompanied by environmental and natural conditions has lower the development rate in these regions, leading to several serious social problems. To reach a balanced and multidimensional development, it seems necessary to investigate the potentials of each geographical region in detail and a development pattern should be considered regarding the social and natural limitations. Taking into account the importance of rural regions of Iran, we have assessed in the present research the rural regions of Saravan as a border city. Under-development in border zones of the country threatens their security and conveys insecurity inward the country, resulting in enormous challenges against development process of the country (Imam Hossein University, 1378).

From the total population of Saravan in 1375, 58651 persons live in urban regions and 109476 persons live in rural zones and the ratios of urbanity and rural population are 34.01 and 65.99 percent, respectively. In comparison of these ratios with similar ratios in the province (46.2% urban and 53.88% rural population) the high contribution of rural population and the significance of this life pattern in social combination of this city's population is clearly observed (The organization of planning and budget of Sistan and Baluchestan, 1376). It is obvious from the change rates in urban and rural populations in the two recent censuses that, the growth rate of urban population in Saravan is double of the similar growth rate in the province. Statistically, the growth rate of urban population in the province is 4.49%, while this rate for Saravan is 9.46%, which has put Saravan as one of cities with highest growth rates. The above issues indicate that compared to other regions of this province, immigration from villages to towns is more serious in Saravan despite high potentials of rural regions (Ibid, 1376). This requires scrutinizing the effective factors in decreasing the population of rural regions in comparison with urban population in Saravan. We have therefore evaluated the development status of these rural regions.

3. The area under study

This research has been carried out in rural regions of Saravan. The city has an area of 23880 square kilometers, equal to 12.73% of total area of Sistan and Baluchestan province, and is located in south-east of the province in Baluchestan zone. It is limited to city Khash from north and to city Iranshahr from west, and has a border with Pakistan, having a common border of 360 kilometers with this country (The organization of planning and budget of Sistan and Baluchestan, 1381).

4. RESEARCH METHOD

In order to evaluate the development levels, taxonomic analysis and human development index were separately used. The method used in this research has analytic and descriptive approach and we have made use of statistics of the organization of planning and budget of Sistan and Baluchestan in 1383, together with the statistics of Iranian statistics center in 1375. Moreover, the softwares Excel and SPSS were used for analyzing data, and the software *ArcView* was utilized in order to drawing the maps.

5. Indexes used in the research

The indexes used in this study are as following.

a) Fundamental indexes: number of employed people; center of services; corporations; post of duty; tap water; electricity; telephone; telegraph; post box; post agency; availability of transportation.

b) Educational, cultural, and social indexes: Islamic council; number of literate people; radio; television; newspaper.

c) Hygienic and medical indexes: bathroom; hygienic centers; pharmacy; hygienic house; doctor; dentist; experimental dentist; paramedic and obstetrician; hygienist; refiner.

6. Method of numerical taxonomic analysis

One of the best ranking methods regarding the level of development is the method of taxonomic analysis, a special kind of which is numerical taxonomic method. It was first presented by Adunson in 1763 and was proposed in 1968 by professor Hellwing in UNESCO as a tool for determining the degree of development in different countries (Hosseinzadeh Dalir, 1380).

In general, it is an excellent method in ranking, classification, and comparison of countries and different regions and zones regarding their degree of development and modernism. This method divides a set into homogeneous subsets and provides the programmers with an acceptable comparison for study and evaluation of development level of the regions (Asayesh, 1375).

Since the most significant step in planning for rural development is determination of development objectives including the decrease in imbalances, it is possible to recognize the direction and type of development via determining the development degree of each place (Ziari, 1385).

7. Procedure of taxonomic method

First step: Formation of data matrix

We first consider the set *X* including *n* members and indicating the different regions 1, 2, 3, …, *n*. These have a group of variables 1, 2, 3, ..., *m*, where *m* is the number of indexes (properties) which are expressed as the following matrix.

$$\begin{bmatrix} X_{11} & X_{12} & X_{13} & . & . & . & X_{1m} \\ X_{21} & X_{22} & X_{23} & . & . & . & X_{2m} \\ X_{31} & X_{32} & X_{33} & . & . & . & X_{3m} \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ X_{n1} & X_{n2} & X_{n3} & . & . & . & X_{nm} \end{bmatrix}$$

So each region is shown by a vector in a two-dimensional space, where x_{ij} denotes the *j*th property of *i*th region. Considering different scales of the properties, it is necessary to remove the interference of different scales from the model. Hence, we first compute the average of the columns and then the standard deviation for each column of matrix X_{ij}. This matrix is depicted in Table 1.

$$S_j = \sqrt{\frac{\sum_{i=1}^{n}\left(X_{ij} - \overline{X}_j\right)}{n}} \quad (1)$$

$$\overline{x}_j = \frac{1}{n}\sum_{i=1}^{n} x_{ij} \quad (2)$$

Second step: Formation of standard matrix

The second step is to form a new matrix *Z* using the standardized members of matrix X_{ij}, which can be computed from the following formula, where the matrix *Z* has the dimension *n.m*.

$$\begin{bmatrix} Z_{11} & Z_{12} & Z_{13} & . & . & Z_{1m} \\ Z_{21} & Z_{22} & Z_{23} & . & . & Z_{2m} \\ Z_{31} & Z_{32} & Z_{33} & . & . & Z_{3m} \\ . & . & . & . & . & . \\ . & . & . & . & . & . \\ Z_{n1} & Z_{n2} & Z_{n3} & . & . & Z_{nm} \end{bmatrix}$$

$$Z_{ij} = \frac{X_{ij} - \overline{X}_j}{S_j} \quad (3)$$

Since the development indexes of the existing quantities in Table 1 are calculated with different scales, we transform each element of matrix X into standard matrix according to the above formula in order to remove the effect of different scales and to replace a single scale, as Table 2 shows.

Matrix Z is now without any scale. The average value of each column is zero, in other words: $\sum j = 0$. If we take sigma from both sides of Equation 3, and divide them by *n*, the following yields.

$$\frac{\sum_{i=1}^{n} Z_{ij}}{n} = \frac{\sum_{i=1}^{n} \left(X_{ij} - \overline{X}_j\right)}{ns_j} = \frac{0}{ns_j} = 0 \quad (4)$$

and standard deviation of each column will be one, since

$$s_j = \sqrt{\frac{\sum_{i=1}^{n} \left(Z_{ij} - \overline{Z}_j\right)^2}{n}} = \sqrt{\frac{\sum_{i=1}^{n} \left(Z_{ij}\right)^2}{n}} = \sqrt{\frac{\sum_{i=1}^{n} \left(X_{ij} - \overline{X}_j\right)^2}{n}} =$$

$$\sqrt{\frac{\sum \left(X_{ij} - \overline{X}_j\right)^2}{n\left(S_j\right)^2}} = \frac{\sqrt{\frac{\sum_{i=1}^{n} \left(X_{ij} - \overline{X}_j\right)^2}{n}}}{S_j} = \frac{S_j}{S_j} = 1 \quad (5)$$

The zero average and standard deviation of unity helps to control the fidelity of matrix *Z*.

Third step: Calculating the combined distances among rural parts and determining the shortest distances

Having obtained the standard matrix *Z*, the next step is to calculate the difference or distance between 2 points among all the points for each of *m* variable or properties. The mentioned matrix is of (n-1) matrix which can be separated by (n-2) horizontal partitions.

We now use the following formula for finding the distance between two points P_a and P_b for each set or subset of *m* variables, and D_{ab} is calculated, where a,b=1,2,3,....

$$\sqrt{\sum_{k=1}^{m} \left(D_{ak} - D_{bk}\right)^2} \quad (6)$$

So $D_{ab}=D_{ba}$, in other words, the distance between *a* and *b* is equal with the distance between *b* and *a*, and $D_{ab} <= D_{ka} + D_{kb}$, and we put the result into matrix D, which is the distance matrix.

$$D = \begin{bmatrix} 0 & D_{12} & D_{13} & . & . & D_{1m} \\ D_{21} & 0 & D_{23} & . & . & D_{2m} \\ D_{31} & D_{32} & 0 & . & . & D_{3m} \\ . & . & . & . & . & . \\ . & . & . & . & . & . \\ D_{n1} & D_{n2} & D_{n3} & . & . & 0 \end{bmatrix}$$

According to formula $D_{ab}=D_{ba}$, matrix D has the characteristics that, it has symmetry and its major diagonal is filled with zero. Members of matrix D show the combined distance of each region with other regions. In other words, there are multi-distances on each of several dimensions on which the regions can be compared to each other, as Pythagoras' theorem says in mathematical terms. In each row or column, the shortest distance D_a between that region and other regions can be found, which is an index showing the similarity value of that region with other regions. Since the least distance between the hypothetical point P_a and other points in row *a* is D_{ab}, P_b is called the pattern and P_a is called the projection of P_b. In other words, the least value in each row indicates the shortest distance, and the column relating to this shortest distance shows the region being the nearest one to this region with that row number, as Table 3 depicts.

As is observed in the table, the diagonal of distance matrix is zero and it is symmetric. Each element of the matrix denotes the distance between two rural parts. In each row, the shortest distance is specified, which is a similarity index of that region with another region. In other words, the nearest and most similar region to the noted region is the one whose combined distance has lowest value.

Fourth step: Determining homogeneous regions

In order to find homogeneous regions, the maximum critical range $d_{(+)}$ and minimum critical range $d_{(-)}$ are calculated as following.

$$d_{(+)} = \bar{d} + 2s_d \quad (7)$$

$$d_{(-)} = \bar{d} - 2s_d \quad (8)$$

in which, $\bar{d}$ is the average shortest distance and s_d is its standard deviation. The number 2 in this formula is the Z value of normal distribution, calculated in 95% level. The regions whose distances are between the two critical ranges are considered as homogeneous spaces and are classified in the same category. On the other hand, the regions with distances more than $d_{(+)}$ have no similarity regarding the development. As a result, all connections with length of more than upper limit can be put away since the length of these distances is more than what to be considered as a part of a united graph. Also, all connections with length of less than lower limit can be put away since the length of these distances is less than what to show difference between the two regions. That is to say, the two regions in this case are so similar to each other that cannot be considered as two regions. In this research, all rural parts are located in this range.

Fifth step: Classification of homogeneous regions and calculating the development representative

After the mentioned procedure, it is possible to rank the regions in each homogeneous group. To do this, we form matrix *Z* for each of homogeneous groups and calculate the largest data in each of the columns relating to selected indexes. This value is called the ideal value. Subsequent to finding the ideal values for each of the indexes, we choose the region of development representative. It is noted by C_{io}, which is the *i*th region of the ideal region (*o*) in matrix *Z*, and is computed from the following formula.

$$C_{io} = \sqrt{\sum_{i=1}^{m} \left(Z_{ij} - Z_{oj}\right)^2} \quad (9)$$

where *o* denotes the ideal region, C_{io} is the region of development representative, and Z_{OJ} shows the maximum values of the columns in standard matrix. The smaller the value of C_{io}, the more developed the *i*th region is, i.e. the distance between *i*th region and the ideal region (*o*) is less. Conversely, the more the value of C_{io}, the less developed the *i*th region is. Table 4 demonstrates the amount of development representatives in rural regions of Saravan.

Final step: Calculating the development degree of regions

It should be mentioned that the development degree of regions is a function of development representative and critical distance from the ideal region and the practical issues can be tested using following formulas. If we consider F_i as the symbol of development value for *i*th region, the following formulas are valid:

$$F_i = \frac{C_{io}}{C_o} \quad (10)$$

$$C_o = \overline{C}_{io} + 2S_{io} \quad (11)$$

$$\overline{C}_{io} = \frac{1}{n}\sum_{i=1}^{n} C_{io} \quad (12)$$

$$S_{io} = \sqrt{\frac{\sum_{i=1}^{n} \left(c_i - \bar{c}\right)^2}{n}} \quad (13)$$

in which, C_{io} denotes average development representative, and S_{io} represents standard deviation of development representative. According to these formulas, value of F_i changes between zero and one, where the nearer it is to zero, the more the development similarity is and vice versa. Table 5 illustrates the F values of rural regions in Saravan.

8. Research findings

Development index was computed for each rural part of Saravan making use of the collected data with 3 indexes (32 variables) and based upon taxonomic model. The results indicate that, the development index of rural regions fluctuates between 0.36 and 0.88. The rural regions of Sibosuran with value of 0.36 and rural regions of Jalagh with value of 0.88 have the highest and lowest values of development index among rural regions in Saravan, respectively, as Table 5 shows.

In order to clarify the development status, we have put the development coefficient in standard classification of this index as following, which indicates a serious imbalance between development levels of the regions. This also reveals that, the rural regions of Sibosuran are very different from other regions, being located in development level (Table 6 and Map 2).

As is observed in Table 6 and Map 2, none of the rural regions are located in high-developed level in total results, which is an indication of the fact that there exists no balanced development and shows the serious spatial inequality in these regions.

9. Ranking the villages of Saravan based on their position in each major group of indexes

If we investigate all development indexes in form of three major index groups as economic and fundamental indexes, educational and cultural and social indexes, and hygienic and medical indexes, it is possible to present a more realistic image of development status.

The results obtained from ranking the rural regions in Saravan based on development coefficient and separated by each of studied indexes indicate that in fundamental indexes, rural regions of Sibosuran have the highest development coefficient, while rural regions of Jalagh, Bamposht, and Zaboli are of least development coefficients. From this view, rural regions of Markazi are in medium level, as Map 3 depicts. Due to high influence of human resources in calculating this index, rural regions of Markazi are located in medium development level since there is serious immigration toward center of the city, though this part is near the city center.

From the view of hygienic and medical indexes, rural regions of Markazi have the highest development coefficient and are located in highly-developed level. Rural regions of Sibosuran are in medium level and the lowest development coefficients belong to rural regions of Jalagh, Zaboli, and Bamposht, respectively (Map 4). It seems that due to high influence of medical staff in calculation of this index, Markazi has been in high level of development. Spatial distribution of facilities and human resources in this part shows that there is a great tendency for establishment of medical teams toward Markazi, due to its closeness to city center. Due to lack of a developed area in rural regions and being Markazi as the only rural region with highest development level, a drastic spatial inequality is observed which requires balanced distribution of hygienic and medical facilities in plannings for this city. From the view of educational, cultural, and social indexes, rural regions of Sibosuran are in medium level and the rural regions of Jalagh, Bamposht, Markazi, and Zaboli are deprived (Map 5). It seems that all rural regions are deprived from this viewpoint since none of them are highly-developed or developed.

10. Strategic model of predicting the development priorities of rural regions in Saravan

The effective factors in development of rural regions can be computed and presented using SPSS software and factor analysis technique (Human, 1381) through Varimax rotation in multi-variable regression model (Nasiri, 1384). In this research, rural development index (RDI) has been considered as dependent variable and factor scores of the three factors are considered as independent variables. The assignment coefficient R^2 has been obtained as one (Table 9) which indicates that 100% of the changes in development degree of rural regions in Saravan is caused by the three mentioned factor under study. Decreasing the percentage of loaded variables in mentioned factors leads to a decline in development degree of the regions, and vice versa.

Making use of Table 11, the model is presented for predicting the development priorities of rural regions in Saravan. The obtained model from regression formula is as following.

$Y= 0/439+0/219\ fa_1+0/111\ fa_2+0/002\ fa_2$

The significance level shows that the influences of the three factors are most effective in descending order. The first factor has the highest contribution in development prediction and other factors have less contribution since one unit of change in standard deviation of effective factors leads to changes of them to 0.891, 0.454, and 0.010.

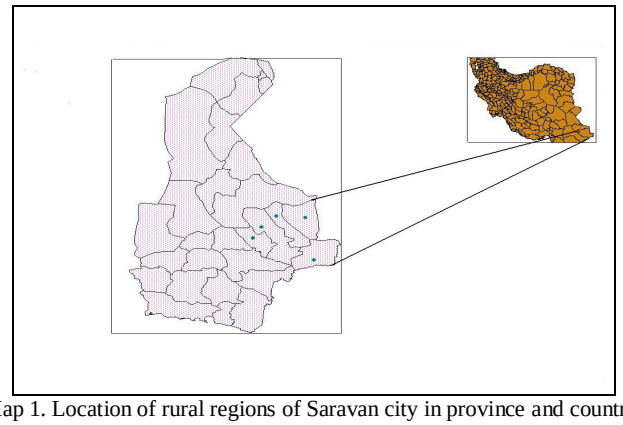
Factor name; Specific value; Variance percentage; Percentage of accumulated variance.

Therefore, it is possible to develop rural regions in Saravan considering the regression model as following.

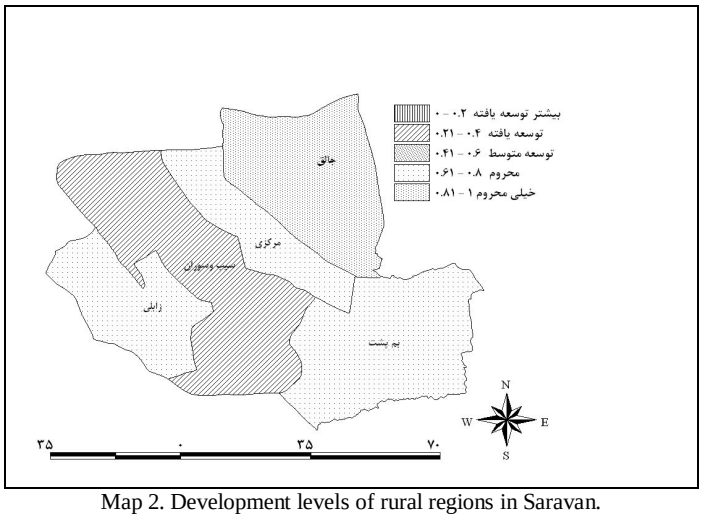
1) Among the loaded indexes in the first factor, the priority for development of rural regions is respectively from low levels to high levels including improvement of services, facilities, and medical staff, which include the increase in refiner staff, development and equipping hygienic centers, and providing doctors and hygienist. In the second group, loaded factors in the first

factor considering the second degree of contribution in these indexes compared to the first case are telecommunication and post facilities and equipments, which are proposed in the second priority in order to improve the development levels from regions with low development to those with higher development levels. The next indexes effective in development are levels of literacy and employment, in which the contribution of women's literacy is 4.5% more effective than men's literacy. Consequently, methods of increasing the levels of literacy and employment are proposed in the third priority for increasing the development levels in rural regions of Saravan.

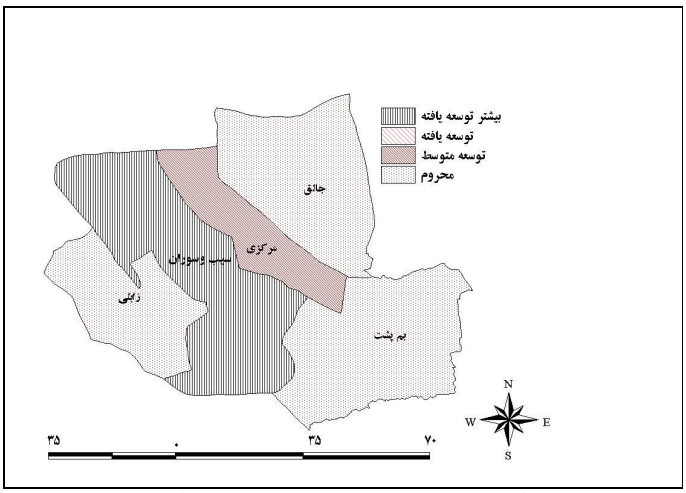
2) Among the indexes for putting the development level of the city in the mentioned range of the second factor, the effective factors in descending order are: extension and equipment of pharmacies, dentist offices, and increasing the number of police stations.
3) The third priority for increasing the development levels in rural regions of Saravan includes the increase in transportation and enhancing newspaper agencies.



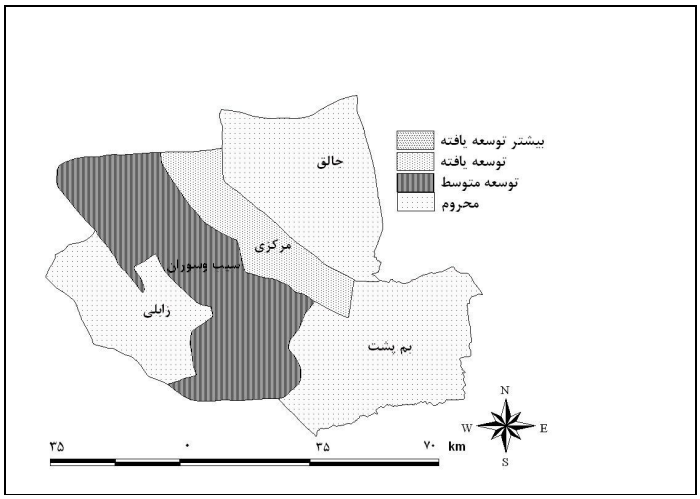
Map 1. Location of rural regions of Saravan city in province and country.
(Source: the author, using *ArcView* software).



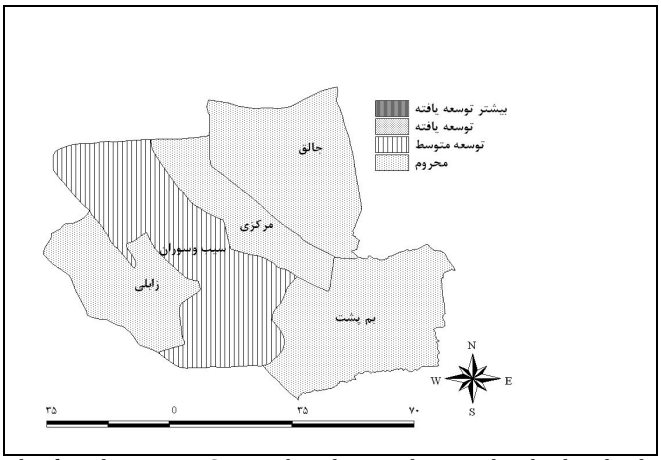
Map 2. Development levels of rural regions in Saravan.
(Source: The author, using *ArcView* software).



Map 3. Development levels of rural regions in Saravan based upon fundamental indexes. (Source: The author using *ArcView* software).



Map 4. Development levels of rural regions in Saravan based upon hygienic indexes. (Source: The author using *ArcView* software).



Map 5. Development levels of rural regions in Saravan based upon educational and cultural indexes (Source: The authors using *ArcView* software).

Table 1. Rural

Section / Index	Bamposht	Jalagh	Sib-o-suran	Zaboli	Markazi	$\overline{X}$	δ
Illiterate men	4230	1940	8546	5376	7490	5516.4	**2346.85**
Illiterate women	2190	1391	6109	3432	3552	3334.8	**1602.60**
employed men	3172	1149	5917	4115	3552	3635	**1453.94**
employed women	29	31	169	89	57	75	**51.78**
Islamic council	21	4	54	37	9	25	**18.42**
services center	0	1	3	2	2	1.6	**1.09**
corporation	27	7	31	11	13	17.8	**9.43**
Post of duty	9	5	5	3	9	6.2	**2.4**
Basij base	2	1	6	4	5	3.6	**1.8**
tap water	23	28	47	16	15	25.8	**11.61**
electricity	19	11	52	13	23	23.6	**14.82**
bathroom	2	16	0	0	3	4.2	**6.01**
hygienic center	6	0	7	3	3	3.8	**2.4**
Pharmacy	6	2	3	2	3	3.2	**1.4**
hygienic house	12	8	36	14	11	16.2	**10.08**
doctor	5	3	13	3	3	5.4	**3.87**
dentist	5	1	1	1	1	1.8	**1.6**
experimental dentist	0	0	1	1	1	0.6	**0.48**
paramedic and obstetrician	37	0	53	32	6	25.4	**19.8**
hygienist	18	7	35	14	21	21	**10.48**
refiner	6	2	22	8	10	9.6	**6.74**
MW radio	110	43	210	121	82	113.2	**55.39**
FM radio	76	0	196	115	63	90	**64.663**
Channel 1 TV	46	11	142	98	63	72	**44.84**
Channel 2 TV	38	99	140	98	62	69.4	**45.8**
Channel 3 TV	0	0	5	1	1	1.4	**1.85**
Post box	4	2	8	2	6	4.4	**2.3**
Post agency	3	1	4	1	1	2	**1.26**
telegraph	1	1	0	2	1	1	**0.63**
telephone	3	0	21	6	9	7.8	**7.2**
Transportation	22	28	38	15	24	25.4	**7.57**
Newspaper	**0**	**0**	**0**	**1**	**0**	**0.2**	**0.4**

(Source: Results of general and residence census report, Saravan city, Iranian statistics center, 1375, and statistical calendar of management and planning organization of Sistan and Baluchestan, 1384).

Table 2. *Z* index for rural regions of Saravan (standard index).

Section / Index	Bamposht	Jalagh	Sib-o-suran	Zaboli	Markazi	Ideal
Illiterate men	-0.54	-1.52	1.29	-0.05	0.84	1.29
Illiterate women	-0.71	-1.21	1.73	0.06	0.13	1.73
employed men	-0.31	-1.52	1.56	0.33	-0.05	1.56
employed women	-0.88	-0.84	1.81	0.27	-0.34	1.81
Islamic council	-0.21	-1.31	1.57	0.65	-0.86	1.57
services center	-1.56	-0.58	1.37	0.39	0.39	1.37
corporation	0.97	-1.14	1.39	-0.72	-0.50	1.39
Post of duty	1.16	-0.5	-0.5	-1.33	1.16	1.16
Basij base	-0.86	-1.40	1.29	1.22	0.75	1.29
tap water	-0.24	0.18	1.82	-0.84	-0.92	1.82
electricity	-0.31	-0.84	1.91	-0.71	-0.04	1.91
bathroom	-0.36	1.96	-0.69	-0.69	-0.19	1.96
hygienic center	0.88	-1.53	1.28	-0.32	-0.32	1.28
Pharmacy	1.90	-0.81	-0.13	-0.81	-0.13	1.9
hygienic house	-0.41	-0.81	1.96	-0.21	-0.51	1.96
doctor	-0.10	-0.63	2	-0.63	-0.63	2
dentist	2	-0.5	-0.5	-0.5	0.5	2

experimental dentist	-1.5	-1.5	1	1	1	1
paramedic and obstetrician	0.57	-1.29	1.38	0.32	0.99	1.38
hygienist	-0.3	-1.4	1.4	-0.7	1	1.4
refiner	-0.53	-1.13	1.85	-0.23	0.05	1.85
MW radio	-0.05	-1.27	1.76	0.14	-0.56	1.76
FM radio	-0.21	-1.4	1.65	0.39	-0.4	1.65
Channel 1 TV	-0.59	-1.38	1.59	0.59	-0.2	1.59
Channel 2 TV	-0.68	-1.33	1.57	0.64	-0.15	1.57
Channel 3 TV	-0.77	-0.77	2	-0.22	-0.22	2
Post box	-0.17	-1.04	1.56	-1.04	0.69	1.56
Post agency	0.83	-0.83	1.66	-0.83	-0.83	1.66
telegraph	0	0	-1.58	1.58	0	1.58
telephone	-0.66	-1.08	1.83	-0.25	0.16	1.83
Transportation	-0.45	0.34	1.68	-1.38	-0.18	1.68
Newspaper	-0.5	-0.5	-0.5	2	-0.5	2

(Source: Author's calculations).

Table 3. Combined distances of rural regions in Saravan.

	Bamposht	Jalegh	Sib-o-suran	Zaboli	Markazi	D.Min
Bamposht	0	7.15	11.25	7.57	6.39	6.39
Jalagh	7.15	0	14.08	7.87	7.08	7.08
Sib-o-suran	11.25	14.08	0	10.46	9.83	9.83
Zaboli	7.57	7.87	10.46	0	5.66	5.66
Markazi	6.39	7.08	9.83	5.66	0	5.66

(Source: Author's calculations).

Table 4. The development representatives.

Rural parts	the development representative
Bamposht	11.18
Jalagh	14.61
Sib-o-suran	6.04
Zaboli	10.91
Markazi	10.72

(Source: Authors' calculations).

Table 5. The development coefficient and ranks of rural regions in Saravan.

Rural parts	Possession coefficient	Grade
Bamposht	0.67	4
Jalagh	0.88	5
Sib-o-suran	036	1
Zaboli	0.66	3
Markazi	0.63	2

(Source: Author's calculations).

Table 6. Development status of villages in Saravan.

	Development position of rural regions	F
----------	more developed	0-0.2
Sib-o-suran	developed	0.21-0.4
----------	medium developed	0.41-0.6
Bamposht-Zaboli-Markazi	deprived	0.61-0.8
Jalagh	very deprived	0.81-1

(Source: Authors' calculations).

Table 7. Final results of the factors.

Factor name	Special value	Variance(%)	Computational variance(%)
1	20.325	63.516	63.516
2	5.580	17.438	80.935
3	5.736	11.675	92.628

(Source: Author's calculations).

Table 8. Factor scores of rural regions in Saravan.

Rural regions	Third factor	Second factor	First factor
Bamposht	-1.74605	0.10626	0.05994
Jalagh	0.5866	0.43311	-1.55
Sib-o-suran	0.39794	1.2927	1.1387
Zaboli	0.66264	-1.43411	0.54076
Markazi	0.09886	0.21541	-0.06952

(Source: Author's calculations).

Table 9. Statistics of multi-variable regression analysis for development indexes of rural regions in Saravan.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000(a)	1.000	1.000	0.00032

a: Predictors: (Constant), fa_3, fa_2, fa_1

Table 10. Variance analysis of multi-variable regression for development indexes of rural regions in Saravan.

Model	Sum of Squares	d_f	Mean Square	F	Sig.
Regression	0.241	3	0.080	788946.359	0.001(a)
Residual	0.000	1	0.000		
Total	0.241	4			

a: Predictors: (Constant), fa_3, fa_2, fa_1
b: Dependent Variable: R

Table 11. Statistics of development indexes of regression patterns in the model.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.439	0.000		3077.293	0.000
fa_1	0.219	0.000	0.891	1370.891	0.000
fa_2	0.111	0.000	0.454	698.040	0.001
fa_3	0.002	0.000	0.010	15.422	0.041

Variable: RDI a Dependent

11. Conclusion

In order to reach a stable and comprehensive rural development, recognition of facilities and limitations of rural regions and determination of their deprivation is of great importance, which should be considered. Based upon this, development coefficient of rural regions in Saravan city was computed in the present investigation using 32 variables as 7 indexes via taxonomic model, and the classification of rural regions was performed in four levels of highly-developed, developed, medium-developed, and deprived. The results indicate that the development coefficient is drastically unequal among rural regions and several rural regions in this city suffer from deprivation of facilities. Based on the obtained results, it is essential for reaching a comprehensive rural development to have a fundamental planning while finding the limitations and potentials of these regions, and to create a hierarchical system through which the decrease in inequalities of rural regions in this city would be accomplished. To predict the development priorities of rural regions in Saravan and after evaluating the factors, the contribution of first factor in expressing the variance is estimated as 63.51%. Therefore, in order to develop the mentioned rural regions, the priorities in descending order are as facilities, medical equipments, increase in level of literacy, communication and telecommunication services, and increasing the transportation facilities.

REFERENCES

1- Comfort, H., regional planning techniques, publisher of Payam Noor, 1998.

2 - Azkia, M., Rural Sociology of Development and Underdevelopment, Information Publishing, 2002.

3 - Badri, SM Ali, centers locate Rural Development, Master's thesis, Geography and Regional Planning, Tarbiat Modarres University, 1990.

4 - brave Hosseinzadeh, K., regional planning, the Publications, Tehran, 2001.

5 - Imam Hossein (AS), Border Town project, Imam Hossein University Press, 1998.

6 - Rezvani, Mohammad Reza, Introduction to Rural Development Planning in Iran Ghomes Publications, Tehran, 2004.

7 - Ziarat, or dignity., Strategy and Regional Planning, Yazd University Press, 2006.

8 - Management and Planning Organization of Sistan and Baluchistan, two-year program to develop the city of Saravan, 1997.

9 - Management and Planning Organization of Sistan and Baluchistan, in Saravan city status in 2002, December 2003.

10 - Saeedi, A., Fundamentals of rural geography, the Publications, Tehran, 1998.

11 - Faraji unencumbered, HA, location of commercial services using a single hierarchy (AHP), Journal of Geographical Research, Tehran University, No. 51, Spring 2005.

12 - SCI, Badyhay of birth, city of Saravan, 1996.

13 - Mrkzamar Iran, the results of the General Census of Population and Housing, the city of Saravan, 1996

14 - DHV Consultants of the Netherlands, guidelines for planning rural centers, the first volume, published by the Construction Jihad, Tehran, 1992.

15 - Misra, R.. Following discussions on rural development, Jihad Magazine, Issue No. 115, 1994.

16 - Nassiri, R., step by step training SPSS13, Wide Publishing Publication Cultural Center, Tehran, 2005

17 - H., Haider Ali, multivariate data analysis in behavioral research, publications, pious, Tehran, 2002.

18- Clark, D (2000); Urban word, Global city, Routledge, London

19- Hodder, R (2000); Development Geography, Routledge, London

20- Mayhew, Susan (2004); Oxford Dictionary Of Geography, press Inc, new York, USA.

21- parahamasa, H (1971); Planning Rural Growth centers for integrated area Development .

22- UNDP (1991); Human Development Report, New York.