DEMOGRAPHIC AND FUNCTIONAL EVALUATION OF URBAN AREAS IN VOJVODINA REGION

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ABSTRACT: The article illustrates the procedure of quantitative demographic and functional evaluation of urban areas in Vojvodina region. Evaluation is based on seven indicators such as total population, population change index, aging index, the share of employees in primary sector, the share of employees in total population, the share of economically active population (non-commuters) and the share of commuters in economically active population of all urban settlements in Vojvodina region. Quantitative procedure of demographic and functional valorization of urban areas is based on a rank method. According to the results of applied procedure, the categories of urban areas are determined. Each category demonstrates a level of demographic development and correlation between demographic potential and suitable geographical and traffic position. The article is an attempt to perceive better the demographic processes in settlements. Moreover, we pay attention to a different approach in the research of urban settlements network in Vojvodina region.

KEYWORDS: evaluation, rank method, urban settlement, Vojvodina

INTRODUCTION

Scientific and professional discussions on uneven and differentiated demographic development in all regions of Serbia focus on the issue of decentralization of Serbia and the establishment of balanced regional development. This imposes the need to encourage the development and preservation of the identity of urban settlements in Serbia. The question of future demographic development of cities is ongoing and the research of the urban population and its potential for the aforementioned problems is significant. The problems that urban areas are facing today, in Serbia as well as in Vojvodina, are the result...
of insufficiently controlled and directed processes of urbanization as well as the insufficient usage of the existing network of settlements. Due to a decrease in the birth rate and reduce of immigration of the population, unfavourable tendencies of the demographic development that manifest themselves through the process of depopulation, negative population growth and population aging, have come to the fore. In the last intercensal period 2002–2011, the decrease in the population was observed in almost all urban settlements in Vojvodina, with the exception of the city of Novi Sad.

Looking back through history, there were favourable natural potentials for population, spatial distribution and demographic increase of settlements in the territory of Vojvodina. Settlements in Vojvodina benefit from the characteristics of this region – plain fields, relatively stable for building, with small slopes and fertile land [Kojić 1961].

However, social factors – demographic and sociological, as well as historical – had a special influence on the intense development of urban centres and the transformation of the settlement network [Bukurov 1954; 1983].

In the period after The World War II, development centres in Vojvodina were Novi Sad, Subotica, Zrenjanin and Pančevo. Development centres were characterized by high spatial concentration of economic activities with diversified structure of activity. The gradual transformation of the urban areas was conducted through the slow development of urban settlements and resulted in the manifestation of the effects of the polarization activity. Since the 1980s, Novi Sad has been proclaimed the leading development centre [Veljković et al. 1995]. Today, Vojvodina is characterized by model of the primate city – Novi Sad [Đurđev 2006].

Centrality of settlements in the settlement network relies first on the demographic conditions of the settlement and its surroundings. Current demographic situation in the urban areas in Vojvodina is the result of negative natural increase and, also, intensive migration of the urban population. Observing the movement of the total population according to the census, since the period 1948–1953, urban settlements of Vojvodina were among the first to record the decrease in population: Irig (4%), Titel (3%), Kanjiža (3%) and Mol (2%). Between the next two censuses (1953–1961) the number of settlements with the decrease in population had increased and Alibunar (4%) and Srbobran (4%) joined the previously mentioned settlements. Such negative trend continued in the following census periods. On the other hand, according to the Census 2002, in some urban settlements (Apatin, Šid, etc.) the increase of the population was noticed due to the influx of refugee population from the former Yugoslavia. Census 2002 data demonstrate that 1,146,731 inhabitants live in urban areas of Vojvodina, which makes 59.4% of the total population. Compared to the previous census, population has decreased by about 1%. Observing the total urban population, the increase in population (18%) was registered in Novi Sad only. The greatest decrease in population was registered in Kovin (28%), Sečanj (21%) and Bela Crkva (15%).
On the territory of Vojvodina, municipalities with urban population between 5,000 and 50,000 are dominant. Particularly dominant are the municipalities with 5,000–10,000 and 20,000–50,000 of the urban population (60% of total urban population in Vojvodina). Municipality Sečanj records the lowest number of inhabitants in urban areas (2,373 inhabitants), while the largest urban population is inhabiting the municipality of Novi Sad. It is important to mention that in Vojvodina there are no urban areas with less than 1,000 inhabitants (Figure 1).
METHODOLOGY AND DATA

The subject of research in this paper was Vojvodina region, precisely urban areas in Vojvodina. From 467 settlements in the region of Vojvodina, 52 are urban type settlements, which is 25.5% of the total number of urban settlements in Serbia. Since the first post-war census in 1948 until today, number of urban settlements on the territory of Vojvodina has not changed. The territories of 52 urban settlements are located in the 42 municipalities. Census 2011 data were used for the demographic analysis.

Quantitative, demographic and functional evaluation of urban areas within the 42 municipalities in Vojvodina was done according to the methodology Grgurević [1995]. This methodology has been partially modified in accordance with the available data from the Census 2011 in Serbia.

Methodological procedure is based on a comparison of seven indicators which are interrelated thus providing a picture of the demographic and functional situation in the observed area.

Following parameters were selected for the evaluation of the urban population:
- total population
- population change index
- aging index
- the share of employees in total population
- the share of employees in primary sector
- the share of commuters in economically active population
- the share of economically active population (non-commuters)

After calculating seven indicators for the urban areas of the mentioned municipalities, the ranking is done in the following way: weak demographic and functional characteristics are marked with the rank 1, while the most favourable demographic and functional characteristics are ranked 42. Number of ranks equals the number of elements in sample, and in this case, the number of researched municipalities. The position or the rank for each municipality and for each of the seven indicators (expressed in numbers from 1 to 42) are demonstrated through a quantitative procedure. Ranking according to above stated indicators represents the basis for the use of method of the cumulative sum of the ranks, in order to obtain a more complete picture of the demographic situation in every urban area as well as its position within the observed sample and the network of the settlements. Grouping of the demographically and functionally similar municipalities has been done based on the cumulative values of the sum of ranks [Grgurević 1995; 2001].

DISCUSSION

Based on the performed ranking (Table 1 in Appendix), groups of municipalities with the same or similar characteristics of the observed demographic and functional indicators have been distinguished from others. Urban areas in the municipalities of Novi Sad and Subotica are highly ranked, while, on the other hand, the populationally small urban areas are low ranked. In the
municipalities with the most favourable circumstances, the contemporary socio-
cr. the change in the number and struc-
ture of the population of these areas. These are the areas that attract people
from the surrounding areas and where daily migrations of the population are
clearly expressed. The urban population of Novi Sad and Subotica participates
with 28.7% of the total urban population of the observed area.

Analyzing the indicators clearly and each individually, the urban areas of
the populationally largest municipalities are distinguished (Novi Sad, Subotica,
Zrenjanin). Observing the population trend between the censuses (2002–2011),
the population growth was recorded in the above-mentioned areas only. On
the other hand, the decrease in population of about 20% was registered in the
populationally smallest urban areas (Kovin, Sečanj, Bela Crkva). The aging
process is present in all of the observed areas with Sečanj, Alibunar, Senta and
Čoka having the highest values of aging index. Relatively favourable relation
between the young and the old population was registered in the municipalities
of Beočin, Žabalj and Temerin (about 0.6). Share of the active population
ranges from 25% to 35%, the largest share registered in Opovo, Novi Kneževac
and Bački Petrovac. Analyzed indicator share of the active population employed
in the primary sector ranges from 1.2% in the municipality of Novi Kneževac
to 27% in the municipality of Žabalj. The total daily circulation of the popula-
tion in the most of the observed municipalities is over 20%. The highest share
of daily commuters was recorded in municipalities near Novi Sad, so the share
of daily commuters in Petrovaradin is 98%, Sremski Karlovci 78%, while the
lowest share of daily commuters was recorded in the municipality of Kikinda
7% [Statistical office of Republic of Serbia, 2012]. Certainly, one of the indica-
tors important for this analysis is the share of the active population employed
in the place of residence, which is directly related to the previously mentioned
indicators (share of the daily out-commuters). The areas with the lowest share
of the daily commuters in the total population record high values of the share
of the active population in the place of residence (Kikinda 93%). It is evident
that the populationally large urban areas stand out as a highly ranked by all
analyzed indicators.

RESULTS

In the first stage of the quantitative method, there are different indicators
which, in authors’ opinion, affect in a number of ways the position of the munici-
pality in the network of settlements in Vojvodina. Special attention is de-
vo. to the analysis of the four indicators – indices of total population change
and aging and socio-economic characteristics.

The urban areas in the municipalities of Novi Sad, Petrovaradin and Te-
merin (Figure 2) have the highest values of indicators of index of total popula-
tion change. This fact is not surprising considering that the municipalities are
located along the main economic and transport corridors. In this regard, there
are also low values (70–90) in the municipalities that occupy a peripheral
position in the network of settlements in Vojvodina. However, positive trends
of the population movement in the last intercensal period are mainly relying on the positive population migration, thereby the urban area of Novi Sad and nearby Petrovaradin are defined as a distinct gravity centre of Vojvodina. On the other hand, observing the aging index of the population, mentioned region centres have an unfavourable relation between the young and the old population (Figure 2). Urban areas in the municipalities of Žabalj, Temerin and Beočin (0.6) have the lowest values of the aging index, while the worst image is in the urban areas Alibunar and Sečanj (1.1).

![Figure 2. Urban population change index in Vojvodina, 2002–2011 (a) and Aging index of urban population in Vojvodina, 2011 (b)](image)

Functional and economic characteristics of the urban centres determine significantly the centrality of the settlements. In this regard, indicators related to the economically active urban population are presented distinctively (Figure 3). Empirical data show that 64.3% of the areas record values between 28.4 and 34. The share of the economically active population that do not go to work from the place of residence, observed in the whole sample, is ranging from 31.2% (Petrovaradin) to 94.5% (Kikinda). Values of the share from 65.1% to 92% were recorded in 78.6% of the urban areas. Urban areas in Vojvodina show a high degree of economic strength and ability to retain the active population.

After analysing the selected indicators, quantitative procedure was continued by adding the ranks for all indicators. This has produced the sum of ranks for each element of the sample separately. Results from Table 1 (in Appendix) indicate the potential grouping of areas with similar demographic and functional characteristics, according to the indicators included in the analysis. In order to confirm this, the cumulative value of the sum of the ranks [Preston 1971] was determined. In this way, the hierarchy of urban areas in Vojvodina was made. In Figure 4, the distribution of urban areas in Vojvodina is presented using quantitative procedure.
In order to distinguish the categories of the urban areas according to their demographic and functional position, there were used different slopes on the cumulative curve of the sum of ranks (Figure 5). If the differences in the hierarchy between the municipalities do not exist, the curve shows the same
slope. In this regard, the categories were selected based on the following principles – the same demographic and functional characteristics are the same for all urban areas where parts of the cumulative curves have the same slope. Changes in the slope of the curve indicate changes between categories of urban areas in the observed municipalities in Vojvodina.

![Figure 5. Hierarchy of urban areas in Vojvodina, 2011](image)

Based on the explained principle, five categories of urban areas in Vojvodina were defined (Figure 6). Urban areas in the municipalities of Novi Sad and Subotica, which are the first class of areas, are distinguished with the best values in relation to other elements of the observed sample. These are, also, the populationally largest municipalities in Vojvodina (the average of inhabitants – 191,601), which stand out as the economically strongest centres with their influence on urban areas in the region. Only in this category of urban areas, analyzing the intercensal period 2002–2011, a population increase of 8% has been recorded based on the urban settlements in Novi Sad. When it comes to the age structure, these areas record the best values of the aging index.

The second group consists of five urban areas within the municipalities of Vršac, Zrenjanin, Kikinda, Bačka Palanka and Sombor. According to the analyzed characteristics, these areas are similar to each other and according to population size are among the larger (the average number of inhabitants of this settlement category is 45,295). In the past intercensal period, population decrease of 5% on average was recorded in this category. The largest population decrease in this group is present in urban areas in the municipalities of Kikinda (90.7) and Sombor (92.5). The average share of the active working population is 32.4%, while the average share of daily out-commuters in the total active population is 14% (Bačka Palanka – 21%; Kikinda – 9%) [Statistical office of Republic of Serbia, 2013]. 64.3% of the observed sample, i.e 27 municipalities are in the third and the fourth category. This third group consists of 11 municipalities: Pančevo, Sremska Mitrovica, Vrbas, Indija, Šid, Ruma,
Petrovaradin, Stara Pazova, Temerin, Senta and Kanjiža. The average number of total population in this category is 29,737. In this group, there was a population decrease of 4%, while the average aging index is 0.8. This category also recorded the highest average share of daily commuters in the total active population (38.4%) in comparison to the other categories of municipalities. Petrovaradin and Temerin have the largest shares, where more than 60% of the active population goes to work outside the place of residence. The fourth and the largest group consists of 17 municipalities: Bečej, Bačka Topola, Novi Bečej, Apatin, Beočin, Novi Kneževac, Bački Petrovac, Kовin, Sremski Karlovci, Bela Crkva, Odžaci, Srbobran, Kovačica, Žabalj, Opovo, Kula and Irig. The average number of inhabitants in this group is 11,374. In this group, a
population decrease of 9% on average was also recorded. Areas in the municipalities of Kovin (28%) and Odžaci (12%) record a significant reduction. The last, the fifth separate group with the lowest values of the analyzed indicators consists of 7 municipalities: Ada, Žitište, Bač, Ćoka, Titel, Alibunar and Sečanj. Average number of inhabitants of this group is 6,237 with the most intense decrease between the censuses 2002–2011 of 13% on average. The highest proportion of elderly population characterizes these municipalities. The average share of the active population is around 29%. Certainly, it is important to emphasize that the majority of settlements that belong to this group recorded the highest share of the active population employed in the primary sector (Table 1 in Appendix).

**CONCLUSION**

The methodological procedure that is presented in this paper is focused on the demographic and functional situation in the urban areas. Although the spatial component was neglected in the paper, the evaluation of demographic conditions of the same areas allows conclusion of the real position of urban areas in the network of settlements in Vojvodina. Quantitative evaluation done based on seven demographic and functional indicators confirms the assumption that primarily functional and economic role of municipality in the network of settlements affects the positive development of urban areas. Share of active working population is the basis of economic strength of settlements. Workplaces in the settlement itself should be added by all means, because this indicator has a direct impact on the appearance and maintenance of the centres of development, on one hand, and the increase of the gravitational power of the centres, on the other hand. Novi Sad, Subotica, Vršac, Zrenjanin, Kikinda, Bačka Palanka and Sombor generate the highest values in a quantitative analysis and are referred to as leaders of the development in Vojvodina region.

On the other hand, the evaluation of urban areas, that is presented in the paper, lead to the reconsideration of the status of urban settlements, in Vojvodina and Serbia. This particularly raises the question whether certain urban areas (within the studied municipalities) justify the status of an urban settlement acquired in 1981, which is based on legislative acts from the period of 1960s–1980s [Pavkov 2008]. Based on the presented demographic and functional evaluation of urban areas, the distinctive fifth category of settlements, according to the authors, does not deserve the status of urban settlement. However, given that the analysis was performed only based on demographic and functional indicators, the question of the division of the settlements in the urban and the others remains open.

The authors consider that the proposed methodological approach can contribute to a more comprehensive and objective introducing of urban areas as well as their surroundings with all their strengths and advantages, but also with limitations and weaknesses. Use of this quantitative procedure could have its share in spatial planning practice. Use of the method in Vojvodina is an attempt to contribute to modern geo-demographic researches of urban areas in Serbia.
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STATISTICAL SOURCES


| Source: Census of population 2011, Republic statistical office of Serbia, Belgrade. |
РЕЗИМЕ: У раду је приказан квантитативни поступак демографске и функционалне евалуације градских насеља у Војводини. Анализа је базирана на седам демографских и функционалних показатеља (укупан број становника, индекс про-мене броја становника, индекс старења, удео запослених у примарном сектору, удео активног становништва, удео активног становништва запосленог у месту становања, као и удео дневних миграната у активном становништву). Циљ рада је да се приказе квантитативни поступак демографског вредновања градских насеља, као и да се на основу добијених резултата утврди постојање насеља са демографским потенцијалима. На позитиван развој градских подручја утиче, пре свега, функционална и еконomsка улога поменутих области у мрежи насеља Војводине. Удео активно запосленог становништва је основа економске снаге насеља. Анализа је показала да управо популационо највећи градски центри (Нови Сад, Суботица, Зрењанин) заузимају највише рангиране позиције, па се самим тим могу окажети као носиоци развоја региона Војводине. С друге стране, позиционирање популационо малних градских подручја (Сечањ, Мали Иђош, Жабаљ и др.) као најслабији рангираних отвара питање да ли та насеља оправдавају статус градских и какви су услови за њихов будући развој. Стога предложени методолошки поступак може допринети свеобухватнијем и објективнијем упознавању градских областиса, као и њиховог окружења.

КЉУЧНЕ РЕЧИ: евалуација, методолошки поступак, градска насеља, Војводина.