THE POPULATION AGING IN SLOVAK SETTLEMENTS IN VOJVODINA, THE EXAMPLE OF BACKI PETROVAC AND KOVACICA

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Abstract: Analyzing last few decades of demographic situation in Vojvodina province indicates to an increasingly share of the elderly population, 60 and over, and the decline in the share of young population. The Slovak minority is characterized by higher average age (40.1 years), an increasing older age categories proportion. The paper gives a comparative analysis of these two settlements, as well as comparison with Vojvodina and Serbia. The aim is to show the possible consequences of unfavorable population age structure and the measures to be taken. The analyses are based on census data and it is used statistical, demographic, comparative and GIS method.

Rezumat: Analizele efectuate în ultimele decade asupra fondului demografic al provinciei Vojvodina ilustrează o creștere semnificativă a ponderii populației vârstnice de peste 60 de ani și implicit declinul numeric al populației tinere. Minoritatea slovacă este caracterizată printr-o pondere mai ridicată a categoriilor de populație vârstnică. Lucrarea de față abordează în mod comparativ analiza a două localități precum și compararea situației demografice existente din această perspectivă în Voievodina și Serbia. Scopul cercetării este de a ilustra consecințele posibile generate de procesul de îmbătrânire demografică. Analiza întreprinsă este bazată pe datele statistice ale recensămintelor precum și pe metode specifice cum sunt analiza statistică, studiul demografic, metoda comparativă și utilizarea Sistemelor Geografice Informatizate.

Keywords: geography, demography, population, population structure, population census
Cuvinte cheie: geografie, demografie, populație, structură demografică, recensământul populației

1. INTRODUCTION

The cultural heritage of the Slovaks in Vojvodina, with all its attributes and characteristics, is part of a multicultural area of Vojvodina, and as such, is in constant permeation with all cultures that exist in this area. Its preservation should be a guarantee that has been created a society that respects diversity, supports cultural diversity and recognizes it as a unique value of the Vojvodina area. At the beginning of the 20th century, in 1900, 53,382 people were recorded Slovak nationality, and that number was a constant
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increase until the Second World War. The number of Slovaks in Vojvodina grew until 1961, then began to decline steadily, and the last census, in 2002, recorded only 56,637 Slovaks (2.79%), which is 17,193 less than 1961. According to the latest census, Slovaks make up 2.79% of the population of Vojvodina. The proportion in 1948 was 4.3%, 3.2% in 1991. The number of Slovaks is only for the last two censuses decreased by 6908 persons. In Backa lives 50% of Slovaks, in Banat 31.74% and 18.23% in Srem. From a total of 466 towns and villages in Vojvodina, in 12 villages Slovaks are the majority population: Janosik, Selenca, Pivnice, Backi Petrovac, Glozan, Lug, Vineyards of Slankamen, Kovacica, Padina, Kisac, Lalic, and Ljub. Like other ethnic groups living in the Vojvodina, Slovaks are also characterized by higher average age (40.1 years), a negative natural growth (-4.0%), an increasing proportion of older age groups, increasing the index of aging and old people dependency rates, which all lead to negative trends in demographic development of the population (Bukurov, B., Hrcan, P., 1976; Bajic, ., 1988).

Backi Petrovac is an urban type settlement and the center of Backi Petrovac municipality. Municipality Backi Petrovac includes a small part of South Backa, between the municipality of Novi Sad, Vrbas and Backa Palanka in Backa, and municipality of Beocin in Srem. Area of this territory is 158 km2, making it the smallest municipality in Vojvodina, and includes four towns with a total of 14,681 inhabitants (census 2002).

Kovacica is a village type settlement, and is located in the southwestern part of the Banat, and belongs to the municipality Kovacica. It covers an area of 419 km2, it has eight settlements and has 27,890 inhabitants (census 2002), which is twice more than in the municipality of Backi Petrovac. Area of Kovacica extends between river Tamis in the north-west, alluvial plains of this river in the west, Alibunar’s depression in the north and Deliblato sand in the south.

Most of the population of Backi Petrovac are Slovaks, with 82.49%, while Serbs are second, with 8.52%. Other national minorities are represented with much lower portion. And in Kovacica, according to 2002 census, the dominant population is Slovaks, with 84.23%, while the proportion in the municipality is 41.07%. The second largest population is Serbs, with 8.25% (Bukurov, B., Hrcan, P., 1976; Bajic, ., 1988).

2. POPULATION

The oldest data about population of Backi Petrovac originate from Turkish documents (tax records). The first settling of Slovaks dates in the first half of the 18th century, and with their arrival on this territory begins a demographic and economic strengthening. Population number changing of Backi Petrovac dates in the first months of 1869, where there was almost no population growth since recording of the population become more regular, and the population almost completely stagnated all the time, with a tendency to fall according to the last few censuses.

In 1869 the number of population was 7256, in 1991 there were 7236 inhabitants, only 20 people less for a period of 122 years, and in 2002 there were 6727 inhabitants, which is the lowest recorded number since the beginning of the period. The causes of this situation are mainly emigration, low birth rate and an unfavorable age structure. The same situation exists throughout the municipality.
Population number changing in Kovacica can be traced back to the 1869. At that time, Kovacica had 3160 inhabitants. From that year until 1910, the approximate ten-year increase of population was 450 inhabitants. In the last decade of the twentieth century, even the basic reproduction of the population has not been achieved, due to much lower birth rate compared to mortality. At the last census in 2002, Kovacica had 6764 inhabitants, which is approximately 9% less than in 1991 (Bukurov, B., Hrcan, P., 1976; Bajic, M., 1988).

If we compare population number changing of these two settlements, we find significant differences which are mainly migratory character, because the characteristic of Backi Petrovac is emigration, while the characteristic of Kovacica is immigration. Census 1991 recorded a fall, and we can see there is a similarity, so in the past 20 years we can speak about the same trend of these two settlements, which is important for further analysis.

2.1. Natural changing of population
The period of observation is from 1961 to 2002, because since 1961 there were some major demographic changes in this region, which are primarily related to the Slovak nationality. Natural changing of population has a negative trend, due to negative natural growth.
2.1.1. Birthrate

Changing of birthrate will be presented by decades, in order to make it easy to survey. Comparative analysis includes comparison of settlements (also with each other), municipalities and situation of Vojvodina for this period, and their trends in comparison to the trend in Vojvodina. To a large extent there is a match of trends in all segments of the natural changing of population, and it will be presented by the following chart.

![Figure 2: Comparative view of birth rate of Backi Petrovac and Vojvodina in the period 1961-2002 (source: The Republic Institute for Statistics, Population Census 1961-2002)](image)

As the chart shows, the birth rate in Backi Petrovac was changing differently. In the first decade, the birth rate was highest, 13.9‰. In the following period the birth rate had decreasing trend and in the mid 70-ies slowly began to grow. However, growth was negligible, but in early 90-ies there was a fall again, which lasts. The situation in the municipality is almost identical, with higher values, while recordings in Vojvodina show constant decrease, which also shows the trend line.

![Figure 3: Comparative view of birth rates of Kovacica, municipality and Vojvodina in the period 1961- 2002 (source: The Republic Institute for Statistics, The Population Census 1961-2002)](image)

In the period 1961 - 1971 in Kovacica, the birth rate is 14.1‰, which indicates its maximum value. As shown in the trend line, the birth rate continues to fall and during the last period between two censuses, period 1991 - 2002, the birth rate markedly decreased to 10.9‰. The lowest birth rate for the same period is similar to the municipality birth rate and amounts to 11.1‰, while the maximum was in the period 1961 - 1971, 13.5‰.
2.1.2. Mortality rate

The average mortality rate of Backi Petrovac in this period is 14.2‰. At the beginning of this period, the rate was lower, and since then has been constantly increasing, and in the last decade, reaching a value of 17.2‰, which is the maximum. The maximum rate of mortality of Kovacica was in the period 1991-2002, and amounted to 17.2‰ for Kovacica, and also in the same period for the municipality, 17.3‰. The mortality of Vojvodina has a constant growth. In the past decade, there has been an increasing trend in the Kovacica, which, as in Backi Petrovac, too, indicates the old population.

![Figure 4](image)


Figure 4 shows an increasing trend of the mortality rate for all areas, however, there are differences between Kovacica and Backi Petrovac, because Kovacica shows a slight decrease of mortality rates until the mid-70’s, as a result of migration of younger (working age) population in this period. After that, this settlement recorded an increasing trend in mortality rate also, as a result of the population aging.

2.1.3. Natural increase

Due to the negative natural increase in both settlements, especially in the last decade, there is a decrease in population. Natural increase of Backi Petrovac showed a negative value very early, which lasted until the end of the period, with a tendency to increase. The lowest rate was at the end of the period and amounted to -6.3‰. In the last decade Vojvodina had an average natural increase rate of -3.6‰, which is 2.9‰ lower than Backi Petrovac. That indicates an unfavorable demographic development of Backi Petrovac, as a result of the large share of elderly population, a decrease of youth population share, due to bad economic, social, and other problems. Natural increase in the area shows a rapid fall in Kovacica from the beginning of this period and the rate of natural increase was -6.3‰.
Based on the chart from figure 5, the population decrease and constant negative natural increase are very clear for both settlements. The highest values were recorded for Backi Petrovac, but at the end of this period, its values were equal to the values of Kovacica. Based on the analysis of the demographic situation in Vojvodina (based on the census 2002), in January 2004, the Assembly of the Province adopted a strategic document, “Demographic development of AP Vojvodina” and measures for its implementation. The goal of the program is to define comprehensive and coherent policy according to Vojvodina population fertility, or the phenomenon of low birth, adoption of low reproductive norms in most of the population and negative natural increase, apparent depopulation, the increase of elderly people share in the population and more widespread single life.

These measures are grouped into several categories:

- Possible solutions of the low birth rates problem;
- Maintenance and improvement of reproductive health;
- The fight against sterility;
- Alignment of work and parenthood;
- Population Education;
- Activating local governments.

2.2. Households

Due to the dynamic natural increase and disintegration of patriarchal family organization within a household, there is a rise in the number of households and reduce in the number of members in them. Household division began when the fertility of this region began to decrease, so the changes happened under the simultaneous action of two processes: the process of division confined households to single-family community, and the process of declining birth reduced the number of family members. The average household size between censuses was steadily decreasing, as in Vojvodina and in the whole Serbia, as a consequence of the increasing number of single households and two-member households.
in this region, and to some extent, this trend is linked to some characteristics of the Slovak people. Table 1 contains data about the number of households, according to census 2002. It is evident that the majority of households contain one, two, three and four members, in both settlements. The average number of household members has been decreasing, especially in recent decades. Since 1981 census, the situation is almost the same in both settlements, and the number of household members was reduced to less than three members, showing a growing number of two-member households, which are the most common. The most households contain one or two members. These are solitary households, which are common mainly for elderly persons, and the two-member households, which are also common for the elderly people.

Table 1: Number of household members of Backi Petrovac, Kovacica and Vojvodina (The population census 2002)

<table>
<thead>
<tr>
<th>Number of members</th>
<th>Backi Petrovac</th>
<th>Kovacica</th>
<th>Vojvodina</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>646</td>
<td>559</td>
<td>149.867</td>
</tr>
<tr>
<td>2</td>
<td>672</td>
<td>667</td>
<td>180.858</td>
</tr>
<tr>
<td>3</td>
<td>534</td>
<td>550</td>
<td>139.843</td>
</tr>
<tr>
<td>4</td>
<td>520</td>
<td>520</td>
<td>153.886</td>
</tr>
<tr>
<td>5</td>
<td>139</td>
<td>139</td>
<td>52.766</td>
</tr>
<tr>
<td>6</td>
<td>42</td>
<td>49</td>
<td>22.779</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>12</td>
<td>6.591</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>3</td>
<td>1.948</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>3</td>
<td>771</td>
</tr>
<tr>
<td>10 and more</td>
<td>1</td>
<td>1</td>
<td>648</td>
</tr>
</tbody>
</table>


This situation is mostly a consequence of the fact that "system of one child" is common amongst Slovaks; because the Slovak families do not want many children because the property does not have to divide into several parts. A typical family household, four-member household, are rare.
3. INDICATORS OF POPULATION AGING

In order to provide a clear presentation of age structure of Kovacica and Backi Petrovac and to point to one of the key demographic problems in our country, we analyzed the eight characteristics of the population:

- gender structure
- coefficient of masculinity
- coefficient of femininity
- age structure
- the average age
- median age
- index of aging
- the aging coefficient
- the demographic dependency rate
- contingent of young (0-19) and old (60 years and over) population, according to age structure type.

These phenomena are analyzed for the entire population of the province and the republic, for the comparison of data and to obtain more precise results and conclusions (Djurdjev, S. B., 2001).

3.1. Age-gender structure

Population structure by age and gender is its biological characteristics of which depend many demographic processes and properties. Certain age groups are the bearers of some processes or characteristics. Gender structure depends on the gender structure of newborn children, the differences in mortality by gender, on migrations and some external influences, such as wars, etc.

Gender structure of infants is biologically conditioned, because per every 1,000 women there is between 1050 and 1070 male children born, and later changes can occur, due to these factors. Populations with low mortality have higher male mortality then female, while the populations with high mortality rate have higher female children mortality and women during the fertile period. The migration to the larger distance involved more men, and a short distance, mostly women (marriage). Wars affect the male population more (Djurdjev, S. B., 2001).

Gender structure has been improving in favor of men from census to census. After the World War II the number of men was lowest, because men were more perished during the wars. Additional reason was the emigration to other countries and other cities to work, which was primarily common for the male population. Since 60-ies the situation changed, the economy has been recovering, and the coefficient of masculinity increased, until 1981, when it started to decrease again.
Figure 6: Comparative view of coefficient of masculinity changing in Backi Petrovac, Kovacica, Vojvodina and Serbia in the period 1961-2002 (source: The Republic Institute for Statistics, Population Census 1961-2002)

The chart from figure 6 shows stagnation and decreasing for the province and the republic. For Backi Petrovac it shows increase from the beginning of this period, while Kovacica shows higher value for the latest period, but with a tendency to fall.

Age structure can be analyzed based on the proportion of three population groups: young, mature and old. Types of age structures are usually defined as the progressive (expansion), stationary (stagnant) and regressive type. The best illustration of the age structure is represented by age pyramid. Age-gender pyramid gives the intersection of all ages and both genders in a given population. Shape of the age pyramid shows a progressive, regressive or stationary population, or some type of transition.

Figure 7: Age structure of Backi Petrovac and Kovacica (census 1961) (source: The Republic Institute for Statistics, census 1961)
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Census from 1961, records only the total population by age categories, with no separation by gender, so the chart shows total population of Kovacica and Backi Petrovac. It is evident that this settlements are characterized by a large share of the adult population which will, in the next census, be categorized as older population.

![Graph showing age and gender distribution in Kovacica and Backi Petrovac](source: The Republic Institute for Statistics, census 1971)

If we compare the population of both settlements according to the census 1971, there is generally match of the share of population aged between 30 and 45 years and older than 55 years. Backi Petrovac recorded higher share of category 75 and over.

![Graph showing age and gender distribution in Kovacica and Backi Petrovac](source: The Republic Institute for Statistics, census 1981)
Census 1981 also shows somewhat higher share of category 75 and over years in Backi Petrovac, in relation to Kovacica. In both settlements there is a high share of categories between 40 and 60, and 30-34 years category, which will in the following census further contribute to increasing the share of category 40-45 years and older.

Figure 10: Age-gender structure of Backi Petrovac (census 1991)
(source: The Republic Institute for Statistics, census 1991)

Census 1991 (figure 10) recorded a new age categories, up to 95 and over, reflecting the deterioration in the age structure. In Backi Petrovac there is even higher share of the population aged 60 and 65 years, high share of population of 55-59, 35-39 and 40-44 years.

Figure 11: Age-gender structure of Kovacica (census 1991)
Figure 11 confirms what is forecast by the previous census, that is, increased share of critical categories which are indicators of demographic aging, especially the high share of categories 55-59 years, and all the other higher categories. Increasing life expectancy is also evident.

![Figure 11](image)

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Census 2002 (figure 12) confirms the previous trend, and shows the highest share of 45-49 and 50-54 categories, but also an enormously high share of the population older than 70 years, especially females. Share of the youngest category is the smallest compared to previous censuses, which makes the situation in Backi Petrovac worrying when the demographic aging process is in question. Among them, the smallest share has category of 0-4 years, which potentially suggest even worse situation in the future censuses, that is, an increasing share of older category, and indicates a regressive population pyramid.

![Figure 12](image)

Figure 12: Age-gender structure of Backi Petrovac (census 2002)

(Source: The Republic Institute for Statistics, census 2002)

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![Figure 13](image)

Figure 13: Age-gender structure of Kovacica (census 2002)
Figure 13 (census 2002) shows an unfavorable age structure in Kovacica: the highest share of category 45-49 years, 50-54 and 65-69 years, and a high share of the oldest categories compared to the youngest, which makes age pyramid more irregular, as is the widest in the middle part, and almost the narrowest in the base where are the categories that should be the bearers of the demographic development and progressive age population. In contrast, the situation points to the increasingly regressive type and growing demographic aging.

### 3.2. Average age

The average age represents middle age of inhabitants during the census. Average age may be considered, in addition to life expectancy, the best indicator of demographic situation in given population. If we compare the average age of both settlements it can be seen that Backi Petrovac population is older in relation to population of Kovacica, by 0.5 years according to census 2002.

![Graph showing average age comparison between Backi Petrovac and Kovacica](image)

*Figure 14: Comparative review of population average age of Backi Petrovac and Kovacica in the period 1961-2002 (source: The Republic Institute for Statistics, Population Census 1961-2002)*

During this period the average age in Backi Petrovac was higher, and it remained higher until the end of the period, but since census 1991 there is a match, and the trend line is almost completely overlaps to the end of the period.

### 3.3. Median age

Median age (Me) is the age that divides the total population into two equal parts, provided that the population is sorted by the age of its members.
Median age is calculated by the following formula:

\[ M_e = L + \left( \frac{P/2 - \sum f_i}{f_{me}} \right) \cdot n \]

where:

- **L** - lower limit value of the median interval
- **P** - total population
- \( \Sigma f_i \) - population younger than the median interval
- **n** - the size of the interval
- **f_{me}** - population median interval

It is not affected by extreme values of certain age groups and is frequently used indicator of age than the average age of the population (Djurdev, S. B., 2001).

*Figure 15: Comparative review of population median age of Backi Petrovac and Kovacica in the period 1961-2002 (source: The Republic Institute for Statistics, Population Census 1961-2002)*

If we compare the median age of both settlements, it also shows the devastating situation in which can be seen increase of median age during the whole period, and for Kovacica the increase was 14.7 years, while for Backi Petrovac it was less than 10 years.
3.4. Aging index

The aging index (i) is one of the most reliable analytical indicators of population age structure, and also of the process of demographic aging, and expresses the relationship between old and young population. The index ranges from 0.1 to 0.65 and a critical value is 0.4 or 40%. Population where this relationship is characterized by higher values of aging and the other way around, and if the index is less than the limit the population is young. Although it does not take into account the middle generation, the importance of the aging index is that it indicates the scale of the old and young population, thus emphasizing the importance of young people and factors affecting its numbers.

![Chart showing the aging index comparison between Backi Petrovac and Kovacica from 1961 to 2011.]

**Figure 16: Comparative review of population aging index of Backi Petrovac and Kovacica in the period 1961-2002**


During this period, Backi Petrovac shows higher aging index values, but with a tendency of approaching values in the last decade as a result of increasing index age Kovacica. The aging index of Backi Petrovac has doubled during the period, while in Kovacica tripled. If one looks at the critical value of 0.40, the chart shows that the value was exceeded already in the census 1971, which means that the share of the population to 19 years and 60 years and over is devastating, because the ratio exceeded 1 by the last census, and the proportion of elderly population is higher than the share of young.

3.5. The aging coefficient

Aging coefficient (x) only takes into account the relationship of individual major age groups and total population. When the share of persons aged 60 and over reaches 12%, it is considered that the population began to age (Djurdjev, S. B., 2001).
Taking into account that the population begins to age when the old share reaches 12%, based on the chart it can be concluded that the aging coefficient of Backi Petrovac since 1961 exceeds the critical value, while in Kovacica it happened in the next census 1971. Census 2002 recorded values over 20, which can be characterized as extremely negative, because this is almost double compared to the critical value. The increase was particularly high between the last two censuses, and the trend is almost fully coincides in both settlements.

3.6. The demographic dependency rate

There is a small number of municipalities in Vojvodina province that have the demographic potential. The development process of population aging can be seen through functional relations between specific age groups. It is best illustrated by the demographic dependency rate (relation between the population 65+ and the active population (15-64)). Socio-economic consequences of demographic transition and population aging are reflected in reduction of social vitality and activity, a huge economic burden for resource allocations health, social and pension insurance.

With increasing numbers of elderly impose certain types of problems such as increasing expenditures for health care, social security. The increase of this rate affects the emigration factor involving only the young population of active population contingent.
Both settlements have the high value of this rate, which is for Backi Petrovac more than average in Serbia (about 24).

3.7. Age structure types

Clearer perception of regional differences in the attained age demographic, as well as consideration of striking changes in age structure can be achieved by aligning the different types of population age structure. Population age structure is analyzed based on three high shares of the population age groups: young, mature and old, and based on the share of children, parents and grandparents. To determine the type of population based on the relationship between three age groups used different classifications: Sandberg typology, Mladen Friganovic typology, Edward Roset typology and typology of the United Nations (Djurdjev, S. B., 2001).

3.7.1. Sandberg typology

The typology analysis three types of population and therefore cannot illustrate any changes in age structure of given population, where the pure types do not appear. Its significance is that it distinguishes a group of reproductive population, and, along with the intersection with gender structure, it is suitable for the analysis of natural changes of population (Djurdjev, S. B., 2001). The following table classifies the population of Backi Petrovac, Vojvodina and Kovacica into the specific types by the Sandberg typology, based on the share of large age groups.

![Figure 18: Comparative review of the demographic rate of Backi Petrovac and Kovacica in the period 1961-2001](source: The Republic Institute for Statistics, Population Census 1961-2002)
Table 2: The population types of Backi Petrovac, Kovacica and Vojvodina by Sandberg

<table>
<thead>
<tr>
<th>The Census year</th>
<th>The town</th>
<th>The population type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backi Petrovac</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kovacica</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vojvodina</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1961.</td>
<td>Backi Petrovac</td>
<td>24,3</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>26,6</td>
</tr>
<tr>
<td>1971.</td>
<td>Backi Petrovac</td>
<td>19,3</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>21,2</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>21,1</td>
</tr>
<tr>
<td>1981.</td>
<td>Backi Petrovac</td>
<td>18,8</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>20</td>
</tr>
<tr>
<td>1991.</td>
<td>Backi Petrovac</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>19,2</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>19,2</td>
</tr>
<tr>
<td>2002.</td>
<td>Backi Petrovac</td>
<td>15,6</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>15,6</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>15,9</td>
</tr>
</tbody>
</table>


Based on data from Table 6 it can be seen the decrease of the young population share, 0 - 14 years, and adult population, 15 - 49 years, the share of elderly population, 50 and over is increasing for all three series. The oldest generation shows constant increase of the share of the total observed population. Due to changes in the socio-economic structure in the new typologies age limits were moved: the young population to 19 years, mature to 20-59 years, old to 60 and over or 65 years and over, that will be seen in the following tables and charts.

3.7.2. The classification by Mladen Friganovic

This classification distinguishes five types of population based on the share of the population age group to 19 years and population aged 60 and older. The following table shows in which demographic stadium is population of Backi Petrovac, Vojvodina and Kovacica by the typology of Mladen Friganovic.
Table 3: The population types of Backi Petrovac, Kovacica and Vojvodina by Friganovic

<table>
<thead>
<tr>
<th>The census year</th>
<th>The town</th>
<th>% of population in age group</th>
<th>The population type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vojvodina</td>
<td>0-19</td>
<td>60 +</td>
</tr>
<tr>
<td>1961.</td>
<td>Backi Petrovac</td>
<td>30.5</td>
<td>15.3</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>34</td>
<td>10.5</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>33.2</td>
<td>11.8</td>
</tr>
<tr>
<td>1971.</td>
<td>Backi Petrovac</td>
<td>27.6</td>
<td>20.2</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>29.9</td>
<td>14.4</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>30</td>
<td>14.8</td>
</tr>
<tr>
<td>1981.</td>
<td>Backi Petrovac</td>
<td>24.9</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>25.8</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>26.9</td>
<td>14.9</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>25.7</td>
<td>18.3</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>25.7</td>
<td>18.7</td>
</tr>
<tr>
<td>2002.</td>
<td>Backi Petrovac</td>
<td>22.1</td>
<td>22.4</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>22.5</td>
<td>21.6</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>22.6</td>
<td>21.4</td>
</tr>
</tbody>
</table>


The table clearly shows that none of the series showed the type of population that is characterized by the stadium of youth, from the very beginning of the period. The population of Backi Petrovac was in the stadium of aging since 1961, while the population of Kovacica was on the threshold of old age since 1961, and from following census year it moved to the old age stadium, named by Friganovic.

Since 1981 the population of each settlement has been in the stadium of deep old age. The share of population 0-19 years ranged from Backi Petrovac from 30.5% to 22.1%, and in Kovacica from 34% to 22.5%. Share of population aged 60 and older exceeded 20% for all three series, which means that this population makes the fifth part of the total population. It is concluded that in this period a young population is constantly decreasing, and the old increases.

3.7.3. The classification by Edward Roset

According to this classification, there are four different types of population, depending on the share of persons aged 60 and over. According to Edward Roset, population which has a share of persons aged 60 and over less than 8% is characterized
with demographic youth. More than 10% leads to the aging process, and when the proportion exceeds 12%, population is in the stadium of demographic aging.

**Table 4: The population classifications of Backi Petrovac, Kovacica and Vojvodina, by Roset**

<table>
<thead>
<tr>
<th>The Census year</th>
<th>The Town</th>
<th>The share of the elderly population 60 + (%)</th>
<th>The population characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961.</td>
<td>Backi Petrovac</td>
<td>15,3</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>10,5</td>
<td>In the aging process</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>11,8</td>
<td>In the aging process</td>
</tr>
<tr>
<td>1971.</td>
<td>Backi Petrovac</td>
<td>20,2</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>14,4</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>14,8</td>
<td>The demographic old age</td>
</tr>
<tr>
<td>1981.</td>
<td>Backi Petrovac</td>
<td>19,2</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>15,8</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>14,9</td>
<td>The demographic old age</td>
</tr>
<tr>
<td>1991.</td>
<td>Backi Petrovac</td>
<td>19,4</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>18,3</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>18,7</td>
<td>The demographic old age</td>
</tr>
<tr>
<td>2002.</td>
<td>Backi Petrovac</td>
<td>22,4</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>21,6</td>
<td>The demographic old age</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>21,4</td>
<td>The demographic old age</td>
</tr>
</tbody>
</table>


As can be seen from the table, the population of all three series since 1971 exceeds value of 12% share of the older population, and thus enters the stage of demographic aging, with a tendency to increase these values to near-doubling, which creates a worrisome situation. The population of Vojvodina was, according to Roset, from the beginning of this period in the process of aging, because the share of persons aged 60 and over was less than 12.0% only in 1961, that is, in Vojvodina 11.8%. In the next three decades, the participation of this age group in the total population has increased and in 2002, in Vojvodina, amounted to 21.4%.
3.7.4. The classification by the United Nations
This classification distinguishes three types of people depending on the proportion of population aged 65 and older.

Table 5: The population types, classification by the United Nations

<table>
<thead>
<tr>
<th>The Census year</th>
<th>The town</th>
<th>The share of the elderly population 65+</th>
<th>The population type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961.</td>
<td>Backi Petrovac</td>
<td>10,5</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>6,9</td>
<td>The MATURELY population</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>7,5</td>
<td>The OLD population</td>
</tr>
<tr>
<td>1971.</td>
<td>Backi Petrovac</td>
<td>13,9</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>8,8</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>9,7</td>
<td>The OLD population</td>
</tr>
<tr>
<td>1981.</td>
<td>Backi Petrovac</td>
<td>15,3</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>12,3</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>11,3</td>
<td>The OLD population</td>
</tr>
<tr>
<td>1991.</td>
<td>Backi Petrovac</td>
<td>14,0</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>11,8</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>12,3</td>
<td>The OLD population</td>
</tr>
<tr>
<td>2002.</td>
<td>Backi Petrovac</td>
<td>17,2</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Kovacica</td>
<td>15,9</td>
<td>The OLD population</td>
</tr>
<tr>
<td></td>
<td>Vojvodina</td>
<td>12,3</td>
<td>The OLD population</td>
</tr>
</tbody>
</table>


Based on the previous table it can be seen that the population of all three series did not show the stadium of young population during this period. According to census 2002, the share of people older than 65 years is exceeding 7% which is the limit value, that is, values exceed the 15% which is twice as much. If we take into account all processed typology Backi Petrovac population can be characterized as regressive, very old, and in deep old age demographic, which is the case with Kovacica. If the aging process in Backi Petrovac and Kovacica continues to develop at this pace, the population will be older, the population number will decrease, which will negatively affect all aspects of life in both settlements. If we look at the values of all parameters of the age of population, we can see
that they reach their maximum in 2002, when the number of population is decreasing, with
the assumption that this trend will continue, because of increasing of the share of elderly
people who are at risk when it comes to mortality. The share of younger categories is
reduced, which improves the situation of demographic aging and declining population,
because the contingent of fertility population is decreasing.

Population aging is not a problem only in these areas. Comparing at the same time
with data from the municipality and Vojvodina, it can be concluded that the aging of the
population gets ever wider scale and to become a general trend on the territory of
Vojvodina. The data presented in Table 23 show that the Vojvodina is, with an average age
of 39.7 years, the share of young people (under 20) in the total population to 22.6%, and old
(60 years and over) with 21.4%, in stadium of deep demographic aging. In 1971, Vojvodina
entered a stadium of demographic aging and according to census 2002, in the whole
province share of the younger population (5-14 years) does not exceed 13% of the total
population.

CONCLUSION

Vojvodina is an environment with modest demographic potential, so the aging
population in recent decades has been relatively rapid. Vojvodina is characterized by long-
term trend of decrease of the young and increase of the old people, which is why it entered,
in 2002, a stage of deep demographic aging. The aging population in the following period
has resulted in fertile contingent of aging, which directly affects the general decrease in
birth rate, which deepens and accelerates the demographic aging process. Decreasing birth rate and aging population have caused changes in the gender structure,
whose main feature is reducing the share of male compared to female population. Looking
at the overall demographic situation in Vojvodina, the problem of aging population is
facing an increasing number of settlements.

Backi Petrovac and Kovacica are settlements of agri-industrial nature, but in spite of
employment in the settlement, the population is looking for work in the nearest cities,
especially in Belgrade, Pancevo, Novi Sad. This is especially common in the last decade,
since the country is in poor socio - economic situation, and there is high unemployment and
low living standards. Due of this, there are migrations of the population of these two
settlements, especially youth, to the cities or abroad in search for work and better life.
Young people are forced to limited births, which leads to a reduction in birth rates. The
high rate of mortality is caused by the increasing share of elderly population. All this leads
to a reduction in the share of population in the reproductive period, and reduction of the
population generally.

Analyzing population by age group according to the above typologies, their share in
total population and population change in some age groups from census to census, it can be
concluded that the population of the settlements Backi Petrovac and Kovacica, in the last
forty years, has an unfavorable age structure, as a consequence of low fertility, increased
mortality rates and higher average age of the population and increasing life expectancy.
The situation in both settlements is similar to the situation in whole Vojvodina, and whole
Serbia: the population entered a deep stage of demographic aging, and what is most
concerning about this is the fact that the share of age groups 44-49, and all categories over
50, especially 65 and over increases from census to census, and bad demographic structure
is expected in the future, if not even worse.
These facts bring a number of issues that are reflected in the overall socio-economic system, and therefore it’s necessary to take population policy measures, as soon as possible. They must be based on realistic assessment, in order to be realizable and reasonable, and above all progressive in the long term. Stronger economic growth and rapid radical measures in the population policy could slow or even stop the unfavorable natural, migratory and structural demographic processes. It is necessary to increase the rate of economic growth and employment, while in the field of natural reproduction, in addition to creating the appropriate material and social preconditions for establishing a family, are important changes in the system of value, in order to motivate young people to spread the family.

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REFERENCES

Bajic, M. (1988), The Kovacica Municipality. Economic and geographic monograph, the Assembly of Kovacica, Faculty of Science, Institute of Geography, Novi Sad


Bukurov, B. (1953), Geomorphological view of Vojvodina. The Collection of paper of “Matica srpska” for Natural Sciences, Volume 4, Novi Sad


Bukurov, B., Hrean, P. (1976), Backi Petrovac municipality. Geographical Monographs Vojvodina municipalities, the Municipal Assembly of Backi Petrovac, Backi Petrovac


Curcic, S. (2005), The biological structure of the population of Vojvodina I, sex. The Collection of paper of “Matica srpska”, Novi Sad

Curcic, S. (2005), The biological structure of the population of Vojvodina II, age. The Collection of paper of “Matica srpska”, Novi Sad


Curcic, S., Djuricic, J. (1994), Relief position as a factor in the formation and morphological characteristics of the settlements in Vojvodina. Proceedings nuts Serbian Social Science, No. 97, pp. 147-148, Novi Sad

Davidovic, R., Miljkovic, Lj., Ristanovic, B. (2003), The Relief of Banat region. University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad

Djurdjev, B. (1998), The Population geography. University textbook, University of Novi Sad, Faculty of Science, Institute of Geography, Novi Sad
The population aging in Slovak settlements in Vojvodina. The example of....

Djurđev, B. (2000), *Methodology of scientific work*. University of Novi Sad, Faculty of Science, Institute of Geography, Novi Sad

Djurđev, B. (2001), *Basic techniques in demography*. Dragon’s library of knowledge, Novi Sad

Ivko, A., Romelic J., Lazic, L., Dragan, A., Ivanovic, M. (2003), *Folklore heritage of the tourism in the Banat region*. University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad

Kicosev, S., Bubalo-Zivkovic, M., Ivko, A. (2005), *The population of Banat region*. University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad

Kicosev, S., Bubalo-Zivkovic, M., Ivko, A. (2006), *The population of Backa region*. University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad

Lazic, L., Pavic, D. (2003), *The climate of Banat region*. University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad


The Federal Institute of Statistics (1965), Book XI-Age, sex, population census 1961, Belgrade


The Republic Institute for Statistics (2003), *Population Census 2002. National or ethnic groups, the data by municipality*, Belgrade


Tomic, P., Romelic J. (2003), *Industry of the Banat region*. University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad

Vasek, Lj. (2006), *The Population aging of Kovacica*. Diploma thesis, University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad

www.en.wikipedia.org/wiki/Ba%C4%8Di_Petrovac#cite_note-0
www.en.wikipedia.org/wiki/Kova%C4%8Dica
www.backipetrovac.rs/naselja/backi-petrovac.php
www.hidmet.gov.rs/latin/hidrologija/index.php
www.hidmet.gov.rs/latin/meteorologija/klimatologija_godisnjaci.php
www.kovacica.org/index.php?option=com_content&view=article&id=50&Itemid=66
www.scribd.com/doc/31367464/Demografija
www.slovackizavod.org.rs/sr/kulturno-nasledje/spomenici-kulture/najstarija-kuca
www.turizambackipetrovac.com/Backi-Petrovac.php

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