

**PRESENTS AND FUTURES OF LOCAL AND REGIONAL DEVELOPMENT.  
MULTI-LEVEL INTERDISCIPLINARY APPROACHES WITHIN  
INTERNATIONAL CONTEXT**

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Local and regional development is an important topic for both academics and decision makers which, through interdisciplinary and transdisciplinary approaches, enables the connection between science and practice. The variety of issues worldwide (e.g. territorial disparities and competition, post-communism and transition, governance and spatial planning) respond to significant social and economic concerns such as: the improvement of living conditions, decentralisation, inequalities and inequities, intensifying environmental pressures (Pike *et al.*, 2011, Rodríguez-Pose, Hardy, 2015). When addressed at multiple spatial levels, these topics are capable of revealing specific processes and patterns induced by the scale and particularity of the territory. As a consequence, local and regional contexts continue to matter in shaping both patterns of development and the variety of policy responses (Pike *et al.*, 2017).

In view of it, the **International Geographical Union's (IGU) Commission on Local and Regional Development** provides an international forum of scholars aimed at advancing research, scholarship and knowledge in a variety of domains concerning local and regional development: reorganization of space, local development in the urban and rural space, and the role of institutions and agencies in developing and reshaping the settled space (<http://igu-clrd.igipz.pan.pl/home.html>).

In 2017, a *Thematic Conference on Land Use/Cover Changes, Biodiversity, Health and Environment, Local and Regional Development* gathering four commissions of the IGU – Land Use and Cover Change, Local and Regional Development, Biogeography and Biodiversity and Health and the Environment – took place in Bucharest and in Tulcea. The event was organized jointly by the Institute of Geography, Romanian Academy and the Faculty of Geography, University of Bucharest. A large number of participants, including prominent IGU members, were present. The Conference gathered representatives of science and practice involved in various research disciplines who, during subsequent sessions, presented their researches on issues such as: ecosystems, global environmental changes and socio-economic developmental challenges, and discussed jointly matters regarding the relationships between society and the environment.

This volume contains selected papers presented during the Conference within the IGU Commission on Local and Regional Development. The articles focus on the following topics: identification of local development factors with particular emphasis on demographic and settlement factors, spatial development inequalities in suburban areas, regional development potentials and barriers, the role of local authorities in the development of marginal areas, spatial relations and communication accessibility, environmental protection and extreme phenomena, the issue of ethnic minorities within a local context. A particularly valuable outcome is that the considerations presented pertain to a broad variety of areas and topics, including such countries as Bosnia and Herzegovina, Indonesia, Italy, Romania and Serbia.

In the first two papers, particular attention is paid to the development potential of the Danube Valley, a key topic of the EU Strategy for the Danube Region (EUSDR), applied to two Danube countries: Romania and Serbia. *Mitrică et al.* identify the disparities in the territorial cohesion of the Romanian Danube Valley in terms of life, environmental and social quality based on a set of statistical socio-economic indicators through a Territorial Cohesion Index. *Milanković et al.* provide an analysis

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of the development potential of the Serbian Lower Danube Sector using an indicator-based approach completed by a SWOT analysis in order to highlight the main potentials and constraints of the region towards future economic growth.

The third paper addresses the regional disparities in the urban sprawl phenomenon in Romania after 1990 (the post-communist period) based on CORINE Land Cover database. In this study, *Grigorescu et al.* try to identify specific intra- and inter-regional differences (at NUTS 2 level) in relation to the spatial and functional patterns of built-up areas expansion and socio-economic transformations.

In the fourth paper, *Cavuta et al.* provide an integrated assessment of Abruzzo Region based on the dichotomy between vulnerability (geomorphological processes) and environmental protection (extended area under protection), essential in understanding the resilience and coping capacity of a territory. Through this two-faced assessment, the authors combined the spatial distribution of environmental hazards with the protected area in order to evaluate the effectiveness of territorial policies in supporting sustainable territorial development.

*Nurković* presents a research on the rural development of Bosnia and Herzegovina under the influence of local policies and socio-economic conditions with special focus on the demographic changes, agriculture and infrastructure. The author also identifies some significant development perspectives of the rural space in its transition from a predominantly agricultural-based to a multi-functional one.

In *Đukićin Vučković et al.*, the authors discuss the socio-economic characteristics as limiting factors of regional development in Kolubara District, Serbia. The assessment combines two distinctive parts, one dealing with the socio-economic characteristics based on statistical data (quantitative assessment) and the other presenting the perception of the local population of the socio-economic changes (qualitative assessment). The results enabled the authors to identify the main limiting factors of regional development (e.g. population aging, migration), as well as the awareness of local communities.

The next two papers focus on the Dobrogea Region (Romania) from two distinctive perspectives: ethnical minorities and spatial connectivity. *Damian and Săgeată*, analyse the ethnical minority communities after 1990 focusing on the structure, evolution and territorial distribution at different territorial levels in relation to the socio-political transformations and the increasing globalizing fluxes. An Ethnical Diversity Index is calculated in order to highlight the spatial pattern of the Dobrogean inter-ethnical model. *Zaharia and Taloş* have evaluated the spatial connectivity degree of the settlements network using GIS-based statistical modelling and computation of the connectivity indicators. The obtained results allowed the authors to identify the spatial distribution of the overall connectivity indicator, as well as the role of the regional transportation network in the process of the economic development of Dobrogea settlements.

In the last paper, *Nurlambang* is proposing a method to assess the effectiveness of decentralization in Indonesia. The author is measuring the decentralization process and quantifies the resulted changes using some economic indicators. The main results pinpoint the role of decentralisation in achieving a more balanced regional development which involves, in this case, less significant economic growth, but more important social and environmental progress.

Overall, the volume is aimed at providing an insight into the recent research findings in the field of geographic science, and particularly the opportunity to compare and identify different approaches to the idea of regional and local development.

## REFERENCES

- Pike, A., Rodríguez-Pose, A., Tomaney, J., (eds.) (2011), *Local and regional development*. Routledge, 642 p.  
Pike, A., Rodríguez-Pose, A., Tomaney, J. (2017), *Shifting horizons in local and regional development*, *Regional Studies*, 51(1), pp. 46–57.  
Rodríguez-Pose, A., Hardy, D. (2015), *Addressing poverty and inequality in the rural economy from a global perspective*, *Applied Geography*, 61, pp. 11–23.

# IS THE ROMANIAN DANUBE VALLEY A COHESIVE REGION? A GEOGRAPHICAL APPROACH

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*Key-words:* cohesion, territorial disparities, towns, Romanian Danube Valley.

**Abstract.** The Romanian sector of the Danube Valley covers a large area in which the life of resident communities is shaped by the River (1,075 km long). At present, 266 local administrative units (LAU) in the Romanian Danube Valley number 238 communes, 28 towns and a population of 1.7 million inhabitants. According to the population structure, 58% of the total population is urban. The current paper is seeking to identify disparities in the territorial cohesion of the Romanian Danube Valley following several research stages: selecting relevant statistical indicators, analysing territorial disparities, standardising the absolute values of the indicators and grouping elementary indicators into 3 secondary indexes in order to reflect the main aspects of territorial cohesion: life, environmental, and social quality. Finally, the authors were able to compute the Territorial Cohesion Index (TCI), revealing the levels of territorial cohesion. Generally, the outcome of the current study shows a higher territorial cohesion in the urban LAU economically developed that have a high demographic potential.

## 1. INTRODUCTION

According to Faludi (2004), the initial focus of the Territorial Cohesion idea was on regional economic development. The same author claims that the roots of this concept are to be found in the French expression ‘*Aménagement du Territoires*’, and that there is a decisive French political influence in including this dimension of cohesion in the EU political agenda in order to support the European Model of Society.

In the Barca Report (2009), which advocates for integrating territorial development policies, Coherent Europe is about territorial cohesion creating added value by packaging policies in such a way as to suit the territory concerned (Faludi, 2013).

The concept of Territorial Cohesion was first mentioned in Europe in 1995 in a report on ‘Regions and Territories in Europe’ published by the Association of European Regions. That report underlined the need for coordinated planning at European level to argument complementariness between territorial and economic-social cohesion as an EU central task (Trașcă *et al.*, 2013). Territorial cohesion appeared in the European Commission’s triennial reports; first in 2001 in the Second Report on Economic and Social Cohesion (Commission of the European Communities, 2001), which used the concept to describe the uneven development of the EU territory and particularly the concentration of population and economic activity in the core area of Europe (Commission of the European Communities, 1999); and later, in 2004, when the concept was given prominence by its inclusion in the Third Report on Economic and Social Cohesion (Commission of the European Communities, 2004)(quoted by Davoudi, 2005).

The Territorial Cohesion concept, disseminated by the Green Paper, has in view the harmonious development of all regions, giving the population the opportunity to use the resources of the respective

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area. In this way, cohesion represents a tool of turning diversity into an asset liable to contributing to the sustainable development of the whole European Union (European Commission, 2008).

According to Waterhout (2008), three ‘storylines’ related to territorial cohesion were identified, not explicitly concerned with territory as such, but rather with the substantive goals of territorial development: ‘Europe in Balance’, ‘Competitive Europe’, and ‘Clean and Green Europe’ (Faludi, 2013).

The European Constitution defines territorial cohesion as a competence shared between the Union and the Member States (Faludi, 2006). Territorial cohesion is a set of principles for harmonious, balanced, efficient, sustainable territorial development. It enables equal opportunities for citizens and enterprises, wherever they are located, to make the most of their territorial potentials. Territorial cohesion reinforces the principle of solidarity to promote convergence between the economies of better-off territories and those where development is lagging behind. The policy of Cohesion represents the essential framework within which EU can approach territorial development challenges and contribute to releasing the local, regional, national and transnational territorial potential (European Union, 2011). Highlighting Europe’s territorial diversity, territorial cohesion is aimed at turning this diversity into an asset benefitting all the inhabitants of all regions, securing thereby a harmonious and balanced territorial development capable to contribute to a sustainable Europe (Dao *et al.*, 2011).

In the Lisbon Treaty, among the crucial implications of the inclusion of territorial cohesion for the future of a cohesion and development policy in Europe, a relevant role is played by the fact that Member States and EU institutions, now share competence in contributing to territorial cohesion, as clearly stated in the Territorial Agenda of the European Union 2020 (HU Presidency, 2011, quoted by Cotella 2012).

The Policy of Cohesion is part of the Europe 2020 Strategy with strong emphasis on labour employment, innovation, sustainability, reduction of poverty and social exclusion. Once territorial cohesion was introduced in the Lisbon Treaty as explicit target of the policy of cohesion, the emphasis fell on services accessibility, functional geography, territorial analysis and sustainability. Between 2010 and 2012, the Policy of Cohesion was focused on one of the eleven key-thematic goals set for the 2014–2020 interval. The EU Cohesion Policy is aimed at implementing a coherent investment policy in order to meet the Europe 2020 Strategy targets and reduce regional disparities. The progress made in attaining the political goals and supporting approaches based on policy implementation are measured by spatial indicators (European Union, 2011; European Commission, 2014). The main target of the reformed European Union Cohesion Policy is to deliver a coherent investment policy in order to achieve the Europe 2020 Strategy goals and reduce regional disparities (González *et al.*, 2015).

The cohesion policy regulation for 2014–2020 contains a range of new measures to strengthen the strategic orientation of programming and incentivize better performance. Programmes have to specify objectives, intervention logics and results targets more clearly (Bachtler J., Mendez C., Kah S., 2013).

At present, new methods to evaluate cohesion by assessing interdependence relationships among the economic variables network, focussing only on living standard indicators exist (e.g. GDP, labour employment, and productivity). In keeping with this new approach, cohesion is viewed as a qualitative-quantitative effect of political decision-making (Lo Monaco, 1983; Prezioso, 2008).

According to Davoudi, 2005, the Community Strategic Guidelines stresses that, ‘the territorial dimension of Cohesion Policy’ should be taken into account and its concept such as, ‘extend[ing] beyond the notion of economic and social cohesion, its objective being to help achieve a more balanced development, to build sustainable communities in urban and rural areas and to seek greater consistency with other sectoral policies which have a spatial impact’.



The current challenge of incorporating geography in impact-modelling raised by the new cohesion policy is different, and macroeconomic models, presently available for policy evaluation, have only limited relevance in this respect. The new type of models should incorporate those various dimensions of geography that affect the overall impact of modern development policies (Varga, 2013).

The main objective of this paper is to identify disparities in terms of the territorial cohesion of Romania's Danube Valley at a micro-scale level (local administrative units – LAU). The way in which the cohesion policy has been defined as a political tool focused on the regions' development level, could not be used in treating the majority of these issues, which requires a territorial analysis on various scales. This approach was carried out by grouping the elementary indicators in three secondary indexes (life quality, environmental quality, and social quality) in order to stress out the main territorial cohesion differences. Thus, analysing territorial cohesion in the Danube Valley, several aspects, such as, demography, economy, education, health-care, technical-building infrastructure, cultural, life quality, social exclusion and the environment had to be taken into account.

## 2. DATA AND METHODOLOGY

Since the territorial cohesion is a complex phenomenon, no single method is able to quantify it. It is important to determine the optimal territorial assessment scale. In the case of Romania, the possible territorial levels may include the national one, macro-regions and/or development regions (NUTS1 and/or NUTS2) and NUTS3/LAU (county level). Also, certain functional areas could represent a territorial scale for the assessment of territorial cohesion. For the evaluation of territorial impacts at a highly disaggregated level, complex methods are available which integrate qualitative and quantitative tools. An essential element of these evaluations is the use of subjective expert assessment (Zsibók Zsuzsanna Márkusne, 2013).

This study relies on the statistical data available at the lowest level of administrative territorial units (LAU or NUTS5) provided by the TEMPO-Online time series published by the National Institute of Statistics. For the current study the authors used the 2015 data for computing the selected indicators.

The selection has been made following the analysis of several papers, scientific reports, and official documents elaborated by experts (e.g. primary indicators monitored by the Territorial Observatory, Prezioso 2006, 2008; Methodology of obtaining the Territorial Development Index, Romania's Territorial Development Strategy, *INTERCO Indicators of territorial cohesion*, ESPON 2011). Noteworthy, an important selection criterion was the availability of local administrative units (LAU) statistical data.

The authors selected 14 statistical indicators in order to emphasize high cohesion and lower cohesion areas: demographic dependency rate = DEPENDDEMO; migration growth = MIGR; employment rate = EMPLOY; no. of hospital beds/1,000 inhabitants) = HOSPITBED; visitors in museums = VISITMUSEUM; number of tourist accommodation places = TOURACC; road accessibility = ACCES; goods transported on inland waterways (thousands tones/km) = WATERTRANSP; length of sewerage system = SEWER; waste-water treated flow (cubic meters/day) = WATERPURIF; artificial area (% of land covered with transport routes and land covered with buildings/total land fund) = ARTIFAREA; graduates of primary and secondary education = GRADUATES; composite index of the social disadvantage (DISADVINDEX); fertility rate = FERTILITY. Given that the statistical indicators were calculated by different measurement units, an important step was to apply a normalization procedure using the national average of each selected indicator (Fig. 1).

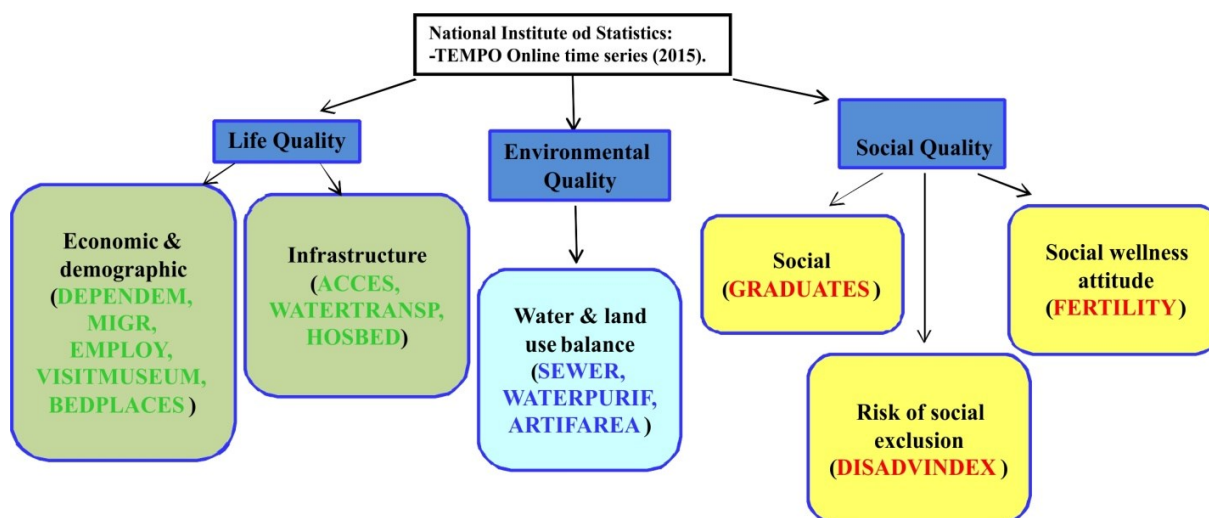


Fig. 1 – TCI Index design (Source: authors' compilation).

The Territorial Cohesion Index, computed as Hull Score of the 14 indicators, shows the following:

$$TCI = 50 + 14 * (MIGR + EMPLOY + HOSPITBED + TOURACC + VISITMUSEUM + ACCES + WATERTRANSP + SEWER + WATERTREAT + GRADUATES + FERTILITY - DEPENDDEM - ARTIFAREA - DISADVINDEX) / 14.$$

### 3. STUDY-AREA

In Romania, there are four development regions and twelve counties (Caraș-Severin, Mehedinți, Dolj, Olt, Teleorman, Giurgiu, Călărași, Ialomița, Constanța, Tulcea, Brăila and Galați) situated alongside the Danube River. The life of resident communities is shaped by 1,075 km of the Danube, out of which over 759 km correspond to the border line with Serbia and Bulgaria, being located in the southern part/periphery of Romania. As the territorial cohesion policy is part of the spatial development policies and it therefore means eliminating, or reducing, regional economic, social and other disparities (Leimgruber, 2004 quoted by Luukkonen, 2010), it is better to speak about peripherality, because of its deeper connotations with the core. That is, having disparities means having at least two different developing regions (e.g. the core and the periphery). Marginality can also be voluntarily caused, and it has positive connotations since marginal (different) subjects can be agents of innovation, whereas peripherality is seen more as an enforced situation (Leimgruber, 2004, quoted by Luukkonen, 2010).

At present, the 266 local administrative units (LAU) in the Romanian Danube Valley number 238 communes, 28 municipia and towns and a population of 1.7 million inhabitants (2014), out of which 42.0% is rural and 58.0% is urban (Fig. 1).

Most Danube Valley towns (19) fall into the small-size category (under 20,000 inh.), Șegarcea (Dolj County) standing at the bottom with only 3,657 inhabitants. The middle-size category (20,000–100,000 inh.) includes 7 towns together with two large-size categories (over 100,000 inh.), of which Galați City is the largest (249,423 inh.). The LAU2 population goes from 542 in Padina Commune (Tulcea County which encompasses the Danube Delta, a less-favoured territory for the development of settlements) and 10,470 in Poiana Mare Commune (Dolj County).

The negative population dynamics (20%) over 1992–2011 reveals the deep-seated crisis in this area, in both the rural and the urban settlements, especially in case of small and middle towns,

numerous demographic aspects correlating with the economic and social situations (Dumitrescu, 2008, Várdol, 2009, Mitrică *et al.*, 2016).

The Romanian Danube Valley population registers a decrease, especially in small towns and rural areas, due to migration to larger cities, mainly to Bucharest, the country's capital-seat, or abroad (Nancu *et al.*, 2016) (Table 1, Fig. 2).

Table 1

The structure of the settlement system in the Romanian Danube Valley.

Development regions	County	Urban LAU2	Rural LAU2	Total LAU2
West	Caras-Severin	1	7	8
South-West Oltenia	Mehedinți, Dolj, Olt	9	91	100
South Muntenia	Teleorman, Giurgiu, Călărași, Ialomița	8	70	78
South-East	Constanța, Tulcea, Brăila, Galați	10	70	80

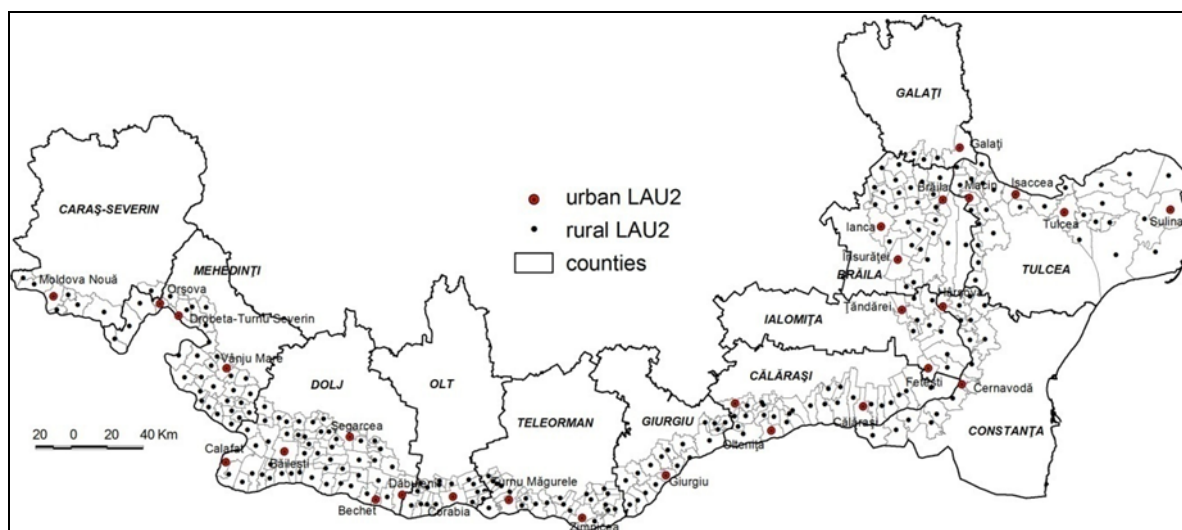


Fig. 2 – The structure of the settlements system in the Romanian Danube Valley.

## 4. RESULTS AND DISCUSSION

### 4.1. The life quality

According to the Lisbon Strategy's objectives, the overall achievement of a good life quality level has to be supported by policies aimed at guaranteeing adequate economic conditions to meet the families' needs. These are measured by the per capita GDP, level of consumer prices and employment and by an adequate level of all the non-economic aspects that contribute to the health condition, basic public health, which is commonly considered an indirect indicator of productivity and economic dynamism (Prezioso, 2008).

**The demographic-dependency rate** is influenced by birth, mortality and migration rates, which shapes the economic dependency rate (Institutul Național de Statistică, 2015). By relating the population group, most likely to be economically dependent (net consumers) to the group most likely to be economically active (net producers), changes in the dependency ratio pinpoints the potential social/life quality support requirements resulting from changes in the population age-structures (United Nations, 2018).

Demographic-dependency rate values are higher than the national average (54.8% in 2015) in 188 Danubian LAU (77.7% of the total network) because of ageing phenomena and a negative migratory balance. The values range from a maximum of 31.1% in Drobeta-Turnu Severin town (Mehedinți County) to 100.5% in Uda-Clocociov Commune (Teleorman County). The lowest values, under 40%, are registered in the urban area, especially in those towns with a higher demographic potential, while the highest values, over 85%, characterized the rural areas, especially some rural LAU from Dolj, Mehedinți and Brăila counties. The lower or higher demographic dependency values are relevant when analysing the birth-rate, death-rate, life expectancy, a settlement's development level, etc.

**Migratory balance.** Migration tends to promote convergence between regions; the poles of attraction are usually the more affluent regions, also more advanced in terms of demographic transition. The main role should be played by towns in providing access to services including the infrastructure necessary to invest in the adaptability of people and enterprises, a key-factor in avoiding rural depopulation and ensuring these areas remain attractive places to live in (European Commission, 2008). One of the factors involved in population shrinkage is the negative migratory balance, values varying from -2.2 ‰ in Ion Corvin Commune (Constanța County) to 3.1‰ in Șendreni Commune (Galați-Brăila Metropolitan Area), 123 of the LAU having negative values.

**Health-care.** The health-care index (Dumitrache, 2004) reveals the geographical distribution of health-care resources in Romania, the most disadvantaged counties being those lying along the Danube Valley. Ialomița County is the poorest in terms of health-care resources. However, limited resources also have Giurgiu, Teleorman, Olt, Mehedinți, Brăila and Tulcea counties. Null values of hospital beds/1,000 inhabitants are registered in 243 Danubian LAU (91.3% of the total LAU network) and below one physician/1,000 inhabitants in 226 Danubian LAU (85.0% of the total LAU network). The highest values scored the main Danubian cities (Galați, Brăila and Drobeta Turnu-Severin), or some rural settlements with departments of urban hospitals or even small hospitals.

**Employment.** Evaluating the economic impact is an essential component of the overall assessment of the EU cohesion policy (Batterbury, 2006 quoted by Varga, 2013). It estimates the aggregate influence of policy interventions on such variables as GDP, employment or wages. The European employment policy highlights another cohesion paradox: cities are places with higher employment and unemployment rates (3/4 of the EU cities have the lowest ratio of employed residents measured throughout the State), thus making the achievement of the Lisbon Agenda goals (employment rate at 70%) (Prezioso, 2008), a difficult task.

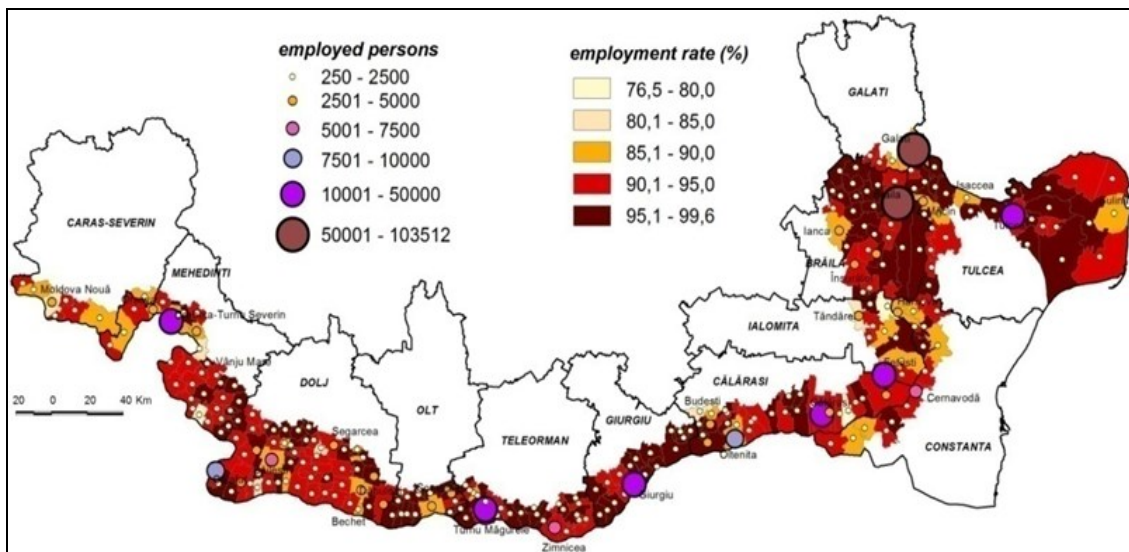


Fig. 3 – The employment rate.

The 2011 Census showed that settlements with a low-value employment rate gained ground in the Danube Valley, a very worrying situation because low values fell even more (the minimum value was 70% in 1992 and only 22% two decades later). Extreme values vary from 76.5% in Gârla Mare rural LAU2 to 99.6% in Tia Mare rural LAU2, the highest ones, over 98%, are recorded in 17 rural LAU2, most of them in Olt County (Fig. 3).

The lowest values, under 85%, are specific to Gârla Mare (Mehedinți County), Dichiseni (Călărași County), Giurgeni (Ialomița County), Cerat (Dolj County) communes and to Budești, Țândărei and Moldova Nouă towns.

**Tourist accommodation.** Sustainable development of tourism is fully in line with the cohesion objectives of a balanced development of the EU territory. Tourism has the potential to allow for a more even distribution of economic activities and of employment opportunities over the EU territory. The sustainable development goals applied to the activity of tourism will ensure its good management under fair economic and social conditions while contributing to environmental protection, including the preservation of the natural EU heritages (European Union, 2006).

Tourist accommodation places are to be found in only in 56 Danubian LAU (21.4% of the total LAU network) and the most numerous ones (5,950 out of a total of 12,083 tourist accommodation places) are concentrated in 4 large towns (Galați, Brăila, Drobeta-Turnu Severin and Tulcea) and in some rural LAU, located in the Danube Delta (2,688 places). There are 38 LAU with less than 100 tourist accommodation places.

**Number of visitors in museums.** The total number of visitors in museums is unequal in the 19 Danubian LAU (14 urban and 6 rural) recording this indicator: 621,962 visitors, out of which 581,544 people visited urban museums in Galați, Tulcea, Călărași, Brăila and Drobeta-Turnu Severin towns.

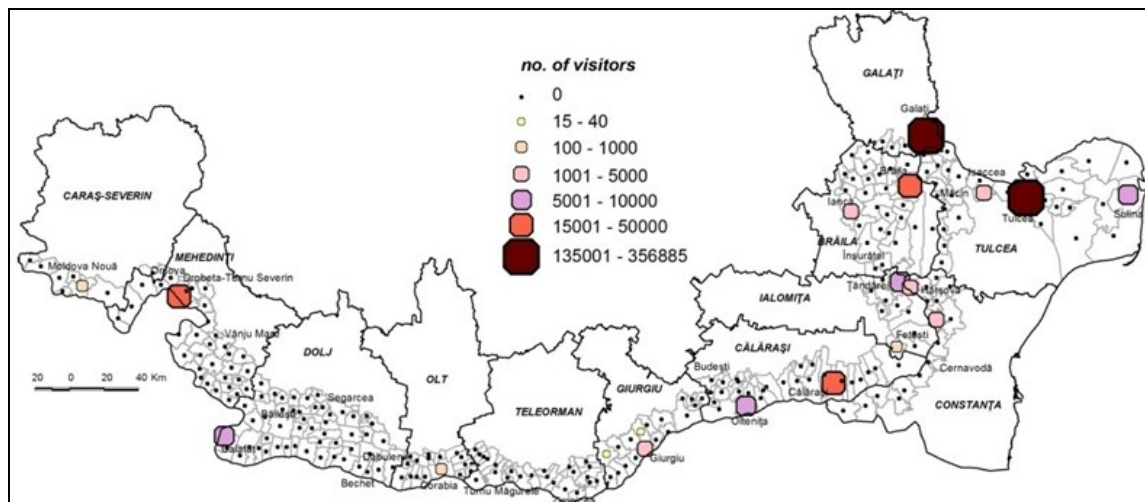


Fig. 4 – The total number of visitors in museums.

The number of visitors in museums vary from 15 people in Gogoșari rural LAU2 (Giurgiu County) to 356,885 people in Galați Towns (Galați County), while 247 LAU2 (92.9% of the total network) have no visitors in museums (Fig. 4).

**Road accessibility.** The development of transport is closely connected with the economic development, transport being one of the basic components of the socio-economic progress, the end point of commodity production and dissemination for production, or consumption (Intermodal Transport Strategy in Romania–2020, 2011 quoted by Damian and Șerban, 2017). The development of the TEN for transport, telecommunications and energy is part of the EU-general strategy for cohesion, aimed at harmonious planning and development. The objective of the trans-European networks is to



connect national infrastructures in a coherent manner and to ensure continuity of services between island, landlocked and peripheral regions and central regions, with aid in particular from the Cohesion Fund (European Union, 2006).

Very good and good accessibility have 15 LAU2 located along the highway and the European roads, mainly in the South-Eastern part of the Danube Valley (Fig. 5).

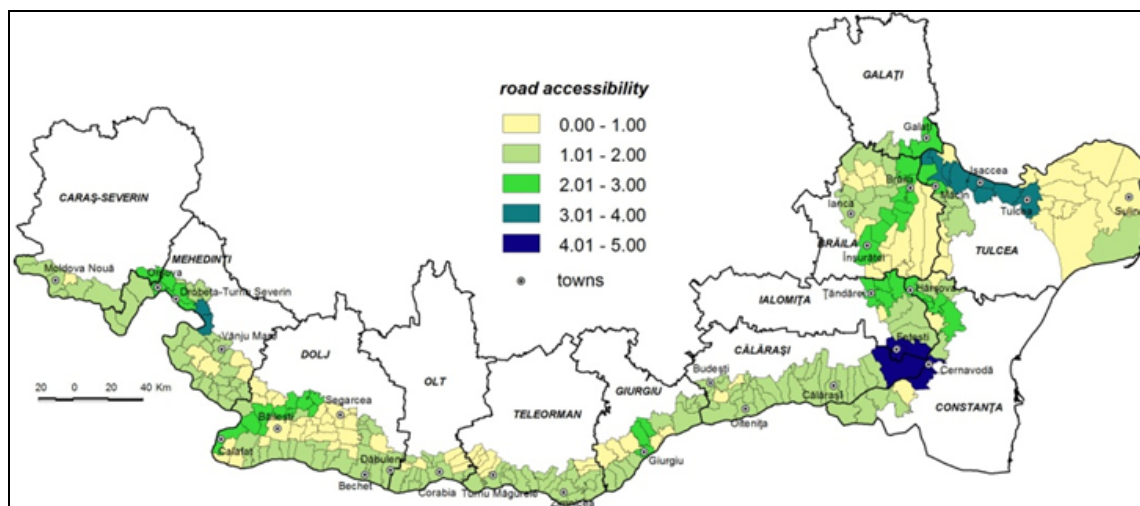


Fig. 5 – Road accessibility (Source: www.sdtr.ro).

Medium accessibility have 37 LAU2 crossed by national roads, with lowest values for the LAU2 situated along county roads (77 LAU2).

**Transported goods.** The Danube River in Romania is the backbone of the Lower Danube and of the entire Danube Region, its economy connecting Rotterdam harbour (North Sea) to Constanța harbour (Black Sea). The first Priority Area of the European Union Strategy for the Danube Region is to improve mobility and intermodality of inland waterways. Among the objectives of this priority area are: 20% increased cargo transport on the River in by 2020 compared to 2010; solving the obstacles to navigation and establishing an effective waterway infrastructure management by 2020; developing efficient multimodal terminals at the River ports along the Danube (<http://www.danube-region.eu/about/our-targets>). The 20 Danube harbours facilitate the transport of goods, mainly through Galați, Drobeta-Turnu Severin and Tulcea, which cumulate 75.5% (3,860,385 thousand tonnes/km) of all the goods carried on the Danube.

#### 4.2. Environmental quality

As argued in the 5th Cohesion Report, territorial cohesion highlights various issues which are central to the cohesion policy. Among these are the environmental dimension of sustainable development and the use of flexible functional geographies for territorial development. Environmental challenges are increasing in number and importance. A large share of cohesion policy resources has always been invested in measures to improve the quality of the environment, or to tackle key-environmental challenges (European Commission, 2017).

**Sewerage network.** Public water supply and sewerage services are among the utilities of general public interest. The EU Green Paper has introduced the concept of a partnership between the different levels of governance in Europe, considering that public services of general economic interest are paramount in maintaining cohesion, improving the quality of life and securing sustainable development

(European Commission, 2014). The sewerage system has an important role in guaranteeing public health, environmental protection and enhancing the living standard.

There are counties where no rural settlement has a sewerage system (199 rural LAU, 74.8% of the total studied network), and in the few communes where it does exist, the network length is very short (e.g. Brăila, Călărași, Giurgiu, Olt and Teleorman) (35 LAU have between one and 10 km) (Fig. 6).

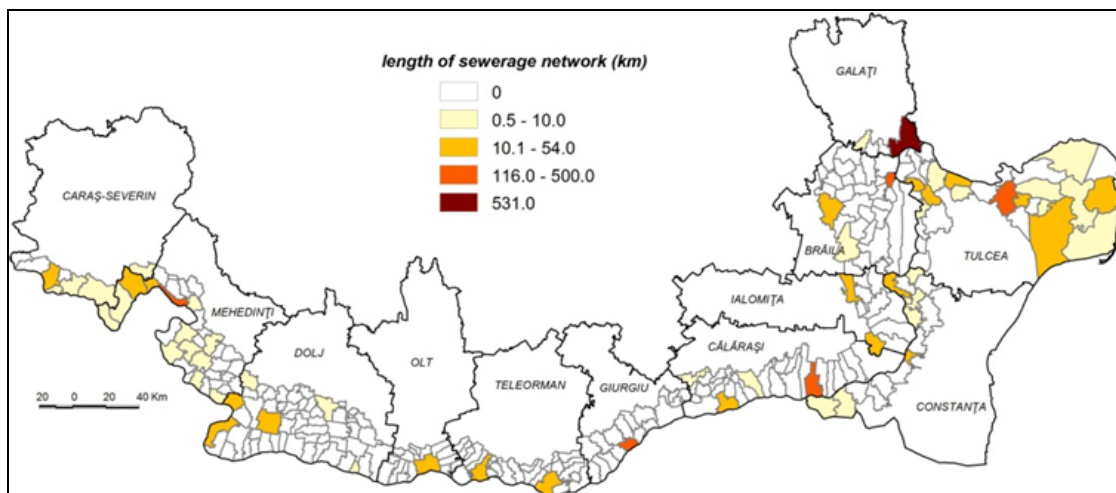


Fig. 6 – Sewerage network length.

The length of the sewerage system ranges from 0.5 km in Ghindărești Commune (Constanța County) to 531 km in Galați City. A length of over 100 km have only county-seat towns with more than 50,000 inhabitants (Galați, Brăila, Giurgiu, Drobeta-Turnu Severin, Tulcea, and Călărași).

**Waste-water treatment.** Despite general progress in reducing environmental pressures (notably as regards wastewater and waste treatment), more efforts are needed to meet EU environmental goals. According to Waste-Water Treatment Directive 9<sup>th</sup> Reporting Exercise, the required level of waste-water treatment before 2018 shows compliance rates below 40% in some Romanian regions and 3% throughout Romania (European Union, 2011). Only 19 Danubian LAU have waste-water treatment stations (5 are in rural LAU and 14 in urban LAU). These stations recorded a total daily flow of treated waste-water somewhere around 170,851 cubic meters.

**Artificial areas.** The values of artificial areas (% of land covered with transport routes and land covered with buildings of total land fund) depend on the local geographical conditions, the demographic size of settlements, the regional and local development of the economic units and the transport networks, etc. In the Romanian Danube Valley, the smallest artificial area is in Crișan Commune, Tulcea County (0.1%), the largest one being in Brăila City (69.3%). The lower percentages covered with artificial areas are in zones where this type of land-cover has a restrictive potential, mainly in the Danube Delta and the Danube Defile. In seven rural LAU2 in the Danube Delta, the artificial land-cover area is under 1%. The majority of LAU (243, i.e. 91.4% of the total LAU network) registered artificial land-cover values between 1.0 and 10.0% (Fig. 7). Values above the national average are characteristic of 128 LAU, i.e. 48.1% of the total network.

Values between 10.0% and 39.5% are characteristic for 13 LAU, 11 of which are urban (Fig. 7). Cities tend to be more efficient in their use of land. In cities, built-up or artificial areas/person are only a quarter of those in rural areas. This reflects the fact that the availability of land and its cost make cities more attractive for less land-intensive activities, such as services, company headquarters or leisure facilities, than suburbs or rural areas are. Between 2006 and 2012, the built-up/artificial area/inhabitant increased most in cities of the Southern and Central-Eastern EU, while it declined in a number of large cities in Northern and Western Europe (European Commission, 2017).

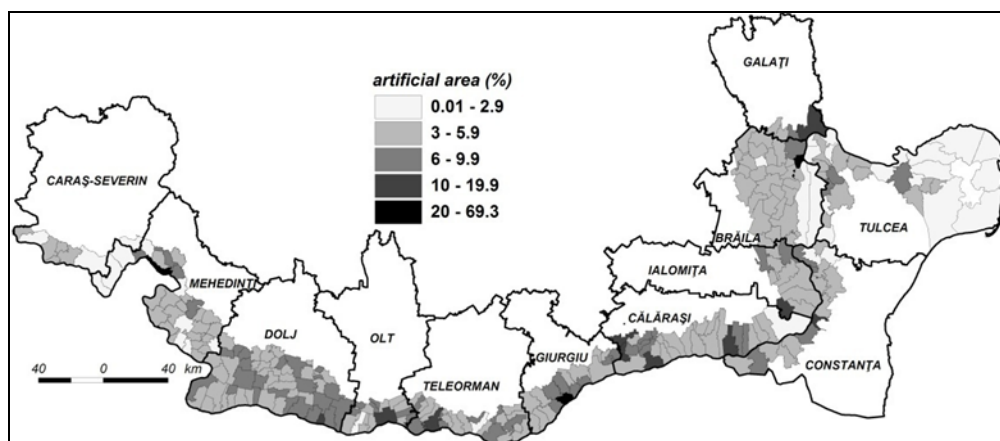


Fig. 7 – Artificial areas.

### 4.3. Social quality

The social quality approach measures the quality of the social context of everyday life, and differs from the quality of life approach in that it is grounded in a theory of ‘the social’ – it is a sociologically grounded approach, as opposed to the quality of life approach, which takes the perspective of the isolated individual as the ultimate reality (Wallace and Abbott, 2009).

**Education.** To improve performance, multiple changes need to happen at the same time: a stronger export-orientation, a shift new sectors and activities, a boost to research and innovation, an increase in education and training and an improvement in the business environment. One of the Europe 2020 targets is to reduce the share of early school leavers to 10% or less. At the EU level, the share of those aged 18–24 with no qualifications beyond basic schooling and no longer in education or training in the 2014–2016 period was 11%, close to the target, but with wide differences between and within countries. In Spain, Portugal, Italy, Bulgaria and Romania, for example, the share in almost all regions was far above the target, whereas in Belgium, Germany, the UK and Greece, there was wide variation between regions, with some close to the target, or below it and others far above it (European Commission, 2017).

The number of primary and secondary school graduates is about 14,760 persons (8,525 in towns, 60% of which are concentrated in the four important Danubian cities: Galați, Brăila, Drobeta Turnu-Severin and Tulcea). A higher number of graduates is registered in county-seats towns: Galați (2,094), Brăila (1,421), Drobeta-Turnu Severin (926), Tulcea (651), Călărași (567) and Giurgiu (486). Each rural LAU2 has between 96 and 2 graduates (Poiana Mare, Dolj County and Carcaliu, Tulcea County, respectively), the majority (139 LAU) having between 2 and 25 graduates.

**Social disadvantage.** The concept itself and, therefore, the expectation of a relationship between social cohesion and social development, is relatively recent (Jenson, 2010). The Copenhagen commitments (1995) demonstrate that social development is not simply a matter of social service provision. It also depends on a range of political, economic, institutional, and cultural factors which, together, play a critical role in poverty reduction and social inclusion (World Bank, Social Development Department, 2000).

For assessing the levels of social development, the Social Disadvantage Index (SDI) was used. The indicators took into account for computation this index are: the unemployment rate, the Roma population, the employment in agriculture, dwelling unconnected to the public water supply network, dwellings without central heating system, and living floor/inhabitant. The SDI has very different values (maximum 0.688 in Gârla Mare – Mehedinți County and minimum 0.072 in Galați City) (Fig. 8). The large cities (Galați, Brăila, Drobeta-Turnu Severin and Tulcea) have the lowest index values due mainly to a higher living standard.



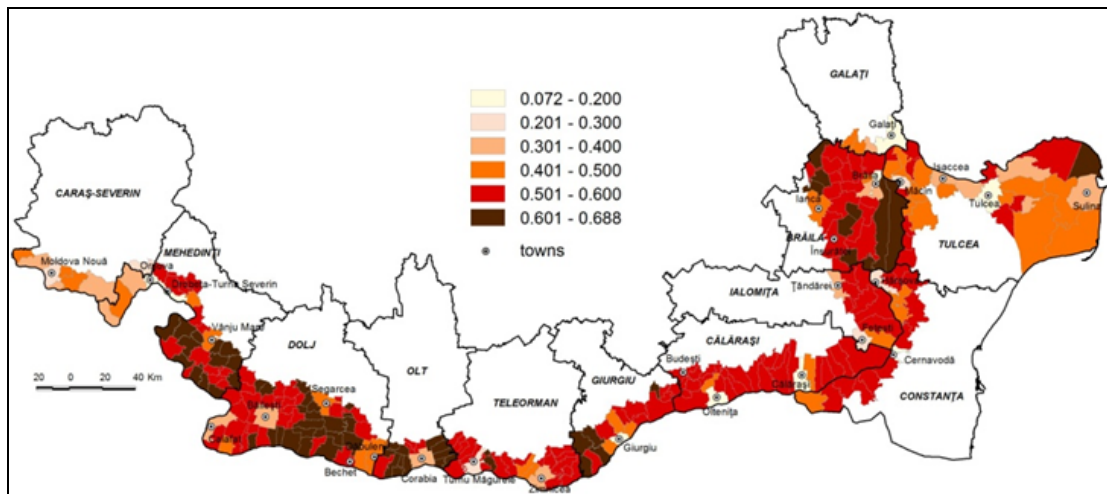


Fig. 8 – Social Disadvantage Index.

The deeply disadvantaged areas in terms of social development are concentrated in rural settlements and small towns (Budești, Vânju Mare, Bechet, etc.) which have a high and very high index score (Fig. 8).

**General fertility rate.** The European Union features both low fertility, motherhood postponement and an increase in childlessness among the younger generations. In the EU-27 countries, cross-region differences are notable. Low fertility seems to be due to a combination of inter-connected factors, with the prevalence of a male ‘breadwinner’ model and inflexible childcare provision, making it difficult for women to combine work and family duties. Childlessness is also becoming more socially acceptable, which could be a contributing factor to the relatively low fertility rate (Hoorens, 2011).

Romania shows the largest regional variations of EU-27 (European Parliament, 2013), in 2015 the fertility rate value (expressed in number of live-births/1,000 women of fertile age (15 to 49 years-old) was 35.9‰. In the Romanian Danube Valley, 160 LAU recorded fertility rate values above the national average, with a maximum of 120.1‰ in Catane Commune, Dolj County, and a minimum of 10.3‰ in Lița Commune, Teleorman County (Fig. 9). Maximum values were recorded by the rural and urban settlements where the Roma population (traditionally recording high birth and fertility rates) is numerous (Cătane, Țândărei, Gruia, etc.).

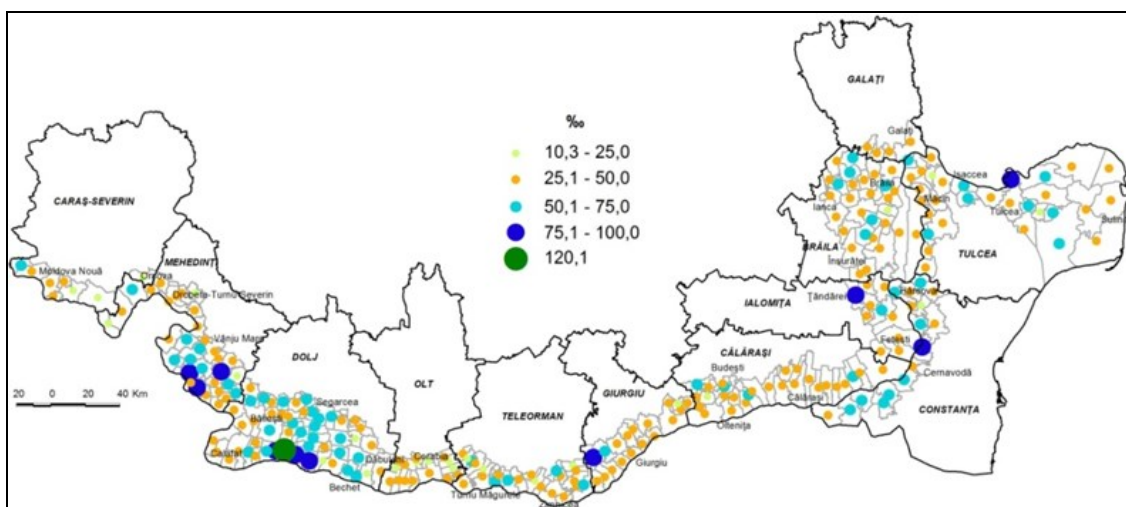


Fig. 9 – General fertility rate.

In 2011, the European Parliament passed a Resolution on the implications of demographic change for a Cohesion Policy at regional level. The growing importance of demographic issues is reflected in their ever greater prominence in the Cohesion Policy 2007–2013 and 2014–2020 programming periods (European Parliament, 2013). In 2005 the European Commission made a clear commitment to ‘demographic renewal’ in Member States with low fertility rates, and national governments began to implement policies, implicit or explicit, to address these challenges (Hoorens, 2011).

#### 4.4. Territorial Cohesion Index

Following the clustering of the life quality environmental and social quality indicators, resulted the Territorial Cohesion Index (TCI). The TCI values vary between 48.2 in Crivăț Commune (Călărași County) and 98.3 in Galați City, the 266 LAU2 being grouped by six classes (Fig. 10).

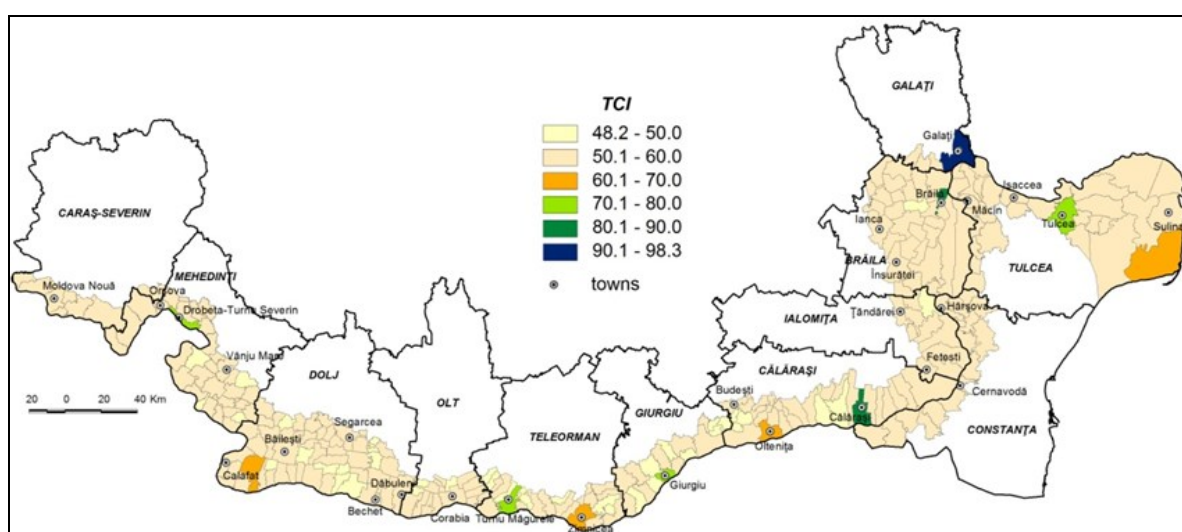


Fig. 10 – Territorial Cohesion Index disparities.

*At the top of the hierarchy* stands Galați City (98.3) (Fig. 10), an urban development pole, through the high number of hospital beds/inh., accommodation places, museum visitors, quantity of transported goods, sewerage network length and low demographic-dependency, as well as less-favoured social index values. What is particularly important is to ensure access to road, train, air and water transport, as well as to other infrastructures, e.g. wide-band and European energy networks. Galați City has moderate road accessibility, but very high water-based access which accounts for the intense harbour traffic of goods.

*The second place* is held by the towns of Brăila and Călărași (Fig. 10), pole of urban development and pole of county development, respectively. The high territorial cohesion 83.2 in the city of Brăila is due to the big quantities of carried goods, sewerage network length, number of museum visitors, primary and gymnasium graduates and low values of demographic-dependency rate and of the social disadvantaged index. In Călărași, territorial cohesion stands high (82.6) owing to the elevated values of waste-water treatment flow, big quantities of carried goods, low demographic-dependency values, and a small artificial area per total administrative area.

Next in line comes the *71–80 value class*, which includes four towns, three of them county-seats – Giurgiu, Drobeta-Turnu Severin, Tulcea and Turnu Măgurele (Fig. 10). These towns feature low demographic-dependency, a high number of hospital beds/inh. (topping the Romania average),

medium-high fertility rate, and small social disadvantaged index values. In terms of accessibility, Turnu Măgurele registers low values, Giurgiu and Drobeta-Turnu Severin fall into the middle values, while Tulcea is the most accessible of all (it is crossed by the Râmnicu Sărat – Brăila – Tulcea – Constanța National Roadway DN22). Indicator values with a negative impact on the degree of territorial cohesion are fertility rate and the flow-rate of waste-water treatment stations in operation.

**Value class 60 and 70 (average territorial cohesion)** includes the towns of Oltenița and Zimnicea, as well as Poiana Mare (Dolj County) and Sfântu Gheorghe (Tulcea County) communes (Fig. 10). The indicators involved in the high social cohesion are: high population employment rate in Sfântu Gheorghe and Poiana Mare communes, the quantity of goods shipped through Oltenița and Zimnicea harbours, and the social disadvantage index, somehow lower in the two towns and more elevated in Sfântu Gheorghe and Poiana Mare communes. Low values with negative impact on the territorial cohesion degree are related to the the number of hospital beds (0) in Sfântu Gheorghe Commune, accommodation places in Poiana Mare Commune, museum visitors in Zimnicea Town and Sfântu Gheorghe Commune.

**The low cohesion value class (50 and 60)** numbers 217 LAU2 among which 19 towns and 198 communes spread out evenly alongside the Danube Valley (Fig. 10). Although Fetești and Cernavodă towns are easily reached by road (A2 Highway), yet all the other indicator values account for their low cohesion degree. Settlements located alongside transport corridors should become effective development corridors, easily accessible and attractive for investors, locals and tourists. In the same class also fall the towns of Calafat, Șegarcea, Moldova Nouă and Orșova. Despite scoring high in terms of accommodation places, these towns have low values for territorial cohesion. There are some Danube Delta settlements (e.g. Murighiol, Sulina, Maliuc and Crișan) in which various statistical indicators contribute to the end-value of the territorial cohesion degree, due to numerous accommodation places; many museum visitors (Sulina and Calafat); significant quantities of treated waste-waters (Corabia, Însurăței and Calafat). Some rural settlements (Tia Mare, Gârcov, Vădastra, Ianca, and Cilieni) boast high fertility rates (over 75%). There are communes Catane, Negoii, Cârna, and Bistreț (Dolj County), Pungina, Gruia, and Gârla Mare (Mehedinți County), Seimeni (Constanța County), Gogoșari (Giurgiu County) and Ceatalchioi (Tulcea County) with elevated labour employment values (especially in agriculture).

**The very low** cohesion class numbers 38 communes in the counties of Dolj – 9, Giurgiu – 8, Teleorman – 7, Călărași – 5, Mehedinți – 4, Olt – 3 and one in Brăila and in Ialomița (Fig. 10). These communes have all indicator and index values depleted, but for migration and occupancy rate (especially in agriculture). There is reduced road access (except for Giurgeni Commune with a medium accessibility record), least easily reached being those settlements accessible solely through county and local roads, which, generally, also score lowest accessibility values, suggesting a direct correlation among an area's road access, the degree of its settlement isolation and territorial cohesion.

## 5. CONCLUSIONS

In terms of the statistical indicators used to measure territorial cohesion, the Romanian Danube Valley sector appears to lack unity. Its low territorial cohesion is the result of the action in time of the economic, political, demographic, socio-cultural and historical forces which, together or individually, have impacted this geographical area. In view of it, the Danubian economy and population are concentrated in the Galați–Brăila metropolitan area (the two big cities having 22.4% of the entire study-area population and 56.1% of all the water-carried goods). However, the station is similar also in the other county-residence cities (Drobeta-Turnu Severin, Tulcea, Călărași and Giurgiu) which hold 18.1% of the Danube Valley population and 22.4% of all the water-carried goods. Increasingly less attractive for

the economic activities and the population are the disadvantaged physical geographical and socio-economic areas located at the far-off periphery. This is the case of settlements in less developed counties, e.g. Olt, Teleorman and Giurgiu, as well as the settlements in the Ialomița and Brăila Lake-area.

Generally, at national and regional levels disparities between urban centres and the deeply rural areas are being maintained, or even increased in most of cases. Also, locally, the big urban agglomerations show significant problems related to social segregation and exclusion (European Union, 2011). The contrasting spatial dynamics described above is even more apparent in those countries where economic growth is concentrated in a strong capital region, while peripheral regions are constantly losing economic power (Zsibók Zsuzsanna Márkusne, 2013). This is the case of Romania, where Bucharest, the capital-city, has a strong attracting human and economic potential. The fundamental question is not whether the state should intervene to correct the injustices that are generated by the operations of the market economy, but rather how much intervention, when, at what level and in what form should be made (Hall, 2005 quoted by Davoudi, 2005).

Balanced and sustainable economic development, inclusive of territorial cohesion, would lead to a more unitary and sustainable use of the Danube area development availabilities, offering advantages since little concentration of and pressure on coasts could prove beneficial to both the environment and the quality of life (European Commission, 2008).

In line with the Treaty on the Functioning of the European Union (Art. 174 and 175), all policies and actions of the EU should contribute to economic, social and territorial cohesion. Therefore those responsible for the design and implementation of sectoral policies should take the principles and objectives of the Territorial Agenda into consideration. The coherence of EU and national policies is of utmost importance for territorial cohesion. Most policies have significant territorial impacts, influencing the development opportunities of territories in different ways. The coordination of different sectoral policies to optimise territorial impact and maximise coherence can significantly increase their success, and help avoid, at all territorial levels, negative effects from conflicting policies. The optimal balance of sustainability, competitiveness, and social cohesion can be realised through integrated territorial development (European Union, 2011).

The White Paper on the Future of Europe launched a debate on which direction the EU should take in the coming years. Together with its reflection papers, it covers three main linked questions relating to cohesion policy: 1. Where should it invest? 2. What should the investment priorities be? and 3. How should the policy be implemented? (European Commission, 2017a). Implementation instruments and competences are in the hands of EU institutions, Member States, regional and local authorities (Cotella, 2012).

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## REFERENCES

- Bachtler, J., Mendez C., Kah S. (2013), *Reflections on the performance of cohesion policy*, in: Kovács Ilona Pálné, Scott J., Gál Z. (Eds.), *Territorial cohesion in Europe*, Institute for Regional Studies, pp. 46–58.
- Batterbury, S., (2006), *Principles and purposes of European Union cohesion policy in less-developed countries and regions*, Regional Studies, vol. 40, no. 2, pp. 189–199.
- Comisia Comunităților Europene (2008), *Carta verde privind coeziunea teritorială. Transformarea diversității teritoriale într-un avantaj*, [http://ec.europa.eu/regional\\_policy/archive/consultation/terco/paper\\_terco\\_ro.pdf](http://ec.europa.eu/regional_policy/archive/consultation/terco/paper_terco_ro.pdf), 13 p.
- Comisia Europeană (2008), *Cartea Verde privind Coeziunea Teritorială, calea de urmat Inforegio*, nr. 28, 20 p.
- Commission of the European Communities (1999), *European spatial development perspective: Towards balanced and sustainable development of the territory of the EU* (Luxembourg, Office for Official Publications of the European Communities).

- Commission of the European Communities (2001), *Unity, solidarity, diversity for Europe, its people and its territory: Second report on economic and social cohesion*, Luxembourg, Office for Official Publications of the European Communities.
- Commission of the European Communities (2004), *A new Partnership for cohesion: Convergence, competitiveness, cooperation – Third report on economic and social cohesion*, Luxembourg, Office for Official Publications of the European Communities.
- Cotella, G. (2012), *Editorial – Cohesion and Development in the EU: a multi-level issue*, Europa XXI, vol. 22, pp. 5–10.
- Damian, Nicoleta, Șerban, P. (2017), *The Role of the International Transport in the Development of Commercial Activities in the Romanian Danube Valley*, in vol. Lower Danube Basin. Approaches to Macroregional Sustainability, Dan Bălțeanu (Ed.), pp. 214–227.
- Davoudi, S. (2005), *Understanding Territorial Cohesion*, Planning, Practice & Research, Vol. 20, No. 4, pp. 433–441, November 2005, DOI: 10.1080/02697450600767926.
- European Commission (2008), *Green Paper on Territorial Cohesion turning territorial diversity into strength*, Bruxelles, [http://ec.europa.eu/regional\\_policy/archive/consultation/terco/paper\\_terco\\_en.pdf](http://ec.europa.eu/regional_policy/archive/consultation/terco/paper_terco_en.pdf) (accessed January 2017).
- European Commission (2014), EU Green Paper, <http://ec.europa.eu/green-papers/>
- European Commission (2014), *Investment for jobs and growth. Promoting development and good governance in EU regions and cities. Sixth report on economic, social and territorial cohesion*, Bruxelles, [http://ec.europa.eu/regional\\_policy/sources/docoffic/official/reports/cohesion6/6cr\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/cohesion6/6cr_en.pdf) (accessed September 2016).
- European Commission (2017), *My Region, My Europe, Our Future. Seventh report on economic, social and territorial cohesion*, [http://ec.europa.eu/regional\\_policy/sources/docoffic/official/reports/cohesion7/7cr.pdf](http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/cohesion7/7cr.pdf) (accessed May 2018).
- European Commission (2017b), White paper on the future of Europe. Reflections and scenarios for the EU-27 by 2025, Bruxelles, [https://ec.europa.eu/commission/sites/beta-political/files/white\\_paper\\_on\\_the\\_future\\_of\\_europe\\_en.pdf](https://ec.europa.eu/commission/sites/beta-political/files/white_paper_on_the_future_of_europe_en.pdf) (accessed May 2018).
- European Parliament, Directorate-General for Internal Policies, Policy Department B: Structural and Cohesion Policies (2013), *How can regional and cohesion policies tackle demographic challenges?*, [http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/513981/IPOL-REGI\\_ET\(2013\)513981\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/513981/IPOL-REGI_ET(2013)513981_EN.pdf).
- European Union (2006), *Sustainable tourism as a factor of cohesion among European regions*, <https://cor.europa.eu/en/documentation/studies/Documents/Sustainable-Tourism.pdf>
- European Union (2011), *Territorial Agenda of the European Union 2020 – Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions*. The Informal Ministerial Meeting of Ministers responsible for Spatial Planning and Territorial Development. Gödöllő. Hungary. [https://www.mmr.cz/getmedia/fb9825b3-9d22-490d-bcd0-43528e505ea3/Uzemni-agenda-2020-\(EN-verze\)](https://www.mmr.cz/getmedia/fb9825b3-9d22-490d-bcd0-43528e505ea3/Uzemni-agenda-2020-(EN-verze)) (accessed January 2017).
- Faludi, A. (2004), *Territorial cohesion: old (French) wine in new bottles?*, Urban Studies, 41 (7), pp. 349–1363.
- Faludi, A. (2006), *From European spatial development to territorial cohesion policy*, Regional Studies, 40, pp. 667–678.
- Faludi, A. (2013), *Territorial cohesion, territorialism, territoriality, and soft planning: a critical review*, Environment and Planning, vol. 45, pp. 1302–1317, doi: 10.1068/a45299, <http://journals.sagepub.com/doi/pdf/10.1068/a45299>.
- González, A., Daly, G., Pinch, P., Adams, N., Valtensbergs, V., Burns, M.C., Johannesson, H. (2015). *Indicators for Spatial Planning and Territorial Cohesion: Stakeholder-Driven Selection Approach for Improving Usability at Regional and Local Levels*, Regional Studies 49/9, pp. 1588–1602. <http://dx.doi.org/10.1080/00343404.2015.1018883>.
- Hall, P. (2005) *Fundamental question for the ESDP*, Town and Country Planning, November, pp. 330–331.
- Hoorens S., Clift J., Staetsky Laura, Diepeveen Barbara Janta Stephanie, Morgan Jones Molly, Grant J. (2011), *Low fertility in Europe. Is there still reason to worry?*, RAND Europe, [https://www.rand.org/content/dam/rand/pubs/monographs/2011/RAND\\_MG1080.pdf](https://www.rand.org/content/dam/rand/pubs/monographs/2011/RAND_MG1080.pdf).
- HU Presidency (2011), *Territorial Agenda of the European Union 2020: Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions*, <http://www.eu2011.hu/files/bveu/documents/TA2020.pdf>.
- Institutul Național de Statistică (2013), *Transportul portuar de marfuri și pasageri în anul 2012*, București.
- Institutul Național de Statistică (2015), <http://statistici.insse.ro/shop>.
- Jenson, Jane (2010), *Defining and measuring social cohesion*, Commonwealth Secretariat, United Nations Research Institute for Social Development, <https://www.files.ethz.ch/isn/151856/Jenson%20ebook.pdf>.
- Leimgruber, W. (2004), *Between Global and Local. Marginality and Marginal Regions in the Context of Globalization and Deregulation*, Aldershot, Ashgate.
- Lo Monaco, Mario (1982), *I sistemi economici*, in Mario Lo Monaco (a cura di), Appunti di Geografia economica, Roma, Kappa, pp. 7–43.
- Luukkonen, J. (2010), *Territorial cohesion policy in the light of peripherality*, The Town Planning Review, 81 (4), doi:10.3828/tpr.2010.12.
- Medeiros, E. (2011), *Territorial Cohesion: a conceptual analysis*, CEG-IGOT – Lisbon University, Alameda da Universidade.
- Ministerul Dezvoltării Regionale și Administrației Publice (2014), *Strategia de Dezvoltare Teritorială a României. România policentrică 2035: Coeziune și competitivitate teritorială, dezvoltare și șanse egale pentru oameni*, <http://sdr.ro/upload/sdr-28.08.pdf> (accessed January 2018).
- Mitică, Bianca, Damian, Nicoleta, Mocanu, Irena, Șerban, Paul, Săgeată, Radu (2016), *Technical-urbanistic infrastructure in the Romanian Danube Valley. Urban vs. Rural territorial disparities*, Geographica Pannonica, vol. 20, issue 4, pp. 242–253.

- Nancu, Daniela, Mitrică, Bianca, Mocanu, Irena, Persu, Mihaela (2015), *Population dynamics in the Romanian Danube Valley. Geographical aspects of the young population – labour relations*, Agricultural Economics and Rural Development, New Series, Year **XII**, no. 2, pp. 157–173.
- Prezioso, Maria (2008), *Cohesion policy: methodology and indicators towards common approach*, Romanian Journal of Regional Science, vol. **2**, no. 2, pp. 1–32.
- Prezioso, Maria, *Regional Territorial Cohesion: What indicators for an EU Sustainable Perspective?*, in Proceedings of 48th Regional Science Association Congress, paper no. **172**, Sustainable development and regional economic strategies Session, Liverpool, 2008.
- Prezioso, Maria (2006), *STeM approach for a sustainable territorial development of the Lisbon strategy*, in ERSA 46th European Congress – ESPON Special Session, Volos, agost–sept.
- Trașcă, Daniela Livia, Aceleanu, Mirela Ionela, Sahlian, Daniela (2013), *Eficiența în plan teritorial a politicii de coeziune în România*, Economie teoretică și aplicată, **XX**, no. 1(578), pp. 64–74.
- United Nations (2018), *Sustainable development knowledge platform*, [http://www.un.org/esa/sustdev/natlinfo/indicators/methodology\\_sheets/demographics/dependency\\_ratio.pdf](http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/demographics/dependency_ratio.pdf).
- Varga, A. (2013), *Economic impact evaluation challenges posed by the new European Union cohesion policy: a rationale for the geographic macro and regional policy impact modeling approach*, in: Kovács Ilona Pálné, Scott J., Gál Z. (Eds.), *Territorial cohesion in Europe*, Institute for Regional Studies, pp. 85–98.
- Wallace Claire, Abbott Pamela (2009), *Social quality in Europe*, University of Aberdeen, [https://www.abdn.ac.uk/socsci/documents/CINEFOGO\\_Social\\_Quality\\_in\\_Europe.pdf](https://www.abdn.ac.uk/socsci/documents/CINEFOGO_Social_Quality_in_Europe.pdf).
- Waterhout, B. (2008), *The Institutionalisation of European Spatial Planning*, IOS Press, Amsterdam.
- World Bank, Social Development Department (2000), *New path to social development. Community and Global Networks in Action*, <https://siteresources.worldbank.org/INTRANETSOCIALDEVELOPMENT/Resources/NewPathsSocialSummit.pdf>.
- Zsibók, Zsuzsanna Márkusne (2013), *Methodologies to measure the impacts of territorial cohesion policies – what's new in Brussels?*, in: Kovács Ilona Pálné, Scott J., Gál Z. (Eds.), *Territorial cohesion in Europe*, Institute for Regional Studies, pp. 99–108.
- \*\*\**INTERCO Indicators of territorial cohesion*, ESPON 2011, [https://www.espon.eu/export/sites/default/Documents/Projects/ScientificPlatform/Interco/INTERCO\\_Interim\\_Report.pdf](https://www.espon.eu/export/sites/default/Documents/Projects/ScientificPlatform/Interco/INTERCO_Interim_Report.pdf).

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# POSSIBILITIES FOR THE DEVELOPMENT OF THE LOWER DANUBE SECTOR IN THE REPUBLIC OF SERBIA

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*Key-words:* potential, local development, economy, Danube, Republic of Serbia.

**Abstract.** The Danube Region in Serbia has a huge potential for the growth of agriculture, energetics, industry and tourism. However, these resources are not equally utilized in all parts of the Danube Region. The middle part is the most developed one of the Danube Region in Serbia, with the largest cities of the state, the biggest concentration of production, capital, traffic and population. In contrast to that part, the lower one of the Danube Region in Serbia, despite its huge resources, still lags behind other parts of the Danube Region. The Lower Danube sector has a great potential for the development of agriculture, especially horticulture. In this part, the Danube had the largest hydropower potential and excellent nautical characteristics. Also, here are reserves of mineral resources and excellent conditions for tourism development. The Lower Danube sector in Serbia represents a historical-ecological tourist zone due to its numerous natural and cultural resources. The paper presents all the potentials of this area, but also its limitations that prevent its development. Special attention is paid to the importance of investing in infrastructure which is an important basis for development.

## 1. INTRODUCTION

The Danube River Basin covers more than 800,000 square kilometers – 10% of continental Europe – and extends into the territories of 19 countries. This makes it the most international river basin in the world. Over 80 million people live in this area, many of them depending on the Danube for drinking water, energy production, agriculture, and transport (ICPDR, 2015). The Danube basin in Europe can be viewed as a kind of conceptual region culturally, politically, economically, and ethnographically heterogeneous (Trócsányi, 2010).

The Danube Region in Serbia is not yet defined as a separate regional entity and there are different interpretations of the concept and spatial coverage of the Danube Region in the territories where the Danube represents a much wider physical boundary, related to functional significance and gravitational influences. According to a narrower definition (the narrower belt along the Danube), the Danube Region covers an area of 18,290 km<sup>2</sup>, but speaking only of the municipalities with direct outlet to the Danube, this region in Serbia would include territories belonging to 24 local self-governments, in effect 29, if we would add the 6 urban municipalities within the city of Belgrade that have direct access to the Danube (Milanković, 2015).

The defined area covers 13,494 km<sup>2</sup>, or 15.2% of the territory of the Republic of Serbia with 28.3% of Serbia's total population. If we would count all urban municipalities of Belgrade (even those without exit to the Danube), the share of population would be as much as 31% of the total population of this country, which means that almost a third of Serbia's population lives in this region, which confirms even more its significance. Tošić and Živanović (2011) emphasize that the area of the Danube belt, due to its exceptional importance, has led to a higher concentration of production, capital,

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traffic, population and settlement in that part of Serbia. Therefore, we may conclude that the Danube axis has an exceptional potential for the development of agriculture, energetics, industry and tourism.

The Danube was the central river of SFR Yugoslavia, but after its breakup the Danube became a border between the Republic of Serbia and the Republic of Croatia, which had a great influence on the development of this area, since the upper Danube sector used to represent the central part of a single country, being now coterminous (Šećerov & Nevenić, 2004). Unlike the upper sector, the Lower Danube sector has always been conceived as a border with Romania and Bulgaria.

The research in this paper covers all the segments of economic development in the Lower Danube sector which can contribute to the development of this part of the Danube Region in the Republic of Serbia. The aim of the paper is to highlight the potential of this area in hydropower, agriculture, tourism and infrastructure as main drivers of development. In addition to the explored potentials of this area, also development restrictions are emphasised.

## 2. METHODS

Numerous authors dealt with the development of the Danube Region (Šećerov and Nevenić, 2004; Mihić *et al.*, 2011; Tošić and Živanović, 2011; Demonja, 2012; Vujko and Gajić 2014; Gajić *et al.*, 2015; Voicilaş, 2017, etc.). Research by Demonja (2012) is based on secondary sources, analysis of approaches and views on the Danube Strategy and its importance for the Croatian Danube Region. Voicilaş (2017) highlights and analyses the economic and social processes that took place in the “Upper Pruth” Euro-region in Romania. The author identified the assets of this space by analyzing the following categories of indicators: population and labour force, social and cultural dimensions, agriculture and forestry, other economic activities, transport and technical infrastructure.

The data for this survey were collected for 29 municipalities with direct access to the Danube River in Serbia. The main social and economic indicators found in national statistics were used. The following categories of indicators were considered: population, agriculture and forestry, hydroenergy and mineral resources, tourism and infrastructure, as the biggest drivers of the development of this area.

It was necessary to collect population data for the 1948–2011 period in order to determine the numerical change in the population of this area. The data used, collected from the data-base of the Statistical Office of the Republic of Serbia, made it possible to obtain population density values.

In order to highlight the area’s agricultural potential, the authors resorted to the Agricultural Census 2012 data (Agriculture in the Republic of Serbia, 2012). For infrastructure, traffic and inland waterways, the data to use were found in the official publication “Transport, Storage and Connections Bulletin of the Republic of Serbia“ and in the European Conference of the Ministers of Transport. The collected data afforded reaching the basic results of the investigation and point out the development potentials and limitations in the Lower Danube sector in Serbia.

Based on the possibilities and constraints in the economic development of the Lower Danube sector, a SWOT analysis can be performed. A SWOT analysis clearly identifies the strengths and weaknesses (Voicilaş, 2017) of this area. Also, the SWOT analysis presented all the opportunities that this region offers, as well as the threats that will affect future development.

## 3. RESULTS AND DISCUSSION

Having in view that the Danube sector in Serbia displays different geographical, administrative, historical and political characteristics, this area was divided into upper, middle and lower sectors (Fig. 1).

The Lower Danube sector in the Republic of Serbia encompasses a part of the Danube that flows through the country along 588.8 km, that is, the section from Bezdán (1,425 km, on the border with Croatia) to the mouth of the Timok to the Danube (846 km, on the border with Romania and



Bulgaria). The Danube Region is located on the territory of Central Europe in the southern part of the Pannonian Basin and in the northern part of the Republic of Serbia (Milanković, 2015).

The Lower Danube sector includes five municipalities with direct outlet to the Danube (Veliko Gradište, Golubac, Majdanpek, Kladovo and Negotin) its relief covering the area of the Djerdap Gorge and the Vlach-Pontian lowland Danube flow.

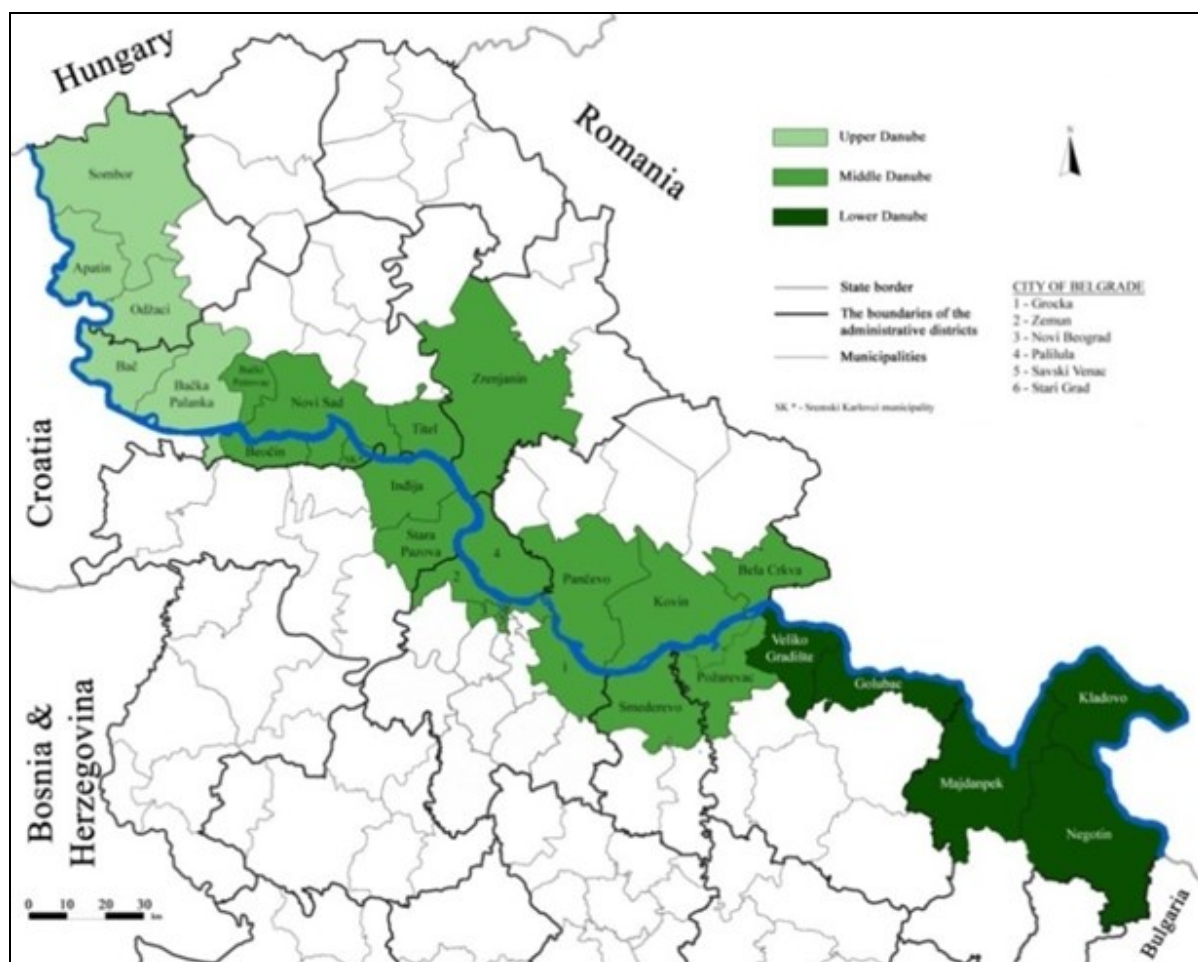


Fig. 1 – Division of the Danube Region in the Republic of Serbia (Milanković, 2015, modified by the author).

This sectoral division is the best solution, it contributing to better analyse and study all three zones that had experienced a different development throughout history, the consequences left could explain the different degrees of both urban and overall development of each of them. The middle Danube sector covers the largest area (53.2%), the lower one and the upper sectors 24.9% and 21.9%, respectively, of the total Danube Region in Serbia. The distribution of population also differs, so 10.6% live in the upper Danube sector, 84.4% in the middle Danube sector and only 5.0% of the total population of the Danube Region live in the Lower Danube sector (Fig. 2). This confirms that the middle part of the Danube flow in Serbia is the most populous and most populated area, with two large agglomerations: the City of Belgrade and the City of Novi Sad. However, besides its peripheral position and threatening depopulation, the Lower Danube sector has numerous development possibilities in agriculture.

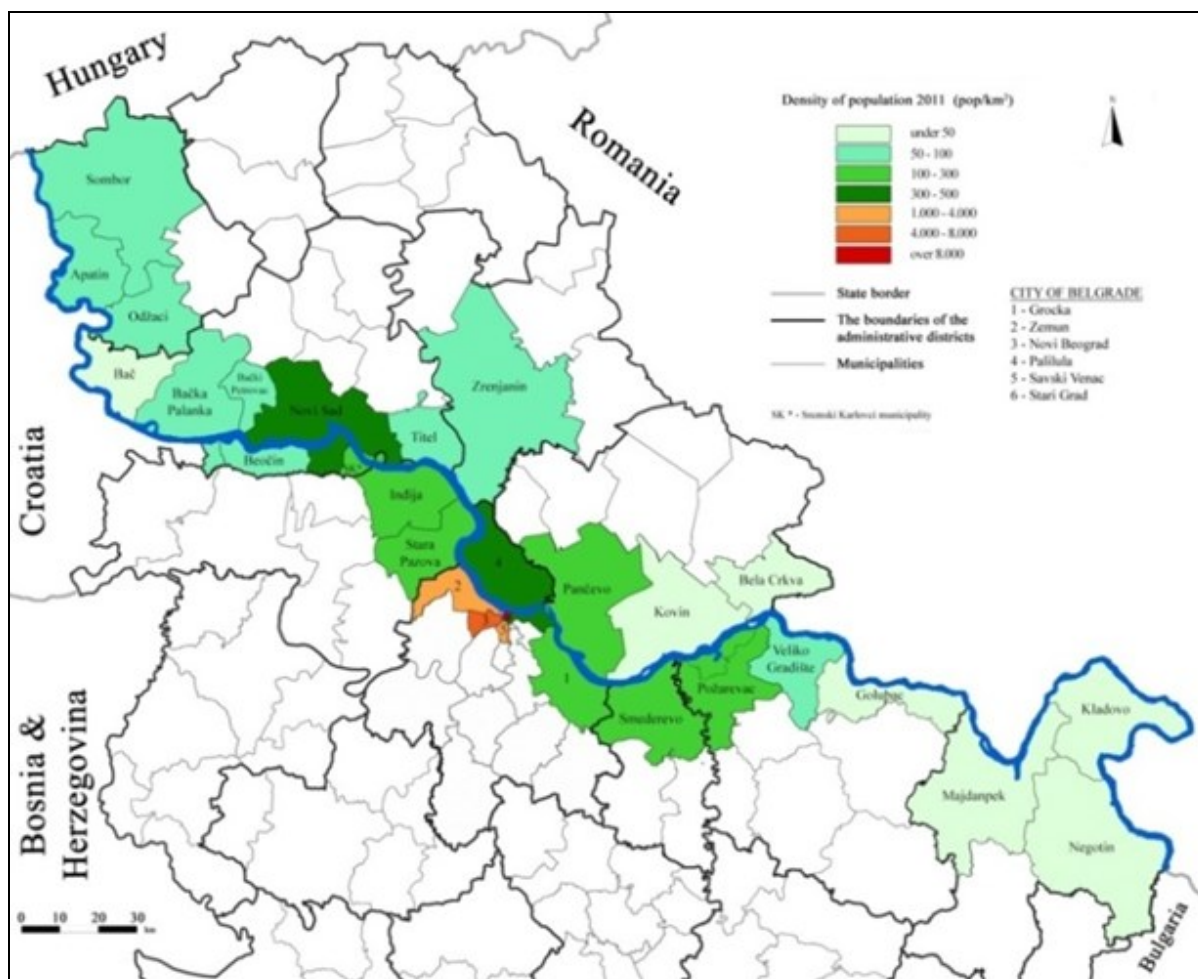


Fig. 2 – Population density (pop./km<sup>2</sup>) in the Danube Region in the Republic of Serbia (Milanković, 2015, modified by the author).

First of all, it highlights the hydroelectric potential, then the mineral resources, as well as the possibilities of the development of agricultural production, food and processing industry. Investing in the navigation infrastructure would contribute to the development of nautical and other types of tourism in this area, as an important segment of economic development.

The natural and social characteristics of this area made it peripheral in relation to the rest of the Danube Region, but quite specific in many ways. This area has many development potentials, but also a number of constraints that make this part of the Danube Region currently underdeveloped. The area of the Lower Danube sector covers 24.9% of the total area of the Danube Region in the Republic of Serbia, while only 5% of the total population of the region lives here.

Despite the constant decline in the number of inhabitants in this area (Fig. 3), some demographic potential has a relatively large share of the economically active population (Golubac, Veliko Gradište) which can be engaged in agriculture, tourism, etc.

Also, this area has a large number of residents, working temporarily abroad, who could invest their capital here. The main limitation in further development is stagnation of population and depopulation, as well as an expected continual aging trend and decrease of the young population.

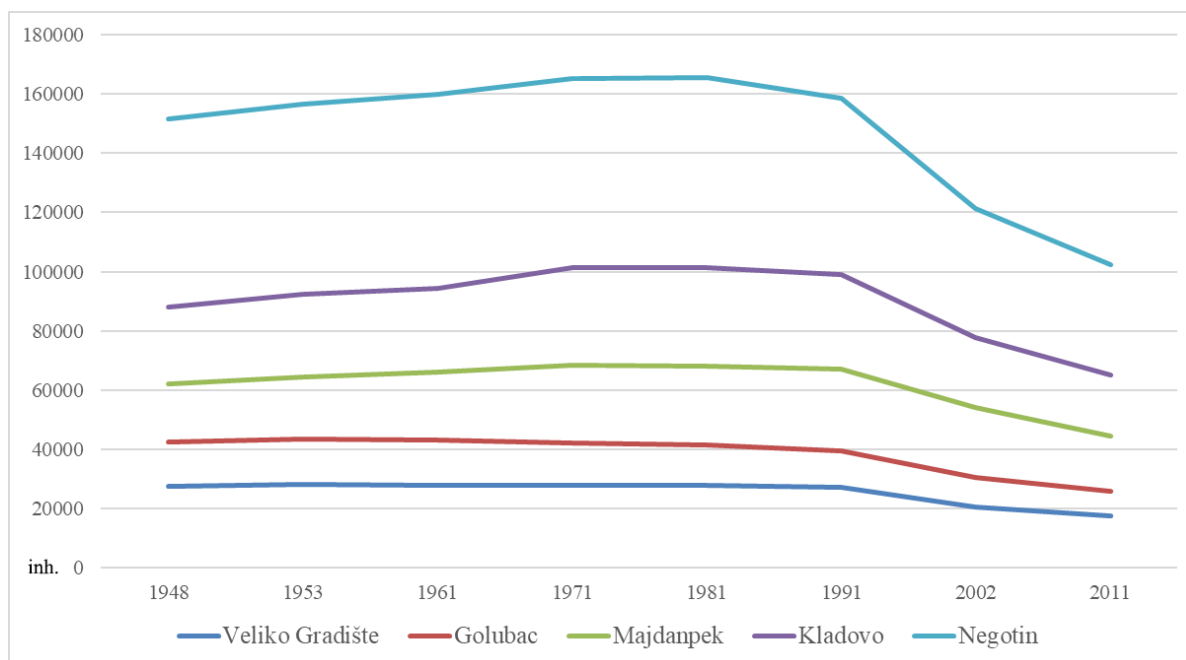


Fig. 3 – Changes in the number of inhabitants in the municipalities of the Lower Danube (1948–2011).

This area stands out by the migration of people to major cities or abroad, which has actually “emptied” the village, especially in parts of the Bor District. The greatest potential for the development of settlements has the position of Corridor VII, followed by a relatively reasonable concentration of population and economic activities in the centers and settlements. A development limitation is the insufficiently valued position between Corridors X and IV, while the basic absence of a balanced spatial-functional development of the settlement network in this area is the concentration of population, economic activities and public-sector infrastructure in regional and sub-regional centers and suburban settlements, on the one hand, and demographic fragmentation, depopulation, traffic isolation, underdeveloped activity structure and inadequate public-sector infrastructure in the villages of mountainous and peripheral areas, on the other. A poor road infrastructure and little accessibility, as well as the absence of a railway network are particularly visible in the municipalities of Majdanpek, Kladovo and Negotin. That is the reason why the position of these municipalities is out of the main traffic corridors, or they are inadequately connected. Uneven spatial distribution is characteristic of the municipality of Majdanpek, since the central part of the municipality is completely uninhabited. This indicates an even more conspicuous trend of demographic fragmentation, which in general, is a major problem in the municipalities of eastern Serbia. The municipalities of the Lower Danube sector were included in Euroregion 21, as a form of cross-border cooperation with Romania and Bulgaria. In the territory of this Euroregion, the Danube plays an important part in matters of transport, economy and political life, as well as in tourism, all with the aim of promoting the border regions of these three countries (Petrović, 2009). Although the Danube countries have different priorities, the cross-border cooperation areas will play an important role in strengthening the territorial cohesion, and the Danube Region strategy should be seen as a working method to increase efficiency and results (Tache, Popescu & Petrișor, 2014).

### 3.1. Hydroenergy and mineral resources as a developing potential of the Lower Danube sector

With its average flow of over 5,350 m<sup>3</sup>, the Danube represents about 42% of Serbia's hydro-energy potential, having two hydroelectric power-plants in the area of the Lower Danube sector, HPP "Djerdap I", total power 1,026 MW, still the largest hydro-technical structure on the Danube, and HPP "Djerdap II", with a total capacity of 270 MW.

The possibilities for the further development of the mentioned hydroelectric power-plants have been exhausted, so further development and increase of the exploitation of the Danube potential can be achieved in the following way (proposal made in the *Spatial Plan of special purpose area – international waterway E-80 – Danube* (Pan-European Corridor VII):

1. Another potential area is located on a part of the Danube flow downstream of the HPP "Djerdap II" to the mouth of the Timok and can be used within the "Turnu Magurele – Nikopol" HPP. This would allow for an industry that uses large quantities of technological water to be located in this area.
2. The development of the RHE "Djerdap III", about 3 km upstream Lepenski Vir, on the slopes of the North Kucaj, is another opportunity considered to increase the exploitation of the Danube potential. It is a technologically possible, but extremely expensive target, for which a preliminary feasibility study is needed.

Observing the mineral resources in the Lower Danube sector, the "Timok eruptive zone" has a long tradition in the exploitation and processing of metal raw materials, the most important copper deposits lying in the regions of Bor and Majdanpek, as well as gold, silver and tungsten near Blagojev Kamen. Deposits of gold and silver also exist in the area of the Pek and Timok Rivers and in the area of the Deli Jovan Mountain. Part of known deposits is exhausted, while part is exploited in underground mines, but there is a prospect to restart production in temporarily closed ore deposits and find and open up new ones. Progress in the exploitation and processing technology contributes to it and allows the use of ores with a small content of useful components, so that the material from the old tip heads can also be used for the economic production of metals (*Mineral Resources Management Strategy of the Republic of Serbia by 2030*).

### 3.2. Agriculture as developing potential of the Lower Danube sector

**Potentials** for the development of agriculture in the Lower Danube sector are primarily found in the heterogeneity of the microclimate, pedological, hydrographic and other natural conditions, which enables using certain areas to offer a wide range of quality agro-food products and relatively large areas of fertile soils, without major restrictions on environmentally safe irrigation.

Based on the data yielded by the Agricultural Census (2013), made on the territory of the Republic of Serbia, the area of the Lower Danube sector is seen as being excellent fruit-and-vineyard land. This gives it the opportunity to advance in the production of grapes and wines, as well as in various continental fruit, especially old autochthonous varieties. The potential is also reflected in the larger area of meadows and natural meadows that provide the possibility for developing livestock. The Lower Danube sector is also favourable to the cultivation of medicinal and aromatic herbs, as well as to the development of beekeeping (the area of the municipalities of Majdanpek, Negotin and Kladovo), where agricultural and forest areas can be combined in an integrated management system. The Bor District area has the best possibilities for collecting forest fruit. The development of agriculture may contribute to a possible significant return of young people from abroad.

It is especially important to preserve and activate the forest potential of this area by providing support for the sustainable exploitation of forest products (primarily wood) with the development of the wood processing industry; the use of forests for scientific-research, educational, sports and recreational, hunting and other activities. This is one of the best wooded areas in Serbia, and certainly the most wooded one in the Danube Region, which is its basic potential. Also, the best use of forests for tourism in protected natural areas would be welcome. We should not ignore the importance of the biomass in recent years as a source of renewable energy in developed countries (Milanković, 2015). The area also has good opportunities for the development of fishing and good fishing conditions, as well as a significant potential of the hunting and fishing tourism offer (Milanković, 2015).

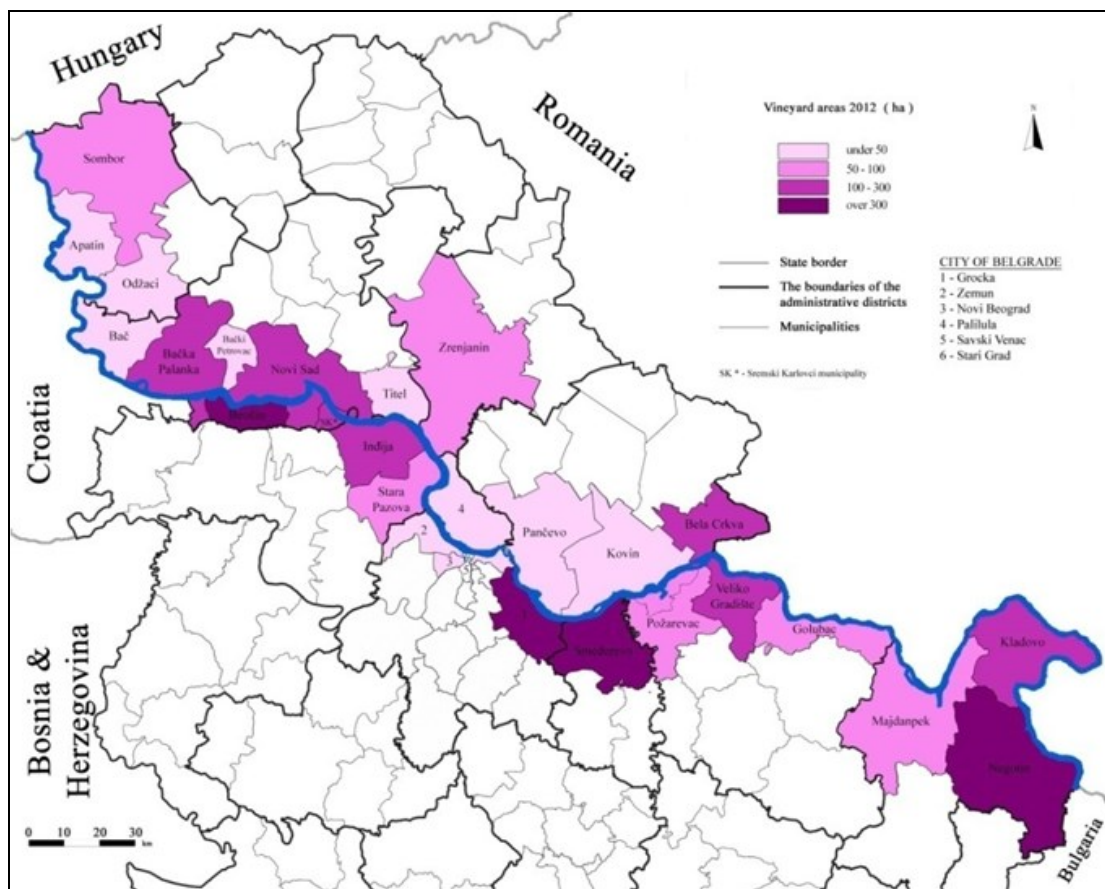


Fig. 4 – Vineyard areas, 2012 (ha), in the Danube Region of the Republic of Serbia (Milanković, 2015, modified by the author).

The basic **restrictions** for the development of agriculture are the unfavourable age and educational structure of the agricultural population, fragmented land ownership of family farms and the poverty of the rural population in households with exclusively agricultural sources of income. This is coupled with a relatively high percentage of hilly and mountainous areas in which soil and climatic conditions are considerably unfavourable for a cost-effective agricultural production, as well as huge cross-border environmental pollution of some parts of Kladovo municipality from the emission of harmful substances in the air and river coming from Romania. The poor development of transport, hydro-technical, social and other rural infrastructure, especially in mountainous areas, is another limitation to the development of agriculture in the Lower Danube sector. The poor health of forests,



extensively subjected to drying in almost the entire area of the Djerdap National Park, is mentioned in the Spatial Plan of the “Djerdap” National Park. The limitation in the development of forestry, hunting and fishing is the result of the absence of a hunting development strategy, but also of little knowledge on the state of private forests (Milanković, 2015).

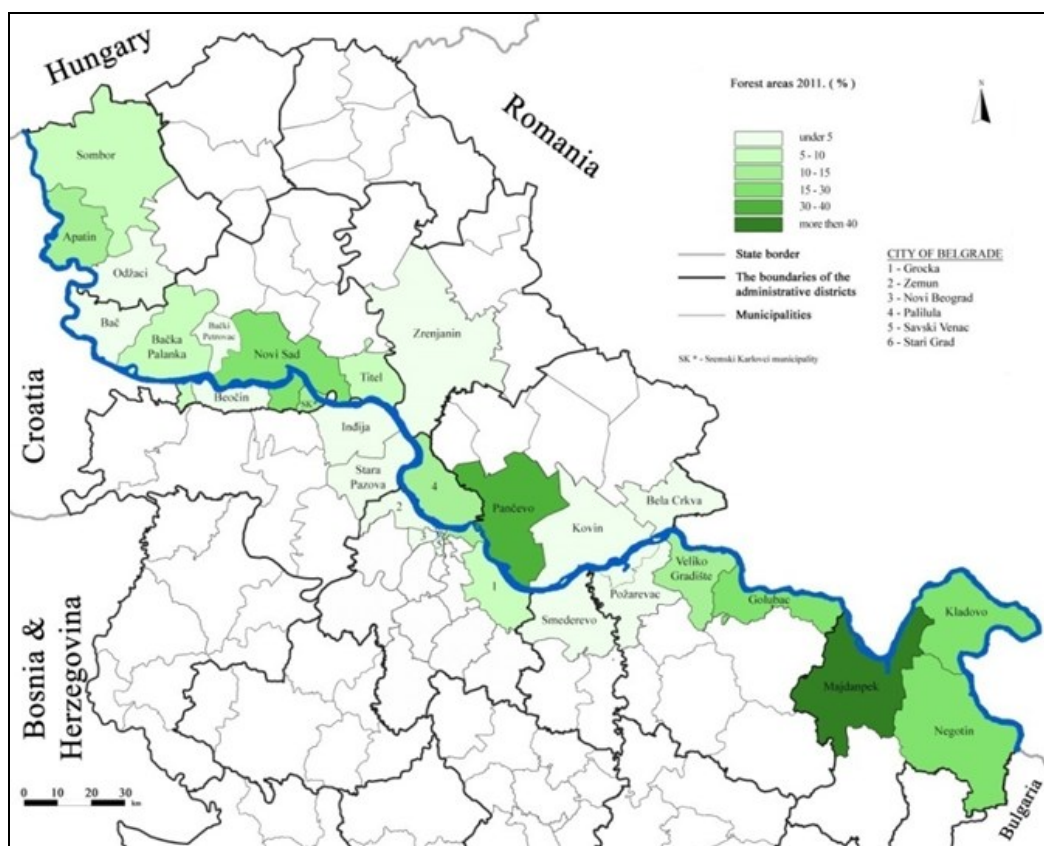


Fig. 5 – Forest areas, 2012 (ha), in the Danube Region of the Republic of Serbia (Milanković, 2015, modified by the author).

### 3.3. Tourism as developing potential of the Lower Danube sector

The **potential** for the development of tourism is represented by the natural and cultural values of this area, which make the Lower Danube sector an extremely important *historically-ecological tourist zone*. The basic potential for the development of tourism is based on the favourable geo-traffic position on the Danube River, the main routes which connect Corridor X and other main roads that provide access to areas for ambient and panoramic tours (ancient and other cultural heritage sites). A number of 12 bridges have already been built on the Danube in Serbia and 5 are planned to be built. The Republic of Serbia has 9 Danubian ports of international importance. The wealth of the cultural heritage in this area (archaeological sites, Roman culture, fortresses, etc.) have turned the Lower Danube sector into a distinct “historical zone” in the tourist offer. Also of interest are the two national parks, Fruška Gora and Djerdap, located on the right bank of the Danube in Serbia (Dragičević *et al.*, 2013). What is particular about the Lower Danube sector are the “Djerdap” National Park and the Djerdap Gorges which provide opportunities for the development of various types of tourism (nautical, eco-tourism, fishing, educational, etc.). This area has numerous possibilities of connecting attractions

on the coast with those in the immediate surroundings of the Danube. This type of tourist valorization requires the revitalization of existing ports and marinas, as well as the construction of planned ones, thus connecting attractive areas with the Danube River (Hadžić *et al.*, 2005; Dragin *et al.*, 2010).

The municipality of Majdanpek (Donji Milanovac and Lepenski Vir) has currently good opportunities for using the Danube waterway in tourism, as well as Kladovo (Tekija towage), while in the Golubac and Veliko Gradiste area they have planned passenger ports and marinas. A special potential for developing rural tourism exists in the Negotinska Krajina and the municipality of Majdanpek areas. Tourism can also target local agriculture, crafts, domestic work, etc., as well as the cross-border areas.

One of the basic **limitations** in the development of Lower Danube tourism is insufficient utilization of its capacities during the year, inadequate tourism product and poor marketing, as well as a shortage of quality accommodation capacities. What obviously prevents the development of tourism is a poor road, river-nautical, communal and tourist infrastructure, an unfavourable demographic picture, as well as the absence of regulation of the greater part of road and waterway facilities for the need of tourists. Other restrictions are represented by the insufficient and inadequate protection of the natural environment (National Park “Djerdap”), seen above all in landfills along the roads, unmanaged area by the river, etc. Some of the limitations of the tourist offer at national level are the insufficiently defined competences for managing sustainable tourism development in protected areas, as well as insufficient state funds for financing capital infrastructure, developing a tourism and recreational infrastructure, etc. The administrative procedure of ship registration with the port authorities and the obligation to announce the route of the vessel and the time limits is also a form of restriction (transition to Romania).

#### 3.4. Infrastructure as developing potential of the Lower Danube sector

The importance of infrastructure for the development of a particular region is obvious, because the transport network has the effect of joining and permeation, integration and organization representing a significant factor in the formation of central regions and axes of development, it (Grčić, Ratkaj, 2003). The greatest **potential** for traffic development is the intermodal conception of infrastructure systems based on road, rail, river and air transport. The boundary between part of this area and the EU countries and between Corridors IV, VII and X affords intensive development of transit traffic. There is a relatively good road traffic network density and accessibility to settlements, as well as the future construction of the Nis to Djerdap II highway and the affirmation of the European bicycle corridor Eurovelo 6 are worth mentioning. According to Vujko and Gajić (2014) the Danube Cycling Route has primarily the role of the economic development of Danubian countries. The possibility of overhauling and modernizing railroads in this area is particularly justified because it would offer environmental protection and low transport prices, as well as the possibility to connect “Prahovo” port with Romania through the “Djerdap II” dam, which would be of international importance for the railway. Also, modernization of the airport in Bor would contribute to increasing traffic accessibility to these parts of Serbia and provide opportunities for using it for tourist and other purposes, too. The main potential of this area in terms of sustainable use of the waterway is certainly the Danube River – waterway class VII in this area, while class VIc (Fig. 6) should be provided downstream Prahovo (European Conference of Ministers of Transport, 1992).

The waterway can be connected with the most developed industrial centers in Europe, “Prahovo” port playing a particular role, while the ports in Donji Milanovac, Tekija, Kladovo and Lepenski Vir have primarily the function of accepting tourism passenger ships (except for the harbours in Kladovo-Shipyard, used also for freight traffic, yet without a sufficient capacity for overloading devices).

Developing the waterway and investing in it is of great importance for the Republic of Serbia, as Mihić *et al.* (2011) emphasize – the development of inland waterway transport is one of the EU long-term sustainable development priorities.

The basic **constraint** in the sustainable development of traffic in this area is the poor condition of the local network of roads, as well as the unfinished and incomplete first-order road and railway sections. Also, the shortcomings of traffic are obsolescence and the insufficient equipment of port capacities and airport infrastructure. In addition, the relief of this area also influences landsliding, thus preventing the river from crossing the Djerdap Gorge, the area becoming quite unsuitable for the development and construction of communication lines. An important limitation in the exploitation of the Danube waterway are the submerged warships downstream Prahovo, which at low water levels prevent and reduce navigation safety in this area. Due to changing morphometric indicators, accessibility in the Djerdap area is limited, and some narrow sections in the cluster create difficulties to navigation.

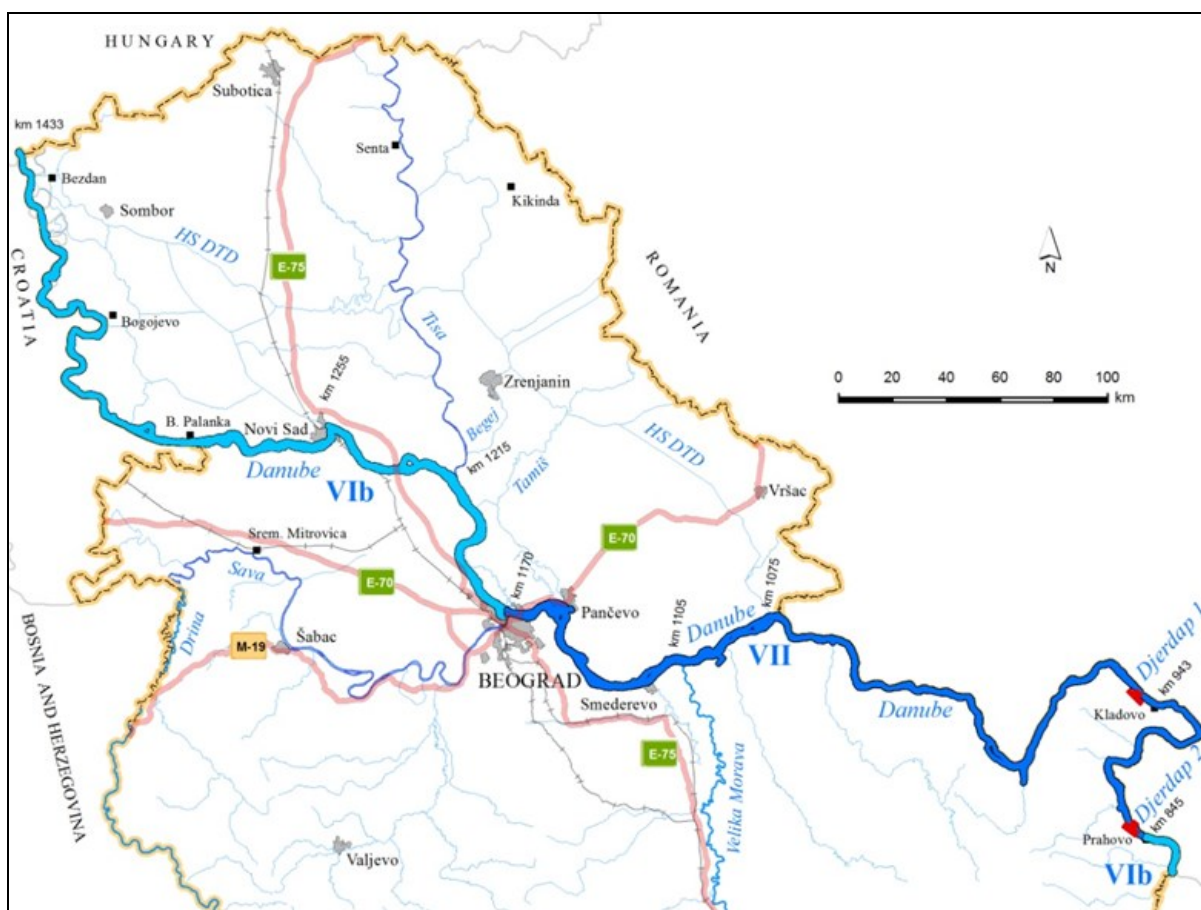


Fig. 6 – The Danube River in Serbia (Corridor VII) (Base map: Global map V2 <http://www.iscgm.org/gmd/>).

### 3.5. The SWOT analysis

Based on the possibilities and constraints in the economic development of the Lower Danube sector, a SWOT analysis can be performed (Table 1).



Table 1

A SWOT analysis for the Lower Danube sector in the Republic of Serbia

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Good geographical position on Corridor VII;</li> <li>• The advantage of the waterway in relation to other types of traffic;</li> <li>• The existence of conditions for the development of intermodal traffic (Prahovo port);</li> <li>• Hydroelectric potential of the Danube River;</li> <li>• Hydropower plants “Djerdap I and II” which contributed to safer navigation;</li> <li>• Mineral and forest resources;</li> <li>• Perfect conditions for the development of wine and fruit growing;</li> <li>• Tourist potentials, natural and cultural heritage;</li> <li>• Relatively good accessibility to tourist destinations;</li> <li>• Extremely favourable state of the environment in protected areas;</li> <li>• Improved water quality of the Danube River;</li> <li>• The participation of Serbia in numerous projects that promote the development of the Danube Region;</li> <li>• Reconstruction of hydroelectric power-plants and building a new Hydropower plant, ‘Djerdap III’, in co-operation with Romania.</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient utilization of the advantages of the Danube waterway (especially in terms of traffic and tourism);</li> <li>• Waste water problem;</li> <li>• Insufficiently built infrastructure, especially toward international corridors;</li> <li>• Difficult port infrastructure;</li> <li>• Old technology, drop in investments and transition recession;</li> <li>• Depopulation and unfavourable educational structure;</li> <li>• Fragmentation of two-member households and single-family households;</li> <li>• Incomplete tourist presentation of the natural and cultural heritage;</li> <li>• Poor use of renewable energy sources (geothermal, wind and solar energy);</li> <li>• Environmental problems (wastewater from agriculture and industry, pollution induced exploitation of mineral resources, erosion, cross-border pollution, etc.);</li> <li>• Bottlenecks on the waterway and sunken ships which affect navigation safety.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Significant use of water transport and improvement of the position of waterways;</li> <li>• The possibility of developing multimodal traffic;</li> <li>• Interests of the countries in the region for the development of a regional transport network;</li> <li>• Possibility of connecting these areas with Corridor IV;</li> <li>• The development of a hydro-melioration system as a positive effect on the region’s agriculture;</li> <li>• The ability of clearly defining the wine region and its involvement in the tourist offer;</li> <li>• The importance of the diaspora and potential returnees from abroad (transfer of knowledge and technology, etc.);</li> <li>• The possibility of linking tourism potentials with cross-border areas;</li> <li>• The possibility of integrating the cultural and natural heritage (History and ecological zone in tourism);</li> <li>• Exploitation of renewable energy sources;</li> <li>• Improving the quality of the environment by using EU funds;</li> <li>• Better transnational and cross-border cooperation with the Danube countries (Romania, Bulgaria).</li> </ul>	<ul style="list-style-type: none"> <li>• Continued degradation of parts of the land infrastructure;</li> <li>• Outdated technology, a big polluter of the environment;</li> <li>• The population aging trend, especially in the rural areas;</li> <li>• Uneven spatial distribution of the population and concentration in the district of the macro-regional center;</li> <li>• Decrease in the number of inhabitants, fragmentation of the households and displacement of rural settlements;</li> <li>• Disproportion in the level of development of regional centers;</li> <li>• Absence of continuous investment in tourism, absence of accommodation capacities and poor quality presentation of the natural and cultural heritage;</li> <li>• Cross-border pollution and weaknesses in the implementation of regulations in protecting natural resources and the environment;</li> <li>• Insufficient protection, conservation and restoration of the cultural heritage.</li> </ul>

#### 4. CONCLUSION

The main potential of economic development in the Lower Danube sector is primarily its hydropower (existing hydroelectric power-plants), the reserves of precious metals, mineral raw materials, copper ore, zinc and lead, stone, gravel and sand. In addition, there are the natural resources for the development of agriculture and the food industry, as well as natural values and conditions for the development of certain types of tourism (mountain, nautical, hunting, eco). This area has a significant land potential, but economic and tax policy measures require the formation of larger agricultural holdings (over 100 ha), with an adequate irrigation system and optimum application of an agro-technology. Despite the potentials that contribute to the development of this part of the Danube Region, there are numerous limitations, such as the poor economic situation and the economic crisis, a high unemployment rate, unfavourable demographic structure, low level of investment and equipment.

Characteristic of the Lower Danube sector which is not economically developed, is the 'brain drain' and shortage of quality personnel, an insufficiently built and developed infrastructure, especially towards the international corridors. Slow economic development is caused by the irrational use of space, high costs of activating existing industrial brownfield sites, as well as lack of financial resources and adverse financing conditions.

From the above one may conclude that the main potentials of economic development in the Lower Danube sector are primarily hydropower and the existing hydroelectric power-plants, the reserves of precious metals, mineral raw materials, copper ore, zinc and lead, stone, gravel and sand. In addition, there are the natural resources for the development of agriculture and the food industry, as well as natural assets and conditions for the development of certain types of tourism (mountain, nautical, hunting, eco). The Lower Danube sector has many development potentials, but also many constraints which prevent the development of this region in the Republic of Serbia.

The basic demographic constraint in the development of the Lower Danube sector is depopulation, the unfavourable educational structure and the fragmentation of households. Unfortunately, the population aging trend, the decrease in the number of inhabitants, the fragmentation of households and the displacement of rural settlements will continue.

Also, there are infrastructural problems, such as the poor quality of roads and the insufficiently built infrastructure, especially in mountain areas. Great problems on the waterway pose the sunken ships which affect navigation safety.

Despite numerous problems, this region has many opportunities, such as the possibility of connecting this area with Corridor IV and developing multimodal traffic. This part of Serbia has many opportunities for developing tourism and linking it with cross-border areas. The main disadvantage for the development of tourism is the absence of steady investment, of accommodation capacities and the poor qualitative presentation of the natural and cultural heritage.

This region is well-known for its environmental problems and waste water, because of old technology and shortage of investments. A big challenge in sustainable development is cross-border pollution and weaknesses in implementing regulations of protecting natural resources and the environment. The quality of the environment, as well as other segments of development of this area can be improved by using EU funds and better transnational and cross-border cooperation with the Danubian countries (Romania, Bulgaria).

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## REFERENCES

- Dragin, Aleksandra (2010), *International Cruising the Corridor 7*, University of Novi Sad, Department of Geography, Tourism and Hotel Management.
- Dragičević, S., Mészáros, M., Djuridjić, Snežana, Pavić, D., Novković, I., Radislav, T. (2013), *Vulnerability of National Parks to Natural Hazards in the Serbian Danube Region*, Polish Journal of Environmental Studies, **22**, 4, pp. 1053–1060.
- European Conference of Ministers of Transport. 1992. Resolution No. 92/2 on New Classification of Inland Waterways (report), retrieved from: <http://www.internationaltransportforum.org/IntOrg/acquis/wat19922e.pdf>.
- Gajić, M., Matkovski, B., Zekić, S., Đokić, D (2015), *Development performances of agriculture in the Danube Region Countries*, Economics of Agriculture **62**(4), pp. 921–936.
- Grčić, M., Ratkaj, I. (2003), *Euroregions and Eurocorridors as integration factors of the southeast European countries into EU*, Collective volume – Faculty of Geography, University of Belgrade, **51**, pp. 1–22.
- Hadžić, Olga (2005), *The Growth of the Cruise Tourism as a Chance for Repositioning Serbia on Tourism Market*, Paper presented at the meeting of University of Novi Sad, Faculty of Natural Science and Mathematics, Novi Sad.
- International Commission for the Protection of the Danube River (ICPDR), *The Danube River Basin District Management Plan – Update 2015*, Part A – Basin-wide overview.
- Milanković, Jelena (2015), *Danube as a transport artery and axis of development in the Republic of Serbia*, PhD thesis, University of Novi Sad, Department of Geography, Tourism and Hotel Management, 232 p.
- Mihić, Svetlana, Golušin, Mirjana, Mihajlović, M. (2011), *Policy and promotion of sustainable inland waterway transport in Europe–Danube River*, Renewable and Sustainable Energy Reviews, **15**, 4, pp. 1801–1809.
- Mineral Resources Management Strategy of the Republic of Serbia by 2030* (2012), National Assembly of the Republic of Serbia, Belgrade.
- Petrović, S. (2009), *Euroregions in the function of transnational cooperation of the countries of the Western Balkans*, Globe, **40**, 34, pp. 73–88.
- Spatial plan of the special purpose area of the National Park “Djerdap” (2009), Official Gazette of the Republic of Serbia, **43/13**. Republic Agency for Spatial Planning, Belgrade.
- Spatial Plan of special purpose area – international waterway E-80 – Danube (Pan-European Corridor VII)* (2014), The Institute for Urbanism of Vojvodina, Novi Sad.
- Statistical Office of the Republic of Serbia (2011), *Census of Population, Households and Dwellings in the Republic of Serbia*. Comparative overview of the Number of Population in 1948, 1953, 1961, 1971, 1981, 1991, 2002 and 2011.
- Statistical Office of the Republic of Serbia (2013), *Agriculture in the Republic of Serbia, 2012* (Book I and II), Belgrade.
- Tache, A.V., Popescu, Oana, Petrișor, A.I. (2015), *Strategic Planning for the Development of the Danube Area*, Romanian Review of Regional Studies, **10**, 2, pp. 15–26.
- Tošić, Branka, Živanović, Zora (2011), *The Danube Region in Serbia within the Process of Transnational Cooperation and Interregional Functional Connections*, Bulletin of the Serbian Geographical Society, **91**, 4, pp. 89–110.
- Trócsányi, A. (2010), *A kulturgeográfia alapjai*. In: Tóth J. (eds.): Világföldrajz. Akadémia Kiadó, Budapest, pp. 619–645.
- Voicilaș, D.M. (2017), *Opportunities and Threats in North Eastern Romania – SWOT Analysis in Suceava and Botoșani Counties*, Agricultural Economics and Rural Development, New Series, **14** (2), pp. 175–184.
- Vujko, A., Gajić, Tamara (2014), *Opportunities for tourism development and cooperation in the region through the improvement of the quality of tourism services – the ‘Danube Cycle Route’ case study*, Economic Research, **27**, 1, pp. 847–860.
- Šećerov, V., Nevenić, Marija (2004), *Danube Space in Serbia through History up to Date – short overview*, /Bulletin of the Serbian Geographical Society/, **84**, 2, pp. 223–230.

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# REGIONAL DISPARITIES IN THE URBAN SPRAWL PHENOMENON IN ROMANIA USING CORINE LAND COVER DATABASE

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*Key-words:* urban sprawl, CLC database, Development Regions, Romania.

**Abstract.** Urban growth is one of the foremost spatial and functional processes in Romania, leading to an increase in the demand for housing, transport and infrastructure. Urban growth generally occurs dispersed throughout rural areas in the proximity of towns, under the form of urban sprawl. The current paper is seeking to assess urban sprawl in Romania after 1990 (the post-communist period) based on CORINE Land Cover (CLC) database. Two sub-periods were selected for this assessment (1990–2000 and 2000–2012) in relation to the particular political, socio-economic and decisional transformations. Given the regional particularities of land use/cover changes and the way the socio-economic transformations have been manifested regionally, the current assessment has been performed for each Development Region of Romania (NUTS 2 level). The study identifies the intra- and inter-regional differences of urban sprawl in relation to the spatial and functional patterns of built-up areas expansion. Generally, urban sprawl occurs at the expense of arable lands, pastures and natural complex cultivation patterns especially inside and outside the cities limits (e.g., Bucharest, Cluj-Napoca, Iași, Oradea, Constanța). However, regional differences are visible in relation to the natural and socio-economic conditions. Hence, North-West and South-West Development Regions registered the highest shares of built-up areas (around 60%), while South-East and West Development Regions the lowest (under 50%). The results of the current study provide useful data on the urban sprawl in Romania, highlighting the regional differences of the phenomenon in order to support further planning and management of land resources and land consumption.

## 1. INTRODUCTION

Europe is characterised by higher urban growth processes, leading to an increase in the demand for housing, transport and infrastructure (EEA, 2016). It has been estimated that by 2020, approximately 80% of Europeans will be living in urban areas which will occur in a dispersed way throughout Europe's countryside, under the form of urban sprawl (EEA, 2011). Over the last decades, land use/cover in Europe has been subject to a variety of structural and functional transformations with significant impacts on the spatial patterns of land processes. Between 2000 and 2006 about 1,000 km<sup>2</sup> of land was covered every year by artificial surfaces (EEA, 2010). The expansion of residential areas and construction sites is the main reason for the increase in urban land coverage in Europe.

Sprawl can be defined as a pattern of urban and metropolitan growth characterised by a continuous outward extension of built-up areas beyond city limits (Brueckner, 2000; Squires, 2002) and its suburbs over the rural land located at the fringe (Patacchini and Zenou, 2009). The extent of urbanisation is mainly driven by population growth and large-scale migration, which controls the changes in land use patterns (Sudhira *et al.*, 2004). In other words, it can be described by low-density housing and commercial development, automobile-dependent commuting, land use fragmentation and change located on the fringe of cities mainly into the surrounding agricultural areas (Squires, 2002; EEA, 2006). As a result, the compact urban areas have constantly been replaced by diffusive, scattered, leapfrog, linear or clustered growth (Allen and Lu, 2003; Cheng and Masser, 2003; Wilson *et al.*, 2003; Berling-Woff and Wu, 2004) which consumes more land resources (Barnes *et al.*, 2001).

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These spatial processes involve significant social, environmental and economic consequences (Patacchini and Zenou, 2009), in many cases restricting the accessibility to natural resources (e.g. agricultural lands, timberland) (Barnes *et al.*, 2001).

In order to assess and understand the spatial dimension of urban sprawl, land use/cover change analyses (LUCC) are already receiving considerable attention for identifying and computing its extension and pattern (Arsanjani *et al.*, 2013; Sudhira *et al.*, 2004). The impervious or built-up areas are generally used as foremost parameters to measure urban growth (Torrens and Alberti, 2000; Barnes *et al.*, 2001; Epstein *et al.*, 2002; Sudhira *et al.*, 2004; Rahman *et al.*, 2011; Shahraki *et al.*, 2011). For this reason, the current paper is proposing a basic assessment of the urban sprawl process based on the built-up areas dynamics for the 1990–2012 period in order to: (1) to detect where specific built-up areas change occurs – hotspots of urban sprawl; (2) to identify which land use/cover categories are subject to change in relation to built-up areas dynamics (change transitions); (3) to assess the change rates in order to pinpoint the spatial and temporal dynamics of the phenomenon. Solving these research objectives will help support effective policymaking in terms of urban and regional development, land-use planning, and planning of transport and other infrastructure, such as health services, ecosystem services and biodiversity conservation.

## 2. STUDY AREA

Located in the South-eastern part of Central Europe, Romania is a medium-sized European state covering a surface of 238,391 km<sup>2</sup> and a population of 20,121,641 inhabitants (INS, 2011; Niculescu, 2016) (Fig. 1).

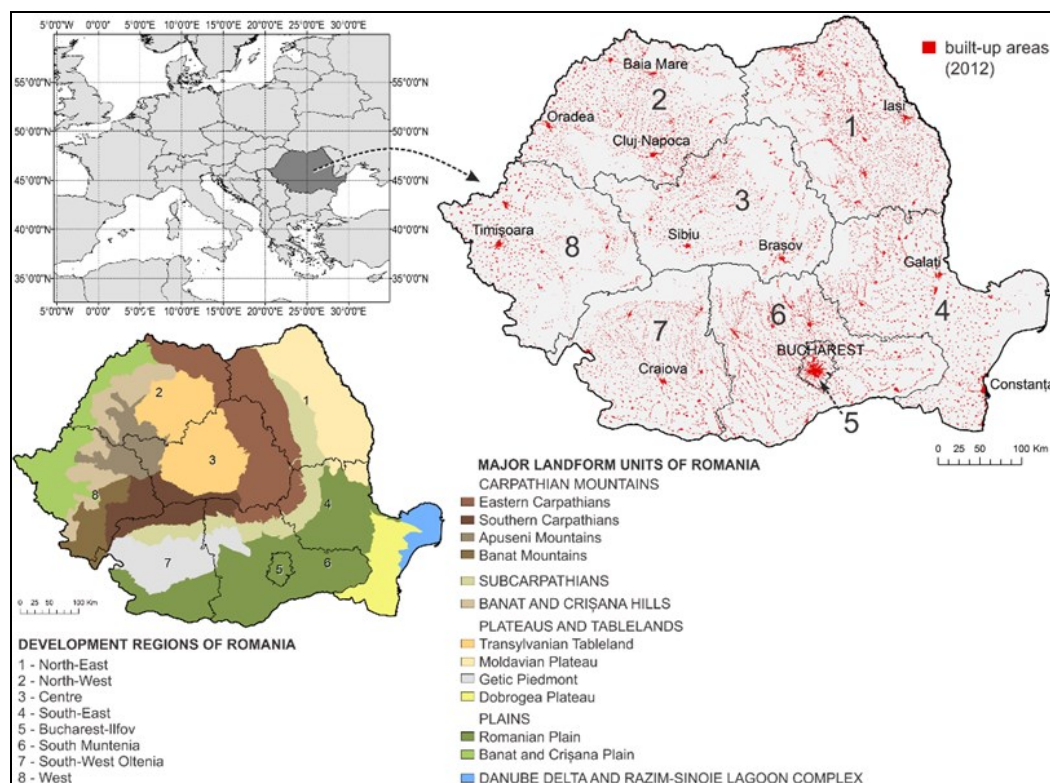


Fig. 1 – The Development Regions and the major landform units of Romania. The built-up areas in 2012 (CLC database).

The diversity of land use/cover types stems from the variety of landforms, the moderate temperate-continental climate, the assortment of soil resources and the socio-economic conditions. Nevertheless, in relation to the local natural and socio-economic particularities, significant regional differences arise. Albeit the main land use categories are agricultural (61.2%) and forests (28.5%), built-up areas (3.1%) (INS, 2012) hold the largest population share. Within the general trends in urbanisation, some regions in Romania (e.g. Ilfov County) are known at European level for the high shares of urban population growth (Eurostat, 2016), setting off visible spatial transformations inside and outside cities.

The spatial differences of urban sprawl are more visible at regional levels. Thus, the authors have assessed urban sprawl phenomena at the level of Romania's eight Development Regions – NUTS 2 (North-West, Centre, North-East, South-East, South-Muntenia, Bucharest–Ilfov, South-West Oltenia and West). The Development Regions have been established in 1998 as territorial-statistical entities without legal personality in order to provide data for Eurostat estimations and for the absorption of European Structural Funds (Săgeată and Popescu, 2016).

### 3. METHODOLOGY AND DATA

The fall of the communist regime (1989) brought in a series of fundamental political and socio-economic changes commonly recognized as major drivers of territorial changes, grouped in two main periods: transition (1990–2003) and post-transition (2003 – to date) (Popovici *et al.*, 2013; Grigorescu *et al.*, 2015a). The transition period marked a significant change in the economy meant to replace the old centralised system by the free market system. Decollectivisation and privatisation of agriculture were the leading spatial and structural processes of this period which resulted in an overconcentration of the land property. The main consequences involved an excess fragmentation and abandonment of agricultural terrains (Popovici *et al.*, 2013), giving room to their conversion into other urban sprawl-related land use categories (e.g. residential, commercial). The post-transition period brought about changes related to the pre-accession and accession to the European Union and the implementation of the Common Agricultural Policy (CAP). These processes led to important land use/cover changes mainly associated with the *intensification* (internal conversion of agricultural land types from lower-to-higher intensity use) and *extensification* (internal conversion of agricultural land types from higher-to-lower intensity use) of agriculture, but also *urbanization and industrialization*, manifested by the expansion of the artificial areas (i.e. urban fabric, industrial, commercial) related to the decrease of the agricultural lands, semi-natural areas and forestlands (Kucsicsa *et al.*, 2018; Popovici *et al.*, 2018).

Following the political and socio-economic changes that took place after 1990 and their significance for the resulted spatial transformations in land use/cover pattern, the current assessment was performed for two relevant time-frames of the post-communist period. The analyses have been performed using Corine Land Cover Database<sup>1</sup>, the only available free spatial datasets with national coverage at a relatively good resolution (equivalent to 1:100000 scale): 1990–2000 (T1) and 2000–2012 (T2). Thus, in order to identify these spatial transformations of the urban sprawl phenomenon in Romania, the authors generalised and used ten land use/cover categories according to the CLC level 3 nomenclature: built-up areas, arable lands, permanent crops, pastures, scrub and/or herbaceous vegetation association, forests, open spaces with little or no vegetation, heterogeneous agricultural areas, natural grasslands and agricultural complex cultivation patterns (Table 1).

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<sup>1</sup> available at: European Environment Agency (Copernicus Land Monitoring Service) (<https://land.copernicus.eu/pan-european/corine-land-cover/view>)

Table 1

Land use/cover categories according to the CLC level 3 nomenclature

Main land use/land cover category	CLC nomenclature (level 3)
Built-up areas	Continuous urban fabric (111); Discontinuous urban fabric (112); Industrial or commercial units (121); Port areas (123); Airports (124); Construction sites (133); Sport and leisure facilities (142)
Arable lands	Non-irrigated arable land (211); Permanently irrigated land (212); Rice fields (213)
Permanent crops	Vineyards (221); Fruit trees and berry plantations (222)
Pastures	Pastures (231)
Scrub and/or herbaceous vegetation association	Moors and heathland (322); Sclerophyllous vegetation (323); Transitional woodland-scrub (324)
Forests	Broad-leaved forests (311); Coniferous forests (312); Mixed forests (313)
Open spaces with little or no vegetation	Beaches, dunes, sands (331); Bare rocks (332); Sparsely vegetated areas (333)
Heterogeneous agricultural areas	Annual crops associated with permanent crops (241); Land principally occupied by agriculture, with significant areas of natural vegetation (243)
Natural grasslands	Natural grasslands (321)
Complex cultivation patterns	Complex cultivation patterns (242)

In order to capture the spatial disparities of this complex phenomenon, the analyses have been carried out at regional level (Development Regions of Romania) and were completed by comparative environmental and socio-economic characteristics to explain the identified spatial changes.

#### 4. URBAN SPRAWL IN ROMANIA. REGIONAL DISPARITIES

Urban sprawl has become the most notable pattern of urban development which, through urbanisation and suburbanisation processes, has significantly shaped the Romanian landscape over the last decades. Up to now, urban growth-related processes and their dynamics in Romania have been assessed in relation to their main explanatory driving factors (e.g. political, economic, demographic, and natural) at different spatial scales. A number of studies have addressed different urban development-related aspects at national level (e.g. Nicolae, 2002; Suditu *et al.*, 2010; Iojă *et al.*, 2011; Ianoș *et al.*, 2012; Petrișor, 2012; Mitrică *et al.*, 2016; Grădinaru *et al.*, 2015; Dumitrache *et al.*, 2016). At regional level, however, there is a wider variety of studies generally focusing on metropolitan regions (e.g. Bucharest, Constanța, Iași, Suceava, Brașov, Cluj-Napoca) or other urban areas (Târgoviște, Sinaia), addressing topics such as: land cover/land use changes and spatial transformations (Simion, 2010; Pătrosescu *et al.*, 2011; Iojă *et al.*, 2011; Iojă *et al.*, 2014; Grigorescu *et al.*, 2012, 2015a), counter-urbanisation process and rural-urban fringe patterns (Ianoș *et al.*, 2010; Guran-Nica *et al.*, 2011; Guran-Nica and Sofer, 2012; Vlădeanu and Petrea, 2013), residential development (Niculiță *et al.*, 2011; Grigorescu *et al.*, 2012; Grigorescu *et al.*, 2015b; Pocol and Jitea, 2013), suburbanization and metropolization processes (Erdeli and Simion, 2006; Dumitrache *et al.*, 2016; Guran-Nica *et al.*, 2016), causes and consequences of urban sprawl (Iațu *et al.*, 2011; Sârbu, 2012; Coheci, 2014; Iațu and Eva, 2016) or different socio-demographic processes taking place at the urban-rural interface (Sârbu, 2012; Istrate, 2015; Coheci and Mitrea, 2016).

After the fall of communism, the intra- and inter-regional disparities in Romania have been mainly explained by some phenomena which involved: urbanisation/suburbanisation, where growth was mainly concentrated in and around large cities (e.g. Bucharest, Iași, Constanța, Cluj-Napoca, Brașov) developing new urban-rural relationships and metropolitan areas (Grigorescu and Kucsicsa, 2017); industrial decline which have affected the former industrialised regions during the socialist period (South-West Oltenia, North-East and partly South-Muntenia); predominant agricultural-rural – based local economies (South-Muntenia); mountain areas affected by stagnation or recession (Centre);



foreign investments (Bucharest–Ilfov) (Popescu *et al.*, 2016; Bălteanu *et al.*, 2016a). All of these help explain the key urban sprawl-related features (pros and cons), which justify the different growth potential of each development region (Table 2).

Table 2

## Key urban sprawl-related features of the development regions in Romania

Development Region	Key urban sprawl-related features
<i>South-Muntenia</i>	<b>pros</b> – extended land resources (e.g. agricultural areas); industrial renewal due to foreign investments (e.g. Pitești, Târgoviște, Ploiești); cross border cooperation and improved connectivity with Bulgaria (Giurgiu–Ruse bridge, Turnu-Măgurele – Nikopol ferry); one growth pole (Ploiești); one development pole (Pitești) <b>cons</b> – significant intra-regional disparities; industrial decline and unemployment (e.g. Turnu Măgurele, Oltenița, Călărași, Zimnicea)
<i>South-East</i>	<b>pros</b> – significant natural resources (e.g. fertile soils, agricultural areas, mineral resources, oil and gas); accessibility and diversity of transport infrastructure (including maritime – Constanța harbour); one growth pole (Constanța) with the most developed economy, foreign investments and metropolitan area; development poles (Galați, Brăila) with revived industry and growth potential, seeking to develop a bipolar metropolitan area; other towns undergoing industrial rehabilitation: Năvodari, Mangalia, Buzău <b>cons</b> – dominant agricultural economy; post-communist industrial decline and unemployment (e.g. Râmnicu Sărat, Medgidia)
<i>North-East</i>	<b>pros</b> – the most extended and populated; rather higher industrialisation rates in Bacău, Neamț and Iași Counties; one growth pole (Iași) which is the most dynamic city in terms of industrial development and suburbanisation (metropolitan area); two development poles (Suceava, Bacău) <b>cons</b> – the lowest values of the economic indicators; low industrialization level; highest employment in agriculture; one of the less attractive areas for foreign investments
<i>North-West</i>	<b>pros</b> – diversified economy mainly based on agriculture, industry and services with high growth levels in Cluj and Bihor Counties; one growth pole (Cluj-Napoca), the most developed city known for the concentration of industries, services and foreign investments; three development poles (Oradea, Satu Mare, Baia Mare); metropolitan development (Oradea, Cluj-Napoca, Baia Mare, Satu Mare) <b>cons</b> – slight intra-regional disparities between the more industrialised counties (Cluj, Bihor, Satu Mare, Maramureș) and the less developed (Sălaj and Bistrița Năsăud)
<i>Centre</i>	<b>pros</b> – diversified economy and high industrial development (mainly energy, aeronautics, chemical fertilizers); foreign investments (Brașov, Sibiu, Târgu Mureș); one growth pole (Brașov); two development poles (Sibiu, Târgu Mureș); metropolitan development (Brașov, Târgu Mureș) <b>cons</b> – extended mountain areas affected by stagnation or recession (Harghita, Covasna Counties); industrial decline (former mining areas in Hunedoara and Alba Counties)
<i>West</i>	<b>pros</b> – diversified natural resources and economy; cross-border cooperation; most of industry and foreign investments concentrated in Timiș and Arad Counties; cross border cooperation and improved connectivity with Hungary; one growth pole (Timișoara); two development poles (Arad, Deva); metropolitan development (Deva, Hunedoara, Simeria, Timișoara); <b>cons</b> – significant intra-regional disparities between Timiș County and the three less developed counties (Arad, Hunedoara and Caraș-Severin)
<i>South-West Oltenia</i>	<b>pros</b> – predominantly agriculture and industry-based economy with some major investments in Craiova, Slatina, Târgu Jiu); cross-border cooperation and improved connectivity with Bulgaria (Calafat–Vidin Bridge, Bechet–Oreahovo ferry crossing) and Serbia (Drobeta Turnu Severin–Kladovo); one growth pole (Craiova) with the highest development potential through the aircraft and locomotive factory; one development pole (Râmnicu Vâlcea) <b>cons</b> – the poorest region in terms of contribution to the national GDP; relatively low industrialization level; negative environmental impact triggered by the energy and mining industry (Turceni, Rovinari and Ișalnița thermal power plants)
<i>Bucharest–Ilfov</i>	<b>pros</b> – the highest contribution to the national GDP; large share of built-up areas; complex agriculture, combining rural with suburban farming; high concentration of foreign investments; the industry is mainly related to the urban market and the multinational companies headquarters; service sector holds 83% of all active enterprises; continuous spatial and functional expansion of Bucharest over the surrounding territory (urban sprawl-suburbanization), especially through residential and commercial development <b>cons</b> – deindustrialization of Bucharest economy and relocation of some companies in Ilfov County; economic disparities between Bucharest and Ilfov County, with different economic characteristics

The variety and dynamics of the main land use/cover categories and socio-economic processes are visible in the inter-regional disparities of the Development Regions. Built-up areas, considered as growth nuclei for future urban sprawl, prevail in the South-Muntenia and North-West Development Regions where some of the biggest cities of Romania are located (e.g. Cluj-Napoca, Oradea). However, areas with natural restrictions for urban growth are located in the South-East Development Region, mainly due to presence of the second largest delta in Europe (Danube Delta). Moreover, the largest share of urban growth-prone land resources (e.g. arable lands, pastures, natural grasslands) is found in the South-Muntenia Development Region, South-East Development Region, Centre and West Development Regions and South-East and South-West Oltenia Development Regions.

## 5. RESULTS

### 5.1. Built-up areas dynamics in the 1990–2012 period

According to the CLC database (Fig. 2), after 1990 built-up areas are among the main land use categories subject to significant dynamics in Romania. Hence, between 1990 and 2012, built-up areas almost doubled, with different increases between the two analysed intervals: 33.8% during the 1990–2000 period and 13.1% during the 2000–2012 period. The overall annual rate reached about 45,664 ha, with 49,045 ha during the 1990–2000 period and 21,142 ha during 2000–2012 period.

Regionally, the highest build-up areas increases between 1990 and 2012 were registered in the North-East (155,400 ha) and North-West (121,750 ha) Development Regions, while the smallest in the Bucharest–Ilfov Development Region (17,700 ha). However, the highest expansion shares were registered in the North-West (60.8%), South-West Oltenia (58.4%) and Centre (56.2%) Development Regions, while the lowest in the South-East (45.1%), West (46.1%) and North-East (46.5%) Development Regions.

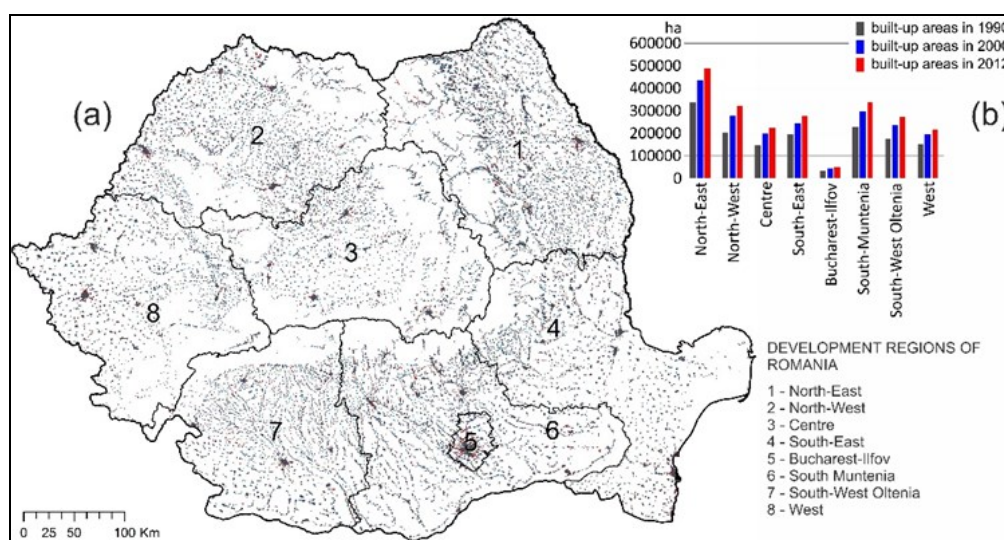


Fig. 2 – Built-up areas dynamics during the 1990–2012 period (a) and its distribution in the Development Regions of Romania (b) according to the CLC database.

At LAU level, the highest built-up areas expansion (1990–2012) was recorded inside very large and large cities such as Bucharest (3,175 ha), Oradea (1,850 ha), Brașov (1,600 ha), Arad (1,575 ha), Constanța Cluj-Napoca (1,325 ha each) and Iași (1,275 ha). Also, significant increases were registered

by some small towns or rural settlements located in the surrounding territories or metropolitan areas of very large and large cities: e.g. Voluntari (950 ha), Popești–Leordeni (925 ha) and Snagov (825 ha) in Bucharest metropolitan area or Miroslava (925 ha) in Iași metropolitan area. Some differences are noticed between the two sub-intervals (Fig. 3). During 1990–2000, built-up areas expansion occurred quite evenly throughout the Romanian territory with higher values inside very large and large cities and lower values in the mountain regions or rural areas. However, after 2000 the general urban expansion pattern has changed visibly. Significant increase is mainly concentrated inside very large and large cities, but also in some small towns and rural settlements located in metropolitan areas or under the influences of different-size cities (e.g. Popești–Leordeni, Miroslava, Voluntari, Otopeni). This tendency of built-up areas expansion is mainly driven by the suburbanization process which is the main urban growth-related spatial process taking place in the two last decades.

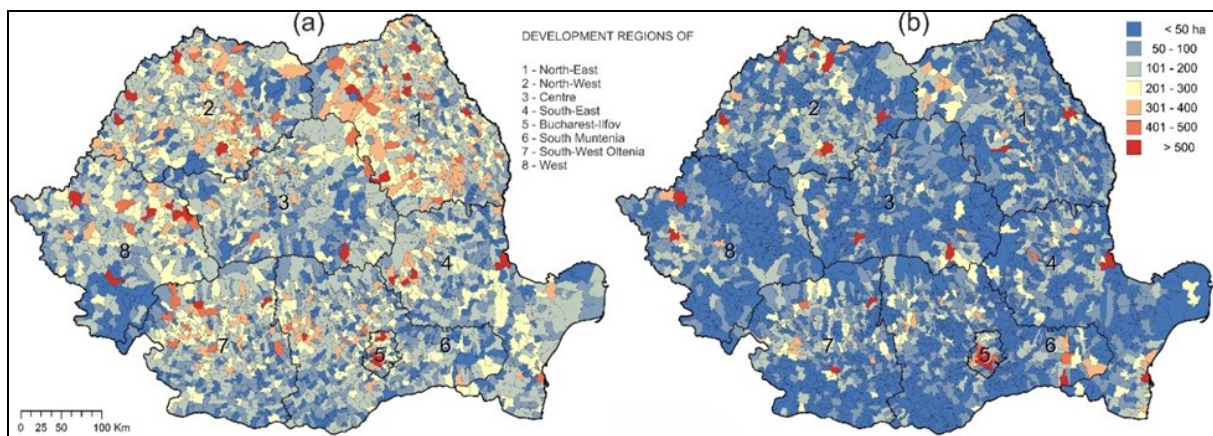


Fig. 3 – Built-up areas dynamics during the 1990–2000 (a) and 2000–2012 (b) periods at LAU level according to the CLC database.

In terms of land use/cover transition, built-up areas increase in relation to arable lands, pastures and agricultural complex cultivation patterns were the most important land use conversion types occurred during the 1990–2012 period, totalling nearly 77% of the total changes related to built-up areas expansion. These changes took place mainly in the Bucharest–Ilfov, South-East and North-East Development Regions. However, between the two analysed sub-periods, the share of changes was maintained slightly the same with differences between the three land use categories: the conversion from arable lands into built-up areas increased from 36.9% to 45.2% while pastures, the second land use category to be converted to built-up areas in the first period (26.1%), were significantly reduced (12.7%) in the second, being replaced by agricultural complex cultivation patterns (19.5%).

At regional level, the most significant land use conversion into built-up areas took place at the expense of agricultural areas in Bucharest–Ilfov (71%) and South-East (49%) Development Regions, of pastures in West (32.6 %) and North-West (24.4 %) Development Regions and of agricultural complex cultivation patterns in South-West Oltenia (19.7%) and North-West (19.4%) Development Regions. However, permanent crops and heterogeneous agricultural areas were also subject to conversion in large shares in South-East (12.8%). Centre (14.6%) Development Regions, respectively. Lower conversion shares involved open spaces with little or no vegetation, natural grasslands and scrub and/or herbaceous vegetation association land use/cover categories. Compared to T1, during T2, an increase in the conversion shares of agricultural lands into built-up areas occurred in almost all Development Regions, with highest values in Bucharest Ilfov (from 63.6% to 77.9%), West (from 29.3% to 43.3%) and South-East (from 45.6% to 55.6%) Development Regions. Concurrently,

agricultural complex cultivation patterns increased in importance (especially in North-East, South-West Oltenia and North-West Development Regions), while pastures registered significant decrease (mainly in North-East, South-West Oltenia and South-Muntenia), generally pinpointing a shift between these two land use categories in terms of conversion to built-up areas. In addition, during T2, permanent crops emerge as a new land use category with significant conversion potential, especially in South-East, South Muntenia and South-West Oltenia Development Regions.

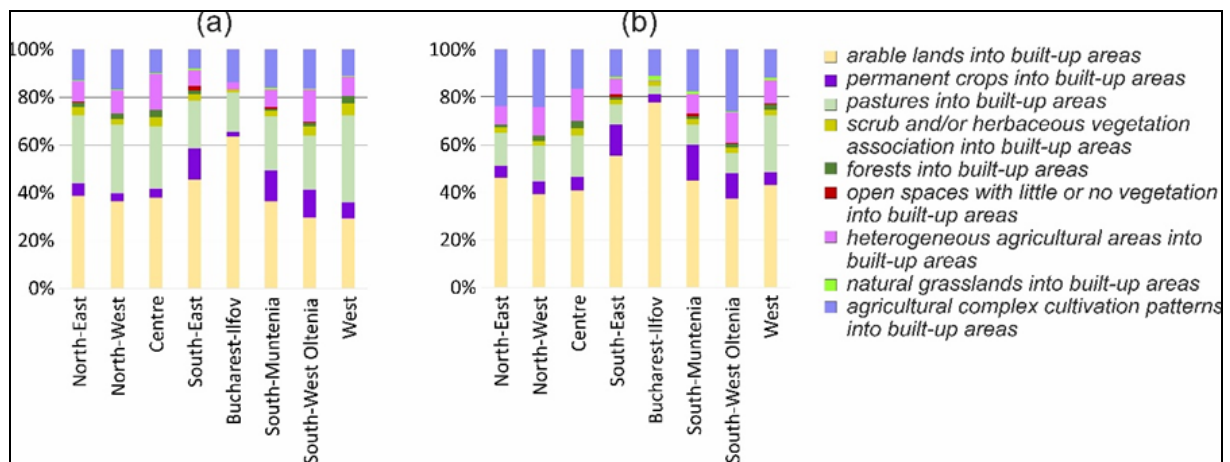


Fig. 3 – The main land use/cover transitions to built-up areas during the 1990–2000 (a) and 2000–2012 (b) periods in the Development Regions of Romania according to the CLC database.

## 5.2. Regional differences

Significant intra-regional differences are noticed in relation to the particular natural and socio-economic features of each development region.

The **North-East Development Region** is characterised by the lowest values of macroeconomic indicators due to the lower labour productivity and biggest share of the employed population in agriculture (Popescu *et al.*, 2016). However, the highest number of inhabitants, the extended land resources, the overdevelopment of some towns (e.g. Iași, Suceava) justify the largest built-up expansion of the region after 1990 (155,400 ha; 46.5%). Between 1990 and 2000, under the positive social and economic development of the transition period, the built-up areas expansion has registered significantly higher rates (107,175 ha; 32.1%), almost three times higher than the second sub-period (2000–2012). One of the main built-up expansion was registered in Iași (550 ha), which is the most dynamic city in terms of education and culture, industrial development (*Antibiotice Iași*, creative industries – *Technopolis Industrial Park*) and suburbanisation processes in its metropolitan area. Other important growth rates were recorded by large, medium-sized and small towns such as: Dolhasca (600 ha), Suceava (525 ha), Piatra Neamț and Bacău (275 ha each), Onești (225 ha) mainly related to the location of important industrial companies (e.g. *Raflo Onești*, *Aerostar* and *Letea Bacău*, *Rifil Piatra Neamț*) (Bălțeanu *et al.*, 2016a), as well as to the money inflows from the family members working abroad. Under T<sub>2</sub>, the continuous economic restructuring in most of towns, the poverty, the high unemployment rate and the poor accessibility to social infrastructure (health services and education) and technical endowments (e.g. drinking water, sewage) in the rural areas triggered an overall lower built-up growth (48,225 ha, which is 10.9%). However, several towns continue to register higher built-up expansion rates compared to T<sub>1</sub>: Iași (725 ha), Bucecea (400 ha), Vaslui (350 ha), Bacău (375 ha), Piatra Neamț (300 ha) etc. Also, under the suburbanization process, important growth was also



registered in some LAU located in the influence area of large towns. E.g. Miroslava (625 ha), Ciurea and Tomești (275 ha each) located in Iași metropolitan area. The development of tourism in some Carpathian and Subcarpathian localities has also led to significant built-up areas increase driven by the development of touristic infrastructure: e.g. Moldova–Sulița (375 ha), Campulung Moldovenesc, Sadova and Dorna Căndrenilor (350 ha each), Vatra Moldoviței (300 ha).

Throughout the entire analysed period, lower built-up areas expansion have been mainly registered in the rural settlements located in Vaslui (e.g. Pogonești, Ivești, Ferești), Botoșani (e.g. Știubieni, Ripiceni), Suceava (e.g. Iacobenii, Pătrăuți, Botoșana, Comănești) or Iași (e.g. Focuri, Sinești, Tansa) Counties, where, in addition the socio-economic drivers, the natural limitations and the exposure to natural hazards are important restrictive factors for built-up area expansion. E.g. flash-floods, deep slides and mudflows in the mountain areas (Eastern Carpathians) and heavy rainfall, severe soil erosion, gullies, slides and mudflows in the hills and tablelands (e.g. Moldavian Plateau, Eastern Subcarpathians) which have a great impact on localities and infrastructure (Bălțeanu *et al.*, 2016b).

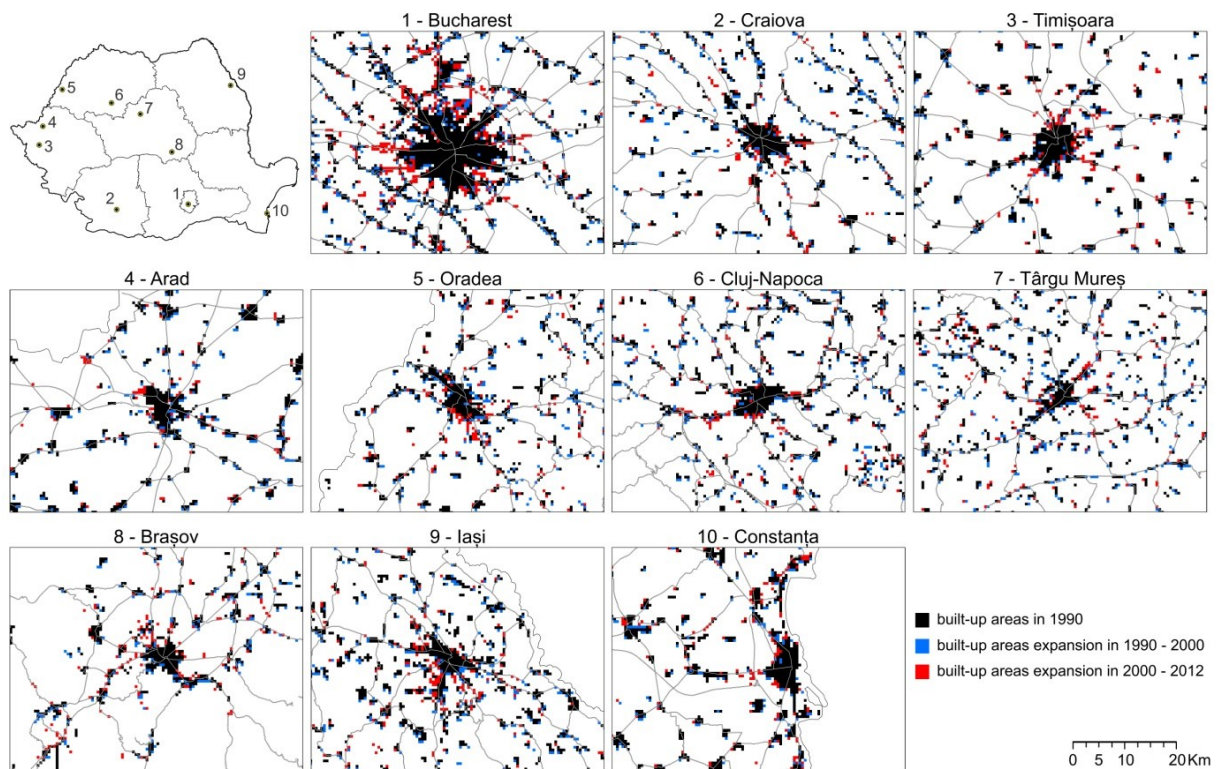


Fig. 4 – Urban growth in the 1990–2012 period in the some of the foremost cities in Romania.

**North-West Development Region** is among the most developed regions with diversified economy, which explains the high built-up expansion after 1990 (121,750 ha; 60.8%). The highest density of the road and rail communication network in Romania and the high potential for cross-border cooperation are among the main factors of attracting important foreign direct investments for the development of economy. Generally, the region maintains its spatial structure with three development levels: core (Cluj, Bihor), semi-periphery (Satu Mare, Maramureș) and periphery (Bistrița-Năsăud) (Popescu *et al.*, 2016).

Despite the general differences between the two analysed intervals (79,550 ha; 39.7% during T1 and 44,200 ha; 15.1% during T2), some towns have registered particular built-up areas expansion: Oradea (975 ha/T<sub>1</sub>, 875 ha/T<sub>2</sub>), Cluj-Napoca (650 ha/T<sub>1</sub>, 675 ha/T<sub>2</sub>), Bistrița (450 ha/T<sub>1</sub>, 725 ha/T<sub>2</sub>),

Satu Mare (625 ha/T<sub>1</sub>, 525 ha/T<sub>2</sub>), Baia Mare (400 ha/T<sub>1</sub>, 625 ha/T<sub>2</sub>), where the greatest part of industry and services were located (e.g. *Zahărul*, Oradea, *Napolact* and *Terapia* Cluj-Napoca, *Electrolux*, Satu Mare, *Teraplast*, Bistrița) (Bălteanu *et al.*, 2016a). Oradea and Cluj-Napoca, in particular, are multifunctional towns with important administrative, business, education and cultural profiles (Mitrică *et al.*, 2016). In addition, the urban development of Tăuții-Măgherăuș, Florești and Recea, (Cluj-Napoca metropolitan area), Sînmartin, Cetariu, Paleu and Nojorid (Oradea metropolitan area) are related to the suburbanisation processes. Nevertheless, a significant number of LAU registered insignificant (<50 ha) built-up areas growth. The main restraining factors are related to the decline of some one-industry towns (e.g. Ștei in Bihor County and Câmpia Turzii in Cluj County), the natural seclusion and predominant rural profile of some villages in the Apuseni Mountains (e.g. Valea Ierii, Mărișel, Râșca in Cluj County, Criștioru de Jos in Bihor County) or in the Eastern Carpathians (e.g. Leșu, Rebrîșoara, Ilva Mică in Bistrița-Năsăud County, Lăpuș, Poienile Izei, Vadu Izei in Maramureș County).

**Centre Development Region**, also one of the economically developed regions with diversified economy, experienced a considerable built-up areas dynamics over the last decades. Differences between the two analysed intervals are maintained. Thus, during T<sub>1</sub> the region registered almost two times higher built-up areas expansion (53,525 ha; 37.2%) compared to T<sub>2</sub> (27,300 ha; 13.8%). Higher increases were registered in the towns of Brașov (675 ha/T<sub>1</sub>, 925 ha/T<sub>2</sub>) and Sibiu (500 ha/T<sub>1</sub>, 650 ha/T<sub>2</sub>) due to the location of important food industry (*Kraft Foods* Brașov, *Scandia*, Sibiu), metallurgy (*Sometra*) or aeronautics (*IAR* Brașov) (Bălteanu *et al.*, 2016a). Other factors involved the cultural and educational profiles, as well as the development of industrial parks in Brașov and Sibiu (hosting many subsidiaries of multinational businesses), urban sprawl and metropolitan development, as well as foreign investments and thriving tourism. All of these make a significant contribution to the local economic development that supports further urban growth. In addition, important growth was recorded in the towns of Alba Iulia, Târgu Mureș, Mediaș or Reghin in relation to the growing industrial development, mainly energy (e.g. *Romgaz* and *Transgaz* Mediaș), food industry (*Hochland Romania*, Mureș, *Elit*, Alba), chemical fertilizers (*Azomureș*) or to the emergent socio-economic and spatial growth in relation to the more dynamic suburbanisation-related processes. The industrial decline of some mining sites or one-industry towns (Dumitrescu, 2008) explains the higher share of LAU with insignificant urban growth (<50 ha) (e.g. Bălan in Harghita County, Valea Crișului, Vârghiș in Covasna County, Victoria in Brașov County, Ciuruleasa, Mogoș in Alba County). Moreover, the natural limitations given by the large extent of mountain areas in Harghita, Covasna and Alba Counties also posed restrictions to built-up areas expansion in the localities affected by spatial and social seclusion and reduced accessibility to transport infrastructure and services. It is the case of most of LAU located in the Apuseni Mountains (e.g. Poiana Vadului, Râmeț, Ponor in Alba County) or in the Eastern Carpathians (e.g. Sânsimion in Harghita County; Bățani, Poian in Covasna County).

**South-East Development Region** registered the lowest urban growth (86,225 ha; 45.1%) because of the predominant agrarian profile or the industrial decline, as well as the lowest difference between the two sub-periods (55,025 ha; 28.8% in T<sub>1</sub> and 31,200 ha; 12.7% in T<sub>2</sub>) compared to the rest of Development Regions. Nonetheless, the largest growth rates was recorded in Constanța (500 ha/T<sub>1</sub>, 825 ha/T<sub>2</sub>) due to its port-related functions (the main gateway of international maritime traffic in Romania) which makes it attractive for foreign direct investments (Săgeată and Popescu, 2016) and Galați (600 ha/T<sub>1</sub>, 525 ha/T<sub>2</sub>) supported by the national-level industrial plants (e.g. *ArcelorMittal*) and its position along the Danube River (the biggest fluvial-maritime harbour in Romania). Several towns which host important industrial activities, some of them rehabilitated after the post-communist industrial decline, also registered significant built-up areas expansion: e.g. Năvodari (300 ha/T<sub>1</sub>, 350 ha/T<sub>2</sub>) mainly in relation to the petrochemical industry (*KazMunaiGaz*), Mangalia (225 ha/T<sub>1</sub>, 375 ha/T<sub>2</sub>) due to the investments in the shipyards (*Daewoo-Mangalia Heavy Industries S.A.*, currently taken over by *Damen*) or Buzău (250 ha/T<sub>1</sub>, T<sub>2</sub>) driven by the support of the steel industry (*Ductil Steel*). The recent urban expansion of Mihail Kogălniceanu (225 ha/T<sub>1</sub>, 275 ha/T<sub>2</sub>) is related to the existence of



the international airport which, apart its transport function and military base, also offers industrial areas for storage and logistics which attracted workforce, infrastructure and housing. A particular case of built-up areas expansion is related to the increasing development of tourist activities along the Romanian Black Sea Coast (e.g. Năvodari, Mangalia, Corbu, Tuzla, Limanu)

On the other hand, a large number of LAU, including small and medium-sized towns, registered built-up areas decrease mainly in relation to the industrial decline (e.g. Pătârlagele, Nehoiu, Medgidia, Ovidiu), the high share of population employed in agriculture and unemployment rate (Chișcani, Berca, Vidra, Mera, Lopătari). Throughout the entire analysed period, some settlements are expecting insignificant built-up areas growth (<50 ha), especially in the localities with predominant agricultural-rural profile located in the south-eastern part of Romanian Plain (e.g. Movila Miresii, Făurei in Brăila County; Independența, Jirlău in Galați County), the Danube Delta (Pardina, Chilia Veche in Tulcea County), the Dobrogea Plateau (Gârliciu, Oltina, Valul lui Traian in Constanța County) or the southern part of the Moldavian Plateau (e.g. Rădești, Oancea in Galați County).

**Bucharest–Ilfov Development Region** registered reached 17,700 ha which, related to the overall surface of the region (the smallest Development Region) is one of the most notable urban growth shares of the whole analyse period (53.3%) and rather equally distributed between the two sub-intervals (24.2% in T1 and 23.5% in T2). This growth can be explained by the region's economic development with the highest contribution to the national GDP and the highest concentration of foreign investments (Bălțeanu *et al.*, 2016a). However, the economic disparities between the Capital-city and Ilfov County, with different economic characteristics and the continuous spatial and functional expansion of Bucharest over its surrounding territory (suburbanization) are visible in the different values of the growth potential. Thus, Bucharest registered the highest built-up areas expansion in Romania during both sub-periods (1,325 ha/T1 and 1,850 ha/T2) in relation to its multifunctionality which involves administrative, business, education and cultural profiles (Mitrică *et al.*, 2016). In addition, its industry underwent profound restructuring, thus some of the abandoned industrial platforms become available land resources for future residential or commercial uses. Nevertheless, the companies that have survived the restructuring process are mainly related to the urban market and multinational corporations that have their headquarters in the region: energy companies (*Electrica, Hidroelectrica, Electrocentrale, Transelectrica*), telecommunications (*Orange, Vodafone, Telekom*), or the tobacco industry (*BAT, Philip Morris, JTI*) (Bălțeanu *et al.*, 2016a). The relocation of some companies in Ilfov County, the suburbanization-related processes, mainly residential and commercial development (Grigorescu and Kucsicsa, 2017; Kucsicsa and Grigorescu, 2018) and the availability of land resources (mainly arable land) for expansion explain the relatively high potential growth of some LAU located in the inner suburbs of Bucharest. For instance, continuous increases during the two intervals were recorded in Voluntari (350 ha/T1; 600 ha/T2), Popești-Leordeni (275 ha/T1; 650 ha/T2), Otopeni (175 ha/T1; 575 ha/T2) Bragadiru (125 ha/T1; 450 ha/T2), Chiajna (125 ha/T1; 400 ha/T2), Mogoșoaia (75 ha/T1; 425 ha/T2) etc. Some traditional residential areas in northern and north-western Bucharest (e.g. Snagov, Gruiu, Periș, Buftea) have slowed down the urban growth process due to the already high pressure of residential development during the first period and the emergence of new development in the south and west (e.g. Popești-Leordeni, Bragadiru, Domnești, Dragomirești-Vale). Under certain limiting factors (e.g. the predominant agriculture-based economy, the limited accessibility to transport infrastructure and services, the high unemployment rates, the aging population) few LAU located in Ilfov County registered insignificant growth (<50 ha) after 1990 (e.g. Dărăști–Ilfov, 1 Decembrie, Grădiștea, Petrăchioaia, Dascălu).

The **South-Muntenia Development Region** was one of the areas with high industrialization, urbanization and agricultural development during the communist period, which partly explains one of the highest built-up area expansion 112,950 ha (50.0%) after 1990, significantly higher in the first interval (74,450 ha; 33.0%) compared with the second (38,500 ha; 12.8%). Under some industrial renewal due to new investments (e.g. *Unilever, Lukoil Petrotel and British American Tobacco* Ploiești,

*Automobile Dacia Renault* Pitești; *Samsung* and *Otelinox* Târgoviște), good transport connectivity (including cross-border cooperation – Giurgiu–Ruse Bridge) or proximity to urban areas, some localities experienced built-up areas increase during both sub-intervals: Călărași (325 ha/T1; 572 ha/T2), Pitești (375 ha/T1; 400 ha/T2), Ploiești (325 ha/T1; 350 ha/T2), Slobozia (250 ha/T1; 375 ha/T2), Giurgiu (275 ha/T1,T2) and Târgoviște (225 ha/T1; 275 ha/T2). Nevertheless, after 2000, in relation to the industrial decline of some towns with negative consequences such as high unemployment rates, depopulation, population ageing etc. (Popescu, 2016), most of localities (mainly rural) recorded significantly lower built-up areas expansion (e.g. Suseni, Rătești, Drajna, Răcari, Posești, Boldești-Scăieni, Cotmeana, Câmpulung, Urlați).

Overall, the inner disparities between the northern and southern counties are maintained after 1990. The concentration of industrial activities in the northern counties (Argeș, Dâmbovița, Prahova) explains the general growth potential. On the hand, the least industrialized southern counties (Teleorman, Giurgiu, Ialomița, Călărași) (Popescu *et al.*, 2016) group the largest share of LAU with reduced or even no growth. However, throughout the entire Development Region, there is a very large number of localities in the plain or mountain areas where the prevalence of the agro-pastoral activities, the highest unemployment rates or the low accessibility limits the sprawling potential (e.g. Glodeni, Băleni, Adâncata, Viișoara, Ștefan cel Mare).

**South-West Oltenia Development Region** has an economy mainly based on agriculture and industry, but with a general low industrialisation level, which is concentrated in some of the important towns. The fluctuating economic development between 1990 until the early 2000s was substituted by a sustained recovery after 2007, the post EU accession period (Popescu *et al.*, 2016) which explains the differences in terms of built-up areas expansion potential between 1990–2000 (65,650; 38.1%) and 2000–2012 (35,000; 14.7%). Overall, built-up areas expansion is relatively high among all development regions (100,650 ha, 58.4%), mainly supported by some industrial towns which maintained their economic profile from the communist period: e.g. Râmnicu Vâlcea (525 ha/T1, T2), Craiova (400 ha/T1; 550 ha/T2), Slatina (250 ha/T1; 400 ha/T2), Drobeta-Turnu Severin (225 ha/T1; 325 ha/T2), supported by the revival of industry or other integrated production companies (e.g. *Prysmian Cables* and *Alro Slatina*, *Lafarge* Târgu Jiu, *Oltchim* Râmnicu Vâlcea). Craiova, in particular, maintains its position as growth pole due to its cultural and education role, but also due to the major investments in the already existing industries such as cars (e.g. *Automobile Ford* Craiova), aircraft and locomotive factories which have contributed to the revival of the regional economy (Bălțeanu *et al.*, 2016a). Also, higher growth is registered in Orșova, Novaci, Călimănești in relation to the touristic potential or in Bulzești, Bucovăț, Podari driven by the suburbanization processes (proximity to the city of Craiova) or the availability of land resources (arable land and pastures) for built-up areas expansion.

Generally, nearly 8% of LAU are subject to insignificant urban expansion (<50 ha). The main growth restrictions are related to the natural conditions (e.g. plain and tableland areas affected by extreme weather events; mountain areas characterised by high fragmentation, isolation and land degradation), low unemployment rate, population ageing, the collapse of industrial activity, poor accessibility to water and sewage systems etc. The southern half of the region (Oltenia Plain) is known as one of the most important agricultural regions in Romania. The major spatial and functional transformations of the post-communist period have turned the area into one of the most vulnerable to extreme weather phenomena (e.g. drought, heavy rainfall) leading to severe degradation of agricultural land with direct impact on crop production, human health, and rural welfare (Dumitrașcu *et al.*, 2018). Also, the poor accessibility to quality drinking water infrastructure (Mocanu *et al.*, 2011) constitute major limitations for the spatial development of most localities of Dolj (e.g. Apele Vii, Cârna) and Olt (e.g. Seaca, Urzica, Bucinișu) Counties. The northern half of the region is overlapping other restrictive areas susceptible to flood risk, mining activities (e.g. Motru–Rovinari Coal Basin) and land degradation (Cocherci, 2016) where some localities of Gorj (e.g. Glogova, Lelești) and Vâlcea (e.g. Șirineasa, Bunești) Counties are also subject to limited built-up areas expansion

**West Development Region** is among the most developed regions, ranking second in the regional hierarchy after the Bucharest–Ilfov Region, although there is a gap between the economic performance of two counties (Timiș and Arad) against the other two (Caraș-Severin and Hunedoara) (Popescu *et al.*, 2016). This could explain the intra-regional growth differences and the overall low built-up areas expansion after 1990 (744,150 ha; 46.1%) compared to the rest of Development Regions. Nonetheless, in terms of the distribution of growth shares between the two sub-intervals, the decreasing trend is maintained (490,450 ha; 33.8% in T1 and 253,700 ha; 13.1% in T2). Due to the concentration of most of industry and foreign investments in the counties of Timiș (telecommunications – *Alcatel Romania*, machine building – *Continental Automotive Products*, chemical – *Procter&Gamble*, electrotechnical – *Luxten Lighting Company*) and Arad (tradition industries – *Astra Wagons*, textiles *Teba*), significant built-up areas expansion occurred in the towns of Timișoara (325 ha/T1; 825 ha/T2) and Arad (900 ha/T1; 700 ha/T2). Here, the most important regional cluster of footwear industry is located, concentrating about one third of the footwear companies in the country (Bălțeanu *et al.*, 2016a; Popescu *et al.*, 2016). Thus, important growth is expected in the towns of Lugoj (250 ha/T1; 400 ha/T2) in Timiș County and Pecica (225 ha/T1; 375 ha/T2) in Arad County linked to the new foreign investments, development projects (e.g. *Lidl Logistic Center Lugoj*, *Arsat Pecica*) and modern transport infrastructure and accessibility. Also, particular increases in the metropolitan area of Timișoara in relation to the suburbanisation processes (e.g. *Dumbrăvița*, *Moșnița Nouă*, *Sinandrei*, *Ghiroda*, *Dudeștii Noi*) was also noticed. A large number of LAU registered significant built-up decrease or even no growth. The growth limitations are mainly related to the natural restrictions (e.g. relief fragmentation, altitude, accessibility) in the Banat Mountains (e.g. *Lăpușnicu Mare*, *Șopotu Nou*, *Eftimie Murgu* in Caraș-Severin County); the industrial decline of some mining sites or one-industry towns in Hunedoara (e.g. *Brad*, *Petrla*) and Caraș-Severin (e.g. *Ocna de Fier*, *Ciudanovița*, *Oțelu Roșu*) Counties (Dumitrescu, 2008); the collapse of some popular touristic resorts (e.g. *Băile Herculane* in Caraș-Severin County); the dominate agricultural activities in Banat Plain (e.g. *Pesac* and *Pădureni* in Timiș County, *Peregu Mare* and *Șeitin* in Arad County).

## 6. DISCUSSIONS AND CONCLUSIONS

Among the traits of urban growth associated with sprawl are the outward built-up areas expansion, low-density housing and commercial development, leapfrog development, “edgeless” cities, fragmentation of land use planning among multiple municipalities, reliance on private automobiles for transportation, segregation of types of land use class-based elitist housing, congestion and environmental damage (Squires, 2002). Over the last years, cities occupy increasingly more space mainly invading arable land, pastures, permanent crops and agricultural complex cultivation patterns. As a consequence, urban expansion through low-density and scattered suburban development (urban sprawl) involves a wide variety of environmental and socio-economic consequences (e.g. traffic congestion, air pollution, social segregation). However, the extension of urban space does provide benefits, allowing people more living space, single-family houses and gardens (EEA, 2010). The low-density characteristic of such development provides ease of commuting and access to shopping for those who live and work in selected suburban areas. It may also provide a separation from the city life associated problems (e.g. unemployment, poverty) (Squires, 2002).

In Romania, under the political, institutional and socio-economic conditions of the post-communist period, significant land use/cover changes occurred, built-up areas being the most dynamic land use category. As a result, urban growth-related spatial transformations become extended. Differences, however, are noticed between the two analysed intervals in relation to the particular social and economic transformations of the transition (1990–2000) and post-transition (2000–2012) periods. Also, the specific environmental features of each Development Region have led to significant inter- and intra-regional disparities. North-West Development Region had experienced the largest share of

built-up areas expansion (60.8%) mainly in relation to the extended suburbanization processes in the proximity of large and medium-sized towns (e.g. Cluj-Napoca, Satu Mare, Baia Mare, Bistrița), the renewal of former industrial sites, new foreign investments in industry and services, as well as the availability of land resources to be converted to built-up areas. The lowest share of urban expansion (45.1%) was recorded by the South-East Development Region, which, although holds some important large towns with national-level industrial and services functions (e.g. Constanța, Galați, Brăila), also includes large rural-agricultural (e.g. eastern part of Romanian Plain, Dobrogea Plateau) and natural restrictions (e.g. waters and inland marshes in the Danube Delta) areas with low accessibility to transportation and services, population aging and high unemployment rates. A particular case is of Bucharest–Ilfov Development Region, which, although the smallest in size (the city of Bucharest and Ilfov County) had experienced a significant urban growth share (53.3%) mainly driven and under the influence of the capital-city and the expended suburbanization processes which are taking place quite constantly after 1990 in Ilfov County.

Generally, urban growth has been mainly observed in the proximity of the main cities (e.g. Bucharest, Constanța, Sibiu, Iași, Oradea, Hunedoara, Cluj-Napoca, Târgu Mureș, Ploiești, Buzău, Craiova, Pitești) at the expense of arable lands, pastures and agricultural complex cultivation patterns. On the other hand, rural areas with limited socio-economic conditions, low accessibility, social inequalities, and, above all, exposed to extreme natural phenomena where subject to lower built-up areas dynamics, thus limited urban growth.

Urban-growth related studies are aimed at providing important data on the detection and measurement of the sprawling process in terms of location, spatial extension, patterns and scale. The assessment of the relationships between land use/cover change and urban growth process is also an important component of urban development. This enables the complex evaluation of urban sprawl in order used in the planning processes by decision-makers and local communities, as well as for spatial modelling to support future growth and to develop planning scenarios.

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## REFERENCES

- Allen, J., Lu, K. (2003), *Modeling and prediction of future urban growth in the Charleston region of South Carolina: a GIS-based integrated approach*, Conservation Ecology, **8**(2) <https://www.ecologyandsociety.org/vol8/iss2/art2/inline.html>.
- Arsanjani, J.J., Helbich, M., Kainz, W., and Bolorani, A.D. (2013), *Integration of logistic regression, Markov chain and cellular automata models to simulate urban expansion*, International Journal of Applied Earth Observation and Geoinformation, **21**, pp. 265–275.
- Barnes, K.B., Morgan III, J.M., Roberge, M.C., and Lowe, S. (2001), *Sprawl development: its patterns, consequences, and measurement*, Towson University, Towson, pp. 1–24.
- Bălțeanu, D., Mitrică, B., Mocanu, I., Sima, M., and Popescu, C. (2016), *Caracterizarea geografică a regiunilor de dezvoltare*. In: Bălțeanu, D., Dumitrașcu, M., Geacu, S., Mitrică, B., Sima, M. (eds.), *Romania. Natură și Societate*, Edit. Academiei Române, pp. 621–652.
- Bălțeanu, D., Sima M., Jurchescu, M., Chendeș, V., Micu, M., and Sandu, M. (2016), *Hazardele naturale și tehnologice*, In: Bălțeanu, D., Dumitrașcu, M., Geacu, S., Mitrică, B., Sima, M. (eds.), *Romania. Natură și Societate*, Edit. Academiei Române, 563–592.
- Berling-Woff, S., and Wu, J. (2004), *Modeling urban landscape dynamics: a case study in Phoenix, USA*, Urban ecosystems, **7**(3), pp. 215–240.
- Brueckner, J. K. (2000), *Urban sprawl: diagnosis and remedies*, International regional science review, **23**(2), pp. 160–171.
- Cheng, J., and Masser, I. (2003), *Urban growth pattern modeling: a case study of Wuhan city, PR China*, Landscape and Urban Planning, **62**(4), pp. 199–217.

- Cocheci, M. (2014), *Environmental impact assessment of urban sprawl in the Braşov Metropolitan Area*, Urbanism. Arhitectură. Construcţii, **5**(2), 21–37.
- Cocheci, V., and Mitrea, A. (2016), *Youthification in the Metropolitan Area of Cluj*, Urbanism. Arhitectură. Construcţii, **9**(2), pp. 121–130.
- Dumitrache, L., Zamfir, D., Nae, M., Simion, G., and Stoica, V. (2016), *The Urban Nexus: Contradictions and Dilemmas of (Post) Communist (Sub) Urbanization in Romania*, Human Geographies, **10**(1), pp. 39–58.
- Dumitraşcu, M., Mocanu, I., Mitrică, B., Dragotă, C.S., Grigorescu, I., and Dumitrică, C. (2018), The assessment of socio-economic vulnerability to drought in Southern Romania (Oltenia Plain), International Journal of Disaster Risk, **27**, pp. 142–154.
- Dumitrescu (Mitrică), B. (2008), *Oraşele monoindustriale din România, între industrializare forţată şi declin economic*, Edit. Universitară, Bucureşti, 301 p. (in Romanian).
- EEA (2006), *Urban sprawl in Europe, The ignored challenge*, European Environmental Agency, no. **10/2006**, Directorate General Joint Research Centre, Copenhagen.
- EEA (2011), *Analysing and managing urban sprawl*, European Environmental Agency, Copenhagen, **22** <https://www.eea.europa.eu/articles/analysing-and-managing-urban-growth>.
- EEA (2016), *Urban sprawl in Europe*, Joint EEA-FOEN Report, no. **11/2016**, European Environmental Agency, Copenhagen.
- EEA (2010), *The European environment — state and outlook 2010: Land use*, European Environment Agency, Copenhagen.
- Epstein, J., Payne, K., and Kramer, E. (2002) *Techniques for mapping suburban sprawl*, Photogrammetric engineering and remote sensing, **68**(9), pp. 913–918.
- Erdeli, G., and Simion, G. (2006), *Local Decentralization and extended suburbanization: A geographical approach of the metropolitan process in Romania*, Buletinul Societăţii de Geografie din România, **XII** (XXCII), pp. 107–120.
- Eurostat (2016), *Urban Europe — statistics on cities, towns and suburbs — patterns of urban and city developments*, Cat. No: KS-01-16-691-EN-N [http://ec.europa.eu/eurostat/statistics-explained/index.php/Urban\\_Europe\\_%E2%80%94\\_statistics\\_on\\_cities\\_towns\\_and\\_suburbs](http://ec.europa.eu/eurostat/statistics-explained/index.php/Urban_Europe_%E2%80%94_statistics_on_cities_towns_and_suburbs).
- Grădinaru, S., Iojă, C.I., Onose, A., Gavrilidis, A.A., Pătru-Stupariu, I., Kienast, F., and Hersperger, A. (2015), *Land abandonment as a precursor of built-up development at the sprawling periphery of former socialist cities*, Ecological Indicators, **57**, pp. 305–313.
- Grigorescu, I., Mitrică, B., Mocanu, I., and Ticana N. (2012) *Urban sprawl and residential development in the Romanian Metropolitan Areas*, Romanian Journal of Geography, **56** (1), pp. 43–59.
- Grigorescu, I., Kucsicsa, Gh., and Mitrică, B. (2015a), *Assessing Spatio-Temporal Dynamics of Urban Sprawl in the Bucharest Metropolitan Area over the last century*, In: Bicik, I., Himiyama, Y., Feranec, J., Kupkova, L. (eds.), *Land use/Cover Changes in Selected Regions in the World*, Charles University in Prague, Faculty of Science, Prague, **X**, pp. 19–27.
- Grigorescu I., Mitrică B., and Mocanu I. (2015b) *Assessing urban sprawl-related housing dynamics in the Romanian Metropolitan Areas*, Rural Studies, **38**, pp. 145–164.
- Grigorescu, I., and Kucsicsa, Gh. (2017), *Spatial and temporal dynamics of urban sprawl in the Romanian Plain over the last century*, Revue Roumaine de Géographie/Romanian Journal of Geography, **61**(2), pp. 109–123.
- Guran-Nica, L., and Sofer, M. (2012), *Migration dynamics in Romania and the Counter-Urbanisation Process: A Case Study of Bucharest's Rural-Urban Fringe*. In: Hedberg, C., do Carmo, R.M. (Eds.), *Translocal Ruralism: Mobility and Connectivity in European Rural Space*, **103**, pp. 87–102.
- Guran-Nica, L., Sofer, M., and Bistriceanu-Pantelimon, C. (2016) *From Urbanization to Metropolization; A Case Study of Romania*, Procedia of Economics and Business Administration, **3**(1), pp. 106–113.
- Guran-Nica, L., Sofer, M., and Ştefan, N. (2011), *New rural-urban relationships in Romania. Issues at the rural-urban fringe of Bucharest*, Studia Universitatis Babeş-Bolyai, Geographia, **1**, pp. 127–140.
- Ianoş, I., Cercleux, A.L., and Pintilii, R.D. (2010), *Remarks on identity building of rural and urban communities in the Bucharest Metropolitan Area*, Analele Universităţii din Oradea – Seria Geografie, **XX**(2), pp. 173–183.
- Ianoş, I., Peptenatu, D., Drăghici, Cr., and Pintilii, R.D. (2012), *Management elements of the emergent metropolitan areas in a transition country. Romania, as case-study*, Journal of Urban and Regional Analysis, **IV**(2), pp. 149–172.
- Iaţu, C., Munteanu, A., Boghinciu, M., Cernescu, R., and Ibănescu, B. (2011), *The effects of transportation system on the urban sprawl process for the city of Iaşi, Romania*, Urban Transport XVII: Urban Transport and the Environment in the 21st Century, **116**, pp. 291–302.
- Iaţu, C., and Eva, M. (2016), *Spatial profile of the evolution of urban sprawl pressure on the surroundings of Romanian cities (2000–2013)*, Carpathian Journal of Earth and Environmental Sciences, **11**(1), pp. 79–88.
- Iojă, C., Onose, D., Niţă, M., Vânău, G., Pătroescu, M., Gavrilidis, A., Saghin, I., and Zarea, R. (2011), *The conversion of agricultural lands into built surfaces in Romania*, Recent Researches in Urban Sustainability and Green Development, USCUDAR Proceedings, pp. 115–120.
- Iojă, C.I., Niţă, M.R., Vânău, G.O., Onose, D.A., and Gavrilidis, A.A. (2014), *Using multi-criteria analysis for the identification of spatial land-use conflicts in the Bucharest Metropolitan Area*, Ecological Indicators, **42**, pp. 112–121.
- Istrate, M.I. (2015), *Urban sprawl and demographic dynamics in Suceava Metropolitan Area*, Journal of Community Positive Practices, **15**(2), 43–55.
- Kucsicsa, Gh., and Grigorescu, I. (2018), *Urban growth related to distance explanatory factors in Bucharest Metropolitan Area. Spatial and temporal assessment using logistic regression*, Journal of Urban Planning and Development, ASCE Library, **144**(1), <http://ascelibrary.org/doi/10.1061/%28ASCE%29UP.1943-5444.0000415>.

- Kucsicsa, Gh., Popovici, Elena Ana, Bălțeanu, D., Grigorescu, Ines, Dumitrașcu, Monica, Mitrică, Bianca (2018), *Future land use/cover changes in Romania: regional simulations based on CLUE-S model and CORINE land cover database*, Landscape and Ecological Engineering, <https://doi.org/10.1007/s11355-018-0362-1>.
- Mitrică, B., Grigorescu, I., and Urucu, V. (2016), *Dezvoltarea urbană și ariile metropolitane*. In: Bălțeanu, D., Dumitrașcu, M., Geacu, S., Mitrică, B., Sima, M. (eds.), *Romania. Natură și Societate*. Edit. Academiei Române, pp. 250–291.
- Mocanu, I., Dumitrașcu, M., Dumitrescu, B., and Popovici, A. (2011), *The Drinking Water Infrastructure in the Oltenia Plain over the Last Decade. Territorial Characteristics and Quantitative Aspects of Production and Consumption*, Forum Geographic, **10**(2), pp. 364–371, DOI: 10.5775/fg.2067–4635.2011.028.d.
- Nicolae, I. (2002), *Suburbanismul, ca fenomen geografic în România*, Edit. Meronia, București, 397 p. (in Romanian).
- Niculescu, Gh. (2016), *Unitățile de relief*. In: Bălțeanu, D., Dumitrașcu, M., Geacu, S., Mitrică, B., Sima, M. (eds.), *Romania. Natură și Societate*. Edit. Academiei Române, pp. 67–101.
- Niculiță, L., Iojă, C., Tudor, A., Pavelescu, G., and Iojă, A. (2011), *Evaluation of environmental impact caused by new residential areas in the Bucharest Metropolitan Area*, Proceedings of USCUDAR, **35**, pp. 130–135.
- Patacchini, E., and Zenou, Y. (2009), *Urban sprawl in Europe*, Brookings-Wharton Papers on Urban Affairs, pp. 125–149.
- Pătroescu, M., Vânău, G., Niță, M., Iojă, C., and Iojă, A. (2011), *Land Use Change in the Bucharest Metropolitan Area and its Impacts on the Quality of the Environment in Residential Developments*, Forum Geografic, **X**(1), pp. 177–186, doi:10.5775/fg.2067–4635.2011.036.i.
- Petrișor, A.I. (2012), *Land cover and land use analysis of urban growth in Romania*, Human Geographies – Journal of Studies and Research in Human Geography, **6**(1), pp. 47–51, doi: 10.5719/hgeo.2012.61.47.
- Pocol, C. B., and Jitea, I. M. (2013), *The residential function of the countryside and the development of the peri-urban area of Cluj Napoca City*, Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Horticulture, **70**(2), pp. 368–373.
- Popescu, Cl. (2016), *Industria României – de la dezindustrializare la reindustrializare*. In: Bălțeanu, D., Dumitrașcu, M., Geacu, S., Mitrică, B., Sima, M. (eds.), *Romania. Natură și Societate*. Edit. Academiei Române, pp. 375–405.
- Popescu, Cl., Mitrică, B., and Mocanu, I. (2016), *Dezvoltarea regională pre- și postaderare la Uniunea Europeană*. In: Bălțeanu, D., Dumitrașcu, M., Geacu, S., Mitrică, B., Sima, M. (eds.), *Romania. Natură și Societate*. Edit. Academiei Române, pp. 613–620.
- Popovici, E. A., Bălțeanu, D., and Kucsicsa, Gh. (2013), *Assessment of changes in land-use and land-cover pattern in Romania using Corine Land Cover Database*, Carpathian Journal of Earth and Environmental Sciences, **8**(4), pp. 195–208.
- Popovici, Elena Ana, Kucsicsa, Gh., Bălțeanu, D., Grigorescu, Ines, Dumitrașcu, Monica, Mitrică, Bianca, Damian Nicoleta (2018), *Past and future land use/cover flows related to agricultural lands in Romania. An assessment using Clue-S model and Corine Land Cover database*, Carpathian Journal of Earth and Environmental Sciences, Vol. **13**, No. 2, pp. 613–628; DOI:10.26471/cjees/2018/013/052 <http://www.cjees.ro/viewTopic.php?topicId=771>.
- Rahman, A., Aggarwal, S.P., Netzbund, M., and Fazal, S. (2011), *Monitoring urban sprawl using remote sensing and GIS techniques of a fast growing urban centre, India*, IEEE Journal of selected topics in applied earth observations and remote sensing, **4**(1), pp. 56–64.
- Săgeată, R., and Popescu, Cl. (2016), *Regiunile de dezvoltare și politica de dezvoltare regională*. In: Bălțeanu, D., Dumitrașcu, M., Geacu, S., Mitrică, B., Sima, M. (Eds.), *Romania. Natură și Societate*. Edit. Academiei Române, pp. 604–608.
- Sârbu, C. (2012), *Urban Expansion – Urban Shrinking Considerations on Brașov Agglomeration Urban Dynamics*, Human Geographies – Journal of Studies and Research in Human Geography, **6**(1), pp. 53–58.
- Shahraki, S.Z., Sauri, D., Serra, P., Modugno, S., Seifolddini, F., and Pourahmad, A. (2011), *Urban sprawl pattern and land-use change detection in Yazd, Iran*, Habitat International, **35**(4), pp. 521–528.
- Simion, G. (2010), *The spatial changes of land use in the Bucharest Metropolitan Area 1970s – 2000s*, Human Geographies, **4**(2), pp. 115–123, doi:10.5719/hgeo.2010.42/115.
- Squires, G.D. (2002), *Urban Sprawl and the Uneven Development of Metropolitan America*, In: Squires, G. D. (Ed.). *Urban sprawl: Causes, consequences, & policy responses*. The Urban Institute, pp. 1–22.
- Sudhira, H.S., Ramachandra, T.V., and Jagadish, K.S. (2004), *Urban sprawl: metrics, dynamics and modelling using GIS*, International Journal of Applied Earth Observation and Geoinformation, **5**(1), pp. 29–39.
- Suditu, B., Ginavar, A., Muică, A., Iordăchescu C., Vârdol, A., and Ghinea, B. (2010), *Urban sprawl characteristics and typologies in Romania*, Journal of Studies and Research in Human Geography, **4**(2), pp. 79–87.
- Torrens, P.M. and Alberti, M. (2000), *Measuring Sprawl. Working Paper No. 27*, Centre for Advanced Spatial Analysis, University College London, London. [http://www.casa.ac.uk/working\\_papers/](http://www.casa.ac.uk/working_papers/).
- Vlădeanu, M.G., and Petrea, C.G. (2013), *Dynamics of the functional profile of the urban-rural interface of Târgoviște*, Urbanism. Arhitectură. Construcții, **4**, pp. 25–38.
- Wilson, E. H., Hurd, J. D., Civco, D. L., Prisløe, M. P., and Arnold, C. (2003), *Development of a geospatial model to quantify, describe and map urban growth*, Remote sensing of environment, **86**(3), pp. 275–285. <http://hot.openstreetmap.org/> Accessed 23.08.2017.
- INS, 2011, *Recensământul Populației și Locuințelor (Population and Housing Census)*, 2011, INS București.
- INS, 2012, *Anuarul Statistic al României (Romanian Statistical Yearbook)*, INS, București.

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## ABRUZZO AS A TWO-FACED REGION: BETWEEN VULNERABILITY AND ENVIRONMENTAL SAFEGUARD

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*Key-words:* natural risks, environmental safeguard, capacity of resilience, Abruzzo.

**Abstract.** Since its establishment, safeguarding and enhancing the landscape and the environmental heritage represent two key-elements in Abruzzo's regional planning. Several implemented plans, regulations and official documents over the years have been underlying the creation of an integrated regional development programme, increasing the image of Abruzzo as a "Green Region of Europe" (one-third of the protected surface so as to have three National Parks and a Regional Park). By contrast, recent national and regional reports show that Abruzzo – in all its four provinces – ranks among top positions in Italy as regards vulnerability risk in terms of surface, population, enterprises and cultural heritage, with percentages well above the national average in each category. These data present a jarring framework compared to the initially envisaged image of regional environmental rebalancing. The recentmost natural catastrophic events (abundant snowfalls within in a few days and continuous earthquakes) suggest the need for studying the actual resilience of the region. In view of it, it is important to assess the real control of the territory, the spending capacity of the local authorities and the broader coordination of the involved institutional actors, in order to avoid – or at least to restrict – situations that have been recognized to severely damage real estate assets, and incur especially heavy human losses.

### 1. INTRODUCTION

The complex relationship between human beings and the environment, if viewed in an anthropocentric perspective, recognizes the natural elements as resources, neutral features, or hazards for humanity (Pelling, 2001). In this sense, natural events and conditions are not *prima facie* classifiable; they can be, according to the territorial, temporal and socio-economic context, favourable, neutral or harmful to human beings.

When considering potential environmental disasters, one must consider natural risk on the one hand, and human vulnerability on the other: as regards natural risk, it is necessary to examine the magnitude and frequency of events; as for human vulnerability, exposure, resistance and resilience must be taken into account.

The process of hazard assessment can be conducted on three levels of analysis: hazard identification, vulnerability assessment and the risk analysis (Deyle *et al.*, 1998).

The first essential phase concerns the process of estimating the geographical extent of the hazard, its intensity and probability of occurrence. It is important to underline that not every natural hazard leads to *catastrophic* disasters (earthquakes, floods, etc.), but there are also more common hazards, less visible at first, which include everyday risks to human health and wealth, the so-called

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*chronic* disasters; in the latter case, an extended definition could include fragile and unstable lands, subject to landslide risks.

The second element to consider is vulnerability; according to a broad definition of this concept, it means: *the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard* (Wisner *et al.*, 2004, p. 11). This definition has a proactive inflection that focuses on the ability to build over time a system able to reduce permanently the impact on the population caused by a risk exposure. About vulnerability, the focus is on people's adaptive capacity: in a physical location, with a given exposure to risks due to some characteristics of built and natural environment, it is important to define the resistance and resilience of a socio-ecological system (Gallopín, 2006).

Resistance to a disaster means the capacity of an individual or a group to withstand the impact of a hazard; in order to strengthen the resistance of a group to natural hazards, it is crucial to improve the goals of economic, social and political inclusion, to ameliorate infrastructures, the health system and so on.

The degree of resistance of a community is based on two concepts: exposure, meaning the gradation, duration and extent to which the system is in contact with, or subject to, perturbation and sensitivity, namely, the extent to which a system can absorb impacts without suffering long-term harm or other significant state change (Adger, 2006).

Close to the concept of resistance is resilience: resilience to natural hazards is the ability of an individual or collective actor to cope with or adapt to the hazard stress.

According to the prominent literature, the concept of adaptive capacity should be incorporated into resilience: *adaptive capacity is the set of potential actions that contribute to the potential minimum vulnerability but not to the existing vulnerability* (Luers, 2005, p. 218). Speaking of hazards, some authors consider that it is better to use the concept of mitigation instead of adaptive capacity, understood as *any action taken to reduce or avoid risk or damage from hazard events* (Cutter *et al.*, 2008, p. 600).

The third level of analysis concerns the risk analysis, which stimulates reflections on the concept of acceptability; the extent to which risks are identified, and the ways in which they are managed, will depend on a range of individual, social and situational factors (Brown, Damery, 2009). Usually, there are two weak points in risk analysis: first, institutions approach the topic of acceptable risk only from an economic point of view rather than considering the overall impact of the natural hazard; second, many structures and procedures employed by government agencies are built on determinism (collected data, models of predictions, communication often top-down rather than deliberative).

The hazard assessment framework is particularly interesting as a topic of discussion in the context of protected areas.

The first idea behind the conception of protected areas is strictly focused on conservation, where nature itself dominates a landscape, conceived deterministic, by the beauty of its landscape and by its biological and aesthetic values, so as to require protection.

In time, the idea of protected areas and the consequent concept of safeguard has become more complex, including the identities of inhabitants, with their cultural background. Thus, protected areas turn into instruments to protect and, at the same time, enhance both natural and human resources that are part of them; consequently, there must be a harmonization between conservation and development within the park.

Protected areas allow for the monitoring of human interventions on their territory, not only to preserve, but also to promote those activities capable to induce a development process also in marginal areas, maybe recovering some practices that are fading away, or creating original patterns of actions compatible with the environment, so as to build new economic outlets.

Therefore, the institution of natural protected areas is one of the most demanding aspects in the ecological subject considered like a process of global planning. It passes over the easy protectionist or preventive aim to lead to territorial forms of management able to respond to concrete economic, social and cultural needs.

By recognizing that natural systems are often resilient is not the same as assuming that these natural ecosystems represent a buffer for human societies against disasters. Therefore, it is essential to make natural ecosystems within protected areas able to mitigate disasters in ways that are convenient for human beings; this function will need to be reflected in the management plans and budgets of protected areas.

*Where properly planned and budgeted, protected areas can play three direct roles in preventing or mitigating disasters arising out of natural hazards: maintaining natural ecosystems (...); maintaining traditional cultural ecosystems that have an important role in mitigating extreme weather events (...); providing an opportunity for active or passive restoration of such systems where they have been degraded or lost* (Randall, Stolton, Dolcemascolo, 2010, p. 101).

The effectiveness of the role of protected areas in preventing, or mitigating, disasters must be assessed in the light of the governance model chosen for them. According to Eagles (2008), there are several models of protected areas governance; substantially, there are four basic models of governance: fully public management (National Park Model); parastatal model; non-profit organization model; private model (ecological model).

All these models, and their combinations, have advantages and disadvantages. Public agencies are able to carry out in-depth analyses and potentially manage large and reliable sources of incomes coming from societal taxes, but they must face a certain bureaucratic and procedural rigidity. Parastatal agencies are more flexible, have a better knowledge of local issues and could have different kinds of revenues (user fees and so on), but they risk to fragment land protection actions, which need to be designed in a comprehensive and unified way, even on a large scale. The contribution of private companies is difficult to establish; usually non-profit activities are very interested in protecting the environment, but they often lack adequate professional skills and economic resources; for profit corporations, despite having large economic means, they often try to maximize revenues and turn the protected area into a product suitable for service users.

The current study is aimed at applying such theoretical premises in order to assess the effectiveness of territorial policies in a context where, on the one hand, there is a marked exposure to natural risks, while on the other, there is a strong propensity to environmental protection. The objective of this work is to produce new synthetic cartographic representations in which the distribution of some environmental hazards can be superimposed on protected areas, by using the capability of geography to hypothesize relations that normally escape different analytical points of view.

## 2. STUDY-AREA

The Abruzzo region is located on the eastern slope of the Central Apennine Chain, with a complex geological and structural framework. The region has been affected by extensional tectonics, uplift processes and morphostructural processes; these events have shaped the three major morphological domains in the Abruzzo area: the Apennine Chain, the Adriatic Piedmont, and the Adriatic Coastal Plain (D'Alessandro *et al.*, 2003).

The Apennine Chain in Abruzzo consists of duplex geometries made up mostly of carbonate: an outer Apennine fold-and-thrust belt divided into two systems, the Lazio-Abruzzi Unit (comprising the Simbruini Ridge) and the Abruzzi Unit (comprising the Gran Sasso-Monte Genzana Unit, 2,912 m. altitude); a series of tectonic windows emerging from the Apulia-Adriatic platform (comprising the Maiella, 2,792 m. altitude, Mount Morrone, 2,061 m. altitude, Mount Sirente, 2,349 m. altitude, and other related forms of relief of relevant altitude) (Vezzani *et al.*, 2010).

Consequently, the morphology of the Central Apennine Chain is asymmetric, with its highest peaks rising eastwards of the main Tyrrhenian-Adriatic drainage divide.

Local extensional tectonics affected the Apennine Chain, producing the formation of intermediate topography undulations along the main NW-SE-directed extensional fault systems. This

caused the uplifting of the chain system, the formation of the intermontane basins, the ensuing widening of the chain area and the emersion of the Adriatic Piedmont (Miccadei *et al.*, 2017).

The present-day tectonic setting is characterized by extensional tectonics still active in the axial part of the chain, with intense seismicity and strong historical earthquakes (Di Bucci, Angeloni, 2013), like those of Fucino in 1915 and L'Aquila in 2009.

The morphostructural elements in Abruzzo are affected by the main surface processes (mostly fluvial, slope, lacustrine, karst and glacial) induced and controlled by climate fluctuations, local and regional tectonics and related base level variations.

The main transversal valleys define the connection of the drainage system of the Apennine Chain with the one in the Piedmont area. Along the front of the chain, a sequence of alluvial fans and terraced fluvial deposits provides evidence that the incision occurred because of uplifting and the drainage network deepening, with the development of intense erosion processes.

The Adriatic Piedmont started developing during the emersion phase that occurred in the Pleistocene. Its morphostructural setting is the result of the late evolution of the Adriatic foredeep domain of the Apennine orogenic system, with a coarsening-up sequence of marine clayey-sandy-conglomerate rocks. There are slopes incised by approximately SW-NE-oriented consequent valleys and covered by landslide and colluvial deposits. Therefore, the piedmont area is mainly characterized by selective erosion processes (Buccolini *et al.*, 2010).

The Abruzzo Coastal Belt is a narrow, elongated plain bounded by palaeocliffs in the northern part and a rock coast with cliffs of variable height and small beaches in the southern part. Coastal plains are characterized by Holocene continental, transitional and marine deposits, with mainly silty and sandy lithotypes. The coastal plain continuity is interrupted by urban areas and coastal hydrographical arrangement, mainly characterized by valleys directly flowing towards the Adriatic Sea (Parlagreco *et al.*, 2011).

According to this morphostructural partition, Abruzzo has been divided, for statistical purposes, in three main zones: the inland mountains, the inland hills and the coastal hills.

The inland mountains, with 7,050 km<sup>2</sup> (65% of regional surface) and 166 municipalities, correspond to the Apennine Chain, with the entire province of L'Aquila (5,048 km<sup>2</sup>) and some parts of the other provinces; this area, despite its large surface, has a low population density, with only 366,813 inhabitants at the beginning of the year 2017 (52 inhabitants per km<sup>2</sup>). Among the most relevant cities are the regional chief town L'Aquila (69,605 residents), Avezzano and Sulmona, all three placed in the flattest areas of intermontane basins.

The inland hills broadly match the inner areas of the Adriatic Piedmont in Abruzzo, covering 1,681 km<sup>2</sup> and having 199,840 inhabitants. This is an area of transition with few relevant municipalities, including the provincial chief town of Teramo (54,775 residents).

The coastal hills fall into the outer portion of the Adriatic Piedmont and the Coastal Plain with a surface-area of 2,100 km<sup>2</sup> and high population densities – 755,594 people (360 inhab./km<sup>2</sup>). Among the 73 municipalities falling into the coastal hills, 19 are effectively in front of the seaside, mostly characterized by a significant urbanization rate, due to a multitude of advantages and consequently to an internal migration process. The seaside municipalities have 443,473 inhabitants, living in a very narrow area (639 km<sup>2</sup>), accounting for 34% of the total regional population; among them, the most populated city in Abruzzo, is Pescara with 120,420 residents. These main characteristics are summarized in Fig. 1.

Along the coastal areas, the rapid growth of population has consolidated a very important phenomenon of urbanization, with the development of dual settlements in most of the coastal municipalities. Historically, the first settlements, usually positioned on the hills immediately overlooking the sea; the latter in the lower flattest areas, after the draining of marshes and the improvement of accessibility by means of relevant communication arteries (railroad and, subsequently, high slip roads and motorway). Nowadays, the population growth is concentrated almost on the narrow coastal strip, while the settlements on the hills have lost much of their historical relevance.

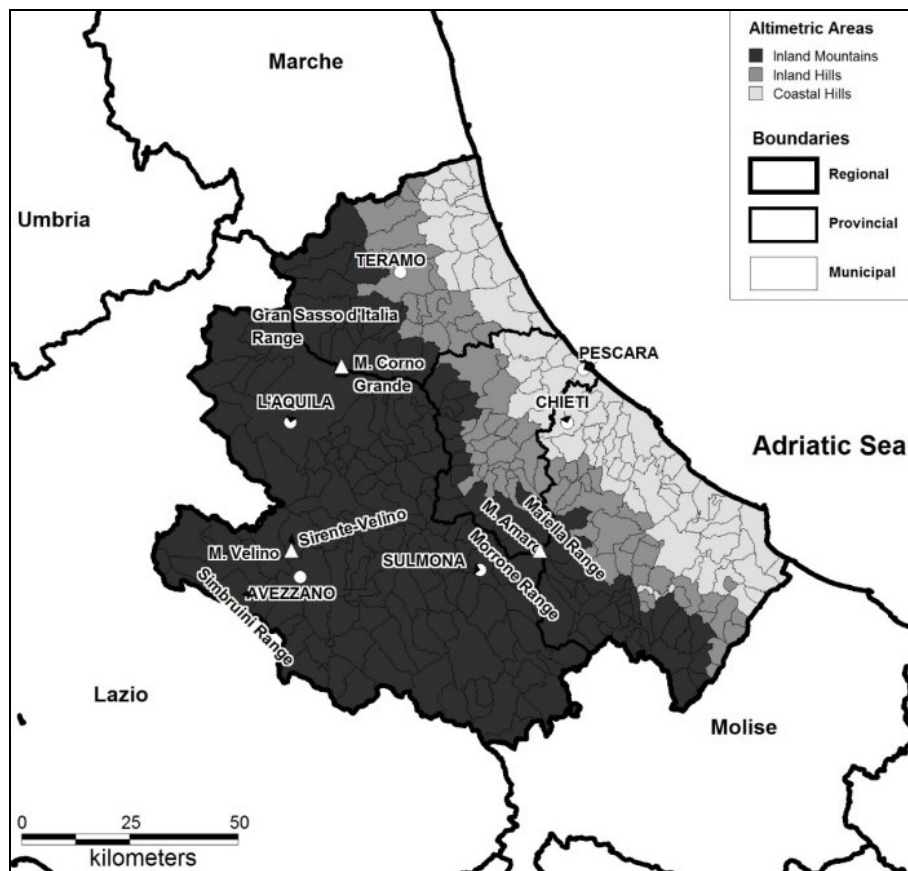


Fig. 1 – Study-area of the Abruzzo Region (Italy).

From the point of view of the urban layout, the region contains a metropolitan area, collocated at the edge of the urban and functional regional hierarchy, formed around the axis constituted by the two chief provincial towns of Pescara and Chieti, presenting phenomena of diffusion of suburbanization and periurbanization, which have allowed the strengthening of a network of intermediate centres, functionally relevant.

Therefore, at first sight, the land consumption phenomenon (Fig. 2), meaning the degree of land artificialization and subjected to human pressure, is obviously increasing, moving from the inside to the coastal areas. In the mountain area, only some municipalities use its territory, to the best, most relevant in this respect being in L'Aquila; however, in this case, the percentage of land made use of is only 6% of the whole surface, due to the high territorial extension of the municipality. In the coastal areas, in particular from Martinsicuro, at the northern regional borders, to Ortona, immediately south to the main regional conurbation area of Pescara-Chieti, there is a real continuum of urbanization, due to vast processes of territorial artificialization (industrialization, tourism, commerce, etc.). The most relevant percentages of land consumption in the coastline municipalities have Pescara (51% of the municipality surface-area), Montesilvano (33%), Martinsicuro (33%) and San Salvo (32%).

Conversely, in the inner areas, there is a historical and now consolidated process of depopulation, there is a high rate of uninhabited dwellings. This is mostly the consequence of the abandonment of inland mountain areas, causing the degradation of heritage building; however, in some cases, there is a growing phenomenon of second houses for winter tourism areas, with a noticeable presence of recently made buildings, used mainly for seasonal holidays.

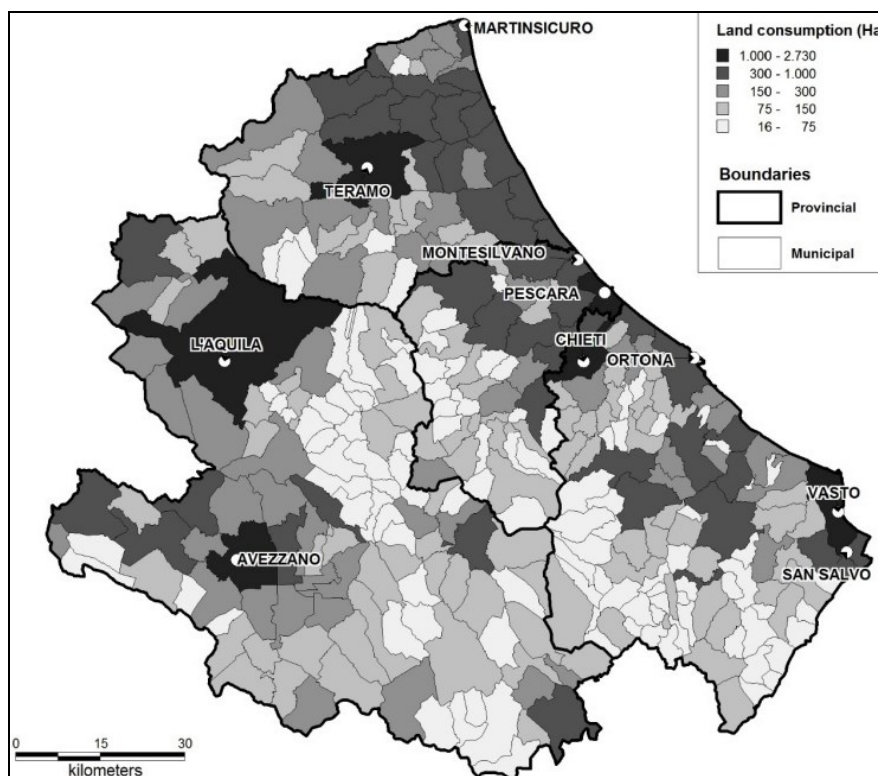


Fig. 2 – Land consumption (ha) in Abruzzo (based on ISPRA, 2016 data).

### 3. METHODS AND DATA

Given the broad heterogeneity of available data and of the regional plan documents, we have agreed to make use of mixed methods in order to offer a qualitative interpretation of existing information. In a first phase, through a synthetic cartographic approach, we will be able to recognize – graphically – what the vulnerabilities of the Abruzzo region are, and, by contrast, which is the level of environmental safeguard, in terms of protected territorial surface, deriving from the institution of five Parks, between National and Regional ones. A single cartography will be provided in greater detail concerning the territorial extent of all the Regional and National Parks currently instituted, or in the phase of being approved, in Abruzzo region; then, for each of the vulnerabilities deriving from the Regional data and Regional plan documents, one specific cartography will be provided. The second phase of the study concerns a qualitative description of the current issues of Abruzzo region, on the basis of the evidence deriving from the cartographic support. In this way, although not exhaustive for understanding what measures of interventions are needed for achieving a regional equilibrium, it will be possible to outline some preliminary suggestions and trajectories to be pursued for accomplishing a balanced management between the natural protected environment and all the related territorial vulnerabilities.

In particular, after having discussed – in the previous paragraph – the main demographic and orographic characteristics of the Abruzzo region, with the support of a series of datasets concerning environmental risks and protected areas (elaborated on ISTAT data, the Italian statistical authority), we are going to outline the human and social landscape of the Region, especially in inland areas, where the issues of depopulation and aging are of particular importance.



In what concerns environmental protection, the respective cartography will show the spatial extent of all the National and Regional Parks currently active in the Abruzzo region (§4.1), while for environmental vulnerabilities the choice is to describe the sequence of landslide risk (§4.2), avalanche risk (§4.3), the risk of hydrogeological instability (§4.4) and the seismic risk (§4.5). For each of the aforementioned subparagraphs, a synthetic cartography and a related qualitative interpretation will be provided in Section 4 (Results and Discussion), with general considerations and preliminarily intervention hypotheses being included in Section 5 (Conclusions).

Data concerning the protected areas of the National and Regional Parks in the Abruzzo Region are available in “Natura 2000”, a source depending on the national Ministry of Environment, which is a network based on the European Directive 92/43/CEE, aimed at providing instruments to guarantee the long-term maintenance of natural habitats. Data regarding these risk phenomena can be obtained by consulting the databases provided by ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale), a national government agency, which published in 2015 an accurate report about hydrogeological instability in Italy. Furthermore, the PAI (*Piano per l’Assetto Idrogeologico*, that is Plan for the Hydrogeological Asset), elaborated by the regional government, has been used. The definition of the earthquake risk, is based on evidence from the Civil Protection Department and from the agencies created to manage post-earthquake emergencies in 2009 and 2016 (USRA, *Ufficio Speciale per la Ricostruzione dell’Aquila*, USRC, *Ufficio Speciale per la Ricostruzione dei Comuni del cratere*, COR, *Centro Operativo Regionale Abruzzo sisma 2016*).

An important passage which is present in all vulnerability cartographies, is overlapping risk maps, as collected, to those of the perimeters of Parks (identified in subparagraph 4.1), intended as the most extensive areas of environmental protection management. This phase will allow to individualise visually what the convergence areas between protection and vulnerabilities are, and to elaborate some initial considerations, surely to be explored further, regarding the opportunity and appropriateness of some political issues.

#### 4. RESULTS AND DISCUSSION

As previously outlined, the Abruzzo Region has highly vulnerable morphogenetic structures, including: landslide risk, due mostly to the porosity of the sandy and silty rocks of the Adriatic Piedmont, and related hydrogeological instability; avalanche risk due to the steep slope of some mountains; the continuous seismic movements triggered by the orogenic activity of the Apennines. All these vulnerabilities will be discussed after having identified the perimeters and the main characteristics of the five protected areas currently active in Abruzzo.

##### 4.1. The environmental framework: protected areas in Abruzzo

The great variety of landscapes in Abruzzo, over a relatively small distance from sandy beaches to mountain karst rocks, induced government bodies to institute many protected areas, so to coin a slogan as “Green Region of Europe”, due to its high concentration of protected areas (Cavuta; 1995; Massimi, Cardinale, 1995; Cardinale, Fuschi, 1998).

Currently, this propensity to environmental protection has led Abruzzo to be the most relevant region in Italy in terms of protected areas included in the European Natura 2000 Network (Fig. 3); more than a third of the regional land surface represents sites of natural interest (35.74%), well above the national average, and one of the highest in Europe.

Among the most important environmental protection sites, Abruzzo has three National Parks, one Regional Park, one planned National Park in the coastal area (Fig. 2) and, also other minor areas.

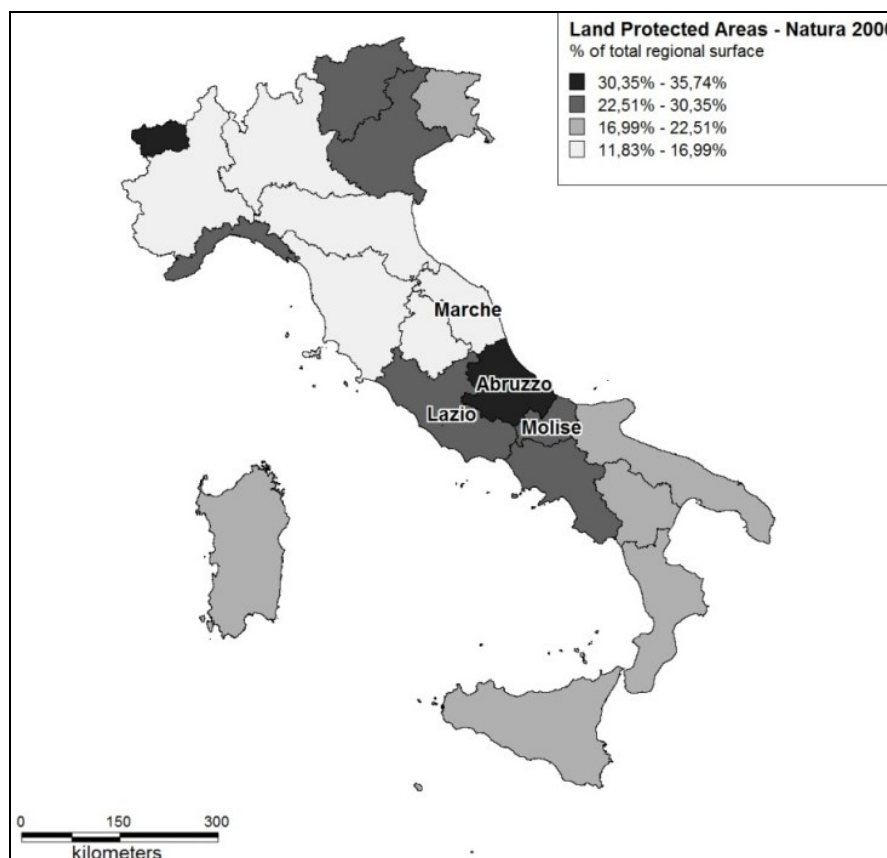


Fig. 3 – Natura 2000 sites in Italy in 2017 (Based on Ministero dell’Ambiente data).

The Abruzzo, Lazio and Molise National Park (PNALM) is the most ancient protected area in the Apennine Chain; originally founded at the beginning of the 20<sup>th</sup> century only in the south-west portion of the Abruzzo territory, it has in time been enlarged to Lazio and Molise regions. The Park area is characterized by a relief arranged as a series of ranges, separated by deep fluvial valleys (River Sangro is the most remarkable one); the landscape is dominated by the Meta Range (Mount Petroso, 2,247 m. altitude, Mount La Meta, 2,242 m. altitude), but there are still other peaks higher than 2,000 m. altitude (for instance Mount Marsicano and Mount Greco in the external protected Park area). The Abruzzo portion of the Park actually occurs in 12 municipalities of low demographic relevance (with an overall population in this area of 12,143 residents; the most important town, Pescasseroli, has only 2,208 inhabitants).

The Gran Sasso e Monti della Laga Park is also an interregional environmental park, which extends for the most part in Abruzzo, but involves some municipalities of Lazio and Marche. The landscape of the Park is predominantly mountainous, marked by the presence of three mountain groups, with the highest peaks in the Apennine Chain: the Monti della Laga Chain, a siliceous lithology, consisting of sandstones, the Gemelli Mountains and the Gran Sasso d’Italia Chain, with a carbonatic, calcareous and dolomitic lithology. The Park covers a large surface-area in Abruzzo, including 40 municipalities with a total population of 128,983 residents, mostly in the chief regional-town of L’Aquila (69,605 residents).

The Maiella Park is geographically made up of four great orographic individualities – the Maiella itself, a large and compact limestone massif, the Morrone, the Porrara and the Monti Pizzi. The Park is founded on 39<sup>th</sup> the territory of municipalities, with an overall population of 87,598

inhabitants; the most important town is Sulmona with 24,454 residents; other relevant settlements are Guardiagrele, Pratola Peligna, Manoppello and Popoli.

It is important to remark that the three established National Parks coincide with relevant portions of the three main geological units of the Apennine range in Abruzzo: the Lazio-Abruzzi Unit, the Abruzzi Unit and the Apulia-Adriatic Unit.

Another protected area in Abruzzo, instituted by the regional government, is the Sirente-Velino Regional Park, consisting of two massifs, the Sirente (2,348 m. altitude) and the Velino (precisely, whose orography serves as a bond between the massifs of the geological unit of Lazio-Abruzzo and of the Abruzzo unit). The Park is spread over the territory of 22 municipalities, with 34,650 inhabitant (the most relevant town, Celano, has 10,982 residents).

The National Park of the Costa Teatina, established by a national law in 2001, but still not concretized, should be added to the current panorama of national and regional parks. It will be located in the southern seaside, consisting largely of rocky coasts. It should involve 10 municipalities in a densely populated area (111,108 residents, with cities such as Vasto, 41,283 inhabitants, Ortona and San Salvo).

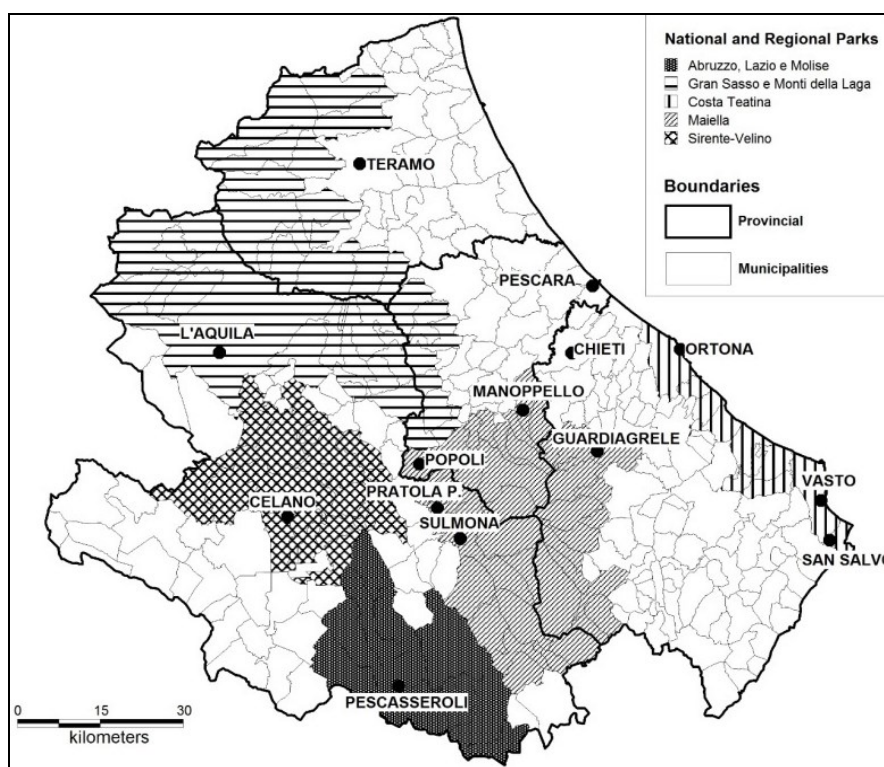


Fig. 4 – National and Regional Parks in Abruzzo.

#### 4.2. Vulnerabilities – Landslide risk

Landslide risk could be understood as one of the most important *chronic* disasters, especially in Italy, with hilly and mountainous terrains exposed to seasonal rainfalls. The most relevant problem in evaluating landslides is to make the difference between hazards and risks: the landslide risk is affected not only by morphological settings, such as hazards, but also, and above all, by population density and human settlements in landslide-prone areas (Guzzetti, 2000; Salbego *et al.*, 2015).

Abruzzo is marked by intense exposure to landslide hazards, the typologies regarding rotational/translational shifts and slow mudslides prevailing mostly in the Adriatic Piedmont, where soils consist of shales, conglomerates and sandstones. Such lithological characteristics condition the hydrogeological structure with the presence of aquifers confined in clayey lithotypes, towards which punctual and widespread water emergencies favour landsliding (D'Alessandro *et al.*, 2007).

The ISPRA national report on landslide risks (ISPRA, 2015) proposes a classification largely based on the concept of population at risk from landslides, divided in 4 categories: P1 – low; P2 – average; P3 – high; P4 – very high.

According to this classification, the ISPRA survey in Abruzzo estimated that 19.25% of the regional territory is exposed to landslide risk; more precisely, the P3 high risk affects 9.13%, the P4 very high risk 5.76%, the P1 and P2 risks together, 4.36%.

In particular, the hills in Teramo and Chieti provinces (due mostly to their proximity to river basins) and Valle Roveto at the southwestern border with Lazio, are the most exposed areas to landslide risk.

The Piedmont Adriatic hills are the more exposed to this risk; in small municipalities like Castelguidone (368 residents) and Colledimacine (191 residents), the percentage of high risk rises to over 55%, and many others (108 municipalities overall) show values over 22% (Fig. 3).

This situation of constant danger in very small territorial communities, consisting mainly of an elderly population, must be included in a management organized by several actors at various government levels, since the resources, economic and human, of these small municipalities are certainly not able to cope with situations of prevention, constant monitoring and rapid response to any risk events.

The landslide risk does not involve too much the Parks' protected areas, but there are some cases of municipalities with considerable propensity to it, especially in the Maiella National Park (Palombaro, Montenerodomo, Ateleta) and in the Gran Sasso-Monti della Laga National Park (Corvara, Pescosansonesco, Villa Celiera, Brittoli); these areas represent borders of transition between mountainous and hilly territories, with the superposition of different soils.

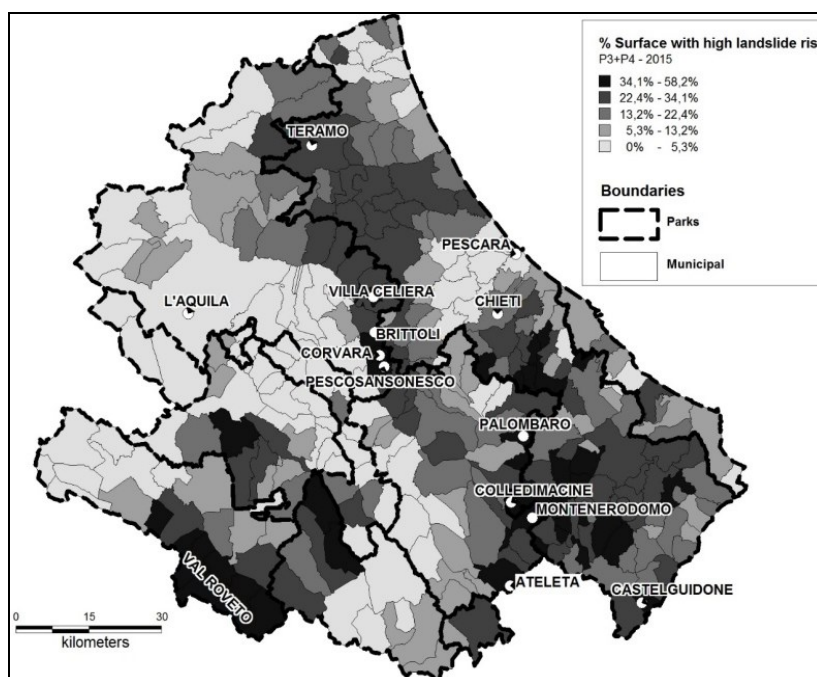


Fig. 5 – High landslide risk and National and Regional Parks in Abruzzo (based on ISPRA data, 2015).

### 4.3. Vulnerabilities – Hydrogeological instability

By enlarging the discussion to the whole issue about hydrogeological instability in Abruzzo, it should be noted that the regional government has drawn up a specific plan called the PAI (*Piano per l'Assetto Idrogeologico*, that is “Plan for the Hydrogeological Asset”, hence forward called PAI), in order to classify the hazards (based on the systematic periodic review of a database containing the recorded events), and then elaborating a process of assessing specific risks (considering their potential impact on the population).

The first step for the regional government was to create a database and the subsequent classification of the events occurred, building up a map of dangerous sites from the hydrogeological point of view, based on objective evidence. According to the PAI classification, the region has 1,561 km<sup>2</sup> of potentially dangerous surface-areas, divided as follows: P1 – Average, 402 km<sup>2</sup>; P2 – High, 882 km<sup>2</sup>; P3 – Very High, 278 km<sup>2</sup>.

In a second phase, this classification has been intersected with data from different types of human settlements. In accordance with the national legislation, the regional government has finally built a risk matrix, in which the most dangerous risks are considered in areas with higher hydrogeological and landslide dangers and more concentrated population densities, so evaluating the vulnerability of each different place.

The result of this classification process shows that the most relevant risks (R4) are only those in scattered settlements and in larger urban centres at higher danger (P3).

Table 1

Classification of hydrogeological risks in Abruzzi, according to PAI

Valuable elements	Dangers		
	P1	P2	P3
Agricultural and forestry areas	R1	R1	R1
Areas with environmental constraints	R1	R1	R1
Public and private service areas	R1	R1	R2
Infrastructures of local relevance	R1	R1	R2
Railroads	R2	R2	R3
Production and technological plants	R2	R2	R3
Infrastructures of national or regional relevance	R2	R2	R3
Settlements with scattered buildings	R2	R3	R4
Urban areas	R2	R3	R4
<b>Dangers: P1=Average; P2=High; P3=Very High</b>			
<b>Risks: R1=Low; R2=Average; R3=High; R4=Very High</b>			

Source: Regione Abruzzo, 2008 and subsequent amendments.

On the contrary, protected and agricultural areas obviously do not have significant demographic burdens, even if they occupy a large part of the regional territory; so, they are classified as low-risk territories (R1), despite the relevance of potential dangers.

As a result, areas actually recognized in the region have been divided as follows: R1 – Low, 1.528 km<sup>2</sup>; R2 – Average, 22 km<sup>2</sup>; R3 – High, 8 km<sup>2</sup>; R4 – Very High, 3 km<sup>2</sup>. Therefore, such a classification could lead the regional government to neglect dangerous situations, when they occur outside the densely populated areas; even the compilation of the inventory of events, often based on direct observation, may favour an imbalance towards human settlements in the future.

These choices are justified by limited access to economic resources to counteract the hydrogeological hazard, thus focusing efforts only on areas where human well-being can be improved.

It is necessary to rethink the entire architecture of the Plan in this sense, so as to safeguard also the areas of environmental and agricultural protection, even if the interventions are of low impact on the population, but this means a necessary increase of economic and human resources to provide for land care.

#### 4.4. Vulnerabilities – Avalanche risk

Forecasting avalanches has a major fundamental physical uncertainty in the usually unknown temporal and spatial variations of instability in the snow cover, including their links to the terrain; one of the most relevant problems is connected with human perception of the avalanche risk (McClung, 2002).

In the 1957–2013 period, according to the database built by the regional government and Meteomont, 799 avalanche events were recorded; most of them took place in the Park areas.

Among the Parks with major avalanche events, the Gran Sasso and Monti della Laga National Park (471) are worth mentioning, especially in the towns of Pietracamela, Fano Adriano and L'Aquila.

These movements usually take place rapidly, with erratic frequencies and, as a rule, in areas of very low population density, so the avalanche phenomenon is often considered irrelevant in the perception of natural hazards in Abruzzo.

Yet, on 18 January 2017, at about 17.00 p.m., from a ridge about 1,900 m. of Mount Siella (Gran Sasso Massif), a snow avalanche triggered by a seismic event destroyed a forest along the way, reaching finally the locality of Rigopiano in the municipality of Farindola (PE), with catastrophic consequences. The avalanche in fact fell on Hotel Rigopiano, currently occupied by 40 people, guests and service personnel: 29 people died and the impact destroyed the structure (Regione Abruzzo, USR, 2017).

Only after this tragic event, the regional government, under pressure from the negative impact on public opinion, is trying to produce a specific plan to improve the techniques of observation, control and response to avalanche phenomena.

#### 4.5. Vulnerabilities – Seismic risk

Since the Quaternary, the region of the Central Apennines has been deformed by active extensional tectonics following the eastward migration of the Apennine compressional front. A broad and complex pattern of normal faults is the result of superposition of extensional systems in areas previously affected by compression. Today, an almost continuous, but segmented, NW-trending active normal fault belt runs along the Northern-Central Apennines between the Adria and the Tyrrhenian plates (Chiaraluce, 2012).

Due to Abruzzo's high exposure to the seismic risk, the national classification of the region includes it, apart from a strip of land close to the coast and the nearest coastal hills, in the higher risk categories (Fig. 6).

In addition, interventions were planned for the reconstruction of private buildings in the area of the earthquake after the completion of a specific damage-assessment investigation. In this case, in addition to the earthquake area established by national law, reconstruction works could be reimbursed also in other municipalities, if earthquake-incurred damages were recognized.



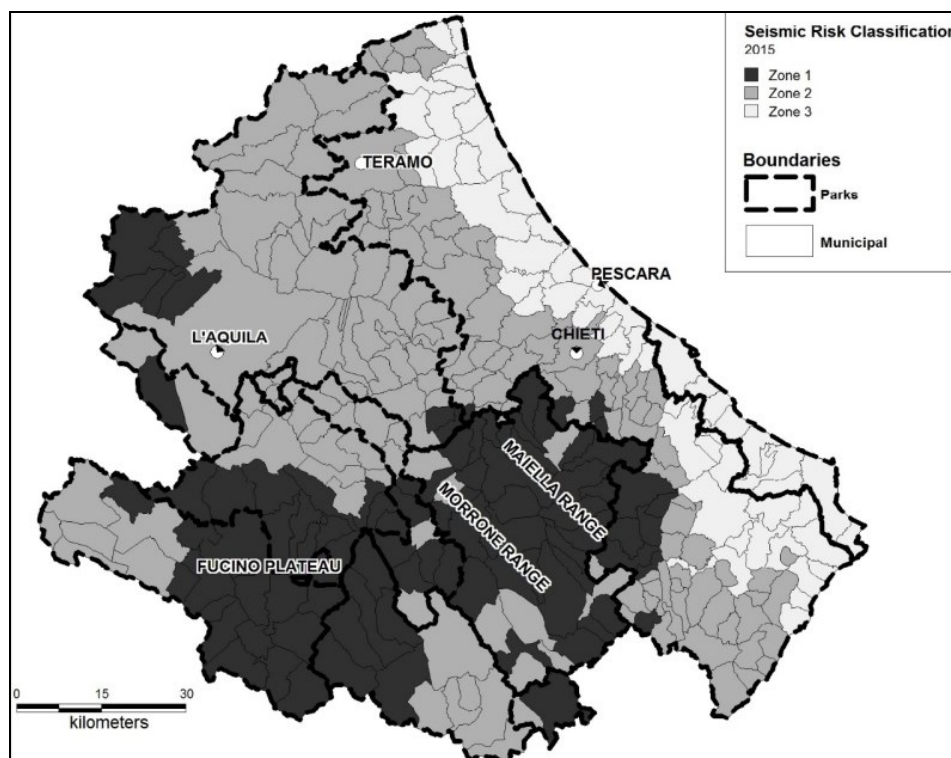


Fig. 6 – Seismic Risk in Abruzzo (based on Protezione Civile data, 2015).

Due to these provisions, the area of post-earthquake reconstruction works has greatly expanded, including also some municipalities lying at a great distance from the epicenter (Fig. 7).

The amount granted for private reconstruction was actually of 6.5 billion euros, out of which 4.8 were disbursed in the city of L'Aquila, 1.4 in the other municipalities of the earthquake area, while over 300 million euro were distributed to municipalities outside the earthquake perimeter (Regione Abruzzo, USR, 2017).

More recently, between August 24, 2016 and January 18, 2017, a new earthquake struck Amatrice and other areas on the border with Abruzzo, causing damages also in some municipalities of the Abruzzo region (involving a large area in the province of Teramo and some municipalities in the north of L'Aquila province), included in some national laws (Fig. 8). The original area of intervention planned after the earthquake of August 2016 (with 8 municipalities) was extended for the first time after the new earthquakes of October 2016 (to additional 6 municipalities) and, finally, another time in January 2017 (to other 9 municipalities, including Farindola, where the tragedy of Hotel Rigopiano had occurred).

The economic impact of this new seismic event is not yet quantifiable, but 20 million euro were planned for public buildings and 24 million for the reconstruction and consolidation of schools (Regione Abruzzo, USR, 2017).

The latest earthquakes involved mainly the Gran Sasso Massif area, in communes with territories falling mostly in the protected National Park perimeter.

The high number of deaths and injuries and the heavy reconstruction costs, available only through national funding and exceeding the national community's investment capacity, reiterate the need for prevention and protection against the seismic risk.

Although it is very difficult to foresee such sudden and catastrophic events, yet national and regional policies have never been very proactive in Abruzzo in preventing accurately this type of hazard and its consequent vulnerability, though a historical memory of seismic risk did exist.

Above all, it is the build-in heritage that needs a deep-going restructuring, especially in mountain areas; paradoxically, the progressive abandonment of villages and their continuous exposure to negligence and temporal degradation have almost made decision-makers forget the urgency of preserving the buildings.

As previously anticipated, Figures 7 and 8 represent the two areas subjected to the two main seismic events which affected Abruzzo region, in 2009 and 2016, respectively. As a consequence of these two different catastrophes, the overlapping of levels of governance in the processes of reconstruction *ex post facto* has resulted in several management problems, which have generated mainly phenomena of parochialism among the interested municipalities, due to the large amount of resources needed for reconstruction. In this way, in order to have access to the funds destined to reconstruction, some local entities have in many cases tried to prevaricate on others, sometimes ignoring the real priorities of those municipalities which had suffered more from the earthquakes, and generating confusion and visible mistakes in the process of allocating the resources.

However, vulnerabilities do not respect administrative boundaries; a good model of territorial governance should therefore overcome the short-range logic and organize, in a systemic and perspective way, a global and supportive response to meet the needs for the seismic protection of the territory. A deep reflection on the resilience capacity of Abruzzo (Ferrari, Fuschi, 2014) could mitigate the effects in cases of catastrophic events.

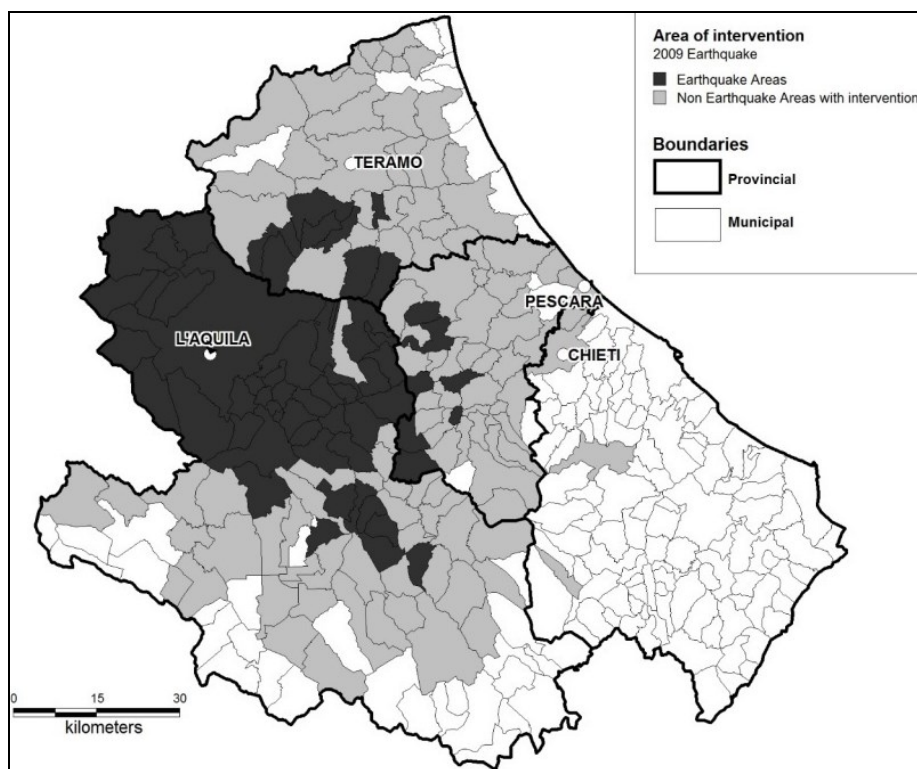


Fig. 7 – Area of intervention for the provision of funds for reconstruction following the “L’Aquila 2009” earthquake (based on Regione Abruzzo data, 2017).

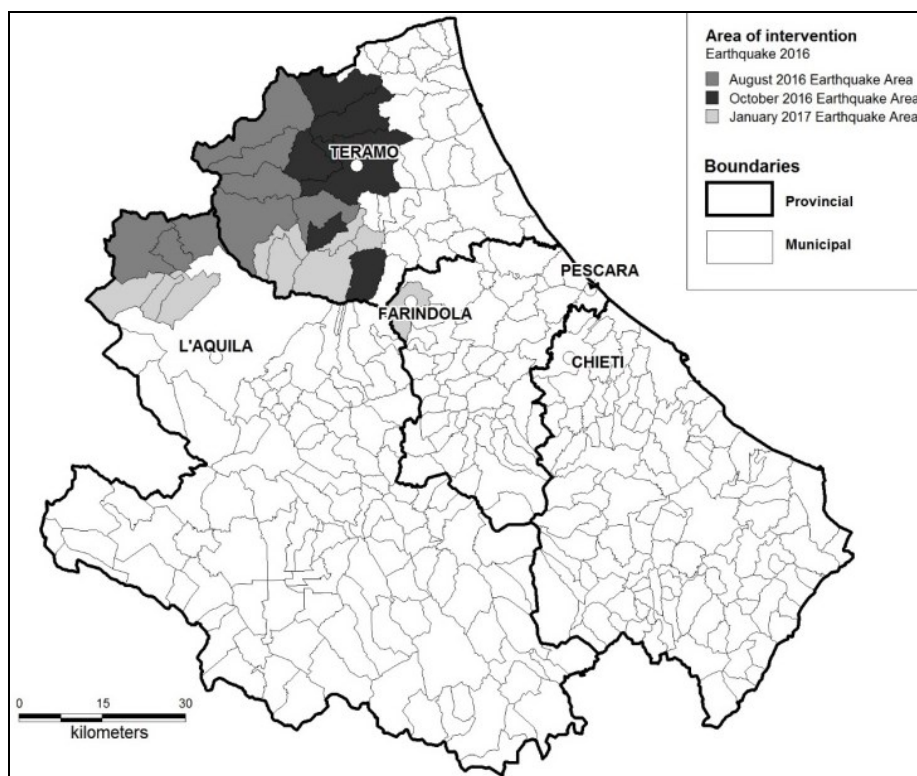


Fig. 8 – Perimeter in Abruzzo of the “Amatrice 2016” earthquake (based on Regione Abruzzo data, 2017).

## 5. CONCLUSIONS

Based on various dichotomies, Abruzzo can be considered a two-faced region: it is a mountain-based region on one side, but it is also a coastal-based region on the other; it is a Region exposed to multiple vulnerabilities, due to geo-morphological processes amplified by human processes (the emptying of inner areas and excessive settlement pressure on the inland hills and coastal areas), but, at the same time, a great percentage of its own territory is under protection; it is a highly-populated Region on its coastal area, but a sparsely-populated Region in its inner areas; it is a highly-urbanized Region in its coastal and inland area, but it is a low-urbanized Region in its mountain areas. If, on the one hand, there is a progressive abandonment of the territories of mountain areas, especially those with high environmental constraints, on the other hand, the coastal areas suffer environmental problems of overpopulation, which, in some cases, exceed their carrying capacity.

National and regional environmental policies are also substantially two-sided: the policy of environmental protection, implemented by the Abruzzo Region and built mainly through the foundation of Parks, must deal with the environmental vulnerability that affects the territory for a long time, endangering the image and, even more so, the very sense of environmental protection, if not tackled (Cardinale, Fuschi, 2015).

Starting from the late eighties, we have assisted to a transition from an integral protectionist policy to a policy based on the valorization of natural and human resources. In this way, the Park becomes a territorial management instrument, potentially capable of combining different human and environmental needs.

The important process of urbanization and the consequent settlement pressure on coastal and mid-hill areas have contributed to increasing the problem of the risk-exposed land; otherwise, the abandonment of some inland areas has made the absence of territorial safeguard into empty areas.

For these reasons, one of the most important regional policies has focused on rebalancing the disequilibrium between inner mountain areas and coastal hills.

Among the most significant choices regarding development policies, Abruzzo Region opted for the institution of a significant number of National and Regional Parks (based on the national law No. 394 of 1991). This choice points to a “functional rebalancing” (with some territorial specification, such as tourism valorization, promotion of food and wine products, local crafts, traditions, etc.) implying a non-conservative and non-restrictive policy, but a proactive policy, which considers the Park as an instrument of valorization and territorial planning.

The main idea was to alleviate the strong contrast between coastal and inland areas through an environmental vision able to better express the greater authenticity of the places lying within the internal areas.

Therefore, the Abruzzo environmental policy, through the government of protected areas, has adhered so much to the principle of socio-economic valorization (even if not achieving successful results in all cases), but overshadowing the strict sense of environmental protection, which is related to the real environmental safeguard.

A full knowledge of the territory implies an in-depth study of places, allowing for a careful and participatory management of hazards and vulnerabilities and looking for the best environmental practices. Municipalities are vulnerable because the maintenance of natural assets through projects of requalification, valorization and promotion have not been developed together with territorial knowledge, by counteracting problems of environmental hazards and vulnerabilities.

This paper has highlighted the main vulnerabilities of protected areas, especially such as the large Park territories.

Thus, by having a profound knowledge of what the territory means and having the full consciousness of its peculiar characteristics and dynamism, one must reach a substantial point of view in which the territory is not neutral and nor static either. It must always be remembered that the territory embodies the concepts of space and time. Therefore, the territory is a patrimonial value and a public asset of collective relevance; its safeguard demands primarily significant social involvement.

For these reasons, an integrated approach to the different subjects of interest is needed (policy-makers, civil society, entrepreneurs), for a governance able to focus on the real territorial safeguard, in order to restore and increase the value of the territory. Surely, we also need a more punctual reconstruction of the hazards and correlated vulnerabilities of the Abruzzo Region socio-economic system (Regione Abruzzo, ENEA, 2010).

## REFERENCES

- Adger, W.N. (2006), *Vulnerability*, Global Environmental Change, **16**, Amsterdam, pp. 268–281.
- Brown, J.D., Damery, Sarah, L. (2009), *Uncertainty and Risk*, in *A Companion to Environmental Geography*, (eds. N. Castree, D. Demeritt, Diana Liverman, B. Rhoads), Blackwell, Oxford, pp. 81–94.
- Buccolini, M., Gentili, B., Materazzi, M., Piacentini, T. (2010), *Late Quaternary geomorphological evolution and erosion rates in the clayey peri-Adriatic belt (central Italy)*, *Geomorphology*, **116**, Amsterdam, pp. 145–161.
- Calandra, Lina Maria (2015), *Governo partecipativo delle aree protette e sviluppo locale sostenibile. Il caso del Parco Nazionale del Gran Sasso e Monti della Laga*, *Geotema*, **49**, Bologna, pp. 29–34.
- Cardinale, B., Fuschi, Marina (1998), *Environmental Protection in Abruzzo*, in *Urban and Regional development in Italy and in Poland* (ed. A. Besana), Colibri, Trento, pp. 207–221.
- Cardinale, B., Fuschi, Marina (2015), *La protezione ambientale in Abruzzo: tra immaginario e realtà*, *Geotema*, **49**, Bologna, pp. 49–54.
- Cavuta, G. (1995), *Parks Project and Compatible Development for the Abruzzo Mountains*, in *Sustainable Development of Mountain Communities* (ed. G. Scaramellini), Guerini, Milano, pp. 195–204.

- Cavuta, G. (2001), *The Protected Areas System for the Conservation and for an Eco-Compatible Development of the Territory: The Maiella National Park*, in *Global Change and Protected Areas* (eds. G. Visconti, M. Beniston, E.D. Iannorelli, D. Barba), Kluwer, Dordrecht, 2001, pp. 465–473.
- Chiaraluca, L. (2012), *Unravelling the complexity of Apenninic extensional fault systems: A review of the 2009 L'Aquila earthquake (Central Apennines, Italy)*, *Journal of Structural Geology*, **42**, Amsterdam, pp. 2–18
- Cutter, Susan L., Barnes, Lindsey, Berry, Melissa, Burton, C., Evans, E., Tate, E., Webb, Jennifer (2008), *A place-based model for understanding community resilience to natural disasters*, *Global Environmental Change*, **18**, Amsterdam, pp. 598–606.
- D'Alessandro, L., Del Sordo, L., Buccolini, M., Miccadei, E., Piacentini, T., Urbani, A. (2007), *Analisi del dissesto da frana in Abruzzo*, in *Rapporto sulle frane in Italia*, APAT, Roma, pp. 463–492.
- D'Alessandro, L., Miccadei, E., Piacentini, T. (2003), *Morphostructural elements of central-eastern Abruzzi: contributions to the study of the role of tectonics on the morphogenesis of the Apennine chain*, *Quaternary International*, **101–102**, Amsterdam, pp. 115–124.
- Deyle, R.E., French, S.P., Olshanky, R.B., Paterson, R.G. (1998), *Hazard Assessment: The Factual Basis for Planning and Mitigation*, in *Cooperating with Nature* (ed. R.J. Burby), Joseph Henry Press, Washington, pp. 119–166.
- Di Bucci, Daniela, Angeloni, Pamela (2013), *Adria seismicity and seismotectonics: Review and critical discussion*, *Marine and Petroleum Geology*, **42**, Amsterdam, pp. 182–190.
- Eagles, P.F.J. (2008), *Governance models for parks, recreation, and tourism*, in *Transforming Parks and Protected Areas* (eds. K.S. Hanna, D.A. Clark, D.S. Slocombe), Routledge, New York, pp. 39–61.
- Ferrari, F., Fuschi, Marina (2014), *L'Abruzzo tra ricostruzione post-sisma e crisi economica: quale resilienza ?*, in *Oltre la globalizzazione. Resilienza/Resilience* (eds. Capineri, Cristina, Celata, F., de Vincenzo, D., Dini, F., Randelli, F., Romei, Patrizia), Società di Studi Geografici, Firenze, pp. 211–216.
- Fuschi, Marina (2001), *Environmental Protection and Social Protection: The Sirente-Velino Regional Park*, in *Global Change and Protected Areas* (eds. G. Visconti, M. Beniston, E.D. Iannorelli, D. Barba), Kluwer, Dordrecht, 2001, pp. 475–487.
- Gallopin, G.C. (2006), *Linkages between vulnerability, resilience, and adaptive capacity*, *Global Environmental Change*, **16**, Amsterdam, pp. 293–303.
- Guzzetti, F. (2000), *Landslide fatalities and the evaluation of landslide risk in Italy*, *Engineering Geology*, **58**, Amsterdam, pp. 89–107.
- ISPRA (2015), *Dissesto idrogeologico in Italia: pericolosità e indicatori di rischi*, ISPRA, Roma.
- Luers, Amy L. (2005), *The surface of vulnerability: An analytical framework for examining environmental change*, *Global Environmental Change*, **15**, Amsterdam, pp. 214–223.
- Massimi, G., Cardinale, B. (1995), *Pathways of Development and Environmental Compatibility in the Abruzzo Mountains: the Marsica Fucense as a Case Study*, in *Sustainable Development of Mountain Communities* (ed. G. Scaramellini), Guerini, Milano, pp. 99–115.
- McClung, D.M. (2002), *The Elements of Applied Avalanche Forecasting Part I: The Human Issues*, *Natural Hazards*, **25**, Dordrecht, pp. 111–129.
- Miccadei, E., Piacentini, T., Buccolini, M. (2017), *Long-term geomorphological evolution in the Abruzzo area, Central Italy: twenty years of research*, *Geologica Carpathica*, **68 (1)**, Bratislava, pp. 19–28.
- Parlagreco, L., Mascioli, F., Miccadei, E., Antonioli, F., Gianolla, P., Devoti, S., Leoni, G., Silenzi, S. (2011), *New data on Holocene relative sea level along the Abruzzo coast (central Adriatic, Italy)*, *Quaternary International*, **232**, Amsterdam, pp. 179–186.
- Pelling, M. (2001), *Natural disasters?*, in *Social Nature. Theory, Practice, and Politics* (eds. N. Castree, B. Braun), Blackwell, Oxford, pp. 170–188.
- Randall, J., Stolton, Sue, Dolcemascolo, G., (2010) *Natural Security: Protected Areas and Hazard Mitigation*, in *Arguments for Protected Areas* (eds. Sue Stolton, N. Dudley), Earthscan, London, pp. 97–120.
- Regione Abruzzo (2008), *Piano stralcio di bacino per l'assetto idrogeologico dei bacini di rilievo regionale abruzzesi e del bacino interregionale del Fiume Sangro*, L'Aquila.
- Regione Abruzzo, ENEA (2010), *Studio di fattibilità per la valutazione della vulnerabilità e degli impatti delle variazioni climatiche sulla Regione Abruzzo ed ipotesi di adattamento*, L'Aquila.
- Regione Abruzzo, USRA (2016), "Ufficio Speciale per la Ricostruzione di L'Aquila", *Lo stato delle pratiche per la ricostruzione delle Frazioni*, L'Aquila.
- Regione Abruzzo, USR (2017), "Ufficio Speciale per la Ricostruzione", *Piano Opere Pubbliche*, actualized on the June 28, 2017.
- Salbego, G., Floris, M., Busnardo, E., Toaldo, M., Genevois, R. (2015), *Detailed and large-scale cost/benefit analyses of landslide prevention vs. post-event actions*, *Nat. Hazards Earth Syst. Sci.*, **15**, Göttingen, pp. 2461–2472.
- Vezzani, L., Festa, A., Ghisetti, Francesca C. (2010), *Geology and Tectonic Evolution of the Central-Southern Apennines, Italy*, Special Paper 469, The Geological Society of America, Boulder.
- Wiesner, B., Blaikie, P., Cannon, T., Davis, I. (2004), *At Risk. Natural hazards, people's vulnerability and disasters*, Routledge, London.

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# RURAL DEVELOPMENT IN BOSNIA AND HERZEGOVINA UNDER THE INFLUENCE OF LOCAL COMMUNITIES

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*Key-words:* rural development, local communities, natural resources, Bosnia and Herzegovina.

**Abstract.** In this paper, rural development in Bosnia and Herzegovina, under the influence of local policy, and its main function – agriculture, is facing numerous challenges, as well as better prospects for the future. In this regard, demography, economy, environment, energy and traffic are the foundation of everything. Demographic averages in Bosnia and Herzegovina considerably determine rural development in the future. Many rural areas in Bosnia and Herzegovina are undergoing depopulation, decrease in birth-rate and increase of the aging population. Local communities in the rural areas of Bosnia and Herzegovina, in the conditions of a predominantly spontaneous transition, acquired a significant role in directing the funds towards rural areas aimed at their revival and a higher quality of life for the population living in these areas. Rural potentials in Bosnia and Herzegovina are a basic precondition for the effective planning and utilization, by political and economic factors, for development in relation to the physical characteristics of the land. New economic and political concepts must be developed and implemented in order to promote the preservation of biodiversity by introducing ecological criteria to stimulate for agricultural development.

## 1. INTRODUCTION

Bosnia and Herzegovina is one of the most rural countries in Europe, and more than sixty percent of its population live in rural areas. Therefore, the main question regularly asked by geographers is: do those rural areas, especially agriculture, have a potential to start the economy of Bosnia and Herzegovina? The analysis also looks at the advantages and disadvantages of rural life: are those rural areas sheltered from urban pressure, symbols of a long and healthy life, or are they just lone places on the edge of misery, far away from the political, economic and social structures of the closest urban centers. The main aim of this study is to use a modern methodology for research into the future of rural development in Bosnia and Herzegovina, especially in the context of the future process of coming closer to the European Union.

The modern rural area of Bosnia and Herzegovina is more or less characterized by a deep crisis of economic, social and demographic development, which is reflected in an evergrowing atrophy of the population, especially in the local communities. The scope and depth of crisis characteristics of the development processes is reflected by the current development index, 58.2%, of the local administrative units (city and municipality administration) which lies below the threshold of 75% of average development in Bosnia and Herzegovina, where 10.5% is below the 50% threshold of the country's development. Considering that, – depending on the geographic position (especially distance from more developed local communities, as the center of areal development) and also the intensity of development processes – issues and development outcomes of certain local administrative units are significantly different. These differences are clearly seen in the diversity of areal structure, that is, a mosaic landscape of rural areas, and they are supported by the current typology of rural and urban settlements in Bosnia and Herzegovina (R. Nurković, 2012).

This paper emphasizes, among other things, that every rural area in this study has its own particular individuality and specificity. Various research methods were used, from critical evaluation

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and compilation of previous research results, interviews and research dialogue, to space-time analysis of indicators of the rural development in modern times of local communities in Bosnia and Herzegovina. The interview method, includes three leading actors in the rural development of local communities from the recent past and present. As a basic source of data, the *Annual reports on co-operative entrepreneurship for 2015* (B&H Statistical Agency Sarajevo, 2017) were used, and their analytical data were considered within a space-time context. Other unpublished (official statistics) and/or published data were resorted to well.

Negative development trends in rural areas are intimately related to the agricultural crisis, agriculture being traditionally the most important economic area with a greater influence on development processes and stabilization of suburban areas. Since the beginning of the transitional period, agricultural development in Bosnia and Herzegovina has been burdened by a series of problems that have resulted in the continuing decrease of manufacturing and an increasing negative intensity of the balance sheet of the agricultural – food sector. Crisis of rural agriculture and its characteristic had a deep-going impact, worsening the agricultural and social position in rural areas. This, along with other unfavourable factors, has encouraged increased migration of population, and in that way, the destabilization of population in a significant part of the rural area of Bosnia and Herzegovina.

Long-term negative trends in the area's agriculture are the result of the interrelated influence of multiple factors: from the direct and indirect consequences of war in the nineties, through a manipulated model of transformation and privatization of social ownership, not conducted, or incompletely conducted restructuring, to the competition of foreign manufacturers in the conditions of joining the European Union (Woods M., 2009). This was supported also by a continuing crisis of co-operatives in Bosnia and Herzegovina, which has, from the beginning of the transition period, started from destruction, almost to the level of survival, to mild revitalization in the past few years. In such circumstances, the co-cooperative sector, burdened by the crisis, had proportionally a modest influence on agricultural development, and consequentially on the stabilization of rural areas in the local communities.

Currently, rural areas in Bosnia and Herzegovina are becoming ever more a destination for the settlement of the urban population eager to leave the urban way of life for the countryside environment. Rural tourism is a new type of selective tourism, which has lately expanded to economically less developed European countries. It is founded on the need of the urban population to search out new attractive sites, and the younger generations of tourists to choose between two types of vacation, that is, passive and active.

## 2. METHODS AND DATA SOURCES

The methodological approach is well-adequated to the intent of the paper to investigate the rural in Bosnia and Herzegovina. Studies on economic rural development cover both local and regional areas. The assessment of rural development and its contribution to the development of new areas is made almost exclusively by resorting to quantitative methods, from deterministic to stochastic. The data used in the elaboration of this paper are based on the secondary publications of previous studies, and the previous study on rural geography by the author, as well as statistical documentation of the Agency for Statistics in BiH. Especially important are field research data that help determining the actual situation on the ground. The other group of papers on rural-geographic research focusses on data collection from sources and the expert literature. The sources used are special geological, pedological, agro-climatic, demographic, and traffic maps. A valuable source are various photographs, either of the bird's eye view type or photographs of former country life. Very useful are satellite photographs, "remote sensing" videos (recorded by using infrared rays), and data from the cadaster of territorial units (Woods M., 2009).

The quantitative method was used in examining rural areas in Bosnia and Herzegovina, stated that rural habitats are said to be the only area of human geography where we may find and locate the

development of habitat geography. Rural habitats are the end-product of a combination of several physical and cultural factors that may be represented through various quantitative methods. There are two sets of variables that influence the habitat type in rural areas: agglomeration and d'agglomerational. Both factors are of a physical and cultural nature and, under the influence of centripetal and centrifugal forces, they may be brought to form a compact or dispersed settlement (Mandal R.B., 2001:78).

A significant source are various statistical censuses, either of population, or special censuses of households, rural areas, poultry, agricultural technology or title deed structure and ownership. If we study previous rural opportunities, we should look at urban land registrars, or other archive materials (for example, old cadaster sketches for studying areal distribution). Surely, it is necessary to emphasize that, during the writing of this paper, we have warned the experts about the political and economic situation in Bosnia and Herzegovina about the problem that may arise from the discrepancy between the statistical data of different government agencies. Through the analysis of available data we have grouped investor countries by similarity criteria, which enables a clearer overview and easier tracking of differences in the focus of investors on certain local communities. Namely, based on statistical data, we may clearly determine the orientation of certain international geo-political subjects according to the exponents of their interests in Bosnia and Herzegovina. On the contrary, due to easier comparisons of the amount of invested capital we considered more appropriate to use relative values in describing and interpreting them. Similarly, we have created a series of parallel graphic images using various geographic methods (Vukušić, J, 2007).

### 3. DEMOGRAPHIC CHANGES IN THE RURAL AREAS OF BOSNIA AND HERZEGOVINA

Demographic processes in Bosnia and Herzegovina are important in determining rural development in the future. Numerous rural areas were undergoing depopulation, depleted natality rate and population aging. This relates primarily to remote rural areas, such as the high mountains of the peripheral areas of large city settlements. An important factor is also the low socio-economic sustainability of rural areas that causes the migration of younger people in search for work and higher incomes to rural or urban areas of great socio-economic sustainability. A consequence of this process is the decrease in the development potential of rural areas and in the number of rural population (Lorber L., 2010).

In the area of Bosnia and Herzegovina, there are no definite rural regions, nor a definition of a rural area (Halfacree K., 1993). At the beginning of the twenty-second century, about 43% of the area's total population lived in the rural. Analysing the number of rural population and the rural characteristics of Bosnia and Herzegovina, means also analyzing the current situation within a broader historical context. Rural areas, ever since the middle of the nineteenth century, especially during the real-socialist economic system, until the mid-fifties to the nineties, along with the transition in the past ten years, and also in the 1992–2017 period, were exposed to degradation processes leading close to village extinction – the main element of a rural area. Civilization and historical processes of de-ruralization, industrialization and urbanization, are present in certain phases of development in all parts of the local communities, which had an extremely selective and negative influence on the development of a Bosnian and Herzegovinian village (Nurković, R., 2012).

The real-socialist planned economy favoured industrial development, and Bosnia and Herzegovina, as a typical rural country, underwent de-ruralization, which became very distinct after 1955. Due to increased industrialization and a decrease of interest in agriculture, a process of de-ruralization occurred, that is, abandonment of villages as places of residence. De-ruralization was an accelerated process in the past fifty years or so. In 2017, over 70% of the rural areas showed distinct development regression, which represents a negative element for socio-cultural and area-planned indicators. These areas experience a deep-going process of extinction due to traffic isolation, high population aging, and a great share of elderly and female population. We must take concrete measures for the further

development of these areas, because, without those interventions, they are lagging behind in development, having in view that 40% of the rural areas experience a balanced development, and about 30% are expanding (Table 1) ( Nurković R., 2007:101).

Table 1

City settlements and the population of Bosnia and Herzegovina according to the 2015 modified model

Size of city settlement	Number of city settlements	% of total number	Number of residents	% of total city population	% of total active population
100,000 – and more	2	2.1	279,400	16.7	6.3
20,000–99,999	10	10.6	743,985	44.4	16.9
5,000–19,999	48	51.0	541,651	32.3	12.3
2,000–4,999	34	36.1	107,819	6.4	2.4
Total	94	100.00	1,672,855	100.00	38.2

Source: B&H Statistical Agency, 2015.

Rural areas in Bosnia and Herzegovina are economically poor and, lack a communal and social infrastructure. Crushed and irrationally scattered properties are unprofitable and do not provide an opportunity for developing a commercial agriculture. Also, those properties, focussed on quantity and have the necessary preconditions, are facing great competition on the market. Development and the practice of new, non-agricultural activities in rural areas is not usually a planned process, but rather a consequence of failure of living only through primary sector activities. The social reputation of villagers has also decreased very much. A series of factors, characteristic of the development of villages and rural areas, have led to this situation, mainly since the middle of the nineteenth century and the abolition of serfdom.

Village revitalization, in the sense of sustainable and holistic development, is a necessary process of preservation of rural areas as primary manufacturing areas of food and other goods, areas of specific anthropogenic landscape with emphasis on natural, traditional, cultural and historic elements, an oasis of green and ecological balance, and last but not least peaceful and recreation areas from the dynamic and stressful urban life. Rural tourism is one of the factors that may play an important role in the revival and sustainable development of villages.

According to *B&H Statistical Agency, Bulletin 6/2015*, most people who have returned to the rural are primarily young or too old. Survey results from various non-government organizations, active in rural areas, show that most youth think of their residence in the rural as temporary, and doing agriculture and other activities is only a way of receiving a minimal income which they save in order to move to town and get employment there sectors in other. On the other hand, older people see agriculture as a solid source of food and income, rather than a commercial activity. Economically, the highest active population section, aged 25 to 49, is least present in farming activities. It is often expected from this group to be most active and motivated to develop farming capacities with an aim to get a good living. This demographic profile is exactly that with a low income in the rural areas of Bosnia and Herzegovina. Also, the number of households shows that Bosnia and Herzegovina is relatively a rural country. Thus, according to 2015 data, out of a total of 1,054,613 households, 58.5% were located in rural areas.

Exact and reliable data about the rural population and the labour markets are very limited. This is mostly due to the fact that there was no official population census in the country since 1991. In the past 15 years, country demographics have drastically changed. Official 2015 data by *B&H Statistical Agency* show a number of 3,531,159 residents in all, out of which 1,110,770 were actively employed. The first step included a differentiation between urban and non-urban settlements, according to a well-known model, *Vresk's model* of extracting urban settlements, and it was critically considered and amended in this case, especially in the sense of using the degree of centrality as an important indicator of the functional independence of a settlement, one of the basic preconditions for understanding the concept of a city in a formal sense. (Table 1, Map 1) On the basis of the analysis conducted in terms of

large, medium and small cities, we conclude that the level of sub-regional centers is a desirable level of centrality – local meaning of settlements that are considered cities in the formal and geographic sense.

The implementation of such a modified *Vresk's model* for 2015 resulted in 139 city settlements with 2,393,746 residents, according to the last census, that is, 53.9% of the total population. A group of 5,215 rural settlements with 1,985,000 residents is also defined, which is about 49% of the total population. A series of variables were considered within the 11 groups: location characteristics; number, allocation and population demographics; demographic dynamics; employment and circulation; socio-economic settlement structure; significance and structure of agriculture as a source of income; the way in which land is used; function and state of residential funds; infrastructural household equipment; centrality of settlements and accessibility to central and functionally better equipped settlements. The share of non-agricultural households in 2015 amounted to 50%, and that of those employed in residential settlements, except for the active agricultural population, was of 25%. Each group of indicators can analyze two basic areal levels: municipal and regional, and the data obtained from municipalities, or possibly settlements, should be used as a justification of regularities, or as emphasizing exceptions in areal distribution. It should be determined how, in most of the analyzed variables, a level of differentiation between certain areas in Bosnia and Herzegovina is emphasized (Table 2).

Table 2

The modified model of extraction of city settlements in Bosnia and Herzegovina, used in the typology of rural areas in 2015

Settlement size (number of residents)	Share of non-agricultural households	Share of the employed in residential settlements, except for active agricultural residents	Centrality degree
1,500–1,999	50 % and less	25 % or more	subregional center
2,000–4,999	50 % and less	25 % or more	–
5,000–9,999	–	25 % or more	–
10,000 and more	–	–	–

Source: B&H Statistical Agency from 2015.

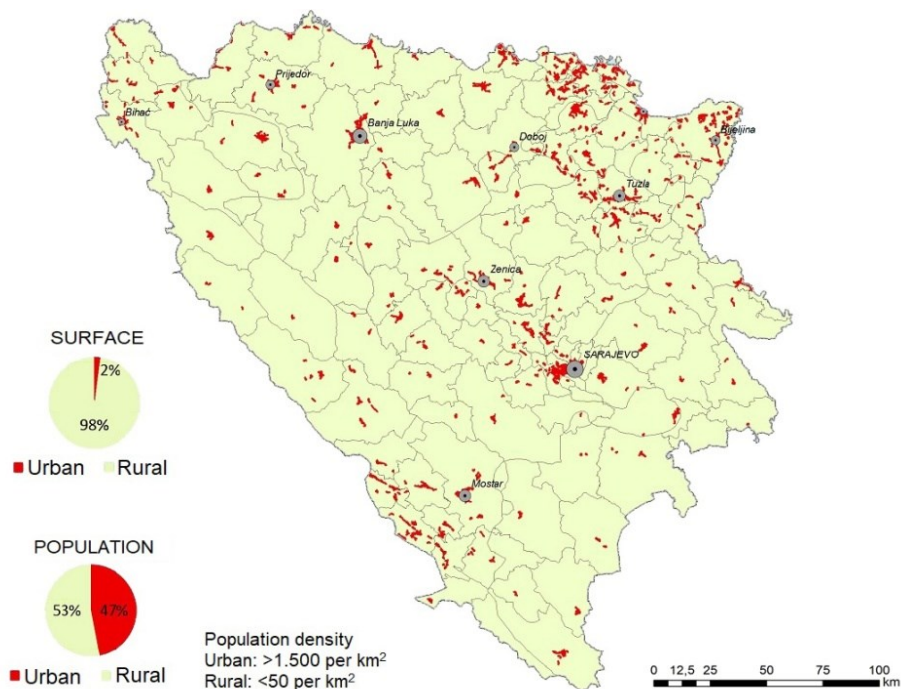


Fig. 1 – Local settlements in Bosnia and Herzegovina, 2015.

For the purpose of monitoring and analysing shifts in population numbers in certain municipalities of Bosnia and Herzegovina, we applied the degree of urbanization and, based on it, the degree of ruralization. The degree of ruralization is a percentage of population that resides in rural areas. The degree itself, and the ruralization dynamics of a country, or a region, was measured by certain indicators. One of the most often used indicators, is the coefficient of ruralization. The coefficient of ruralization represents the relation of the rural population versus the total population of a certain country, or region. The respective formula may look as follows:  $K_r = \frac{S_r}{S_t}$ . In this formula, the coefficient of ruralization is equal to the quotient of the number of rural population and the number of total population in a certain country, or region.

#### 4. MODERNIZATION OF RURAL AREAS IN BOSNIA AND HERZEGOVINA

The modernization of society in the rural areas of Bosnia and Herzegovina is generally often described in the works of many authors by infrastructural development programmes, such as electrification, construction of roads, or restauration of rural houses. Such projects have left a significant mark on the rural landscape of the local communities of Bosnia and Herzegovina; however, their greatest significance lies in the possibilities created for the rural population to take part in the new commercial society and buy technological innovation items that will change their lives. The list of technological innovations that have changed the aspect of the rural society and its economic life-styles is large, however, three examples may illustrate our assertion. The development of tele-communication technologies has spared many rural areas from remoteness and peripherality. On the one hand, it meant pleacing new industries, such as bio-technology and telematics, rural areas being no longer vulnerable, and allowed to, as Howard Newby stated, “compete on a fair basis with cities regarding employment”, for the first time since the industrial revolution (Marsden *et al.*, 1993:2).

On the other hand, people from rural areas are new consumers, through television, radio and the Internet, of those same cultural goods and experiences as urban residents are, which destroys the attractiveness of local rural traditions, events and cultural customs, even despite the attempts to revitalize them. Besides, the impact of modernization on rural areas is not limited only to technological innovations. George 1987: 88, defines modernization as a paradox, an old and relatively new word in the social science dictionary. George cites Havilland (2002) who states that modernization is defined as an all-embracing global process of cultural and socio-economic changes, where a society in its development attempts to gain the characteristics of industrial societies. Today, modernization has been proven to be extremely powerful, but also an unpredictable force. It has a great impact on the environment and the social structure of a society. Bright (2000:145) explains that modernization is a concept that relates to a process of change through which traditional societies can adjust to the demands of the modern world. Modernization is also seen as closing the gap between food manufacturers and consumers through the organization of village fairs, where, besides finished goods, we may see the way it took to come to those finished products (Fig. 2).

The rural population in Bosnia and Herzegovina is growingly aware of its health and dependence on health centers that are ever more present in rural areas as well. Clinics and pharmacies have become a part of the infrastructure of many rural areas. The traditional approach to healing is becoming scarce. Collecting herbs and daily walks have been replaced by modern and latest medicine and therapies. There is clear evidence that information-communication technologies help the introduction of innovations in agricultural manufacturing – from support in precise sowing and care for the health of animals, to ensuring information on markets and prices of agricultural products, and in that way, they have significantly impacted the change of organization of farms and their operations. This applies to rural development as well: for example, information-communication technologies are



extremely important for the development of rural tourism, and also for ensuring important services to the rural population, such as, tele-medicine (medical diagnostics and on-line treatments)(Horvat U.2010). Reducing the differences in the level of their use in urban and rural areas is important for reducing the development imbalance, and also for ensuring an instrument that may significantly contribute to solving long-term problems of rural areas in Bosnia and Herzegovina.

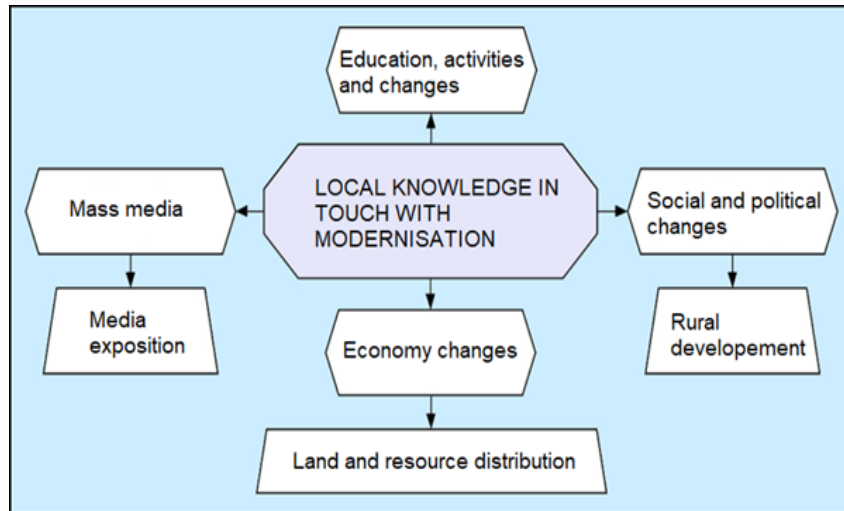


Fig. 2 – The concept of modernization in rural areas, 2017.

##### 5. THE AGRICULTURAL ROLE IN RURAL DEVELOPMENT IN BOSNIA AND HERZEGOVINA

Agricultural manufacturing is still traditionally the dominant activity in the rural areas of Bosnia and Herzegovina. Large numbers of returnee residents succeeded in building their own farms with the intention of manufacturing and selling goods, without the possibility of any other economically acceptable opportunity. Many of those people are former employees of the industrial and tertiary sectors, however, they have returned to the farms owned by their families. Their capabilities are limited, as is their farming experience. There are usually several animals and a large number of small seedlings on farms, and most of them are consumed and traded locally, producing a very small income. At the beginning of the twenty-first century, according to B&H Statistical Agency, Bosnia and Herzegovina had 2,450,000 hectares of orchards, 4,000 hectares of vineyards, and a remaining 470,000 hectares of meadows, and 935,000 hectares of grasslands. This means that agricultural land is a deficient resource which must be handled very carefully in order to create as much added value as possible (available per capita 0.26 ha of arable land). Despite that, more than 40% of the agricultural land is still unused (Figs. 3 and 4).

At the end of 2015, rural areas in Bosnia and Herzegovina had approximately 35,000 small farms and farming households of approximately 2.5 ha of land. Only 15% out of the total number of these farms may be considered commercial, that is, they owe more than 5 ha of land. Amongst those farmers, there is a special type of poverty. Life-styles differ from household to household. Most of them still depend on loans, pensions, donations from the diaspora, employment in urban areas, public sector or small businesses. Smaller farms represent a very significant area in the lives of their owners, because they provide them with food and create employment possibilities, especially for women, youth, and the elderly.



Fig. 3 – Mini-plantations of grapevines close to Srebrenik, 2013 (Source: R. Nurković, 2013).

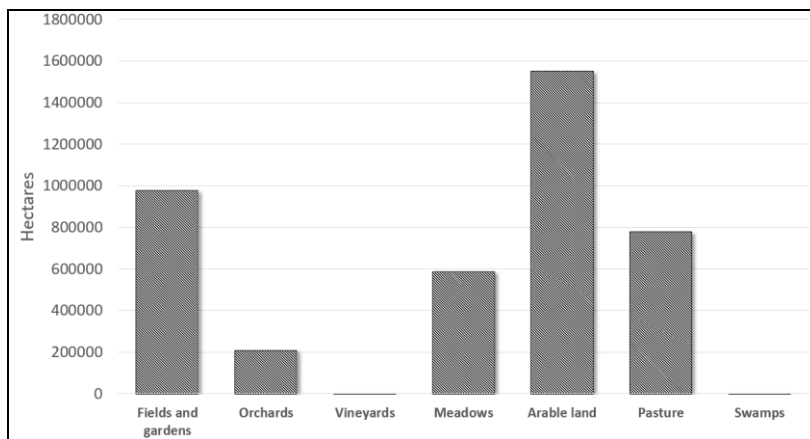


Fig. 4 – Average size of agricultural land in Bosnia and Herzegovina, 2013 (Source: Agency for statistics of Bosnia and Herzegovina, 2009).

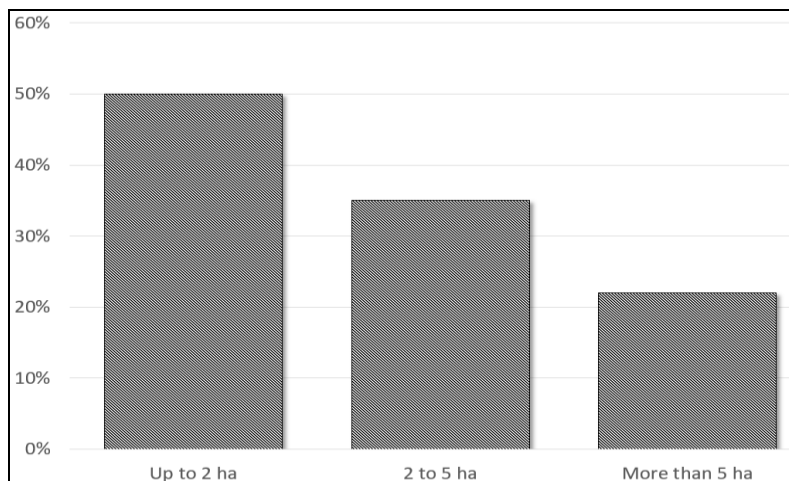


Fig. 5 – Farm structure in Bosnia and Herzegovina according to area in ha, 2015 (Source: Agency for Statistics of Bosnia and Herzegovina, 2010).

As can be seen in Figure 5, more than half the households had less than 2 hectares in 2010. At the beginning of the twenty-first century the situation was much more unfavourable considering the Law on Inheriting Land, which states that each child inherits an equal part of land and he/she has a right to do with it as they please. It is very important to emphasize the very unfavourable structure of agricultural property size. The average size of a property is 3.1 ha, and properties are usually divided in 7 to 9 parcels, a main element in slowing down the modernization of this sector.

After 1995, agriculture began reviving, the process being ruled by projects of co-operative recovery in Bosnia and Herzegovina. The whole co-operative sector contains 348 cooperatives, their recovery being assumed by the entity of co-operative unions formed immediately after the war and the establishment of a peaceful life for the population. Recovery of the general co-operative sector, including the agricultural one, was rather slow after the war as pre-war co-operatives were in the lead. Today, it is very difficult to determine how much of the property belongs to co-operatives, and how much to individuals and legal entities. This acts as a brake for many old co-operatives to turn into modern business organizations, and it is doubtful whether their plans can solve the problem. In every case, the monotony represents a very good copy of the ex-Yugoslavian and the same Bosnian and Herzegovinian co-operative system: however, it is completely different from that offered by the "old-Yugoslavian" Bosnia and Herzegovina, especially the overall co-operative system of Old Yugoslavia. Available data point to it, as, in 1939, from the total of 9,359 various types of agricultural co-operatives, almost 2,080 (22%) had some specialized manufacturing-processing orientation (crop, wine-vineyard, orchard, oil, livestock-pasture, turnip, rosemary, machinery, and other). This is exactly the reason why such co-operatives should be taken, in a structural sense, as an example to follow (Bećirović S., 2000).

The restructuring processes of rural areas in Bosnia and Herzegovina have developed with various intensity and with different outcomes in several areas in terms of the mutually dependent impact of several factors. Amongst them, three had a basic meaning:

- Development specificities caused by differences in the socio-political order at the beginning of transition, or government-planning management in the former communist countries;
- Forms of deconstruction of the collective order of complex government formations in times of peace or war;
- The recent position of certain countries within the European integration processes (Lukić, A. 2010).

This also prevents the establishment of active land markets, which, again, prevents farmers from obtaining and using modern technology and modern know-how capable of ensuring benefits from the market economy. Besides, only 0.4% of the lands are irrigated. All of these are reasons for the low competitiveness of the agricultural sector in Bosnia and Herzegovina. According to BiH Statistical Agency 2004 data, in the period from 2001 to 2015, all economic sectors recorded economic growth. The average national growth in the mentioned period was 28.2%, while, during the same period, growth in agriculture was only 13.8%, that is the lowest among all sectors. As a result, the structure of GDP in Bosnia and Herzegovina changed significantly after 1995. According to official statistical data, the share of the agricultural sector is significantly low. However, even though the situation in both entities is generally developing in a similar direction, there still are noticeable differences. The primary sector (agriculture, fishing, forestry) is still one of the more significant ones in the Republic of Serbia (20% GDP), while the same sector has fallen below 10% in the Federation of Bosnia and Herzegovina.

#### **4. INFRASTRUCTURAL ASPECTS OF DEVELOPMENT IN THE RURAL AREAS OF BOSNIA AND HERZEGOVINA**

A great significance for rural development of Bosnia and Herzegovina has traffic. Considering its being weaker in rural areas, the transport of goods and services is much more difficult in most such areas. Especially so, as highly negative consequences affect the industry dislocated in rural areas and

its settlements. Roads, railroads, caravan roads are known as transport routes. They are considered one of the most important factors that encourage and influence the development of rural areas. The location of rural settlements depends primarily on transport lines, which considerably increase the efficiency of a settlement and open up a series of possibilities for its residents. An easier approach is to see how settlement impacts morphology, health and the trade network, and also many services and institutions. So, it is obvious that transport lines have a multiple significance and impact on rural communities (Fig. 4).

Transportation is undoubtedly necessary in order to achieve rural development in Bosnia and Herzegovina, however, the way in which different components of development interact is influenced by the various roles played by several institutions. An improved transportation network brings rural settlements closer to the source of politics, economy and society. This stimulates changes in the economy of rural areas. The process of rural change is encouraged by the possibilities offered to rural communities to improve their socio-economic standard. These possibilities come in the form of improved agricultural manufacturing, greater non-farming employment, market expansion for products, a greater market of formal loans, higher land values, better accessibility to education and healthcare, and a higher living standard (Munsi S., 1975:54)

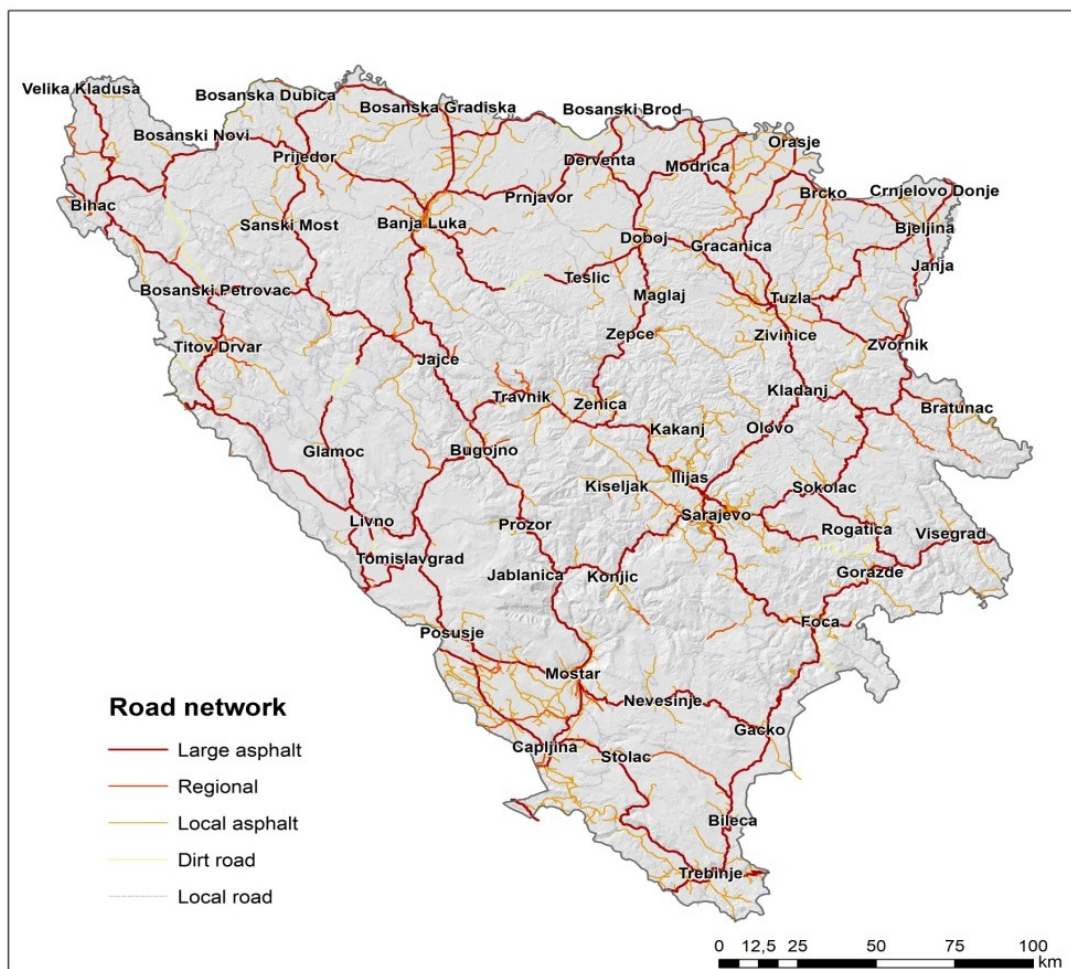


Fig 6 – Transportation improvements in the rural areas of Bosnia and Herzegovina, 2015.

The transportation infrastructure is also an important factor of the social-economic sustainability of rural areas. Manufacturing and services depend on market accessibility. In return, tourism and settlement greatly depend on the accessibility of Bosnia and Herzegovina rural areas. At the same time, increased accessibility is connected with increased competition with other areas. This may be a challenge for rural areas in which agriculture prevails and also in those areas that discharge different activities. The traffic system is of great importance for the economic and social development of every country. The development of a traffic system enables greater mobility for the rural population, in the countryside itself, and to the urban area. The process of daily trips from rural areas to employment in the urban requires good road connections and a developed bus lines of suburban traffic.

The analysis of traffic for rural development clearly reveals that, as physical manufacturing was continuously increasing, freight transport in Bosnia, beside passenger transport, increased as well. The intensive growth of work in industry has led to a numerical increase of rural people engaged in traffic, hence, the greater share of Bosnia and Herzegovina (B&H Statistical Agency from 2007) in the total GDP. Along with extremely high motorization, besides the increase of daily trips, and the number of people employed in industrial enterprises, the suburban and rural settlements along the roads have also developed, which made them more accessible to residents from remote areas. The basic means of transport that connects rural areas to urban centers are the buses, massively used in the suburban and urban transport of most travelling-workers and students (Deichmann J. I., 2012).

#### 5. DEVELOPMENT PERSPECTIVES IN THE RURAL AREAS OF BOSNIA AND HERZEGOVINA

Development trends in the rural areas of Bosnia and Herzegovina, can be seen in many different aspects. Currently improvement of infrastructural development in rural areas is being advocated. From the previous industrial development, some of the minor industrial piths were preserved, and they may be a good basis for future processes in rural areas. Creating new job opportunities in the rural areas of Bosnia and Herzegovina in the upcoming period must be based on energy potentials, on the one hand, and on a qualified labour force on the other, that is, economic success of smaller enterprises with lesser location demands. Considering that, a smaller economy in local communities will emerge in the upcoming period. Still, the priority should be given to the food industry operations which would rely on the location of land and water (Velagić, I, 2011).

On the other hand, smaller industrial operations for food processing – milk, meat, fruit, potatoes and other vegetables – could be developed in rural areas, and their activities could successfully fill existing gaps in Bosnia's markets and wider. This would, amongst other things, also mean opening smaller industrial operations (textiles, graphic, and wood industry) on bigger locations. In the future, development, should search for a common solution to the manufacturing of food products in the food industry. Food industry factories in Bosnia and Herzegovina should not be allowed lose to their production at times when there are excellent location conditions for them. Considering the existence of location factors, the existing industry operation structure, and the qualification structure of the labour force, the smaller food industry should operate on a lower scale (Sarajčić S., 2006).

The rural development of Bosnia and Herzegovina in the future economic development must go in the direction of positive de-industrialization, that is, in the direction of a more equal number of employees in rural areas. Incentives and support systems to agriculture should be synchronized, and those incentives should be directed towards registered agricultural properties. Also, it is necessary to establish an agricultural market information service to strengthen the government capacity of collecting statistical data and analyze policies in modern agriculture. Science and technology are an extremely important dimension of life quality in the rural areas of Bosnia and Herzegovina. They will become more dominant with the further development of civilization, because they will find adequate

solutions to all living conditions of rural people in. The influence of this dimension on the quality of life has a direct and indirect impact. In the future, this dimension will directly influence the quality of life in striking a balance with the natural environment and create a sustainable development for human communities, and a safe quality of life for future generations.

Considering that each sector of modern society is intensively influenced by the development of science and technology, rural areas make no exception. For example, we must study the possible effects of modern biotechnology on agriculture, the raising of cattle and the food industry, if we wish to get an insight into the process of rural development. Important questions in this study refer to new technologies, and the extent of their impact especially on rural development. Changes that the modern information technology has made in some sectors of the rural economy are already visible, e.g. direct marketing and tourism, with new possibilities for economic growth in the rural areas of Bosnia and Herzegovina. These trends must be analyzed, in order to consider further development and answer the question as to which sectors of rural development could be included in it. For example, it is assumed that rural areas located on the edge of bigger cities will experience a new sub-urbanization due to the increase in telecommunications, or through home-working using tele-communication channels. A special dimension of rural growth has the impact of globalization. In the future, The World Trade Organisation (WTO) will increase its pressure on the agriculture of Europe. Besides, other trends of globalization are also important. Firstly, it is the information technology which may lead to market expansion for certain rural products and services, such as tourism and high value products in Bosnia and Herzegovina.

## 6. CONCLUSIONS

During the middle of the nineteenth century, Bosnia and Herzegovina was mostly an agricultural and rural country. Three quarters of the population lived in rural areas, and more than half of the total population have based their existence on agricultural manufacturing. Complex and mutually intertwined processes of industrialization, urbanization, de-agrarization and de-ruralization, have resulted in deep changes in the image of Bosnia and Herzegovina. Between 1953 and 2001, the share of the rural in the total population decreased from two thirds to 42–49%, and the share of the pure agricultural one lowered ten times, from 56.1 to 5.5%. In the sixties and seventies, the climax of the agrarian exodus, just like in other Balkan countries, was registered together with the development of industry and the tertiary sector, as well as with migrations abroad. General and agrarian policies did not support private country-side properties, affecting the social and economic impoverishment of the rural area, alongside with the above-mentioned processes. As a consequence, most modern studies emphasize the negative demographic, economic and social characteristics of the Bosnian and Herzegovinian rural area at the beginning of the twenty-first century.

It is necessary to focus on the specific infrastructural necessities of the rural areas, especially on the serious lack of water supply and of a sewerage system, which still affect a smaller part of the rural population. Public services, responsible for water supply, sewerage and urban planning, should be key-partners in solving this issue. In the rural areas of Bosnia and Herzegovina, early education, at home and in pre-school institutions, should be improved, which should be done by the national education system and social institutions in partnership with the local communities. For rural areas that lie closer to urban centers, the development of urban jobs and services might represent the most efficient and economic way of supporting the rural population, and, at the same time, providing direct support to middle-sized cities, where economic development is the weakest. In order to attain this goal, rural development planners should leave aside the traditional land-based approach to the rural issues, and take into account the best experiences of economic development and job creation, wherever those experiences may be.



Improvements in rural transportation and communications would have a significant benefit. By shortening travel time to urban centers, many more village residents could have economic possibilities and provide services to the urban population. The topography of Bosnia and Herzegovina makes the construction of roads very expensive, however, the improvement of roads and of public transportation would greatly contribute to reducing the unattractiveness of rural areas. Considering that funds for rural development are strictly limited, Bosnia and Herzegovina should attempt to include rural questions and tasks in their general policies on transportation, education, healthcare, and economic development. Such policy-makers should carefully assess all costs, including the fact that a decrease in the growth of urban centers will affect neighbouring rural communities as well. They must also consider that the rural areas produce almost half of the GDP, and therefore, they will be directly taxed in order to finance rural development measures. That is why, policies should focus not on attempts to resist the inevitable, but rather on helping people adjust to changes and make the best use of new opportunities those changes may bring about.

#### REFERENCES

- Agency for Statistics of Bosnia and Herzegovina, Sarajevo, 2008–2014.
- Bećirović S. (2000), *Poljoprivredno zadrugarstvo, temeljni preduslov razvoja i ekonomske stabilnosti malih gazdinstava*, Poljoprivredni institut Sarajevo, Sarajevo, 2000.
- Burnazović T. (1998), *Foreign capital in Bosnia and Herzegovina and investment possibilities (status and perspectives)*, *Ekonomika*, godina 1, no. 1, pp. 3–18.
- Chopra, G. (2011): *Agricultural Geography*, Commonwealth, New Delhi, India.
- Deichmann J. I. (2012), *Historical Legacies as Determinants of Foreign Direct Investment in Bosnia-Herzegovina*, *South East European Journal of Economics and Business*, 17 (1), pp. 7–18.
- European Commission, Directorate General for Agriculture and Rural Development (2006), *Rural Development in the European Union*, Statistical and Economic Information.
- FIPA – Agency for promotion of foreign investments in Bosnia and Herzegovina (2011), retrieved from [http://www.fipa.gov.ba/local\\_v2/default\\_bs.asp](http://www.fipa.gov.ba/local_v2/default_bs.asp) (25. 01. 2011).
- Foreign trade chamber of Bosnia and Herzegovina (EFTA, the EU, others 2010–2014), *Overview of registered FDI in BH by countries and companies from May 1994 to June, 30 2010*.
- Gadžić M. (1997), *Direct Foreign Investment in Countries in Transition*, Faculty of Economics, Split. 181–182.
- Halfacree K. (1993), *Locality and social representation: space, discourse and alternative definitions*, *Journal of Rural Studies* 9 (1), str. 23–37. DOI: 10.1016 / 0743–0167 (93) 90003–3.
- Horvat U. (2010), *Health Resorts and Their Importance for the Development of less Developed Areas in Slovenia*, *Journal for geography* 5–1, (IGU)Maribor, pp. 147–157.
- Jordan P. (2009), *Development of Rural Space in post-Communist Southeast Europe after 1989, A Comparative Analysis*, *Revija za geografiju*, *Journal of Geography*, 4–1, pp. 89–102.
- Lorber L. (2010), *New challenges for Sustainable Rural Development in the 21<sup>st</sup> Century*, *Journal for geography*, 5–2, (IGU) Maribor, pp. 6–13.
- Lukić A. (2010), *O teorijskim pristupima ruralnom prostoru*, *Hrvatski glasnik* 72/2, 49–75, Zagreb.
- Mandal R.B. (2001), *Introduction to Rural Settlement*, New Delhi.
- Marsden T. (1998), *New Rural Territories: Regulating the differentiated rural space*, *Journal of Rural Studies*, vol.14 no. 1, pp 107–117.
- Ministry of Foreign Trade and Economic Affairs of Bosnia and Herzegovina (2010), *Companies with capital over 1 mil. KM*, Sarajevo,
- Ministry of Foreign Trade and Economic Affairs of Bosnia and Herzegovina (1998), *Law on Foreign Direct Investment in Bosnia and Herzegovina*, Sarajevo.
- Muller D. (2000), *Der landliche Raum Sudosteuropas in der Transformation, Agrarpopulismus in der Zwischenkriegszeit und Reformstrategien in der 90<sup>er</sup> Jahren am Beispiel Rumaniens*, *Aus der Sudosteuropa-Forschung*, 12, pp. 55–61.
- Musabegović N. (1997), *Ruralno-urbani antagonizam i moderni svijet*, Nacionalna i univerzitetska biblioteka BiH, Sarajevo.
- Mustafić-Cokoja D. (2008), *Foreign Direct Investment and Sustainable Development*, Sarajevo.
- Nurković R. (2010), *Influence of tertiary activities on transformation of the rural settlements in Bosnia and Herzegovina*, *Journal for Geography* 5–1, (IGU)Maribor, pp. 67–73.



- Nurković R. (2012), *Rural space as a product of contemporary economic-geographic development in Bosnia and Herzegovina*, IGC COLOGNE 2012. 32 International Geographical Congress, University of Cologen, Institute of Geography, Germany, pp.178–179.
- Nurković R. (2012), *Socio-economic transformation of Bosnia and Herzegovina*, Rural Studies vol. 27, Local and regional development-challenges and policy issues, pp. 151–161.
- Pejaković G. (2011), *Foreign Direct Investment and the Economy of Bosnia and Herzegovina*, Faculty of Economics, Sarajevo, pp. 21–22.
- Sarajčić S. (2006), *Foreign Direct Investment and the Transition: Current Results and Future Prospects*, DES, Sarajevo.
- Statistical Yearbook of Bosnia and Herzegovina for 1961, 1971, 1981, 1991, 2001, 2007 and 2009, The Republic agency for Statistics, Sarajevo.
- Woods M. (2009), *Rural Geography*, London, SAGE Publications Ltd.
- [http://en.volksbank.com/investor\\_relations/group\\_information/ownership\\_structure](http://en.volksbank.com/investor_relations/group_information/ownership_structure) (14. 01. 2013).
- <http://www.fipa.gov.ba> (2014).
- <http://www.telekom.rs/Contents/ContentDefault.aspx?temp=0&sid=1253&id=1254> (14. 01. 2013).
- <http://www.ziraatbosnia.ba/turkish/text.php?tekst=16> (14. 01. 2013).

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# SOCIO-ECONOMIC CHARACTERISTICS AS LIMITING FACTORS OF REGIONAL DEVELOPMENT. THE CASE OF KOLUBARA DISTRICT, REPUBLIC OF SERBIA

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*Key-words:* population, economy, settlements, regional development, local residents, Republic of Serbia.

**Abstract.** One of the essential preconditions for the regional development of an area is a positive demographic, economic and development of the settlement network. Positive population trends, positive net migration and the share of young, educated and active population contributes to the good demographics of the area, thereby facilitating its development. Sustainable agriculture and planning, the maintenance of existing industries and the construction of new and modern industrial facilities contribute to regional development. Population mobility and the transport of goods are greatly facilitated by the existence of an adequate transport infrastructure, which is closely linked to regional development. A well-developed network of settlements is important for the quality of life of residents, and proximity to big centers can be a great advantage, but in some cases can also be a disadvantage. In order to highlight the importance of socio-geographical features of regional development a survey was conducted among residents of Kolubara District. This paper consists of two parts. The first part deals with the socio-economic characteristics of the Kolubara Region based on statistical data, and the second part presents the perception of the local population about socio-economic changes. The main instrument of the study was a closed type survey. The results showed that respondents perceived aging and population emigration as a big limiting factor for regional development. They also believe that the proximity of large urban centers influences the emigration of population and depopulation.

## 1. INTRODUCTION

Socio-geographical characteristics are to a great extent determined by the natural characteristics of an area. In this way, both natural and social characteristics of the area influence its regional development. This paper focuses on the socio-geographical characteristics and their adverse influence on the regional development of Kolubara District. The population, and the economic features of an area and its settlements are the backbone of socio-geographical characteristics and if these elements are not positive, they greatly slow down the development of the region. The Republic of Serbia is still in transition and adapting to the contemporary trends of regional development. In this sense, it lags far behind European and world countries. Bad socio-geographical indicators only deepen problems and prevent development (Hugo, 2001; Yan *et al.*, 2005).

The European Union developed a regional policy of its own, with progressively more resources devoted to economic and social cohesion. The objectives of the EU regional policy are: to reduce

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inequalities between regions, to increase efficiency at national and European level and to decrease inequalities between the Member States of the EU (Bachtler and Wishlade, 2005). In recent years, it has been possible to identify a significant shift in the paradigm of regional development (Bachtler and Yuill, 2001). There was no approach made to solving the regional problems of development in Serbia before 2007, because at that time there was no strategy at a national level, nor the basic instruments, institutional framework or coordinating system for the financing and stimulation of the construction of a regional infrastructure and allocation of public services and investments, and there were no specialized financial institutions and regional development agencies. Generally defined goals, mainly repeated for years with inefficient stimulating policies, deepened the regional and structural development problems (Miljanović *et. al.*, 2010; Đukičin Vučković *et al.*, 2018).

This paper presents the socio-geographical indicators that mostly influenced and limited the development of the Kolubara District. The demographic indicators, the economic characteristics and the characteristics of the settlement are presented based on the Census of Population Books, statistical annals and other statistical materials, and the negative trends in the domain of these characteristics are pointed out. Also, a special part of the paper is devoted to the presentation and analysis of the survey research among the inhabitants of the Kolubara District. The research was conducted in order to find out what the local population thinks of the poor socio-geographical trends that hinder regional development. In order to better examine the attitudes of the local population, a survey was carried out. The research was conducted through personal inquiries and the attention was paid to the membership of respondents to different social-demographic groups.

The starting hypothesis was that statistically poor demographic, economic indicators and settlement characteristics slow down the development of the research area. Another hypothesis considered in the paper was that the local population agrees that regional development is slowed down by those factors. The third hypothesis was that there are statistically significant differences in attitudes among respondents of different gender, age, educational attainment and location towards socio-geographical characteristics and regional development.

## 2. AN OVERVIEW OF THE STUDY-AREA

The Republic of Serbia, situated in Southeast Europe, belongs to both Southern Europe (about 80% of the territory) and Central Europe (in the Pannonian Plain where around 20% of its territory lies), occupying an area of 88.361 km<sup>2</sup>. It is a continental country bordering on Hungary, Romania, Bosnia and Herzegovina, Croatia, Montenegro, Bulgaria, Albania and the former Yugoslav Republic of Macedonia (see Reference List no. 8; Stancetic, 2009; see Reference List no. 9).

The Kolubara District is covered by more than four-fifths of hilly and mountain units, and a little less than one fifth by plain areas. The district is made up of six municipalities: Valjevo, Osecina, Mionica, Ljig, Lajkovac and Ub. The district covers an area of 2,474 km<sup>2</sup> with a population of 174,513 inhabitants according to the 2011 Population Census (see Reference Lists nos. 29 and 30). The population density (70.5 people per km<sup>2</sup>) is lower than the national average (81.3 people per km<sup>2</sup>), but the dense settlement network (218) requires high transport connectivity. The population of Kolubara District represents 2.3% of the total population in Serbia of which 49.5% are males and 50.5% are females. The active population represents 47.96%, 18.84% being income-based and 33.20% dependent persons. The share of population engaged in agriculture is 40.1%, in industry and mining 19% (Tošić, 2006; see Reference List no. 36).

The district is open towards the northwest, north, and especially northeast with the wide Kolubara River Valley, while the Valjevo Mountains separate it from neighbouring natural areas in the southwest, south and southeast. Specific to the Kolubara Region is its location near the Belgrade area and at the crossroads of significant routes. Another important feature of this area is its historical

character. The proximity of Belgrade and good traffic connection with the capital has always attracted the residents of the Kolubara District. When going on the road that follows the Kolubara Valley, Valjevo is 96 km far from Belgrade (see Reference List nos 8 and 9). This valley has always been a crossroad and a bridge that connects the Pannonian Basin with Central Serbia and Pomoravlje with Bosnia and Herzegovina. The construction of roads and the development of industry have influenced changes in human activities that turned from agricultural to the secondary and tertiary sectors. Part of the Kolubara lignite mine is located in the north-eastern part of the Kolubara District, which adds one more specific feature to the regional development of this area. The exploitation of raw materials requires a number of changes in watercourses, relocation of settlements, in agricultural activities and in the socio-economic structure of the population which seriously disturb the natural environment (Gaskell, 1979; Jankovic, 1983).

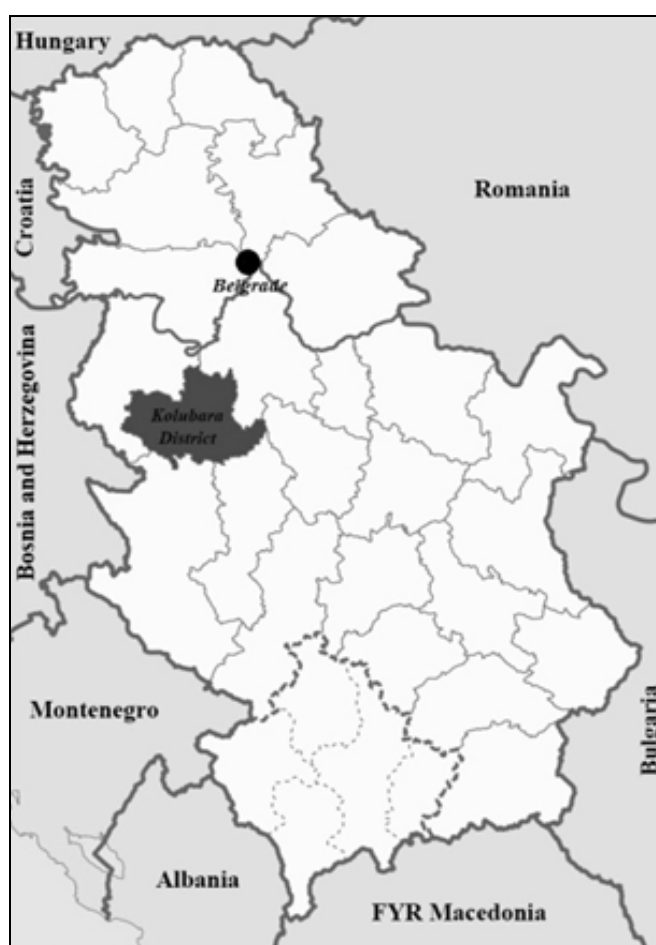


Fig. 1 – The geographical position of the Kolubara District in the Republic of Serbia.

The Kolubara District with its two municipalities – Ub and Lajkovac –belongs territorially to the western part of The Kolubara Lignite Mine (see Reference List nos 14, 15 and 16; Đukićin Vučković *et al.*, 2018). The Kolubara Lignite Mine includes 21 exploitation fields and only six of them belong to the Kolubara District municipalities and occupy the western part of the mine. Significant land-use changes have occurred due to current and future extensions of excavations (Spasic *et al.*, 2009; Zivanovic Miljkovic, Djurdjevic, 2010; Djukicin *et al.*, 2014).

### 3. METHODOLOGY

The authors used the statistical data from the Population Census and Statistical Yearbooks. The descriptive statistics methods helped the authors identify the indicators appropriate for the socio-geographical characteristics of the Kolubara District. In addition to analytical methods, comparative and synthetic ones were used to represent these data. Furthermore, annual statistical bulletins were employed to examine the socio-economic characteristics of the Kolubara District.

In this study, the field survey research method was also resorted to. In order to best examine the attitude of the local population towards the transport infrastructure of Kolubara District, a survey was conducted, sampling 0.1% of the population, meaning that 176 residents of the Kolubara District participated in it. The research was conducted as a personal survey questionnaire given to every respondent to fill in. The questionnaires contained mainly closed questions and were anonymous, so that respondents could freely give honest answers. It was a random stratified sample. Out of the 176 respondents participating in the survey, 48.3% were male and 51.7% female. When looking at the distribution of respondents according to age, most of them (40.9%) were over 51 years old. The group of respondents aged 26 to 50 ranked second, with a share of 33%, and the least frequent group (merely 26.1%) was made up of respondents under the age of 25. With regard to the educational structure, the largest share of respondents had completed a secondary education (65.9%), their highest qualification grade. This reflects the educational structure of the country's total population, where secondary education is the most common highest qualification (44.2%), 22.2% of the respondents having graduated only the elementary school. The smallest share held individuals with a college or university education (only 11.9% of the respondents). This research included individuals from all the six municipalities in the Kolubara District. The largest share went to respondents from the Municipality of Valjevo (51.1%), followed by those from the Municipality of Ub (17%). Respondents from the Municipality of Lajkovac ranked third, with 9.1%, while those from the Municipalities of Ljig and Mionica were on the fourth place with 8% each. The smallest population of respondents (6.8%) comes from the Municipality of Osecina, this municipality having the fewest inhabitants.

The participants voluntarily agreed to participate in the study. The study was anonymous. A two-part questionnaire, with 12 items, was used for data collection. The first part (4 items) was applied to collect demographic data. The second part (8 items) was a 5-item Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) that measured people's attitudes. The content of the questionnaire is original; it is not based on any available research of this type. Cronbach's alpha test was run to estimate its reliability and the value obtained was 0.72. Bearing in mind that the reliability coefficient higher than 0.7 is considered satisfactory, the questionnaire used has acceptable reliability (Misevic-Kadijevic, 2009).

The data obtained are analyzed in the statistical programme IBM SPSS Statistics, widely applied in similar researches. The most common statistical analyses applied in this research are: an initial descriptive statistical analysis followed by t-test analysis for independent samples (Sheldon and Abenoja, 2001) and one-way analysis of variance, ANOVA (Vargas-Sánchez *et al.*, 2011).

In order to determine the significance of the difference among individual groups, the post-hoc Scheffe test was used as one of the most rigorous and most commonly applied tests. The t-test for independent samples is used for comparing the mean values of the results and for determining the statistical significance of their differences. The t-test of independent samples was applied in order to compare the arithmetic means of two groups of respondents: male and female. The application of the one-way analysis of variance, ANOVA, was meant to investigate if a statistically significant relationship exists between the dependent variables (items related to the attitudes of respondents) and the independent variables (social characteristics of the respondents) (Đukićin Vučković *et al.*, 2018).

## 4. RESULTS AND DISCUSSION

### 4.1. Socio-economic assessment

The section dealing with demographic indicators analyzes only the parameters which are directly connected to regional development. Demographic changes can best be observed on the basis of official lists. Due to the topic of this paper, monitoring the population movement began with 1948. That year was taken as starting point because the most intensive development and most changes in the Kolubara Region happened in the second half of the 20<sup>th</sup> century.

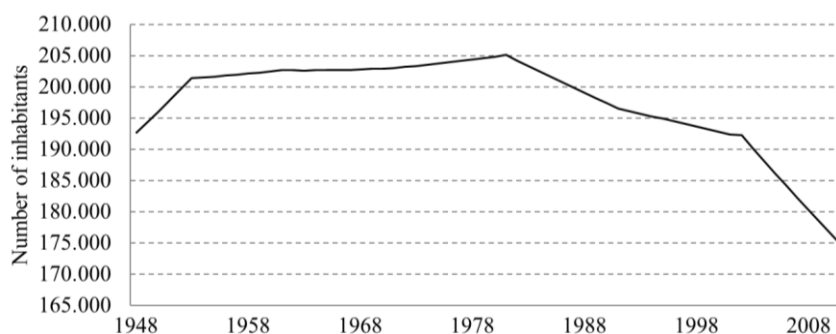


Fig. 2 – Movement of the population in Kolubara district from 1948 to 2011.

*Source:* Statistical Office of the Republic of Serbia, 2004, Census of Population, 2002, Book 9, Comparative Overview of the Number of Population 1948, 1953, 1961, 1971, 1981, 1991 and 2002; Statistical Office of the Republic of Serbia, 2012, Census of Population 2011, Book 1, Ethnicity.

As shown in Figure 2, the population decrease in Kolubara District versus to exponential population growth is visible since 1992. The population movement depends on natural increase and migrations and these two factors did not have a positive influence on population increase in this area over the last 30–40 years. The process of urbanization, the growth of city settlements and the movement of people from smaller to larger areas are all connected with the general numerical decrease of inhabitants. These negative trends slowed down regional development and thus, represent a limiting factor. It is difficult to plan regional development in areas where the population is decreasing.

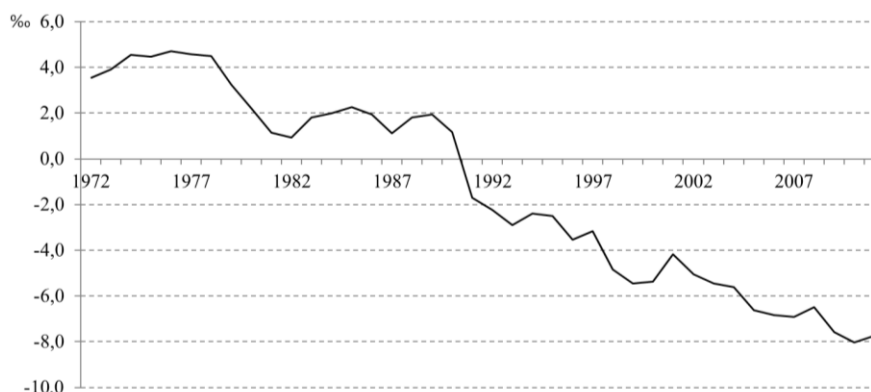


Fig. 3 – Changes in the natural increase rate in Kolubara District from 1972 to 2011.

*Source:* Statistical Office of the Republic of Serbia, 1974–1989, Municipalities in the Republic of Serbia, 1972–1988; Statistical Office of the Republic of Serbia, 1990–1998, Municipalities in the Republic of Serbia, 1989–1997; Statistical Office of the Republic of Serbia, 1999–2010, Municipalities in the Republic of Serbia 1998–2009; Statistical Office of the Republic of Serbia, 2011–2012, Municipalities and regions in the Republic of Serbia 2010–2011.

The natural increase is directly connected with birth and death rate values, the findings revealing a decreasing in Kolubara District the natural increase rate from 1972 to 2011.

As seen in Figure 3, at the beginning of the observation period the natural increase rate was of 3.5 ‰, increasing to 4.7 ‰ until 1976. The first negative natural increase rate occurred in 1991 (-1.7‰), a situation going on until the end of the observed period, basically a constantly negative value and a downward trend. The lowest natural increase rate even -8 ‰ occurred in 2010. The negative rate of natural increase is a limiting factor for the development of Kolubara District.

The modern trend of social development shows migrations to be a very important component among the main demographic categories with significant consequences for the areas they are taking place in.

Table 1

The indigenous and migrant population of Kolubara District

Census years	Population total	Indigenous		Migrant	
		Total	%	Total	%
1961	202,630	123,911	61.2	78,719	38.8
1971	202,990	127,591	62.9	75,399	37.1
1991	196,556	111,815	56.9	84,741	43.1
2002	192,204	112,390	58.5	79,814	41.5
2011	174,513	102,828	58.9	71,685	41.1

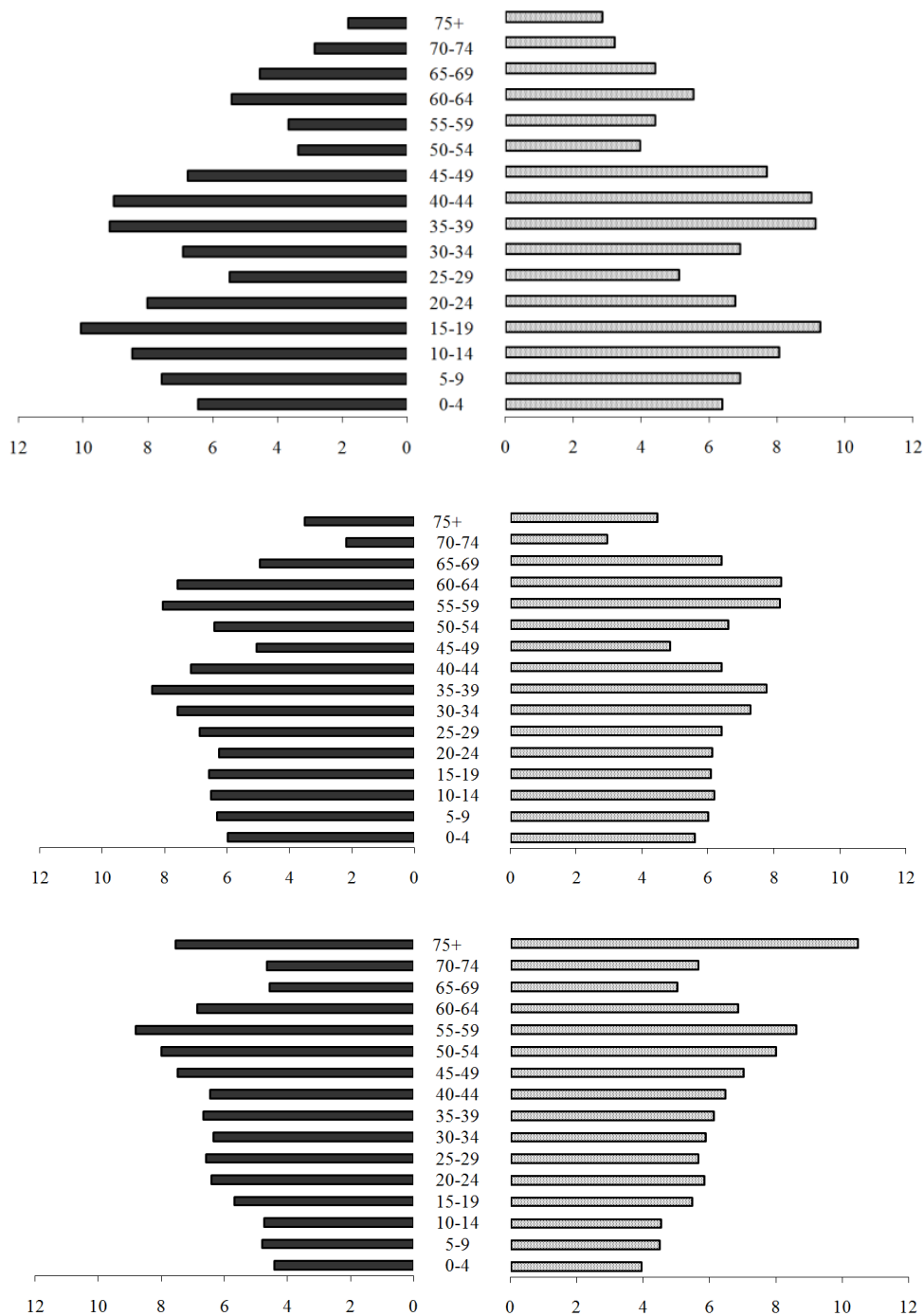
Source: Statistical Office of the Republic of Serbia, 1965, Census of Population 1961, Book 12, Migration; Statistical Office of the Republic of Serbia, 1974, Census of Population 1971, Migration; Statistical Office of the Republic of Serbia, The Census of Population – electronic form 1991; Statistical Office of the Republic of Serbia, 2004, Census of Population 2002, Book 8, Migration; Statistical Office of the Republic of Serbia, 2013, Census of Population 2011, Book 9, Migrations.

Based on Table 1, one can see that, during the observed period, the share of the indigenous population was decreasing at the expense of an increasing migrant population. The conclusion is that in the last two or three decades, migration processes in the Kolubara District have been quite common. The intensive migration processes in this district are the result of urbanization. Social and economic conditions are often stated as main driving factors of migration in the area (Đjukicin *et al.*, 2014; Smiljanic, 2002). The demographic outflow due to migration movements is a major problem throughout Serbia, as the population is moving from smaller communities to larger ones which are much more attractive from a socio-economic perspective. The demographic outflow from small settlements adversely affects regional development.

Figures 4, 5 and 6 clearly illustrate that population age in Kolubara District was growing in the respective census years. Figure 4 shows a very high share of population in the age-group 15–19, as well as a high share in the population between 35 and 45 years old. The population aged 50 and over forms the same group in subsequent censuses, so in the next censuses the significant expansion of the age-pyramid peak is due to low natural increase, the basis of the age pyramid increasingly narrowing. In 2011, the average age of inhabitants in the Kolubara District was of 43.4 years old.

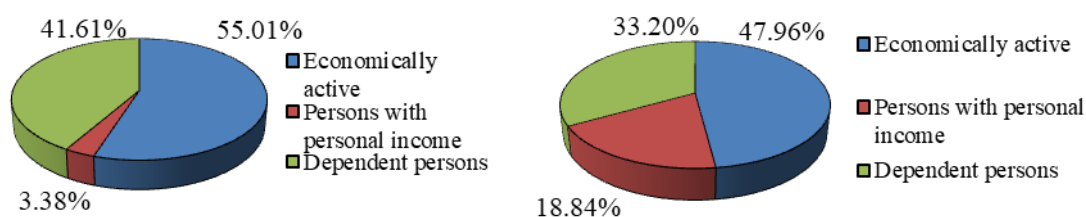
An ageing population makes the development of the area more difficult and, accordingly, planning the development of the area is based on its adaptation to the high share of the elderly population. Demographic aging implies ever more people near retirement or already retired and hence, an economically decreasing active population. This adversely affects the development of the area the need for new jobs being reduced. The following figures also show these changes.





Figures 4, 5. and 6 – Age-structure of the population in Kolubara District according to the 1971, 1991 and 2011 Censuses (left – males; right – females).

Source: Statistical Office of the Republic of Serbia, 1974, Census of Population 1971, Sex and age; Statistical Office of the Republic of Serbia, 1994, Census of Population 1991, Book 4, Sex and age; Statistical Office of the Republic of Serbia, 2012, Census of Population 2011, Book 2, Age and sex.



Figures 7 (left) and 8 (right). The population by economic activities in 1971 and 2011.

Source: Statistical Office of the Republic of Serbia, 1974, Census of Population, 1971, Agricultural population; Source: Statistical Office of the Republic of Serbia, 1994, Census of Population, 1991, Book 7, Activity and gender; Source: Statistical Office of the Republic of Serbia, 2013, Census of Population, 2011, Book 7, Economic activity.

Analyzing the share of the economically active population in Kolubara District one can notice a decrease in the number of economically active population and an increase in the number of people with a personal income. The share of the economically active population in 1971 was of 55% and only 48% in 2011. This indicates that the overall population in the area is decreasing, but also that the decrease in the share of the economically active population is the consequence of population aging and the increase in the number of persons with personal income (pensioners). This is supported by the fact that the share of population with personal income was 3.4% in 1971 and as high as 18.8% at the 2011 Census. As the share of young population was decreasing, that of dependent persons also decreased, because most people in this group were pupils and students (41.6% in 1971 and 33.2% in 2011 Census data). These trends have a negative effect on the regional development of this area.

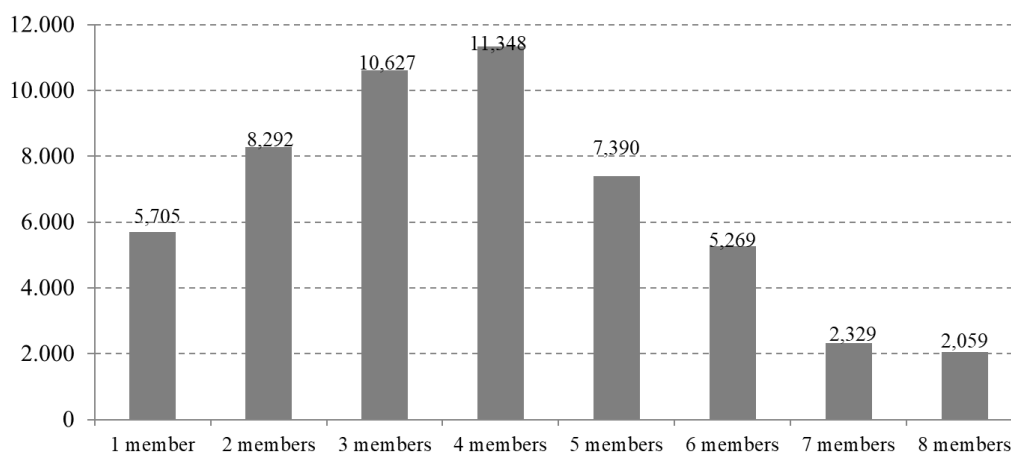


Fig. 9 – The structure of households by number of members in Kolubara District in 1971.

As seen in Figure 9, most households had three and four members in 1971; fewer households had eight or more members. Such a picture is to be expected, taking into account that the natural increase in Kolubara District in the 1970s was higher than it is now, there was a more numerous economically active population and the average population age was lower.

Figure 10 shows that the number of one-member households in 2011 more than doubled compared to 1971 and that two-member households drastically increased as a consequence of the negative natural increase, poor economic indicators and population aging. In the above census year, there was a slight increase in the number of three-member households. All the other categories recorded a decrease.

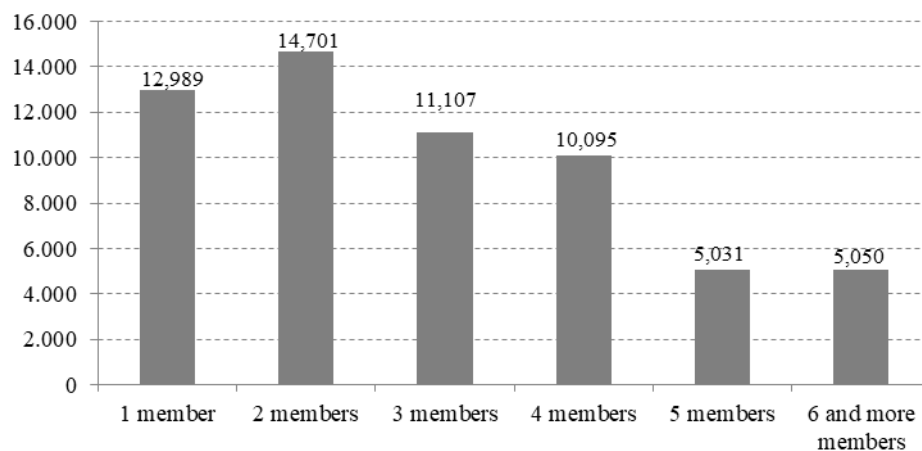


Fig. 10 – The structure of households by number of members in Kolubara District in 2011.

Source: Statistical Office of the Republic of Serbia, 1974, Census of Population, 1971, Ethnicity, Education, Economy and Households by number of members; Statistical Office of the Republic of Serbia, 2013, Census of Population, 2011, Book10, Households by number of members.

Based on these indicators, planning and expecting economic and business development in the study-area is a difficult matter.

Economic characteristics are one of the main drivers of regional development. Most of the inhabitants of Kolubara District are engaged in agriculture, industry and mining.

As shown in Table 2, the share of the population engaged in agriculture in the three census years decreased from 72.7% in 1971 to 53.1% in 1991 and to only 40.1% in 2011. Poor investments in this area and the absence of planned agricultural production are the reasons for this trend. Due to such conditions, regional development that could rely on agriculture cannot be planned. According to the share of domestic and foreign tourists (Table 2), it is clear that the share of population engaged in industry over the last 40 years has significantly increased. That increase is largely the result of the reduction in the share of population occupied in agriculture. Although there is an increase in the share of inhabitants engaged in industry and mining, the situation in these two sectors is not satisfactory. If one takes into account the natural industrial and mining potential of Kolubara District, then the above indicators are poor. In order to improve the situation in industry and mining, it is necessary, in addition to reforms, for people and a population potential which unfortunately is getting ever lower.

Table 2

The share of the population engaged in agriculture, industry and mining within the economically active population occupied % in 1971, 1991 and 2011

	1971	1991	2011
Agricultural population	72.7	53.1	40.1
Population engaged in industry and mining	8.42	20.87	19.05

Source: Statistical Office of the Republic of Serbia, 1974, Census of Population, 1971, Agricultural population; Statistical Office of the Republic of Serbia, 1995, Census of Population, 1991, Book 12, Economically active population; Statistical Office of the Republic of Serbia, 2014, Census of Population, 2011, Book 15, Occupation.

As regards tourism, a slight increase is noticed in the share of foreign tourists, which can be a good indicator for the future development of the services sector.

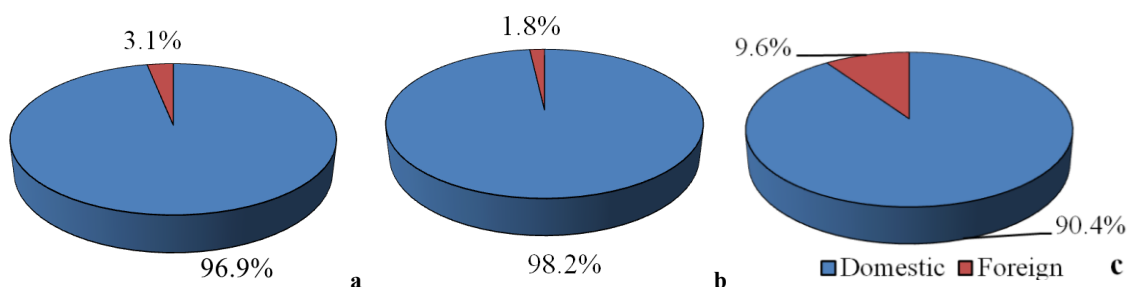


Fig. 11 a, b, c – The share of domestic and foreign tourists in the total number of tourists in Kolubara District 1971, 1991 and 2011.

Source: Statistical Office of the Republic of Serbia, 1972, Statistical Yearbook of SFRY; Statistical Office of the Republic of Serbia, 1992, Municipalities in the Republic of Serbia, 1991; Statistical Office of the Republic of Serbia, 2012, Municipalities and regions in the Republic of Serbia, 2012.

As seen in Figure 11 (a, b and c), the number of tourists in this District is dominated by native ones. In the last forty years, very few foreign tourists came here. It is only in 2011 that there was a slightly higher share of foreign tourists (9.6%), which is still insufficient. Infrastructure is one of the factors largely unfavourable for both domestic and foreign tourists. Although significant traffic routes pass through the District and there are many local and regional roads, they are in a poor condition. This contributes to the backwardness of the District, regional development being slowed down to a large extent due to the poor network of roads (Đukičin Vučković *et al.*, 2018). A dense network of 218 settlements is spread out in the territory of Kolubara District. The population decrease reflects both in the network and functions of settlements. As Table 3 shows, according to the 1971 Census, most settlements in Kolubara District had between 501 and 1,000 inhabitants, which was the case of 45.4% of all settlements.

Table 3

Classification of settlements by number of inhabitants in 1971 and 2002

Classification by number of inhabitants	Share in the total number of settlements in %	Share in the total number of settlements in %
up to 500	33.9	55.0
501–1,000	45.4	33.9
1,001–2,000	17.9	7.8
2,001–3,000	0.9	0.9
3,001–5,000	1.4	1.4
5,001–10,000	–	0.5
10,001–20,000	–	–
20,001–50,000	0.5	–
from 50,001	–	0.5
Total	100	100

Source: Statistical Office of the Republic of Serbia, 2004, Census of Population, 2002, Book 9, Comparative Overview of the Number of Population, 1948, 1953, 1961, 1971, 1981, 1991 and 2002.

Compared to 1971, the number of settlements with up to 500 inhabitants increased in 2002 and the number of settlements with 501 to 1,000 inhabitants decreased. It can be concluded that the number of settlements with 501 to 1,000 inhabitants decreased in 2002 at the expense of the increase in the number of settlements with up to 500 inhabitants. This is a very bad indicator which, first of all, points out the poor demographic picture and the high demographic outflow from the villages. Such changes in the network of settlements are another bad indicator for regional development.

Table 4

Type of settlement by occupational structure in 1971 and 2002.\*

Type of settlement	Census 1971		Census 2002	
	Number of settlements	Share / total number of settlements in %	Number of settlements	Share / total number of settlements in %
SNA	6	2,8	10	4,6
N	6	2,8	15	6,8
M	6	2,8	35	16,1
A	200	91,7	158	72,5
Total	218	100,0	218	100,0

Source: Statistical Office of the Republic of Serbia, 1974, Census of Population 1971, Agricultural population; Statistical Office of the Republic of Serbia, 2004, Census of Population, 2002, Occupation and gender.

As shown in Table 4, by far the largest number of settlements in Kolubara District is of an agrarian-type. According to the 1971 Census, there were 91.7% of agrarian-type settlements, with only 72.5% in 2002. The most drastic changes occurred in the category of mixed settlements, which increased from 6 to 35 or 16.1% settlements / total number of settlements. Such a big change in the category of mixed settlements is due to the fact that settlements that were agrarian in 1971 turned into mixed by 2002. If the demographic picture of the Kolubara District would not be bad, the changes that occurred in the types of settlements by structure of economic activity could have a positive impact on regional development.

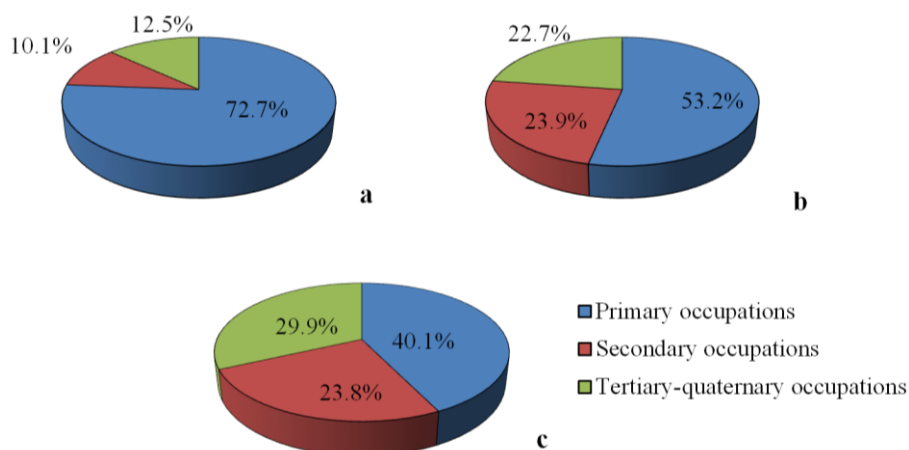


Figure 12 a, b, c – The structure of economic activities in Kolubara District according to the of 1971, 1991 and 2011 Censuses.

Source: Statistical Office of the Republic of Serbia, 1974, Census of Population, 1971, Agricultural population; Statistical Office of the Republic of Serbia, 1995, Census of Population 1991, Book 12, Economically active population; Statistical Office of the Republic of Serbia, 2014, Census of Population, 2011, Book 15, Occupation.

According to Figure 12 (a, b and c), the share of population engaged in agriculture was significantly reduced in the study period. The share of agricultural population decreased from 72.7% in 1971 to 40.1% in 2011. This phenomenon resulted in the de-agrarization and relocation of the village population. What also appears as a side effect is the aging of the agricultural population.

The share of secondary occupations from 1991 to 2011 did not change significantly, yet it was to the development of the tertiary-quaternary sector, what had priority over the secondary sector, the share of the former increasing from 12.5% in 1971 to 22.7% in 1991, and to 29.9% in 2011. Such indicators suggest good regional development despite the poor demographic situation.

\* Meaning of the abbreviations in the Table: SNA-strictly non-agrarian settlements, N-non-agrarian settlements, M-mixed settlements, A-agrarian settlements.

#### 4.2. The local population's perception of the socio-economic changes Results of the t-test

The t-test for independent samples is used to compare the mean values of results and determine the statistical significance of their differences. The t-test of independent samples was applied in order to compare the arithmetic means of two population groups: male and female respondents. On that occasion, only the statistically relevant results at the level of  $p < 0.05$  significance are presented.

Table 5

The results of the t-test analysis of the local population's attitudes of both gender

Statement	Sex	M	$\sigma$	t-test	p
It is necessary to invest more in rural and spa tourism in the district	M	4.35	0,909	16.34	0.000*
	F	4.64	0,606		
Poor internal traffic infrastructure in the district is slowing down the development of trade, tourism and catering industry	M	4.31	0,964	13.53	0.000*
	F	4.66	0,670		

Note: \* $p < 0.05$

Respondents expressed their full agreement with statements indicating a considerable difference between the two groups, in terms of  $p < 0.05$  significance. Such results are likely to be expected, given that attitudinal differences between the two genders are particularly frequent. Some of the previous research papers confirm this (Bhatti, Church, 2000; Kirkpatrick *et al.*, 2012).

The statistically significant difference between male and female respondents can be noticed in two out of eight tested statements. Therefore, this hypothesis is not confirmed.

#### 4.3. Results of the one-way analysis of variance, ANOVA

The application of the one-way analysis of variance, ANOVA, was used to investigate if there is a statistically significant relationship between dependent variables and independent variables (social and demographic characteristics of the respondents). Therefore, only the results having a statistical relevance at the  $p < 0.05$  significance level will be presented. When examining the statements, there is no statistically relevant difference between the respondents of different age. Therefore, this hypothesis is not confirmed.

Table 6

Results of the analysis of variance ANOVA of the perception of the local population with a different degree of education

Statement	Level of education	M	$\sigma$	F	p
The proximity of Belgrade, its expansion and gravitational area have a strong influence on Kolubara Ddistrict	elementary school	3.54	1.253	3.237	0.042*
	secondary school	2.90	1.404		
	college/ faculty	3.05	1.322		
Poor internal traffic infrastructure in the district is slowing down the development of trade, tourism and the catering industry	elementary school	4.18	0.823	3.831	0.024*
	secondary school	4.55	0.868		
	college/ faculty	4.71	0.561		
If more investments were made in the development of smaller municipalities in the district, the population from the same would not move to Valjevo or outside the district	elementary school	3.85	1.065	7.683	0.001*
	secondary school	4.49	0.880		
	college/ faculty	4.48	0.680		
Some city functions need be moved from Valjevo to other municipal centers in order to support their development	elementary school	3.44	1.231	3.673	0.027*
	secondary school	3.92	1.166		
	college/ faculty	4.19	0.873		
It is necessary to invest more in rural and spa tourism in the district	elementary school	4.23	0.842	3.547	0.031*
	secondary school	4.60	0.745		
	college/ faculty	4.43	0.746		

Note: \* $p < 0.05$ ;  $F \geq 3.00$

For five out of eight statements (Table 6), there is a statistically significant difference between the answers of respondents of different education levels to  $p < 0.05$  significance. This hypothesis is confirmed.

The level of a population's education has a critical role in explaining the attitudes of local people, an opinion supported by some previous research studies (Pyrovetsi, Daoutopoulo, 1991).

Table 7

Results of the analysis of variance ANOVA of the attitudes of local population from different municipalities

Statement	Municipality	M	$\sigma$	F	p
Poor inner traffic infrastructure in the district slows down the development of trade, tourism and the catering industry (HoReCa)	Valjevo	4.42	0.848	2.329	0.045*
	Lajkovac	4.88	0.342		
	Ljig	4.07	1.141		
	Mionica	4.93	0.267		
	Osecina	4.50	0.674		
	Ub	4.47	0.973		
If more money were invested in the development of smaller municipalities in the district, local residents would not move to Valjevo or outside the district	Valjevo	4.14	0.978	2.421	0.038*
	Lajkovac	4.69	0.602		
	Ljig	4.29	0.914		
	Mionica	4.86	0.363		
	Osecina	4.50	0.798		
	Ub	4.50	1.075		
Some city functions should be moved from Valjevo to other municipal centers in order to support their development	Valjevo	3.60	1.169	2.824	0.018*
	Lajkovac	4.31	1.014		
	Ljig	4.07	1.072		
	Mionica	4.29	1.139		
	Osecina	3.42	1.379		
	Ub	4.20	1.031		

For three out of eight statements (Table 7), there is a statistically significant difference between the answers of respondents from different municipalities,  $p < 0.05$  significance. Therefore, this hypothesis is only partially confirmed. This standpoint is supported by some of the earlier research papers on the attitudes of the local population (Soini *et al.*, 2012).

## 5. CONCLUSIONS

Population and economy are the driving forces of regional development. There is no balanced regional development in the areas that are in transition and adjusting to changes. Demographic, economic, business and social stability, as well as planning of the area, are steadily needed for regional development.

Kolubara District is the true example of an area in which, despite good geographical, natural and traffic opportunities, regional development is slowing down. This slowdown is a consequence of historical and political circumstances, demographic outflow (the lowest rate of natural increase -8 ‰ was in 2010), aging of the population (the average age of inhabitants in 2011 was 43.4 years) and insufficient share of the young population that will be the bearer of economic and regional development.

The results presented in the paper point to the main obstacles in regional development. Even though the investigated area has some good indicators (change in settlement type according to activities (more mixed settlements (16.1%) and non-agrarian settlements (6.8%) and changes in the structure of activities), this is not enough to talk about its regional development. Regional development implies much more, primarily in demographic growth followed by economic growth, greater number of work-places, higher living standard and quality of life.

The findings of a survey conducted for the purpose of this paper has revealed that the local population is aware of the problem it is facing, but that decades-long unfavourable trends requires now



much more time and effort to make progress. Most of Serbia is facing similar problems, because of the poor demographic, economic and social trends present in all smaller communities. It is necessary for the state to adopt a series of measures and reforms which would gradually demographically revive areas, economy and business, move some functions from larger cities to smaller ones, and bring young population back to the villages.

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## REFERENCES

- Bachtler, J., Wislade, F. (2005), *From building blocks to negotiating bases: the reform of EU Cohesion Policy*. European Policy Research Papers **57**. Glasgow.
- Bachtler, J., Yuill, D. (2001), *Policies and Strategies for Regional development: A shift in Paradigm?* European Policy Research Papers **46**. Glasgow.
- Bhatti, M., Church, A. (2000), *I never promised you a rose garden': Gender, leisure and home-making*, Leisure Studies, **19**, pp. 183–197. doi : 10.1080/02614360050023071.
- Djukicin Smiljana, Djordjevic Jasmina, Milankovic Jelena (2014), *Spatial and social changes caused by the continuous exploitation of lignite in the Kolubara lignite basin, the Republic of Serbia*, Acta geographica Slovenica, **54**, pp. 41–49. doi: 10.3986/AGS54102
- Đukićin Vučković, Smiljana, Đorđević, Jasmina, Milanković, Jovanov Jelena, Ivanović Bibić Ljubica, Protić, B., Đorđević, Tijana, Ivkov, M. (2018), *The development of transport infrastructure and attitudes of the local population: a case study from the Republic of Serbia*, Geografisk Tidsskrift-Danish Journal of Geography, **18(1)**, pp. 101–113.
- Gaskell, M. (1979), *Model industrial villages in S. Yorkshire/N. Derbyshire and the early town planning movement*, Town Planning review, **50(4)**, pp. 437–458.
- Hugo, G.J. (2001), *Addressing social and community planning issues with spatial information*, Australian Geographer **32**, pp. 269–293.
- Institute of Architecture and Urban and Spatial Planning of Serbia (2005), The Yugoslav Institute for Town Planning and Housing 1999. *Regional Spatial Plan of the Kolubara District Stricken by the Earthquake*. Analytic Documentative Basis, **1**: Belgrade.
- Institute of Architecture and Urban and Spatial Planning of Serbia (2005), *The Spatial Plan of the Municipality of Valjevo. Strategy of Development, Advancement and Space Utilization*: Belgrade.
- Jankovic, M. (1983), *Degradation, rehabilitation and protection of the areas in the zones of major structural changes. Scientific assembly „Planning and organization in zones of major structural changes on the example of REIK Kolubara“*, Book **3**, IAUS, Belgrade.
- Kirkpatrick, J.B., Davison, A., Daniels, G.D. (2012), *Resident attitudes towards trees influence the planting and removal of different types of trees in eastern Australian cities*, Landscape and Urban Planning, **107**, pp. 147–158.
- Miljanović, D., Miletić, R., Đorđević, J. (2010), *Regional inequality in Serbia as a development problem*, Acta Geographica Slovenica, **50**, pp. 253–275.
- Miscevic-Kadijevic Gordana (2009), *The Construction of Test on Declarative and Procedural Knowledge*, Psychology, **42**, pp. 535–547.
- The Municipality of Lajkovac (2010), *Strategy of Sustainable Local Development of the Municipality of Lajkovac 2010–2015*: Lajkovac.
- The Official Gazette of the Republic of Serbia (2009), *The Regulation on the Nomenclature of Statistical Territorial Units*, Vol. **109**. Belgrade.
- The Official Gazette of the Republic of Serbia (2010), *The Regulation on the Nomenclature of Statistical Territorial Units*, Vol. **46**. Belgrade.
- The Official Gazette of the Municipality of Ub (2012), *Spatial Plan of the Municipality of Ub*, Vol. **13**. Ub.
- Pyrovetsi Myrto, Daoutopoulo G. (1991), *Educational response to differences in environmental attitudes among lake fishermen*, Landscape and Urban Planning, **20**, pp. 167–172.
- Sheldon Pauline, J., Abenoja, Teresa (2001), *Resident attitudes in a mature destination: the case of Waikiki*, Tourism Management, **22**, pp. 435–443.
- Smiljanic, Zora (2002), *Contemporary trends in the process of urbanization of the Kolubara district*, Collective Volume of the Faculty of Geography, **50**.

- Soini, Katriina, Vaarala, Hanne, Pouta, Eija (2012), *Residents' sense of place and landscape perceptions at the rural–urban interface*. Landscape and Urban Planning, **104**, pp. 124–134.
- Spasic, N., Dzunić, Gordana, Djurdjevic, Jasmina (2009), *Conflicts and Restrictions in Spatial Development of Mining Basins*. Architecture and Urban Planning, **27**, pp. 20–34.
- Stancetic, B. (2009), *Region as a Developmental Perspective in the European Union*. The Official Gazette, Vol. **6**: Belgrade.
- Tošić, Branka (2006), *Regional Aspects of the Development of the Municipality of Ljig*. Collection of Studies, The Geographic Institute "Jovan Cvijic" SASA, **55**.
- Yan, T., Brett, B., Graeme, H. (2005), *Development, Land-use Change and Rural Resettlement Capacity: a case study of the Three Gorges Project, China*, Australian Geographer, **36**(2), pp. 201–220.
- Vargas-Sánchez, A., Porras-Bueno, Nuria, Plaza-Mejía, María de los Angeles (2011), *Explaining residents' attitudes to tourism: Is a universal model possible?*, Ann. Tourism Res., **38**, pp. 460–480.
- Zivanović Miljkovic, Jelena, Djurdjevic, Jasmina (2010), *Natural and Manmade Constraints and Conveniences for Spatial Development of Western Part of the Kolubara Lignite Basin*. In: *Spatial, Social and Ecological Aspects of Sustainable Development in Large Coalfields*. Belgrade: Institute of Architecture and Urban and Spatial Planning of Serbia.
- Statistical Office of the Republic of Serbia, 1974–1989, *Municipalities in SR Serbia 1972–1988*; Statistical Office of the Republic of Serbia, 1990–1998, *Municipalities in the Republic of Serbia 1989–1997*; Statistical Office of the Republic of Serbia, 1999–2010, *Municipalities in Serbia 1998–2009*; Statistical Office of the Republic of Serbia, 2011–2012, *Municipalities and regions in the Republic of Serbia 2010–2011*, Belgrade.
- Statistical Office of the Republic of Serbia, (2004) *The Census of Population, Households and Dwellings 2002*, Book **6**, Occupation and sex of the economically active population that perform occupation, data by settlements, Belgrade.
- Statistical Office of the Republic of Serbia, (2004) *The Census of Population, Households and Dwellings 2002*, Vol. **9**, Comparative Overview of the Number of Population 1948, 1953, 1961, 1971, 1981, 1991 and 2002, data by settlements, Belgrade.
- Statistical Office of the Republic of Serbia (2012) *The Census of Population, Households and Dwellings 2011, Vol. 1, Nationality, data by municipalities and towns*, Belgrade.
- Statistical Office of the Republic of Serbia, (1991) *The Census of Population* – electronic form 1991, Belgrade.
- Statistical Office of the Republic of Serbia, (1992) *Municipalities in the Republic of Serbia 1991*, Belgrade.
- Statistical Office of the Republic of Serbia, (2004) *The Census of Population, Households and Dwellings 2002*, Book **8**, Migration, data by settlements, Београд.
- Statistical Office of the Republic of Serbia, (2012) *Municipalities and regions in the Republic of Serbia*, Belgrade
- Statistical Office of the Republic of Serbia, (2014) *The Census of Population, Households and Dwellings 2011*, Book **15**, Occupation, data by municipalities and cities, Belgrade.
- Statistical Office of the Republic of Serbia, (2013) *The Census of Population, Households and Dwellings 2011*, Book **10**, Households by number of members, data by settlements, Belgrade
- Statistical Office of the Republic of Serbia, (2013) *The Census of Population, Households and Dwellings 2011*, Book **7**, Economic activity, data by municipalities and cities, Belgrade.
- Statistical Office of the Republic of Serbia, (2013) *The Census of Population, Households and Apartments 2011*, Book **9**, Migrations, data by municipalities and cities, Belgrade.
- Statistical Office of the Republic of Serbia (2012) *The Census of Population, Households and Dwellings 2011, Vol. 2, Age and Sex*, data by settlements, Belgrade.
- Statistical Office of the Republic of Serbia, (1972) *Statistical Yearbook of SFRY*, Belgrade.
- Statistical Office of the Republic of Serbia, (1965) *Census of Population 1961*, Book **12**, Migration, results by settlements, Belgrade.
- Statistical Office of the Republic of Serbia, (1974) *Census of Population and Dwellings 1971*, Ethnicity, Economy and Households by number of members results by municipalities, Belgrade.
- Statistical Office of the Republic of Serbia, (1974) *Census of Population and Dwellings 1971*, Migrations, results by settlements and municipalities, Belgrade.
- Statistical Office of the Republic of Serbia, (1974) *Census of Population and Dwellings 1971*, Sex and age, results by settlements and municipalities, Belgrade.
- Statistical Office of the Republic of Serbia, (1974) *Census of Population and Dwellings 1971*, Agricultural population, results by settlements and municipalities, Belgrade.
- Statistical Office of the Republic of Serbia, (1995) *The Census of Population, Households, Apartments and Agricultural holdings in 1991*, Book **12**, Economically active population, data on the level of municipalities, republics and provinces, Belgrade.
- Statistical Office of the Republic of Serbia, (1994) *The Census of Population, Households, Apartments and Agricultural holdings 1991*, Vol. **7**, Activity and sex, data by settlements and municipalities, Belgrade.
- Statistical Office of the Republic of Serbia, (1994) *Census of Population, Households and Dwellings in the Republic of Serbia and Agricultural holdings 1991*, Book **4**; Sex and age, data on the level of settlements and municipalities, Belgrade.

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# ETHNICAL MINORITIES IN THE ROMANIAN SECTOR OF DOBROGEA

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*Key-words:* ethnic minorities, dynamics, Dobrogea, Romania.

**Abstract.** The evolution of ethnic minority communities in the Romanian sector of Dobrogea (the counties of Tulcea and Constanța) after the year 1990 is discussed based on the 1992, 2002 and 2011 census data. The analysis focusses on the structure, evolution and territorial distribution of each ethnic community at regional, county and settlement level and the changes experienced in their ethnic structure following the collapse of the communist political system and the increasing globalizing fluxes. Finally, the ethnic diversity index is calculated at locality level. The presence of ethnic minorities in Romania, with highlight on the study region, is the outcome of a lasting historical evolution of good co-habitation relations between the local majority and the newcomers, devoid of inter-ethnic conflicts. Dobrogea's ethnic communities would mingle, tolerating one another, borrowing one another's life-style, a reality that has in time developed a unique co-habitation pattern known as the Dobrogean inter-ethnic model.

## 1. CONCEPTUAL FRAMEWORK

The ethnic structure of a territory is the result of a time-long historical, social and economic evolution. The ethnic minorities do confer an area's cultural diversity, the work of a lasting history associated with a complex of culture and civilization phenomena underlying the co/habitation of various ethnicities (Nicoară, 2005). Several definitions of ethnic minorities have in time been produced. According to Sylvie de Tirilly (1995, p. 36), a numerical minority group distinguishes itself from the majority population by national, cultural, and linguistic traits (p. 36). Jackson Preece (1998, p. 28) defined the minority as a numerically lower group than the rest of a state's population, a group that has a non-dominant position, is well-defined historically, having settled in the territory of that state; the group's members are nationals of the respective state, but have ethnic, religious, linguistic, or cultural traits distinctively different from those of the population at large, exhibiting, even implicitly, a feeling of solidarity in conserving their own culture, traditions, religion, or language (p. 28).

The definition of ethnic minorities given by the United Nations Organisation reads as follows: a group of citizens of a state which constitute a numerical minority, share different ethnic, religious or linguistic characteristics than the majority population; they display a feeling of solidarity, motivated implicitly by a collective rush to survive in order to obtain factual and legal equality with the majority population (Necula, 2009).

There are states in which the term ethnic minority is equivalent with national minority, avoiding thus possible confusions when it comes to implementing international regulations. In effect, there are also other terms that define the ethnic/national minorities, e.g. in Poland, Albania and Hungary they speak of linguistic, religious and cultural minority and only seldom use the term national or ethnic; in Croatia, Slovenia, or Cyprus, they opt for ethnic community or minority; in Finland it is racial/ethnic minority or group, etc. (Brădățeanu, 2014).

In the Romanian geographical literature, the ethnic minority is defined as the human group or collectivity formed on the territory of another state and is less numerous than the autochthonous population; the respective group is linked historically to the latter, but has distinct traits related to its own ethnic specificity (Erdeli *et al.*, 1999, p. 197).

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The ethnical minorities have in time contributed to completing Romanian traditions and culture, offering an overall image of their spread country wise and of the way in which the traditions of these ethnicities are interacting mutually, and influencing one another (Mihăilescu, 2017).

In view of it, ever since Romania had initiated EU-membership procedures (Law 33 issued on April 29, 1995) harmonised EU provisions on the rights and protection of ethnical minority groups, also ratifying the Framework Convention for the Protection of National Minorities, a document adopted by the European Council at Strasbourg on February 1, 1995. According to Census data (2011), Romania numbered 3,328,773 persons (16.54%/total) who declared themselves as belonging to some ethnical minority communities. The greatest proportion was held by the Magyars (Hungarians) with 1,227,623 pers. – 36.9%; next in line coming to Rroma (Gypsies), 621,753 pers./18.7%/total numbers, because very many Gypsy ethnics either refused to declare themselves as such, presumably because of social prejudice, while some others, having assimilated to a certain extent, or themselves unaware of any ethnical appurtenance (Zamfir *et al.*, 1993 & Bunescu, 2014). Far behind come the Ukrainians and the Germans (50,920 and 36,042 pers., respectively). Except for the Rroma, the Csàngò (Hungarians who live in Moldavia) and the Macedonians hold an insignificant proportion in the national ethnical structure; persons of other, or undeclared, ethnicity were numerically on the increase compared to the previous census (2002); all the other ethnical communities registered fewer inhabitants (Table 1).

Table 1

## Ethnical minorities represented in Romania

Minorities	No. of members (pers.)		Parliamentary representation (mandates)		Cultural representation (No.)					
	2002	2011	Senators	Deputies	Central newspapers	County newspapers	Political newspapers	Cultural newspapers	Other publications	Public houses
Magyars	1,431,807	1,227,623	9	21	2	7	4	7	Ld.	25
Rroma	535,140	621,573	–	1	–	–	–	–	1	1
Ukrainians	61,098	50,920	–	1	–	–	–	–	3	1
Germans	59,764	36,042	–	1	1	–	3	2	1	3
Lippovan–Russians	35,791	23,487	–	1	–	–	–	–	2	1
Turks	32,098	27,698	–	1*	–	–	–	–	1	–
Tartars	23,935	20,282	–	1*	–	–	–	–	1	–
Serbs	22,561	18,076	–	1	–	–	–	–	2	–
Slovaks	17,226	13,654	–	1**	–	–	–	–	–	1
Bulgarians	8,025	7,336	–	1	–	–	–	–	2	–
Croats	6,807	5,408	–	1	–	–	–	–	2	–
Greeks	6,472	3,668	–	1	–	–	–	–	2	–
Jews	5,785	3,271	–	1	–	–	–	–	1	1
Czechs	3,941	2,477	–	1**	–	–	–	–	–	–
Poles	3,559	2,543	–	1	–	–	–	–	1	–
Italians	3,288	3,203	–	1	–	–	–	–	1	–
Chinese	2,243	2,017	–	–	–	–	–	–	–	–
Armenians	1,780	1,361	–	1	–	–	–	–	2	1
Csàngò	1,266	1,536	–	–	–	–	–	–	–	–
Macedonians	731	1,264	–	1	–	–	–	–	–	–
Other ethnics	16,119	18,524	–	2 ***	–	–	–	–	1 ****	–
Undetermined ethnicity	1,941	123,6810	–	–	–	–	–	–	–	–

\*joint representation of the Turkish and Tartar Muslim communities, \*\* joint representation of the Czech and Slovak communities, \*\*\* joint representation of the Albanian and Ruthenian communities, \*\*\*\* Albanian publication.

Sources: The 2002 and 2011 census data, the Romanian Government, Department for Interethnic Relations.

The most numerous ethnical groups were found in Transylvania, Crişana, Banat and Dobrogea, regions featuring the most complex ethnical structure compared to sporadic minority occurrences in other parts

of Romania. These communities have 19 associations for the protection of the national minorities, with membership in the country's Parliament, (47 mandates to the Senate and the Deputy Chamber). Three central newspapers, 7 county ones, 7 political weeklies, and 9 cultural reviews are published in the languages of the minorities, 23 publications are edited by national minority organisations and 34 publishing-houses put out works in minority languages.

Looking at Table 1 data, one sees a good political and cultural representation at national level of the Magyar minority (one Parliament member/40,921 pers., one publication in Hungarian/61,381 pers.), second in line coming the Rroma, actually poorly represented (one Parliament member and one cultural publication/621,573 pers.). A well-represented historical minority are the Germans. The base of the hierarchy is even more disproportionate: the Armenians (1,361 pers.) are represented in Parliament, have two cultural publications and a publishing-house, while larger communities, e.g. the Chinese or the Csângò, have no political, or cultural representation either; other minorities, e.g. the Albanians and the Ruthenians, statistically ranked under 'other ethnicities', are nevertheless represented in Parliament. There are a lot of reasons behind this situation, both historical (the Chinese community being of relatively recent date in Romania) and cultural, social and, last but not least, political.

## 2. METHODOLOGY

An analysis of Dobrogea's ethnical communities proceeds from bibliographical sources, from the historical and geographical context, as well as from their emergence and evolution. Next, the statistical data yielded by the 1992, 2002 and 2011 censuses will be used to get an insight into the overall and local (settlement level) ethnical structure in Dobrogea after 1990.

The last section of the paper is devoted to calculating the ethnical diversity index in order to find the share of the minority population per total Dobrogea population. Noteworthy, in calculating this share of the majority population versus that of the other ethnical minorities, people who had not declared their appurtenance to any ethnicity were not taken into account. The minorities taken into calculation were from Constanța and Tulcea County, registered at the last census: Hungarians, Rroma, Ukrainians, Germans, Turks, Lippovan-Russians, Tartars, Serbs, Slovaks, Bulgarians, Croats, Greeks, Italians, Jews, Czechs, Poles, Chinese, Armenians, Csângòs, Macedonians and other ethnics.

Noteworthy, in calculating the proportion of the majority population and of the other ethnical minorities, missing information from people who had not declared their appurtenance to any ethnical group, was not taken into account.

The main goals of this study were as follows: a comparative analysis of the ethnical structure of Dobrogea's population (basically in its two counties: Constanța and Tulcea) and the changes occurred as a result of the socio-political and economic modifications experienced by Romania in the course of time. Also, the idea was to present the nationalities in terms of their numerical importance, inter-ethnical relations, common traits acquired by co-inhabitation inter-ethnical relation.

## 3. STUDY-AREA

Historical and geopolitical background of the formation of minority ethnical communities.

Dobrogea is a cross-border region (23,320 km<sup>2</sup>) which extends on the territory of three states: Romania (67.7%) and Bulgaria (32.3%) of the region's total surface area. Speaking in terms of administration, this territory includes two Romanian counties, two Bulgarian provinces and another five villages, as well as a small Ukrainian sector, namely Insula Șerpilor (Serpent Island) and another four islands south of the Chilia Arm thalweg (Nicoară, 2009) (Table 2).

Table 2

## The administrative structure of Dobrogea

<b>Romania</b>	15, 570 km <sup>2</sup>	Constanța County	12 towns (of which 3 municipia) and 58 communes
		Tulcea County	5 towns (of which 1 municipium) and 46 communes
<b>Bulgaria</b>	7, 412 km <sup>2</sup>	Dobrici Province	8 municipalities
		Silistra	7 municipalities
		Razgrad Province (partially)	Konevo and Raynino villages in Isprih Municipality, Mădrevo and Terter in Kubrat Municipality
		Varna Province (partially)	Gheneral Kantardjievo Village in Aksakovo Municipality

Dobrogea's boundary lines are: the Lower course of the Danube in the north and west, the Black Sea in the east, and some Bulgarian provinces and communes, conventionally traced, in the south.

The Romanian sector of Dobrogea is the largest and most homogeneous administratively (15,570 km<sup>2</sup>, 897,165 inhabitants). It encompasses two counties Constanța (7,071 km<sup>2</sup>, 684,082 inh.) in its southern half, and Tulcea (8,499 km<sup>2</sup>, 201,462 inhabitants.) in the northern one. Population density values between the two counties are distinctively different: 89.2 inh. (above the all-country average of 84.4 inh./ km<sup>2</sup>) in the former and only 23.7 inh. in the latter caused by the low Danube Delta density level (4.88 inh./ km<sup>2</sup> on average) (Damian, 2013 & Dogaru, 2013).

A favourable geographical position, between the Danube and the Black Sea accounts for Dobrogea becoming in time a social-economic, but moreover, ethnical and cultural region (Sallanz, 2005 & Nicoară, 2006).

An ancient Thracian hearth (the Gumelnita and Hamangia cultures), the Antiquity saw Dobrogea possessed first by the Greeks, who built the cities of Histria and Callatis – in the Romanian sector, and Dionysopolis in the Bulgarian one), then ruled by the Romans (as Scythia Minor Province) and the Byzantines. The early Middle Ages witnessed a strong Slav influence from the south, hence the diversification of its ethnical structure, seen on the maps of the time, which marked it as *Valacia minor*, *Bulgaria tertia*, *Graecia tomitana*, *Despotatus Vicinensis*, or later on (14<sup>th</sup> cent.) *a treia Bulgaria* (the third Bulgaria).

Dobrogea was first annexed to Wallachia (1388–1389) by Voivode Mircea the Old, but after his death, with the Ottoman Empire advancing to Central Europe, the Province fell under its rule (1418–1421) at the time of Turkish Sultan Mehmet I (Rădulescu & Bitoleanu, 1998), the Turks possessing it for over 450 years, when the largest ethnical communities – of the Turks and the Turkish-Muslim Tartars were settled here to defend the borders of the Ottoman Empire. Later on, beginning with 1492, came the Jews (from Andalusia in Spain) after Granada was conquered by the Catholics, but in 1948, they would leave for the State of Israel which was founded that year.

In time, the number of Muslims (of Muslim Turks, in particular) kept growing, they becoming the majority population (Ekrem, 1994). According to the Ottoman Administration, the largest communities of *giaours*' (people of non-Islamic faith) were the Romanians and the Bulgarians joined later by Armenians and Greeks (engaged in trade), Gypsies, Gagautzi (Bulgarian adherents to Islam), etc. (Gemil, 2008). The Lippovans of the old Orthodox rite, who opposed the reprisals initiated by the Russian Tzar Alecei Mihailovich, would settle in the north of Dobrogea beginning with the 18<sup>th</sup> cent., after the schism in the Russian Orthodox Church (Ipatiov, 2002).

Since Dobrogea was a border region of the Empire, it was not deemed to be of particular strategic or economic importance, so that port activities were all but disappearing. Coastal towns turned into fishermen villages. However, inland settlements, like Babadag and Medgidia, emerged as market-places. Dobrogea became a destination for the transhumant shepherding of Transylvanian sheep-breeders (from Mărginimea Sibiului, in particular), the Getic Subcarpathians and Moldavia, who used to winter here. These migrations are also attested by the fact that, in 1870, the Ottoman



authorities designated monk Nifon Bălășescu (born in Sibiu County and made a monk at Căldărușani Monastery) as director of the Romanian schools from Dobrogea (Stănciugel & Bălașa, 2005).

With the rising of the Russian Empire and its advance up to the Mouths of the Danube (18<sup>th</sup>–19<sup>th</sup> cc.), the geo-strategic balance in the Danubian-Pontic region suffered radical changes (Popa, 2006), Dobrogea becoming a battle-ground between the Ottoman and the Russian empires, especially after 1812, when the Russians annexed Bessarabia, the Danube being a common border between the two empires. A deal was struck between the Sultan and the Tzar for an exchange of populations: the Nogay Tartars and the Turks from the Bugeac came to Dobrogea, while an equivalent number of Bulgarians and Gagautzi settled in the south of Bessarabia. Also, most Germans were colonised in Dobrogea after 1840 (the majority choosing to repatriate after 1940) (Stinghe, 2007); Greeks and Italians were brought in later (when the European Commission of the Danube, set up in 1856, intended to begin big infrastructure works), and were engaged in the processing of sandstones in the settlements of Măcin and Iacobdeal, as well as in red limestones at Agighiol, Mahmudia and Babadag (Heller & Sallanz, 2009).

In this way, Dobrogea's cosmopolite ethnical structure took its final shape, being included in the Romanian Kingdom after its independence was acknowledged and the South Bessarabian communities of Cahul, Belgrad and Ismail were ceded to the Russian Empire (1878).

The Romanian administration installed in Dobrogea after the end of the Russian-Turkish War and the conclusion of the San Stephano Treaty, did considerably increase Dobrogea's geopolitical importance, Romania getting direct access to the Black Sea; noteworthy, it was the time when the Fetești–Cernavodă bridge system was being built for straight railway connection with Bucharest and the rest of the country; also Constanța harbour underwent management works.

After the Second Balkan War (1913), Romania annexed Cadrilaterul (The Quadrilateral) – South Dobrogea, a territory owned (except for two years during the First World War) until 1940, when Adolf Hitler ordered King Carol II to resolve territorial disputes with Bulgaria, the frontier-line becoming that of 1912. That territorial surrender was associated with an exchange of population, in that the Bulgarians from the Romanian sector of Dobrogea were moved to Bulgaria and the Romanians from the Cadrilater were brought into the counties of Constanța and Tulcea. At the same time, the Turks would emigrate in mass to the new Turkish state, were Mustafa Kemal Atatürk's policy encouraged the repatriation of Balkan muslims (after 1923) (Ekrem, 1994) (Fig. 1).

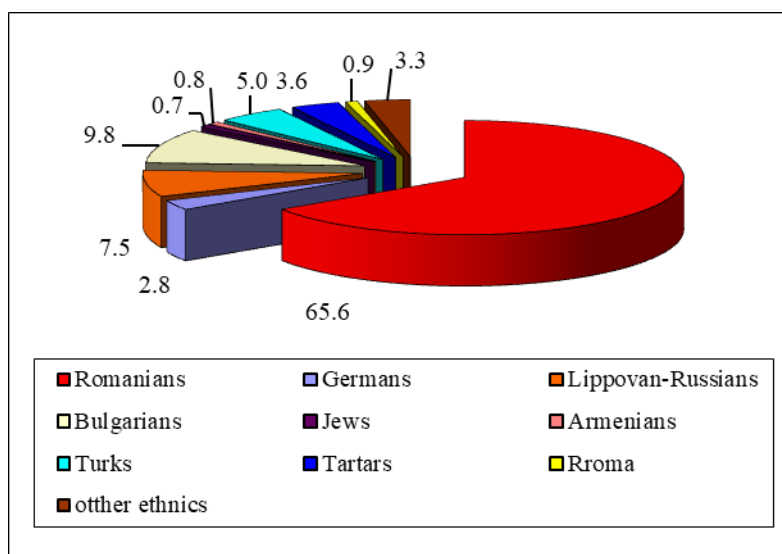


Fig. 1 – The ethnical structure of the Romanian sector of Dobrogea (1930 Census).

The communist period had a huge negative impact on Dobrogea's economy as the collectivization of agriculture got momentum (Bordânc, 2008); on the other hand, measures taken to attain big economic and infrastructure targets, such as extension and modernisation of Constanța harbour, the construction of the Danube-Black Sea and Poarta Albă–Midia Năvodari navigable canals, as well as the beginning of building works at the first atomic-electrical central in Romania (at Cernavodă) are worth-mentioning. The opening of these big building sites encouraged the workforce from other zones of the country to come to Dobrogea, which did significantly contribute to increasing the share of Romaninans in the region's ethnical structure (Kahl & Sallanz, 2006) (Table 3).

Table 3

The share of Romanians in the ethnical structure of the Romanian sector of Dobrogea. Evolutions (1930–2011)

Census years	Population total (inhabitants) 100%)	Romanians		Ethnical minorities	
		inhabitants	%	inhabitants	%
1930*	815,475	360,572	44.2	454,903	55.8
1956	635,950	560,521	88.1	75,430	11.9
1966	510,346	447,305	87.6	63,041	12.4
1977	863,348	784,930	90.9	78,418	9.1
1992	1,020,106	926,495	90.8	93,611	9.2
2002	971,643	883,620	90.9	88,023	9.1
2011	824,677 **	751,250	90.1	73,427	9.9

\* including the Cadrilater (South Dobrogea), a territory passed under Bulgarian administration in 1940.

\*\* calculations did not include the 72,488 inhabitants who had not declared their ethnicity.

After 1990, the population of Dobrogea followed the general evolution trend of Romania's population, namely a steady decrease from 1,020,106 inhabitants in 1992 to 971,643 in 2002, and 897,165 in 2011. The Romanians had continually held an absolute majority (over 90% population total) (Table 3) with a slight proportional decrease between 2002 and 2011, largely because of the increasing Rroma minority. Beside, despite the cosmopolite character of Dobrogea's population at the beginning of the 20<sup>th</sup> century, the share of the region's ethnical minority communities was below the national average (9.9% versus 11.1% total population).

The last census data (Oct. 20, 2011) show that the main ethnical minorities in Dobrogea are still the historical ones, namely, Turks (2.5%) and Tartars (2.19%), remnants of the 457 years of Ottoman rule, and the Lippovan–Russians, a border minority or the followers of some refugee communities arrived in Dobrogea in the wake of some particular historical and political circumstances. The Rroma community appears to be steadily increasing (officially more than 1% of the total population), concomitantly with the almost symbolic proportion of the other cross-border minority – the Bulgarians (only 55 persons).

#### 4. THE ETHNICAL STRUCTURE OF THE POPULATION IN THE ROMANIAN SECTOR OF DOBROGEA. EVOLUTIONS – 1990–2011

Looking at 1992, 2002 and 2011 census data on the ethnical structure of the population, and to subsequent statistical estimations, one finds a steep numerical decline both in the majority population and in most minority ethnical communities, at both regional and national levels. The 1992 census data, show the two Dobrogea counties (Constanța and Tulcea) with a total of 1,020,106 persons out of which 926,495 Romanian ethnics (90.83% in all) and 9.17% minority ethnics/total population of Dobrogea.

Numerically represented were the Turks (27,386 pers., 2.68% of total population), next the Lippovan–Russians (25,773 pers., 2.52% of total population) followed in decreasing order by Tartars (24,265 pers., 2.38%/ population total), Rroma (Gypsies) (6,910 pers., 0.67%/ population total), Ukrainians (4,092 pers., 0.90%/ population total), Magyars (1,716 pers., 0.17%/ population total), and Greeks (1,170 pers., 0.11%/ population total). Other minority communities had up to 1,000 members: Germans (626 pers.), Armenians (618 pers.), Bulgarians (277 pers.), Jews (128 pers.), Serbs (96 pers.), Slovaks (69 pers.), Poles (66 pers.), Czechs and Croats (18 and 8 pers., respectively). Some minorities registered 361 pers. in all; 40 people did not state their ethnicity (Fig. 2).

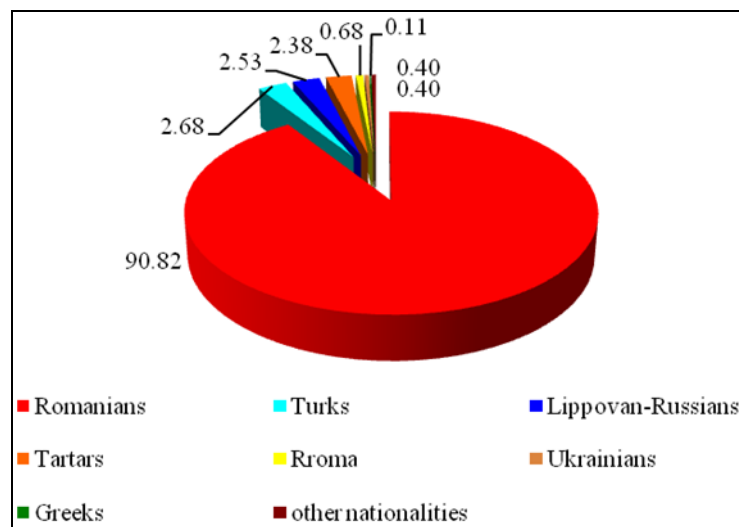


Fig. 2 – The ethnical population structure (%) in the Romanian sector of Dobrogea (1992 census data).

The 2002 census reveals a numerical decrease per total population and per ethnic minorities as well, both throughout Romania and in Dobrogea region, too. Thus, the total population of Constanța and Tulcea counties registered 971,643 persons, basically a decrease of 48,463 pers. caused by low birth-rates, a negative natural balance, and emigration from Romania of a significant number of young people. Self-declared Romanians were 883,620 pers. (90.94% of the total population), a slightly higher population (by 0.11%) than at the 1992 census, the ethnic minorities numbering 88,023 pers. (9.06% of the total population).

Census data revealed a situation similar to the previous one, namely, a dominant Turkish population (27,580 pers., 2.83%/population total), mildly increased (by 0.15%) versus the 1992 census data, followed by the Tartars (23,409 pers., 2.4% of population total) who decreased by 856 pers., the Lippovan–Russians (21,623 pers., 2.22% of population total) with 4,150 pers. less than in 1992, which could be accounted for either by many people having emigrated to other countries or by others who declared themselves Romanians (a situation found in the course of field investigations in the Danube Delta villages) (Gâștescu & Știucă, 2008; Damian, 2013).

The other ethnical minorities (in decreasing order): Rroma (Gypsies) – 8,295 pers. (by 1,385 pers. more than in 1992); Magyars (Hungarians) / 1,056 pers.; Germans – 398 pers.; Italians – 214 pers.; Bulgarians – 135 pers.; Jews – 72 pers.; Poles – 61 pers.; Slovaks – 37 pers.; Serbs – 34 pers.; Czechs and Csângòs (24 pers. each); Croats – 24 pers.; Chinese – 9 pers. Another 798 persons belonged to other ethnicities, 67 persons did not state their ethnical appurtenance (Fig. 3).

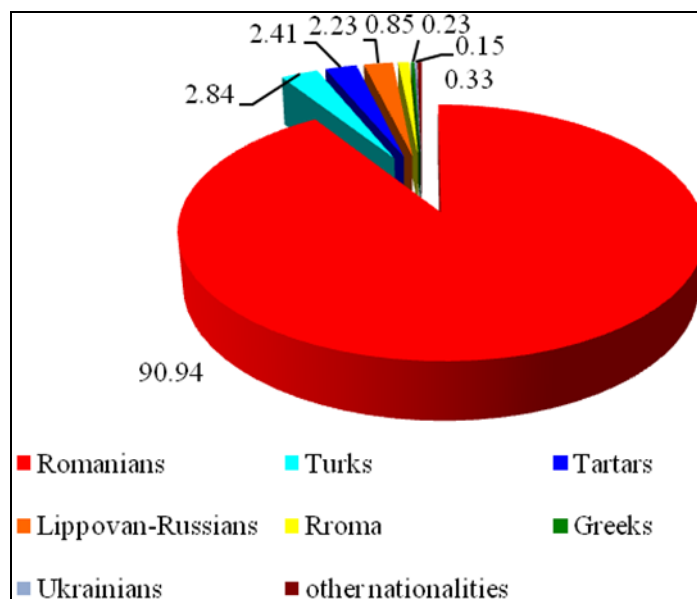


Fig. 3 – The ethnic population structure (%) in the Romanian sector of Dobrogea (2002 census data).

The 2011 census data show the same 2002 steadily decreasing general population trend. Thus, from 897,165 pers. in 1992, one finds by 122,941 fewer people than in 1992 and by 79,478 than in 2002.

The absolute majority is still Romanian (751,250 pers., 91.10% of total population), however, percentages are lower than in 1992 and 2002 when they represented 90.83% and 90.95% respectively/total population of Dobrogea, a decrease caused mainly by a statistical situation, since very many people (72,488 inh.) did not declare their ethnicity (Table 3).

Just like at the previous census, the ethnic rank of minorities remained the same, first coming the Turks (22,494 pers., 2.5% population total), followed by the Tartars (19,719 pers., 2.19% of total population) and the Lippovan–Russians (13,904 pers., 1.54% of total population) (Fig. 3).

Rroma (11,976 pers. (by 5,066 more than in 1992); Greeks – 1,444 pers.; Ukrainians – 1,168 pers.; Macedonians – 557 pers.; Magyars – 512 pers.; Armenians – 317 pers.; Germans – 163 pers.; Italians – 114 pers.; Bulgarians – 55 pers.; Csàngòs – 51 pers.; Jews – 43 pers.; Poles – 26 pers.; Serbs – 20 pers.; Slovaks – 9 pers.; Chinese – 8 pers.; Croats – 5 pers.; Czechs – 3 pers. Other ethnics: 778 pers.; undeclared ethnic appurtenance: 72,488 pers. (Fig. 3).

The 2002 and 2011 censuses listed new ethnics – the Chinese and the Csàngò; the Macedonians also appear in the 2011 census data (Fig. 4).

Since the two counties of Dobrogea's Romanian sector have a very diverse ethnic structure, the region could be viewed as a model of ethnic co-habitation. A number of 18 ethnic communities are statistically reported, 11 of them being better represented numerically (Turks, Tartars, Lippovan–Russians, Rroma, Greeks, Ukrainians, Macedonians, Magyars, Armenians, Germans and Italians) (Fig. 5). All of them have succeeded in preserving their characteristic traits, over time that is, language, traditions, and customs. A great many ethnicities who live in Romania between the Danube and the Black Sea reflect the centuries-old history of these places which had experienced the rule of several foreign powers.

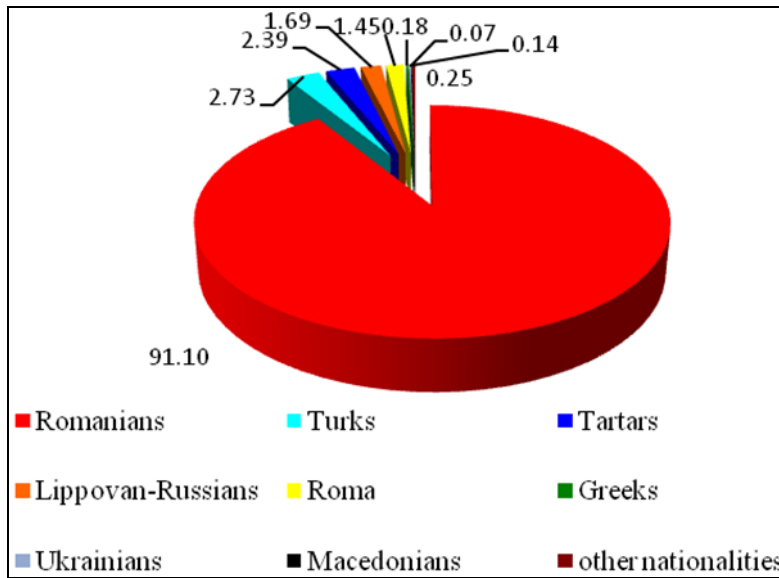


Fig. 4 – The ethnic population structure (%) in the Romanian sector of Dobrogea (the main ethnic minorities)(2011 census data).

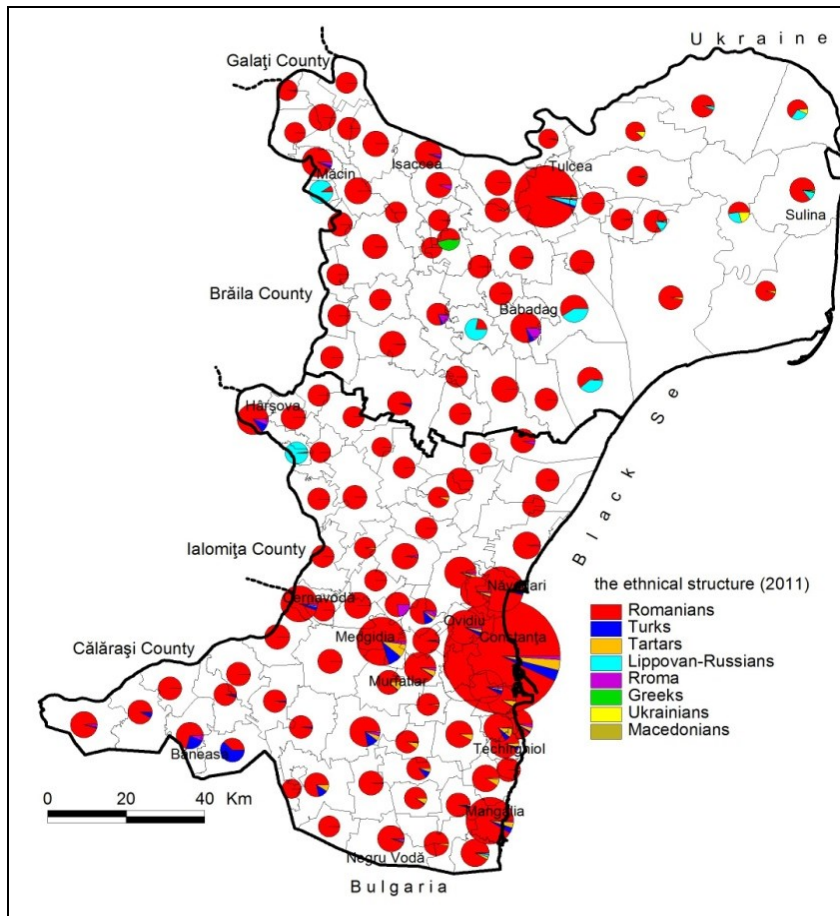


Fig. 5 – The ethnic structure of the population at settlement level (2011 census data).

## 5. AN ANALYSIS OF ETHNICAL COMMUNITIES IN THE ROMANIAN SECTOR OF DOBROGEA (2011)

### 5.1. The Turkish Community

According to the last census data (2011), the Turks represent the most numerous ethnical minority in the two counties of the Romanian sector of Dobrogea (22,494 pers., 81.2% of all the Turks living in Romania). Most of them are found in Constanța County (20,823, 3.4% of this County's population), in the towns of Constanța (6,525 pers.), Medgidia (3,340 pers.), Mangalia (1,474 pers.), Băneasa (1,136 pers.), and in the communes of Dobromir (1,751 pers.) and Cobadin (1,026 pers.). In Tulcea County, the homonymous county-seat town – Tulcea, is their preferred residence (819 pers.); apart from Dobrogea, important Turkish communities are reported in Bucharest City and in the counties of Călărași and Brăila.

The first references to the presence of Turks on the territory of today's Romania date back to the year 1264, when the Byzantine Emperor Mihail Paleologul (Palaiologos) sent there a troop of 12,000 soldiers to defend the Empire against foreign enemies. They founded the settlement of Babadag (translated as 'father of the mountains') (Bărbuleanu, 1998). The next wave of Turks would settle in Dobrogea after having conquered the town of Varna (1484), stimulating economic relations with the Ottoman Empire (Mustafa, 1978 & Ekrem, 1994).

With the Romanian administration installed in Dobrogea (1878), the Balkan Wars (1912–1913) and the foundation of the modern Turkish State (1923) are historical moments that marked the repatriation of the Turks from Dobrogea. Thus, 1930 census data report 5,983 Turkish ethnics in Constanța County and 2,285 in Tulcea County compared to some 100,000 in 1834 (Hellert, 1847 cited by Mustafa, 1978, p. 49). From 238 mosques in 1990, no more than 72 have remained in all of Romania. The Great Mosque was built in Constanța (1903) by order of Romania's King Carol I (1913); the oldest, 'Esmahan Sultan' Mosque (1575), stands in Mangalia Town. The Turkish Democratic Union, with headquarters in Constanța, is represented in Romania's Parliament and has subsidiaries in most counties.

### 5.2. The Tartar Community

The second representative ethnical community is that of the Tartars, who kept settling in Dobrogea along several successive stages (beginning with the 18<sup>th</sup> cent.). The next wave appeared after the Crimean War (1853–1856) when, under pressure from the Russians, the Tartars left Crimea, occupied the Casimcea River basin as far as Cape Midia, the whole Carasu Valley region up to Vadu settlement. This community was engaged mainly in agriculture, horse-breeding, carting and trade.

The first assessment of this community was made at the 1912 census (25,000 pers.) numbers falling (in 1930) to 1,668 pers. in Constanța County and to only 39 pers. in Tulcea County; at the end of the 20<sup>th</sup> cent., the 1992 census data indicated 24,596 pers., (the Tartar minority representatives estimating nearly twice as many – ca. 55,000 pers.) (Romania, a Europe in Miniature, 2005). The next two censuses (2002 and 2011) registered a steady decrease: 23,935 pers. and 20,282 pers., respectively, generally in keeping with the overall trend in Romania's population.

The counties of Constanța and Tulcea hold 97.2% of all the Tartar ethnics in Romania (19,600 pers. in the former county and 119 pers. in the latter one, the largest communities being registered in the towns of Constanța (8,724 pers.), Medgidia (3,987 pers.), Mangalia (1,415 pers.), Valu lui Traian (1,323 pers.), Techirghiol (743 pers.), Murfatlar (705 pers.), Cobadin (576 pers.), Valea Nucarilor (509 pers.), Ovidiu (442 pers.), Topraisar (440 pers.), Agigea (439 pers.), Eforie (395 pers.), etc.

The Tartars of Dobrogea boast a rich cultural heritage based on their history and traditions (Nuredin, 1998). The community is represented politically by the Democratic Union of Turkish-Muslim Tartars.

### 5.3. The Lippovan–Russians Community

The members of the Lippovan–Russian community are Orthodox believers of the Old Rite, known by the name of *starovere* (of the old faith), or *starobreatzi* (of the old rite). They settled on Romanian territory, especially in Dobrogea and Moldavia, in the wake of the church reforms initiated by Tzar Aleksei Mihailovici (1629–1676) and promoted by the Patriarch Nikon (1605–1681), reforms that triggered discontent and protests among the clergy and the faithful of the Russian Church, the new canons being perceived as an unacceptable infringement on the Orthodox teachings. Internal disturbances within the Church, especially loss of Russian believers in the ecclesiastical hierarchy and the decisions made by the Great Orthodox Synod in Moscow to adopt liturgical and ritual decisions promoted at the time of Patriarch Nikon, triggered the 1666–1667 schism. The supporters of the old rules (e.g. *starovenyi*), being persecuted, had to seek refuge in some more isolated places of the former Russian Empire, in border areas, or in neighbouring countries (Romania, a Europe in Miniature, 2005). Initially, Russian *Starovenyi* chose the Don and Kuban regions, settling in Romanian territory beginning with the 18<sup>th</sup> cent., and being known by the name of Lippovans.

Dobrogea hosts about 60% of all the Lippovan community in Romania (13,904 pers., out of a total of 23,487 pers.) mostly in Tulcea County at Sarichioi (3,417 pers.), Tulcea Town (3,129 pers.), Carcaliu (3,046 pers.), Ghindărești (2,576 pers.), Jurilovca (2,330 pers.) and Slava Certeză (2,309 pers.). More numerous Danube Delta communities live in the villages of Sfiștofca, Periprava and Mila 23; in Constanța County they are reported in Constanța City and Năvodari Town.

The Lippovan–Russians are Orthodox of the Old Rite, the Church playing a decisive role in preserving their identity. Speaking old Russian, interspersed with some Ukrainian and Romanian words, as well as customs and traditions represent a particularity of this population (Echim, 1995). The Lippovan–Russian community was officially recognized in January 1990, when the Community of the Lippovan–Russians in Romania was founded with a view to preserving their ethnic identity.

### 5.4. The Rroma Community

This is one of the most numerous ethnic communities in Romania, with some 12,000 persons that declared themselves of belonging to it. Unlike the previously depicted ethnic communities in Dobrogea, the Rroma represent only 2% of all resident Rroma in Romania.

Originating from India (Punjab Region), they appear to have migrated there about one-thousand years ago in the wake of some invasions. Their massive migration to Europe began in the 14<sup>th</sup> cent., when the Turks conquered the Greek port of Gallipoli (Petcuț *et al.*, 2003). They appeared in the Romanian Countries that same century. Main occupations: copper makers, blacksmiths, tinsmiths, and singers. After the 1848 Revolution, all people were declared free and equal, Gypsy serfdom being abolished for good in 1856 (Riski, 1974 & Barany, 2002).

Most Rroma people live in Constanța City and in the localities of Cuza Vodă, Medgidia, Hârșova, Cernavodă, Castelu, Cobadin, Băneasa, Eforie, Năvodari, Ovidiu, Murfatlar, Mihail Kogălniceanu, Valul lui Traian, Cumpăna; in Tulcea County, they are found in Babadag, Tulcea City, Măcin, Ciucurova, Niculițel and Casimcea (Romania, a Europe in Miniature, 2005).

Demographically speaking, this ethnicity behaves atypically (Ringold, 2000) compared to the Romanian population, having steadily grown by 1,385 pers. (1992–2002 census data) and by 3,681 pers. (2002–2011 census data). Besides, birth-rates with this community are higher than among other ethnics. Politically, they are represented by the Partida Rromilor – Europa.



### 5.5. The Greek (Hellenic) Community

Greek ethnics number 1,444 pers. in both counties, 39.3% of all Greeks residing in Romania, over half of them (898 pers.) live in Izvoarele Commune (Tulcea County), Constanța (231 pers.), and Tulcea (208 pers.) cities, as well as in the town of Sulina (62 pers.). A Greek population came to Dobrogea as early as the 17<sup>th</sup> cent. BC, founding the first settlements on the banks of the Sinoie Lake (Istros town, named Histria by the Romans), and Tomis (today's Constanța) in the 6<sup>th</sup> cent. BC; in the south of Dobrogea, Greeks from Heracleea Pontica set up the town of Callatis (currently Mangalia). In Ancient Times, the Black Sea cities, populated largely by Greeks and Dacians, discharged an intense commercial activity. After the year 1,000, the Genoese traders would arrive on the Black Sea shore, and establish numerous commercial localities, extending their influence farther in, along the Danube, and founding the towns of Giurgiu and Calafat (Brătescu, 1928).

### 5.6. The Ukrainian Community

The Ukrainians rank sixth (1,168 pers.) among the other ethnics of Dobrogea, they amounting to only 2.3% of all this ethnicity in Romania. Some of them settled in Dobrogea and in the Danube Delta with Turkish accord (late 18<sup>th</sup>–early 19<sup>th</sup> cc) under the reign of Empress Catherine II persecutions. In the Danube Delta they are called 'haholi', an appellation distinguishing them from the Lippovan–Russian ethnics (Nichersu & Iacovici, 1995).

In Dobrogea, one finds them especially in Tulcea County (1,079 pers.) and mostly in the Danube Delta: Tulcea City (376 pers.), the villages of Murighiol (91 pers.), Crișan (247 pers.), Mahmudia, Pardina, Sfântu Gheorghe, Frecăței, Chilia Veche and in the town of Sulina (45 pers.); in Constanța County, the majority live in Constanța City (61 pers.).

That there are fewer Ukrainian ethnics results from their declaring themselves Romanians; some field investigations, conducted in the Danube Delta, show them to be the majority population in some village lanes at Crișan, and Sfântu Gheorghe (Damian, 2013). Ukrainian is frequently heard spoken especially by elderly people, but also by members of other age-groups.

Among themselves, they speak both the 'haholi' and the Romanian languages, quickly passing from one language to the other. They are proud of their origins, though nobody tries to establish any contact with its their native country. Outside the Delta area and before foreign tourists who come to their villages, they call themselves Romanians. If one insists on finding their nationality, the answer is 'in Tulcea Town we are Romanian, because there are more Romanians there, and we live in this country, do you not? In the village we are Ukrainians, because more of us are here'.

The Ukrainian population practices agriculture, fishing, animal-breeding and hunting. They settled mostly in the Danube Delta, primarily because of the natural factors (vast water expanses protecting them), originating from regions where they used to fish and till the land. If in time, some of their customs have been lost, the Ukrainian language has been well-preserved. In the villages of Sfântu Gheorghe, Dunavăț and Murighiol they go by the name of 'haholi', being known as '*ukrainians*' in Crișan and Caraorman.

### 5.7. The Macedonian Community

This community numbers 557 people, being the eighth ethnical minority in Dobrogea. They live especially in the cities of Constanța (370 pers., 66% of total) and by far fewer in the other localities: 64 at Mihail Kogălniceanu, 47 in Tulcea Town, 18 at Năvodari, 17 at Medgidia, 10 at Eforie, etc.

### 5.8. The Armenian Community

The Armenians live in the city of Constanța (230 pers.) and the town of Tulcea (35 pers.), and, here and there, in another 17 settlements of Constanța County, in particular. They settled in Dobrogea in the 14<sup>th</sup> cent. as traders, bankers and handicraftsmen, influencing the economic and spiritual life of Constanța City.

### 5.9. The Magyar (Hungarian) Community

The 2011 Census data registered 512 persons, most of them in the towns of Constanța (214 pers.), Mangalia (82 pers.) and Tulcea (40 pers.). It appears that part of this ethnic minority are followers of the Moldavian Csângòs who had migrated in this area ages back to defend the borders of the Austro-Hungarian Empire. In war-time they would settle here (especially at Oituz, Constanța County) to never return to Moldavia (*Romania, a Europe in Miniature, 2005*).

### 5.10. The German Community

German ethnics in Dobrogea number 163 people, who live mainly in Constanța City (86 pers.) and in Tulcea Town (18 pers.). Small German communities are also found in Mangalia, Năvodari, Eforie Nord, Medgidia and in Cumpăna Commune.

### 5.11. The Italian Community

The Italians in Dobrogea (114 pers.) reside especially in Constanța City and in a north-east area of Tulcea County (at Greci and Măcin).

The presence of this community is connected with the colonisation of the Black Sea towns (13<sup>th</sup>–14<sup>th</sup> cc.) by the maritime towns of Genoa and Venice with the agreement of the Byzantines and the Ottomans. Part of the Italians would settle in Dobrogea after Romania's War of Independence (1878), when this province passed under Romanian administration. Occupations: stone-cutting and land-tilling (the case of Italians in the Greci–Măcin area).

### 5.12. The Bulgarian Community

For all its being a cross-border minority, there are quite a few Bulgarian ethnics in the Romanian sector of Dobrogea; most of them live in Constanța City and in Tulcea Town. After the Treaty of Craiova (1940), when southern Dobrogea – Cadrilater (the Quadrilaterul) passed under Bulgarian administration, an exchange of population took place between Romania and Bulgaria, whereby 80,000 Romanians had to move from south-to-north Dobrogea and 66,000 Bulgarians shifted from the north of the province to the Cadrilater (*Romania, a Europe in Miniature, 2005*).

During the Ottoman rule, a part of the Dobrogea Bulgarians' forefathers had emigrated from Bulgaria to the north of the Danube, while another part no longer moved to the south of Dobrogea (Cadrilater) as stipulated under the Craiova Treaty.

Other ethnical minorities in the Romanian sector of Dobrogea are in smaller numbers: the Csângòs (51 pers.), Jews (43 pers.), Poles (20 pers.), Serbs (20 pers.), Slovaks (9 pers.), Chinese (8 pers.), Croats (5 pers.) and Czechs (3 pers.) (2011 census data).

### 5.13. The Diversity Index in Dobrogea

In order to better illustrate the number of ethnical minorities, the ethnical diversity index/administrative unit was calculated by looking at the proportion of minorities/total population. Next, the results obtained were normalized by the minimum–maximum normalization technique referring the difference between the real value and the minimum value to the difference between the maximum and the minimum value. The minorities taken into calculation were from Constanța and Tulcea.

The mean of this indicator for the two counties registered a score of 0.135, that is, 0.14 in Tulcea and 0.13 in Constanța. Highest index values were recorded in the east of Dobrogea and in a few Danube Delta settlements, which confirms the large number of ethnical groups (Ghindărești – 1.00; Carcaliu – 0.93; Slava Cercheză – 0.81; Dobromir – 0.65; Crișan – 0.50; Izvoarele – 0.48; Sarichioi – 0.44; Jurilovca – 0.40; C.A Rosetti – 0.36; Băneasa – 0.34; Babadag – 0.30, etc.).

Lowest index values (0.01–0.08) registered the west Dobrogea settlements of Turcoaia, Luncavița, I.C. Brătianu, Peceneaga, Ostrov, Topalu, Rasova, Oltina, Ion Corvin, etc. bordering on the counties of Călărași, Ialomița, Brăila, and Galați (Figure 6).

The fact that higher values are found sea-sidewise comes from migratory peoples having in the course of time settled in the proximity of the littoral, where conditions were propitious to the development of commercial activities, especially sea-connected transport and trade.

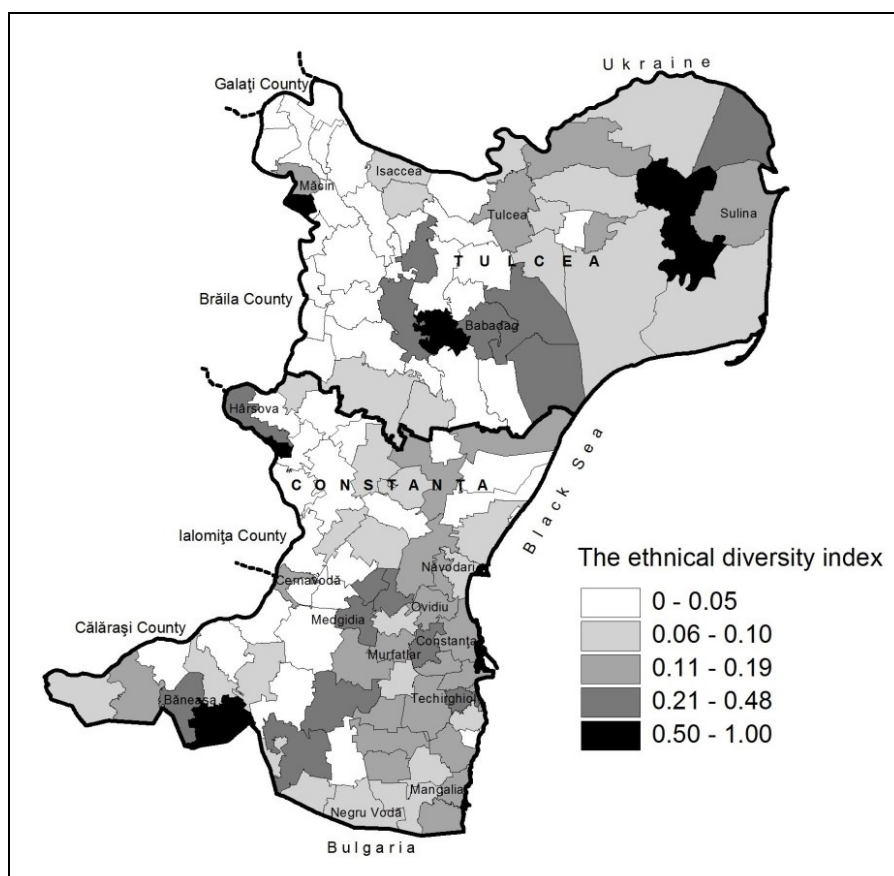


Fig. 6 – The ethnical diversity index in Dobrogea.

## 6. CONCLUSIONS

Dobrogea has always been a cosmopolite region with numerous co-inhabiting ethnicities living on its territory, a reality bespeaking of the region's tumultuous history. Despite the numerous minority ethnics, cohabitation was devoid of tensions and conflicts, this area being considered a multicultural model in which the Romanians represented the majority population. According to Brătescu (1923), the population of Dobrogea, Indo-European, Semitic, Mongolian, Latin, German and Slav, with Orthodox, Catholic and Protestant Christians, side-by-side with Muslims and Mozaics; a Europe and an Asia in miniature; a huge live ethnographic museum, this is, in brief, the icon of the great River'.

Historical documents on Dobrogea and the Danube Delta evidence the permanence of the autochthonous Romanian population joined by other allogeous ethnicities that have shaped certain cultural particularities by cohabiting with the autochthonous population. Here is what Grigore Antipa wrote (1914): 'also today are old people who tell how their parents had been the first overseers at the trawls and were the first to teach the Cossaks to draw the trawl'.

Each minority ethnical community in Dobrogea has become both an emitter and a receptor of cultural elements, interacting with and borrowing one another's way of life. Thus, a culture specific to this region has in time emerged, containing elements common to all ethnicities and elements characteristic of each of them. The ethnical communities, distinguished by traditions, religions and way of life have respected and tolerated one/another, constituting a unique model, the so-called 'Dobrogea inter-ethnic model' (Brătescu, 1928).

Characteristic of the whole analysed period and of the four censuses taken into calculation 1930, 1992, 2002 and 2011 is the presence of a majority Romanian population, even through of their rates differing from one period to the other (64.7% in 1930, 90.94% in 2002 and 90.10% at the last census. The numerically important minorities have remained the same, with only hierarchical changes in their order (the 1992 census showed the Lippovan–Rusians rank second after the Turks, while at the next censuses this positions was occupied by the Tartars); thus the first positions go to the Turks, Tartars and Lippovan–Rusians followed by Roma, Greeks, Ukrainians, Macedonians, Armenians and Italians. The last census (2011) shows the presence of Macedonians in rather lower numbers in Dobrogea (557 pers.)

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## REFERENCES

- Antipa, Gr. (1914), *Câteva probleme științifice și economice privitoare la Delta Dunării*, Analele Academiei Române, **36**, București.
- Barany, Z. (2002), *The East European Gypsies: Regime Change, Marginality and Ethnopolitics*, Cambridge University Press.
- Barnea, I., Ștefănescu, Ș. (1971), *Din istoria Dobrogei*, III, Edit. Academiei Române, București.
- Bărbuleanu, C. (1998), *Monografia orașului Babadag*, Edit. Charne-Scott, București.
- Bordânc, Floarea (2008), *Analiza regională a spațiului rural dobrogean*, Edit. Universitară, București.
- Brădățeanu, V. (2014), *Analiză. Minoritățile naționale din România – între aspirații și realități*, <http://www.rador.ro/2014/12/18>, acc. Oct. 2017.
- Brătescu, C. (1923), *Dobrogea*, Biblioteca „Cunoștințe folositoare”, seria C, 7, București.
- Brătescu, C. (1928), *Populația Dobrogei*, în *Analele Dobrogei*, IX, vol. festiv Dobrogea (1878–1928), Constanța, pp. 201–258.
- Brătescu, C. (1929), *Câteva notițe despre „Grecii” din satul Alibeichici din jud. Tulcea*, *Analele Dobrogei*, Cernăuți, **X**, pp. 269–272.
- Bunescu, Ioana (2014), *Roma in Europe: The Politics of Collective Identity Formation*, Ashgate.
- Damian, Nicoleta (2013), *Mediul geografic și factorii de risc social din Delta Dunării*, Edit. Univeritară, București.
- Dogaru, Diana (2013), *Analiza spațială a presiunii antropice în geosistemele din Dobrogea*, Edit. Academiei Române, București.
- Echim, A. (1995), *Condiția populației din Rezervația Biosferei Delta Dunării*, Edit. Lumina LEX București.
- Ekrem, M-A. (1994), *Din istoria turcilor dobrogeni*, Edit. Kriterion, București.

- Erdeli, G., Cădea, Melinda, Braghină, C., Costachie, S., Zamfir, Daniela (1999), *Dicționar de Geografie Umană*, Edit. Corint, București.
- Gâstescu, P., Știucă, R. (ed.) (2008), *Delta Dunării – Rezervație a Biosferei*, Edit. CD Press, București.
- Gemil, T. (2008), *Români și otomanii în secolele XIV–XVI*, ed. a II-a, Edit. Ovidius University Press, Constanța.
- Heller, W., Sallanz, J. (ed.) (2009), *Die Dobrudscha. Ein neuer Grenzraum der Europäischen Union: Sozi-ökonomische, ethnische, politisch-geographische und ökologische Probleme*, Südosteuropa-Studien, 76, Verlag Otto Sagner, München–Berlin.
- Ipatiov, F. (2002), *Rușii lipoveni din România: studiu de geografie umană*, Presa Universitară Clujeană, Cluj Napoca.
- Kahl, T., Sallanz, J. (2006), *Die Dobrudscha, Rumänien*, Österreichische Osthefte, 48, Wien, pp. 857–879.
- Mustafa, A.-M. (1978), *Istoria turcilor*, Edit. Științifică și Enciclopedică, București.
- Mihăilescu, V. (2017), *Românul minoritar sau majoritar? Minorități fluide și mobilizare politică*, Sinteza, 37, Puterea minorităților, București.
- Necula, Elena-Maria (2009), *Definirea conceptului de minoritate națională*, Asociația pentru Dezvoltare Interculturală, <https://www.adintecultura.wordpress.com/studii-in-arhiva/>, acc. Oct. 2017.
- Nichersu, I., Iacovici, Eugenia (1995), *Scurtă istorie a etnicilor: ruși – lipoveni și ucrainieni pe teritoriul Rezervației Biosferei Delta Dunării*, Analele Științifice ale Institutului Delta Dunării, IV/2, Tulcea.
- Nicoară, T. (2005), *Istoria și tradițiile minorităților din România*, Ministerul Educației și Cercetării, ed online <http://www.aliantacivilizatiilor.ro>, acc. Oct. 2017.
- Nicoară, V. (2009), *Dobrogea, regiune transfrontalieră europeană*, Edit. Cadrilaterul, Constanța.
- Nuredin, I. (1998), *Comunitatea musulmană din Dobrogea: repere de viață spirituală: viață religioasă și învățământ în limba maternă*, Edit. Ex Ponto, Constanța.
- Petcuț, P., Grigore, Delia, Sandu, Mariana (2003), *Istoria și tradițiile rromilor*, Edit. Ro Media, București.
- Popa, V. (2006), *Dobrogea, spațiu de interferențe geopolitice*, Edit. Universității din București, București.
- Preece, J. (1998), *National Minorities and the European Nation-States System*, Oxford, Clarendon Press.
- Rădulescu, A., Bitoleanu, I. (1998), *Dobrogea. Istoria românilor dintre Dunăre și Mare*, ed. a II-a, Edit. ExPonto, Constanța.
- Ringold, Dena (2000), *Roma and the Transition in Central and Eastern Europe: Trends and Challenges*, Washington D.C., The World Bank.
- Rishi, W-R. (1974), *Multilingual Romani Dictionary*, The New Age Printing Press, New Delhi.
- Sallanz, J. (ed.) (2005), *Die Dobrudscha. Ethnische Minderheiten, Kulturlandschaft, Transformation; Ergebnisse eines Geländekurses des Instituts für Geographie der Universität Potsdam im Südosten Rumäniens*, Praxis Kultur und Sozialgeographie, 35, 2, Potsdam. Universitätsverlag Potsdam.
- Stănciugel, R., Bălașa, Liliana-Monica (2005), *Dobrogea în secolele VII–XIX. Evoluție istorică*. București. Edit. DC Promotions.
- Stinghe, H. (2007), *Despre germanii din Dobrogea*, Edit. DC Promotions, București.
- Tirilly, Sylvie de (1995), *Minorités et sécurité en Europe*, Ares, XV, 1.
- Zamfir, Elena, Zamfir, C. (coord.) (1993), *Țigani între ignorare și îngrijorare*, Edit. Alternative, București.
- \*\*\* (2005), *România – o Europă în miniatură. Scurtă prezentare a minorităților naționale*, Guvernul României, Departamentul pentru relații interetnice, București.
- \*\*\* (2005), *Geografia României, V, Câmpia Română, Dunărea, Podișul Dobrogei, Litoralul Românesc al Mării Negre și Platforma Continentală*, Edit. Academiei Române, București.
- \*\*\* (2016), *România. Natură și Societate*, Edit. Academiei Române, București.
- <http://www.cjc.ro/proiecte/itinerarii/Brosura-Etnii.pdf>, acc. Oct. 2017.
- <http://www.elpis.ro/istoria-grecilor.php>, acc. Oct. 2017.
- [https://www.cjtuлча.ro/sites/cjtuлча/PrezentareaJudetului/ComunitatiEtnice/Pages/Uniunea-Ucrainean% C4%83.aspx](https://www.cjtuлча.ro/sites/cjtuлча/PrezentareaJudetului/ComunitatiEtnice/Pages/Uniunea-Ucrainean%C4%83.aspx), acc. Oct. 2017.
- <https://blitz09.wordpress.com/2012/04/19/pe-pamant-dobrogean-in-buricul-dobrogei-se-vorbeste-limba-maghiara/>, acc. Oct. 2017.
- [www.ddbra.masterplan.ro](http://www.ddbra.masterplan.ro), acc. Oct. 2017.
- [http://www.ddbra.ro/mediatizari/Anexa%201\\_%20proiect%20HG%20strategia%20Deltei%20Dunarii%20rev1.pdf](http://www.ddbra.ro/mediatizari/Anexa%201_%20proiect%20HG%20strategia%20Deltei%20Dunarii%20rev1.pdf), acc. Oct. 2017.
- <http://www.recensamantromania.ro/rezultate-2/>, acc. Oct. 2017.

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# EVALUATING THE SPATIAL CONNECTIVITY DEGREE OF THE DOBROGEA SETTLEMENT NETWORK

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*Key-words:* transport network, connectivity, settlement network, GIS evaluation.

**Abstract.** The spatial connectivity of settlements within a regional settlement network is an essential component for the mobility of people and goods and consequently for a sustainable regional and economic development. A two-way correlation is established for the economic development of settlements and the development of the transportation network that serves them, both influencing each other. The aim of the paper is to evaluate the spatial connectivity degree of the Dobrogea settlement network and its impact on the local and regional development. The further assessment targets two major aspects of the transportation network that influence the economic development of settlements in Dobrogea. The first issue refers to the quality of the transport network and the second to the connectivity degree of the network. The analysis of the transport network in Dobrogea is also motivated by the existence of all types of transport modalities (road, rail, maritime, fluvial, intermodal), even if the analysis will take into consideration land transportation modalities. The present analysis uses a Geographical Information System (GIS) that allowed us to achieve a statistical modelling and computation of the connectivity indicators of the transport network in Dobrogea infrastructure. The changes in the degree of economic development of settlements in Dobrogea could be explained by the different values of spatial connectivity that appear in a specific area within the region. The paper provides a methodological approach to the evaluation of a regional transportation network and represents a first step in identifying its roles in the process of economic development of the Dobrogea settlement network.

## 1. INTRODUCTION

The spatial connectivity of settlements within a regional settlement network is an essential component for the mobility of people and goods and consequently for a sustainable regional and economic development. The economic development of settlements and the development of the transportation network that serves them is established by a two-way correlation, both influencing each other. The aim of the present study is to evaluate the spatial connectivity degree of the Dobrogea settlement network and its impact on the local and regional development. The connectivity of a network may be defined as the degree of completeness of the links between nodes (Bamford & Robinson, 1978).

The degree of connection between all vertices is defined as the connectivity of the networks (Bamford & Robinson, 1978). The greater the degree of connectivity within a transportation network, the more efficient that system can be (Marr, 2007). One of the most important attributes of a transportation network relates to accessibility, and the geographer is particularly concerned with accessibility as a locational feature (Bamford & Robinson, 1978).

Network analysis is an important aspect of transport geography because it involves the description of the disposition of nodes and their relationships and line or linkage of distribution (Knowles, Shawn & Docherty, 2008). It gives measures of accessibility and connectivity and also allows comparisons to be made between regional networks within a country and between other countries (Marr, 2007). As Kennedy & Derrible (2012) said, variations in the characteristics of networks may be considered to reflect certain spatial aspects of the socio-economic system.

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When examining a transportation network, a geographer is also interested in node-linkage associations in terms of accessibility (Taaffe, Gauthier, & O'Kelly, 1996). A high degree of connectivity means high geographic accessibility, while a low degree of connectivity involves limited accessibility, both with direct and indirect consequences in terms of the economic and social development of some localities (Marr, 2007). The structure of a network changes in response to the addition of new linkages, or the improvement of existing linkages. These changes are reflected in changes in nodal accessibility. The measurement of nodal accessibility is usually based on the graph theory (Kansky, 1963).

Accessibility is defined as the measure of the capacity of a location to be reached by, or there from reach different locations. Therefore, the capacity and the structure of the transport infrastructure are key-elements in the determination of accessibility (Rodrigue, Comtois, & Slack, 2006).

Given the increased interest in the regional analysis of transport networks and human settlements, in the context of emerging regional development policies and their importance in investment documentations, the paper aims to make a methodological approach to assessing the geographical accessibility of a regional transportation network in terms of the impact of the regional settlement system on the socio-economic characteristics. We believe that direct beneficiaries of such analyses, which can identify the needs for regional and local transport network development, are the population of the region. Methodological approaches in research studies may be starting points in identifying solutions to the regional needs of communities. Geography plays an important role in the spatial aspects of territorial disparities, both in human settlements and in local, regional and macroregional transport systems. The integrated functionality of these individual systems can be overcome a spatial analysts and territorial plan to identify solutions that optimize the degree to which these systems service the population.

The main objective of this study is to assess the degree of connectivity of the network of settlements to the national road and rail network. The human settlement system in Dobrogea presents a number of peculiarities resulting from the natural build-up of the region. The Black Sea and the Danube River, together with its delta have created, since ancient times, the premises for the development of a system of settlements with some distinct regional particularities. The paper deals with the interaction of the settlement system with the regional transport network (rail and road).

The present study aims to identify the territorial discontinuities in the degree of accessibility of human settlements to the national transport network through the regional one and to present a methodology for assessing the efficiency of the regional transport system functionality in relation with the settlement system it serves. The isolated character of Dobrogea as a natural barrier, formed by the Danube River in the west of the region, justifies the need to carry out such an analysis and to assess the impact on the urban and rural settlements in the region.

The regional analysis of the transport network performance in assessing the degree of connectivity of settlements in a region isolated by natural barriers, to the national network it belongs to, may be a starting-point in identifying the need for new network-links. The need thus identified can argue the necessity for developing a transport infrastructure in the region, such as new railways, or road bridges, a temporary solution being a ferry-boat crossings infrastructure. The proposed methodology aims to be a right step in evaluating the efficiency of the regional transport networks in relation to the territory served, in terms of human settlements and the population living there.

## 2. STUDY-AREA

The study-area is represented by the historical region, Dobrogea, located in the south-eastern part of Romania (Fig. 1). Dobrogea is the Romanian region that has been inhabited since ancient times, falling into the administration of modern Romanian in 1878. Currently, the connection with the national transport network is made by 3 bridges: 2 bridges between Cernavodă and Fetești, generically named Anghel Saligny Bridges (King Carol the I<sup>st</sup> Bridges), built between 1890–1895 and the Giurgeni-Vadu Oii Road Bridge, which started being used in 1970 (Iordănescu, Georgescu, 1986 &



Grigor, 1984). The King Carol I<sup>st</sup> bridges (renamed the Anghel Saligny Bridges during the Communist period) were built between 1890 and 1895 to ensure the railway link between Bucharest and Constanța (Dae, 2016).

The two counties in the study-area, Tulcea and Constanța, have about 885 000 inhabitants (2011 Census data), that is almost 5% of the total population of Romania (National Institute of Statistics – INS, 2011). The human settlement system is made up 17 towns, the main ones, Constanța and Tulcea, are also county capitals. The region has 121 administrative units (communes and towns), consisting of 353 distinct human settlements (National Institute of Statistics – INS, 2011). From a socio-economic point of view Constanța County (southern Dobrogea) is better placed than its northern neighbour, Tulcea, the localities being much better connected to the transport network. Thus, differences in the development of the land transport network (road and rail) are due largely to natural conditions. Tulcea County has one of the largest wetlands in Europe, the Danube Delta. Most of its territory is covered by wetlands (lakes, canals, dams and an alluvial relief) (Carp, 1980). The settlement system has a lower density and a high degree of isolation. Its acute isolation and harsh living conditions, based mainly on subsistence, made the Danube Delta a place of emigration or of transit at least. Very few of those born in the region stay there through adulthood. The Delta influences the demographic structure of Tulcea County, population density being of 25.7 inhabitants/km<sup>2</sup>, compared to 96.7 km<sup>2</sup> in Constanța (National Institute of Statistics – INS, 2011). This situation is reflected in the economic and social development of the two counties, Constanța being better developed economically.

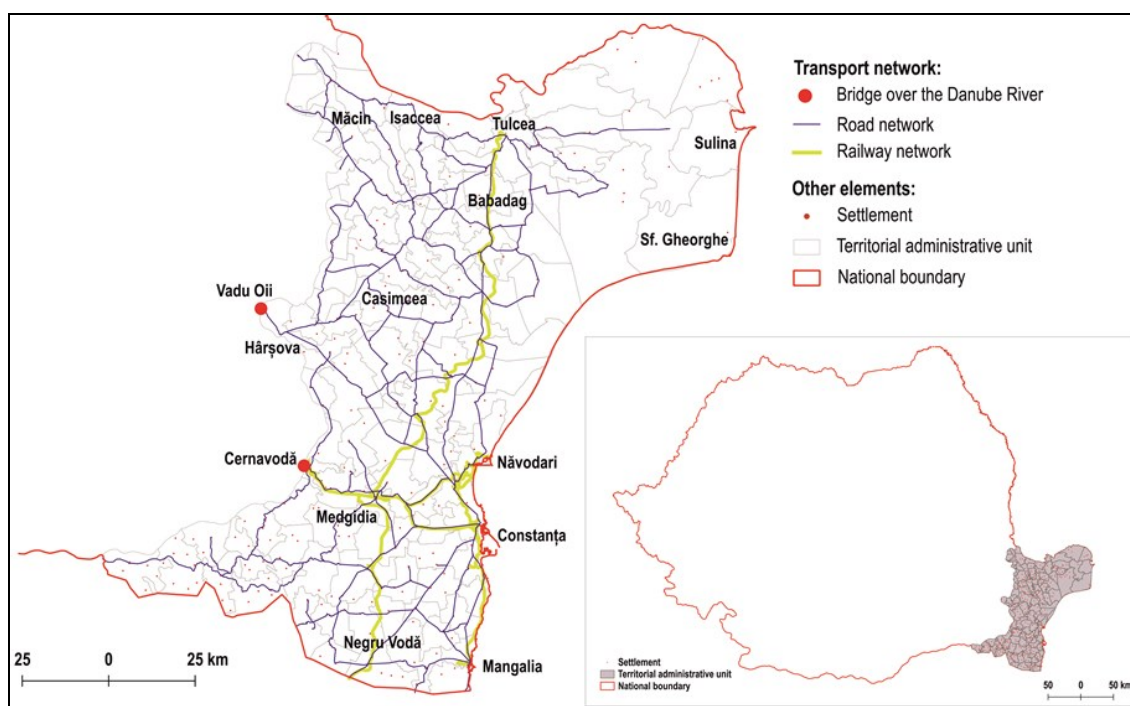


Fig. 1 – Geographical location of Dobrogea and the settlement network system.

### 3. METHODOLOGY

In order to achieve the objectives proposed in this study, a series of methods specific to these types of studies were used: the interpretative-descriptive method, the statistical-mathematical method (network analysis method) and the graphical and cartographic method.

The network analysis is a method of Transport Geography that considers the spatial and temporal characteristics and dimensions that the transport network organization points at the level of the territories (Docherty, Giuliano & Houston, 2008). This is based on the mathematical sub-disciplines of the graph theory and of topology (Marr, 2007). Cartographic representation is a method specific to Geography which allows, by means of graphical representations, scale, to get a graphical representation of different natural, social, economic, demographic phenomena, etc.

The present analysis uses the Geographical Information System (GIS) that allowed us to achieve a statistical modelling and computation of the connectivity indicators that are related to the infrastructure of the transport network in Dobrogea. A specific branch of GIS applied to transportation issues, commonly labeled as GIS-T, has emerged. The Geographical Information Systems for transportation (GIS-T) refer to the principles and applications of geographical information technologies to transportation problems (Rodrigue, Comtois, & Slack, 2006).

GIS-T studies have employed both object-based and field-based data models to represent the relevant geographical data. Some transportation problems tend to better fit one type of GIS data model than another (Higgs, 2004). For example, the network analysis based on the graph theory typically represents a network as a set of nodes interconnected with a set of links (Dramowicz, 1994). The object-based GIS data model, therefore, is a better candidate for such transportation network representations (Rodrigue, Comtois, & Slack, 2006).

The working steps consisted in the elaboration of a database (transport network and human settlements) and the actual analysis (evaluating the connectivity of the settlement network). Elaborating the database involved geocoding and construction of the transport network (road and railway) and the human settlement network. A main source of data was the Open Source portal: Open Street Map (OSM). This is an open source collective project that aims to build a global geographical database such as road atlases using both manually entered data with background images, as well as data collected from GPS (OpenStreetMap Foundation, 2017). During the construction of the geospatial database of the railway and road transportation networks, the geolocation of the characteristic features of connecting the Dobrogea regional network with the national transport network of Romania (represented by the bridges described in the introduction had been considered). In the second stage, that is the actual analysis, these features will represent the points of origin in assessing the spatial accessibility degree in the light of the connectivity of the human settlement network to the national transportation network. The transport network database consists of the national road network and the Dobrogea railway network, while the database of localities as destinations in the analysis, in relation to the features of origin (the links with the national network), are represented by the region' human settlements (353). For processing statistical data, cartographic and remote sensing data, several software programmes were used: QGIS 2.18 and ArcMap 10.4 as GIS software, and Microsoft Excel 2013 as a statistical software.

The analysis of the connectivity degree of human settlements to the national transport network was made by using the ArcMap 10.4 "network analysis" tool. The Network Analyst toolbox from ArcMap 10.4 contains tools that perform network analysis and network dataset maintenance. With the tools in this toolbox, one can maintain network datasets that model transportation networks and perform routes, the closest facility, service areas, origin-destination cost matrix, vehicle routing problem, and location-allocation network analyses on transportation networks. The tools within the Analysis toolset perform analyses using a network-based impedance such as travel time or distance (ESRI Company, 2017). The assessment of connectivity to the national transport network of the settlement system in Dobrogea referred only to spatial accessibility. The calculation of indicators and their representation on the map was made by using the data obtained from the OSM through the Arc Map 'network analysis' tool. The analysis was carried out by calculating the distance within the transport network (railway and road) from the interconnection infrastructure (bridges over the Danube) with the national transport network, to each locality within the Dobrogea settlement system.

After generating service areas from the linking points with the national network and regional transportation network (Anghel Saliny/Carol I Bridge, and Giurgeni–Vadu Oii Bridge) using the network analysis tool, polygons were generated and reclassified, in order to extract the settlements in a specific impedance (network travel distance). The spatial accessibility of human settlements in Dobrogea will be represented by iso-network distance lines (lines joining points in which the distance to them from a certain landmark is the same). The analysis was carried out in two distinct directions: road and railway, obtaining a picture of the yields of these transport networks at the level of Dobrogea's territory. Subsequently, the obtained results were compiled into a common indicator by summing up distances (railway and road distance) and represented at the territorial administrative unit level, in order to assess the impact on the population.

Another approach that the study proposed made was to evaluate the impact of transmission (rail and road) on the affected population. Thus, the general connectivity was determined for the terrestrial transport network of each territorial administrative unit, a normalization of the values of the general connectivity indicators was made and then the data were assigned to 4 classes (very low connectivity, moderately-low connectivity, moderately-high connectivity and very high connectivity), in order to quantify the impact on the population of Dobrogea. Although there may already be certain standards or guidelines for mapping your data, it was decided to use the method of equal intervals. After the calculation of the gross values of the distances within the network to the connection with the national transport network, a normalization of the values was made in order to divide them in equal intervals. Equal interval divides the range of attribute values into equal-sized subranges. This allows one to specify the number of intervals, and the GIS software will automatically determine the class breaks based on the value range. Equal interval is best applied to familiar data ranges and the values obtained by normalization within a range of values. This method emphasizes the amount of an attribute value relative to other values. The evaluation was completed by estimated 2018 INS data to calculate the population within each of the resulting connectivity classes.

The last methodological step in the study was the analysis and interpretation of the results obtained from their spatialization. The geographical analysis of the degree of connectivity of human settlements in Dobrogea to the national transport network has been made by developing a vast cartographic material and by interpreting it and all the processed data.

#### 4. RESULTS AND DISCUSSION

The main results are represented by the connectivity indicators of settlements in Dobrogea to the railway and the national road networks in terms of the efficiency of the regional land transport network. In the analysis of the land transport network, the values of the connectivity indicators of settlements with the national transport network are determined by the presence of the bridges across the Danube, in the west of the Dobrogea Region, in Constanța County (Fig. 2).

The bridges link Ialomița County with Constanța County, Wallachia Historical Region with Dobrogea, respectively. Thus, in the west of the Region we can see the formation of an area of localities where the values of the indicators, both connectivity of the railway transport network and the road network, are very high (under 25 kilometers, or under 50 kilometers up to the national transport network) (Fig. 2).

Regarding connectivity to the railway transport network, one can notice the constant decrease in the northern and eastern parts of the regions. Constanța County presents a better connected rail network in relation to Tulcea County, which has significantly supported the economic development of this county. The Medgidia Railway – Tulcea City is a railway linking Medgidia Municipality with the county seat of Tulcea County. It crosses two counties, namely Constanța and Tulcea, and has the role of ensuring a connection between the Danube Delta and Tulcea County with the national railway

network. The industrial development of Tulcea, as well as the development of tourism in the Danube Delta, will require future investment in increasing the connectivity degree of the northern part of the region. The towns of Măcin, Isaccea and SfântuGheorghe do not have a direct connection with the railway, but connectivity has been calculated by reference to the city with the nearest railway, in this case Tulcea (Fig. 2). The lack of railway connections and the need for a bridge over the Danube in the north can be justified by these low values of the national railway network connectivity indicator. The best connectivity to the national rail transport network occurs along the alignment of the Cernavodă–Constanța railway line. The towns of Medgidia, Cernavodă, Alba, and Murfatlar are privileged by access to a high infrastructure connectivity to the national transport system. These aspects explain the level of economic development of these localities and the development of the Cernavodă–Medgidia–Constanța development axis. Constanța Municipality has a high degree of connectivity, measured at the regional level of the rail transport network. This factor creates the prerequisites for a sustainable economic development at the level of this city. The transport function, as a specific function of Constanța City over the time has generated the need for infrastructural development, both rail and road, which has led to a higher connectivity degree (Fig. 2).

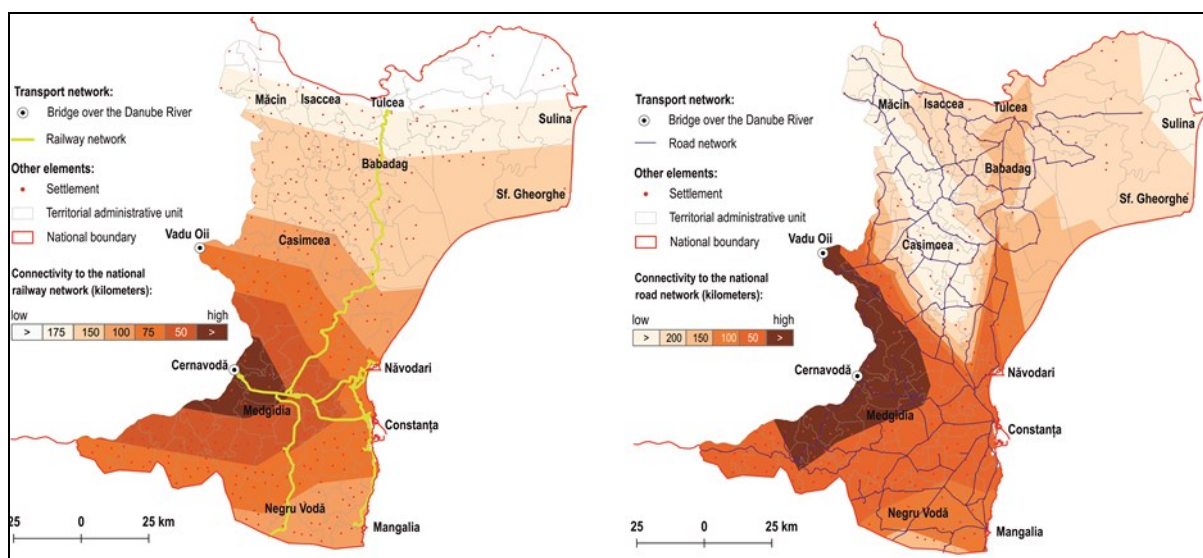


Fig. 2 – The degree of connectivity of the settlement system to the national rail transport network (left) and to the national road transport network (right).

The regional road transport network in Dobrogea is a developed one, which has benefited from important investments over the last 20 years. It includes both national roads (DN2A, DN3, DN22, DN38 and DN39) and the Bucharest–Constanța highway as the main transport axes. Important axes within the regional road network are also Constanța–Babadag–Tulcea, Hârșova–Constanța, Hârșova–Tulcea, Măcin–Babadag. The settlement network of the region is developed mainly along these arteries and they create the premises for economic sustainability, through the access it offers to the national transport network.

According to the analysis assessing the connectivity degree of the settlement network to the national transport network, the regional road network covers more significant areas than the railway one, at the level of Dobrogea. In the distribution map of the connectivity indicator on the national road transport network, one can notice that Constanța County has a significant advantage over Tulcea County (Fig. 2). The Cernavodă–Medgidia–Constanța transport axis, doubled by national roads and highways, determines a high degree of connectivity to the national transport network of the territorial

administrative units on this alignment, as well as to neighbouring localities (Fig. 2). According to the analysis, the Constanța–Babadag–Tulcea transport axis offers moderate connectivity for the adjacent localities to the national road network, making up for the absence of a bridge over the Danube in the North side of this part of Dobrogea. Areas with a low degree of connectivity, hence a high degree of isolation, are the Danube Delta (eg. Sfântu Gheorghe, Sulina) and the north-western area of Dobrogea (eg. Isaccea, Măcin).

In the southern region of Dobrogea, both networks (railway and road) meet the transport needs of the respective localities. The railway network via Medgidia–Negru Vodă and the Constanța–Mangalia railway offer a high degree of connectivity, for both the southern central region of Dobrogea and the southern Romanian seaside. The road network is also sufficiently developed from the viewpoint of network configuration in relation to the local system, covering the southern regions of Dobrogea with a high and moderate degree of connectivity to the national road transport network.

Regarding the overall distribution of the Dobrogea land transport network, we would say that the system of settlements in this region has generally a high and moderately high connectivity (Fig. 3). The highest values of connectivity to the national transport system are registered in the central and southern parts (Medgidia, Murfatlar, Cernavodă, Negru Vodă, Constanța, and Mangalia). Medium-high connectivity values cover the Casimcea Plateau and the surrounding settlements, along with the region around the town of Babadag. Tulcea and the surrounding localities have a general moderate-to-low value connectivity degree with, while the north-west (Isaccea, Măcin) and the Danube Delta have the greatest deficiencies in terms of network connectivity (Fig. 3). The isolated character of the Danube Delta is reflected, besides connectivity, in the density of the road transport network. This is due to the Biosphere Reservation status attributed to this area. A denser transport network may also imply a deterioration of the quality of the natural environment, so that in these conditions the degree of isolation and low connectivity could find an explanation. The strategies for developing the quality of life in this part of Dobrogea should take into account increased accessibility through environment-friendly measures (Sustainable Development Strategy of Tulcea County, 2014). The fact is that the low connectivity of Isaccea–Măcin area has a negative impact on the socio-economic development of the area, although environmental costs for developing the transport infrastructure are lower than in the Danube Delta. According to the County Council's Report on the impact of tourist activities on the economic development of the Danube Delta area, by referring the number of legally active companies to the number of inhabitants, the result is 23.76, which means a significant ratio, that signals a certain stimulating effect on the local business environment. This ratio has a lower value in the north-eastern part of the county, in the area of Măcin–Isaccea respectively, which signals some economic dysfunctions compared to a more isolated area in terms of accessibility to the national transport network (Sustainable Development Strategy of Tulcea County, 2014). The ratio of the population employed in the services sector (tourism) per total population, has a lower value in the towns of Măcin and Isaccea, compared to similar localities in the Danube Delta area, which despite their lower connectivity, have nevertheless a higher economic development alternative (South-East Regional Development Plan 2014–2020, 2014). The consequences of isolation for Isaccea and Măcin, as well as for the localities around them, are reflected in their economy. The towns are dominated by agrarian and agrarian-industrial activities, while the services sector has a very low share compared to regions with a high degree of connectivity.

The rail transport and road transport axes in Dobrogea overlap the Cernavodă–Medgidia–Constanța, Constanța–Năvodari, Constanța–Mangalia and Medgidia–Tulcea alignments, which explains the results of the high degree of connectivity of the localities adjacent to these axes.

Concerning the assessment of the affected population and the dimensioning of the impact of the transport network configuration on the region's inhabitants, we would mention that about 75% of Dobrogea's population lives in high connectivity areas (18% very high, 57% moderately-high) to the national transport network. The largest part of this percentage live in urban areas, in the towns located



along the Cernavodă–Constanța transport axes (Constanța, Cernavodă, Medgidia, Năvodari, and Ovidiu). The share of the population living in localities with a low degree of connectivity to the national transport network is 25%, of which 20% is very low and 5% moderately-low. Most of them live in the urban and rural localities of the Danube Delta, as well as in the Măcin–Isaccea area (Fig. 3).

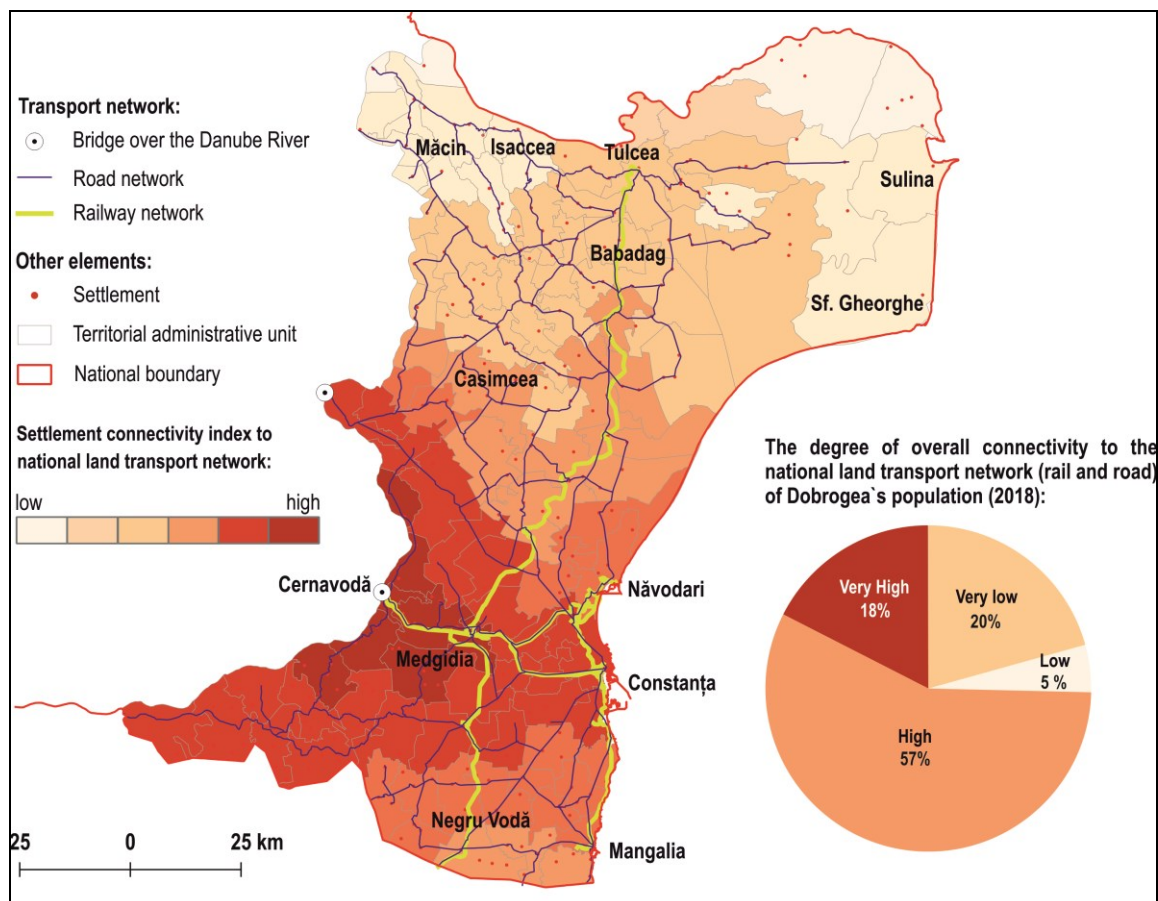


Fig. 3 – The overall connectivity index of the settlement system to the national land transport system (rail and road) (population's data source: National Institute of Statistics – Government of Romania – 2018).

An overview of the results obtained regarding the spatial distribution of the overall connectivity indicator in relation to the national land transport system, as well as the calculation of population distribution for each degree of connectivity, makes us suggest a hypothesis for a future study on the extent to which the socio-economic development of a locality is influenced by its connectivity to the transport network. The results reported herein represent the findings of a regional evaluation of the connectivity degree of the settlement system.

## 5. CONCLUSIONS

The study has focussed on territorial discontinuities in the degree of connectivity to part of the transport system of the settlement system of a very isolated region. The paper provides a methodological approach to the evaluation of a regional transportation network and represents a first step in identifying its roles in the process of the economic development of Dobrogea's settlement

network. The results presented in this section, if economically substantiated, could be a starting point for finding alternatives and solutions to connecting low connectivity areas. The economic disparities between Tulcea and Constanța can also be explained on the basis of this connectivity indicator, which synthesizes the performance that the design of a regional transport network has in relation to its users (population and territory).

The main transport axes, both rail and road, are attractive for the development of localities. Industrial and services activities are located along these lines, given the need for the mobility of goods and services; therefore, areas with a high degree of connectivity have a significantly larger population than areas with a high degree of isolation. Areas with a high degree of connectivity, also urban, have a higher share of agrarian activities, suggesting assumptions on the relation between connectivity, access to the transport infrastructure and the degree of development and economic diversity of a human settlement. The analysis of the settlement system's connectivity degree has revealed a series of differences between the general connectivity of the settlements in Tulcea and in Constanța, which demonstrates the necessity for developing an infrastructure to connect Tulcea County with the rest of the national transport network (road and / or rail link).

Assessing the characteristics of the transport networks, the higher the connectivity degree and the need to connect other spaces, must be made in parallel with outlining the demographic dimensions that the transport networks aim to serve. The analysis looked at how this demographic dimension can be assessed, the result being that, in Dobrogea, the most densely populated areas are generally well-connected to the national transport infrastructure.

Assessing the characteristics of transport networks in terms of their impact on population and territorial services is an area which geographers can increasingly tackle, thanks to their specific tools and methods (GIS-T, as a new branch).

## REFERENCES

- Bamford, C., Robinson, H. (1978), *Geography of transport*,s MacDonal and Evans, Plymouth.
- Carp, E. (1980), *Directory of Wetlands of International Importance in the Western Palearctic*, UNEP-IUCN, Bidless Ltd., Switzerland.
- Dae, G. (2016), *Evoluția căilor ferate dobrogene (1860–1938)*, Ex-Ponto Publishing-house, Constanța.
- Docherty, I., Giuliano, G. & Houston, D. (2008), *Connected Cities*, in: *Transport Geography. Mobilities, Flows and Spaces* [eds. R. Knowles, J. Shaw & I. Docherty], Blackwell Publishing, Oxford, pp. 83–10.
- Dramowicz, K. (1994), *Application of graph theory to network evaluation: theoretical and practical issues*, Proc. 6<sup>th</sup> Canadian Conf. on GIS (Ottawa, 6–10 June).
- Grigor, P. (1984), *Romania – Geografia circulației*. București, Edit. Științifică și Enciclopedică.
- Higgs, G. (2004. ), *A Literature Review of the Use of GIS-Based Measures of Access to Health Care Services*, Health Services & Outcomes Research Methodology.
- Iordănescu, D., Georgescu, C. (1986), *Construcții pentru transporturi în România*, 1–2, Centrala de Construcții Căi Ferate, București.
- Kansky, K. J. (1963), *Structure of Transportation Networks: Relationships Between Network Geometry and Regional Characteristics* (3 ed.), Chicago Press, University of Chicago.
- Kennedy, C., Derrible, S. (2012), *Network Analysis of World Subway Systems Using Updated Graph Theory*, Transportation Research Record: Journal of the Transportation Research Board, 21(12), pp. 112–123.
- Knowles, R., Shaw, J. & Docherty, I. (2008), *Transport Geographies. Mobilities, Flows and Spaces*, 1st edition, Blackwell Publishing, Oxford.
- Marr, P. (2007), *Changes in accessibility in the Meseta Purépecha region of Michoacán, Mexico: 1940–2000*, Journal of Transport Geography, 15(6), pp. 465–475.
- Rodrigue, J., Comtois, C., Slack, B. (2006), *The Geography of Transport Systems*, Routledge – Taylor and Francis Group, New York.
- Taaffee, E., Gauthier, H., O'Kelly, M. (1996), *Geography of Transportation*, Prentice Hall; Subsequent edition (February 27, 1996).



- \*\*\* ESRI Company, *ArcGIS Desktop tools*, Retrieved from ArcGIS Desktop tools: <http://desktop.arcgis.com/en/arcmap/10.3/tools/network-analyst-toolbox/an-overview-of-the-network-analyst-toolbox.htm>, last accessed on August 28th, 2018.
- \*\*\* “The Danube Delta – Halmyris”, [www.halmyris.org](http://www.halmyris.org), last accessed on October 20<sup>th</sup>, 2018.
- \*\*\* National Institute of Statistics (INS), *Recensământul populației și locuințelor României – 2011*. Bucuresti.
- \*\*\* National Institute of Statistics (INS), *Baza de date TEMPO*, 2018, Retrieved from Baza de date TEMPO: <http://statistici.insse.ro/shop/>, last accessed on September 1st, 2018.
- \*\*\* OpenStreetMap Foundation (OSM), Retrieved from OpenStreetMap – Wikipedia. <https://ro.wikipedia.org/wiki/OpenStreetMap>, last accessed on September 1st, 2018.
- \*\*\* `Sustainable Development Strategy of Tulcea County` (2014), Tulcea County Council. <https://www.cjtulcea.ro/sites/cjtulcea/AnunturiPublice/Pages/diverse-anunturi.aspx>, last accessed on October 20th, 2018.
- \*\*\* South-east Regional Development Plan 2014–2020 (2014), Southeast Regional Development Agency, [http://www.adrse.ro/Documente/Planificare/PDR/2014/PDR.Sud\\_Est\\_2014.pdf](http://www.adrse.ro/Documente/Planificare/PDR/2014/PDR.Sud_Est_2014.pdf), last accessed on October 20th, 2018.

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# THE EFFECTIVENESS OF DECENTRALIZATION IN INDONESIA. A CASE-STUDY OF THE DEVELOPMENT OF A MARGINAL AREA BY LOCAL AUTHORITIES

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*Key-words:* decentralization, regional development, policy and institution analysis, spatial perspective, disparity.

**Abstract.** The decentralization system is mandated by the Indonesian Government to enable regional development in the reformation era, specifically after 2004–2005. There were at least two crucial momentums that enforced the decentralization effort by the government; the Regional Government Law (*UU Pemerintahan Daerah*) which was then revised in 2014, and President Joko Widodo's (2015–2019) policy of 'marginal' development, or development focussing on rural regions and citizens in the lower economic classes. In the last decade, the development process in Indonesia has greatly accelerated, especially in the infrastructure of Indonesia's many regions. Unfortunately, there is still a significant disparity between the western and the eastern part of Indonesia, and between the urban and the rural areas. Indonesia's inequality problem is evident in its Gini ratio, which scores at around 0.4, even though in the last five years that number has shown some decrease. Using Bromley's policy-institution analysis and a 'time and space' approach, the disparities of Indonesia's development, caused by its policies and the arrangements of its respective institutions, can be dissected. The basic pattern of the disparities is apparent, but its gap is evidently growing smaller. Meanwhile, with a time-space approach, that pattern can be clarified further by putting it in the context of regional planning periods. It is apparent that focusing on citizens in the lower economic classes and rural regions can shorten the developmental gap between regions. Moreover, the choice of a more controlled decentralization system is a determining factor in achieving a more equal regional development in Indonesia.

## 1. BACKGROUND

Indonesia is a geographically diverse country, both in terms of its physical and *social* landscape. Indonesia is an archipelago with around 16 thousand islands spread across the tropical zone on the Eequator. The land mass of Indonesia is 1.95 million km<sup>2</sup> wide and its sea spans 3.26 million km<sup>2</sup>, which adds to the country's area, 5.21 million km<sup>2</sup> in total (Patmasari, 2009). Indonesia is larger than the whole of Western Europe. Amongst the thousands of islands in the country, five are the biggest and most populous: Sumatera, Kalimantan (Borneo), Jawa (Java), Sulawesi (Celebes), and Papua (Fig. 1). Java, located in the southern area of the country, boasts the highest population, mean Human Development Index, and intensity of infrastructure development. In 2017, the country's population numbered around 260 million, 44% of them living in Java. Jakarta, the country's capital, is located in Java, making the island the center for economic activities, especially in the provinces of Greater Jakarta and West Java (Susatyo, 2018 and Biro Pusat Statistik, 2017 and 2018).

The eastern part of Indonesia has a drier climate compared to the humid western regions. Indonesia is also known as the location of the 'ring of fire' which makes it quite vulnerable due to numerous earthquake points. Only Borneo is free of any earthquake points. There are 625 ethnic groups spread across the country (Patmasari, 2009).

To manage and cultivate Indonesia's resources, national institutions created development programmes which were carried out by the regional governments. These regional governments consist of provincial governments and municipalities/districts. As of 2018, Indonesia has 34 provincial

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governments, which are also known as level 1 regional governments, next coming 525 level 2 regional governments with 426 districts and 99 municipalities. The lowest levels of regional governments include 7,000 sub-sub districts, and 82,253 villages (Setiawan, 2018).

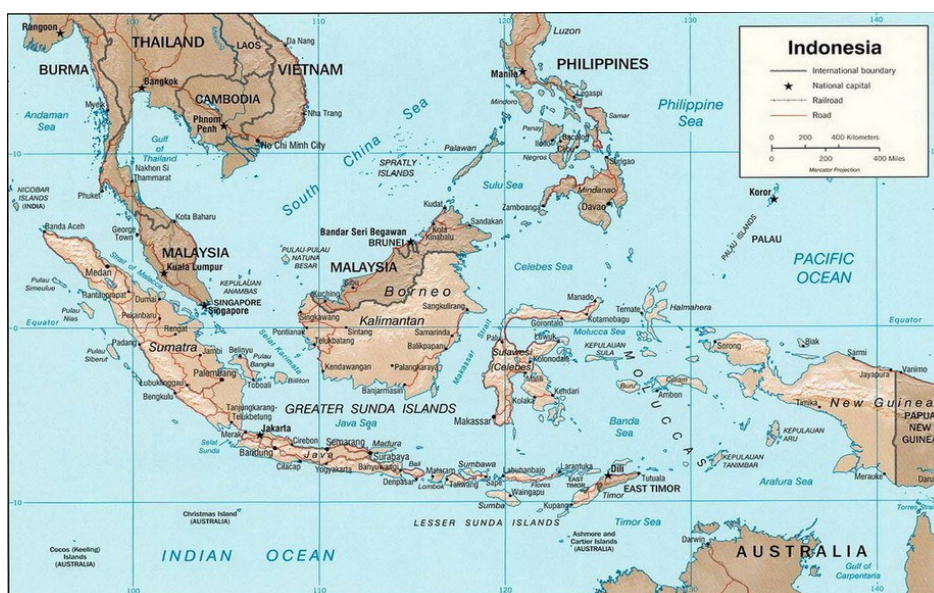


Fig. 1 – Indonesia.

Source: Perry Castaneda Laboratory, 2002. Indonesia. US CIA.

The wide geographical diversity of the country creates a multitude of problems that consequently require multiple approaches to achieve effective decentralization. Decentralization is implemented to assist the central government in quickly providing services in areas far from it. Promoting development with diverse capacities and capabilities to the various regions of Indonesia is a much different experience compared to countries with more interconnected and homogeneous regions, like mainland European countries (Djohan, 2014 and Prasojo, 2009). As such, this analysis is an investigation into the effectiveness of the implementation of decentralization.

## 2. A SHORT HISTORY OF DECENTRALIZATION IN INDONESIA

Decentralization is the transfer of government authority from the central to the regional government based on the principle of autonomy, legally based on Law no. 23 of 2014 (UU Republik Indonesia no. 23 tahun 2014). This definition adapts several global definitions such as:

- The definition proposed by the United Nations Development Programs: “*A decentralization refers to transfer of authority away from the national capital wether by de-concentration (i.e. delegation) to field offices or by devolution to local authorities or local bodies*”
- The definition proposed by Turber and Hulme (1997): “*A decentralization is a transfer of authority to perform some services to the public from an individual or an agency in central government to some other individual or agency which is “closer” to the public to be served*”
- The definition proposed by Litvack and Seldom (1999): “*The transfer of authority and responsibility for public function from central to subordinate or quasi-independent government orgaization or private sector.*”

Rondinelli and Nellis (1986) stated: “*define decentralization from an administrative perspective as the transfer of responsibility for planning, management, and the raising and allocation of*

*resources from the central government and its agencies to field units of government agencies, subordinate units or levels of government, semi-autonomous public authorities or corporations, area-wide, regional or functional authorities, or non-governmental private or voluntary organizations' “.*

Following the end of the New Order Era in 1998/1999 and the dawn of the reformation era, decentralization becomes a widely pursued principle in Indonesia's governance (Ramses, 2009). The main reason for this is to transfer public services in order to reach out as effectively as possible to the population in all parts of Indonesia. Decentralization cannot be separated from the public's will to achieve democracy after the highly centralized government of the New Order Era. After the fall of the New Order regime in 1998, the government divided several provinces that were deemed too large, and where the populations are difficult to reach, into smaller provincial administrations. For example, in 2000, the province of West Java was split into two provinces, the Banten Province and West Java. These smaller provinces were more effective in delivering services to the public. This is a practical solution to achieve the intended quality of service. However, the human resources capacity and strong political interests hamper the effectiveness of regional governments. Thus, in the mid 2000s, the plan to split up more regional governments was suspended.

The history of the actual implementation of decentralization in Indonesia is marked by the publication in 1999 of the Regional Governments Law considered to be the start of the Regional Autonomy era. The law was later revised in 2004 by Law No. 32. Until the new regional autonomy law of 2004, the political authorities functioned in districts/municipalities (Setiawan, 2018). However, the evaluation conducted by the Office of the Presidential Unit for Development Monitoring and Control on decentralization efforts by means of regional autonomy, revealed that the results of regional development were not satisfactory. These lacklustre results were also caused by the transformation phase that took much time and money, and were especially taxing to regional government, as well as to the development funds of the central government through the deconcentration programme. Consequently, a committee was formed to revise the Regional Government Law No. 23 2014. This revision shifts the focus of regional development from the level of districts and municipalities to provinces (Djohan, 2014 and Prasojo, 2009).

### 3. HOW TO MEASURE THE EFFECTIVENESS OF DECENTRALIZATION

There are two types of research on policy effectiveness: policy research and research for policy. This study uses the policy research approach and focusses especially on outcome or summative evaluation, but also on other processes such as formulative evaluation. The study focusses on evaluating policy-making and its implementation. We use the Bromley approach (1989) that evaluates the harmonization of policy systems, including the policy planning process, and how institutions translate those systems into and implement them into an operational system. In evaluating the outcome of that policy, the main object of study is policy achievements compared to policy contents. Ideally, the policy impact as perceived by the public is measured. However, what is practically measured are the outcomes included in plans of the development projects. The implementation of development policies is affected by the capacities and capabilities of the institutions charged with carrying them out (Iqbal and Anwar, 2008).

Capabilities and capacities may also refer to the decision distance of a policy (Scott, 2010). It is in this context that policies have a geographical context in terms of their implementation from the central to the regional governing bodies. Distance denotes not only metric values in-between policy-makers and the respective policy targets, but also their accessibility. Indonesia's diversity and its width also create differences between regions in the capacity and capability of public services. For example, regions in Papua are by far less accessible, since policies implemented there have a greater distance of realization compared to, for example, Java. This issue indicates a bigger challenge for the development of regions the further away they are from the central government, which incidentally is

also the center of economic activity and growth, especially with the country's highly limited infrastructure, capital, human resources, and organizational capital.

Several important indicators of the effectiveness of decentralization with great impact are: economic growth, the trends of economic growth, poverty levels, the Gini ratio, improvements in public service outreach, development funding, and the effectiveness of the government's performance. Some of those indicators are later interpreted in a spatial perspective (Aoyama, 2011).

#### 4. CHANGES AFTER DECENTRALIZATION

Changes in the outcomes of development could be depicted by a single set of indicators. In the previous section, the indicators used have been mentioned. These indicators could reflect some of the actual components of the outcomes of development. At the very least, these indicators could serve as a point of reference to what the government sets to achieve through its development policies. Different outcomes are stressed differently in a development policy between one administration period and the next. However, we could consider the country as a whole, and evaluate the national development achievements of Indonesia. Besides being affected by the human resources, in regional governments specifically, and the public services systems that are implemented, development outcomes are also tied to the availability of natural and artificial resources, such as electricity in the region where development takes place.

Several reports on the Improvement of Public Service Delivery between 2013–2014 indicates that, as a whole, services cannot be considered as adequate, though there is a positive trend. A study conducted by Bratakusumah (2013) on the government's capability as indicated by bureaucratic parameters shows that among other Southeast Asian countries (where Singapore is already highly ranked compared to the rest of the world), Indonesia ranks in the middle.

EoDB 2014		CPI 2013		CoC 2012		GOV. EFF. 2012		GCR (TOTAL) 2013-2014		GCR (INST.) 2013-2014	
CTRY	RANK	CTRY	SCORE	CTRY	SCORE	CTRY	SCORE	CTRY	RANK	CTRY	RANK
SGP	1	SGP	87	SGP	2,15	SGP	2,15	SGP	2	SGP	3
MYS	6	BRN	55	BRN	0,64	MYS	1,01	MYS	24	BRN	25
THA	18	MYS	49	MYS	0,30	BRN	0,83	BRN	26	MYS	29
BRN	59	BRA	43	BRA	-0,07	THA	0,21	CHN	29	CHN	47
RUS	92	CHN	39	THA	-0,34	PHL	0,08	THA	37	LAO	63
CHN	96	THA	37	CHN	-0,48	CHN	0,01	<b>IDN</b>	<b>38</b>	<b>IDN</b>	<b>67</b>
VNM	99	IND	36	IND	-0,57	BRA	-0,12	BRA	56	IND	72
PHL	108	PHL	34	VNM	-0,56	IND	-0,18	PHL	59	THA	78
BRA	116	<b>IDN</b>	<b>32</b>	<b>IDN</b>	<b>-0,66</b>	<b>IDN</b>	<b>-0,29</b>	IND	60	PHL	79
<b>IDN</b>	<b>120</b>	VNM	31	PHL	-0,58	VNM	-0,29	RUS	64	BRA	80
IND	134	RUS	28	RUS	-1,01	RUS	-0,43	VNM	70	KHM	91
KHM	137	KHM	22	LAO	-1,04	KHM	-0,83	LAO	81	VNM	98
LAO	159	MMR	15	KHM	-1,04	LAO	-0,88	KHM	86	RUS	121
MMR	182	LAO	13	MMR	-1,12	MMR	-1,53	MMR	139	MMR	141

<b>EoDB</b> : Ease of Doing Business (IFC, WB) (2014)	<b>SGP</b> : Singapore	<b>RUS</b> : Russia	<b>LAO</b> : Laos
<b>CPI</b> : Corruption Perception Index (TI)	<b>MYS</b> : Malaysia	<b>IDN</b> : Indonesia	<b>MMR</b> : Myanmar
<b>CoC</b> : Control of Corruption (WB)	<b>THA</b> : Thailand	<b>BRA</b> : Brazil	
<b>Gov. Eff.</b> : Government Effectiveness Index (WB)	<b>BRN</b> : Brunei	<b>IND</b> : India	
<b>GCR</b> : Global Competitiveness Report (WEF)	<b>CHN</b> : China	<b>KHM</b> : Cambodia	
<b>GCR (Inst.)</b> : Global Competitiveness Report (Variabel Institution) - WEF	<b>VNM</b> : Vietnam	<b>PHL</b> : Philipina	

Fig. 2 – Bureaucracy Indicators.

Source: Bratakusumah, 2013.



In terms of Bureaucracy indicators (Fig. 2), Indonesia is relatively far from being the best in the region. The Government Effectiveness Index also shows the same position. However, Indonesia's competitiveness is growing. This means that the trust between bureaucratic and economic growth is getting stronger. Amongst the issues Indonesia is facing, bureaucracy and corruption are the two main challenges (Bratakusumah, 2013). Compared to other ASEAN (Association of South-East Asia Nations) countries, between 2004 and 2007 Indonesia ranked 6<sup>th</sup> in Government Effectiveness (Daniel Kaufma *et al.*, 2008).

The development programmes assessed by their economic, social, and environmental outcome show that Indonesia is gradually improving, especially after President Joko Widodo took office in 2014. It is estimated that this economic growth will increase substantially up to the year 2050 (see Fig. 3), while other countries face a relative decrease. Indonesia is the number one economic size in Southeast Asia. This is also corroborated by several study groups and consultancies, such as McKinsey Consulting's report: "The Archipelago Economy; Unleashing Indonesia's Potential" (2012).

During the last decade of Indonesia's development, welfare and infrastructure have been the two main focal sectors. This is evident in the doubling of funds directed to the development of education and healthcare, a development in line with the main policy principles of President Joko Widodo, with focus on marginal people. Infrastructure development funds, especially for roads to improve inter-region connectivity, registered an over three-time increase. It should also be noted that infrastructural development, especially of roads, require the regional government to provide the land needed for this development. Meanwhile, government subsidies to the energy sectors are declining down to a quarter compared to the last administration in 2014/2015 (Nasution, 2016 and OECD, 2016).

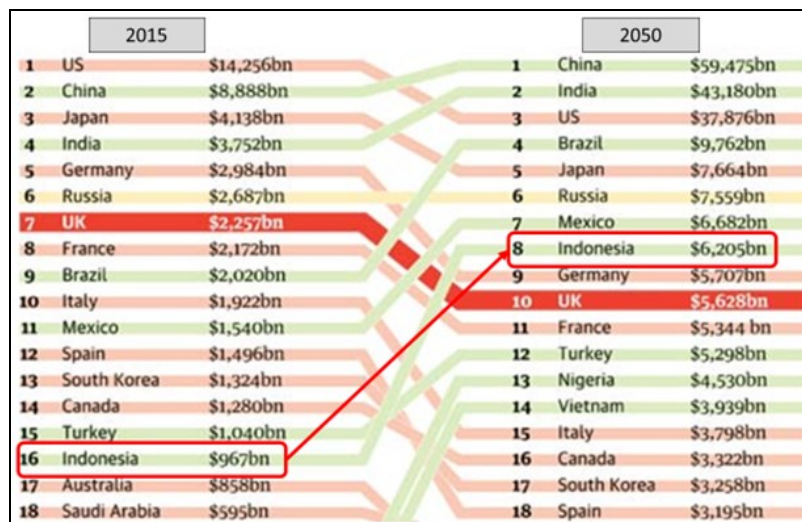


Fig. 3 – The Rise and Fall of Economic Growth.

Source: The Guardian, 2016.

The impact of this policy is to decrease the national disparity rate. In Indonesia, the Gini ratio has fallen to under 0.4, even though it is still globally much higher than in other developed countries. The decrease is also only from 0.41 to 0.39. The Gini ratio tends to be higher in the eastern regions of the country. This change in the Gini ratio is supported by the fall in poverty rates from 32.52% in 2009 to 27.76% in 2016 (Biro Pusat Statistik, 2017). Like the distribution of the Gini ratios, the poverty rate also tends to be higher in provinces located in the eastern regions of the country, especially in Papua. This fact describes the difficulty of development to reach those regions, where population characteristics and distribution contribute to this difficulty.

The national distribution in 2016 is shown in Figure 4, where it is evident that western Indonesia, especially Java, receives 58.49% of the national distribution, or areas well-connected to Java.

Distribution is, of course, highly correlated with the quality of transportation systems. Sumatera achieves 22.03%, which means that Sumatera and Java both create a total of 80.52% of the whole national distribution. The volume of distribution derives from industry and trade in those regions (Biro Pusat Statistik 2017 and 2018). The higher the distribution volume, the more trade and industry is supported. The multiplying effect makes economic activities of people living in that region more open, hence the faster growth. It can be said that distribution and accessibility to the Eastern regions of Indonesia is relatively missing. The concentration of distribution is far too narrow, the focus being specifically on Java and Sumatera. Those two islands cover only 30% of the nation's land-mass. This may mean that the part closest to the central government may have better services than the remoter areas. However, the Government of Indonesia has pushed higher economic growth to remoter areas. In general, the benefit of development remains dominant in areas closest to the central government. This is quite similar to the findings of a study made by Rand Consultant on economic development zones in Indonesia (Rothenberg, 2017).

Inequality in economic activities and its social impact affects development in a distinctive way. Indonesia's Human Development Index scores grew between 2010 and 2017. However, it is curious why this growth is much more significant in the eastern part of Indonesia than in its western regions. One may interpret this pattern as an indication of greater that development equality over the years was greater.

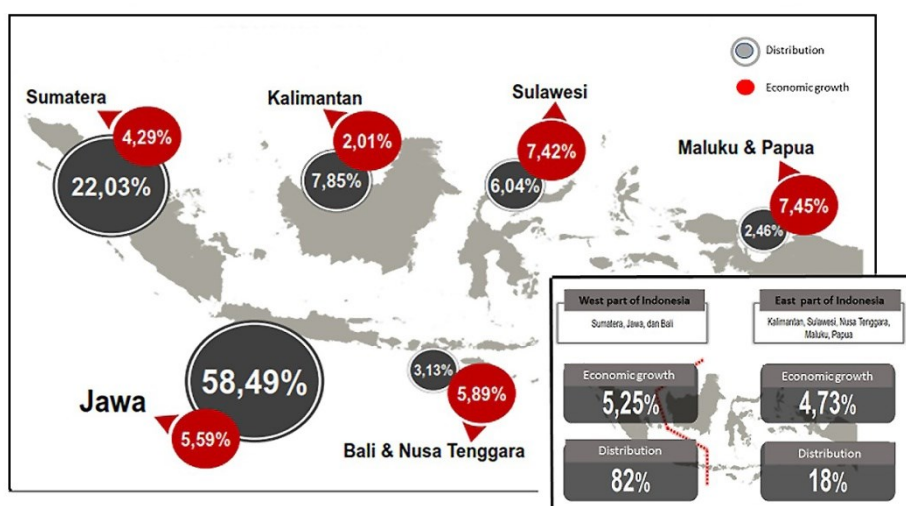


Fig. 4 – A Comparison of Economic Growth between Western and Eastern Islands in Indonesia.

Source: Biro Pusat Statistik, 2017.

#### Indonesia Human Development Index 2010–2017.

Part of Indonesia	2010	2017	Gap
Western	72.2	76.5	4.30
Eastern	63.61	71.99	8.38

Source: Analyzed from Data Provided by the Biro Pusat Statistik.

There are also consequences for the environmental condition of the affected regions. Compared to other large Islands in Indonesia, Jawa has the lowest Environmental Quality score (see Table 1). This number is predicted to go even lower, as it decreased from 54.41% in 2009 to 48.7%. Meanwhile, the average index of national environmental quality is generally rising, from 59.79% in 2009 to 63.42%. In other islands this index is relatively stable, or on the rise (Borneo). This is the consequence of growth, concentration of economic activities and development in Indonesia.



The economic, social, and environmental aspect of the above national development process is related to the services policies implemented since the early era of reformation and democratization in 2004/5, and further strengthened during the 2014–2019 administration, with focus on the needs of marginal populations in areas considered remote from the economic and social activity centers. Several legal instruments were then published. First, is the Public Services Standard in Law No. 25 of 2009. Then, a law on Minimum Services Standards was published as Government Regulation No. 65 of 2005. Next, there is an effort to publish a law on Public Services for Innovation, which basically means an effort to create “one institution, one innovation” (ADB, 2013, Nasution, 2016, and Setiawan, 2018).

Table 1

Indonesia's Environment Quality Index 2009–2014

No	Group of Islands	2009	2010	2011	2012	2013	2014
1	Sumatera	63.76	73.63	65.13	61.76	62.08	63.19
2	Jawa	54.41	59.82	51.54	41.97	49.30	48.70
3	Kalimantan	60.31	64.02	71.01	67.66	66.56	67.54
4	Sulawesi	75.40	77.21	73.63	71.08	69.77	71.01
5	Bali – Nusa Tenggara	68.53	74.19	63.46	64.52	63.15	64.06
6	Papua & Maluku	79.56	74.26	79.86	79.93	79.42	79.24
	National – Indonesia	59.79	61.07	65.76	63.96	63.20	63.42

Source: Kementerian Lingkungan Hidup dan Kehutanan (2015).

In general, the Indonesian Government has made progresses in terms of policy changes, operational regulations, and operational systems. This progress has also made at least some improvements with regard to the human, social, organizational, and leadership capital. Moreover, this effort seems to have made a marked improvement on several main aspects of development, namely, economic, social, and environmental (Bank Indonesia, 2017). This development has been marked in the United Nations Development Programme (UNDP) Report.

In the 2015 Report on Development Policy and Programs in Indonesia, the UNDP concludes:

- “The Nawa Cita starts from the President’s vision of the nation’s sovereignty in political, economic, and cultural arenas, derived from an assessment that the nation suffers from three types of situations: (1) incapability to ensure the safety of all citizens, (2) poverty, inequality, environmental degradation, and natural resource over-exploitation, as well as (3) intolerance and crisis of national character”.
- “Meanwhile, the SDGs see poverty, inequality, and environmental degradation and natural resource over-exploitation as global issues that need be tackled by all nations in the coming 15 years”.
- “Furthermore, the Nawa Cita as reflected in the RPJMN (Mid-Term Development Plan) includes both sectoral and regional (spatial) targets, while the SDGs focusses mainly on sectoral issues”.
- “Differences also surface in the categorization of issues between the global and the national agendas. As an example, good governance in the Nawa Cita and RPJMN is seen both as a special target to achieve and an overarching theme to mainstream, while in the SDGs it is one goal, number 16, with specific targets to reach”.
- “At the substantive dimension, no significant contradiction is found in the development agenda. Chapter 3.4 of the RPJMN is even prepared to bring the national development agenda to the global context, where the SDGs are mentioned as a reference”.

- “Minor discrepancies, however, may occur at the technical dimension – e.g., the targeted size of poverty rate to reduce, the planned years of schooling to achieve, etc. Those possible discrepancies will need to be identified as part of the preparation for the monitoring of progress against indicators”.
- “Despite those differences, an analysis of the Nawa Cita, RPJMN, and SDGs shows a high degree of convergence. The Nawa Cita is mainly accommodated in Chapter 6 of the RPJMN, thus a one-to-one comparison among the three can be done here”.

The Report shows the overall results of policies, planning, and execution of Indonesia’s national development. The UNDP’s Report also is an indication of how much the decentralization approach has managed to achieve in terms of central and regional development.

## 5. CONCLUSIONS

In general, the Indonesian Government has returned to centralization (Law No. 23 of 2014), but regional authorities are still in the focus. This means that decentralization is still taking place as a form of democratization, in line with the development goals of President Joko Widodo’s administration, which stresses on the development of marginal regions and population.

There is still development disparity, evident in the relatively high Gini ratio, especially in the eastern regions of Indonesia. However, there is a relative decrease in the ratio, by 0.4, which is unprecedented since the end of the New Order Era in 1998.

Trends in the outcomes of national development show positive results: there are not evident economic improvements, but social and environmental improvements are. If we use the prediction of Indonesia’s economic development capacity growth as a reference point, then growth is likely to continue, but that would require increasing the capacity and capability of infrastructures and human resources. These two factors are also becoming more effective, but they still need be improved, especially at regional government level. In other words, effective decentralization is essential for Indonesia’s national development.

## REFERENCES

- Aoyama, Yuko *et al.* (2011), *Key Concept in Economic Geography*. Sage Publications Inc., Los Angeles.
- Asian Development Bank (2013), *Empowerment and Public Service Delivery in Developing Asia and the Pacific*, ADB, Manila.
- Bank Indonesia (2017), *A Resilient and Progressive Economy – July 2017*, BI, Jakarta.
- Biro Pusat Statistik Indonesia (2017), *Statistical Year of Indonesia 2017*, BPS, Jakarta.
- Biro Pusat Statistik Indonesia (2018), *Statistical Year of Indonesia 2018*, BPS, Jakarta.
- Bratakusumah, Deddy Supriyadi (2013), *Bureaucracy Reform in Indonesia Toward ASEAN Community 2015*, Bappenas, Jakarta.
- Bromley, Daniel W. (1989), *Institutional Change and Economic Efficiency*, dalam *Journal of Economic Issues*, vol 23, no. 3 (Sep. 1989), pp. 735–759, Association For Evolutionary Economics.
- Djohan, Djohermansyaf (2014), *Merajut Otonomi Daerah; Pada Era Reformasi (Kasus Indonesia)*, IKAPTK, Jakarta.
- The Guardian (2016), GDP Projections From PwC; How China, India and Brazil Take Over Western by 2050, *The Factblog: Facts are Scared*, <https://www.theguardian.com/news/datablog/2011/jan/07/gdp-projections-china-us-uk-brazil>.
- Iqbal, Kazi, Anwar, Shah (2008), *How Do Worldwide Governance Indicators Measure Up?*, The World Bank Paper, April 2008,
- Kaufmann, Daniel *et al.* (2010), *The Worldwide Governance Indicators; Methodology and Analytical Issues*, Policy Research Working Paper, no. 5430, The World Bank Development Research Group, Washington.
- Kementerian Lingkungan Hidup dan Kehutanan (2015), *Indeks Kualitas Lingkungan Hidup 2014*. KLHK, Jakarta.
- Litvack, Jennie, Jessica, Seddon (1999), *Decentralization Broefing Notes*, World Bank Institute, Washington.

- McKinsey Global Institute (2012), *The Archipelago Economy; Unleashing Indonesia's Potential*, MGI, Jakarta.
- Nasution, Anwar (2016), *Decentralization Program in Indonesia*, No. 601, October 2016, Asian Development Bank Institute, Jakarta.
- OECD (2016), *Indonesia; Overview*, Indonesia Economic Survey Report, October 2016, Jakarta.
- Patmasari, Tri *et al.* (2009), *The Indonesian Archipelagic Baselines; Technical and Legal Issues and The Changing of Environment*, Bakosurtanal, Jakarta.
- Perry Castaneda Laboratory (2002), *Indonesia*, US CIA, Washington.
- Prasojo, Eko *et al.* (2006), *Desentralisasi dan Pemerintahan Daerah; Antara Model Demokrasi Lokal dan Efisiensi Struktural*, DIA FISIP UI, Depok.
- Prasojo, Eko *et al.* (2009), *Reformasi Kedua; Melanjutkan Estafet Reformasi*, Salemba Humanika, Jakarta.
- Ramses, Andy M., dan La Bakry (2009), *Pemerintahan Daerah di Indonesia*, Jala Penerbit Jakarta.
- Rondinelli, Dennis A., Nellis, John R. (1986), *Assessing Decentralization Policies in Developing Countries: The Case for Cautious Optimism*, Development Policy Review, vol. 5, Issue 1, March 1986, Wiley.
- Rothenberg, Alexander D. *et al.* (2017), *When regional policies fail: An evaluation of Indonesia's integrated economic development zone*, working paper RAND Labour and Population, WP 1183, February 2017.
- Setiawan, Irfan, 2018. *Handbook Pemerintahan Daerah*. Wahana Resolusi, Yogyakarta
- Susatyo, Mohammad Gunawan, *et al.* (2018), *Indonesia*, Encyclopedia Britannica, <https://www.britannica.com/place/Indonesia>.
- Scott, W. Richard (2004), *Institutional Theory: Contributing to a Theoretical Research Program*, in *Great Minds in Management: The Process of Theory Development*, Ken G. Smith dan Michael A. Hitt (eds.), Oxford University Press, Oxford.
- Turner, Mark, Hulme, David (1997), *Governance, Administration and Development : Making the State Work*, Kumarian Press, Manchester.
- United Nations Development Programs (1999), *Decentralization; A Sampling of Definitions*, Working Paper, October 1999, A Joint UNDP and the Government of Germany, UNDP, Washington.
- United Nations Development Programs (2015), *Human Development Report 2015; Work for Human Development*, UNDP. New York.
- United Nations Development Programs (2016), *Human Development Report 2016; Human Development for Everyone*, UNDP, New York.

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FORUM ROUMAIN-FRANÇAIS *HISTOIRE ET PERSPECTIVES DES RELATIONS  
GÉOGRAPHIQUES ROUMAINE-FRANÇAISES,*  
18 JUIN 2018, BUCAREST, ROUMANIE

L'Institut de Géographie de l'Académie Roumaine et les Comités Nationaux de Géographie de Roumanie et de France, avec la Faculté de Géographie de l'Université de Bucarest ont organisé le forum roumain-français – "*Histoire et perspectives des relations géographiques franco-roumaines*" – dédié au Centenaire de la formation de l'Etat National Roumain, qui a eu lieu le 18 juin 2018, dans l'Aula Magna de l'Académie Roumaine à Bucarest.

Les organisateurs du Forum roumain-français "*Histoire et perspectives des relations géographiques roumaine-françaises*" ont suivi à atteindre les objectifs suivants:

- la mise en valeur de la contribution du grand géographe français Emmanuel de Martonne pour la recherche géographique moderne en Roumanie et son implication dans le dessin de frontières roumaines d'après-guerre;
- l'accroissement de la visibilité enregistrée par la contribution de la recherche géographique roumaine au patrimoine scientifique international et l'augmentation de sa reconnaissance internationale;
- une intégration plus forte de la communauté géographique scientifique roumaine dans les activités de la communauté scientifique internationale, en connaissant les réalisations et le stade du développement des relations dans le domaine de la géographie entre la Roumanie et la France;
- établir les orientations futures de la coopération scientifique bilatérale dans le domaine géographique.

Le Forum roumain-français a réuni 57 universitaires et chercheurs géographes de 12 universités et 2 instituts de recherche de Roumanie, de France et de la République de Moldova. Le prestige scientifique du forum avait gagné par la participation des Prof. Nicolae Panin, membre de l'Académie Roumaine, président de la Section des Sciences Géonomiques de l'Académie Roumaine, Prof. Dan Bălteanu, membre de l'Académie Roumaine, président du Comité National de Géographie de Roumanie, Prof. Nathalie Lemarchand, vice-présidente de l'Union Géographique Internationale, Prof. Liliana Dumitrache, Université de Bucarest, Faculté de Géographie, Prof. Lydia Coudroy de Lille, Comité National Français de Géographie.

Le programme scientifique du Forum roumain-français "*Histoire et perspectives des relations géographiques roumaine-françaises*" a été structuré en trois sessions: une session plénière (*Géographie franco-roumaine: travaux de longue durée et diversité des coopérations scientifiques* avec 7 présentations et 10 participants) et trois sessions thématiques (*Emmanuel de Martonne*, avec 4 présentations et 8 participants, *Villes et sociétés en mouvement*, avec 6 présentations et 6 participants et *L'environnement et la société* avec 5 présentations et 6 participants).

À la fin des travaux du Forum roumain-français, à l'Institut Français (Direction Régionale de Bucarest), a été signée la *Convention de partenariat* entre le Comité National Français de Géographie, représenté par sa vice-présidente aux relations internationales, prof. Lydia Coudroy de Lille, d'une part, et le Comité National Roumain de Géographie, représenté par son président, acad. Dan Bălteanu, d'autre part. La *Convention de partenariat* encourage et promeut les relations scientifiques entre les deux pays, elle soutient le développement de la géographie et de l'interdisciplinarité et facilite la collaboration entre leurs membres, individus ou collectifs.

Le Forum a fini par une application de deux jours sur le terrain (Bucarest – Ploiești – Sinaia – Predeal – Brașov – Bran – Rucăr – Bucarest), avec la participation des professeurs et chercheurs roumains et français.

Le Forum roumain-français "*Histoire et perspectives des relations géographiques franco-roumaines*" a représenté la continuation d'une collaboration bilatérale à long terme dans le domaine de la recherche géographique.

Irena Mocanu

## THE ANNUAL MEETING OF THE IGU COMMISSION ON LOCAL AND REGIONAL DEVELOPMENT, AUGUST 1–4, 2018, KALAMAZOO, MICHIGAN, USA

An important event of the *International Geographical Union (IGU) Commission on Local and Regional Development* is the annual meeting which, in 2018, was held in Kalamazoo, Michigan, USA (1–4 August). The conference was jointly organized by Western Michigan University, Department of Geography, Kalamazoo, Michigan, USA and the IGU Commission on Local and Regional Development.

The meeting gathered scholars from various research institutes and universities from four countries (Poland, Israel, Romania, and USA). In addition, the meeting was designed to bring together some of the members of the IGU Local and Regional Development Commission: Prof. Jerzy Banski, Institute of Geography and Spatial Organization, Polish Academy of Sciences (Chair of the Commission); Prof. Michael Sofer, Department of Geography and Environment, Bar-Ilan University, Israel (former Chair and current Honorary Member of the Commission); Prof. Benjamin Ofori-Amoah, Department of Geography, Western Michigan University, Kalamazoo, Michigan, USA (Vice-Chair of the Commission); Dr. Ines Grigorescu, Institute of Geography, Romanian Academy (Full Member of the Steering Committee).

The focal theme of the Conference, *Appreciating Difference in Restructuring Local and Regional Economies*, revolved around general and particular aspects of local and regional development, diversity of local and regional economies, restructuring issues, and stakeholder-oriented approaches. The main topics were grouped into four sessions: *I. Agriculture and Industry in Local and Regional Development; II. Disparities in Local and Regional Development; III. Socio-economic Changes in Local and Regional Development and IV. National Development Policy and Local and Regional Development.*

The conference agenda also included a two-day field trip showcasing some examples of post-industrial economic development and revitalization in the Great Lakes area. Thus, on August 3<sup>rd</sup>, the field trip to South West Michigan (Hartford – Benton Harbour – St. Joseph – South Haven – Grand Rapids) was focused on the functional relocation and revitalization activities after deindustrialization and economic decline in the area. The August 4<sup>th</sup> field trip to post-industrial Detroit (US leading heavy manufacturing centers during most of the early part of the 20th century) was centred on issues such as: social segregation, industrial decline, abandoned buildings vs. downtown revitalization and the rise of the creative class.

On behalf of the Institute of Geography, Romanian Academy two scientific papers were presented: “*External migration and children left-behind in Romania – a consequence of the post-communist socio-economic changes. A territorial multi-level approach*” (I. Grigorescu, I. Mocanu, B. Mitrică, M. Dumitrașcu) and “*Territorial disparities in the socio-economic development of rural areas of Romania. Focus on the social disadvantaged areas*” (B. Mitrică, I. Mocanu, I. Grigorescu, P. Șerban, M. Dumitrașcu).

The upcoming annual meeting of the IGU Commission on Local and Regional Development is projected to be held in Fiji (June 2018) with the support of the University of the South Pacific, School of Geography, Earth Science and Environment.

*Ines Grigorescu, Bianca Mitrică*

## THE INTERNATIONAL GEOGRAPHICAL UNION REGIONAL CONFERENCE, AUGUST 6–10, 2018, QUEBEC, CANADA

One of the leading scientific events of the world's geographical community in 2018 was the *Regional Conference of the International Geographical Union (IGU)* which was held in Quebec, Canada (6–10 August). The central theme of this event was “*Appreciating Difference*”, a topic with which brings into discussion *differences* stemmed from the diversity of landscapes, people, and knowledge.

The IGU Quebec Conference was jointly organised by the Université Laval (North America's oldest French-language university), International Geographical Union (IGU), the National Council for Geographic Education (NCGE) and the Canadian Association of Geographers (CAG). Due to the large number of attendants (over 1,500) from over 30 countries (e.g. Brazil, Canada, China, France, India, Israel, Japan, Poland, Romania, Slovakia, Slovenia, South Africa, Switzerland, USA, Turkey), this scientific event have become the “biggest geography get-together in the history of Canada”. With this occasion, fifteen plenary talks on topics such as resources and communities, indigenous-related studies, globalization, borders and borderlands, geography and Giscience and education geography, as well as over 1200 oral papers and one hundred posters were presented. From Romania, the conference was attended by researchers and professors from the Institute of Geography, Romanian Academy and the Faculty of Geography, University of Bucharest. Throughout the conference, the IGU Commissions and task forces integrated their business meetings on the current topics of modern geography and the participating scientists displayed their scientific results during the Plenary Sessions, as well as during Commissions sessions (e.g. Local and Regional Development, Land use and Land Cover Change, Biodiversity and Biogeography, Population Geography, Transport and Geography, Urban Challenges in a Complex World, Water Sustainability).

The conference agenda also included different workshops and ten interdisciplinary field excursions in the Quebec City area enabling the participants to get in touch with the particular features of the Canadian natural and cultural landscape.

Associated to this event was the 15<sup>th</sup> International Geography Olympiad (iGEO) organised through the IGU Olympiad Task Force. From July 31<sup>st</sup> to August 6<sup>th</sup>, iGeo 2018 unfolded in the campus of Université Laval (Quebec City) and in the surrounding region and gathered students from over 40 countries. The 2018 theme of the Olympiad was “Appreciating landscape”. Once more, the Romanian Geography obtained significant success, being awarded with four medals: three gold and one silver, ranking first among the participating countries both by score and by medals. The iGeo gold Medal Ceremony took place during the IGU-CAG Opening Ceremony.

On behalf of the Institute of Geography, Romanian Academy four scientific papers were presented: “*Forest cover changes in the Apuseni Mountains Natural Park. Romania*” (M. Dumitraşcu, I. Grigorescu, R. Cuculici, C. Dumitrică, C. Dumitraşcu), “*Urban-rural interactions in Romania. Regional spatial and statistical analyses*” (I. Grigorescu, Gh. Kucsicsa, B. Mitrică, I. Mocanu, M. Dumitraşcu), and “*Changes in the dynamics and demographic structures of the Romanian rural population. An overview of the post-communist period*” (B. Mitrică, Persu M., Damian N., Şerban P., I. Grigorescu, M. Dumitraşcu), and “*Apportioning sources of streambank sediments by using coal mining tracers The case of Jiu River Basin (Romania)*” (G. Moroşanu, E. Traista, L. Zaharia, P. Belleudy, G. Minea).

One of the future events of the geographical community will be the Thematic Conference on “*Transformation of Traditional Cultural Landscapes*” which will be held in Koper, Slovenia, September 24–26, 2019. The Thematic Conference will assemble five IGU Commissions: Land Use and Land Cover Change, Biogeography and Biodiversity, Local and Regional Development, Mediterranean Basin and Land Degradation and Desertification.

*Monica Dumitraşcu, Ines Grigorescu, Bianca Mitrică*





Dănuț-Vasile Jemna (2017), *Demografia României* (Romania's Demography), "Alexandru Ioan Cuza" Publishing House, University of Iași, 276 pages, tables, figures, bibliography.

Demography is a science that attracts both specialists from diverse fields and the general public interested in its issues. The "Romania's Demography" book appeared in the context of the need for in-depth and competent analyzes in this field, because the demographic situation of Romania is not enviable, the natural and migratory balance being negative.

This book, which can be considered one of the reference research endeavors on Romania's demography, a result of the author's teaching and scientific activity, addresses the issue of Romania's demography from a useful perspective for various categories of readers (students, specialists, the general public); the paper is organized by four chapters which form a unitary analysis of this subject: introductory and methodological elements, Romania's population in the European context, Romania's population in territorial profile and the demographic future of Romania.

Thus, the first chapter contains a presentation of this discipline: the history of the discipline, methodological aspects (Lexis diagram, probabilities, transversal and longitudinal analysis), very useful to specialists and to those who study demography, followed by elements about the structure of the population and the main demographic indicators (birth rate, mortality, migration, marriage, divorce). This first chapter includes both methods (illustrated with numerous formulas and examples) as well as a historical on Romania's demography, including data from the communist censuses. The issue of migration (both before and after 1989) is detailed at the end of the chapter, illustrated with data in Romania.

The second chapter, referring to the population of Romania in European context, presents the main theories in the field of demography (pessimistic, optimistic, neutralistic, demographic transition – analyzing the new social transformations related to marriage, birth rate, and gender relations), a sub-chapter being devoted to the demographic transition of Central and East-European countries, which presents a number of hypotheses existing in the scientific literature on the demographic evolution of the countries of the former communist bloc: the hypothesis of a strictly demographic development, the hypothesis of the poor economic conditions, and the mixed hypothesis).

The last but one subchapter, treats the demographic evolution of Romania in the last century: general considerations (which estimate that the signs of the demographic transition were observed from the beginning of the last century, and the natality policy of the communist regime failed to stop the decline of birth, only delaying it by some twenty years), population in UN censuses and estimates (the Romania's population is estimated at 10 million inhabitants in the year 2100), the ethnic structure of the population (which recorded significant variations, as the share of some minorities kept decreasing), the religious structure (correlated with the life environment structure, the share of minorities and the beginning of a process of secularization), the life environment structure and of the structure of education. The last part of this subchapter deals with the demographic transition of Romania, both for the communist period and the post-1989 period.

The third (and last) subchapter of chapter 2 is very interesting in terms of comparisons made in Central and Eastern Europe for the communist and post-communist periods, the author considering that the statistical analysis of the main demographic indicators supports the hypothesis of a common pattern of demographic evolution in the case of the ten analyzed countries, as well as the continuation of demographic trends in the past. This subchapter is illustrated with numerous tables, graphs and a comparative multivariate statistical analysis, using the SPSS program, and the main component method, resulting in the grouping of states into certain categories. The econometric modelling of fertility with panel data (the stages being the verification of the stability of the data series and their appropriate transformation, the identification of appropriate models, validation of the models), in the last part of this subchapter, has the merit of statistically substantiating and confirming the theoretical framework adopted.

The third chapter, referring to the population of Romania in terms of territory makes an analysis of population by counties and development regions; in this part of the chapter the author resorts to the statistical analysis and the econometric modeling (this also contains an interesting and brief synthesis of the literature on the three categories of determinants of fertility – social, demographic, economic). The results suggest that, at national level, the demographic transition has reached the last stage but that there are significant regional differences regarding the level and variation of fertility and its possible determinants.

The last chapter of this book represents an extremely useful approach to studying the demographic future of Romania, the author pointing out that the negative values of the natural balance suggest a worrying

demographic picture with very important implications. The estimation for the future of the population and the population structure by age groups is made through demographic projections, which present various evolution scenarios. Data and charts, including age pyramids, are the source of the United Nations Department of Economic and Social Affairs. In addition to the findings that Romania will face a decrease of young population (and a birth-rate recovery will have effects in thirty years), it is suggested that some lessons could be learned from the experience of West-European countries which experienced demographic decline long before Eastern countries; these lessons should be appropriated after thorough studies on the demography of Romania at present and in the future.

*Gabriel Camară*

Marcin Wojciech Solarz (Editor) (2018), *Geograficzno-Polityczny Atlas Polski/Atlas of Poland's Political Geography*, University of Warsaw, 248 pages, maps and texts in Polish and English.

Conceived and edited by Marcin Wojciech Solarz, Ph.D. Habil. Professor at the University of Warsaw, with the assistance of numerous contributors, this Atlas was issued as part of the events commemorating the lapse of one century since Poland won its independence.

The work contains four big sections, which offer a complex and comprehensive view of Poland against the background of the evolution of the regional geopolitical and geostrategic context, with highlight on the current situation.

The first part, which is also the most consistent one, presents *Poland's International Relations*, starting with the country's geographical positions on the Globe, its situation in the European Union and its enlargement, followed by two sets of geo-historical maps illustrating Poland's evolution as a state (Poland in Space and Time), basically the changes that have affected its frontiers in the course of time (*Territory and Borders*). An important place in this work represents the analysis of the course of events that changed its borders, the country acting as a geographical buffer between Russia and Germany, two empires with expansionistic tendencies over the time, Poland ranking among the European states with volatile frontiers. The first part second section (*Polish Geopolitical Metaconcepts*), discusses those geopolitical elements that have in time influenced border migration, being in turn influenced by them, e.g. the national background, religion, culture, migrations and place-names. After 1918, once the Polish State became independent, these elements are being analysed in the light of "geopolitics in practice" (*International Politics. Geopolitics in Practice*), illustrated by Poland's geopolitical situation during the Second World War, the country's spatial re-orientation during the post-war period, bilateral relations with other states, also within the framework of regional and international co-operation organisations, the visa regime, and of work abroad, etc. *Security* is the object of the next set of first chapter maps. An analysis is made of NATO reports-Russia and the defence system on Poland's territory, oil transport systems and considerations on resources. The section devoted to *Poland in Its Regional Environment* discusses the country's regional position in the light of the gross domestic product, human development, export of goods and services, number of soldiers and military expenditure.

Poland's arguments in favour of "soft power" are based on the analysis of geographical names worldwide regarding this country, Nobel Prize and Oscar winners, Award winners at the Cannes Film Festival, Summer Olympic medals, World Championships medals in team games, Crown of the Himalaya and Karakorum – first winter ascents, Participants in the International Chopin Piano Competition, Polish official development assistance, Polish Humanitarian Action activities outside Poland, Polish missionaries in the world, Pastoral visits of Pope John Paul II in Europe and in the world and Literature translated from Polish between 2004 and 2016. The last section of part one, *Religions and language*, has in view cultural geography regarding Poland's position within the European Union with highlight on religion and religious groups, the proportion of christians, muslims, and atheists in the EU states, Dominant language or language group and Domination of the official language in the European Union.

The second part of this work is devoted to the *State*, its political system, justice and security, equality, administrative divisions, elections and referendums, communization and decommunization of public space and independent Poland in public space.

The first three sections of this chapter illustrate Poland's position in the EU in such matters as: Head of state – method of selection, term of office, System of government, National territorial systems, National

parliaments, European Parliament, Confidence in the national government and in the judicial system and courts, Size of administrative units, Observance of political rights and civil liberties, Volunteering – active citizenship, Criminal, civil and commercial court cases, Judges, Prosecutors, Perceptions and Corruption, Terror attacks and murders, Arrested for terrorism and overall prison population, Inequalities, Women's suffrages, women in parliaments and women in politics and business, Employment and Unemployment of women and men, Salaries of women and men and Life expectancy of women and men. *The administrative system* is represented by a set of maps on the evolution of the country's administrative divisions over 1939-2018, followed by an analysis of the last administrative outline in terms of some relevant social and public administrative indicatives. Electoral geographical aspects (*Elections and referendums*) focusses on some aspects (the parliamentary and presidential elections in 2015, the presidential elections in 2014, 2011, and 2001, the presidential elections in 2010, 2005 and 2000, the elections for the EU Parliament in 2009 and 2004, parliamentary elections in 2007 and 2005, the referendum for EU accession in 2003 and the constitutional referendum in 1997. Of particular interest is the set of maps on the *Communization and decommunization of public space*, many such maps being a pioneering attempt in the Geography of Europe and of the World; it contains Communist Names in Public Space and Names in Public in Independent Poland.

Chapter Three is devoted to **Society**, with focus on three major aspects: *Demographic processes and migration, National and ethnic minorities and regional groups, and Polish people abroad*. The cartograms of the first illustrated set reveals Poland's EU situation, and emphasizes the country's main demographic situation: Natural increase, Fertility, Median age of population, Pre-working age population, Old dependency ratio, Urban population, Capital city versus country population, Polish citizens in the EU and EFTA countries, Polish-born and Born in the country of residence, Emigrants and Immigrants, Net Migration, Non-EU citizens Immigrants and EU Countries according to types of migration. The second section of this chapter speaks of *National and Ethnic Minorities and Regional Groups*; it opens up with a general map on the Spatial Distribution of National / Ethnic Minorities and Regional Language Groups, followed by maps in detail regarding the distribution of each national minority and regional group in Poland. *Polish People Abroad*, is a particularly comprehensive section in which thematic cartograms illustrate the size of Polish communities worldwide and in Europe, the biggest "Polish" cities outside Poland, offering a detailed representation of Polish communities in Lithuania, Belarus and Latvia, Ukraine, the Czech part of Cieszyn (Zaolzie), Romanian Bukowina, the United Kingdom, USA, Canada and Kazakhstan.

The last chapter (**Development**) provides an illustrated cartography of Poland's development level within a EU context in terms of the quality of life and of environment, the economy and infrastructure, respectively. The first section of this chapter groups a set of maps of economic-social indicators relevant for the *quality of life*: Human Development Index (1990, 2015), Increase in the Human Development Index (1990–2015), Overall Life Satisfaction Index (2014–2015), Life Expectancy at Birth (2014), Practising Physicians per 100,000 inhabitants (2014), respectively *mediu*: Terrestrial Protected Areas as a Percentage of Total Land Area (2014), Forests and Other Wooded Land as a Percentage of Land Area (2015), Total Emissions of Sulphur Oxides, of Benzo(a)pyrene, of Nitrogen Oxides and of Particulate Matter PM10 per inhabitants (2014). The last section of the Atlas presents cartographically, at UE-28 level, the GDP per capita; International Trade Balance and Economic Openness; Imports and Exports; Total Reserves and Gold Reserves; General Government Gross Debt and General Government Deficit/Surplus; Services, Industry and Agriculture; Carbon Dioxide Emissions; Railway Lines, Motorways and Passengers Air Transport; Internet Users; Weekly Working hours; Labour Productivity; Work on Sundays; Time Required to Start a Business; Earnings and Incomes; Young Adults Living with Their Parents; Unemployment and Quality of Education.

The work ends up with a useful Polish-English Glossary of Geographical Names, and Polish Political Parties.

By scope, rigour and subject-matter, the *Atlas of Poland's Political Geography* represents a reference work for the cartography of Europe and of the World at large, being actually a model in guiding the elaboration of other national atlases on a similar topic.

Radu Săgeată

Sorin Geacu (2018), *Vertebratele României în perioada 1940–1950* (The Vertebrates in Romania over 1940–1950), Romanian Academy Publishing House, București, 200 pages, 34 figs, references.

The distinctively different dynamic evolutions of the vertebrate species over the years depends on the abiotic conditions and the condition of their preferred habitats. In addition to these natural conditions, also the anthropic factor plays a part, it usually affecting the biocoenoses in a negative way. Man's interventions being sometimes imposed by political decision-makers, one can better understand that past periods in human society are also reflected in the previously mentioned dynamic developments, especially of economic and hunting interest.

The volume, elaborated by Mr. Sorin Geacu, Ph.D., covers the years 1940–1950 when all vertebrate groups experienced significant populational oscillations. According to the author, the Second World War had favoured an abnormal incidence of poaching, some species losing 90–95% of their effectives, others coming close to disappearance.

The practice of grazing on the alpine meadows, of herds entering forestland, the numerical increase of stray dogs, deforestations, when sometimes tens of thousands of hectares were set ablaze, lack of additional food (eg. for the big mammals) at times of harsh draughty episodes, etc. have all a negative impact on the vertebrate populations.

Choosing for this study the period spanning the years 1940–1950 is motivated by the author who cites from a Report issued by the Commission for the Monuments of Nature in 1942, which reads as follows: “*from some military vessels navigating on the Danube, there is steady shooting, with automatic armament and rifles, of the game seen on the banks of the Danube, or: in 1944–1945, on the territory of Brașov County alone, “all kind of dezertors, hidden in the mountain forests, and holding automatic arms, destroyed much of the game in order to secure their everyday food”*. And examples may continue by quoting some situations from Banat, where in 1944–1945, “*extremely high and unhindered poaching*” actually decimated the game stock.

According to Philipovici, in 1947 all shepherds used to bear arms, because strychnine for controlling the packs of wolves was missing and... “*in the remotest mountains it is the poaching shepherd's rifle that keeps singing*”. Moreover, in the most deserted and almost inaccessible valleys, one hears the sound of people's axes who put down the few clusters of an old forest, or of a primary forest. The end of the war and the months that followed, disorder was still raging and plenty of uncontrolled arms and ammunition being at hand, the last stocks of stags would be destroyed. During the Second World War, among the species most severely affected were the cervides and the alpine chamois.

In 1948, the Buzău-based Hunting Inspectorate reported to the Ministry of Agriculture that the number of faunistic elements had shrunk also because of the last three draughty years that deeply affected the reproduction rate and the development of the young.

As from 1949, a campaign was launched for liquidating all ichthyophagous species (mainly birds, but also amphibian mammals) by any means, starting with destroying, nests, breaking eggs and killing the offsprings. A next campaign targeted the predatory species: foxes, weasels, wild cats, polecats, pine martens, badgers, ermines, otters, etc.

Noteworthy, some legislation of the time prohibited fishing in certain waters in order to help remake the fishing stock. In addition, some programmes were aimed at repopulating with mammalian, bird and fish species of hunting, sporting and fishing importance and of economic value.

The data reported in this book have been obtained by the author after a long documentary endeavour in the National Archives and the forest-related institutions of several counties, the study of synthesis articles and works on Romania's vertebrate fauna, or focussing on hunting and fishing species alone.

The information gathered is presented by the author chronologically and synthetised in tables and – what proved to be most difficult –, distributing them by vertebrate classes in 141 pages, covering basically 70.5% of the book (which make up the special part of the 200 pages). Appended to each species is its scientific class, order and family name (with mention of the author's name and description year), the Romanian and scientific name of the respective species, the list of localities, or points where it was signaled out. In some cases (e.g. Salmonidae), these data cover 4–5 pages on the history of their presence and people's preoccupations for organised economic exploitation.

The book on *The Vertebrates in Romania over 1940–1950* represents an important historical synthesis on the biodiversity of vertebrates in this country. Its publication at the *Centenary of the Great Union of 1918* is meant to be the author's homage paid to the foundation of the Romanian Unitary National State.

Dumitru Murariu