Abstract. The paper is aimed at analysing the recent population development sensitive areas, comparing two karst areas – one in the Czech Republic and one in the Republic of Bulgaria. Methodologically, crude data from population balances and population censuses were used. The Moravian Karst is an area situated in the vicinity of Brno – the administrative center of Moravia region, and, therefore, is subjected to suburbanisation processes, which puts the Moravian Karst area under pressure by urbanisation and tourism on the one hand, “fighting” with landscape protection on the other hand. Although this rural territory is unsuitable for intensive agricultural production, it does not really mean it is uninhabited, nor does it mean it is depopulated. The Devetashko Plateau on the other hand is a plateau situated in the vicinity of Lovech – a city ten times smaller than Brno in terms of population number. Commuting in that area is more difficult, regarding the age and qualification structure of the population, as well as the existing transport conditions. The micro-region is depopulated, while population aging is extreme. The differences between the compared areas are the result of their geographical location, level of dependence on primary economic activities and socio-historical development. The aging processes are highly likely to continue in the future. In the Moravian Karst area, the population development is slow, which makes it easier to cope with. The drawdown of some settlements in the Devetashko Plateau area was rapid and too deep, to a point where hardly any remedies are possible. The following factors have been suggested to have the greatest impact on the rural depopulation: the overall population development in the country, the vicinity of a regional center, the state of the urbanisation processes, the level of dependence on the primary economic sector, the efficiency of the transport systems, the excessive cultural diversity, as well as some other individual circumstances.

Keywords: depopulation, Moravian Karst, Devetashko Plateau, Czech Republic, Republic of Bulgaria

1 Czech Academy of Sciences, Institute of Geonics, Brno, Czech Republic; vaishar@geonika.cz; zapletalova@geonika.cz; dvorak@geonika.cz
2 National Institute of Geophysics, Geodesy and Geography, Bulgarian Academy of Sciences; dili_stefanova@abv.bg; eti2015@abv.bg
СЪВРЕМЕННО РАЗВИТИЕ НА НАСЕЛЕНИЕТО В ЧУВСТВИТЕЛНИ КАРСТОВИ ТЕРИТОРИИ: НА ПРИМЕРА НА МОРАВСКИ КАРСТ (ЧЕШКА РЕПУБЛИКА) И ДЕВЕТАШКО ПЛАТО (РЕПУБЛИКА БЪЛГАРИЯ)

Антонин Вайсхар, Яна Заплеталова, Петър Дворжак, Диляна Стефанова, Емилия Черкезова

Резюме. Целта на изследването е сравнителен анализ на съвременните промени в развитието на населението в типични карстови територии, разположени в две държави – Чешка република и Република България. Използвани са данни от текущата статистика и преброяванията на населението в двете страни. Моравският карст е разположен в близост до регионалния център Бърно и частично е обект на субурбанизация, което заедно с туризма оказват силно влияние върху опазването на ландшафта. Въпреки че тази селска територия е неподходяща за интензивна селскостопанска дейност, не е обезлюдена. Застаряването на населението вероятно ще продължи и в бъдеще, въпреки че в тази карстова територия процесът протича по-бавно, което позволява овладяването му. Деветашкото плато е разположено в близост до Ловеч, който е 10 пъти по-малък по население от Бърно. Обезлюдяването в някои от населените места е изключително напреднало, което ограничава възможностите за преодоляване на този негативен процес. Застаряването е траен процес. Ежедневните пътувания са по-трудни от гледна точка на възрастовата и квалификационната структура на населението и транспортните условия. Различията в тези две сравнявани карстови територии се дължат на географското им положение, социално-икономическото им развитие и техните специфични културно-исторически особености. Предложени са за анализ следните фактори, оказващи влияние върху обезлюдяването на селското население: общо развитие на населението в страната, близост до регионален метрополис, стадий на процеса на урбанизация, степен на зависимост от първичния сектор, ефективност на транспортната система, прекомерно културно разнообразие и индивидуални обстоятелства.

Ключови думи: обезлюдяване, Моравски карст, Деветашко плато, Чешка република, Република България

INTRODUCTION

Environmentally sensitive territories in post-socialist countries oscillate between two main tendencies. The protection of landscape which belongs to European priorities is confronted with market conditions which are directed to intensive utilisation of natural resources. The local administration has often to decide between the environmental protection (promoted by the institutions of the landscape protection) and local or micro-regional development (advocated by entrepreneurs). Local population writhe between the nostalgia for the home place and impossibility to find an appropriate work. Such situation often results in depopulation tendencies. In European conditions, rural depopulation is connected usually with agricultural decline especially in mountain areas (e.g. McDonald et al., 2000). Although karst areas are not often found in mountains, their natural conditions for intensive agriculture are quite similar. The emigration which finished in Western Europe more or less was replaced by the negative natural development as a consequence of rural aging (Pinilla et al., 2008). By such a way the depopulation tendencies persist, balanced by immigration...
of foreigners in some areas (Bayona i Carrasco and Gil Alonso, 2011; Collantes et al., 2013).

In the post-communist countries, the transition from the central planned to the marked economy meets another transition – from the productive to the post-productive era – which is followed by the loss of jobs in productive sectors – agriculture, forestry, fishery, and industry. The agrarian transformation had a different course in Czechia and Bulgaria. In Czech Republic, former socialist cooperatives and state farms were mostly transformed to owner’s co-operatives, joint stock companies, limited liability companies and other legal persons who rent the land from individual owners. By such a way, the structure of large enterprises who employ agricultural population has been kept. Small farmers make up the majority of enterprises but their share in the market is unimportant. In Bulgaria, the land was also returned to individual owners but co-operatives and state farms were ceased. There is now a process of ownership concentration through the acquisition of small plots. Additionally, many entrepreneurs do not buy land for farming but as a property investment (Giordano and Kostova, 2001).

Protected territories are often attractive for tourism. However, tourism could hardly substitute the loss of jobs in productive branches. Moreover, in the case of mass tourism development, just tourists could devalue original natural beauties. All these factors increase the sensitivity of the protected territories in a natural, economic and social sense.

To understand present population development in such kind of territories, the population development in Moravian Karst and Devetashko Plateau was analysed. The paper is aimed at understanding contemporary demographic processes, their causes and consequences and an attempt for a prediction of future development in environmentally sensitive areas. The research question is a part of a wider project comparing the sensitivity of karst areas from different viewpoints. During the investigation, it was discovered that both the territories differ one from the other by population trend and their conditionalities.

SECOND DEMOGRAPHIC TRANSITION, URBANISATION PROCESSES, COUNTRYSIDE AND THE KARST AREA

Population development in the majority of European countries is impacted by the second demographic transition. Increasing individualism, women’s empowerment in terms of education and career building, developing of alternative life motivations, general accessibility of contraception and some other factors caused the decrease of the fertility rate deep under the level of natural reproduction (van de Kaa, 1987). In combination with the improvement of living conditions and health care, it leads to aging of the population (Lowe and Speakman, 2006). According to EUROSTAT, total fertility rate was similar both in Bulgaria (1.53) and in Czech Republic (1.57) in 2015. From the long-time view, Czechia more or less keeps the population number just above 10 million, whereas Bulgaria reached the top (almost 9 million) in 1988. In general, in Bulgaria depopulation began in 1989 as a result of emigration and negative natural growth (Mladenov, 2005). Till this time, the country lost more than 20% of inhabitants – mostly young people in the first half of the economic active age. By
2015 the population is already 7.1 milion only. The changes in the dynamic of the natural movement (births and deaths) have a serious negative influence on the number of the population in the last years. Till this time, the country lost more than 20% of inhabitants – mostly young people in the first half of the economic active age. The emigration (including the migration of ethnic Turks to Turkey) is the main reason of this development (Mladenov et al., 2008).

The depopulation of the Bulgarian mountain and borderland countryside is characterised by Mladenov and Ilieva (2012, p.107): *The continuation of these processes will lead to the depopulation of large areas in the mountainous and the border regions of the country. The living rhythms of villages with a favourable economic-geographic location will be deteriorated permanently. This will be a cause of serious obstacles of an organisational and production nature emerging as well as hampering, or inferior use of their lands, residential and public fund. The closing of schools and health care centres will continue because of the decreasing demographic potential. Moreover, as Galindo-Pérez-de-Azpilaga et al. (2013) state, depopulation trends are generally typical for protected areas which is also our case.*

Because of the traditional conservatism of rural population, the mentioned changes featured more slowly in the countryside. The fertility of rural population is still higher than in the case of the urban one. It is connected with lower education structure of rural women among others because women with tertiary education start their reproduction process much later than less educated ones and that is why the length of their reproduction period is shorter.

On the other side, predominantly young (and educated) people move from the countryside to cities looking for prestigious and well-paid jobs, possibilities of cultural and social life and seeming freedom of urban life, whereas old people who have closer relation to their homes and villages often stay – sometimes they even return to the countryside after finishing their economic activities searching for more simple life. Hypothetically, the higher fertility rate in the countryside improves the demographic structure of cities whilst villages get older.

Rural aging is one of phenomenon discussed (Berry, 2011). Aging is manifested in Bulgaria more seriously than in Czech Republic. From the table 1 follows that the age index\(^3\) in Bulgaria is 0.695 whereas in Czechia is 0.854. Similarly, the index of economic dependence\(^4\) is 0.512 for Bulgaria and 0.418 for Czechia. Population aging will challenge health and social care systems in individual countries. Also, some disproportion between old pension system and increasing number of seniors could originate (Rechel et al., 2013).

### Table 1

*Shares of population in the main age population groups in 2015 (EUROSTAT)*

<table>
<thead>
<tr>
<th>Age group</th>
<th>0-14</th>
<th>15-64</th>
<th>65+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republic of Bulgaria</td>
<td>13.9</td>
<td>66.2</td>
<td>20.0</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>15.2</td>
<td>67.0</td>
<td>17.8</td>
</tr>
</tbody>
</table>

\(^3\) Share of juniors and seniors  
\(^4\) Share of economically dependent people (juniors + seniors) and economic active people
In some countries, a different demographic behaviour is connected with minor ethnical (or ethnic-social) population groups. Ethnic minorities in Czechia are represented mostly by Ukrainians, Slovak and Vietnamese (about a quarter of million together) who do not present any serious cultural neither social problem. In Bulgaria, 588 thousand Turks and 325 thousand Roma were found in the last population census. Moreover, ethnical minorities in Czechia are mostly an urban element whereas in Bulgaria they occur also in the countryside.

The population development of the countryside is a part of the general development in the respective country but it could be different from the national average in some indicators. Additionally, the development is connected with contemporary urbanisation processes. One-sided rural – urban migration has been completed with suburbanisation, counter-urbanisation, naturbanisation, re-urbanisation. The whole matter is relatively complicated and multiform. Development of rural population would probably depend on the type of the countryside. Whereas suburban countryside has hypothetically similar (or even better) demographical characteristics as towns, rural periphery could be threatened by depopulation.

In the period of 2012-2016, all size categories of rural municipalities in Moravia under 5,000 inhabitants (very small municipalities, small municipalities, medium-size rural municipalities, large rural municipalities and very large rural municipalities) recorded a positive net migration. Only in very small municipalities, the negative natural balance was bigger than the immigration. All categories of small and medium-size towns were among demographic losers. So, rural depopulation is not the case in Moravia in general. Of course, there are individual cases in the northern, south-western and eastern periphery of the land which are really depopulated. However, these cases should be solved individually. For sure, Moravian Karst does not belong to this category.

For the past five observed years, in general, in the Devetashko Plateau has been established a negligible, positive migration growth. Only in two of the settlements, the displaced and the populated ones have slightly higher values. This different movement of migratory processes in these settlements is largely related to the more mobile Roma population. Due to the extremely small population, most of the settlements will lose their emigration potential. In some of the Plateau villages, the incoming population will be primarily Roma populations. It can be summed up that the migration contingents are largely exhausted in the rural settlements and this will reduce the migration impact on the depopulation process of the Devetashko Plateau.

The depopulation is sometimes discussed in relation to the labour market. It is necessary to point out that the labour market is not a local but a micro-regional feature. After the railway and later road transport started to be accessible for common people, commuting is an integral part of the rural life. From it follows that it is not necessary to have jobs and services in each place. Moreover, people often migrate from places where job opportunities are concentrated to other locations. From the micro-regional viewpoint activities in any place (most often in the micro-regional core) are endogenous sources of the whole micro-region. Only commuting crossing a reasonable distance (usually 30 minutes) or longer than one-day commuting is problematic.

Many experts recommend substituting disappearing jobs in the primary sector with jobs in tourism. It cannot be realistic (except some mountain, water or spa re-
The decisive tourist infrastructure is concentrated in cities and spas. The main way of rural tourism is second housing which brings only very limited jobs for local people, followed with soft tourism branches. In the regions with prevailing cognitive tourism (as karst areas typically are), the tourists use the infrastructure in some city and make optional trips to the rural area not spending much money there. Additionally, institutions of landscape and nature protection prevent larger infrastructure development in order to preserve the natural landscape as much as possible.

However, the question of jobs both in agriculture and tourism is not important for the Czech countryside. The share of population employed in agriculture, forestry, and fishery decreased from 4.5% in 2000 to 2.5% in 2016 whereas the share of employed in accommodation, gastronomy, and hospitality decreased from 3.0% in 2000 to 2.9% in 2016. According to the last population census (2011), the share of employed in primary sector was 11.6% in very small municipalities (under 200 people) and it decreased with increasing size of the municipality. The share of inhabitants depending on agricultural jobs in the Czech countryside can be estimated at about 6%. The majority of the Czech rural population is employed in industry (about one third) and in services (about 60%). Czech rural population is threatened much more by decreasing number of jobs in industry – not in agriculture.

Further, the labour market in the Moravian countryside has hardly any relation to the depopulation. The unemployment rate in all demographic types of the Moravian micro-regions in the period of 2012 – 2016 is about 4% (tab. 2). Additionally, all towns and cities over 20,000 inhabitants have higher unemployment rate than rural municipalities in their surroundings. The respective data for Brno is 5.6%. The migration movements are both-sided: Young and educated people move to cities for career and richer cultural and social life whereas some other people move to the countryside within suburbanisation or for easier and cheaper life, natural beauties, security.

Talking about a labour market on the territory of Devetashko Plateau, it is definitely highly unbalanced - it is hard to talk about looking for a workforce. The proposed workforce can actually be realised outside the Plateau area, but due to its unconfirmed ability, this proves to be quite difficult. The predominant part of the settlements connected to Devetashko Plateau shows a tendency of going down the economically active population (busy and unemployed) and the opposite increasing of the economically inactive population (unemployed, pensioners). The parts of the economically active population are around 10% to 60% for the 2001 year and around

### Table 2

<table>
<thead>
<tr>
<th>Population type</th>
<th>Unemployment rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive natural balance and net migration</td>
<td>4.0%</td>
</tr>
<tr>
<td>Positive natural balance and negative net migration</td>
<td>3.9%</td>
</tr>
<tr>
<td>Negative natural balance and positive net migration</td>
<td>3.9%</td>
</tr>
<tr>
<td>Negative both natural balance and net migration</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

*Source: Ministry of Labour and Social Affairs, Prague, own calculations*
10% to 40% for the 2012 year to the settlements. A part of the economically active population is unemployed so the real part of the population of the Plateau which is doing working activity is very small. The economic inactive population for 2011 (68.47%) prevail over the economic active part (31.53%). In some settlements, the share of economic inactive population crosses 90%.

The periphery can be understood differently. The geometric viewpoint (pure distance) is the easiest one. In reality, the peripherality depends more on accessibility but also on some economic, social or natural handicap and also on the perception of the respective area. Depopulation could be also a part of the definition of peripherality (Pinto-Correia and Breman, 2008). Worsened condition for the agricultural production in karst areas may represent a handicap which theoretically could cause some depopulation.

Although not very stressed in European concepts, karst areas, represented e.g. with rugged micro-terrain, dolines (sinkholes), flooding of karst poljes, lack of surface water or variable soil depth represent problematic and sensitive regions from the viewpoint of agricultural utilisation (Ciglič et al., 2012). It is more or less clear that agriculture is limited in karst areas. Thinking about the traditional way of rural life, such conditions for agriculture would cause abandonment of land and depopulation of villages. It could lead to the spread of poverty (see Liu et al., 2008).

However, to which extent the people in contemporary European rural areas actually depend on agriculture and to what extent the agriculture of European Union is market-oriented? The primary sector in European karst areas is hardly based on intensive traditional agriculture. Forestry and grazing are the main activities often under special organisational and financial conditions. A return of sheep breeding is one of the examples. Sheep graze grasslands on rugged terrain which is accessible for machines with difficulty. Multifunctional agriculture turns its attention to the landscape maintenance besides of food production and benefits from various forms of financial support within EU common agricultural policy.

On the territory of Devetashko Plateau there is no industrial production with the exception of Suhindol. For this reason, the local population employed in the industry make daily trips to larger settlements providing employment. The extraction industry is related to two limestone quarries (Gorsko Slivovo and Chavdartsi), but they have ceased their activity so that employment in this sector is liquidated. Real employment is extremely limited. Employment in agriculture is related to raising animals in small family farms (Gorsko Slivovo, Chavdartsi, Suhindol, Koevci, Agatovo and others). There are also a few local grain producers (part of the land is leased to outside tenants). The services are mainly occupied by the town hall, the post office, the cultural house and a few commercial outlets.

Tourism as a lasting alternative cannot be yet imposed on the territory of Plato. However, there is a tendency to increase the number of accommodation and shelter and the supply of tourist attractions in the villages of Krushuna, Karpachevo and Gorsko Slivovo, which is an alternative for employment and additional income. Lack of jobs and employment is a major cause of the depopulation of Devetashko Plateau.

Nevertheless, there is no doubt that the number of jobs in agriculture rapidly decreases in karst areas (as in the whole economy). The drawdown of jobs in the primary sector can be hardly substituted by increasing jobs in tourism as a rule. If the economic active population does not want to emigrate from karst regions, they
have to commute. The question is whether there are enough jobs responding to the qualification of former farmers in the vicinity of karst areas and whether the transport capacities (both private and public) are sufficient to transport the people to and from work.

Not only population numbers but also their structure seems to be important. The age structure explains partly the dynamics of population development both in the past and in the future. Also the quality of population plays a role. Hypothetically, sensitive rural areas can be destitute not only by decreasing population number but also by worsening of the quality of population expressed in the educational structure. It is possible that young educated people leave the countryside whereas old people remain or even immigrate.

METHODOLOGY AND DATA

The territory of karst areas is often researched from the viewpoint of physical features. Using of the karst landscapes for tourism is also frequently investigated. But complex management in karst areas and its impact on the social system is almost on the periphery of interest. In Moravian Karst, a relatively compact study analysing both physical and social features was elaborated in the 1980s (Přibyl et al., 1983). The demographic situation in the 1970s was clear: rural – urban migration prevailed which resulted in population increase in towns and industrial centres, population decrease in rural municipalities. However, the cited work is outdated from the viewpoints of methodology, data, and reality of the centrally planned system. Some complex observation of the Devetashko Plateau territory including the social-economic aspect were developed also in Bulgaria (Stefanova and Stefanov, 2009).

Methodologically, an analysis of secondary sources, evaluation of statistical quantitative data and field research, representing the qualitative approach were used. The comparative analysis represents the final step. There is hardly any possibility to use quantitative data for a comparison of two territories which do not create any administrative units within the NUTS system in different countries – except very simple data like number and demographic structure of inhabitants eventually education structure gained on the municipality or settlement level. For the analysis of the population development data about natural development and migration, age and educational structure were used. We investigated the period 2006 – 2015 in Czechia on the municipality level and the same period in Bulgaria on the settlement level. Due to the different administrative organisation, the size of Czech municipalities and Bulgarian settlements are comparable because the usually represent one locality.

The programme Street View was used for the visual analysis of individual settlements. The contemporary level of this tool allows to pass through individual settlements virtually, observing the condition of individual buildings, the structure of the settlement the general atmosphere and also the traffic in the time of the imaging. For Bulgaria, Google Street View was used whereas Panorama Seznam gives an analogic information for Czech Republic.

An analysis of the development of the population numbers from the viewpoint of depopulation tendencies manifest the first step. Its results are discussed and relations to other data will be looked for. Hypothetically, the age structure, education
level, accessibility of jobs in surrounding centres come into account. Finally, we will try to explain possible reasons for negative or positive population development and predict next development.

MORAVIAN KARST

Protected Landscape Area Moravian Karst (92 km²) is the largest karst area in Czech Republic. It is a fairly hilly landscape dissected by deep valleys built up of the limestone of Devonian age. The area is situated north of Brno in Drahanská výchovna Highland. There are ca. 1,100 caves here, of which currently five cave systems are open for public tours. The Macocha Abyss is the most known attraction of the territory. Climatic and soil conditions are not suitable for intensive agriculture.

Current economic activities include primary branches: forestry and agriculture. Forest Enterprise Masarykův les Křtiny (belonging to Mendel University in Brno) is the main forest owner in the area. Agriculture is directed more to the crop production, less to the animal husbandry. Only 17% of the territory is formed by arable land. Earlier, the share of arable land was much higher but the land use has been changed after 1997 mostly for meadows (Balák et al., 1999). The landscape protection contributes to the creation of a positive image of the area and thus to the tourist development which is another important economic branch.

Mining includes one mine of the limestone directly on the territory, the second (big) one can be found just on the border. All the territory is protected since 1956 when it was declared as Protected Landscape Area (Fig. 1 – appendix). The population is engaged mostly in industry and services. About 36% of employees commute to work. Big industrial plants were situated on the fringe of the area in Blansko (mainly electrical engineering), Adamov (machinery), Boskovice (machinery and textile) and also in the regional capital Brno. Tourism develops quickly with 400,000 visitors annually (mostly one-day tourist).

On the protected landscape area or on its fringe there are 22 settlements with 23,264 residents (2015). The density of population is relatively high – 121 persons per km². The population number increased by 18% since 2000. Rural development is supported by the Local Action Group Moravian Karst. The villages have residential, partly agricultural and/or touristic character (Korábová, 2007) with some architectural heritage (Fig. 2).

The majority of settlements is connected to gas, the share of connection to public water conduit does not fall under 85% and share of population equipped with the sewerage system connected to wastewater treatment plant is about a half. The housing stock consists of buildings from pre-socialist, socialist and post-socialist era (Fig. 3).

There is no motorway nor first-class road in the territory of Moravian Karst. The skeleton of the area is formed by two second-class roads which are managed by the South-Moravian Region. In some of them, the intensity of transport crosses 4,000 vehicles per a day⁵ which does not respond to their horizontal either vertical alignment,

⁵ Census of Road Transport 2016. Directory of Roads and Motorways Prague
width, and condition. On the other hand, two roads going through deep and narrow valley were closed for the automotive transport.

The settlements are connected by the South Moravian Integrated Public Transport System. The transport accessibility is excellent. Each settlement should be served with public transport at least six times in working days and three times in weekend days; the way to the closest stop should be shorter than 2,000 meters from each inhabited place and the time for the change may not exceed 10 minutes. In reality connection from the majority of villages is much more frequent. For tourist purposes, an ecological (electric) train and the cableway were introduced.
DEVETASHKO PLATEAU

The territory of the Devetashko Plateau (340 km$^2$) is situated to the east of Lovech (a city approximately ten times smaller than Brno) in the inner periphery, on the border zone between NUTS 3 regions Veliko Tarnovo, Gabrovo, and Lovech. Devetashko Plateau is a relatively comparable territory to the Moravian Karst in terms of natural conditions (Fig. 4 – appendix). It is situated among valleys of Rivers Rositza, Osam, Gostinka, and Magara in the southern periphery of the Danubian plain. The predominance of limestone is the cause for the development of a typical karst relief including 68 karst caves with total length of 18 km (Zapletalova et al., 2016). The climate of the Devetashko Plateau is moderate continental. Around 33% of precipitation create an underground water flow. Part of the territory has been established as a territory of the ecological network of Natura 2000. Two natural monuments and six protected sites with the area of 55.64 hectares are situated in the territory of the plateau.

There are 15 settlements with 6,254 (2015) residents in the territory of the plateau or on its borderline. These settlements belong to five municipalities and three administrative districts: Lovech, Gabrovo and Veliko Tarnovo. To a certain extent, this administrative-territorial fragmentation of the Devetashko Plateau is an obstacle for solving a number of issues related to its sustainable development including demographic development from the point of view of differences in administrative and managerial decisions.

The population density is very low – 18 persons per km$^2$. Houses are old and most of them are abandoned (Fig. 5). There is no technical infrastructure (sewerage, wastewater treatment plants, internet communications) which makes the region not so attractive for the living.

In general on the territory of the plateau is developing agricultural activity. The soil is cultivated mainly by leaseholders who settle outside of the territory. In 2015, each of 103 agricultural holdings cultivated 118 ha of agricultural area on average. The EU subsidy for direct payments stimulates the farmers to increase the size of the utilised area and towards smaller fruit gardens. There is also a tendency of restoration

Fig. 5. Chavdartsi: a street view (Source: Google.com)
of old fruit gardens (mostly plumbs), because there is an opportunity of receiving additional agro-ecological payments. The stock-breeding is focused on cows, sheep and goats on pastures, and with preparing hay and straw. It belongs to the small, mostly family sector where there are no conditions for a breeding of a large number of animals. The milk is produced on 73 farms with 1,523 cows (2015). There is also a tendency in the development of beekeeping for which the National beekeeping program plays a very important role. The forests occupy around $\frac{1}{3}$ of the territory of the plateau and are directed to the pasture of cattle, sheep or goats, production of hay and forest berries among others.

About 60% of the territory of Devetashko Plateau is formed by the agricultural land. From it follows that productive pressures to the land are much stronger there which probably impacts on the standpoints of municipalities. There are no coordinate actions in the service of managing the karst resource executed to the Devetashko Plateau and there are no real measures for the protection of the karst resource. The main reason for this are serious gaps in the legislation about the karst and the caves in Bulgaria but also because in the territory of the Plato there is no park administration with functions like keep, protect and control.

In the periphery of the area, few industrial plants can be found. It could be named following ones: Suhindol town with the food industry and small enterprises of the metal industry. The big industrial companies in the close situated municipal centers Lovech (engineering) and Sevlievo (sanitary ceramics) give an opportunity for employment. The Devetashko Plateau has natural conditions for the development of tourism: ecotourism, sports, cognitive tourism and cultural tourism. Tourist infrastructure is under the construction.

POPULATION DEVELOPMENT

The population development of municipalities in Moravian Karst in the decade 2005 – 2015 is in table 3 which shows the general population increase. The only town Adamov lost a relatively big number of residents as a consequence of shortening the main industrial plant - Adamovské strojírny Engineering (more than 5,000 jobs in the 1980s). A part of rural settlements in the most South grew as a consequence of the suburbanisation process whereas others play a role of rural subcentres with their own functions (e.g. Jedovnice, Fig. 6). There were 417 new flats built in the area in the period of 2011-2015. In 6 villages, one new flat accounts to less than 25 inhabitants: These settlements can be considered suburbanised.

Aging of population is manifested by the share of young people (age 0-14) and seniors (age 65+) which is 0.92. However, some municipalities have a progressive age structure. It is better than the national average (0.85) – partly due to the suburbanised character of the southern part of the territory. From it follows that the population of Moravian Karst is active. The dependency index$^6$ is 0.54 which is worse than the national average (0.50).

$^6$ The share of dependent and independent people calculated as the quota of children (0-14) + seniors (65+) divided with the number of people in economic active age
### Table 3

*Population development in municipalities in Moravian Karst 2006-2015*

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Births</th>
<th>Deaths</th>
<th>Immigrants</th>
<th>Emigrants</th>
<th>Average population number</th>
<th>Population balance [‰]</th>
<th>Population number 31.12.2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adamov</td>
<td>585</td>
<td>468</td>
<td>1,421</td>
<td>1,722</td>
<td>4,677</td>
<td>-39.3</td>
<td>4,593</td>
</tr>
<tr>
<td>Mokrá-Horákov</td>
<td>311</td>
<td>201</td>
<td>650</td>
<td>618</td>
<td>2,705</td>
<td>+52.5</td>
<td>2,772</td>
</tr>
<tr>
<td>Jedovnice</td>
<td>279</td>
<td>229</td>
<td>558</td>
<td>475</td>
<td>2,709</td>
<td>+49.1</td>
<td>2,745</td>
</tr>
<tr>
<td>Ochoz</td>
<td>125</td>
<td>115</td>
<td>548</td>
<td>382</td>
<td>1,268</td>
<td>+138.8</td>
<td>1,344</td>
</tr>
<tr>
<td>Babice nad Svitavou</td>
<td>128</td>
<td>90</td>
<td>461</td>
<td>221</td>
<td>1,029</td>
<td>+270.2</td>
<td>1,152</td>
</tr>
<tr>
<td>Ostrov u Macochy</td>
<td>96</td>
<td>139</td>
<td>228</td>
<td>155</td>
<td>1,102</td>
<td>+27.2</td>
<td>1,115</td>
</tr>
<tr>
<td>Olomučany</td>
<td>115</td>
<td>104</td>
<td>289</td>
<td>194</td>
<td>952</td>
<td>+111.3</td>
<td>1,017</td>
</tr>
<tr>
<td>Rudice</td>
<td>121</td>
<td>90</td>
<td>236</td>
<td>146</td>
<td>907</td>
<td>+133.4</td>
<td>969</td>
</tr>
<tr>
<td>Březina</td>
<td>139</td>
<td>72</td>
<td>383</td>
<td>115</td>
<td>778</td>
<td>+430.6</td>
<td>968</td>
</tr>
<tr>
<td>Sloup</td>
<td>104</td>
<td>85</td>
<td>214</td>
<td>168</td>
<td>945</td>
<td>+68.8</td>
<td>960</td>
</tr>
<tr>
<td>Kanice</td>
<td>109</td>
<td>56</td>
<td>512</td>
<td>225</td>
<td>769</td>
<td>+442.1</td>
<td>927</td>
</tr>
<tr>
<td>Vavřinec</td>
<td>77</td>
<td>68</td>
<td>189</td>
<td>131</td>
<td>846</td>
<td>+79.2</td>
<td>872</td>
</tr>
<tr>
<td>Křtiny</td>
<td>72</td>
<td>81</td>
<td>252</td>
<td>197</td>
<td>790</td>
<td>+58.2</td>
<td>823</td>
</tr>
<tr>
<td>Šošůvka</td>
<td>51</td>
<td>69</td>
<td>134</td>
<td>155</td>
<td>776</td>
<td>-50.3</td>
<td>693</td>
</tr>
<tr>
<td>Petrovice</td>
<td>90</td>
<td>57</td>
<td>259</td>
<td>191</td>
<td>592</td>
<td>+170.6</td>
<td>637</td>
</tr>
<tr>
<td>Habrůvka</td>
<td>51</td>
<td>45</td>
<td>132</td>
<td>51</td>
<td>380</td>
<td>+228.9</td>
<td>428</td>
</tr>
<tr>
<td>Žďár</td>
<td>34</td>
<td>22</td>
<td>81</td>
<td>83</td>
<td>386</td>
<td>+25.9</td>
<td>390</td>
</tr>
<tr>
<td>Krasová</td>
<td>46</td>
<td>27</td>
<td>174</td>
<td>77</td>
<td>296</td>
<td>+391.9</td>
<td>366</td>
</tr>
<tr>
<td>Vilémovice</td>
<td>33</td>
<td>31</td>
<td>99</td>
<td>50</td>
<td>300</td>
<td>+170.0</td>
<td>329</td>
</tr>
<tr>
<td>Holštejn</td>
<td>21</td>
<td>13</td>
<td>35</td>
<td>38</td>
<td>156</td>
<td>+32.1</td>
<td>164</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,587</strong></td>
<td><strong>2,062</strong></td>
<td><strong>6,855</strong></td>
<td><strong>5,394</strong></td>
<td><strong>22,363</strong></td>
<td><strong>+8.9</strong></td>
<td><strong>23,264</strong></td>
</tr>
</tbody>
</table>

*Source: Czech Statistical Office. Own elaboration*

On the whole, 54% of the population is with lower education⁷, 32% with secondary and 13% with higher education in 2011. The population of Moravian Karst is ethnically homogenous. There are 0.8% of Slovaks and 0.2% of Ukrainians in the territory. Although many people did not declare any ethnicity within the last census (2011), experiences from the field do not indicate some substantial presence of foreign ethnics.

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⁷ Primary and secondary education with an apprenticeship certificate
Population development in settlements in Devetashko Plateau in table 4, which shows generally negative development in the number of inhabitants. However, the negative population development is caused mainly by the natural decrease which is typical for all settlements. It is probably the consequence of aging. On the other

Table 4

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Births</th>
<th>Deaths</th>
<th>Immigrants</th>
<th>Emigrants</th>
<th>Average population number</th>
<th>Population balance [%]</th>
<th>Population number 31.12.2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varbovka</td>
<td>224</td>
<td>267</td>
<td>379</td>
<td>362</td>
<td>1,334</td>
<td>-19,5</td>
<td>1,374</td>
</tr>
<tr>
<td>Dimcha</td>
<td>24</td>
<td>165</td>
<td>148</td>
<td>107</td>
<td>426</td>
<td>-234,7</td>
<td>341</td>
</tr>
<tr>
<td>Koevci</td>
<td>10</td>
<td>63</td>
<td>50</td>
<td>79</td>
<td>189</td>
<td>-433,9</td>
<td>139</td>
</tr>
<tr>
<td>Suhindol</td>
<td>207</td>
<td>386</td>
<td>419</td>
<td>548</td>
<td>2,059</td>
<td>-149,6</td>
<td>1,735</td>
</tr>
<tr>
<td>Agatovo</td>
<td>35</td>
<td>154</td>
<td>151</td>
<td>125</td>
<td>409</td>
<td>-227,4</td>
<td>294</td>
</tr>
<tr>
<td>Kramolin</td>
<td>40</td>
<td>129</td>
<td>98</td>
<td>130</td>
<td>479</td>
<td>-252,6</td>
<td>373</td>
</tr>
<tr>
<td>Gorsko</td>
<td>33</td>
<td>225</td>
<td>148</td>
<td>202</td>
<td>701</td>
<td>-350,9</td>
<td>524</td>
</tr>
<tr>
<td>Slivovo</td>
<td>33</td>
<td>225</td>
<td>148</td>
<td>202</td>
<td>701</td>
<td>-350,9</td>
<td>524</td>
</tr>
<tr>
<td>Krushuna</td>
<td>35</td>
<td>113</td>
<td>196</td>
<td>203</td>
<td>476</td>
<td>-178,6</td>
<td>377</td>
</tr>
<tr>
<td>Karpachevo</td>
<td>0</td>
<td>55</td>
<td>56</td>
<td>31</td>
<td>136</td>
<td>-220,6</td>
<td>115</td>
</tr>
<tr>
<td>Brestovo</td>
<td>0</td>
<td>135</td>
<td>58</td>
<td>32</td>
<td>207</td>
<td>-526,6</td>
<td>130</td>
</tr>
<tr>
<td>Gostinya</td>
<td>3</td>
<td>79</td>
<td>59</td>
<td>21</td>
<td>170</td>
<td>-223,5</td>
<td>139</td>
</tr>
<tr>
<td>Devetaki</td>
<td>3</td>
<td>141</td>
<td>54</td>
<td>41</td>
<td>236</td>
<td>-529,7</td>
<td>159</td>
</tr>
<tr>
<td>Smochan</td>
<td>36</td>
<td>112</td>
<td>62</td>
<td>58</td>
<td>298</td>
<td>-241,6</td>
<td>249</td>
</tr>
<tr>
<td>Tepava</td>
<td>0</td>
<td>68</td>
<td>52</td>
<td>36</td>
<td>114</td>
<td>-456,1</td>
<td>55</td>
</tr>
<tr>
<td>Chavdartsi</td>
<td>26</td>
<td>137</td>
<td>101</td>
<td>82</td>
<td>365</td>
<td>-252,1</td>
<td>250</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>676</strong></td>
<td><strong>2,229</strong></td>
<td><strong>2,031</strong></td>
<td><strong>2,057</strong></td>
<td><strong>7,199</strong></td>
<td><strong>-219,3</strong></td>
<td><strong>6254</strong></td>
</tr>
</tbody>
</table>

*Source: National Statistical Office Bulgaria. Own elaboration*
side, ⅔ of the settlements including the smallest ones show the increase by migration. The loosing moves usually about a quarter of population for 11 years under monitoring but they can reach also about a half of inhabitants.

The age structure of the population in Devetashko Plateau is extremely bad. Aging is very typical for the majority of settlements (maybe except two largest settlements Varbovka and Suhindol, Fig. 7). Although both countries are not fully comparable, the age index in Devetashko Plateau is 0.33 and the dependency index is 1.29 there. Although both countries are not fully comparable (because in Czechia seniors are people in the age of 65 and more, in Bulgaria people 60 and more), the age index in Devetashko Plateau is 0.33 and the dependency index is 1.29 there. For the villages with less than 1,000 inhabitants, the respective data are 0.16 the age index and 1.95 the dependency index. With only one exception (Krushuna, Fig. 8), the numbers of seniors are higher than numbers of people in the productive age.

On the whole, 53% of the population is with lower than secondary education, 34% with secondary and just 7.4% with higher education in 2011. The economic inactive population for 2011 (68.47%) prevail over the economic active part (31.53%). In some settlements, the economic inactive population is over 90%. In the area, relatively high share of culturally different ethnical groups can be found (not taking into account that the ethnical affiliation is of a declaratory character and members of

![Fig. 7. Suhindol: the largest settlement and the seat of a municipality in Devetashko Plateau (Source: Google.com)](image)

![Fig. 8. Krushuna: The core of the village (Source: Google.com)](image)
minorities often tends to declare themselves with the majority): Bulgarians manifest 69.3% of rural population, Turks 24.9% and Roma 2.6% (population census 2011). The village Gorsko Slivovo (Fig. 9) shows the majority of the Turkish population.

A COMPARISON

Population development based on population balances has been compared in both the areas (Fig. 10). In the case of the Moravian Karst and the Devetashko Plateau, a big difference between the two areas can be seen in the recent population development. Whereas rural settlements in Devetashko Plateau lose inhabitants (28% in the period under study), rural settlements in Moravian Karst slowly end equally gain population (by 8% for the same period). The main cause of such a development can be seen in the geographical positions of both areas.

Moravian Karst is situated in the vicinity of the regional capital Brno and the middle-size district town Blansko (population 20,000). Thus some villages are sub-

Fig. 9. Gorsko Slivovo: the village core (Source: Google.com)

Fig. 10. Recent population development in Moravian Karst and Devetashko Plateau (Own elaboration).
Data: National Statistical Office Sofia, Czech Statistical Office Prague
jects of suburbanisation (Fig. 11). However, the population grows also in more dis-
tanced parts of Moravian Karst which are out of the suburbanisation zone. On the
other hand regardless that part of the territory of the Devetashko Plateau is situated
close to the district center Lovech, the city is not able to provide employment and
to keep the population by everyday work trips. The other two district centres Veliko
Tarnovo and Gabrovo, and municipal centre Sevlievo are more distant from the set-
tlements in south and southeast parts of the plateau and they are not able to keep the
population by commuting. Another neighbouring district center Pleven has no rela-
tionships to the study area.

The difference leads to quite opposite set of problems. In the Devetashko Pla-
teau there are several problems: migration of young people to the cities or abroad,
closing schools and pre-school institutions, difficult access to medical cares, high
level of morbidity and death-rate caused by aging, abandoning and self-destroying of
the house fund, limited public transport, difficult administrative services, high level
of criminality (thefts), unemployment, etc.

On the other side, villages in Moravian Karst are losing their rural character,
depend more and more on commuting for jobs, education, services and thus on indi-
vidual and/or public transport.

Fig. 11. Březina in Moravian Karst: a suburbanized part of the village

Fig. 12. Tepava: the smallest village on Devetashko Plateau (Source: Google.com)
The quantitative changes can turn into qualitative ones. When considering the limit of 1,000 inhabitants between middle size and large villages, two of settlements in Moravian Karst have crossed this limit upwards in the last decade. On the contrary, if we consider the limit of 200 inhabitants as a barrier between small and very small villages (Fig. 12), two settlements in Devetashko Plateau crossed this barrier downwards in the same period.

There is another factor, connected with increasing/decreasing population number: level of services. In the market economy, localisation of services depends on the minimum number of customers who are necessary for the effectiveness of the establishment and operation of respective service branches. Increasing number of the population could evoke some service establishment which could attract immigration of additional inhabitants. On the other side, decreasing population number could result in an extinction of certain services and consequently next outmigration.

The share of the population with lower than secondary education is almost the same in both regions. The difference is seen in the share of people with the tertiary education which is in the Czech area higher. The educational structure of inhabitants is an important part of human capital which impacts on the ability to maintain and develop the village and raise funds for it.

The main part of the road network in the territory of Devetashko Plateau is formed by municipal roads of poor quality with the exception of those in Letnitsa municipality. A smaller part belongs to the national road system of the third category. The settlements are served by public bus transport based on the existing road schemes. Neither roads in the territory of Moravian Karst are of an optimum quality. The main difference can be found in the operation of public transport.

**DISCUSSION**

Municipalities in Moravian Karst do not express any depopulation tendencies. The only municipalities which are losing population are the only town Adamov and one of the small villages - Šošůvka. It responds to the general trend of urban – rural migration in Czech Republic. Both the number and share of the Czech rural population slowly but permanently increases. Processes of suburbanisation, counter-urbanisation and naturbanisation prevail over the classical urbanisation, it means mobility of people from the countryside to the cities. It is enabled by a relatively dense network of small and medium-size towns which are mostly well accessible by the developed system of public transport. In such conditions, the people can live in the countryside and work in towns.

The second reason is that the Czech rural population does not depend on agriculture, forestry and other activities of the primary sector. The process of agricultural abandonment which has occurred in western European countries after the WWII was done in Czechia very quickly within the collectivisation in the 1950s and the 1960s. At the end of the 1980s, only about 20% of the rural population was employed in agriculture. Rural areas also displayed a high level of resilience in absorbing a decline of agriculture production and employment through the 1990s, as well as impacts of EU accession in 2004 and related policy changes (Šimon and Bernard, 2016). In general, about 6.5% of rural population is employed in primary industries in Czechia.
by now. In Blansko and its surroundings, it is only 2.7%. So, the economically active people commute mostly to the towns for work and their activities are not dependent on the landscape protection. It is supported by efficiently operating public transport. And of course the southern part of the karst area is directly in the suburbanised area of Brno (and Blansko), so the population increases rapidly there.

In general, the rural population in Moravian Karst is stabilised by the dense network of cities and towns, the dense network of terrestrial communication and efficient and cheap system of public transport. All these factors enable daily commuting of rural people to cities and towns. Czech population is not very familiar with changing of permanent living. The people feel to be connected with their houses, villages, and landscapes. They mostly migrate at the beginning and at the end of their economic active age only. When the landscape is attractive and the municipalities provide good living conditions the people prefer to stay.

The situation in the Bulgarian area is different. The public transport mostly collapsed or has decreased to a very basic level. The people often use shared cars for the transport. The road network is similar to compare it with Czechia but distances are longer. It is necessary to presuppose almost one hour per a trip in Devetashko Plateau, whereas the distances in the Moravian Karst manifest more or less a half. So the daily commuting in the Devetashko Plateau area is not an optimum solution.

The case of Devetashko Plateau shows how the situation looks like when the depopulation is enormous. Original population (probably except the oldest people) emigrate from the area (to cities, other regions or abroad). Their original houses dilapidate and they are available for an extremely low price. Consequently, they are purchased by the unprivileged population. The migration balance is temporarily positive. However, due to the presence of socially deprived people and continually dilapidating housing stock, the area acquires a negative image for possible residents, tourists, entrepreneurs. The process can be hardly stopped. It responds to general trends. In Bulgaria, about 100 villages were completely depopulated during the 1990s. These were villages which economically depended on farming and/or forestry. The significant demographical decline also affected the majority of “Turkish” villages (Mladenov et al., 2008). One of the problems can be connected with a threat that with abandoned villages also their cultural heritage disappears (Filipe and Mascarenhas, 2011). Extreme depopulation and aging can be seen as a characteristic of instability in social systems and could weaken the socio-ecological resilience of landscapes (Moorfeld, 2011).

Aging is a problem in both cases. However, aging in Moravian Karst means a slow increase of the share of seniors and a slow decrease of the share of children. On the other side, aging in Devetashko Plateau shows big shares of seniors which are usually higher than shares of people in the productive age. So, the quality of the feature and its consequences are different. In the first case, it is possible to adapt planning strategies to gradual aging and to develop services and care for seniors as a new prospective branch of local economy. The age group 55 – 65 (young seniors) is very interesting from this viewpoint (Fischer, 2014). When the aging occurs abruptly, use of such strategies is limited.

None direct impact of the regional sensitivity was stated. The facts observed are explained mostly with a geographical position in relation to regional centres, with
relation to general development in the respective countries and with social and historical reasons. Some indirect relation connected with the protection of nature (and thus some limitation of productive economic activities) or with the tourism development in an attractive area can be taken into account. Protected area can be also attractive for the residential function. Of course, it depends on the level and way of the protection. In strictly protected areas (on the level of national parks) may occur to depopulation (Järv et al., 2016) but it is not our case. However, in post-productive societies, natural sensitivity of a territory is usually drowned with social impacts.

It is more or less clear that the aging of the rural population will continue because the long-term demographical development is probably irreversible both in Bulgaria and Czech Republic. Future migration balances are questionable. The mixture of rural-to-urban migration with suburbanisation, counter-urbanisation, and naturalisation can have selective consequences. However, with decreasing role of the productive sector, the attractiveness of the landscape, personal security, and potentially cleaner environment could keep the prevailing urban-to-rural migration in Czechia also in the future. Villages will be endangered by depopulation in few individual cases only – not as a whole.

The prognosis for the Bulgarian case study area is not so optimistic. Dilapidating villages offer neither attractiveness, not the security. Moreover, the drawdown of some settlements was too rapid and too deep. It seems that some of the villages lost their inner development potential. The future will be probably also selective but in the case of Devetashko Plateau only not numerous villages could stop or slow the depopulation. Romero Renau and Valera Rozano (2015) show some possible ways in four strategies or their combinations: deconstruction, reutilisation, reorganisation, and imagination.

CONCLUSIONS

Based on the results gained, let us try to generalise hypothetically which causes can lead to the rural depopulation:

a) General development in the country. When the whole country loses its population, it is very probable that the same concerns its rural areas.

b) Vicinity of a regional metropolis. Such a city offers not only jobs (which could be accessible also in smaller centres) but also a rich cultural and social life, important especially for young and educated people.

c) Stadium of the urbanisation process, especially the proportion between rural-to-urban and urban-to-rural migration.

d) The level of a dependence of rural people on the primary sector of the economy. The high dependence could cause depopulation in relation to the growing productivity in agriculture.

e) Efficiency of transport systems (both individual and public). Highly efficient transport system could minimise some disadvantages of rural life.

f) Ethnic problems? The presence of ethnically different people has been frequently mentioned occurrence. However, let us speculate that neither ethnic, nor racial but cultural differences could lead to the problematic social milieu and thus to the support of some depopulation.
g) Individual circumstances connected with any other natural, historical, economic or social conditions (e.g. insufficient area for territorial expansion, unsuitable political intervention or – on the other hand - a successful business plan).

The mentioned set of conditions of depopulation could serve as starting hypotheses of the next research in different areas and countries.

Acknowledgement

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Fig. 4. Devetashko Plateau (Drawn by E. Tcherkezova)