

DEMOGRAPHIC PROCESSES IN THE MUNICIPALITIES OF THE TOPLICA DISTRICT

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Abstract: This paper analyses the long-term demographic processes on the territory of the Toplica District, which marked the last sixty-year period. The results of the 1948 to 2011 Censuses were used in the analysis. The processes which marked this period were depopulation (total and natural) and the aging of the population (both total population and specific age groups). The intensity of depopulation in some periods is investigated on the basis of intercensus changes in population. The age structure is presented by means of the aging index, the aging coefficient, the median age and the percentage share of age groups in the total population. In order to create a more complete demographic picture, the analysis of demographic data was done by the type of settlement, at the level of municipalities as well as the district as a whole.

Keywords: Toplica district, depopulation, age structure, aging of the population

1. Introduction

Demographic processes on the territory of the Toplica District in the second half of the twentieth and early twenty-first century are characterized by extremely unfavorable trends, affecting both present and future demographic and economic development. The processes of total and natural depopulation and the aging of the population are seen as fundamental demographic processes on the territory of both Serbia and the Toplica District (Djokic, 2015). The intensive process of depopulation, caused by extensive emigration of the population and a negative population growth, has led to significant changes in the age structure of the population of the analysed area. Negative demographic processes which have marked the entire period exhibit different intensity if they are analysed at lower administrative-territorial units (municipalities and the type of settlement). Demographic dynamics demonstrates an ever stronger spatial polarization, which is particularly

evident when it comes to urban and non-urban settlements (Jukic, Turk, 2010). It is notable that in certain territorial units of districts, these processes take place more slowly, while in others, they have led to a complete degradation of demographic resources.

The basic demographic processes that are discussed in this paper are depopulation and the aging of the population.

2. Materials and methods

The timeframe of the research covers the period from 1948 to 2011. The results of eight post-war Censuses were used for the analysis of demographic processes. When analyzing the numerical population trends, it should be taken into account that starting from the 2002 Census, there are differences in the census methodology, which makes it difficult to compare the data. The 2002 Census in Serbia applied international recommendations which suggest that the permanent resident population includes the population living in the country and persons with temporary work and residence abroad for less than a year. Foreign nationals with work and residence in Serbia for longer than a year are also included in the permanent resident population.

The analysis of demographic processes on the territory of the Toplica District and its lower administrative-territorial units is based on the use of relevant demographic variables, which serve to calculate the demographic indicators of negative demographic processes. Several variables were used to shape the indicators: the percentage share of the population by five-year age groups, the percentage share of the population younger than 20 years of age, the percentage share of the population over 60, intercensal population change and median age. Based on these, the aging index and the aging coefficient were calculated. The obtained results determined the direction and intensity of changes in the analysed period, and pointed to the consequences of such developments.

3. Population changes

Change in the total population is a synthetic indicator of demographic trends and processes in a particular area (Turk, Jukic, 2009). It is a result of natural and spatial mobility of the population. The territory of the Toplica

District and its component parts are characterized by the processes of total depopulation and extreme aging of the population. In the period from 1948 to 2011, population growth was only recorded in the observed area in the first intercensus period (1948-1953), whereas stagnation was recorded in all other periods. Total population decline from 1948 to 2011 amounted to 49,748 or 35.16%. The long-term process of depopulation threatened the vital characteristics of the population, and it is certain that the population decline will continue in the future as well. The decrease of population in the observed period was recorded in all municipalities. It ranged from 22.97% in the Municipality of Zitoradja to 50.35% in the Municipality of Blace. The municipalities of Prokuplje and Kursumlija recorded a decrease of 25.08% and 48.47% respectively. Table 1 shows that the Municipalities of Blace and Kursumlija have extremely negative demographic characteristics. The population of these municipalities belongs to the strong depopulation type (Kursumlija) and the first phase of extinction type (Blace).

The extent of depopulation can best be seen if analysed by the type of settlement. Only 16 settlements, four of which are municipal centers, had an increase in population, while the trend of population decline was recorded in 251 settlements. Three rural settlements were affected by total depopulation: Vukojevac and Tacevac in the Municipality of Kursumlija and Obrtnica in the Municipality of Prokuplje. An interesting example is the village of Rastelica (Municipality of Kursumlija) where the 2002 Census did not record a single resident, while the following Census recorded three inhabitants. All these settlements are located in the altitude zone of 750 to 850 meters above sea level. The most intensive depopulation process, where the population decreased by more than 90%, was recorded in 59 settlements. 167 settlements belong to the second group of settlements with extremely unfavorable demographic characteristics, where the decrease ranged between 40 to 90%. 17 settlements belong to the group of settlements with slightly more favorable characteristics, although still negative (decrease from 10 to 40%). Only 5 settlements experienced a decrease of 10%.

In order to gain a better understanding of demographic processes and potential, hypsometric distribution of the population and settlements was analysed as well. For this purpose, settlements are classified into three groups: settlements located in the altitude zone of 200 to 499 meters above sea level, settlements located in the altitude zone of 500 to 999 meters above sea level and settlements located in the altitude zone above 1000 meters

above sea level. Demographic problems are particularly pronounced in the parts of the district with high altitude, which have been characterized by extreme depopulation for several decades, caused by emigration of the working-age and fertile-age population (Ivkovic, Todoric, 2013). Most of the settlements, 147, are located in the altitude zone of 200 to 499 meters, which represents 55.06% of the total number of settlements. 116 settlements are located in the next altitude zone (500 to 999 metres) which represents 43.45%, while only 4 settlements are located in the altitude zone above 1000 meters (1.5%). Analyzing the settlements and population by hypsometric zones, it can be clearly observed that the depopulation is more pronounced with higher altitudes (Ivkovic, Todoric, 2013). The most intensive population decline occurred in the highest altitude zone. The percentage share of the population of this zone in the total population during the period under review decreased from 0.97% to 0.13%. The population of the four settlements in this zone, according to the last Census, makes up only 8.78% of the population in 1948.

Table 1. Population change by type of settlement from 1948 to 2011

	1953/48	1961/53	1971/61	1981/71	1991/81	2002/91	2011/2002	2011/1948	Type of change 1948-2011	Type of change 2002-2011
Toplica District	105.60	94.46	91.78	94.13	91.70	91.29	89.89	64.84	R ₄	R ₃
Urban	115.01	130.76	154.27	131.50	113.45	101.49	97.79	343.50	P ₁	R ₁
Other	104.62	90.30	81.41	82.37	80.78	84.10	83.16	35.79	R ₄	R ₄
Blace	103.94	89.80	87.47	89.69	90.60	87.59	85.43	49.65	R ₄	R ₄
Urban	119.57	117.56	131.55	130.71	118.58	104.53	96.12	287.99	P ₁	R ₂
Other	102.63	87.10	81.69	81.02	81.07	79.13	78.38	29.75	R ₄	R ₃
Zitoradja	105.54	98.41	96.16	97.58	94.37	93.15	89.90	77.03	R ₄	R ₃
Other	105.54	98.41	96.16	97.58	94.37	93.15	89.90	77.03	R ₄	R ₃
Kursumlija	106.67	92.77	85.84	87.23	85.38	91.60	88.92	51.53	R ₄	R ₃
Urban	112.05	122.78	195.37	142.96	118.25	108.50	96.49	475.72	P ₁	R ₂
Other	106.24	90.20	73.09	69.89	64.45	71.86	75.56	17.13	R ₄	R ₄
Prokuplje	105.60	95.94	95.41	98.15	94.16	91.56	91.58	74.92	R ₄	R ₃
Urban	115.00	136.11	146.97	127.35	110.55	97.77	98.77	312.77	P ₁	R ₁
Other	103.98	88.27	80.20	82.38	80.47	84.44	82.03	33.80	R ₄	R ₄

Source: Census of population, households and apartments in 2011 in the Republic of Serbia, Comparative overview of population 1948/2011, Data by settlements, Book 20, RSO Belgrade, 2014.

The settlements in the altitude zone from 500 to 999 meters recorded a slightly lower decrease in the total population. In 116 settlements in this zone, the percentage share of the population in the total population decreased

from 31.09% in 1948 to 8.4% in 2011. The current population of these settlements represent only 17.51% of the population at the beginning of the period under review. Bearing in mind that this hypsometric zone, where 43,45% of the settlements are located, is now inhabited by only 8.40% of the total population of the district, it is clear that the spatial demographic imbalance in the network of settlements, which existed in the past decade, continues to grow (Ivkovic, Todoric, 2013).

Table 2. The hypsometric distribution of the population and settlements in the Toplica District according to the 1948 Census and the 2011 Census

	Number of settlements	Hypsometric zone					
		200-499		500-999		1000-1499	
		Number of settlements	%	Number of settlements	%	Number of settlements	%
Blace	40	31	77.50	9	22.50	-	-
Zitoradja	30	28	93.33	2	6.67	-	-
Kursumlija	90	28	31.11	58	64.44	4	4.44
Prokuplje	107	60	56.07	47	43.93	-	-
District	267	147	55.06	116	43.45	4	1.50
1948							
	Population	200-499		500-999		1000-1499	
		Population	%	Population	%	Population	%
Blace	23676	18353	77.52	5323	22.48	-	-
Zitoradja	21250	20294	95.50	956	4.50	-	-
Kursumlija	37284	16758	44.95	19147	51.35	1379	3.70
Prokuplje	59292	40728	68.69	18564	31.31	-	-
District	141502	96133	67.94	43990	31.09	1379	0.97
2011							
	Population	200-499		500-999		1000-1499	
		Population	%	Population	%	Population	%
Blace	11754	10275	87.42	1479	12.58	-	-
Zitoradja	16368	16318	99.69	50	0.31	-	-
Kursumlija	19164	16437	85.77	2606	13.60	121	0.63
Prokuplje	44419	40848	91.96	3571	8.04	-	-
District	91705	83878	91.47	7706	8.40	121	0.13

The 2011 Census recorded 83,878 residents in the lowest altitude zone, in which 147 settlements are located (55.06% of the total number of settlements). The percentage share of the population of this zone in the total population increased from 67.94% in 1948 to 91.47% in 2011. All 16 settlements which recorded population growth compared to 1948 are located in this altitude zone (Glasince - increase index of 102.36, Staro Momcilovo

102.52, Djurovac 108.40, Drenovac 110.19, Babin Potok 115.30, Samarinovac 118.36, Recica 120.12, Bela Voda 120.47, Jasenica 127.0, Zitoradja 138, Berilje 158.03, Novo Selo 197.97, Donja Strazava 286.38, Blace 287.99, Prokuplje 312.77 and Kursumlija 554.16).

Table 3. Settlements in the Toplica District according to population size in 2011

1948											
	Total	Without	1-9	10-49	50-99	100-299	300-499	500-999	1000-1999	2000-4999	5000+
Blace	40					6	15	14	5		
Zitoradja	30					4	6	16	3	1	
Kursumlija	90				2	38	27	20	2	1	
Prokuplje	107				2	35	30	32	6	1	1
District	267	-	-	-	4	83	78	82	16	3	1
2011											
	Total	Without	1-9	10-49	50-99	100-299	300-499	500-999	1000-1999	2000-4999	5000+
Blace	40			1	16	17	5	1	5		1
Zitoradja	30			4	2	4	9	9	1	1	
Kursumlija	90	2	7	36	23	21					1
Prokuplje	107	1	8	33	10	38	8	7	1		1
District	267	3	15	74	51	80	22	17	7	1	3

The structure of settlements by population size is clearly differentiated and indicates uncontrolled concentration of the population primarily in the center of the municipality ("the centre of growth") and spontaneous depopulation and fragmentation of other settlements. During the observed period, a decrease in the number of medium-sized settlements is evident as well as a significant increase in small settlements. The largest number of settlements in 1948 had between 300 and 999 inhabitants. These settlement made up 59.93% of the total number of settlements. The settlements with 100 to 299 inhabitants had a significant share, which amounted to 31,08%. The share of the largest settlements (with more than 1000 inhabitants) was 7.49%, while the share of the smallest (from 50 to 99 inhabitants) was 0.15%.

In the conditions of extreme depopulation and demographic emptying of the settlements until 2011, there have been significant changes in the population size of the settlements (Martinovic, 2012). According to the latest Census, the settlements with up to 99 inhabitants are the most numerous. Their share in the total number of settlements increased from 0.15% in 1948 to 53.56%. The 2011 Census registered the smallest settlements in terms of

population (up to 50 inhabitants), which were not listed in the 1948 Census. There were 89 of these settlements (33.33% of the total number of settlements). Settlements which no longer have inhabitants belong to a separate group of settlements. This group of settlements was not listed until the 1991 Census, when a settlement without inhabitants (Vukojevac) was registered for the first time. Each subsequent Census recorded an increase in the number of these settlements. In 2011, there were three.

4. Changes in the age structure of the population

The age structure, together with the sex structure, reflects the actual biodynamics and potential vitality of a certain area (Nejasmic, 1992). It is important for the current and future demographic and economic development of an area because the key contingents for biological reproduction, as well as for the formation of work force, stem from it (Wertheimer-Baletic, 1999). It is formed under the direct influence of the three basic components of population movements (birth rate, death rate and migration), and in turn, the distribution of population by age directly affects the number of births, deaths, as well as the intensity of spatial mobility of the population, in other words, it directly affects birth rates, death rates, as well as the migration rate (Radovanovic, Gigovic, 2010).

Unfavourable demographic processes in the Toplica District took their toll on the age structure of the population. The process of demographic aging of the population in the district intensified in the 1970s. The analysis of the age structure indicators in the period from 1971 to 2011 shows a strong progression of the aging process. Unfavorable age structure of the population of the Toplica District is the result of depopulation, which in turn is caused by intensive emigration and negative natural movement (Djokic, 2015).

Changes in the age composition of the population are reflected through two parallel demographic processes: decrease in the share of the young population with a simultaneous increase in the share of the old population (Nejasmic, Toskic, 2013).

The reached level of population age is visible from the proportion between large age groups. Since the aging process occurs when the share of the old population (60 or 65 years of age and over) in the total population reaches 12%, it can be said that the population of the Toplica District and its component parts began the aging process in the 1960s. According to the 1971

Census, the share of the population over 60 years of age amounted to 13.96%, while the share of young people (aged 0-19) was relatively high (33.71%). The subsequent Census periods, in addition to an increase in the percentage of the old population, recorded a decrease in the percentage of young people. The comparison of the results of the 1971 Census and the 2011 Census points to a significant intensification of the process of aging and a high aging index. In the analysed period, there was a significant increase in the percentage of the old population, while at the same time the share of the young decreased to a value that indicates the stage of the deepest demographic old age. The share of young people in the 2011 Census was 20.76% (33.71% in 1971), while the share of the people aged 60 and over was 27.75% (13.96% in 1971).

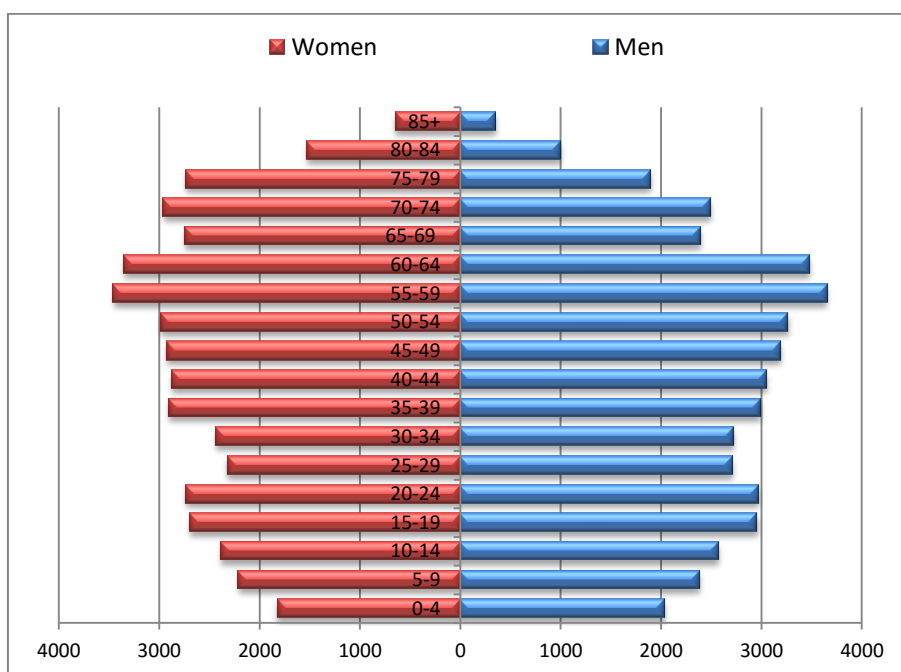
Table 4. Selected indicators of population age structure in the Toplica District according to the 1971 Census and the 2011 Census

	1971						2011					
	0-19	20-39	40-59	60+	median age	index	0-19	20-39	40-59	60+	median age	index
Blace	30.33	27.36	26.06	15.84	35.29	52.22	17.70	20.90	27.96	33.45	46.4	189.04
Urban	33.68	36.88	20.10	9.13	30.31	27.11	22.84	26.27	28.67	22.22	40.4	97.25
Other	29.63	25.35	27.32	17.26	36.34	58.25	13.54	16.55	27.38	42.53	51.2	314.20
Zitoradja	31.56	30.60	28.52	13.61	35.96	43.13	21.34	23.42	25.71	29.52	43.4	138.33
Urban	33.27	32.11	22.53	11.58	31.86	34.81	23.68	26.02	25.79	24.51	40.7	103.51
Other	31.30	30.36	29.45	13.93	36.59	44.50	20.73	22.75	25.70	30.82	44.1	148.65
Kursumlija	37.91	26.55	22.37	12.77	31.84	33.69	20.73	23.70	28.96	26.62	42.9	128.43
Urban	39.96	34.83	18.65	16.08	27.69	15.22	24.06	26.81	29.59	19.54	39.3	81.20
Other	37.31	24.12	23.46	14.73	33.05	39.50	13.20	16.69	27.54	42.56	51.2	322.31
Prokuplje	33.32	28.91	23.28	14.11	33.36	42.33	21.38	24.61	27.72	26.29	42.3	122.99
Urban	35.86	34.35	20.33	8.11	29.45	22.62	23.26	27.67	28.80	20.26	39.4	87.12
Other	31.95	25.97	24.87	17.34	35.46	54.28	18.36	19.71	26.00	35.93	47.0	195.70
District	33.71	28.38	24.33	13.96	33.70	41.41	20.76	23.73	27.65	27.85	43.1	134.15
Urban	36.30	34.52	20.13	8.07	29.37	22.25	23.45	27.26	29.01	20.28	39.5	86.49
Other	32.81	26.23944	25.80	16.01	35.21	48.80	18.08	20.20	26.29	35.43	46.8	196.02

Source: Sex and age, the 1971 and 2011 Census results

The aging index is used as a relevant indicator in the analysis of the age structure of the population, and especially in the assessment of the level of demographic aging (Djokic, 2015). The aging index, calculated as the ratio between the population aged 60 and over and the population younger than 20,

was 134.15 in the Toplica District in 2011. This is a significant increase compared to 1971, when it was 41.41. Since it is considered that the process of aging starts when the index value exceeds 40, it can be said that the population of the Toplica District began the process of demographic aging as early as 1971. A more favorable ratio between the mentioned population groups compared to the median value of aging index for the district was present in the Municipalities of Prokuplje (122.99) and Kursumlija (128.43). The other two municipalities, Blace and Zitoradja, recorded values which are higher than the median. The scope and intensity of the aging process can best be seen when it is analysed by the type of settlement. All municipal centers, except Zitoradja, have index values lower than 100. A particularly extreme situation was observed in rural areas, where the effects of extreme depopulation led to index values of over 300. The rural settlements in the Municipalities of Blace (index value of 314.20) and Kursumlija (index value of 322.31) have the highest values.



Graph 1. The age-sex structure of the Toplica District population in 2011

The data on the median age of the population also provide evidence on the reached level of demographic aging. It is considered that the populations whose median age is 30 are in the first phase of demographic

aging. The median age of the population of the Toplica District reached the threshold value as far back as the 1971 Census, when it was 33.70 years. All subsequent Censuses recorded an increase in the value, and in 2011 it reached 43.1 years.

The unfavorable age structure of the population of the Toplica District is best illustrated by the age pyramid. It can be observed that the base of the pyramid is significantly narrower compared to the middle part. The analysis of the age-sex pyramid shows a narrowing in the younger age groups and an expansion in the older age groups (50 and over). Based on the presented proportions of the five-year age groups and the analysis of the pyramid, we can say that the Toplica District belongs to the group of demographically endangered areas, and its population belongs to a regressive type.

The population of the Toplica district, based on analytical indicators, is characterized by deep demographic aging.

5. Conclusion

Demographic development of the Toplica District in the analysed period is characterized by unfavorable demographic processes, total and natural depopulation, the aging of the population and reduced reproductive potential. All these processes have contributed to the weakening of the demographic base and total demographic potential. The analysis of the indicators at the level of lower administrative-territorial units (municipalities and settlements) revealed visible spatial differences in demographic processes, which are especially pronounced between urban and rural settlements (Spevec, 2009). The Toplica District recorded a positive population change only in the period from 1948 to 1953 (up by 5.6%). In all other Census periods (from 1953 to 2011), the studied area is characterized by a negative growth (in the period from 1953 to 2011, the decrease was 38.6%). The analysis of census data in terms of rural-urban polarization shows that in the period from 1948 to 2011, the population in rural settlements decreased by 64.21%, while in urban settlements, it increased by 243.5%.

The age structure of the population of the Toplica District is analysed using the aging index and the median age. It is considered that the aging of the population begins when the aging index exceeds 40%, and the share of the population aged 60 and over exceeds 12% (Wertheimer-Baletic, 1999). The analysis of the age composition of the population in the period from

1971 to 2011 showed that the aging index and the median age exceeded the critical values as early as 1971. In all subsequent Census periods, there is an increase of the index value, so that in 2011, it amounted to 134.15. At the same time, the median age increased from 33.7 to 43.1 years.

Based on the analysed indicators of age structure, it can be concluded that the Toplica District is demographically a highly endangered area, whose population is in the stage of deepest demographic old age.

Further demographic developments will take place under a strong influence of the aging of the population and changes in the age structure. The consequences of these processes will be: intensified depopulation, decreased birth rates, increased overall mortality rates, reduced migration of the population, deterioration of the composition of the population by age and sex, and aging of the working-age population (Werheimer-Baletić, 1999).

References

- Djokić M, Golubović N, Petrović V, Demografski potencijal Nišavskog okruga, Glasnik antropološkog društva Srbije, 2014; 49: 127-136.
- Ivković M., Todorčić J., Hipsometrijski razmeštaj stanovništva unaseljima Pirotskog okruga, Zbornik radova – Geografski fakultet Univerziteta u Beogradu, 2013; 61: 151-178
- Jukić M., Turk I., Dinamičke demografske determinante ruralno-urbane polarizacije Osiječko-baranjske županije (1971-2001.), Društvena istraživanja 2010; 6: 1139-1162,
- Martinović M., Tipovi populacione dinamike u naseljima Zaplanja, Glasnik srpskog geografskog društva 2012; 2:132-152.
- Nejašmić I., Promjene u dobnospolnom sastavu stanovništva istočnojadranskog otočja (1953-1991.), Acta geographica Croatica 1992; 27: 15-33.
- Nejašmić I., Toskić A., starenje stanovništva u Hrvatskoj-sadašnje stanje i perspektive, Hrvatski geografski glasnik, 2013; 75/1: 89-110.
- Radovanović S., Gigović LJ., Demografski procesi u pograničnom području Srbije prema Bugarskoj, Demografija 2010; 7: 105-128
- Turk I., Jukić M., Promene u obrazovnoj strukturi stanovništva Karlovačke županije, Društvena istraživanja 2009; 6: 1173-1194,
- Werheimer-Baletić A., Stanovništvo i razvoj, Mate, Zagreb, 1999
- 2011 Census of Population, Age and sex – data by settlements, Statistical Office of the Republic of the Serbia, Book 2, Belgrade 2012.
1971. Census of Population, Age and sex – data by settlements, Statistical Office of the Republic of the Serbia, Book 8, Belgrade 2013.
- 2011 Census of Population, Comparative overview of the number of population in 1948, 1953, 1961, 1971, 1981, 1991, 2002. i 2011 – data by settlements, Book 20, Statistical Office of the Republic of the Serbia, Belgrade 2014.