
Measuring Development of Settlements by Using Category Numbers

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SUMMARY

Several approaches are used to define the development and disparities of settlements. The investigation of four settlements in the County of Hajdú-Bihar, such as Balmazújváros, Hortobágy, Tiszacsege and Egyek, suggests that previous methods using few indicators are not suitable enough to measure economic, social and ecological development. My starting point was the complex index of the Hungarian Central Statistical Office (HCSO). I examined the economic, ecological and social development of the communities by separating the 19 indicators and determined that complex indexes or indicators hide the real consideration of the main functions of rural development and opportunities for comparison in a community level. Furthermore, I established that the 19 indicators were not enough to analyse the situation, in this way I raised the number of indicators. I used more indicators, altogether 116 ones, than the previous research. I handled these indicators from economic, ecological and social aspects and carried out a method development. While only Egyek and Tiszacsege were considered to be backward according to the complex index of the HCSO, even Balmazújváros and Hortobágy proved to be lagged behind from economic and social aspects on the basis of my calculations. The methodical development justified the hypothesis that few indicators are not suitable for establishing decisions objectively. New developmental ranges evolved. Using this method this method, determining development may be more realistic and may contribute to strengthening decisions in rural development and help in spreading financial subsidies.

INTRODUCTION

The significance of rural development increased gradually in Hungary during the 1990's. Communities with a dominance of agriculture have got to unfavourable conditions due to the decline of agriculture caused by the economic and social changes. These resulted in losing working places, high unemployment rate, ageing and emigration. While the areas in advantageous situations have become more developed, the unfavourable situations of rural and agricultural areas seemed to be more and more lagged behind. These rural areas became the centres of research topics and several attempts happened to define their area and the development. On the other hand, there have not been uniform approaches for determining development, yet. Though one of our most important tasks is to determine rural areas and define their development before the EU-accession in order to spread subsidies more realistic. My aims were to review and analyse the special literatures on determining development of rural areas and communities, and to work out a method, which considers development of

communities according to the three functions of rural development.

1. LITERATURES ON MEASURING DEVELOPMENT

The condition of spreading subsidies more realistically and defining beneficiary subregions and settlements relating to the Structural Funds after accession is to reflect development and disparities with reliable indicators. There have been several regional studies in Hungary and even suggestions for defining rural areas.

Studies focus on regional disparities from different aspects. Measuring development of infrastructure (Nadabánné, 1979), agriculture (Enyedi, 1976; Bernát et al., 1986) and industry (Bartke, 1971) was one of the often used methods. Regional disparities in living standard were examined by factor and cluster analysis, focusing on districts (Beluszky, 1977) or communities (Enyedi, 1975). Fehér (1996) used multivariable methods to divide the territory of Northern Hungary from agricultural point of view. Per capita gross income was used as an objective indicator, which reflects both economic development and farmer adaptability. Regarding foreign research, Cloke and Park defined extreme rural, intermediate rural, intermediate non-rural and extreme non-rural areas based on principal components analysis of 16 indicators, which yielded the mapping of rurality levels in England and Wales. Kilkenny (1998) explains the problems of rural communities by geography and remoteness. The more remote the location of a community is, the more the costs of transport and inputs are and the higher the degree of specialisation is.

There is a fundamental difference between the approaches in the United States and in Europe for considering rural areas. There is an indirect description of rural areas in the USA: a rural place is one that is not urban. Only the conditions of urban communities and urbanised areas are set and the rest are considered to be rural. The Census Bureau of Iowa, for example, considers a community as urban if it has a population of more than 2,500 (Goudy-Burke, 1991). An urbanized area comprises one or more places ('central place') and the adjacent densely settled surrounding territory ('urban fringe') that together have a minimum of 50,000 persons. The urban fringe generally consists of contiguous territory having a density of at least 1,000 persons per square mile (near 400 persons per square kilometer). In this way, the rural population is composed of three parts: farm residents, residents of

small towns (towns with fewer than 2,500 residents), and country residents (those neither on farms nor in small towns, but living in rural areas).

The European Union follows the OECD definition of rural areas, i.e., a community is identified as being rural if the population density is below 150 inhabitants per square kilometer. Furthermore, at the regional level, according to the share of the region's population living in rural communities, regions of predominantly rural significantly rural and predominantly urban are distinguished. In predominantly rural regions, over 50% of the population live in rural communities; in significantly regions, 15 to 50%; in urban regions, less than 15%. In this way 85% of the European Union's territory is considered to be as rural area (from which 47% belong to predominantly rural regions) where 40% of the population live (from which 10% live in predominantly regions). The Eurostat approach is based on the degree of urbanisation and distinguishes densely populated, intermediate and sparsely populated zones. The communities in the densely populated zones have a population density of more than 500 inhabitants per square kilometer and the population of the communities reach the 50,000 inhabitants. These figures are 100 inhabitants per square kilometer and 50,000 inhabitants in intermediate zones. The sparsely populated zones include communities that are not classified as either densely populated or intermediate (Situation and Outlook, 1997). Depending on the degree of integration with the national economy, rural areas can be distinguished as economically integrated, intermediate and remote rural areas (OECD, 1993).

There have been several suggestions for identifying rural areas in Hungary, from which I

focus on the most important ones as for me. Dorgai (1997) considers a community as rural if it has a population of less than 10,000 residents. Kovács (1998) identifies rural places by using five indicators showing mainly demographic and agricultural situations. Fehér (1998) has a remarkable suggestion for outlining rural places in which the OECD indicators first and further classification may be made using more detailed indicators.

The Concept of National Regional Development (1998) identified the underdeveloped subregions, of which 42 are subregions of agriculture and rural development. In these subregions, the rate of people living in villages are high, so as the number of agricultural workers and the rate of unemployment and the per capita base for income tax is low. According to the Concept, 83% of Hungary's territory is considered to be rural, where 30% of the population live. Csátári (2000) determined the criteria for rural subregions, which is a lower population density than 120 inhabitants per square kilometer regarding the average Hungarian population density and the specific settlement structure. Thus, the number of rural subregions is 92. On the basis of settlement structures, he classified further subregions of small settlements, farm-steads, country-towns, and small towns, and the appropriate combinations of these.

The HCSO used nine indicators to determine economic and social development of statistical subregions in 1998, and classified five groups of development on the basis of the relationship between the indicators and the average of rural communities (*Table 1*).

The HCSO in 1999 ranked communities using a complex index containing 19 indicators (*Table 2*).

Table 1

Defining Statistical Subregions on the Base of their Economic and Social Conditions

Dynamically developing subregions	the majority of the indicators are above the rural average with 10%
Developing subregions	the majority of the indicators are above the rural average with less than 10%
Joining up subregions	the indicators come close to the rural average and there are signs of growth and development
Stagnant subregions	the lag behind the rural average approaches 10%
Lagging behind subregions	the lag behind the rural average is at least 10%

Source: Faluvégi (2000), HCSO (2000)

Table 2

The 19 Indicators of the Complex Index Used by the Hungarian Central Statistical Office

1. Population density (inhabitants per km ²)	11. Number of guest nights
2. Ratio of population above 60 (%)	12. Personal income (per capita HUF)
3. Migration deficiency	13. Built flats (%)
4. Educational level ¹	14. Water supply (%)
5. Employment in agriculture (%)	15. Canalisation (metre)
6. Employment in the third sector (%)	16. Gas supply (%)
7. Change in employment in industry (%)	17. Number of cars (per 1000 inhabitants)
8. Unemployment rate (%)	18. Telephone supply (per 1000 inhabitants)
9. Number of enterprises (per 1000 inhab.)	19. Transport conditions ³
10. Average AK-value (per hectare) ²	

Source: Faluvégi (2000)

¹ – Number of levels completed by the population above 11; ² – “The “taxable net income” of each parcel of land registered in the land cadastre was established almost a hundred years ago, in the execution of Act VII of 1875, and was later converted to Gold Crowns, the monetary unit of the Austro-Hungarian Monarchy. This valuation still serves a basis of valuating agricultural land for the purposes of taxation or redemption. The national average of taxable net income of all agricultural land was 19.46 Gold Crowns per hectare.” (Szabó, 1977); ³ – Converse indicator includes: distances from the centre of the subregion and the county centre, and own supplement

These indicators were determined for every settlement, the spread of the indicators was distributed at ten equal intervals. The indicators of a specific community were scored from one to ten, depending on the position of the indicators in the intervals. Finally, the average of the scoring resulted in the complex index relating to a given settlement, which has a national average of 3.91. Those settlements are considered to be underdeveloped whose complex index do not reach this national average. 1,051 settlements are considered to be underdeveloped according to this approach constituting near one third of all the settlements in Hungary.

2. CHARACTERISING THE STATISTICAL SUBREGION OF BALMAZÚJVÁROS AND ITS SETTLEMENTS

I have been doing research in four settlements in the County of Hajdú-Bihar, such as Balmazújváros, Hortobágy, Tiszacsege and Egyek, all forming one statistical subregion and located along the Hortobágy National Park. The development of the settlements and the subregion can be summarised as follows, according to the above mentioned literatures.

All of the communities are considered to be rural on the basis of the OECD approach (*Table 3*), as the population density is below 150 inhabitants per square kilometre (120 inhabitants in Hungary). As the rate of rural population is above 50%, the subregions are predominantly rural.

Using the Eurostat approach, the subregion is sparsely populated.

Following Dorgai's suggestion, Balmazújváros is not a rural community because the number of its residents exceeds 10,000 inhabitants. Egyek and Hortobágy are rural communities and so is Tiszacsege, despite its city title. The subregion is significantly rural as the ratio of the rural population exceeds the 15%.

According to the Concept of National Regional Development, the subregion is economic and social backward, copes with significant unemployment and constitutes the area of agriculture and rural development. In this way it is accumulated underdeveloped, where the agriculture forms the basic of the economy, on the other hand the profitability and efficiency of the agriculture is low, its competitiveness is not appropriate.

Table 3

Criteria of Rurality of the Settlements on the Basis of the OECD Approach

	Balmazújváros	Hortobágy	Tiszacsege	Egyek
Population (inhabitants)	18689	1757	5284	6046
Territory (km ²)	205,45	284,58	136,40	104,79
Population density (inhabitants/km ²)	91	6	39	58

Source: Statistical Yearbook of the County of Hajdú-Bihar (2001)

Considering Csatóri's (2000) classification, the statistical subregion of Balmazújváros is a combination of country town and farmsteads. Determining the economic and social situation of statistical subregions, the Central Statistical Office classified the examined statistical subregion as being stranded as the average of the indicators was lower by more than 10% than the rural average (HCSO, 2000).

The averages of the complex index used by the Central Statistical Office are 3.51 in the North Great Plain Region, 3.49 in the County of Hajdú-Bihar and 3.42 in the Statistical Subregion of Balmazújváros. The development ranging of the examined settlements are the following: Hortobágy (4,53), Balmazújváros (4,37), Tiszacsege (3,32) and Egyek (3,16). Tiszacsege and Egyek are therefore considered to be lagged behind.

Considering the above mentioned literature and classifications, research on settlement level is rare and furthermore the number of indicators used are few and not classified according to the three functions such as economic, social and ecological. The different approaches lead to misunderstanding which is reflected by the example of the examined statistical subregion. More indicators should be taken into consideration and classified on the basis of the

three functions in order to define development well-established (Nemessályi-Szabó, 2001). It is imaginable that a settlement that is not considered to be underdeveloped as a whole may be underdeveloped relating to one or two functions. For example, if the indicators of the complex index are divided into economic, social and ecological indicators, the development of the examined settlements vary depending on the certain functions. According to my research (Szabó, 2002) Balmazújváros is the first, following by Hortobágy, Egyek and Tiszacsege, from an economic aspect; Tiszacsege, Egyek, Hortobágy and Balmazújváros are the sequence from an ecological aspect; and Balmazújváros, Hortobágy, Tiszacsege and Egyek from a social aspect. I concluded, that complex indexes, or indicators hide the real consideration of the main functions of rural development and opportunities for comparison in a community level.

I will show a new method in the next part, which classifies the indicators depending on the three functions and characterises the situations of the examined settlements from economic, social and ecological aspects. Furthermore, the number of indicators exceeds the number of those already utilised in research aiming at defining development of settlements.

3. MEASURING DEVELOPMENT OF THE SETTLEMENTS OF THE STATISTICAL SUBREGION OF BALMAZÚJVÁROS

My aim was to determine the economic, social and ecological development and underdevelopment of settlements belonging to the statistical subregion of Balmazújváros. Underdevelopment may be considered as a relative phrase (Enyedi, 1993) which depends always on the economy and living-standard of the country. In this way, it is the negative deviation from these. Accordingly, I determined the situations of the settlements, the statistical subregion, the County of Hajdú-Bihar and the Region of the Northern Great Plain in comparison with the national situation. I analysed 47 indicators from an economic aspect, 33 from a social aspect and 36 from an ecological aspect. The database for the year 2001 was gathered from the HCSO, Labour Centre in the County of Hajdú-Bihar, Directorate of Water Management, the County Office of Agriculture and within own data gathering.

3.1. Method

I classified the economic, social and ecological indicators into indicator groups within each function. I compared every indicator to the national average and showed their relative positions in percentage

form. Then, I ranked every indicator for each settlement from -5 to +5 according to *Table 4*.

Table 4

Ranking the Indicators

%	score	%	score
101-120	1	99-80	-1
121-140	2	79-60	-2
141-160	3	59-40	-3
161-180	4	39-20	-4
180-	5	-20	-5

Source: own construction (2002)

If a certain indicator is more favourable than the national average got a score from +1 to +5, if unfavourable, from -1 to -5. I used the reciprocal value of the % of converse indicators (e.g. unemployment rate), in this way the results above 100% always show the favourable situation from the national average. I could calculate the so-called group number by counting the average of the scores of the indicators within specific indicator groups. In the end, I calculated the development of the given function by averaging the group numbers, which resulted in the category number of the given function. By using the category number, the settlements may be classified into either categories of development or underdevelopment (*Table 5*).

Table 5

Classification of Settlements into Categories of Development or Underdevelopment on the Basis of Category Numbers

Category numbers	Categories of development	Category numbers	Categories of underdevelopment
0,1-0,5	I.	-0,1-(-0,5)	-I.
0,6-1,0	II.	-0,6-(-1,0)	-II.
1,1-1,5	III.	-1,1-(-1,5)	-III.
1,6-2,0	IV.	-1,6-(-2,0)	-IV.
2,1-2,5	V.	-2,1-(-2,5)	-V.
2,6-3,0	VI.	-2,6-(-3,0)	-VI.
3,1-3,5	VII.	-3,1-(-3,5)	-VII.
3,6-4,0	VIII.	-3,6-(-4,0)	-VIII.
4,1-4,5	IX.	-4,1-(-4,5)	-IX.
4,6-5,0	X.	-4,6-(-5,0)	-X.

Source: own construction (2002)

3.2. Measuring the Economic Development of the Examined Settlements

I analysed the economic situation of the settlements by 47 indicators within the indicator groups in *Figure 1*.

The figure shows the indicator groups of the economic function in comparison with the national average. As it is clear, the examined settlements are underdeveloped from an economic aspect located in a backward county and region. Egyek has a specific straggling behind situation because of its peripheral geographical situation.

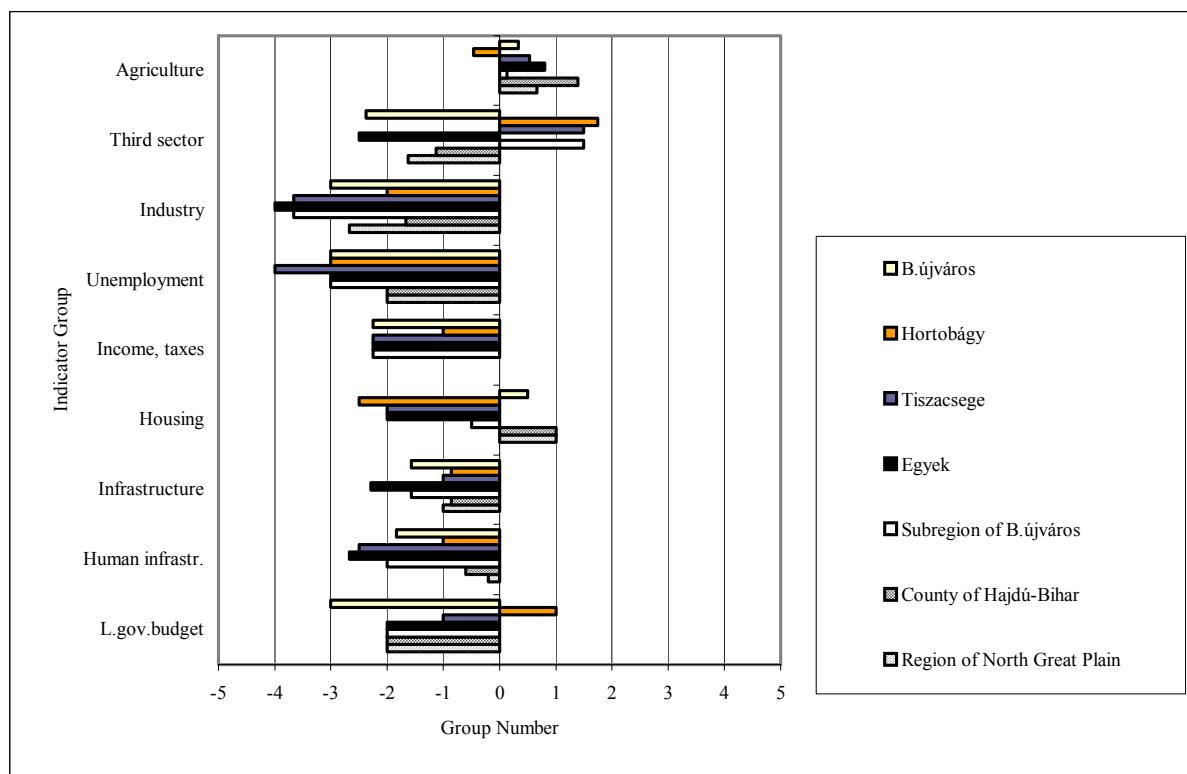
Relating to agriculture, besides the village of Hortobágy, the settlements have better conditions for

farming than the national average, which reflects agricultural potential. On the other hand, the number of workers in agriculture has dropped to 10 to 25% during the previous 15 years in the examined settlements. In the village of Hortobágy, the income from agriculture, the area of arable land, the yields of grain crops and the animal stock projected to agricultural land are less fewer than the national average and the quality of the land is unfavourable. In this case, to achieve a more efficient input-output relationship the aim may be the extensive farming, conventional, intensive farming may not be competitive. It is true for all of the examined settlements that the income from agriculture reduced to 5 to 10% between 1985 and 2000. Regarding the

closeness of the Hortobágy National Park, the unique but unfavourable natural conditions for farming, the financial opportunities of the National Agricultural Environmental Programme and the imminent EU-accession, extensive farming, such as utilising pastures of Hortobágy by small ruminants (Jávor et al., 2000) and alternative income sources relating to agriculture, such as bio-farming, herb production,

rural tourism, will have important roles in the future in this area. This is even proved by the fact that the major part of the settlements' territories belongs to the Hortobágy National Park, where only bio-farming may be realised. In this way the livelihood of people getting out from the agricultural sector, and those who work in agriculture may be ensured.

Figure 1: Economic Indicator Groups According to the National Average



Source: own calculation (2002)

The unfavourable situation of the industry and the high unemployment rate constitute the biggest problems. The Hortobágy National Park has been the part of the World Heritage since 1999, from which strict environmental regulations arise. Thus the unfavourable conditions for industry may be fixed for the future as the low employment in industry is caused by the fact of World Heritage and the strict regulations. The Hortobágy National Park, the Environmental Inspection, Directorate of Water Management and the Monument Inspection judge strictly already the plan for establishing a new industrial plant. Thus, the prior function is to maintain the already existing firms, such as the Hortobágy Fish Farm Incorporated Company, Incubation Firm of the Hajdú-Bét Stock Company, Reed Farm of Hortobágy, the Nature Preserve and Gene Saving Public Company. Tiszacsege has an unfavourable situation relating to unemployment, as it exceeds the national average by three times. The mechanical infrastructure is in a backward condition in the settlements, in the county and even in the region. The village of Hortobágy has a better position

as the State Farm of Hortobágy had a significant role in creating the appropriate infrastructure. This is true mainly for the centre of the village. The uncomfortable situations of the adjacent farmsteads result in the fact that the local government spends the majority of its subsidies for developing these areas. Thus there is a big contradict between the residents of the village centre and the local government. The ratio of households attached to the sewage system is very low in Balmazújváros and Egyek, which is an intolerable situation due to even the neighbourhood of the national park.

Analysing the human infrastructure from an economic aspect means to examine the conditions of education and medical health care. The settlements may be considered to be backward even in this point of view. Nursery and secondary school may be found only in Balmazújváros, but there is not any in Tiszacsege despite its city title. There is not any hospital in either of the settlements.

To sum up, the economic conditions for agriculture and industry are dependant on the nature conservation. The extensive farming, bio-farming,

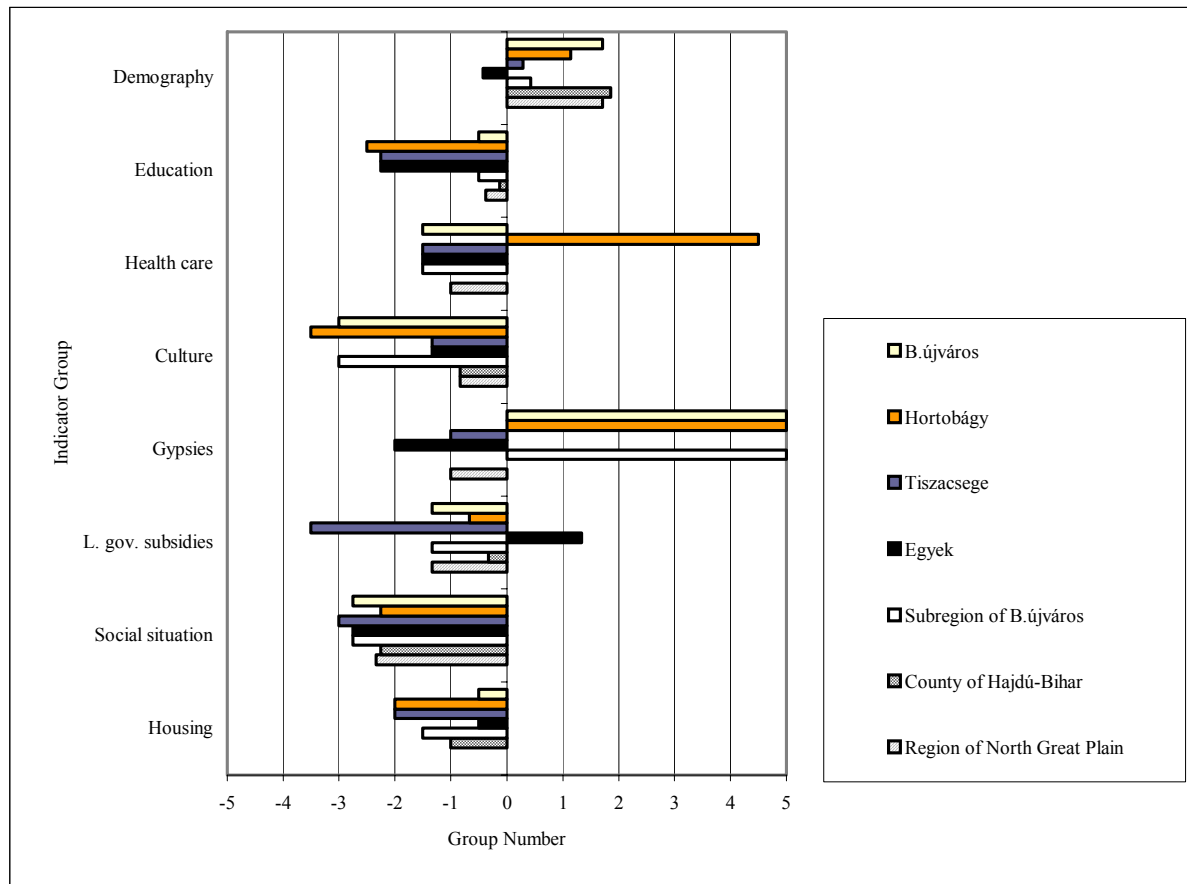
rural tourism may be good breaking points for the settlements, which require a better state of infrastructure, mainly in Balmazújváros and Egyek.

3.3. Measuring the Social Development of the Examined Settlements

In order to analyse the social conditions I took 33 indicators into consideration within the indicator groups in *Figure 2*.

These settlements are straggling behind even from a social aspect. Demography shows a favourable situation, but only in comparison with the average, as the natural population growth, besides the village of Hortobágy, and the migration deficiency, besides Tiszacsege, reflect negative tendency. The natural population growth was positive in each of the settlements and was even higher in Hortobágy in 1990. The migration deficiency was much more negative in 1990 than at present.

Figure 2: Social Indicator Groups According to the National Average



Source: own calculation (2002)

From the aspect of human infrastructure, the number of nurses, kindergarten teachers and other teachers are few in comparison with the number of the given age of children, and the conditions of the medical health care also needs some improvement besides the village of Hortobágy. There is a bid deficiency in the opportunities of culture and spending spare time in the settlements. Neither of the settlements have cinemas or theatres, there is not any library and old's club in Hortobágy. The number of gypsies, their uncontrolled problems may be source of social stresses just like in Tiszacsege and Egyek. There is not any gypsy population in Hortobágy. Local governments spend a considerable amount of money on the unemployed, regular social aid and supplementing the flat maintenance. The rate of these

subsidies exceeds the national average, which means that these subsidies are needed to a greater extent in these settlements. This is proved by the fact that the numbers and ratios of the unemployed over 180 days, of those who are entitled to allowance, get income subsidies or regular social aid are much more higher than the national average.

Regarding the housing conditions from a social aspect, the ratio of the one-room-flats are high in Hortobágy, Tiszacsege and Egyek, and more people live in one flat in average in Balmazújváros and Hortobágy than the national average.

All in all Tiszacsege is considered to be the most underdeveloped from the examined settlements, and the village of Hortobágy is the less underdeveloped from them.

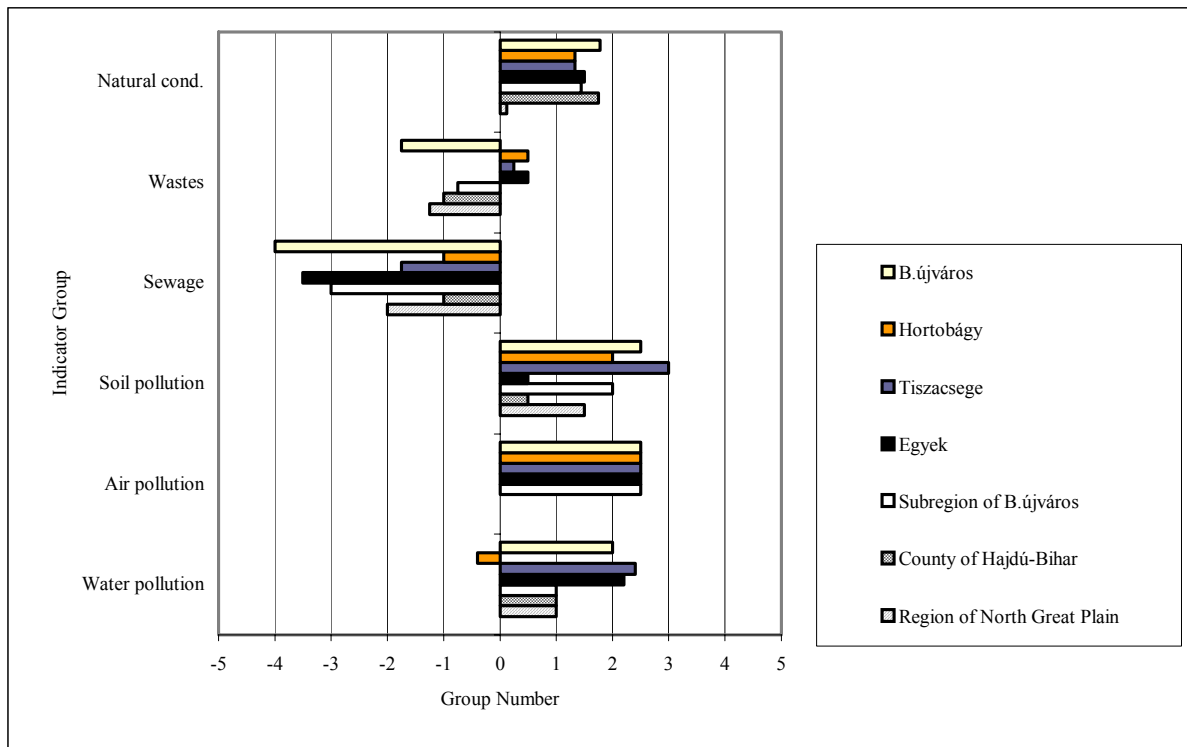
3.4. Measuring the Ecological Conditions of the Examined Settlements

I analysed 36 ecological indicators within the indicator groups and the group number of the indicator groups can be seen in *Figure 3*.

The settlements are in a favourable situation from the aspect of nature conservation due to the closeness of the Hortobágy National Park. The amount of bio-farming on land rented from the national park and the ratio of preserved areas are much more higher than

the national average. The degree of sewage management is very low in Balmazújváros and Egyek, where the low ratio of canalisation and the sewage produced cause problems. The illegal dump in the neighbourhood of Balmazújváros just makes the situation worse, as did the illegal digging of a great amount of animal waste in Egyek in 2000. Handling solid and communal waste in an anaerobic manner may solve these problems, which may contribute to even the local energy supply using a EU-compatible method (Bai et al., 2002).

Figure 3: Ecological Indicator Groups According to the National Average



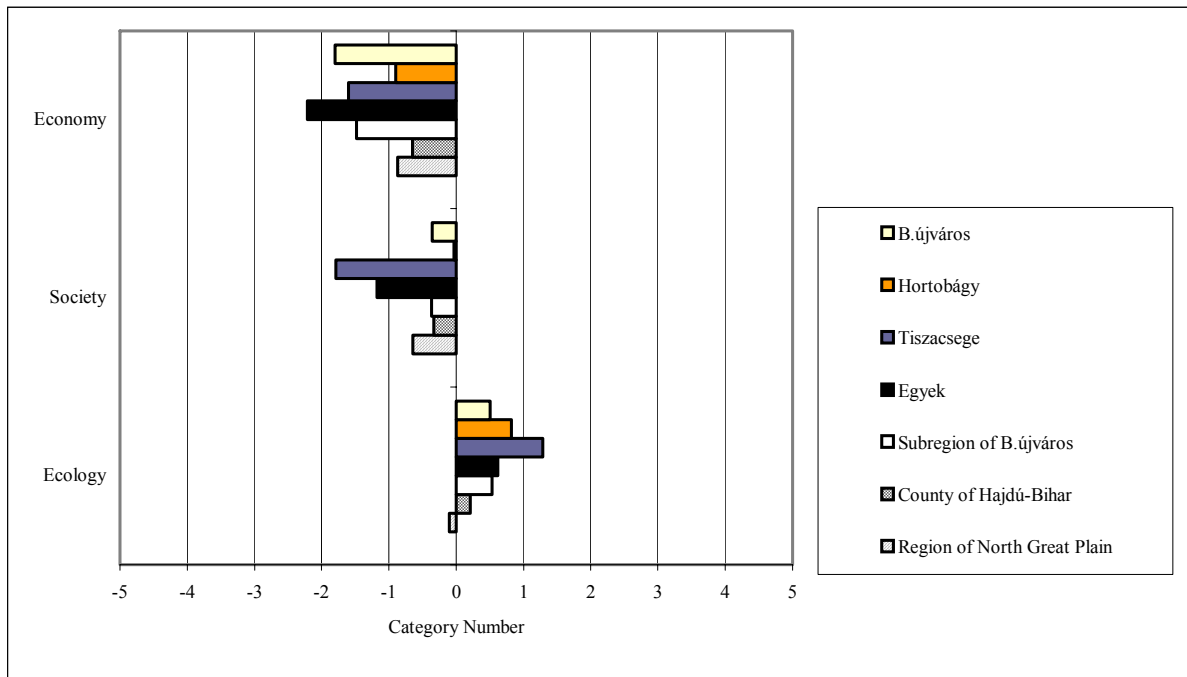
Source: own calculation (2002)

Indicators showing pollution are more favourable than the national average. Unique natural conditions, as well as the high degree of biodiversity, characterise the settlements natural environment. The closeness of the River Tisza to Tiszacsege and Egyek, the proximity of the Hortobágy National Park, and the presence of thermal water may be all taken as curiosities. On the other hand, in order to maintain these values, the built environmental elements, the social, economic, as well as infrastructural, backgrounds need improvement and development for the future.

3.5. The Classification of the Examined Settlements into Categories of Underdevelopment and Development

The classifications of the settlements, the statistical subregions, the County of Hajdú-Bihar and the Region of the Northern Great Plain according to their economic, social and ecological conditions can be seen in *Figure 4* and *Table 6*. All in all, the settlements, the statistical subregion, the county and the region are considered to be backward from economic and social aspects.

Figure 4: Determining the Economic, Social and Ecological Development of Settlements According to the National Average



Source: own calculation (2002)

Table 6

Economic, Social and Ecological Development/Underdevelopment of the Examined Settlements on the Base of the Category Numbers

	B.újváros	Hortobágy	T.csege	Egyek	Subregion of B.újváros	County of Hajdú-Bihar	Region of North Great Plain
Economy	-1,800	-0,897	-1,598	-2,211	-1,484	-0,650	-0,869
	-IV.	-II.	-IV.	-V.	-III.	-II.	-II.
Society	-0,359	-0,034	-1,787	-1,179	-0,368	-0,336	-0,645
	-I.	-I.	-IV.	-III.	-I.	-I.	-II.
Ecology	0,505	0,822	1,289	0,617	0,532	0,208	-0,104
	II.	III.	IV.	II.	II.	II.	-I.

Source: own calculation (2002)

CONSEQUENCES

- Until recently, only few indicators have been used in research for defining development and underdevelopment and the research has focused on mainly bigger territorial units than a community. In order to determine development reliably, many more indicators need to be utilised, which should be analysed on a community level first.
- The previous research does not evaluate the economic, social and ecological conditions separately; the fact of development or underdevelopment results in a single number. The indicators should be separated, and handled according to the three functions of rural development, thereby gaining a more realistic reflection of the economic, social and ecological situations of settlements. Regarding the complex index of the HCSO, for example, only Tiszacsege and Egyek are underdeveloped, while according

to my calculations, even Balmazújváros and Hortobágy may also be considered backward from both economic and social aspects.

- The methodical development justified the hypothesis that few indicators are not suitable for establishing decisions objectively. New developmental ranges evolved. From the economic aspect: Hortobágy, Tiszacsege, Balmazújváros and Egyek; from the ecological aspect Tiszacsege, Hortobágy, Egyek, Balmazújváros; from the social aspect Hortobágy, Balmazújváros, Egyek és Tiszacsege.
- Determining development may be comprehensive and more established by using this method, helping to make decisions in rural development and to spread development subsidies more realistically. Defining the development stage of a statistical subregion may help to spread regional development subsidies among the beneficiary subregions, as well.

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