Assessing Development Degree and Ranking Townships of Mazandaran Province by Using Factor Analysis and Cluster Analysis

M. Taghvaei, I. Bahari

Extended abstract
1- Introduction

Regional planning aiming at promoting development and decreasing inequality is considered among important issues in developing countries. Necessary for regional planning is to identify the position of regions toward each other with respect to development. Decreasing inequality in enjoyment of national resources, findings and facilities is one of the basic criteria for development. In addition to growth in all directions, the concept of development involves balanced distribution. The balanced distribution of facilities and services is a step toward removing regional differences and proportionate distribution of population in a region.

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The Balanced development of geographical spaces requires accurate and comprehensive examination of economical, social and cultural issues, better recognition of society needs and their improvement. Therefore, ranking of regions based on enjoyment of various development indices is of common criteria in regional development.

Balanced development of geographical spaces requires investigating economical, social, cultural issues carefully and completely and knowing society needs better and improving them. These are subject to the availability of complete, processed statistical data concerning mentioned regions. The way facilities and services distributed in the regions become apparent through comparatively investigating different economical, social and spatial indexes

in different regions in comparison. Indices may reveal the condition of different geographical areas comparatively and they may rank and prioritize these regions in terms of facilities and shortages (Zali, 1379, p.5). Lack of balance in the procedure of development causes creating gap among regions and intensifying regional inequalities, which in turn, is considered as a barrier on the path of development. Therefore, to study socio-economical inequalities among country or province regions is of essential and basic measures in economical growth together with social justice, affecting the allocation of resources with the aim of solving regional inequalities.

2- Methodology

Concerning investigated factors, dominant approach in this study is descriptive-analytical and research method is applied-developmental. Research population consists of Mazandaran Province's townships. To collect data, 1386 (2005) statistical calendar of the province and Iranian Statistics Center were made use of. In the current study, every index was calculated for all townships through factor analysis and cluster analysis using SPSS and EXCEL. Then, development levels, inequalities and differences among townships were calculated and analyzed. Furthermore, those development levels were drawn on maps.

3- Discussion

To analyze development indices in Mazandaran Province, after converting 105 selected indices to statistical analyzing, 88 statistical indices in 9 main sectors (educational, medical and health, population and human force, logistics and communication, social-administrative and welfare services, fundamental services and facilities, mine and industry, socio-cultural and agricultural) were determined for proper factor analysis and factor analysis technique was done through SPSS. The results of KMO1, with more than 70% in development indexes, represented that the indexes in all sectors were proper for performing factor analysis and the result of Bartlett′S Test of Sphericity was significant. For every sector, the stages of factor analysis were separately employed for 16 townships of the Province. Those stages include: 1.preparing standard matrix, 2.calculating correlation coefficients matrix, 3. Extracting factors, 4.Turning factors using Varimax Method, 5.titling factors, 6.calculating factor points, and 7.ranking townships. After passing factor analysis stages for every sector using obtained factor points, composite index was calculated. Then, townships were ranked in every understudy sector, the most deprived and the most enjoyed townships were specified in every sector and factors effective on the depravity and enjoyment were determined. In the next phase, combined index of 9

1- Kaiser- Meyer- Olkin Measure of Sampling Adequacy.

sectors was summed up, their average was calculated and composite index was obtained for all development indexes. Furthermore, final rank of townships was achieved. Ultimately, according to the below formula, townships were ranked in development indices:

$$\bar{x}+sd=0.740098$$
$$\bar{x}_{+\frac{1}{4}sd}=0.185285$$
$$\bar{x}_{-\frac{1}{4}sd}=-0.24965$$
$$\bar{x}-sd=-0.7394$$

In the above formula, average is 0.000347 and Standard Deviation 0.739751. Therefore, the townships were categorized to 5 groups or development levels:

So enjoyed townships with points higher than 0.740098, including Savadkooh and Ramsar Townships

Enjoyed townships with points between 0.185285 and 0.740098, including Babolsar, Noor and Amol Townships

Relatively enjoyed townships with points between -0.24965 and -0.185285, including Sari, Chaloos and Babol Townships

Deprived townships with points between -0.7394 and -0. 24965, including Juibar, Behshahr, Mahmoodabad, Noshahr, Tonekabon and Ghaemshahr Townships

So deprived townships with points lower than -0.7394, including Galoogah and Neka Townships

According to extracted points and composite index, using cluster analysis technique, homogeneous groups were determined and the townships were ranked. In the present study, hierarchical cluster analysis was made use of for more applications in geographical studies.

4- Conclusion

Findings obtained from factor analysis points in sectors understudy and composite index resulted from their points indicate that there are differences among townships of Mazandaran Province in such a way that the most deprived and the most enjoyed townships has a difference higher than 3.06 points. In 88 indexes understudy, Savadkooh with 1.937 and Neka with -1.124 obtained first and last rank respectively in the composite index and were recognized as the most enjoyed and most deprived townships. Generally speaking, in accordance for factor analysis points and composite index, townships' development levels in 5 levels are as below:

So enjoyed level: Savadkooh and Ramsar Townships

Enjoyed level: Babolsar, Noor and Amol Townships

Relatively enjoyed level: Sari, Chaloos and Babol Townships

Deprived level: Juibar, Behshahr, Mahmoodabad, Noshahr, Tonekabon and Ghaemshahr Townships

So deprived level: Galoogah and Neka Townships

Therefore, Findings showed that 12.5% townships are in so enjoyed level, 18.75% in enjoyed level, 18.75% in relatively enjoyed level, 37.5% in deprived level and 12.5% in so deprived level.

Findings indicate that townships' ranks are different in various sectors. In educational, medical and health, mine and industry, fundamental services and facilities, logistics and communications, Savadkooh is considered as the most enjoyed township. In socio-cultural, administrative, social and welfare services, Ramsar, in population and human forces, Noshahr and in agricultural, mahmoodabad are considered as the most deprived townships. Savadkooh in population and human forces, Neka in medical and health, Galoogah in fundamental services and facilities, Mahmoodabad in socio-cultural, Juibar in educational, Chaloos in agricultural and mine and industry, Babol in administrative, social and welfare services and Behshahr in logistics and communication are considered as the most deprived townships in the Province. So, only Savadkooh is the most enjoyed township in more sectors. Ultimately, Savadkooh is the most enjoyed and Neka is the most deprived township (Table 1). This ranking indicates that Mazandaran townships have spatial inequality with respect to development indices.

Table 1. The Results of the Most Enjoyed and the Most Deprived Townships in Different Sectors

Indexes	Most Enjoyed		Most Deprived	
	Township	Point	Township	Rank
Education	Savadkooh	4.34	Juibar	-1.53
Medical and Health	Savadkooh	4.34	Neka	-2.98
Population and Human Forces	Noshahr	3.09	Savadkooh	-2.23
Logistics and Communications	Savadkooh	3.13	Behshahr	-2.46
administrative, social and welfare services	Ramsar	4.09	Babol	-1.93
Fundamental Services and Facilities	Savadkooh	2.66	Galoogah	-4.01
Mine and Industry	Savadkooh	3.76	Chaloos	-2.38
Socio-economic	Ramsar	3.91	Mahmoodabad	-1.86
Agricultural	Mahmoodabad	4.63	Chaloos	-4.24

(Authors, 2009)

Findings of cluster analysis technique reveal that townships are in 5 homogeneous groups. Savadkooh is in the first group and has high points in medical and health, mine and industry, logistics and communications and fundamental services and facilities. The second group consists of Ramsar and Chaloos. The third group includes Amol, Babol, Babolsar, Juibar, Sari, MAhmoodabad and Noor. The fourth group contains Behshahr, Tonekabon, Ghaemshahr, Neka and Noshahr. Furthermore, with lower points in most indices, Galoogah is in the fifth group.

This ranking shows that spaces in one rank have much similarity with each other, but have considerable difference with spaces in other ranks.

Key Words: Development, Inequality, Development Levels, Factor Analysis, Cluster Analysis, Mazandaran Province

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