

## TRENDS IN THE DEMOGRAPHIC DEVELOPMENT OF THE DABRASH KARST AREA OF THE WESTERN RHODOPES

*Aleksandra Ravnachka*<sup>1</sup>

<https://doi.org/10.35101/prg-2020.3.10>

The main purpose of the study is to reveal the current state and trends in the demographic development of the Dabrash karst area. The karst in the study area has a limited spatial distribution, but despite this fact, it is extremely diverse. The population with its number, demographic and social characteristics, its economic activity, indirectly influences the evolution of the karst. The current ongoing processes of depopulation, aging and migratory mobility of the population have been analyzed in the paper. The demographic and social characteristics of the population have been studied through calculation of indicators which describe the demographic structures, thus allowing the disclosure of a number of features that determine both the current state and the future development trends of the local population. The negative demographic processes occurring in the Dabrash karst area, are less manifested in comparison to Blagoevgrad district and the country as a whole. The most significant demographic problems in the area are the declining birth rates, the reduction of the number of young and working-age population, the emigration and the low level of education of the local population. These processes will have an increasing negative impact in the future, both on the demographic situation and on the overall sustainable development of the area.

**Key words:** Dabrash karst area, demographic development, depopulation, aging, educational and age structure of the population

## ТЕНДЕНЦИИ В ДЕМОГРАФСКОТО РАЗВИТИЕ НА ДЪБРАШКИЯ КАРСТОВ РАЙОН В ЗАПАДНИТЕ РОДОПИ

*Александра Равначка*

**Абстракт:** В публикацията са разгледани тенденциите в демографското развитие на Дъбрашкия карстов район. Те, в съчетание с извършваната от населението стопанска дейност, оказват влияние върху развитието на карста и пораждат разнообразни пробле-

---

<sup>1</sup> Department of Geography, National Institute of Geophysics, Geodesy and Geography - Bulgarian Academy of Sciences, email: a\_ravnachka@abv.bg

ми. Дъбрашкият карстов район териториално съвпада с едноименния дял на Западните Родопи, който е формиран между долините на реките Мътница, Места и Доспат. В Дъбраш карстът е с ограничено площно развитие, но независимо от този факт, той е изключително разнообразен по форми и районът се характеризира с голям брой защитени територии и значително биоразнообразие. В статията са анализирани съвременните процеси на обезлюдяване, застаряване и миграционно движение на населението. Изследвани са демографските и социалните характеристики на населението чрез проследяването на определени показатели, което позволява разкриването на редица особености, предопределящи както моментното демографско състояние, така и тенденциите в бъдещето му развитие. Това състояние е по-благоприятно в сравнение с тази на областта и страната, което се дължи на особености в историческото развитие на населението, етническата му принадлежност и религиозните му убеждения. Независимо от това, през целия разглеждан период населението на района намалява, но с по-ниски стойности (-9,8 %) спрямо тези за Благоевградска област (-10,6 %) и страната (-11,8 %). Негативна тенденция на намаление се наблюдава приблизително в 80 % от населените места, което се дължи на отрицателните стойности на естествения и преди всичко на механичния прираст. Налице е макар и по-слабо изразено влошаване на възрастовата структура на населението в района, изрязващо се в нарастване на дела на лица над 65 годишна възраст. Като най-значими демографски проблеми се очертават спадът на раждаемостта, миграцията и високият дял на нискообразовано население. Над половината от населението в района е с основно и по-ниско образование, а делът на лицата, никога не посещавали училище, е 1,2 % (2011 г.). Това са процеси, които в перспектива ще оказват все по-голямо негативно влияние както върху демографската ситуация, така и върху цялостно устойчиво развитие на района. Демографските изменения в съчетание с лошото икономическо развитие и ниската инвестиционна активност в района, използването на природните ресурси, както и с големия брой защитени територии, привлекателни за туристите, са определящи за състоянието и промените в карстогенезиса и карста в изследваната територия.

**Ключови думи:** Дъбрашки карстов район, демографско развитие, обезлюдяване, застаряване, образователна и възрастова структура.

## INTRODUCTION

Over the last decades Bulgaria has undergone a number of political and socio-economic reforms, which lead to adverse demographic and economic consequences, the manifestations of which are most strongly reflected in rural regions and mountainous areas, including karst geosystems. The anthropogenic impact on karst areas has a number of effects and causes various problems, which, in turn, affect the sustainability of these areas, the quantity and quality of natural resources.

The population with its number, demographic and social characteristics, its economic activity, as well as the existing infrastructure, directly and indirectly influence the evolution of the karst. On the one hand, the ongoing processes of depopulation and aging of the population in karst areas, lead to the expansion of desolate arable land and to an increase of pastures, which in turn becomes a prerequisite for disruption of the existing karst environment. On the other hand, the increase of population in such areas leads to intensification of the economic activity, including the development of construction, search for alternative employment such as quarrying, water supply activities, and others that may affect the formation of karst.

The paper analyzes the demographic situation in the Dabrash karst area. Territorially it coincides with the part of the Western Rhodopes bearing the same name (Dabrash). The demographic and socio-economic development of the settlements in the Dabrash karst area is determined by their historical development, the psychological and ethnic characteristics of the population, the existing natural conditions and resources, the peripheral geographical location and the remoteness from the regional center – the city of Blagoevgrad, and from the main roads in that part of the country. The settlements in the study area are characterized by a relatively good demographic situation – their population is declining and aging, but at a lower rate than in the rest of the country. The area is characterized by poor economic development, low investment activity, extensive agriculture and poor urban development. Most of the settlements lack sufficient infrastructure, and in some places even sewerage networks and treatment plants, which affects not only the quality of life of the population, but also the cleanliness of rivers, the environment, and in particular – the existing karst forms.

#### DEMOGRAPHIC CHANGES, SOCIO-ECONOMIC DEVELOPMENT AND URBANIZATION OF RURAL AREAS

As a result of a number of political and economic factors, significant demographic changes are taking place in rural areas, which leads to unsolvable problems and irreversible consequences in their development. The problems of rural areas have been the subject of research by a number of Bulgarian scholars, such as Geshhev (1990), Iliev (2002), Ilieva M. (2000, 2001, 2002, 2006), Ilieva and Mladenov (2003), Ilieva, N (2018) Kazakov (2015), Koulov et al. (2019), Madzharova et al. (2013), Markov (2000), Mladenov (2006, 2014, 2015), Mladenov and Dimitrov (2015), Mladenov and Ilieva (2012), Patarchanov (2001), Patarchanova (2007), Petcova, T. (2017), Popov (2004), Ravnachka (2006), Tsekov (2014, 2015, 2018) and many others. In their works, the experts focus on: the development trends and the demographic situation in Bulgarian villages; the demographic and social structures of the rural population; the demographic crisis and the factors for its various manifestation; depopulation and its consequences; the transformation of Bulgarian agriculture and its impact on the demographic situation in the villages; the deepening spatial disparities in the demographic and economic development; the changes in the labor market and labor shortages.

Some of the most acute problems in the development of rural settlements are related to depopulation and the high rates of population aging, emigration and the high share of population with low level of education. The decrease in number of Bulgaria's rural population began in the early 1960s, due to the state policy, related on the one hand to administrative-territorial changes leading to changing the status of villages and declaring them for urban settlements (towns), the consequences of which led to an increase of the urban population and the spread of urban lifestyle. On the other hand, the rapid industrialization of the country triggered intensive migration flows from rural to urban settlements. Until the early 1970s, the natural population growth of the rural population had been able to compensate the migration losses. After that period, urbanization caused large waves of migration to administrative centers, increasing the depopulation of rural areas. Thus, the 1975 population census recorded

predominance of the number of urban population over the rural (Petkova, 2017). According to Koulov et al. (2019) the centrally-planned economy of Bulgaria at that time significantly changed the geography of the rural population and the value system of the rural residents. Most of the owners of agricultural land moved to the cities and have long lost any experience or interest in the rural lifestyle and agricultural work. The better living conditions in the cities, the greater opportunities for professional realization and access to high quality education, led to the emigration of young and working-age population from the villages and thus contributed to the deepening of the negative demographic processes.

Since 1989, in the context of transition from a centrally-planned to a market economy, the demographic situation in the rural areas of Bulgaria has deteriorated dramatically. Depopulation occurs at a high rate, due to a number of factors, the most important of which are: the very narrow natural reproduction of the population; the existence of a low-competitive and poorly diversified economy; inefficient reforms in the agricultural sector, which led to great fragmentation of the arable land and to loss of markets; lack of investment and poor infrastructure. “The transition was much slower in the countryside and the rural regions were the least prepared to face market competition” (Koulov et al., 2019). As a result of the reforms, a large part of the rural population is losing their jobs and unemployment is reaching high levels, which also determines the migration to urban settlements. Employment in agriculture and tourism cannot lead to a significant increase in the number of new jobs, with the exception of settlements which function as mountainous resorts, seaside and spa resorts (Vaishar et al., 2018). Parallel to the above processes, a process of deepening spatial disparities in the demographic and socio-economic development of urban and rural areas is going on, as well as between rural settlements alone, mainly due to their geographical location and ethno-religious profile of the population.

## METHODOLOGY AND DATA

The aim of this study is to analyze the contemporary demographic processes of depopulation, aging and migratory mobility of the population in the Dabrash karst area of the Western Rhodope Mountains of Bulgaria. Studying the characteristics of the population through calculation of various indicators, allows the disclosure of a number of features that clarify both the degree of depopulation and the current characteristics of the population, as well as some trends in the future development. According to Mladenov et al. (2012) ‘Depopulation is the visible synthesised display of the demographic crisis. As a term it has geographical essence for depopulation is always a process in a certain area (territory). The term ‘depopulation’ signifies a decrease in the total population number (as a result of natural and/or migration decrease)’(pp. 99).

The population changes have been studied at two levels of spatial organization: at the regional level and at the level of local karst subareas, which allows a more detailed analysis and focus on specific features of the population that have a direct impact on the economic, social and environmental status of the studied area. The analysis has been made for the 2001-2018 period, which overlaps a period of significant political, economic, demographic and social changes in the country.

Demographic methods, as well as comparative geographical analysis and synthesis have been used in the study. The comparative method establishes the similarities and differences between demographic processes in spatial aspect. The study is based on statistical data on the number and structures of the population from the National Statistical Institute (NSI) of Bulgaria and summaries of legislative documents. The spatial differences have been visualized through tables and maps. In this regard, and in order to reveal the intensity of the demographic processes, the paper traces the change of the following indicators characterizing the demographic situation in the area: number and dynamics of the population for the period between 2001 and 2018, population density, average annual population growth rate, crude birth and death rates, natural and migratory population growth, relative share of the population aged 0-14, 15-64 and over 65, relative share of the population of primary and higher education as of 2011. Data from the so-called current statistics on the number of population, births and deaths by settlements, as well as data from the Census of the Population and the Housing in 2001 and 2011, were used for the purposes of this study.

## STUDY AREA

The Dabrash section of the Western Rhodopes is locked between the valleys of the Matnitsa River, the Mesta River and the Dospat River. The southernmost tip of Dabrash, located at the confluence of the Mesta River and the Dospat River, is in Greek territory. Within the territory of Bulgaria, Dabrash covers an area of 940 km<sup>2</sup>. It is characterized by hilly and mountainous relief, with an average altitude of 1171 m (the highest peak being Beslet - 1937.3 m above sea level), and has an asymmetric development with a general slope to the southwest (Encyclopedia..., 1995).

The karst in Dabrash was developed in Proterozoic marbles. Marbles are often layered with silicate metamorphites (gneisses, shales, amphibolites) or are cracked by granite, pegmatite and quartz veins. Therefore, the karst forms occupy limited areas and are unevenly scattered in the western and southwestern metamorphic mantle of Dabrash, within the altitude belt of 400-1600 m (Stefanov, 1981). The karst in Dabrash has a limited areal development – just 5.64% of the area (Stefanov, P., personal message, 1988). Despite this fact, the karst in the study area is extremely diverse, while the allogeneic type is dominating (Yakuch, 1979). Almost all types of surface karst forms are present in the relief, with the predominance of limestone pavements. One of the longest cave systems in the Rhodopes was formed in Dabrash – the Manailovska Dupka – 2299 m of length and denivelation of 115 m (Stefanov, 1982). The largest springs in the area are also connected with the karst formation – those are the spring near the village of Kochan, the Varok spring near the village of Slashten, Banyata spring near the village of Godeshevo and the spring from the Manailovska Dupka cave near the village of Ribново (Stefanov, P., personal message, 1988; Encyclopedia..., 1995).

According to the zoning of karst and caves in Bulgaria, performed by V. Popov, Dabrash is delineated as an independent karst area (Fig. 1) (Encyclopedia..., 1995).

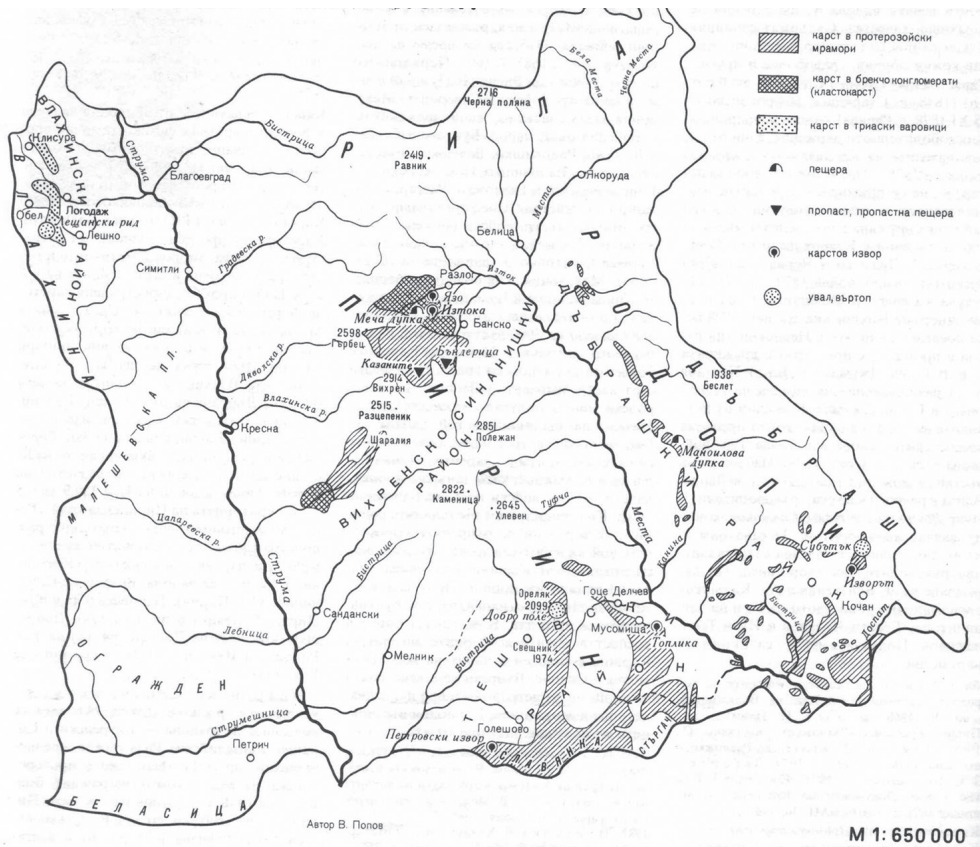


Fig. 1. Karst areas in Blagoevgrad district (according to Vl. Popov, „Encyclopedia of the Pirin Region“, volume 1, 1995)

Due to the specifics in the distribution of the karst areas, the studied region can be additionally divided into three karst subregions (Stefanov, P., personal message, 1988):

- Northwestern (Ribново-Osikovo), developed in the upper reaches of the Kurtovitsa River (Mihova, Stefanov, 1993). The karst is mainly of the armored type, with a predominance of underground forms, including the Manailovska Dupka cave.
- Central (Satovcha-Kochan), where surface karst forms predominate, including two uvalas and the semi-blind karst valley of Kurudere, whose waters sink, and through an indicative experiment have been traced to the the Kochanska River spring (Stefanov, 1983).
- South (Chech subarea: Valkosel-Godeshevo). It has the largest area and is located the lowest, on the left slopes of the Chech gorge of the Mesta fault zone. Out of the surface karst forms, limestone fields – transformed by human activity – predominate, while precipice caves and crevice caves are the most common underground forms.

A number of protected areas exist in Dabrash: two nature reserves of the maintained type (the „Konski dol“ and the „Temnata gora“), natural landmarks (the „Kay-

aliyskite skali“ and the „Kupena“), the „Chernata skala“ rock formation, etc. However, no karst has developed within their borders. Limited karst areas fall within several protected areas of NATURA 2000: the „Rhodopes - Western“, the „Lower Mesta“ and the „Mesta River“ protected areas (under the Habitats Directive) and the „Western Rhodopes“ and the „Mesta“ protected areas (under the Birds Directive).

The attractiveness of a number of tourist sites in Dabrash creates preconditions for the development of tourism: spa tourism (the village of Ognyanovo), rural tourism (the villages of Kovachevitsa and Leshten), architectural tourism (the village of Kovachevitsa) and ecotourism are developed in the area. According to Vaishar et al. (2018) tourism in protected areas is unlikely to provide a sufficient number of jobs so as to make young people to return to the villages, while its development can lead to destruction of natural landmarks and karst forms.

The area is characterized by mountainous terrain, diverse soils and vegetation, which are the basis for development of logging and mountain farming. The forests cover approximately two-thirds of the territory of Dabrash. Forests are the main source of employment of the population through activities such as logging, wood processing and tourism. Logging has an important economic significance for the settlements in the area, but is also a source of firewood for personal use by the households (Municipal Plan .. Garmen 2014-2020, 2020). This in turn leads to vulnerability of the karst geosystems and results in the formation of the so-called bare karst.

The Dabrash karst area includes 37 settlements with a total population of 34 261 people (as of the end of 2018, NSI data). The settlements fall within five rural municipalities (LAU 1): Satovcha and Garmen, with all their settlements, Hadzhidimovo (the villages of Blatska and Ablanitsa), Gotse Delchev (the villages of Bukovo and Gospodintsi) and Bansko (the villages of Gostun, Osenovo and Filipovo), all within Blagoevgrad district (NUTS 3) (Fig. 2).

The three local karst subareas include eight settlements with a combined population of 13 005 people. The Northwestern, or the Ribново-Osikovo subarea, includes the villages of Ribново and Osikovo, located in the municipality of Garmen. The Central subarea includes the villages of Satovcha and Kochan, and the Southern subarea – the settlements of Valkosel, Godeshevo, Slashten and Tuhovishta, all within Satovcha municipality (Fig. 2).

During the study period, the process of depopulation (i.e. entire depopulation of settlements) in Dabrash is proceeding at a slower pace compared to most of the country. There is a trend of decreasing share of settlements of the „very large“ and „largest villages“ categories, while the share of villages of the „smallest“ and „small villages“ categories is increasing (Table 1). The categories of „small to medium-sized villages“ and „medium-sized villages“ predominate in the area: as of the end of 2018, their share was 24.3% of all settlements. The largest share of the population in the area (36%), however, is concentrated in the category of „very large“ villages, with a population of 2001 to 3000 people (Table 1). This group of settlements includes Ribново (pop. 2822), Ablanitsa (pop. 2503), Valkosel (pop. 2375), Kochan (pop. 2371) and Debren (pop. 2245). The least populated are the villages of Leshten (pop. 3), Gostun (pop. 31), Kovachevitsa (pop. 39) and Osenovo (pop. 51) (Tabl. 1).



Fig. 2. Boundaries of the settlements' adjacent land-use areas in the Dabrash karst area

The average population density in the area is low: as of the end of 2018, it was 37.7 p/km<sup>2</sup>, with a decreasing trend during the studied period (41.7 p/km<sup>2</sup> as of 2001). For comparison, the average population density in Blagoevgrad district and the country is 48.5 p/km<sup>2</sup> and 63.4 p/km<sup>2</sup> respectively (Regions..., 2018). The process of depopulation at the national and the regional level leads to the desolation of arable lands and to their erosion (Tsekov, 2018), which in turn leads to a negative impact on the karst forms in the area.

Table 1.

*Structure of the settlements in the Dabrash karst area by number of population  
(according to NSI data)*

Category of villages by number of population	2001		2009		2018	
	Relative share of villages in the category	Relative share of the population in the category	Relative share of villages in the category	Relative share of the population in the category	Relative share of villages in the category	Relative share of the population in the category
Smallest (pop. 1 - 100)	8.1	0.4	10.8	0.5	10.8	0.4
Small (pop. 101 - 200)	5.4	0.8	5.4	1.0	8.1	1.5
Small to medium-sized (pop. 201 - 500)	27.0	9.9	24.3	9.2	24.3	9.4
Medium-sized (pop. 501 - 1000)	18.9	12.9	21.6	15.2	24.3	19.2
Large (pop. 1001 - 2000)	21.6	30.5	18.9	27.5	18.9	33.5
Very large (pop. 2001 - 3000)	16.2	37.5	16.2	38.4	13.5	35.9
Largest (pop. over 3000)	2.7	8.0	2.7	8.3	0.0	0.0

## RESULTS AND DISCUSSION

### DEMOGRAPHIC DEVELOPMENT OF THE DABRASH KARST AREA

The changes in the demographic characteristics of the population in the study area are directly dependent on the population's historical development, its ethnicity and religious beliefs, the economic environment and the policies pursued at the regional level.

The Dabrash area has a relatively good demographic situation compared to the rest of the country, although during the studied period a trend of population decrease and deterioration of the demographic structures had been observed. This is a direct consequence of the demographic transformation, expressed through the reduction of the country's population as a whole and the depopulation of rural areas. Tsekov (2018: 3) points out that "[...] over the last seven decades, depopulation has gradually encompassed the rural settlements in 92% of the municipalities and all settlement categories - from the largest to the smallest villages". Similar to the trends in the country and in the area under consideration, depopulation affects the better part (82%) of the settlements. For the 2001–2018 period, the population of the area decreased by 3 730 people, which resulted in an average annual growth rate of -0.5% (Fig. 3).

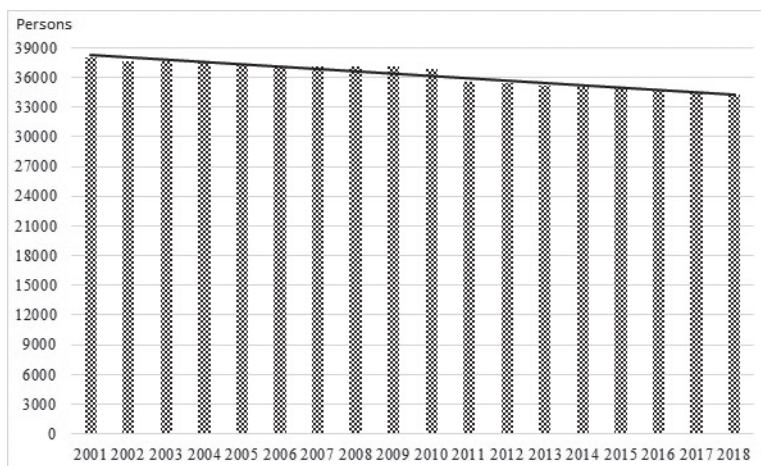


Fig. 3. Population dynamics in the Dabrash karst area for the 2001-2018 period (NSI data)

There are many factors that determine the population decline, but the greatest impact is exerted by the negative socio-economic processes taking place in the area, leading to emigration and declining birth rates. The settlements are characterized by a low-competitive economy of an agro-industrial structure, with a large fragmentation of agricultural land and a large number of small farms, which has an indirect impact on the karst forms in the area.

As of the end of 2018, the population in Dabrash was 34 261 people or 11.2% of Blagoevgrad district's total. Despite the ongoing process of population decline, the Dabrash karst area is one of the few exceptions to the process of rapid depopulation of rural regions in the country. According to Mladenov's (2014) classification for the degree and strength of depopulation, based on two main indicators (average annual growth rate and relative change of the population number between the end year and the base year), the area is classified as an area of slight-depopulation. Throughout the study period, the population of the area decreased, but with lower values (-9.8%) compared to those observed in Blagoevgrad district (-10.6%) and the country as a whole (-11.8%). There are two main reasons for the milder population decrease: the preserved demographic potential and the belated demographic transition in the area. These two reasons result in positive natural population growth, which managed to compensate the migration losses at the beginning of the study period (Ilieva, N. 2018) (Table 2). After 2011, the negative demographic trends in the area deepened and the natural population growth acquired negative values (-2.1 ‰) (NSI).

At the beginning of the study period, the settlements in the area exhibited higher birth rates, which decreased in the following years and by 2018 they were 8.5 ‰ on the average – lower than the district average (8.7 ‰) and the national average (9 ‰). The main reasons for this unfavorable trend are emigration and population decline, including the number of women of childbearing age, as well as a change in people's value orientations. There has been a continuous increase of death rates due to population aging, low living standards and difficult access to medical services. In 2001,

Table 2.

*Indicators of the natural reproduction of the population (NSI data)*

Territorial units	2001			2011			2018		
	Crude birth rate (‰)	Crude death rate (‰)	Natural growth (‰)	Crude birth rate (‰)	Crude death rate (‰)	Natural growth (‰)	Crude birth rate (‰)	Crude death rate (‰)	Natural growth (‰)
Bulgaria	8.6	14.2	-5.6	9.6	14.7	-5.1	8.9	15.4	-6.5
Blagoevgrad district	8.9	10.5	-1.6	9.8	11.9	-2.1	8.7	13.2	-4.6
Dabrash karst area	10.1	8.8	1.3	10.1	10.0	0.1	8.5	10.6	-2.1

the mortality rate in Dabrash was 8.8 ‰, gradually increasing over the years and reaching 10.6 ‰ in 2018 (Table 2).

Despite these unfavorable changes, the area stands out with better indicators of natural reproduction of the population compared to rest of the country, which is mostly a result of the ethno-confessional structure of the population, its relatively well-preserved age structure and its lower level of education.

According to the 2011 Census of the Population and Housing, 16.2% of the area's population declared themselves as ethnic Turks<sup>2</sup>. Their relative share in the area is twice higher than the national average (Fig. 4). The ethnic Turkish population

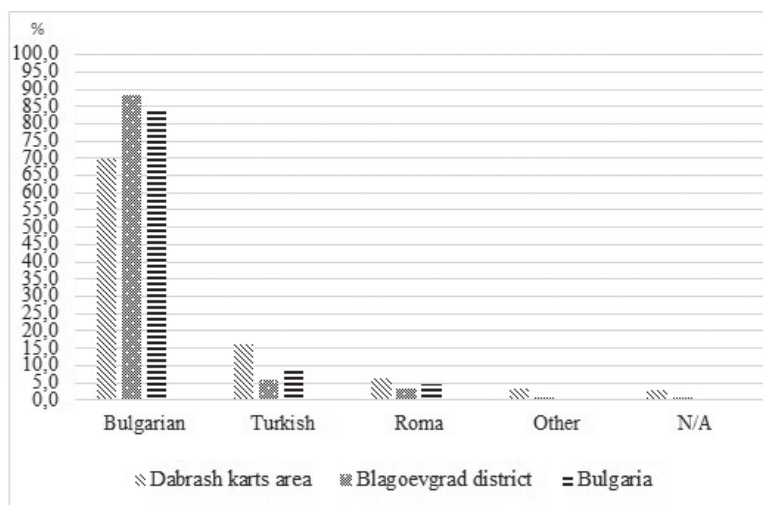


Fig. 4. Ethnic structure of the population as of 2011 (NSI data)

<sup>2</sup> The Turkish population in the study area actually represents Bulgarian Muslims, some of whom declared Turkish ethnicity during the last censuses of the population.

is characterized by higher birth rates and lower migratory mobility compared to the Bulgarian population, despite the fact that in the last two decades there has been an increase in emigration. The relative share of Roma (6.7%) in the area is also higher than both the district average (3.4%) and the national average (4.3%). This ethnic group is characterized by a number of specific features in its cultural and social development, their specific demographic behavior, expressed in higher birth rates and a younger age structure of the population compared to any other ethnic group in the country (Fig. 4).

The aging of the population is one of the most important demographic factors, affecting not only the overall demographic situation, but also other spheres of social life such as employment, quality and quantity of the workforce, standard of living, healthcare, etc. The age structure of the population is influenced by changes in the reproductive behavior, changes in the value orientation, migration, ethno-confessional features of the population, and the overall economic development (Naydenov, Traikov, 2016).

Despite the ongoing negative trends, the population in Dabrash is characterized by a slower rate of aging. The share of persons aged 0-14 is higher, while that of the population aged 65+ is lower, compared to those shares for the country as a whole, Blagoevgrad district and most of Bulgaria's rural areas (Table 3). The age dependency ratio (based on the share of senior population) is also characterized by values (21.3%) lower than those for the district (28.3%) and the country as a whole (32.5%).

Although less pronounced, the process of demographic aging in the study area is visible through the increase of the share of persons aged 65+ (Table 3): during the 2001-2017 period, their share increased by 4%. Similar to the trends typical for all rural areas of the country, this process in the Dabrash area is more pronounced among women, as a result of the lower average death rate (Koulov et al., 2019). The sex-age structure of the population in the area shows that men predominate in the population groups up to 54 years (52% of the total population), after which the share of women prevails.

One of the main social problems in the area is the low level of education of the population, which has a negative impact on the quality of the labor force and on the functioning of the local labor markets. The comparative analysis of the data shows that the area is characterized by a lower share of people with higher education and a much higher share of people with primary and lower level of education, compared to

Table 3.

*Age structure of the population (NSI data)*

	2001			2011			2017		
	0-14	15-64	65+	0-14	15-64	65+	0-14	15-64	65+
Bulgaria	15.3	67.8	16.9	13.2	68.3	18.5	14.3	64.7	21
Blagoevgrad district	18.0	69.0	13.0	14.0	70.0	16.0	14.6	66.6	18.8
Dabrash karst area	22.8	66.6	10.6	17.5	69.6	12.9	16.8	68.6	14.6

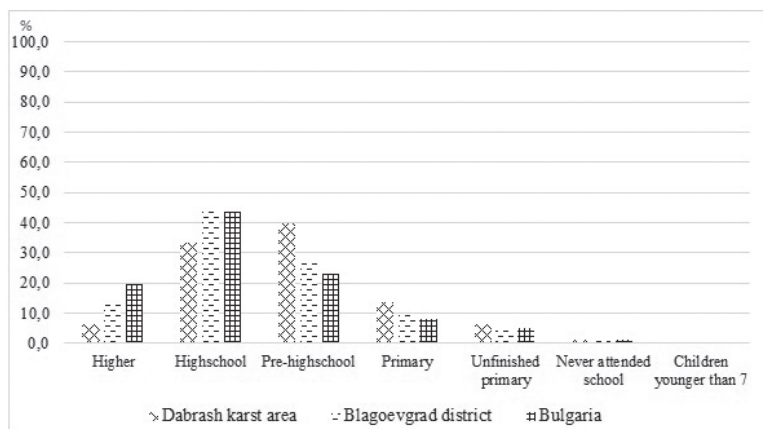


Fig. 5. Structure of the population by attained educational level as of 2011 (NSI data)

both the district and the national average (Fig. 5). Approximately 60% of the population in the area has primary and lower level of education, while the share of people who have never attended school is 1.2 %.

The reasons for that situation are different, the most important of which are: the traditions and the psychological characteristics of the population declaring Turkish ethnicity, the low level of education of Roma (residing mostly in the villages falling within the municipality of Garmen), lack of sufficient income, the remoteness of the villages from the municipal centers, where most of the schools are concentrated, and the involvement of children in family farms (Ravnachka, 2017). According to Vekova et al. (2010), education and training of the population are the basis for sustainable development of each settlement. The unfavorable condition of the educational structure of the population in the area is a prerequisite for low living standards and poverty among the population, hence – its difficult integration into the labor market. In the settlements of the area, mainly activities of the primary and secondary sector are developed: agriculture and forestry, extraction of rocks for tiling materials (in the villages of Krushevo, Oreshe and Dolno Dryanovo), marble and lignite (Baldevo and Ognyanovo). This is confirmed by the data from the Census of Agricultural Holdings conducted in 2010, according to which 14 537 people in the settlements belonging to the municipalities of Satovcha and Garmen (with a total population of 31 477) work in agricultural holdings. Extensive and non-diversified agriculture is being developed, while most of the production is for own consumption, and therefore, not available on the market (Ravnachka, 2017). The existence of quarries and the extraction of materials, in turn leads to destruction of both karst forms and arable land.

During the study period the area is characterized by negative net migration rate (-6.0 ‰), while the highest migratory mobility of the population was recorded in the 2001-2010 subperiod. Similar to the trends in all rural areas of the country, here too, the economic transformation, the unemployment, the negative processes in agriculture, poverty, the changes in the value orientation of the population and the striving

for a better life, are all factors that predetermine emigration of the population (Atanasova, Malamova, 2011). In the villages of the area the economic conditions and the social infrastructure are unfavorable, which triggers migration of young population – a large part of the working-age population (mostly men) emigrate abroad, returning temporarily during the winter months of the year. The saved funds are used to meet the needs of households and improve the living conditions, for medical and dental services, to help out relatives, to educate children, etc. In certain settlements in the area the net migration rate is positive, but that does not have a significant impact on the overall demographic situation in the area and in particular – on the process of depopulation. The continuing negative trends of emigration, albeit the better net migration values, will exacerbate the existing demographic and socio-economic problems.

#### INTRA-REGIONAL DIFFERENCES IN THE DEMOGRAPHIC DEVELOPMENT

The spatial differences in the demographic processes in the Dabrash karst area are manifested not only in the temporal aspect, but also exhibit different intensity. As of 2001, more than half of the settlements were in better demographic situation compared to the one they were in 2018, while the population number decreased in 29 out of all 37 settlements in the area (Fig. 6).

The villages of Hvostyane, Dabnitsa, Ribново, Garmen, Dolno Dryanovo (Garmen municipality), Bukovo and Gospodintsi (Gotse Delchev municipality) exhibit positive values of the average annual growth rate for the studied period due to higher natural growth rate and lower migratory mobility of the population compared to other settlements. The highest negative values of the average annual growth rate (below -2.0%), on the other hand, were recorded in the villages of Gostun, Osenovo (Bansko municipality), Leshten and Oreshe (Garmen municipality). In this group of settlements the main reason for the population decrease is the small demographic mass and the high negative values of the natural population growth. The least negative values of the average annual growth rate for the studied period (from 0.0 to -1.1%) were exhibited in a group of villages that make up for 37.8% of all, where the population decline was mainly due to emigration (Fig. 6).

During the 2001-2018 period there was an expansion of the territorial scope of the settlements with negative natural growth of the population. As of 2001, 51.1% of the settlements in the area were characterized by positive values of the natural growth, while five villages had values exceeding 10.0 ‰. After 2011, the share of settlements of positive natural growth began to decline rapidly and by 2018 their relative share had decreased to 32.4% of all settlements (Fig. 7 and Fig. 8).

The reasons for this are related to the declining birth rates, aging, low living standards and emigration of young people. The highest negative values of the natural population growth (below -20.1 ‰) were recorded in the mountainous villages of Leshten, Osenovo and Gostun. The villages of Marchevo, Godeshevo, Zhizhevo, Krushevo, Dolen and Baldevo follow, with values ranging from -20 ‰ to -10, 1 ‰. Those are settlements of Bulgarian Orthodox population whose age structure is highly deteriorated. On the other hand, in settlements where the ethnic and religious profile of the population is dominated by ethnic Turks and Roma, combined with their



Fig. 6. Average annual population growth for the 2001-2018 period (%) in the Dabrash karst area (calculations based on NSI data)

larger total number of population, predetermine the positive natural growth in villages such as Ognyanovo, Gorno Dryanovo, Bukovo, Filipovtsi, Ablanitsa, Gospodintsi, Garmen, Hvostyane, Debren, Ribnovo and Fargovo. In the village of Kovachevitsa, the positive values of the natural growth rate are due to statistical distortions resulting from the small demographic mass (34 people).

The intra-regional differences in the values of the natural population growth coincide to a large extent with the differences in crude birth and crude death rates.



Fig. 7. Natural population growth in 2001; (NSI data)

Birth rates higher than the average for the Dabrash area and Blagoevgrad district are observed in larger villages and in those with a higher share of Roma and Turks – 33% of the settlements (again including Kovachevitsa for the above-mentioned reason). On the other hand, death rates above the average for the district (13.2 ‰) and the region (10.6 ‰) were recorded in 56.7% of the settlements. The highest death rates (over 20‰) were observed in the villages of Zhishevo, Godeshevo, Ore-



Fig. 8. Natural population growth in 2018 (NSI data)

she, Gostun, Osenovo and Leshten, due to their small size and highly deteriorated age structure.

Territorial differences in the age structure of the population predetermine to a large extent the specifics of the demographic situation of the area in spatial terms. The decrease of population in the younger age groups is typical for all settlements in the area (Fig. 9 and Fig. 10).



Fig. 9. Share of the population aged 0-14 as of 2001 (NSI data)

Nevertheless, in 2017 21.6% of the settlements had a share of the population in the age group of 0-14 years higher than the average share for the area (16.8%), while in 59% of the settlements that share was higher than the district average (14.5%). The settlements of Gostun, Osenovo, Leshten, Kovachevitsa and Oreshe exhibit the highest rates of depopulation and the most unfavourable age structure of the population. In those villages the share of population under 14 years of age is three times below



Fig. 10. Share of the population aged 0-14 as of 2017 (NSI data)

the area average, and in the first three villages in the list there are no persons in this age group at all. The settlements of Garmen, Gospodintsi, Ribnovo, Bukovo, Debren and Dolno Dryanovo, on the other hand, have a share of population aged 0-14 over 20% of the total, which gives grounds to define them as settlements with a relatively good demographic potential.

## DEMOGRAPHIC DEVELOPMENT OF THE LOCAL KARST SUBAREAS

As it has been already indicated, three local karst subareas have been formed on the territory of the Dabrash karst area, encompassing eight settlements of similar demographic and economic characteristics (see Fig. 2). The subareas include some of the most populous villages in the area (Table 4). This results in both direct and indirect impact on the existing karst forms through the development of economic activities in those settlements.

Despite the negative demographic changes, the settlements in the three karst subareas exhibit slower rates of depopulation, which is to some extent determined by the ethno-religious characteristics of the population – a high share of Bulgarian Muslims, Turks and Roma, who all distinguish themselves with a specific social, reproductive and migratory behavior. For example, in the Central subarea, the share of Roma is 7.1% of the population, while in the Southern and the Northwestern subareas the share of ethnic Turks is 23.2% and 9.4%, respectively. The process of population aging will continue in the future, but at a slower pace. Regarding the analysis of the spatial differences in the demographic development trends in the three subareas, it was found that during the study period the population decreased in two of them. The biggest decrease was recorded in the Satovcha-Kochan subarea – by 1188 people, resulting in an average annual growth rate of -1.2%, due mostly to the negative values of the natural population growth. The demographic situation is similar in the Valkosel-Godeshevo subarea (Table 4) where the population decreased by approximately 1000 people, with a slightly milder average annual decrease rate (-0.9%), but still higher than the area average (-0.5%). In both subareas there has been a trend of population aging, more pronounced in the Satovchansko-Kochanska subarea. In 2017, the share of people under 14 years of age had decreased by 0.8% for the Satovchansko-Kochanska, and by 2.6% for the Valkosel-Godeshevo subarea, compared to 2011. In both subareas the share of persons in this age group is 14.4%, which is lower than

Table 4.

*Indicators characterizing the demographic situation in the local karst subareas of the Dabrash karst area (based on NSI data)*

Subarea	2018					2017	
	Area (km <sup>2</sup> )	Average pop. density (p./ km <sup>2</sup> )	Population number	Natural pop. growth (‰)	Migration pop. growth (‰)	Population growth rate (2001-2018)	Relative share of the pop. aged 0-14
Northwestern (Ribново-Osikovo)	86.8	38.3	3324	3.9	-7.2	0.39	20.5
Central (Satovcha-Kochan)	88.3	47.0	4156	-6.5	10.3	-1.2	14.4
Southern (Chech: Valkosel-Godeshevo)	78.7	70.2	5525	-6.7	-3.2	-0.9	14.4

the area's average and in the long run will lead to greater difficulties in the economic and social sphere.

In the period between 2001 and 2018, the number of the population only increased (by 219 people) in the Ribnovo-Osikovo subarea. That increase was mainly due to the positive natural growth of the population in the village of Ribnovo, regardless of the ongoing trends of declining birth rates and increasing death rates. This in turn is a direct consequence of the religious structure of the population (Bulgarian Muslims and ethnic Turks), which predetermines the higher birth rates. This subarea has observed intensified emigration in recent years (Table 4), which in the long run will have an adverse impact on the demographic and economic situation in the settlements affected. The emigration flow is directed both towards other areas of the country and abroad, and is related to the desire of young people for better professional realization, better education and higher incomes. At this stage, the population in the subarea is still characterized by a relatively preserved age structure – the share of persons under 14 years of age (20.5%) is higher than the area average (16.8%).

It can be summarized that the demographic changes in two of the three subareas have a similar character and do not differ significantly. This is due to their geographical location, socio-economic development and ethno-religious characteristics of their population. Only in the third subarea (Ribnovo-Osikovo) the demographic processes still exhibit slightly better development compared to the other two subareas.

## CONCLUSION

In conclusion, it can be summarized that during the 2001-2018 period, the depopulation processes in the area affect approximately 80% of the settlements. This is due to the negative values of both the natural and the migration growth, with a higher degree of influence of the negative net migration rate. There is a process of expanding the territorial scope of settlements in which the demographic crisis is deepening. The demographic transition has ended in most of the studied territorial units, with the exception of seven settlements (Hvostyane, Dolno Dryanovo, Gospodintsi, Bukovo, Garmen, Dabnitsa and Ribnovo) with a high share of Bulgarian Muslim, Turkish and Roma population. These settlements exhibit a positive trend of population growth and higher birth rates, and can be considered in the future as settlements with relatively good demographic potential, but with unsatisfactory educational and professional characteristics of the workforce. Of all three subareas, only the Ribnovo-Osikovo subarea exhibits population growth. However, analyzing the trends during the study period, it can be assumed that in the long term this subarea too will be affected by the process of depopulation.

The most important demographic problems in the Dabrash karst area are the decline in the birth rates (by two permille points), the reduction of young population aged 0-14 (by six percentage points), emigration and the low level of attained education. These processes will have an increasing negative impact in the future, both on the demographic situation and on the overall sustainable development of the area, including the formation of workforce potential. These adverse trends will not only exacerbate the existing spatial, economic and social problems in the study area, but will also have a negative impact on land-use and the natural and anthropogenic resources, which in turn is likely to affect the local landscape, including the karst formations.

These are interrelated problems, the solution of which requires the implementation of a set of national and regional measures, based on the efficient use of local natural resources. The measures should provide an improvement of the living standards of the population, the infrastructure and the economic microclimate of the area, raising the education level, creating jobs and returning of young and working-age population back to the villages. Otherwise, depopulation in the area will proceed at a faster pace and the existing problems of economic, social and demographic nature will deepen.

Despite the established negative trends in the demographic development of the settlements in the Dabrash karst area, they exhibit a relatively well-preserved demographic potential, while the discussed negative processes are less acute compared to the rural settlements in Blagoevgrad district and the country as a whole.

### Acknowledgments

This study was funded by the research project „Current impacts of global changes on evolution of karst (based on the integrated monitoring of model karst geosystems in Bulgaria)“, Science Research Fund of Bulgaria, grant №DN14/10/20.12.2017.

### REFERENCES

- Atanasova, M., N. Malamova.** 2011. Development of the demographic resources and the labor force in rural areas. *Economics and management of agriculture*, 56, 3-4/2011, ISSN 0205-3845 (Print) (Bg)./ Атанасова, М., Н. Маламова. 2011. Развитие на демографските ресурси и работната сила в селските райони. Икономика и управление на селското стопанство, 56, 3-4/2011, ISSN 0205-3845 (Print).
- Geshev, G.** 1990. Depopulation of rural areas in Bulgaria. *Problems of geography*, vol. 4, Izd. BAS “Prof. M Drinov”, Sofia, 25-38 (Bg)./ Гешев, Г. 1990. Депопулацията на селските райони в България. – Проблеми на географията, кн. 4, Изд. БАН „Проф. М. Дринов“, София, 25-38.
- Ilieva, M.** 2001. Some issues on the transformation of rural regions in Bulgaria. *Problems of geography*, vol. 1-2, Izd. BAS “Prof. M Drinov”, Sofia, (Bg)./ Илиева, М. 2001. Някои въпроси за трансформацията на селските райони в Българи. – Проблеми на географията, кн. 1-2, Изд. БАН „Проф. М. Дринов“, София.
- Ilieva, M.** 2006. The unemployment in rural regions in Bulgaria during the transition to a market economy. *Problems of Geography*, vol. 1-2, Izd. BAS “Prof. M Drinov”, Sofia (Bg)./ Илиева, М. 2006. Безработицата в селските райони в България в периода на преход към пазарна икономика. — Проблеми на географията, кн. 1-2, Изд. БАН „Проф. М. Дринов“, София.
- Ilieva, N.** 2018. Typology of the rural settlements in Bulgaria for the 1992-2011 period in the context of depopulation processes. *Problems of Geography*, vol. 1-2, Izd. BAS “Prof. M Drinov”, Sofia (Bg)./ Илиева, Н. 2018. Типологизация на селските селища в България за периода 1992–2011 г. в контекста на процесите на депопулация— Проблеми на географията, кн. 1-2, Изд. БАН „Проф. М. Дринов“, София.
- Kazakov, B.** 2015. Demographic situation in Southeastern Bulgaria according to the demographic situation. *Problems of geography*, vol. 1-2, Izd. BAS “Prof. M Drinov”, Sofia, 59-67 (Bg)./ Казаков, Б. 2015. Демографската ситуация в Югоизточна България според демографската ситуация. – Проблеми на географията, кн. 1-2, Изд. БАН „Проф. М. Дринов“, София, 59-67.
- Markov, Iv.** 2000. Some opportunities for rural development in Veliko Tarnovo district. *Problems of geography*, vol. 1-4, Izd. BAS “Prof. M Drinov”, Sofia, p. 142-145 (Bg)./ Марков, И. 2000. Някои възможности за развитието на селските райони във

Великотърновска област. – Проблеми на географията, кн.1-4, Изд. БАН „Проф. М. Дринов“, София, 142-145.

- Mikhova, D., P. Stefanov.** 1993. Design of an information system for functional modeling of a karst geosystem. *Problems of Geography*, vol. 2, Izd. BAS “Prof. M Drinov”, Sofia, 68-82 (Bg)./ Михова, Д., П. Стефанов. 1993. Проектиране на информационна система за функционално моделиране на карстова геосистема. – Проблеми на географията, кн. 2, Изд. БАН „Проф. М. Дринов“, София, 68-82.
- Mladenov, Ch.** 2006. Demographic Problems of the Rural Territories in Bulgaria. *Problems of geography*, 1-2, Izd. BAS “Prof. M Drinov”, Sofia, 61-66 (Bg)./ **Младенов, Ч.** 2006. Демографски проблеми на селските територии в България. – Проблеми на географията, кн. 1-2, Изд. БАН „Проф. М. Дринов“, София, 61-66.
- Mladenov, Ch.** 2014. Depopulation - “The plague“ of the settlement network. – In: A. Hristova (Editor) Processing „The demographic situation and the development of Bulgaria“ (Proceeding of symposium, 26 and 27 February 2014), pp. 461–476 (Bg)./ **Младенов, Ч.** 2014. Обезлюдяването – „чумата“ в селищната мрежа. – В: А. Христова (ред.) Сб. доклади от Конференция „Демографската ситуация и развитието на България“, 26 и 27 февруари 2014, С., с. 461-476.
- Mladenov, Ch.** 2015. Reflection of internal migration on the regional demographic situation. *Population*, 2, p. 73-87 (Bg)./ **Младенов, Ч.** 2015. Отражение на вътрешната миграция върху регионалната демографска ситуация. – Население, кн. 2, 73–87.
- Mladenov, Ch. and E. Dimitrov.** 2015. Depopulation – the main geographic problem of the demographic crisis in Bulgaria. – In: European future of Bulgaria and population development. Center za izsledvane na naselenieto, pp. 379–390 (Bg)./ **Младенов, Ч., Е. Димитров.** 2005. Депопулацията – основен географски проблем на демографската криза в България.– В: Европейското бъдеще на България и развитието на населението. Център за изследване на населението при БАН, С., с. 379– 390.
- Madzharova, S., M. Peneva, E. Patarchanova.** 2013. Rural areas. University of national and world economy Publishing House, Sofia, p. 290 (Bg)./ **Маджарова, С., М. Пенева и Е. Патарчанова.** 2013. Селски райони. Издателство УНСС, С., с. 290.
- Naidenov, K., T. Traikov.** 2016. Aging of the population in Bulgaria - trends, features and regional differences. - In: Proceedings of the National Conference “Geographical aspects of planning and use of the territory in the conditions of global changes”, Varshets, Bulgaria, 23.09 - 25.09.2016, ISBN: 978-619-90446-1-2. Available at: <http://geography.bg/images/dokladi/38.pdf/> (Accessed on 28.01.2020) (Bg)./ **Найденев, К., Т. Трайков.** 2016. Застаряване на населението в България - тенденции, особености и регионални различия. – В: Сб. доклади от НК „Географски аспекти на планирането и използването на територията в условията на глобални промени“, гр. Вършец, България, 23.09 – 25.09.2016 г., ISBN: 978-619-90446-1-2. Достъпно на: <http://geography.bg/images/dokladi/38.pdf/> (Посетен 28.01.2020).
- Patarchanov, P.** 2001. Development and geographic features of the agrarian reform in Bulgaria. *Annual of Sofia University ‘Sr. Kliment Ohridski’, Faculty of Geology and Geography*, book 92, Vol. 2, Geography, ST. Kliment Ohridski University Press, Sofia (Bg)./ **Патарчанов, П.** 2001. Развитие и географски особености на аграрната реформа в България. – Годишник на СУ „Св. Климент Охридски“, кн. 92, т. 2, География, Изд. Св. Климент Охридски, София.
- Patarchanova, E.** 2007. Rural areas in the Blagoevgrad district: socio-economic problems and opportunities for diversification of holding. Abstract of the dissertation, Sofia (Bg)./ **Патарчанова, Е.** 2007. Селските райони в Благоевградска област: социално-икономически проблеми и възможности за диверсификация на стопанствата. Автореферат на дисертационен труд.
- Petcova, T.** 2017. Natural and Migratory Movement of the Rural Population in Bulgaria – State and Trend. *The Balkans - language, History, Culture*, vol. 5, Issue 1., St.

- Cyril and St. Methodius" University of Veliko Tarnovo, Bulgaria (Bg)./ Петкова, Т. 2017. Естествено и миграционно движение на селското население в България – състояние и тенденции. - Балканите - език, история, култура, том 5, бр. 1. УИ ВИ „Св. Кирил и Методий“.
- Попов, Р. 2004.** The development of rural areas in the light of Bulgaria's accession to the EU. *Bulgarian Journal of Agricultural, Economics and Management*, vol. 1, ISSN 0205-3845 (Print), Sofia (Bg)./ Попов, Р. 2004. Развитието на селските райони в светлината на присъединяването на България към ЕС. – Икономика и управление на селското стопанство, кн.1, , ISSN 0205-3845 (Print).
- Ravnachka, Al. 2006.** The unemployment in rural regions of Southwestern Bulgaria. *Problems of geography*, vol. 1-2, pp. 83-91, ISSN 0204-7209 (Bg)./ Равначка, А. 2006. Безработицата в селските райони на Югозападна България“. – Проблеми на географията, кн. 1-2, 83-91, ISSN 0204-7209.
- Ravnachka, A. 2017.** Territorial differences in the supply and demand of labor in Blagoevgrad district (2001 - 2011). Doctoral thesis (Bg)./ Равначка, А. 2017. Териториални различия в търсенето и предлагането на работната сила в Благоевградска област (2001–2011 г.). Дисертационен труд.
- Stefanov, P. 1981.** Features of the karst in Dabrash. - In: Proceedings of the Fourth National Congress of Geographers in Bulgaria October 5-7, 1981, International House of Scientists «Frederic Joliot Curie» (Bg)./ Стефанов, П. 1981. Особености на карста в Дъбраш. – В: Сб. на резюмета от докладите изнесени на Четвърти национален конгрес на географите в България 5-7 октомври 1981 г., Международен дом на учените „Фредерик Жолио Кюри“.
- Stefanov, P. 1982.** Morphometry and morphography of the Manailovska Dupka cave. *Problems of Geography*, Publishing house BAS, vol. 3, 51-59 (Bg)./ Стефанов, П. 1982. Морфометрия и морфография на пещерата Манаиловска дупка. – Проблеми на географията, кн. 3, Изд. БАН, 51-59.
- Stefanov, P. 1983.** The morphological analysis of the „Kurudere - Kochanska river“ karst complex in the Dabrash part of the Western rhodopes as indirect evidence of the existence of a large cave system. - In: Collection of abstracts from the Second Youth Session, Institute of Geography - BAS, S., 1983, 13 (Bg)./ Стефанов, П. 1983. Морфоложкият анализ на карстовия комплекс „Курудере – Кочанска река“ в Дъбрашкия дял на Западните Родопи като косвено доказателство за съществуването на голяма пещерна система. – В: Сб. резюмета от Втора младежка сесия, Геогр. инст. БАН, С., 1983, 13.
- Tsekov, N. 2014.** Rural depopulation in Bulgaria for the period 1946-2011. – In: A. Hristova (Editor) Processing „The demographic situation and the development of Bulgaria“ (Proceeding of symposium, 26 and 27 February 2014), pp. 477-483 (Bg)./ Цеков, Н. 2014. Селската депопулация в България за периода 1946-2011 г. – В: А. Христова (ред.) Сб. доклади от Конференция „Демографската ситуация и развитието на България“, 26 и 27 февруари 2014, С., с. 477-483..
- Tsekov, N. 2015.** The migratory flow of village-town as a factor for the depopulation of the Bulgarian village. *Population*, 2, 139-152 (Bg)./ Цеков, Н. 2015. Миграционният поток село-град като фактор за депопулацията на българското село. – Население, кн. 2, 139–152.
- Tsekov, N. 2018.** Rural depopulation in Bulgaria in the period 1946-2011. Doctoral thesis summary, Available at: [http://www.iphs.eu/n/images/Demografiq/Nikolaj\\_Tsekov/AVTOREFERAT%20TSEKOV%202018%20FINAL.pdf](http://www.iphs.eu/n/images/Demografiq/Nikolaj_Tsekov/AVTOREFERAT%20TSEKOV%202018%20FINAL.pdf) (Accessed on 15.01.2020) (Bg)./ Цеков, Н. 2018. Селската депопулация в България през периода 1946-2011 г. Автореферат. Достъпно: [http://www.iphs.eu/n/images/Demografiq/Nikolaj\\_Tsekov/AVTOREFERAT%20TSEKOV%202018%20FINAL.pdf](http://www.iphs.eu/n/images/Demografiq/Nikolaj_Tsekov/AVTOREFERAT%20TSEKOV%202018%20FINAL.pdf) (Посетен 15.01.2020).

- Vekova L., D. Zlatinov, T. Taskov, I. Taneva, V. Fingarova, S. Todorova.** 2010. Study of the educational and professional-qualification structure of the employed and the labor force at national, sectoral and regional level. Available at [https://www.bia-bg.com/uploads/files/\\_oldsite\\_news/bulgarian\\_industrial\\_association\\_news\\_1287395789\\_analyses\\_5.2.2\\_full\\_version.pdf](https://www.bia-bg.com/uploads/files/_oldsite_news/bulgarian_industrial_association_news_1287395789_analyses_5.2.2_full_version.pdf) (Accessed on 12.01.2020) (Bg)./ Векова, Л., Д. Златинов, Т. Тасков, И. Танева, В. Фингарова, С. Тодорова. 2010. Проучване на образователната и професионално-квалификационна структура на заетите и работната сила на национално, секторно и регионално ниво. Достъпно на [https://www.bia-bg.com/uploads/files/\\_oldsite\\_news/bulgarian\\_industrial\\_association\\_news\\_1287395789\\_analyses\\_5.2.2\\_full\\_version.pdf](https://www.bia-bg.com/uploads/files/_oldsite_news/bulgarian_industrial_association_news_1287395789_analyses_5.2.2_full_version.pdf) (Посетен 12.01.2020).
- Iliev, I.** 2002. Undeveloped rural regions in Bulgaria In: Gałczyńska, B., M. Ilieva (Eds.) Transformations of rural areas in Poland and Bulgaria. Case studies. - Dokumentacja Geograficzna, No 27. Instytut Geografii i przestrzennego zagospodarowania PAN, Warszawa.
- Ilieva, M.** 2000. Rural areas in Bulgaria on the way of the transformation (case study of Dobrudzha) In: M. Jasiulewicz (Ed.) Socio-economical alterations in rural areas of Central Europe in the transition period, Koszalin.
- Ilieva, M.** 2002. Transformation of the rural areas in Bulgaria (processes, territorial disparities) In: Gałczyńska, B., M. Ilieva (Eds.) Transformations of rural areas in Poland and Bulgaria. Case studies. Dokumentacja Geograficzna, No 27. Instytut Geografii i przestrzennego zagospodarowania PAN, Warszawa.
- Ilieva, M., Ch. Mladenov** 2003. Changes in the rural areas in Bulgaria: processes and prospects In: Geographia Polonica, Vol. 76, No 1, Spring.
- Koulov, B., V. Boyadjiev, A. Ravnachka.** 2019. Demographic Transformations in the Bulgarian Rural Area: A Gis-aided Geospatial Analysis (1992-2017) Banski, J. (ed.) Three Decades of Transformation in the East-Central European Countryside, Springer, ISBN:978-3-030-21236-0, DOI:10.1007/978-3-030-21237-7\_11, 22.
- Mladenov, Ch., M. Ilieva.** 2012. Depopulation of Bulgarian village. – Bulletin of Geography, Socio-economic series, 17, Torun, 99-107. Available at [http://www.bulletinofgeography.umk.pl/17\\_2012/10\\_Mladenov.pdf](http://www.bulletinofgeography.umk.pl/17_2012/10_Mladenov.pdf) (Accessed on 12.04.2020)
- Yakuch, L.** 1979. Morphogenesis of karst areas. Variants of karst evolution. M., 1979, 388 p. / Якуч, Л. 1979. Морфогенез карстовых областей. Вариантѣй еволюции карста. Пер. англ. М., 1979, 388 с. (Ru).
- Vaishar, A., J. Zapletalová, D. Stefanova, P. Dvořák, D. Stefanov, E. Tcherkezova.** 2018. Recent Population Development in Sensitive Karst Areas: Case Studies of the Moravian Karst (Czech Republic) and the Devetashko Plateau (Republic of Bulgaria). *Problems of Geography*, vol.3-4, Izd. BAS “Prof. M Drinov”, Sofia, 88-109.
- \*\*\* **Census of Agricultural Holdings in 2010**, MAF (Bg)./ Преброяване на земеделските стопанства през 2010, МЗХ.
- \*\*\* **Census of the Population and Housing**, 2011, NSI (Bg)./ Преброяване на населението и жилищния фонд, 2011, НСИ.
- \*\*\* **Encyclopedia of the Pirin region.** 1995. Vol. 1: A-M, Blagoevgrad, pp. 608 (Bg)./ Енциклопедия Пирински край. 1995. Том.1: А-М, Благоевград, с. 608.
- \*\*\* **Municipal Development Plan of Garmen Municipality 2014-2020.** Available at: [https://garmen.bg/docs/20/OPR\\_Garmen\\_08.04.14\\_priet\\_ot\\_ObS\\_new.pdf](https://garmen.bg/docs/20/OPR_Garmen_08.04.14_priet_ot_ObS_new.pdf) (Accessed on 12.02.2020) (Bg)./ Общински план за развитие на община Гърмен 2014-2020 г. Достъпно на: [https://garmen.bg/docs/20/OPR\\_Garmen\\_08.04.14\\_priet\\_ot\\_ObS\\_new.pdf](https://garmen.bg/docs/20/OPR_Garmen_08.04.14_priet_ot_ObS_new.pdf) (Посетен 12.02.2020).
- \*\*\* **National Statistical Institute.** 2018 (Bg)./ Национален статистически институт. 2018.
- \*\*\* **Regions, districts and municipalities in the Republic of Bulgaria 2018.** Available at: <https://www.nsi.bg/> (Accessed on 01.05.2020) (Bg)./ Районите, областите и общините в Република България 2018. Достъпно на <https://www.nsi.bg/> (Посетен 01.05.2020).

