

## RELIEF AS POPULATION DISTRIBUTION FACTOR IN BOSNIA AND HERZEGOVINA

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*It is evident that geographical distribution of the Bosnia and Herzegovina population is unequal, and it's conditioned by series of natural and social geographical factors. Researches presented in this paper show how crucial is the relief as a factor in unequal geographical distribution of Bosnia and Herzegovina population, and determine the differences in population density among relief regions and within it. The areal differentiation of natural regions, that is, the areal differentiation of the complex geographic regions was carried out by using the conducted analysis. Research indicated which natural regions, along with their relief highly affected depopulation, and which regions enabled population concentration, as well as its growth and development of settlements.*

*Similarly, the influence of natural base was indicated, especially the influence of relief on the population migrations from one region to another more adequate region. With population density analysis, the direct and indirect effects of relief on the population distribution in Bosnia and Herzegovina have been confirmed.*

**Key words:** relief, population, settle, depopulation, region, Bosnia and Herzegovina.

### INTRODUCTION

The distribution and density of population in Bosnia and Herzegovina indicate that there is a connection between the natural basis, first and foremost relief, with other factors that had an influence on the relocation and later on the migration from one region to the others. The assumption is that the trend of emigration, from one region of Bosnia and Herzegovina to the other will continue, although it may have a negative impact on the overall economic development of the country. Natural geographical factors, relief and climate, being as the most important, have influenced and still have a great impact on the most densely populated areas in Bosnia and Herzegovina. Those regions of Bosnia and Herzegovina include the northern and central Bosnia, especially Sarajevo-Zenica basin. Other regional entities of Bosnia and Herzegovina are characterized by low population density.

The set problem of the research is the impact of relief on demo-geographical distribution of the population in Bosnia and Herzegovina. It was presumed that in some cases the relief is dominant factor of unequal density and thus a crucial factor of unequal demographic development. The subject of study is based on the demonstration of how and to what extent relief limits the unequal demographic development and thus migratory movements of population in Bosnia and Herzegovina.

To prove this assumption, the paper started from the analysis of the following: basic and dominant morphological structures, application of cartographic, field and cabinet research methods; density of population implemented by cartographic analysis of settlement



in the expanded river valleys, there is a relatively to extremely equal relief. The region extends from NW-SE, being 328 km long and about 60 km wide. The region is predominantly characterized by low hypsometrical levels of 100-200 m above sea level, not taking into account the low horst mountains and foreland steps. The region is characterized mainly by minimum energy relief values and minimum values of slope angle. In this part of Bosnia and Herzegovina, the valleys of the largest rivers are located such as: Sava, Bosna, Drina, Una and Vrbas, which presented the natural direction of movement of the population since the earliest times. Within the northern Bosnia, according to the principle of complex geographical homogeneity, three sub-regional areas are defined: Una-Sana part (Unsko-sanski kraj), lower Vrbas and the lower part of Bosna (Donji vrbaski i donji bosnin kraj), and Spreča-Majevica part with Semberija (Sprečko-majevički kraj sa Semberijom).

The central Bosnia (Središnja Bosna) covers the area of the central Dinaric basin and valleys with mining and flysch mountains and has an area of 12,884 km<sup>2</sup>, which is 25.2% of the national territory. The mountain ranges Dimitor, Manjača, Čemernica, Vlašić, Konjuh and Javor make the northern border of the region, while mountain ranges Lisa, Vitorog, Raduša, Bitovnja, Bjelašnica, Treskavica and Zelengora make the southern border. "This mountain area of Bosnia and Herzegovina has always represented an important crossroad of main roads and transit area between the area of northern Bosnia and the Adriatic coast" (Encyclopedia of Yugoslavia, 1983). The central Bosnia contains a high mountain area where there are many medium-high and high mountain ranges and spines, such as: Bjelašnica, Treskavica, Vranica, Romania, Jahorina and others. The mountain relief of central Bosnia and Herzegovina is extremely broken by composite valleys of large rivers Drina, Bosna, Vrbas and their tributaries. Apart from them, there are spacious basins, where the most important ones are: the Sarajevo-Zenica and Uskoplje. Within the region of central Bosnia three sub-regional parts are defined: Upper Vrbas river valley (Gornje Povrbasje), the Sarajevo-Zenica valley (Sarajevsko-zenička kotlina) and the Upper Drina valley (Gornje Podrinje).

The region of high karst (Regija visokog krša), as its name says, covers the karst area of Bosnia and Herzegovina, which is located at the transition from mountain-basin to the Mediterranean area. The high karst region extends from Grmeč in the northwest to the border with the Republic of Montenegro in the southeast. It borders with central and northern Bosnia, in the north, and from low Herzegovina it is separated by: Viduša, Velež, Prenj and Čvrstica. Thus bounded region covers an area of 10,500 km<sup>2</sup>, which is 20.5% of the total area of Bosnia and Herzegovina. The region is characterized by fully developed karst that affects the surface aridity. The surface streams are very rare, but the area is abundant in underground streams. The mobility in the region is limited by the orthographic assembly and the main traffic mobility in the north-south relation is accomplished by mountain passes. High karst region is divided into two sub-regions: Bila and polja of southwestern Bosnia and high (mountainous) Herzegovina (Visoka-planinska Hercegovina). These two sub-regions to some extent differ in their physical geographical characteristics even in relief.

The lower flows of the river Neretva and Trebišnjica system represent low Herzegovina (Niska Hercegovina). It is Adriatic and sub-Adriatic zone, expanded at a low, Mediterranean and sub-Mediterranean Herzegovina and includes a part of the territory to Posušje, Široki Brijeg, Mostar, Stolac and Trebinje. The northern border of Herzegovina make southern foreland steps Čabulja, Prenj, Velež and Viduša. In these borders the surface of the region is 5,957 km<sup>2</sup>, or 11.6% of the territory of Bosnia and Herzegovina. Low

Herzegovina in the south ends slightly by jagged ingressed tectonic coast of the Neum-Klek and Mali Ston bay. The relief of low Herzegovina is characterized by extreme diversity of landscapes that are visually reflected in the existence of karst fields, bays, low plains, hills, the Neretva valley and its tributaries, and the mountain Bila in the peripheral areas of the region (see Table 1).

**Table 1: Basic geographical data about regions/subregions of Bosnia and Herzegovina**

Region / subregion	Area km <sup>2</sup>	% B&H surface	% region surface
<b>SJEVERNA BOSNA / NORTHERN BOSNIA</b>	<b>21856</b>	<b>42,7</b>	-
Unsko-sanski kraj	5871	11,5	26,9
Donji vrbaski i donji bosnin kraj	8847	17,3	40,4
Sprečko-majevički kraj sa Semberijom	7142	13,9	32,7
<b>SREDIŠNJA BOSNA / CENTRAL BOSNIA</b>	<b>12884</b>	<b>25,2</b>	-
Gornje Povrbasje	2655	5,2	20,6
Sarajevsko-zenička kotlina	5821	11,4	45,2
Gornje Podrinje	4408	8,6	34,2
<b>REGIJA VISOKOG KRŠA / HIGH KARST REGION</b>	<b>10500</b>	<b>20,5</b>	-
Bila i polja jugozapadne Bosne	6254	12,2	59,6
Visoka (planinska) Hercegovina	4246	8,3	40,4
<b>NISKA HERCEGOVINA / LOW HERZEGOVINA</b>	<b>5957</b>	<b>11,6</b>	-
<b>BOSNIA AND HERZEGOVINA (mainland)</b>	<b>51197</b>	<b>100</b>	-

*Source: Spahić, M. (2011)*

## Relief structure impact on the areal distribution of Bosnia and Herzegovina population

The fluvial relief, defined by numerous composite river valleys, is widely represented on the territory of Bosnia and Herzegovina. These are mainly polyphasic, polymorphic and polygenetic relief forms with developed alluvial plains, terraces and pediments. For the process of the population concentration, the fluvial morphostructural and morphosculptural elements are of great importance among which the most important ones are: river valleys, river basin alluvium, river terraces and valley pediments.

Such morphological forms are located in Medjugorje depressions, basins, valleys and flood plains. The most important valleys are: a bi-fold Sarajevo-Zenica, Bihać, Tuzla, Skopaljska, Sprečanska etc., and most important floodplains are: Prijedor, Donjounska, Liječanska, Šamačka and Semberska. Every valley and floodplain is intensely populated with a large part of the total population of Bosnia and Herzegovina.

The larger Bosnian rivers of the Black Sea catchment absorb rainwater of interior and central Dinarides. The upper mountain river systems of this basin have been built in the compact rock mass, in area with prominent neo-tectonic uplift and faulting, where small villages are located.

The central part of Bosnia and Herzegovina is mostly mountainous area, vertically dissected by valleys and ravines, and according to the morphological forms it received physio-gnomic name, not just mountainous, but the ravine-valley too. The latter have a lower altitude, the parish continental climatic characteristics, rich pedologic substrate and

bio-production, and is densely populated. In this valley-basin region of central Bosnia the most important urban settlements and cities of Bosnia and Herzegovina are formed; such as: Sarajevo, Zenica, Travnik, Jajce, Bugojno, Donji Vakuf, Gornji Vakuf, Visoko, Kakanj and others.

The high karst region has its own peculiarities when it comes to population and housing. Geological carbonate basis, stony ground, scarce and disintegrated surface river networks influenced the emigration of the population, deagrarianization, deruralization and deurbanization of the region. The domicile and rare population inhabits the periphery of karst fields or bottom and peripheral parts of the basin.

The basic relief feature to the southern parts of Bosnia and Herzegovina is given by the Neretva valley and its transverse valleys which, directly and indirectly, end in it near Čapljina. Trebižat from the west drains precipitation in the region of high karst and Trebišnjica that in part indirectly ends in Hutovo blato, which is through Krupa connected to Neretva River. The Neretva valley, especially from the upper and middle basin dissects high karst regions, and then from Mostar also dissects the Mediterranean region. The Mediterranean climatic influences can be felt all way to Mostar, that determined the affordability of settlement. In addition to climate, it is conditioned by fertile agricultural land in the valleys and basins, permanent surface streams and abundant springs. The villages are located at karst fields, ravines, sinkholes, and in the vicinity of springs, but they are almost never at the bottom of the mentioned relief forms, because it is arable land or the area is affected by periodic floods.

### **Impact of morphometric relief characteristics on the areal distribution of population**

Bosnia and Herzegovina is largely mountainous country because 30,885.83 km<sup>2</sup> or 60.31% of its territory is situated at an altitude of 500-2386 m. According to the 1991 census, Bosnia and Herzegovina had 5825 settlements. Their total number is different in altitude. At an altitude of 100 m Bosnia and Herzegovina has 226 settlements, or 3.8% of the total number of settlements. The number of settlements is significantly increased at an altitude 100-800 m. Thus, eg. in the hypsometric zone 200-300 m there are 738 settlements (12.7%), in 300-400 m 631 settlements (10.8%), in 400-500 m 547 settlements (9.4%), in 500-600 m 590 settlements (10.1%), in 600-700 m 598 settlements (10.3%) and in 700-800 m zone there are 573 (9.8%) settlements.

From this zone, the number of settlements has been continuously decreasing, so in the area above 1000 m and to the upper population border there are totally 470 settlements (8.2%).

These are the mountain villages with small population. The feature of Bosnia and Herzegovina region is characterized by deployment of the total population in hypsometric zones and changes that have occurred in recent decades. In the analysis that follows, these changes are observed, so it is possible to extract relief regions which are characterized by depopulation and those that include a larger number of the population. For this purpose, the period between 1961 and 1991 is analyzed. According to the 1991 census, the zone between 100 and 200 m above sea level had the largest population in which there were 856,536 inhabitants, or 19.6% of the total population of Bosnia and Herzegovina. In the zone of 200-300 m there were 819,275 or 18.7% of the population, and the third most populous zone between 500 and 600 m, which is located in Sarajevo, had 736,720 inhabitants, which is 16.8% of the total population of Bosnia and Herzegovina.

The terrain inclination is extremely important in the distribution of the population and settlements. The inclinations determine the type and method of construction of residential and commercial properties as well as other infrastructures. The inclinations on the southern exposures have a beneficial effect on life, while the northern exposures are somehow drastic and reduce vertical settlement. Additionally, higher inclination, especially in unstable molasse series, increases erosion and rockfall processes, which are the limiting factor of settlement.

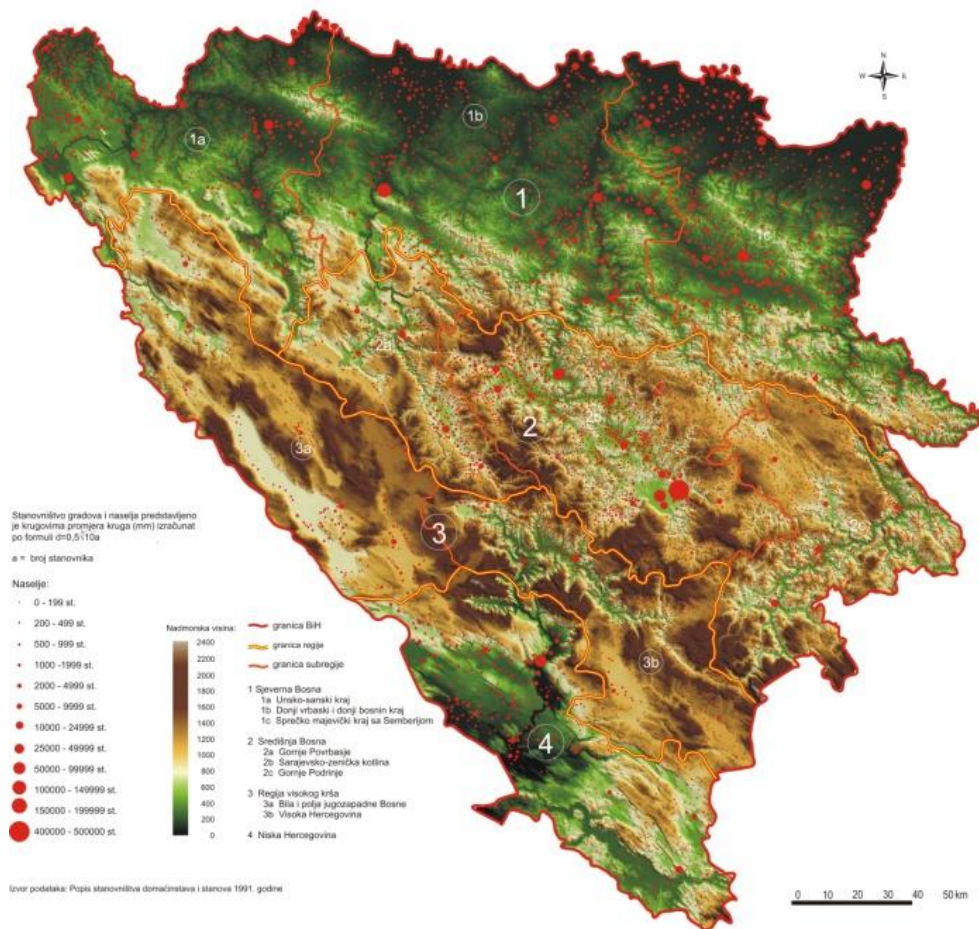


Fig. 2. Relief impact on the areal distribution of Bosnia and Herzegovina population, 1991.

During this observation period, the largest increase in population was recorded in the zone between 100 and 200 m and it amounted to 277,995 (48.1%). The largest decline in population, in the same period was recorded in the hypsometric zone 1000-1100 m and it amounted to 19,368, or 59.9%. All of the above mentioned highlight the great impact of the relief on the population that indicates the process of the population concentration of Bosnia and Herzegovina in low relief units (see Fig. 2 and 3).

In some stressful situations, such as landslides, which often have an enormously large scale, as the one occurring during the preparation of the work for publication, they have disastrous consequences. The largest part of the territory of Bosnia and Herzegovina has an inclination in the range from  $8^\circ$  to  $12^\circ$ . The inclinations in Bosnia and Herzegovina cover  $8419.12 \text{ km}^2$  or  $16.44\%$  of the total area of the country. The inclination with intervals of  $20^\circ$  from  $30^\circ$  cover up to  $7733.11 \text{ km}^2$  or  $15.15\%$  of the total area, while the lowest area of Bosnia and Herzegovina has inclination larger than  $40^\circ$  and is  $337.17 \text{ km}^2$  or  $0.65\%$  of the total area. The flat surfaces with inclination of  $1^\circ$  cover  $5553.12 \text{ km}^2$  or  $10.84\%$  of the total area of Bosnia and Herzegovina.

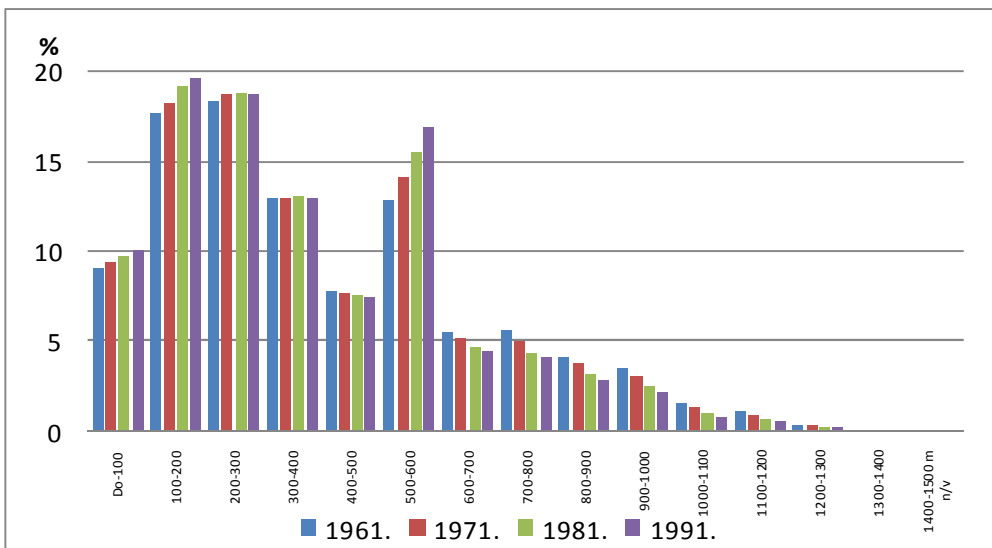


Fig. 3. Population distribution of Bosnia and Herzegovina by hypsometric levels (%) in the period from 1961 – 1991.

Until now, it was shown that the most productive fields of Bosnia and Herzegovina for the population concentration were those that have slopes of  $1^\circ$  to  $3^\circ$ . Those are mostly low river terraces in basin extensions. The conditions for the construction of settlements are partially favorable on the inclinations of  $12^\circ$ , however people often build rural settlements or parts of urban settlements on the unstable pediment up to  $20^\circ$  and sometimes even over  $20^\circ$ , as is the case in some suburban areas of Sarajevo, Tuzla and Zenica. Primarily, high inclinations are reached by the valleys of mountain-depression Bosnia and Herzegovina and they are mostly uninhabited areas (see Fig. 4).

Geomorphological processes, that negatively affect the gathering of the population, are mainly related to inclinations. This primarily emphasizes the emergence of landslides. From the architectural and environmental point of view, the process of landsliding in the rocks is one of the most important egzo-dynamic processes, sometimes with disastrous consequences. Landslides are frequent on slopes with inclination between  $5^\circ$  and  $30^\circ$ .

In decomposed relief, such as the Bosnia and Herzegovina's relief, conditions for the reception of solar insolation are different. For this reason, the impact of expositions on topoclimate is big, and thus on other physical-elements, all of which have an impact on the

use of area. Northern (shady) expositions occupy the largest area in Bosnia and Herzegovina (38.09%). This is certainly a limiting factor, even when it comes to population and settlements. Southern (sunny) expositions occupy smaller part of the territory of Bosnia and Herzegovina (36.19%). However, because of the direction of Dinaric mountain system, the most common are the northeast and southwest inclinations. Also, eastern expositions are more represented in relief of Bosnia and Herzegovina (13.94%) when compared to the western ones (11.78%), (see Fig. 5).

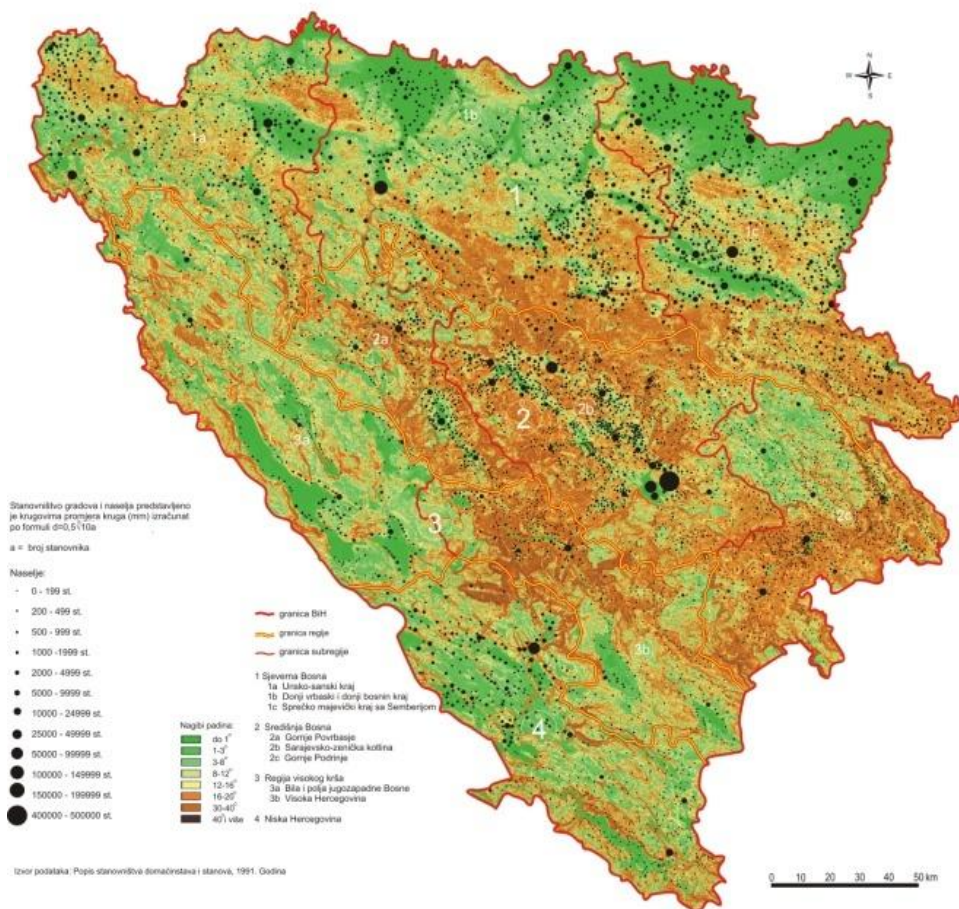
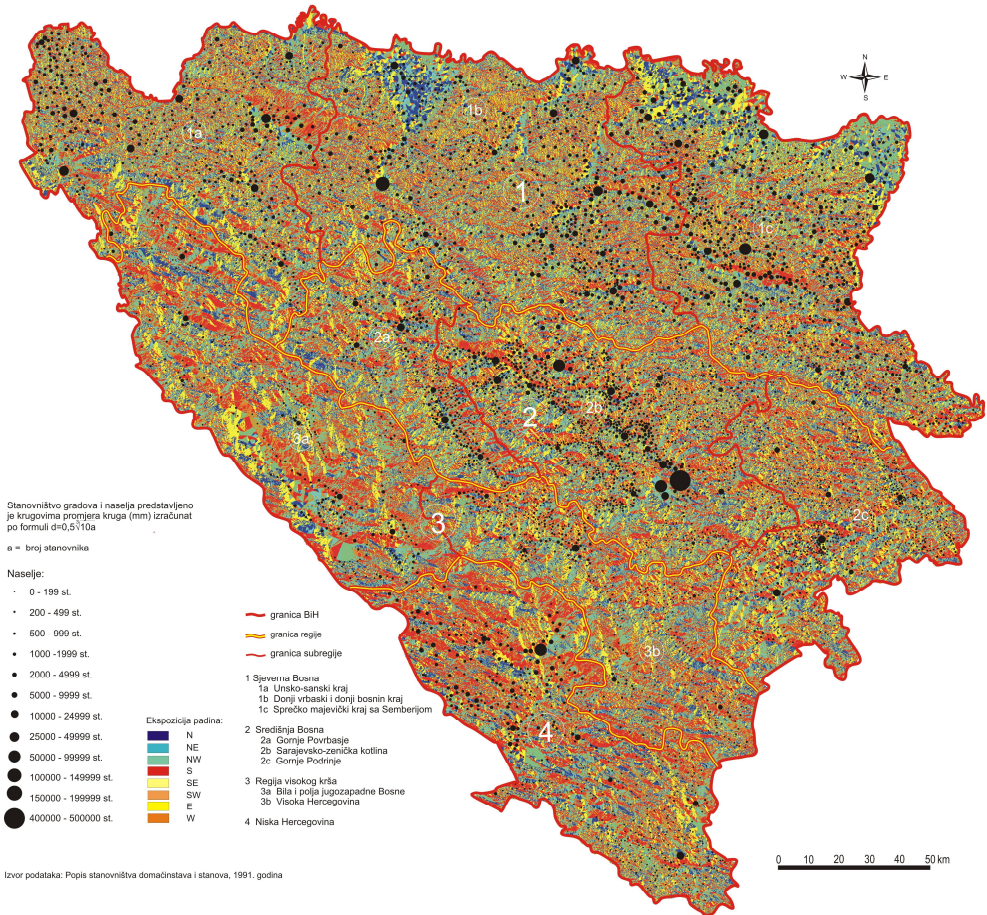


Fig. 4. Terrain inclination impact on the areal distribution of Bosnia and Herzegovina population

From the previous statements, we can conclude that a large number of settlements is necessarily exposed to the north. However, looking at the deployment of settlements on topographic maps, we noticed that the settlement of shady exposition are mainly distributed on the slopes of the northeast and northwest expositions, because they have a better topoclimate and microclimate in relation to the north. In some places, we see a greater concentration of settlements in the eastern expositions in relation to the west. This phenomenon cannot be explained by the influence of insolation, since the eastern slopes are



considered shady. The only "propitious climate" of eastern slopes compared to the western is that the eastern ones in these areas represent a lee.



**Fig. 5.** Slope exposition impact on the areal distribution of Bosnia and Herzegovina population

In Bosnia and Herzegovina the most densely populated areas are northern and southern, lowland areas, or areas that are not significantly affected by exposition. In addition to these, basins and valleys of major Bosnian and Herzegovinian flows are densely populated and these generally have Dinaric direction with southwestern and northeastern slopes. By analyzing the distribution of the settlement we see that, in certain morphological units, the concentration of settlements in southern, more precisely the southwestern sides, is significantly higher when compared to the other exposition (see Fig. 5).

## Population distribution and density by complex regions of Bosnia and Herzegovina

"Population Distribution is the main indicator of population density of a certain area. General or geographical density refers to the number of residents living in the unit area" (Friganović, M. 1990). Movement of the total number of people, according to some areas of Bosnia and Herzegovina, is extremely uneven and small areas of population growth can be extracted such as the sub-region Bila and polja of southwestern Bosnia and high Herzegovina and areas of high population growth, which include the region of Northern Bosnia and sub-regions of Sarajevo -Zenica basin.

The following analyses include preliminary results of 2013 census, so it is possible to talk about the latest changes related to population growth and population density across regions and sub-regions of Bosnia and Herzegovina. It is evident, from the first to the last census, that in the region of northern Bosnia there lives the largest number of people. In this region, according to the censuses of population, there is more than half of the total population of Bosnia and Herzegovina. This is confirmed by the last census from 2013, according to which this region has 56.7% of the population of Bosnia and Herzegovina. The number of inhabitants of mentioned region has been constantly increasing since 1948 (1,443,928 inhabitants) to 1991 (2,432,723 inhabitants). Index increase for the period 1991-1948 was 168.5, and from 2013 to 1991 it was 92.1. Therefore, the number of inhabitants in 2013 has been reduced, as well as in the other parts of the country, but considering percentage it is reduced to a lesser extent than in other parts.

The population density in northern Bosnia is characterized by the highest value of 66.2 inh./km<sup>2</sup> (inhabitants per km<sup>2</sup>) which is the number of registered in 1948 to 111.5 inh./ km<sup>2</sup> registered in 1991, while in 2013 the population density decreased to 98.4 inh./km<sup>2</sup>, which is a result of the overall decrease in population in Bosnia and Herzegovina.

In addition to the spatial structure, this region stands out with its demographic size as a result of the benefits of natural conditions for settlement which besides relief include: climate, water and fertile soil. In addition to renewable natural-geographic factors, the highest population density is affected by the wealth of non-renewable natural resources of northern Bosnia.

The isolated sub-regional entities have different demographic characteristics. Thus, the Una-Sana area in 2013 had the smallest number of inhabitants amounting to 451,850 inhabitants, and the lowest population density within the region of 77.0 inh./km<sup>2</sup>. The low Vrbas and low Bosna area in the same year had 848,489 inhabitants, or 88.5 inh./km<sup>2</sup>, while demographically the largest sub-region, Spreča-Majevica area with Semberija, in the same year had 942,276, or 128.3 inh./km<sup>2</sup>. The population of this region is quite evenly distributed across sub-regions, and all three sub-regions in 1991 and 2013 had a density higher than the national average.

According to the observing period, 1948-1991, we see almost twofold increase in population and population density in the region of northern Bosnia and its sub-regions and a slight decrease between 1991 and 2013. The decrease in the absolute number of inhabitants of the region had no effect on its part in the total population of Bosnia and Herzegovina. The proportion of the northern Bosnia population in total, for a given period, increased from 55.6% in 1991 to 56.7% in 2013. Municipalities in the region that stand out for population density are: Banovići, Banja Luka, Bijeljina, Bosanski Šamac, Brčko (District), Bužim, Cazin, Doboj, Doboj South, Doboj East, Domaljevac Šamac, Gračanica, Gradačac, Kalesija, Lukavac, Odžak, Orašje, Prijedor, Sapna, Srebrenik, Teočak, Tešanj, Tuzla, Usora, Velika

Kladuša, Vukosavlje, Zvornik, Žepce and Živinice. These municipalities have a population of over 100 inh./ km<sup>2</sup>.

The central Bosnia is characterized by an intensive growth of the total population which is associated with the dynamic economic development of the region. A small number of inhabitants and the uneven population density of this region, in relation to the region of northern Bosnia, is portrayed by mountainous basin relief and therefore scarce natural characteristics of soils and somehow drastic climatic conditions. The largest concentration of population in the central Bosnia can be found exclusively in the valley-ravine areas, which have the best geographical conditions for life and settlement.

The construction of major roads in the valleys of large BiH rivers, the concentration of economic activities and industrial capacity has affected the affluence of the population from distant mountain village settlements to valleys, big commercial buildings and cities. Here we mainly refer to the sub-region Sarajevo-Zenica basin, which was distinguished by the industrial development both in Bosnia and Herzegovina and the former Yugoslavia. The above mentioned valley, together with Lašva Valley, was the center of development of ferrous metallurgy as well as several branches of manufacturing industry: metal, wood, food, textile and others.

According to the 1991 census, in the area of central Bosnia there were 1,374,157 inhabitants, or 31.4% of the total population of Bosnia and Herzegovina, and in 2013 the total population number of the region was 1,131,494, or 29.8% of the total population. This region has had a continuous increase in population density, with 50.3 inh./km<sup>2</sup>, the same number it had in 1948, at 106.7 inh./km<sup>2</sup> in 1991 and decline in 2013 to 87.8 inh./km<sup>2</sup>. Sarajevo-Zenica valley is the most populous sub-region in Bosnia and Herzegovina. In 1948, it had 68.1 inh./km<sup>2</sup>, and in 1991 it had 176.4 inh./ km<sup>2</sup>. After the last war in Bosnia and Herzegovina, even this sub-region marks the decrease in density, registering 153,0 inh./ km<sup>2</sup> in 2013. The region of high karst is the least populated region. Evidence of this is found in the unfavorability of natural-geographic conditions for gathering population. This region is the only one in Bosnia and Herzegovina, which in 1948 had more inhabitants than in 2013.

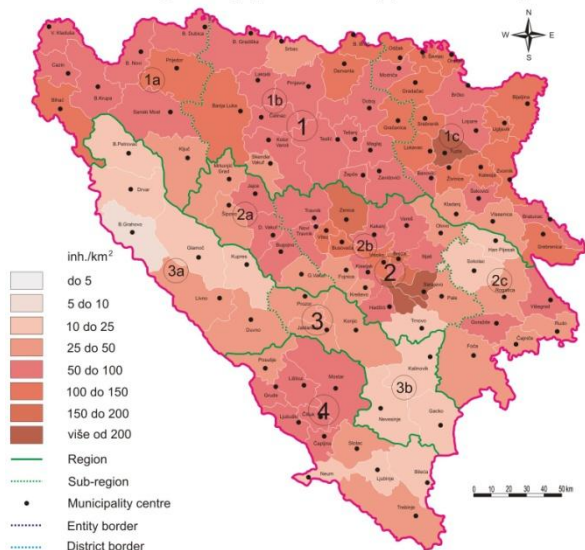
Between World War II and the recent war in this region (1992-1995) the number of inhabitants and population density slightly increased, so here 234,376 inhabitants lived in 1948, which is 22.3 inh./km<sup>2</sup> and 1991 lived 240,110 residents or 22.9 inh./km<sup>2</sup>. The highest population density in this region is recorded in 1961 when there were 25.3 inh./ km<sup>2</sup>. High karst region, as its name confirms, is characterized by mostly karst morphostructure, which limits the natural advantages of settling, out of which the most important are: karst mountainous relief, lack of surface water flow and poor skeletal soil.

According to the census from 2013, sub-region Bila and polja of southwestern Bosnia had the lowest population density, with an average density of 15.9 inh./km<sup>2</sup>. From the total population of the area, 70.9% is concentrated in the area of two municipalities Livno and Tomislavgrad, while less than 30% of the population lived in the remaining 70% of the territory. An extremely small number of residents in this area is shown by the data on population density in 2013 for municipalities: Bosansko Grahovo (4 inh./km<sup>2</sup>), Glamoč (4 inh./ km<sup>2</sup>) or Kupres (10 inh./km<sup>2</sup>).

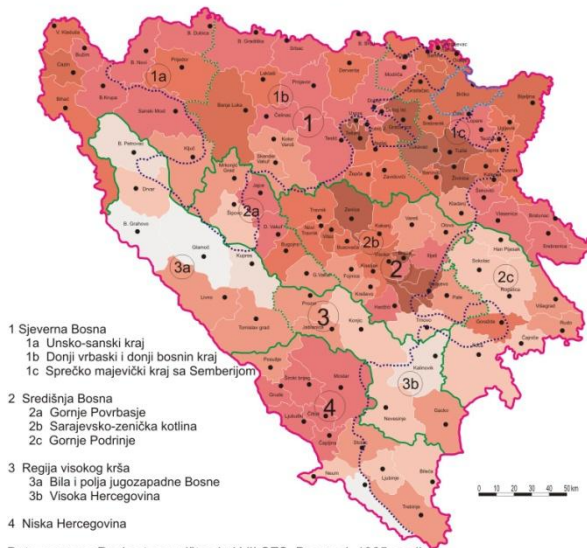
High Herzegovina also records decline in total population and population density. Compared to the pre-war period, sub-region of high Herzegovina had a small number of inhabitants in 2013, and data on population density of Kalinovik municipality (4 inh./ km<sup>2</sup>)

show an extremely small population in this mountainous area, while sub-regions Konjic (23 inh./km<sup>2</sup>) and Jablanica (35 inh./ km<sup>2</sup>) are most densely populated municipalities.

**Bosnia and Herzegovina - population density (state from 1961)**



**Bosnia and Herzegovina - population density (state from 2013)**



Data sources: Popis stanovništva, knj. VII SZS, Beograd, 1965. godina; Preliminarni rezultati Popisa stanovništva, domaćinstava i stanova u BiH, Agencija za statistiku Bosne i Hercegovine, Sarajevo, novembar 2013. godina

**Fig. 6. Population density of Bosnia and Herzegovina, 1961-2013.**

This data confirms the existence of large variations in the total number of population at the level of regions and sub-regions, and at the level of municipalities. Under the influence of the past war, and as confirmed by the results of the censuses from 1991 and 2013, there was a reduction of the total population of 50,115, which made the demographics of the region of high karst even more unfavorable.

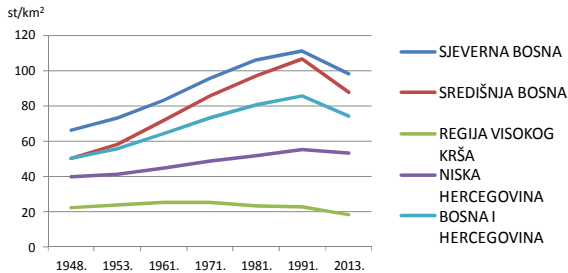
It is worrying that the already poor population density of Bila and polja area of south-western Bosnia and Herzegovina through war period has decreased significantly and the negative trend continued in the postwar period. Therefore it can be said that this is almost completely demographically devastated area of Bosnia and Herzegovina. The causes that brought about the emergence of this situation are numerous, and there is a need to emphasize the problem of intensive emigration of young people from this area (see Fig. 6).

Low-Herzegovina had a specific course of settlement and demographic development throughout history, primarily because of its geographical position and the fact that it is the only region in Bosnia and Herzegovina, which is strongly influenced by the Mediterranean and has access to the Adriatic Sea. For the settlement of this part of Bosnia and Herzegovina in the past, and even today, the most significant role has had the Neretva River, which is a valley forming a natural road that linked the coast with the

hinterland of Bosnia and Herzegovina. In addition, one of the most important roads of settlement of Bosnia and Herzegovina from the earliest times led through Herzegovina, the

area which communicated with the ancient civilizations of the world over the Mediterranean Sea. The specifics of modern development of the population of the region are reflected mainly in stagnation and depopulation, which is caused by a number of negative factors of modern political-geographical development of Bosnia and Herzegovina.

In territorial, as well as in demographic terms this is the smallest regional entity of Bosnia and Herzegovina. The most important and largest settlements emerged in the Neretva River valley and along the valley of karst fields. By the census of 1991 in this area there were 330,043 inhabitants, or 11.6% of the national territory was inhabited by 7.5% of the total population of Bosnia and Herzegovina.



**Fig. 7. Population density dynamics of Bosnia and Herzegovina regions, 1948-2013.**

population, according to estimates by the Federal Bureau of Statistics and the Statistical Office of Republic of Srpska, was recorded after the war, in 1996. According to these sources, the population number of low Herzegovina in 1996 had 58,860 inhabitants less compared to 1991, representing a decrease of 18.6%. After 1996, the number of inhabitants continued to rise, but by 2013 did not reach pre-war figures. Total population stood at 318,654, or 53.5 inh./km<sup>2</sup>, which is significantly below the BiH average for 2013, which amounts to 74.1 inh./km<sup>2</sup> (see Fig. 6 and 7).

## CONCLUSION

The research started with the premise that the relief is a limiting factor which defines geosystems of Bosnia and Herzegovina and they limit favorable or unfavorable conditions of life in them. Geosystems of Bosnia and Herzegovina have defined different natural landscapes that provide different conditions for life and therefore different densities, ways of life and customs in them. Relief of Bosnia and Herzegovina, with its forms and morphometric characteristics, has a significant impact on the spatial distribution of the population. It is evident that inhabitants are leaving higher mountain areas and settle in the lowlands. Forms and relief units in Bosnia and Herzegovina that bring inhabitants together are plain with hills to the north, valley-expansion in the central part and less emphasized karst basin, and lower areas in the south. Individuals often, mostly unplanned, inhabit areas of lower hypsometric levels which are characterized by slopes with strong inclination or areas along river beds where settlements are often hit by floods.

The findings point that the region of northern Bosnia has the most emphasized demographic and urban growth and development. This region is characterized by a flat relief suitable for settlement, which is dominated by rural areas of mixed type, even the urban

In addition, specific conditions which affected Bosnia and Herzegovina, including this region within it since 1992, have led to severe changes in the dynamics of demographic development that initially manifested through significant reduction in the total population in this area.

As a result of suffering and intensive migration during the war period (1992 - 1995) the most significant decline in the

ones, built on the river terraces, foothill stairs and slopes of hills shaped by slope and fluvial-denudation processes. This area has the highest population density, in which dominant settlements bring together a large number of inhabitants. The corresponding sub-regions show very small relief and demographic differences. Despite the fact that the census of 2013 registered a decrease in population in Bosnia and Herzegovina, in some parts of the northern lowland region there was a significant increase in population and population density, especially in the northeastern part of the country. Densely populated part of Bosnia and Herzegovina is Sarajevo-Zenica valley that formed, and still forms, the backbone of the demographic and urban development of the area. The rest of the BiH area is characterized mainly by mountainous valley basin relief and karst relief. It is the area which is continuously being emptied demographically by migratory displacement.

### Literature and sources

- Dinić, J. 2007: Čovek i reljef, Srpsko geografsko društvo, Forma B, Beograd;
- Domaćinstva po naseljenim mjestima, Statistički bilten br. 272., FZS, Sarajevo, 1999;
- Enciklopedija Jugoslavije, Socijalistička Republika Bosna i Hercegovina, Jugoslavenski Leksikografski zavod, Zagreb, 1983;
- Fričanović, M. 1990: Demogeografija-stanovništvo svijeta, Školska knjiga, Zagreb;
- Konačni rezultati popisa stanovništva od 15. marta 1948., Knj. I, Stanovništvo po polu i domaćinstva, Beograd 1951;
- Popis stanovništva iz 1953., Knjiga XIV, Osnovni podaci o stanovništvu, Podaci za naselja prema upravnoj podeli u 1953. godini, Beograd 1958;
- Popis stanovništva 1961., knj. VII SZS, Beograd 1965. godina;
- Popis stanovništva i stanova 1971. Stanovništvo – Djelatnost, rezultati po naseljima i opštinama, knj. X, SZS, Beograd, 1974;
- Popis stanovništva, domaćinstava i stanova 1981. Domaćinstva – po naseljenim mjestima, Statistički bilten br.112., RZS, Sarajevo, 1983;
- Popis stanovništva, domaćinstava, stanova i poljoprivrednih gazdinstava 1991., Prvi rezultati za stanovništvo, domaćinstva, stanove i poljoprivredna gazdinstva – po opštinama i naseljenim mjestima, Statistički bilten br. 220., RZS, Sarajevo, 1991;
- Stanovništvo po naseljenim mjestima, Statistički bilten br. 257., FZS, Sarajevo, 1998;
- Stanovništvo F BiH 1996-2006, Statistički bilten br. 110, FZS Sarajevo 1998;
- Popis stanovništva, domaćinstava, stanova i poljoprivrednih gazdinstava 1991. Stanovništvo - uporedni podaci 1971, 1981 i 1991, Statistički bilten br. 265., FZS, Sarajevo, 1998;
- Spahić, M., Drešković, N. 2011: "Implikacija političko-teritorijalnog ustrojstva Bosne i Hercegovine na njen regionalnogeografski razvoj", Zbornik radova Međunarodnog simpozija "Bosna i Hercegovina - 15 godina Dejtonskog mirovnog sporazuma", Univerzitet u Sarajevu;
- Topografska karta 1:200000, BiH, J.P. Geodetski zavod BiH, Sarajevo;
- Wertheimer-Baletić, A. 1999: Stanovništvo i razvoj, MATE, Zagreb.

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