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MIGRATION TRENDS AND THE CONCEPT OF ECOTOURISM

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Abstract

The paper presents the results of a study of the impact of the population migration in the area of Eastern Serbia (Kladovo, Negotin, Zaječar and Knjaževac municipalities) on the natural potentials for the development of ecotourism. There are over 60 protected, rare, vulnerable or endangered plant and animal species, 7 protected natural resources, a large number of cultural and historical monuments and natural rarities registered in the area. On the other hand, there are certain limiting factors for the development of ecotourism, such as rich but polluted hydrographic network, proximity to Bor mines and transboundary impacts. The most striking features of the area are the demographic emptying of its mountain and hill areas and the migration of the population to their administrative centers. Demographic emptying of the area can be considered as a positive process, as it enables the natural ecosystem restoration and the return of endangered plant and animal species to their natural habitats.

Key Words: *migration, sustainable tourism, ecotourism, development constraints, Eastern Serbia*
JEL classification: *Q24, Q25, R14, Z32*

Introduction

Ecotourism is now defined as `responsible travel to natural areas conserving the environment, improving the well-being of the local people, and educating the tourists`. Ecotourism typically involves travel to destinations where flora, fauna and cultural heritage are the primary attractions (The International Ecotourism Society, 2015).

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In order to develop ecotourism in an area, the area must fulfill the conditions that determine its tourist attractiveness, while the facilities of rural tourism must meet certain criteria. These conditions and criteria are used to determine the potential of an area for the development of ecotourism (favourable climate, unpolluted air, water and soil, absence of noise and vibration, absence of natural disaster risks, preserved nature, preserved architectural and cultural heritage, good road connections, regional cuisine, *etc.*).

Ecotourism, as a sustainable and selective form of tourism, is determined by the adequate protection of natural values, their presentation and evaluation (Ratknić & Braunović, 2015). In line with the above, we studied the recent state of biodiversity and geodiversity of the categories that are most important for the development of ecotourism in the study area. Special focus was put on the limiting factors because eastern Serbia has poorly developed tourist infrastructure. Otherwise, it is ideal for the promotion of ecotourism with its exceptional combination of geomorphologic characteristics, natural contrasts, rich flora and fauna and very low population density.

Natural characteristics

The study area includes the border part of eastern Serbia, *i.e.* the municipalities of Kladovo, Negotin, Zaječar and Knjaževac, covering 3 990 km^2. The topography of this area is characterized by diverse landforms (mountains, river basins, valleys and terraces), which have been formed through complex processes of genesis and evolution (tectonic processes, volcanic eruptions, seas, lakes).

The forest belt stretches along the mountain massifs of Rtanj, Čestobrodica, Južnokučajske planine, Crni Vrh, Stara Planina, Tupižnica, Tresibaba, Miroč, Deli Jovan, Severni Kučaj, Liškovac. The altitude ranges from 28 m a.s.l. (Negotin) to 2,196 m a.s.l (Midžor). The most fertile part is the Negotin Plain, which covers an area of 260 km^2 at an altitude of 37 m. It is suitable for all agricultural crops as well as for irrigation (close to the Danube and other smaller streams). Negotin is a municipality with an extraordinarily large share of arable agricultural land. Its total area of agricultural land amounts to 70,341 ha, which is 64.5% of the total area. About 25,000 ha of this area is cultivated. ("Official Gazette of Negotin Municipality", 2015). The municipality of Zaječar is crossed by the rivers of Crni Timok (The Black Timok) and

Beli Timok (The White Timok), which merge to form The Veliki Timok (The Great Timok) and make the backbone of the hydrographic network of this region. The Timok River basin is of great importance because of its fertile valley which is suitable for agriculture.

According to its geographical position, the area of eastern Serbia belongs to the continental climate zone with pronounced temperature extremes, rainfall variations and its unfavourable distribution during the year (Table 1). The mean annual temperature ranges from 10.4°C (Knjaževac) to 11.9°C (Negotin), and the annual rainfall from 579 mm (Zaječar) to 630 mm (Negotin). May and June are the wettest months in all municipalities. Because of its extremely low altitude, Negotin has a specific climate with very warm summers (265 sunny days) but cold and harsh winters. The municipality of Knjaževac has a semi-arid continental climate type with hot and dry summers and cold winters.

Table 1: *Climate characteristics*

Municipality	Climate type	Mean annual	
		Temperatures (^{0}C)	Precipitation (mm)
Knjaževac	semi-arid continental	10.4	599
Negotin	humid continental	11.9	630
Kladovo	humid continental	11.3	560
Zaječar	humid continental	11.1	579

Source: *Authors*

A developed hydrographic network is made of the catchment areas of The Trgoviški Timok, The Svrljiški Timok, The Crni Timok, The Beli Timok, The Veliki Timok, and the Danube Basin. The Trgoviški Timok River is formed by the confluence of several rivers. It starts as The Strmna River at about 1,200 m above sea level in the northern part of Stara Planina (The Balkan Mountain Range). Upstream, its right tributaries are The Crnovrška River with The Debeštička River, The Janjska River and The Golaška River which strongly dissect this part of the terrain. The left tributaries of The Strmna River are numerous unnamed streams of relatively short flows and deep and narrow riverbeds. The second branch of The Trgoviški Timok stream is The Stanjanska River.

In the village of Izvor, The Izvorska River flows into it from the left side and together they form the upper stream of The Trgoviški Timok. In the

village of Kalna, The Trgoviški Timok cuts through the surface to make a gorge at the point where The Brezova River with The Mala River and The Papratna River with The Repušnička River flow into it from the east side. Downstream from Knjaževac, The Žukovska River with The Dejanovačka, The Aldinska and The Leva streamlets and their smaller tributaries join them. Near the confluence, The Balinačka and Štitarska Rivers with their smaller streams flow into The Žukovska River. All the water collected on the slopes of Stara Planina are carried by The Trgoviški Timok until it merges with The Svrljiški Timok and starts The Beli Timok watercourse, which flows through the lowest part of the Knjaževac Basin.

The Beli Timok tributaries are The Znička River, The Jelašnička River, The Jakovačka River, The Vitkovačka River, The Selačka River and The Bela River, whose sources are near the border with Bulgaria. From the western side, it has The Volevačka River with The Žubetinska River and its tributaries - The Gradna and Pavlovačka Streamlets and The Sokolovačka River with The Bučanska Streamlet as its tributaries. The Manjinačka River "carries" water from the southern part of Tupižnica Mountain. Watercourses named after the villages flow through the villages of Debelica, Trnovac and Vrbice and accumulate waters of the eastern slopes of Tupižnica Mountain before they flow into The Beli Timok. In the area of Vratarnica Gorge, The Beli Timok receives The Šaska River from the east and The Zagrađska River from the west. Below the gorge, the Grliška River flows from the west and with a number of small and large tributaries joins The Beli Timok, as well as The Lubnička River. The Beli Timok meets The Crni Timok above Zaječar forming the main course of The Veliki Timok.

Artificial (accumulating) lakes in this area are Grliško Lake, Rgotsko Lake and Sovinac Lake. Grliško and Sovinac Lakes serve for water supplying purposes.

Hot springs include Gamzigradska Banja (hot mineral springs with a modern spa health resort), Nikoličeva and Rgoška Banja (a number of springs that emerge on a water producing fault 800 m in length). Rgoška Banja is a spa located on the bank of The Svrljiški Timok, 5km southwest of Knjaževac. It has been known since ancient times, which is evidenced by the remains of a Roman bath.

The map of land use was the basis for the assessment of the share of non-productive (man-made) areas, productive areas and water basins (Table 2). In the category of productive areas, the share of forests and semi-natural habitats ranges from 34.4% in the municipality of Zaječar to 64.1% in the municipality of Knjaževac, while the share of agricultural area ranges from 34.9% in the municipality of Knjaževac to 63% in the municipality of Zaječar. The high share of forest and agricultural ecosystems is an important indicator of the ecotourism potential. Furthermore, Knjaževac and Negotin vineyards are also valuable. 'According to the 2012 Census, there are 1076.47 hectares of vineyards in the Knjaževac region (about 1033.37 ha or 95.55% of which are fertile vineyards) with 118.23 ha of stone grape varieties and 958.24 ha of wine grape varieties. There are 978.04 hectares of vineyards in the Negotin Krajina region (about 955.83 ha or 97.73% of which are fertile vineyards), with 87.92 ha of table grape varietis and 890.12 ha of wine grape varieties' (Ivanišević et al., 2015).

Table 2: *CORINE land use*

CORINE land use	Zaječar		Knjaževac		Negotin		Kladovo	
	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
Man-made areas	2730.0	2.5	625.2	0.5	2844.9	2.6	1550.3	2.5
Agricultural land	67310.9	63.0	42194.5	34.9	66271.3	60.9	26789.8	42.5
Forests and semi natural areas	36749.5	34.4	77380.3	64.1	39560.7	36.3	29895.2	47.5
Wet habitat	0.0	0.0	0.0	0.0	223.0	0.2	99.2	0.2
Water basins	109.6	0.1	0.0	0.0	0.0	0.0	4665.5	7.4
Total	106900.0	100.0	120200.0	100.0	108900.0	100.0	63000.0	100.0

Source: *Authors*

Protected natural areas

`Stara Planina` Nature Park was protected by the Decision of the Government of RS No. 110-1307 / 97 of 18 April 1997. The area of the Nature Park is 142,219.64 ha. The position of Stara Planina in the center of the Mesian floristic province, the diversity of its bedrock, soil and terrain and the altitude have contributed to the diversity of flora and vegetation of this mountain. From the lowest point of the Nature Park (about 300 m above sea level) to the highest peak of Midžor (2,169 m

above sea level) there are seven vegetation belts. Its vegetation richness is reflected in the diversity of forest, shrub, meadow, pasture and peatland communities within strict nature reserves and natural monuments. The Nature Park has protection regimes of 1st, 2nd and 3rd degrees. The first-degree protection regime prohibits the use of natural resources and restricts activities to scientific research and educational purposes. The second-degree protection regime allows the selective and limited use of natural resources and controlled interventions and activities in the area provided that they are in line with the functions of the protected natural area or that they are related to traditional forms of economic activities and housing, including tourism. All the remaining areas are under the third-degree protection regime.

`Golema Reka` was declared nature reserve in 1981 (`Official Gazette of SRS `, No. 50/75) with a total area of 34.60 ha. The reserve belongs to the Golema Reka Basin, at an altitude of 1,250-1,350 m. on a steep terrain. The boundaries of the reserve include the forest community of mountain beech (*Luzilo – Fagetum serbicum* Misic at Popović 1954.). This virgin forest community is native to Stara Planina. It occurs in patches (as small stands in the oak zone) on its western, southwestern and northeastern slopes, at an inclination of 20^0- 40^0.

`Draganište` was declared nature reserve in 1981 (`Official Gazette of SRS`, No. 50/75). The area of the reserve is 112.03 ha within the altitude zone of the subalpine spruce on Stara Planina (1,200 - 1,800 m above sea level). Babin Zub peak was proclaimed natural monument in 1981 (`Official Gazette of SRS`, No. 50/75) as a monument of geomorphological character. It covers an area of 44 ha at an altitude between 1,710 and 1,758 m.

Depending on the meso and micro topography and microclimate conditions of the locality as well as its other site conditions, it has developed a complex, diverse and unique mosaic of meso and micro vegetation types including mountain pasture communities (*Hygronardetum, Coccineo – Dechampsietum, Deshampsietum subalpinum, carici – Sphagno – Eriophoretum. Nardetum strictae),* shrub communities (*Vaccinio – Juniperetum nanae*) and a belt of broadleaved forests *(Fagetum montanum* and *Fagetum subalpinum serbicum).*

`Bukovo` Reserve is a mixed stand of beech, sessile oak, hornbeam, common ash, mountain elm, linden, field maple, etc. It was protected by

the former Institute for Protection and Scientific Research in Natural Rarities of the People's Republic of Serbia of 26 July 1961 (`Official Gazette of the NRS`, No. 46/91) and covers an area of about 10 ha.

The Canyon of The Vratna River with three gates was proclaimed natural good of geomorphological character by the Decision of the former Institute for Protection and Scientific Research in Natural Rarities of the People's Republic of Serbia No. 274 of 20 June 1957. `Near the Vratna Monastery, on a clear mountain river suitable for fishing, there are huge stone gates, which nature made without a chisel or a hammer`.

The first gate is called Veliki Prerast, the second is Mali Prerast, and the third is Suvi Prerast. The whole complex of the Vratna, including a village, a monastery and the gates, is surrounded by rivers and forests. These `nature jewels` are only thirty kilometers away from Negotin. http://www.negotin.rs/turizam.htm

The Canyon of The Zamna River with a stone arch was proclaimed protected natural good of geomorphological character by the Decision of the former Institute for Protection and Scientific Research in Natural Rarities of the People's Republic of Serbia No. 275 of June 20, 1957.

Stevan meadows are located at the foot of Deli Jovan Mountain, at an altitude of 480 meters. Its natural and climate conditions make them one of the most famous air climate spas of Serbia. Nature lovers have marked hiking trails leading to the top of Deli Jovan mountain.

8. Part of the National Park Djerdap

Protected, rare, vulnerable and endangered species

Rare, vulnerable and endangered species include 12 species of ground flora, 41 species of mammals, reptiles and birds, 5 species of trees and 2 species of fungi (Table 3).

The group of meadow vegetation consists of a large number of medicinal herbs (artemisia, belladona, yarrow, chamomile, centaury, St John's wort). Rural areas have a tradition of collecting these raw materials but they lack processing capacity (Ratknić & Milovanović, 2016).

Table 3: *Protected, rare, vulnerable and endangered species*

Data on species			
Latin name	Common name	Latin name	Common name
Allium ursinum L.	The ramsons	*Lepus europaeus*	The European hare
Apodemus uralensis	The pygmy field mouse	*Martes foina*	The beech marten
Asarum europaeum L.	The asarabacca	*Meles meles*	The European badger
Betula pendula	The birch	*Mustela nivalis*	The least weasel
Boletus edulis Bull.	The penny bun	*Myotis myotis*	The greater mouse-eared bat
Bubo bubo	The Eurasian eagle-owl	*Natrix natrix*	The grass snake
Canis aureus	The golden jackal	*Onthophagus (Furconthophagus) furcatus*	The dung beetle
Canis lupus	The wolf	*Oreopteris limbosperma*	The mountain fern
Cantharellus cibarius Fr.	The chanterelles	*Otus scops*	The Eurasian scops owl
Capreolus capreolus	The roe deer	*Pieris brassicae*	The cabbage butterfly
Cervus elaphus	The red deer	*Rosa canina* L.	The dog rose
Columba palumbus	The common wood pigeon	*Rubus fruticosus* L.	The European blackberry
Cornus mas L.	The cornelian cherry dogwood	*Rubus idaeus* L.	The red raspberry
Corvus corax	The common raven	*Salamandra atra*	The salamander
Corylus colurna L.	The Turkish hazel	*Salamandra salamandra*	The fire salamander
Crataegus monogyna	The common hawthorn	*Sciurus vulgaris*	The red squirrel
Cuculus canorus	The common cuckoo	*Sorex alpinus*	The alpine shrew
Darevskia praticola	The wall lizard	*Strix aluco*	The tawny owl
Dendrocopos major	The great spotted woodpecker	*Sus scrofa*	The wild boar
Dendrocopos medius	The middle spotted woodpecker	*Testudo hermanni*	Hermann's tortoise
Dendrocopos minor	The lesser spotted woodpecker	*Thymus serpyllum* L.	Breckland thyme
Dryomys nitedula	The forest dormouse	*Tilia tomentosa*	The silver linden
Erinaceus roumanicus	The northern white-breasted hedgehog	*Turdus merula*	The common blackbird
Felis silvestris	The wildcat	*Tyto alba*	The western barn owl
Fragaria vesca L.	The wild strawberry	*Upupa epops*	The Eurasian hoopoe
Garrulus glandarius	The Eurasian jay	*Vipera ammodytes*	The horned viper
Helix lucorum	The land snail	*Vipera beru*	The common European adder
Hypericum maculatum	The imperforate St John's-wort	*Vulpes vulpes*	The red fox
Ilex aquifolium L.	The common holly	*Zamenis longissimus*	The Aesculapian snake

Source: *Authors*

Socio-demographic characteristics

The basic demographic characteristic is the existence of the areas of demographic rise (cities) and the areas of demographic decline (most rural settlements). The uneven distribution of population has been caused by the migrations from rural areas to administrative centers (Table 4).

Table 4: *Population and population density by municipalities*

Category	Population							
	1948	1953	1961	1971	1981	1991	2002	2011
Knjaževac								
Urban	4862	5906	7448	11249	16665	19705	19351	18404
Rural	56698	56067	51997	40761	32124	24331	17821	13087
	61560	61973	59445	52010	48789	44036	37172	31491
Negotin								
Urban	6143	6982	8635	11166	15311	17355	17758	16882
Rural	57304	57376	56774	52540	48662	42204	25660	20174
Total	63447	64358	65409	63706	63973	59559	43418	37056
Kladovo								
Urban	3867	4019	4484	8625	10024	11183	10218	9729
Rural	22294	23773	23733	24548	23352	20698	13395	10906
Total	26161	27792	28217	33173	33376	31881	23613	20635
Zaječar								
Urban	11861	14489	18690	27599	36958	39625	39491	38165
Rural	51026	50418	49926	45548	39723	33138	26478	21296
Total	62887	64907	68616	73147	76681	72763	65969	59461
Study area								
Urban	26733	31396	39257	58639	78958	87868	86818	83180
Rural	187322	187634	182430	163397	143861	120371	83354	65463
Total	214055	219030	221687	222036	222819	208239	170172	148643
Population density (inhabitants/km^2)								
Knjaževac	51.2	51.6	49.5	43.3	40.6	36.6	30.9	26.2
Negotin	58.3	59.1	60.1	58.5	58.7	54.7	39.9	34.0
Kladovo	41.5	44.1	44.8	52.7	53.0	50.6	37.5	32.8
Zaječar	58.8	60.7	64.2	68.4	71.7	68.1	61.7	55.6
Average	52.5	53.9	54.7	55.7	56.0	52.5	42.5	37.2

Source: *Statistical Office of the Republic of Serbia, 2014a*

The trends of population, household population and population density were analyzed according to the Censuses of 1948, 1953, 1961, 1971, 1981, 1991, 2002 and 2011 (Braunović & Perović, 2017). The 2002 census is not fully comparable to previous Censuses. The Censuses of

1971, 1981 and 1991 included not only the population living in the country as permanent residents but also the population temporarily working abroad and their family members living with them. The population analysis was based on data for 4 municipalities: Knjaževac 86 settlements, Negotin 36 settlements, Kladovo 23 and Zaječar 42 settlements. Data were collected and analyzed for 187 settlements. Compared to 1948, the population decreased by 69% in 2011 and the biggest changes occurred in the municipalities of Knjaževac and Negotin. A decrease in the total population was followed by an increase in the urban population and in the number of urban households at the expense of the number of rural people. This process is most noticeable in the municipality of Zaječar. Regarding the study area, there has been a triple increase in the number of urban households. On the other hand, rural households have almost halved.

Table 5: *Comparative overview of the number of households*

Category	Number of households							
	1948	1953	1961	1971	1981	1991	2002	2011
Knjaževac								
Urban	1667	1901	2353	3650	5179	5854	6268	6168
Rural	12226	12328	12391	10962	9814	8451	7114	5404
Total	13893	14229	14744	14612	14993	14305	13382	11572
Negotin								
Urban	2074	2291	2874	3767	5075	5630	6212	6240
Rural	13180	13087	13505	12763	11946	10731	8989	7666
Total	15254	15378	16379	16530	17021	16361	15201	13906
Kladovo								
Urban	1030	1093	1255	2760	3108	3499	3575	3594
Rural	4749	4996	5348	6041	5601	5208	4722	4151
Total	5779	6089	6603	8801	8709	8707	8297	7745
Zaječar								
Urban	4261	4913	6118	9119	11955	12666	13733	13441
Rural	12131	12160	12525	11991	11074	9856	8974	7590
Total	16392	17073	18643	21110	23029	22522	22707	21031
Study area								
Urban	9032	10198	12600	19296	25317	27649	29788	29443
Rural	42286	42571	43769	41757	38435	34246	29799	24811
Total	51318	52769	56369	61053	63752	61895	59587	54254

Source: *Statistical Office of the Republic of Serbia, 2014b*

Table 5 shows a comparative overview of the number of households according to the Censuses from 1948 to 2011 by municipalities. The

municipalities of Knjaževac, Negotin and Zaječar had the largest number of households in the 1981 census, and then it decreased in all municipalities. In the municipality of Kladovo, the number of households has been in a constant decline since 1971.

The analysis of the presented data shows a decline in the population and in the number of households since 1971 in all municipalities, with an exception of urban settlements that had increasing population until 1991, and since then, there has been a slight decline.

Out of a total of 187 analyzed cadastral municipalities, the largest number of settlements are in the altitude zone from 101 to 300 m (68 settlements), then in the zone of 301-500 m (46 settlements) and in the zone below 100 m (37 settlements). The highest concentration of settlements is in the zone below 500 m (151 settlements). Accordingly, this altitude zone has the highest concentration of population (Table 6).

The altitude in the municipality of Knjaževac ranges from 177 to 1126 m a.s.l. The largest share of settlements are at altitudes between 300 and 500 m, and the smallest share of them are over 1000 m. According to the 2011 Census, there are 3 inhabitants in the settlement of Tatrasnica (1126 m above sea level), while Repušnica village (956 m) hasn`t been populated in the last decade.

Table 6: *Number of settlements by altitude zones and municipalities*

Altitude zone m a.s.l.	Knjaževac		Negotin		Kladovo		Zaječar	
	Number of settlements	%	Number of settlements	%	Number of settlements	%	Number of settlements	%
below 100			16	44	20	87	1	2
101-300	17	20	16	44	3	13	32	76
301-500	35	41	3	9			8	21
501-700	26	30	1	3				
701-1000	7	8						
> 1001	1	1					1	1
Total	86	100	36	100	23	100	42	100

Source: *Authors*

The town of Negotin and 35 settlements in the municipality are located mostly below 300 meters above sea level (32 settlements), 16 below 100 m and 16 from 101 to 300 m. Their altitudes range from 44 m to 758 m. In the municipality of Kladovo, 87% of settlements are located in the

zone below 100 m a.s.l and 3 settlements in the zone from 101 to 300 m. In the municipality of Zaječar the settlements are located in the range between 94 and 1158 meters above sea level. Out of 42 settlements, 33 are in the zone below 300 m a.s.l., 9 in the zone of 300-400 m a.s.l. and one settlement above 1000 m a.s.l. (Braunović et al., 2017).

Table 7: *Settlements by category of population*

Category	1948	1953	1961	1971	1981	1991	2002	2011
	Number of settlements							
Municipality of Knjaževac								
no inhabitants							1	1
1 to 10 inhabitants						1	2	5
11 to 20 inhabitants					1	1	3	7
21 to 50 inhabitants					2	7	10	9
51 to 100 inhabitants				1	9	11	13	23
101-300 inhabitants	12	13	14	30	26	34	37	33
301-500 inhabitants	25	25	23	17	23	20	14	4
501-1000 inhabitants	33	31	35	34	21	9	4	2
> 1000 inhabitants	16	17	14	4	4	3	2	2
Total	86	86	86	86	86	86	86	86
Municipality of Negotin								
301-500 inhabitants			2	3	3	7	15	22
501-1000 inhabitants	11	11	11	10	12	13	14	8
> 1000 inhabitants	25	25	23	23	21	15	7	6
Total	36	36	36	36	36	36	36	36
Municipality of Klatovo								
101-300 inhabitants	2	2	1	1	1	3	6	7
301-500 inhabitants	1	1	2	1	3	2	2	2
501-1000 inhabitants	9	8	8	6	7	6	9	13
> 1000 inhabitants	11	12	12	15	12	12	6	1
Total	23	23	23	23	23	23	23	23
Municipality of Zaječar								
101-300 inhabitants	2	2	2	2	3	6	12	20
301-500 inhabitants	1	1	3	4	7	11	12	8
501-1000 inhabitants	13	15	14	18	18	12	8	8
> 1000 inhabitants	26	24	23	18	14	13	10	6
Total	42	42	42	42	42	42	42	42

Source: *Authors*

The number of settlements by population categories (settlement size) is shown in Table 7. The analysis shows a decreasing tendency in the population and in the number of large settlements (with the population of

300), while at the same time there is an increase the number of settlements with the population below 300 (particularly the settlements with the population below 100). The total population of the settlements with the population below 100 increases along with the number of settlements of this size. The number of settlements with the population over 1000 was reduced in the period from 1953 to 2011 from 78 to only 15. According to the altitude zones, the number of settlements in them and the changes in the population numbers, the following areas can be distinguished:

1. The area with positive demographic development (the zone below 300 m a.s.l.) and constantly the highest concentration of population.
2. The area with variable (positive and negative) demographic development (the zone of 300-500 m a.s.l.).
3. The rural area with negative tendencies of demographic development and the pronounced depopulation processes (above 500 m a.s.l.).

The changes in the population and its structure in the hill and mountain areas have brought about the changes in the land use patterns (Braunović & Ratknić, 2012). The most important change affecting the development of ecotourism has been the abandonment of agricultural areas at greater slope inclinations, which has contributed to the stabilization of soil and vegetation cover and natural restoration of vegetation on abandoned fields, meadows and pastures. Furthermore, the level of environmental pollution and the number of pollutants have been reduced.

Table 8: *Population in the altitude zone of 701-1000 m*

Knjaževac Municipality	Altitude	Population by Census years							
		1948	1953	1961	1971	1981	1991	2002	2011
Aldina Reka	941	315	332	396	184	35	20	12	1
Banjski Orešac	701	356	350	323	311	247	154	96	66
Crni Vrh	893	1325	1303	1243	805	383	225	133	91
Ravno Bučje	994	521	436	349	218	85	40	28	15
Repušnica	956	369	333	297	149	12	6	-	-
Stanjinac	752	762	707	614	506	289	156	95	53
Tatrasnica	1126	820	724	435	102	45	21	5	3
Total		4893	4607	4059	2629	1407	846	541	343

Source: *Authors*

This is confirmed by the fact that the population in the zone of 701 to 1000 m a.s.l. has been drastically reduced and a great number of settlements in that altitude zone have been abandoned. All the settlements

in this zone belong to the municipality of Knjaževac. According to the 1948 Census, there were 4893 inhabitants. According to the Censuses of 1953 and 1963, these settlements recorded a slight decrease in the number of inhabitants, and since 1971 their population has been falling sharply. The last Census (2011) registered only 343 inhabitants (Table 8).

The share of agricultural population

In the study area, 28.2% of the total population is engaged in agriculture. In the municipality of Knjaževac, according to the official data of the Census of Agriculture (Statistical Office of the Republic of Serbia, 2012), 4,959 agricultural holdings use agricultural land and 11,151 inhabitants (35.4%) are engaged in agriculture. In the municipality of Kladovo, 2,132 households use agricultural land. In Kladovo there are 4,883 people working in agriculture (23.7%). In the town of Zaječar, 6,124 households use agricultural land, while 15,113 inhabitants (25.4%) are engaged in agriculture. In Negotin municipality, 4.658 households use agricultural land, while 10,809 inhabitants are engaged in agriculture (29.2%). The largest number of households are family households (99.5%), and the rest are legal entities. Most of them have arable fields and farm plots, i.e. they most commonly grow grain corn, wheat and spelt. The largest number of households raise different combinations of crops and cattle. There is a significant share of households that grow vine (municipalities of Negotin, Zaječar and Knjaževac).

Cultural heritage

Trajan`s plaque, Trajan`s bridge (the remains of a bridge of the Pontes fortress located in the village of Kostol, 5 km downstream of Kladovo), Diana Zanes, a fortress built on a high bank of the Danube (in the village of Sip), remains of Rtkovo – Glamija fortress about 3 km downstream of the village of Rtkova (the most prominent point to the Romanian border, and thus very important in the defense of the fortress), Fetislam fortress built in 1524, the `Pena` and `Varnica` balloon stations at Djerdap - the former system of six signaling balloon stations on both banks of the Danube, which were used to regulate the river traffic (today they are part of monumental Infrastructure Heritage), St. George's Church in Kladovo built in 1735, Monastery of St. Trinity in Manastirica, The Archaeological Museum of Djerdap are only some of the monuments in this area. Pimnice are unique complexes dedicated to vine growing and wine production. Whole villages in Negotin are turned into wineries. There

used to be wineries in all settlements around the Timok River, but they are now preserved in the villages of Rajac, Rogljevo, Smedovac and Štubik. Most of them were built in the 19th and early 20th centuries, but it is thought that some wineries existed in the 18th century.

Restrictions on the development of ecotourism

Unfavourable demographic trends (reduction in the natural increase rate, population migration to urban centers, demographic emptying, depopulation, change in the population age structure, unfavorable spatial distribution) and inadequate financial support of the state have hampered the development of this type of tourism. Land use analysis shows that the `waste disposal` category is not registered in this area. According to the Census of Agriculture 2012, about 60% of the total number of households do not dispose of the waste such as oil, plastics or packaging on the designated dumping places, but `somewhere else` (Table 9). These substances directly endanger ecosystems, soil and watercourses, thus making the method of disposing waste from agricultural holdings a limiting factor for the development of ecotourism.

Table 9: *Waste disposal methods in the study area*

Municipality	Kladovo			Negotin			Zaječar			Knjaževac		
	1	2	3	1	2	3	1	2	3	1	2	3
Oil	277	320	995	143	1186	2300	320	1239	2576	349	707	1667
Plastics	995	225	433	348	1627	1933	962	1647	2183	752	866	1509
Rubber	320	324	806	219	1508	1828	366	1499	2272	307	624	1552
Plant protection product packaging	635	266	760	320	1532	1763	609	1474	2732	568	832	1980
Veterinary helthcare packaging	488	251	765	188	1158	1479	310	1205	2387	411	532	1320
Other waste	378	396	1024	175	1868	2134	495	1800	3348	406	1147	2986

Legend: 1. By the communal utility service; 2. By households on designating dumping sites; 3. Other methods.

Source: *Statistical Office of the Republic of Serbia, 2012*

There is a Regional Waste Management Plan and Agreement on Joint Waste Management between the Local Self-Government Units of Zaječar, Bor, Negotin, Kladovo, Knjaževac, Boljevac and Majdanpek, which set goals and tasks related to municipal waste management, financing of

preparatory activities and construction of a joint regional center for the management of municipal waste at `Halovo` landfill (the city of Zaječar). Its construction has not been realized yet.

Conclusions

The analyzed part of eastern Serbia is a natural, cultural and spiritual treasure which completely fulfills the prerequisite of ecotourism - to see, feel and enjoy the richness of natural resources and cultural and historical heritage. The natural attractiveness of the rural areas in the investigated area, their preserved state and cultural and historical heritage make an essential and important requirement for the development of tourism, but it is not enough. A number of negative factors such as inadequate road network connectivity in rural areas, lack of tourist tradition, bad communal infrastructure, spatial and demographic imbalance in the network of settlements, pronounced depopulation and demographic decline of rural settlements above 500 m above sea level etc. disturb the ecological and sociocultural aspects of sustainable ecotourism.

Demographic emptying of areas above 500 m can also be considered to be a positive process. Apart from enabling the natural restoration of ecosystems and return of endangered plant and animal species to their natural habitats, it has reduced the pressure on forest ecosystems and the number of pollutants of soil and rich hydrographic network.

Sustainable tourism (which includes ecostourism) is the most important factor in the development of the rural part of the investigated area. The rural environment plays an important role in the protection of bio-, geo- and landscape diversity. In this way, its role is not only the production of healthy food or the provision of recreation and holiday facilities but also the provision of new job prospects and increased sustainability of rural areas.

Recognition of the restrictions on the development of ecotourism should help the local community become aware of the black spots that can prevent its development in this area.

References

1. Braunović, S., Ratknić, M. (2012). The Change of Land Use - Impact on the Distribution And Intensity of Water Erosion in the Watershed.

International Conference on water, climate and environment BALWOIS 2012, Ohrid, The Republic of Macedonia.

2. Braunović, S., Ratknić, M., Rakonjac, Lj. (2017). Analiza uticaja antropogenog faktora na promenu intenziteta erozije, *Časopis Ecologica*. Vol.24, Broj 87, Pp: 578-583.

3. Braunović, S., Perović, V. (2017). Soil Erosion, Changes of Land Use And Migration Trends - Impact on Tourism Development. *The Second International Scientific Conference Tourism in Function of Development of the Republic of Serbia - Tourism product as a Factor of Competitiveness of the Serbian Economy and Experiences of Other countries*, Thematic proceedings II, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, pp. 306-323.

4. Ivanišević, D., Jakšić, D., Kor, N. (2015). *Vinogradarski atlas*. Census of Agriculture 2012. Agriculture in The Republic of Serbia, Statistical Office of the Republic of Serbia, http://webrzs.stat.gov.rs/WebSite/repository/documents/00/01/69/22/Vinogradarski_atlas.pdf, (9 March 2018).

5. Official Gazette of Negotin Municipality, 6/2015, http://www.negotin.rs/turizam.htm, (14 March 2018) .

6. Ratknić, M., Braunović, S. (2013). Migration movement in the area of Grdelička klisura and concept of bioregionalism. *International Scientific Conference `Sustainable Agriculture and Rural Development in Terms of The Republic of Serbia Strategic Goals Realization Within The Danube Region – achieving regional competitiveness`*, Topola, Thematic Proceedings, 1007-1024.

7. Ratknić, M., Braunović, S. (2015). Sustainable tourism and forest fires. *International Scientific Conference `Sustainable Agriculture and Rural Development in Terms of The Republic of Serbia Strategic Goals Realization Within The Danube Region- Regional Specificity`*, Belgrade, Thematic Proceedings, 622-639.

8. Ratknić, T., Milovanović, J. (2016). Medicinal Herbs As Part Of The Development Of Sustainable Tourism In Nature Park `Stara Planina`, *Economics of Agriculture*, vol. , no. 3, pp. 847 – 859.

9. Statistical Office of the Republic of Serbia (2012). *Census of Agriculture 2012, Census results (by settlements),* http://popispoljoprivrede.stat.rs/?page_id=6221&lang=cir, (14 March 2018) .

10. Statistical Office of the Republic of Serbia (2014a). *Book 20: Comparative Overview of the Number of Population by 1948, 1953, 1961, 1971, 1981, 1991, 2002 and 2011 Censuses - data by settlements*.

11. Statistical Office of the Republic of Serbia (2014b). *Book 21: Comparative Overview of the Number of Households by 1948 – 2011 Censuses and Dwellings by 1971 – 2011 Censuses.*

12. The International Ecotourism Society (2015). *What is ecotourism*, http://www.ecotourism.org/what-is-ecotourism, (14 March 2018).