

**„BABEȘ-BOLYAI” UNIVERSITY CLUJ-NAPOCA
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**SMALL DEPRESSIONS, FACTORS AND COMPONENT OF THE
HUMANISATION (ANTHROPISATION) OF THE EASTERN
CARPATHIANS’ CENTRAL GROUP**

**CASE STUDY: THE NORTHERN COMPONENT OF THE
DEPRESSIONARY ALIGNMENT
(DRĂGOIASA-GLODU-BILBOR-SECU-BORSEC-CORBU-TULGHEȘ)**

DOCTORAL THESIS

Summary

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***Key words:** two tiered depressions and depressionary alignments, systemic components, mineral waters, glacial relics, BORSEC-The Queen of Mineral Waters, rural space, sheep cotes, forests, pastures, spa town.*

Introduction

The study of human geography regarding the Drăgoiasa-Tulgheș depressionary alignment is part of a larger set of works, of regional character, dedicated to social, economic and cultural spaces with a certain representativity in the national territorial ensemble.

The thesis targets one of the less studied natural units of the Eastern Carpathians, a geographic space with specific manner of combining the components of the geographic environment, set in a transition area when it comes to the research of two geographic schools, the one in Cluj-Napoca and the other one in Iași.

The reasons for choosing this theme are both objective and subjective in nature.

Firstly, due to the fact that this area was never part of a complex geographic study or one that intended to research one or more geographic components, which is why a first complex geographic approach is more than welcomed, from the point of view of human geography, regarding the alignment of small depressionary areas.

The subjective reasons include the fact that the area is my birth place (Bilbor), and the same place where I spent most of my childhood.

After a careful analysis of the geographic-physical elements of a depressionary alignment, the thesis' structure, as well as the approach of every study dealing with human geography, responds to major objectives, which are: creating a history of the population settlement and emphasizing the permanence and the humanisation of the analysed space, the study of the evolution, frequency and intensity of the natural and migrating movement's variables, population dynamics, as well as a presentation of the economic structure of the area, by using the evolution of economic activities, from simple ones to the current structure, establishing a system of statistical indicators, applicable to the quality of life analysis for the human settlements of this area.

This scientific endeavour was actualized by making use of the regional method, alongside the usual ones (inductive, deductive, cartographic, mathematic, informatic, hypothetical, modelling, comparative, observation, analysis, synthesis, GIS, etc).

The used means include geographic enquiry, polls, questionnaires, employed in identifying the social-cultural dimensions of the quality of life.

In the thesis at hand, the cartographic material was done on hydrographic basins, as well as on the depressionary space, where the demarcation of the depressions was conducted based on glaxis.

1. THE NORTHERN COMPONENT OF THE DRĂGOIASA-GLODU-BILBOR-SECU-BORSEC-CORBU-TULGHEȘ DEPRESSIONARY ALIGNMENT

1.1. Approach model for the small depressions of the Romanian Carpathians

The depressions of Romania have lately been studied from a physical-geographic perspective, as well as from a human perspective, leading to a series of aspects of theoretical and practical character, such as: the diversity of the depressionary relief or its genetic and evolutionary complexity, the identification, inventory and classification of all depressions, the localisation of surface and underground water sources, the distribution and composition of plant associations and soil types, the evolution of demographic structures, the social-economic development or the geographic space's organisation and management.

Within this chapter, we intended to sketch an approach model for the small depressions of the Romanian Carpathians starting with the definition of the term „depression”, according to the DEX, more exactly a negative, concave relief form, situated at a lower level than the surrounding areas, with various shapes and sizes.

One must mention the fact that, in many cases, the terms „*depressionary alignment*” or „*depressionary passageway*” are associated with the term mentioned above, when it comes to a succession of elongated and narrow depressions, semiclosed, that go over several river basins divided by saddles, separating mountainous massifs or hill and mountain ridges. In a geographic sense, depressions, alongside valley passageways, first and foremost constitute areas of geographic discontinuity in the Carpathian mass (V. Mihăilescu, 1969), detaching themselves from the high mountain areas through the landscape's specificity in which man's activity is extremely intense and also permanent.

Within the Eastern Carpathians, unlike the other two Carpathian chains, the depressions are more numerous, representing more than 48% of the total number of intramountainous depressions in the country.

This chapter also includes a short review of a series of hierarchical criteria for depressions. Therefore, we would like to mention the following criteria: *the positional criteria*, in the study at hand we have depressions situated in the mountainous area, also named *intramountainous* or *intracarpathian depressionary areas*; *the genetic variety*, where we have *tectonic-volcanic depressions* or *volcanic barrage depressions* (Drăgoiasa, Bilbor, Secu and Borsec), and sculptural depressions, with two main types: *depressions of differential erosion (of accelerated erosion in non-homogenous rocks)*, with the subtype *of contact facies* (Pintic and Glodu) and *depressions of accelerated erosion in homogenous*, with the subtype *confluence depression* (Corbu and Tulgheș). According to the *dimensional criteria*, we have *depressionary basins* (under 10 km²) and *depressions* (more than 10 km²), a criteria that involves a complex operation, some authors using only the depressions hearth as a means of calculating the surface. In the thesis at hand, the surfaces of the analysed depressions were calculated using GIS automatic calculus procedures, taking into account only the depressionary space proper. According to *shape*, the depressions that were analysed can be *oval* (Bilbor) and *depressionary passageways* (Capu Corbului-Corbu and Tulgheș-Pintic).



Fig. 1. The Drăgoiasa-Tulgheș depressionary alignment. General map.

2. RESEARCH HISTORY AND KNOWLEDGE LEVEL

Until now, the geographic space of the Drăgoiasa-Tulgheș depressionary alignment was never fully analysed from the physical geography and human geography perspectives, as the analyses that had been conducted had only a general character, being part of larger works, that contained references to this area, as well as in the works that tackled only some fragments of the mountainous area. Most works come from the fields of geology, botanics, and there are also a series of research on mineral waters.

This chapter encompasses an analysis of the most significant papers and articles classified according to the category of contributions, dealing with diverse issues of geological, geomorphological, hydrogeological, biopedogeographical, economic, tourism nature, plus a series of methodological-scientific papers for the first didactic degree, dissertation papers and monographic studies.

3. THE NATURAL PREMISES OF THE INDIVIDUALISATION OF THE NORTHERN PART OF THE DEPRESSIONARY ALIGNMENT FROM THE EASTERN CARPATHIANS CENTRAL GROUP (DRĂGOIASA-GLODU-BILBOR-SECU-BORSEC-CORBU-TULGHEȘ)

The Drăgoiasa-Tulgheș depressionary alignment is a well defined geographic unit, whose shape is that of a narrow and high depressionary passageway, made up of string of small depressions (Drăgoiasa, Glodu, Bilbor, Secu, Borsec, Corbu and Tulgheș), situated in the Central group of the Eastern Carpathians, where the crystalline-Mesozoic area of the Bistricioarei Mountains (to the east) and the Neogene eruptive of the Căliman Mountains (to the west) meet. This suspended intramountainous depressionary compartment is the middle area that connects Dornelor Depression with Giurgeu Depression, its margins being flanked by the Căliman Mountains to the west and north-west, by the Giurgeului Mountains to the south-west, Hăghimaș and a bit of the Ceahlău Massif to the south-east, and Bistricioarei Mountains to the east.

From the administrative point of view, the researched area covers the territory of the Păltiniș, Drăgoiasa, Catrinari and Glodu villages, belonging to Panaci Commune, Suceava County, then continuing with Bilbor Commune, Secu (part of Toplița), the city of Borsec and Corbu and Tulgheș communes from the County of Harghita.

We further emphasized a series of aspects regarding the *genesis of the depressionary territorial microsystem*, with a synthetic presentation of the main genetic phases, from which one can clearly observe the complete origin of the analysed alignment, that is of *volcanic barrage and erosion*.

We must mention the fact that, currently, both in geographic literature, as well as among geographers, there are some doubts regarding the depressionary character of the Drăgoiasa-Glodu area. From our part, we consider that the most pertinent and justified consideration is that of the existence of *Glodu depression*, with the compartment of *Catrinari*, and *Drăgoiasa depression*, with the compartment of *Păltiniș*. These units are independent and distinctly outlined by its position, geologic characteristics, genesis and morphology.

The two-compartment structure is also present at Borsec (*Upper Borsec*, smaller, in the north and *Lower Borsec* or *Tinoave*, larger, to the south), while for Corbu a basinet at *Capu Corbului*, situated at the confluence between Vinului Stream and Bistricioara and *Corbu*, where Corbu and Barasău merge with Bistricioara, and also the depressionary alignment of *Tulgheș* with the depressionary basinet of *Pintic*. Due to the above mentioned facts, the two-compartment structure is considered to be a fundamental feature of the Drăgoiasa-Tulgheș alignment.

The analysed territory has a complex geologic structure, with three tectonic units of the Eastern Carpathians (*the crystalline-Mesozoic area*, in its central area, *the Neogene vulcanite area*, only at its western and north-western extremities, and *the Pliocene-Quaternary sedimentary deposits* from the basins of Bilbor, Secu and Borsec).

The depressions in the northern compartment of the depressionary alignment from the Eastern Carpathian's central group, decrease in altitude, from north to south: Drăgoiasa and Glodu 1 100-1 000 m, Bilbor 1050-950 m, Secu 950-870 m, Borsec 950-750 m, Corbu 750-700 m, Tulgheș 700-640 m. From morphological and altitudinal points of view, this sector has three subunits: *the hearth* (between altitudes of 640-1 100 m, has the form of an alluvial plain, with swamping tendencies), *the slopes* and *the surrounding mountains*. The erosion and the accumulation from the hearth encompasses: *downs, terraces, glacis*.

Also in terms of relief characteristics, aspects regarding *relief energy, relief fragmentation degree, slope and side exposition* were analysed, carefully recreated through graphical representations, which is why knowing these parameters has an important role on the social-economic processes.

In terms of climate, the analysed area fits in the *temperate-continental transition type*. Being concave relief forms, they have higher air humidity, frequent dew deposits, atmospheric calm, thermic contrasts between day and night, between winter and summer, less precipitations than in the surrounding mountains, as well as temperature inversions. One must point out from the start the fact that due to the lack of weather stations in these areas, part of the data were taken either from the Climate Atlas of S.R. Romania, 1974, while another part from the Water Management Agency Piatra Neamț, which registered weather patterns from the Muncelul hydrometric site, where Bistricioara leaves the depression of Bilbor (between 1953-1973).

The average annual temperatures are between 2 and 6 degrees C. The extreme temperatures are -4 and -6 degrees C, in January and 14 and 16 degrees C in July. The precipitations have the same vertical leveling, that is a higher quantity, over 1 000 mm/year at Drăgoiasa and Glodu, at over 1 000 m and decreasing under 700 mm/year in the valley area, at Corbu and Tulgheș.

The relief, alongside the vegetation, generates conditions for some distinct microclimates (*plain microclimate, passageway microclimate, secondary valley microclimate, southern, northern, eastern and western slopes microclimates, forest microclimate*).

In term of *hydrography*, there was a special emphasis on mineral waters, that belong to the northern sector of the moffette of the Căliman-Harghita eruptive, represented by the springs from the Dornelor area (the mineral water springs of Păltiniș, Drăgoiasa and Glodu) and the mineral waters accumulated in the cracks and hollows of the crystalline formations, from the upper and middle basins of Bistricioara, grouped in Bilbor, Borsec, Corbu and Tulgheș. From the detailed analysis conducted on the entire territory, a number of 43 mineral water sources were surveyed, most of them being *bicarbonated, calcic, magnesian carbogaseous*, sometimes *sulfurous, iron and mildly radioactive*.

The intent of this study is to create a clear picture of all the mineral water sources that exist at this moment in the area, since, due to the many drillings in the surrounding area and to the lack of maintenance, some no longer exist today.

Once the correlation with the reality in the field is completed, it is extremely important to indicate some clear solutions for a better capitalisation from an economic and pharmaceutical-dynamic point of view.

The main hydrographic arteries are *Neagra Broștenilor* and *Bistricioara*, two of the more important right side tributaries of the Moldavian Bistrița. The two water courses belong, from a hydrographic point of view, to the Siret basin, while in terms of hydrographic network configuration, we find a *rectangular* one. The only exception is *Secu stream*, which crosses Secu depression from north to south, thus belonging to the Upper Mureșul basin.



Fig. 2. Localisation of mineral water springs.

The swamps represent an essential element of the depressionary triad's landscape (Drăgoiasa-Bilbor-Borsec), being eutrophic swamps, with small oligotrophic areas (12 out of a total of 171 in the country) and with a surface of more than 84 ha).

The swamps here are different from those in Giurgeului and Ciucului depressions due to their smaller extent, to their richness in mineral waters and to the appearance of oligotrophic patches, while the swamps from the Dornelor basin are dissimilar due to the larger frequency in which borcuts appear, as well as due to their greater age.

An element of extreme importance in the depressions' natural framework is the forest, considered the most complex natural ecosystem, vertically structured. Through its multitude of functions, the forest influences the climate, stops erosion processes, decreases pollution, oxygenates the air and provides shelter for wildlife. The evergreen forests have the largest extent, the dominant species being the spruce (*Picea abies*), alongside fir (*Abies alba*), larch (*Larix decidua*), pine (*Pinus sylvestris*), (*Pinus cembra*), juniper (*Juniperus communis*), while deciduous species are represented by beech (*Fagus sylvatica*), birch (*Betula pendula*),

(*Scorbus aucuparia*), mountain sycamore (*Acer pseudoplatanus*), mountain elm (*Ulmus glabra*), common ash (*Fraxinus excelsior*), willow (*Salix caprea*). An atypical element, that appears at Tulgheș, on the left, southern, slope of Bistricioara („Fața Runcului”), is the pedunculate oak (*Quercus pedunculiflora*), covering 77 ha, considered by botanists as a relic from the „spruce forest with mixed oak forests and filbert”, that creates a striking and pleasant contrast with the surrounding vegetation, requiring special protection. We also mentioned a series of species found in tundra areas, seen in the „borviz swamps”: the dwarf birch (*Betula nana*) and the dwarf willow (*Salix repens*).

Among the more rare grassy plants we would like to mention: the lady’s slipper (*Cypripedium calceolus*), mountain globe flower (*Trollius europaeus*), Siberian tongue (*Lingularia sibirica*), buckbean (*Manyanthes trifoliata*), edelweiss (*Leontopodium alpinum*), (*Nigritela rubra*), (*Astragalus pseudopurpureus*), mouse-ear hawkweed (*Hieracium pilosella*). Also very interesting is the presence of *medicinal* and *aromatic plants*, extremely well spread in the Drăgoiasa-Tulgheș area and in considerable numbers, used in traditional medicine or for cooking, some of them being part of century old traditions.

In this area, several nature reserves were established: *Pietrele Roșii Tulgheș* (10 ha), a well individualised rocky area, *Hărmasliget Botanic Reserve Borsec* (2 ha), *Scaunul Rotund Borsec Nature Reserve* (40 ha), and the *Dobreanului Stream Swamp Bilbor* (4 ha). In the near future, four more nature reserves will be established: at the *Rușilor Stream* (Bilbor), *The Daffodil Clearing* (Corbu), *Stejăriș Reserve* and *Edelweiss Reserve*, the latter two at Tulgheș. In terms of fauna, the forests surrounding the depressions have important game resources, that are rationally capitalised, strongly connected with maintaining an ecologic balance between species.

The predominating shallow soils, with a high degree of debasification and a mild to strong acid reaction, restricted the extent and the productivity of agricultural land, imposing the adoption of a mixed economy, composed of animal husbandry and logging.

The main soil types, subtypes and varieties from both the hearth and the surrounding mountains are part of the following classes: *luvisols*, *cambisols*, *spodisols*, *andisols*, plus *hydriols*, *lithomorph soils*, *protisols* and *histisols*, the latter being present in the area of eutrophic swamps. By analysing the soil repartition map, we clearly see that *districambosols* are predominant.

Among the *biopedogeographic risks* we would like to mention *deforestation processes* and *intensive grazing*.

4. THE GEOGRAPHIC-HUMAN PREMISES OF THE ANTHROPISATION OF THE DRĂGOIASA-TULGHEȘ ALIGNMENT

This chapter contains a view regarding geographic-historical considerations, where archeological proof, historical data, aspects on medieval cartographic sources and last but not least the connections of this area with the outside have been presented.

One of the most interesting aspects was the chronological sequence that put forward the emergence and the population settlement phenomenon in this area, where, like in the case of some localities such as Borsec, the capitalisation of mineral waters played a major role in the attraction and settlement of people.

The settlement network from the Drăgoiasa-Tulgheș alignment emerged in time, starting in the 16th century-Borsec (1594), 18th century-Bilbor (1776), 19th century-Corbu (1808), Tulgheș (1850) and 20th century, when a series of hamlets like Drăgoiasa, Glodu, Catrinari received the title of village, in 1956. It is highly probable, that the first inhabitants of this area were „colonists”, that crossed the mountains, from Bucovina, and settled the lands of Ditrău and Lăzarea, a fact backed by

patrimonial evidence, followed by the Szekler population of Giurgeu Depression, as well as Germans and Czechs, as qualified workforce in mining and glass blowing.

By analysing *the population's evolution* in the northern compartment of the Drăgoiasa-Tulgheş alignment during the 161 years taken into account (1850-2011), one can draw the following conclusions:

- easily distinguishing two distinct periods: the 1850-1966 interval, marked by a positive demographic evolution, with relatively short periods when the population stagnated or slightly decreased, as a result of subjective factors (the two world wars); and the 1977-2011 interval, defined by a continuous descending curve due to negative migrating and natural trends.

On the whole, the absolute increase in population was one of 7996 people (276%), with an average annual evolution of 49 persons and an average annual rate of 3.5%. One can observe that in three of the analysed settlements there is a negative average annual evolution: Păltiniş (-56.1%), Catrinari (-7.1%), and Secu (-47.4%); two settlements fit between the percentages of 0.1-100%: Drăgoiasa (3%) și Glodu (12.6%); the largest average growth (over 100%) took place in four administrative-territorial units: Corbu (114.3%), Tulgheş (164%), Bilbor (321.8%) and Borsec (704%).

In terms of *general population density*, due to the fact that the territory's surface at village level is unknown, this indicator has been analysed at administrative unit level.

The general density decreased from 16.6 inhabitants/km² in 1992 to 14.5 inhabitants/km² in 2011. Borsec Depression, in 2011, had the highest value of general density (27 inhabitants/km²), followed by Tulgheş (14.6 inhabitants/km²) and Bilbor (11.6 inhabitants/km²). The lowest density was in Corbu (10.7 inhabitants/km²), due to the fact that this rural settlement has very few inhabitants (1505 inhabitants) compared to its surface (140 km²).

Significant changes appear if we compare the population of the Drăgoiasa-Tulgheş alignment to the surface of its territory actually situated in the depression, when the population general density reaches 74 inhabitants/km², the largest density still found in Borsec (126.1 inhabitants/km²), and the lowest at Secu (7 inhabitants/km²).

When it comes to population dynamics, a series of demographic indicators have been quantified such as *birth rate*, *mortality*, *natural growth*, *population migrating movement* (with the calculation of the emigration and immigration rates), *migrating growth*, and analyses have been conducted for the 1990-2010 interval, only at administrative level, due to lack of data at village level.

The settlement network of the Drăgoiasa-Tulgheş alignment is composed of an urban settlement (Borsec), three rural settlements (Bilbor, Corbu și Tulgheş), which in turn encompass eight villages (Bilbor, Răchitiş, Capu Corbului, Corbu, Tulgheş, Pintic, Recea and Hagota), plus four more villages (Păltiniş, Drăgoiasa, Catrinari and Glodu), belonging to Panaci commune.

There is another settlement - Secu, which, since 1956, has been part of Toplița Municipality. In the analysed space, we can refer to the population's evolution per types of habitat, only since 1956, when Borsec became a city.

Furthermore, a series of demographic structures were analysed: *population structure per gender*, *population structure per age groups*, *professional structure*, the last two only for 2002, *matrimonial structure*, *ethnic structure*, *confessional structure*, carefully portrayed through graphical representations. The chapter closes with a brief presentation of the aspects related to the *population's education level*, followed by a look on the *human risks* that are highly relevant to the community in this area (poverty, alcohol abuse, unemployment and crime).

In terms of the settlements of this alignment, we presented the determining factors in the creation of this regional microsystem's habitat component, the first one being the relief, that enabled an intense capitalisation of the depressionary space proper and also of the surrounding mountain areas. Another factor that influenced the spread of settlements was *water*, vital element for the human community and for social-economic activities. A somewhat influence on settlement emergence and development was exerted by navigation on the Bistricioara and Neagra rivers, alongside fishing, hemp melting, mineral

waters. *The forest* was an essential factor in the evolution and development of this microregion, the prolonged deforestation process, extremely active in the last two centuries, enabling the clearing of lands suitable for settlements, hayfields and pastures, actions which can be found in the local toponimy.

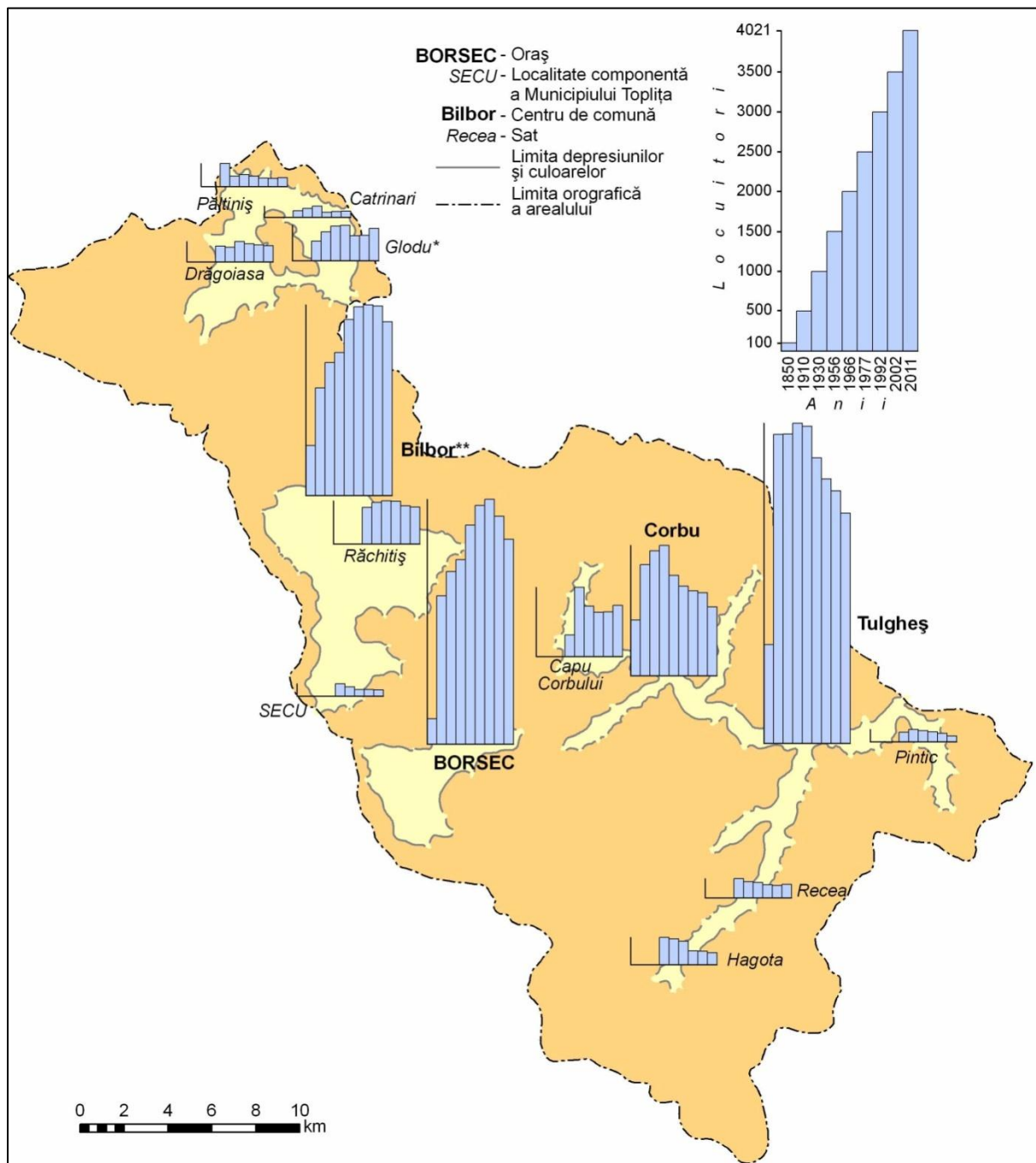


Fig. 3. The population of the Drăgoiasa-Tulgheș depressionary alignment at the 1850, 1910, 1930, 1956, 1966, 1977, 1992, 2002 and 2011 censuses, average values.

Glodu* = in 1930 and 1941, the population of Glodu was surveyed together with the hamlets belonging to Drăgoiasa and Catrinari; **Bilbor**** = including the population of Secu until 1956.

In regards to the *genesis and evolution of the settlement network* we began with the presentation of a hierarchical structure represented by the Drăgoiasa-Tulgheș region, which, until 1956, was entirely rural, with the *hamlet* at its base, a permanent settlement, with a low

population (Chiruțeni, Stânceni, Păștinărești, Ferărești, Suseni Deal, Suseni Luncă, Fundoaia Deal, Fundoaia Luncă, Bilboraș, Joseni, Barasău, Valea Corbului, Valea Frumoasă, Poiana Veche), followed by the *village proper*, and then the *village, commune residence* (Bilbor, Corbu and Tulgheș).

The rural settlements of the analysed area were defined and quantified through a series of geographic indicators such as: *population density within the hearth, spatial distribution, settlement density, the areality value, the average distance between two settlements, the dispersion index, the polarisation potential of communal centres and the morphological distribution of settlements* were calculated.

From the point of view of hearth shape, most are *irregular*, which implies a spontaneous settlement, with progressive extensions in time, with some cases in which smaller settlements have been included in larger ones, due to territorial expansion. A somewhat *circular shape* can be seen in the case of *Răchitiș*, in the south-eastern part of Bilbor.

Along the Bistricioara and Secu, but especially along the main routes, there are hearths or settlement nuclei of elongated, linear shape (Drăgoiasa, Bilbor, Secu, Corbu and Tulgheș). Most settlements of this area have a *linear-tentacle texture*, the households being situated along the valleys, or along the main roads (Bilbor, Capu Corbului, Corbu, Tulgheș, Hagota, Recea, Pintic), the *simple linear texture* is rarely found (Drăgoiasa, Secu), while the *radial texture* is the rarest, as in the case of Borsec.

The hearth structural types are characterised by a wide variety and complexity, the ones that predominate being transitional, that combine two of the three structural types. On this basis, we can sum up the following classes:

- *gathered-elongated* (Bilbor, Corbu, Tulgheș);
- *spread-elongated*, with the hearth situated along rivers and roads (Glodu);
- *spread proper* (Catrinari and Păltiniș, as well as some parts of Bilbor, Corbu and Tulgheș, with a logging and animal husbandry profile).

In terms of hearth size, small ones (Păltiniș, Drăgoiasa, Glodu) and larger ones (Răchitiș, Capu Corbului, Pintic, Recea, Hagota) predominate, but large hearths can still be found (Corbu 248 ha) as well as very large ones (Bilbor, Tulgheș), the smallest (under 10 ha) only in the cases of Catrinari and Secu.

According to the latest data from the 2011 census, in terms of demographic size, the communes of Bilbor, Corbu and Tulgheș, together with the four villages from Suceava County (Păltiniș, Drăgoiasa, Catrinari, Glodu) have a population of 8 232 inhabitants, therefore can be classified as follows: very small rural settlements (under 250 inhabitants), small rural settlements (251-500 inhabitants), middle range rural settlements (501-1500 inhabitants) and large rural inhabitants (1501-4000 inhabitants).

Very small rural settlements (less than 250 inhabitants), six in total, represent 50% of the total number of rural settlements, but concentrate only 9.4% of the rural population.

Small rural settlements (251-500 inhabitants) – two settlements (Glodu and Răchitiș), representing 16.6% of the total number of rural settlements and 10.6% of the rural population.

Mid-range rural settlements (501-1 500 inhabitants) encompass Capu Corbului and Corbu with 18.2% of the rural population of this space.

Large rural areas (1501-4 000 inhabitants) include just two settlements (Bilbor-sat and Tulgheș-sat), with 61.6% of the rural population.

The only urban center of the microregion is Borsec, dating back from Roman times, whose international recognition and fame is due to its mineral waters, being one of the many spas that formed the backbone of the Romanian spa system, even rivaling Baden-Baden and Karlovy Vari.

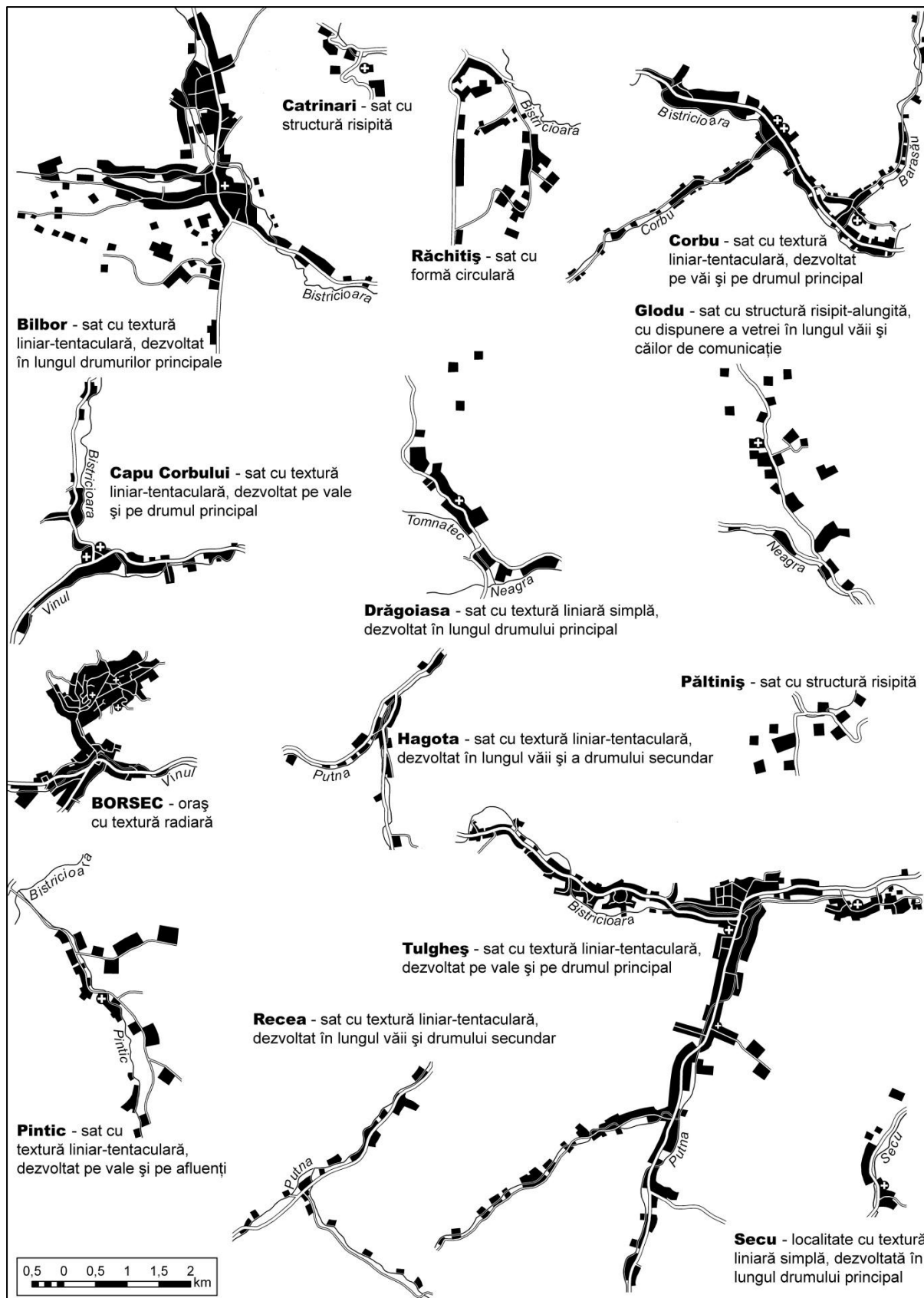


Fig. 4. Models of settlement hearths from the Drăgoiasa-Tulgheș depressionary alignment.

Two smaller settlements took shape here, one that is older – Upper Borsec, and a more recent one, Lower Borsec, that can be classified as a small urban settlement (less than 25 000 inhabitants).

Based on the data from the 2011 census, within the analysed space, the average number of persons per household is 2.6, higher in rural areas (2.7) and lower in urban areas (2.3).

An important indicator in the analysis of the alignment's housing infrastructure is the livable surface /household ratio, where smaller surfaces predominate, with values between 25.4 and 137.1 sqm/household.

In the subchapter that tackles *the architectural specificities of the elementary habitat (household)*, three types of houses and also villas were presented, with those defining elements that contribute to the establishment of the analysed space's identity.

The aspects regarding the *toponymy* of this space were presented based on different classification, the most important being the geographic one, more exactly the nature of the geographic elements designated by toponyms (geomorphonym, hydronym, oikonym, odonym).

5. THE SPECIFIC ACTIVITIES OF THE DRĂGOIASA-TULGHEȘ ALIGNMENT

The social-economic activities encompass three sets of components: primary, secondary and tertiary. The first category includes agriculture, forestry, which are extremely important in the economic structure of the Drăgoiasa-Tulgheș alignment, as well as collection and trade with the forest's auxiliary products. The other sets of components, secondary and tertiary, represent derivatives through which society has diversified its occupations and capitalized the basic products of the primary sector at superior levels.

This category includes: industry, transportations, education, culture, religion, healthcare, tourism etc.

Agriculture is one of the main components of the alignment's economy, being the chief supplier of food produce for the population and also of raw for the light industry and food industry, as well as an important generating factor of humanized landscapes. The specific form of agriculture in the Drăgoiasa-Tulgheș alignment is the one of *subsistence*, which is not profitable.

The natural conditions, especially the climatic conditions, are not favourable for agriculture in general, which decisively contributes to the lack of agricultural production diversity. The long winters, the sometimes cool summers, as well as soil freezes, considerably reduce the plants' vegetation period.

From the analysis of the land stock in terms of usage, in 2011, one can clearly see that most surfaces are covered in forests (62.8%), followed by pastures (25.7%), hayfields (8.7%), other surfaces (2.1%), and arable land with just 0.7%, a very low percentage due to restrictive geographic conditions. From the presented analysis, it is obvious that Tulgheș and Bilbor, had, in 2011, the largest administrative territories: Tulgheș (24 447 ha) and Bilbor (22 731 ha).

Due to the damp and cool climate, *the potato* is the main crop, being a fundamental element in the populations diet, considered to be „the second bread of the locals”. *Corn* is found only in the households on the middle and lower basin of the Bistricioara, a sunnier valley due to its west-east orientation. At Corbu and Tulgheș, the locals grow corn with a small cob (small „cincantin”, Hangu variety), with short period of vegetation. Even though the yield per hectare is modest, the locals with large tracts of arable land still grow as animal fodder.

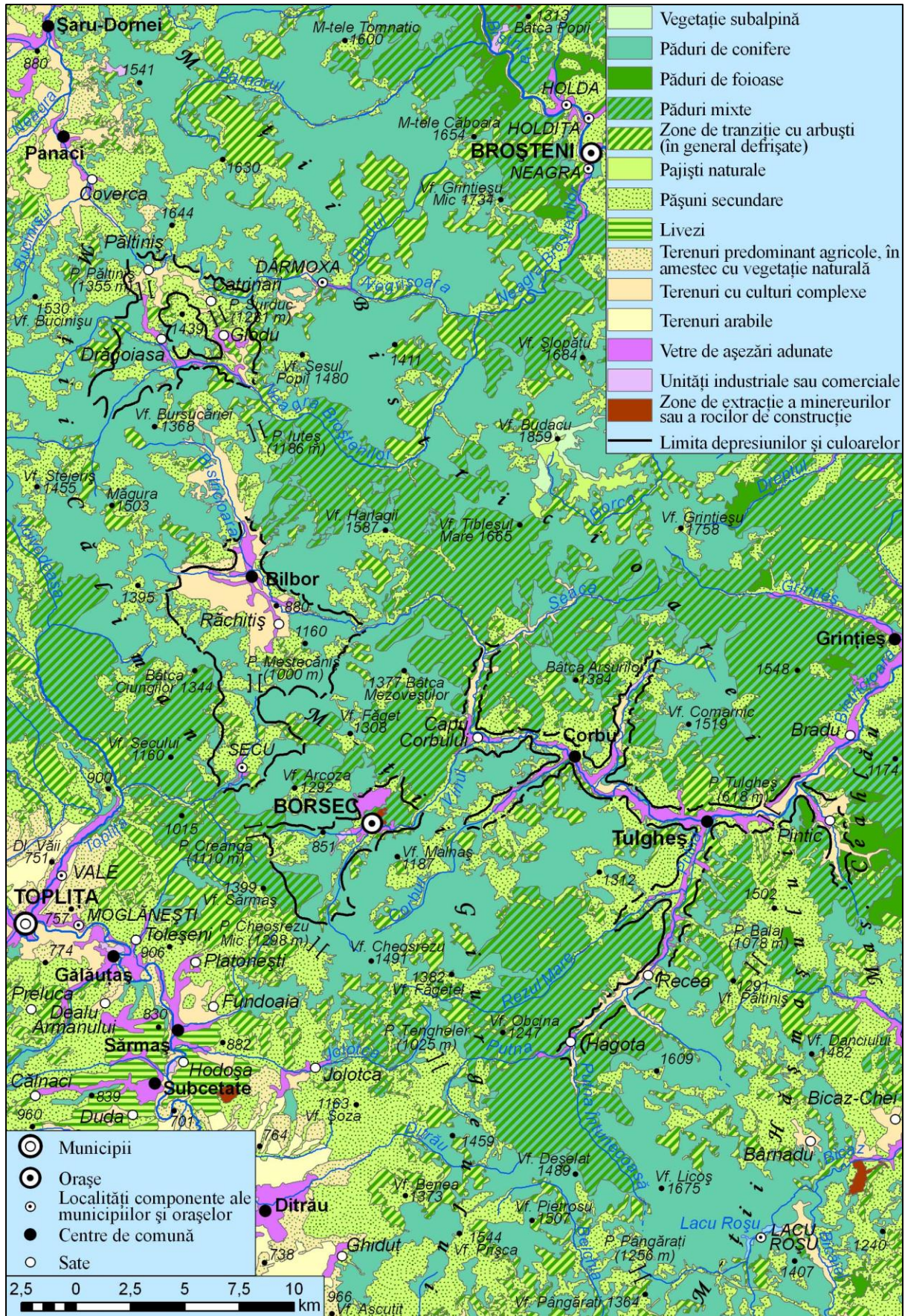


Fig. 5. Land usage in the Drăgoiasa-Tulgheș depressionary alignment.

In recent years, more and more people built greenhouses, that have remarkable yields of tomatoes, cucumbers, eggplants and other more sensitive plants.

Pomiculture occupies the inhabitants' households, especially those in the middle basin of Bistricioara. A series of fruit-trees are cultivated, the most common being: plum trees, apple trees, pear trees, cherry trees, even walnuts (Poiana Veche, Tulgheș). According to the statistical data from 2003, the largest fruit yields are in Tulgheș (155 tons), Corbu (15 tons), and Borsec (3 tons).

Bovine husbandry, with a density of 23.1 heads/100 ha of agricultural land, is the most important sector, providing considerable income for individual households. The existing natural pastures offer optimal conditions for the development of this sub-branch, enabling, with the expansion of fodder crops and usage of pastures in forest clearings, as well as the improvement of hayfield and pasture quality, a substantial growth in the number of bovines.

In general, regarding bovine density at each administrative unit level, only the commune of Bilbor stands out, where bovines have density levels of 35.2 heads/100 ha of agricultural land, due to the large extension of pastures and hayfields, followed by Tulgheș with 15.1 heads/100 ha agricultural land, Corbu with 13.8 heads/100 ha agricultural land and Borsec with 7.8 heads/100 ha of agricultural land. Besides bovines, there are also *pigs* (404.3 heads/100 ha arable land), *sheep* (32.5 heads/100 ha), *horses* (5 heads/100 ha), *birds* (2576.2 birds/100 ha), plus a number of 1086 *bee families*, all these values being calculated for 2011.

A special attention has been given to aspects regarding *sheepherding and its role in local development*, and we made a short description of the aspects related to sheeppens, to their tools and main activities. We introduced graphic representation of the pens geographic distribution within the area, and we presented cheese making technology.

Another activity from the primary sector, specific for the area in question, is *forestry*, a subchapter where we dealt with issues regarding the organisation and management of the forest fund under the coordination of the forestry departments of Borsec, Tulgheș, Gheorgheni and Broșteni.

Hunting and fishing are two more other activities carried in the Drăgoiasa-Tulgheș alignment, which is why we included a short presentation of the eight game funds, with its infrastructure, as well as the situation of the game resources.

Besides the main occupations already presented (herding, logging, potato cultivation, mowing and hay gathering), there are still some further occupations, crucial for the population of the area: *gathering forest fruit* (blueberry, raspberry, wild strawberries, cranberries), *eatable mushrooms*, *gathering and using medicinal plants, resin, leaves, fir buds, punk*, etc.

From the secondary sector, the most representative activity is *mineral water bottling*, which has a very interesting history, and whose area of influence crossed national borders. We speak of the activity carried out at the old *Apemin Borsec plant*, now renamed as *Romaqua Group Borsec*, the company that made Borsec the only Romanian brand of mineral water present on the international market, receiving the honorific title of „*Queen of Mineral Waters*”.

It is also worth mentioning the bottling station of Bilbor, built by Tuborg, which in 2010 entered the market with the *Bilbor* brand. We cannot omit *Aqua Carpatica* bottling station, also opened in 2010, situated outside the researched area (Coverca, Panaci commune), but which bottles water from the Păltiniș spring, considered to be „*the purest waters in the world*”, as in the span of five years 417 physical-chemical and microbiological studies were conducted, which proved the lack of nitrates.

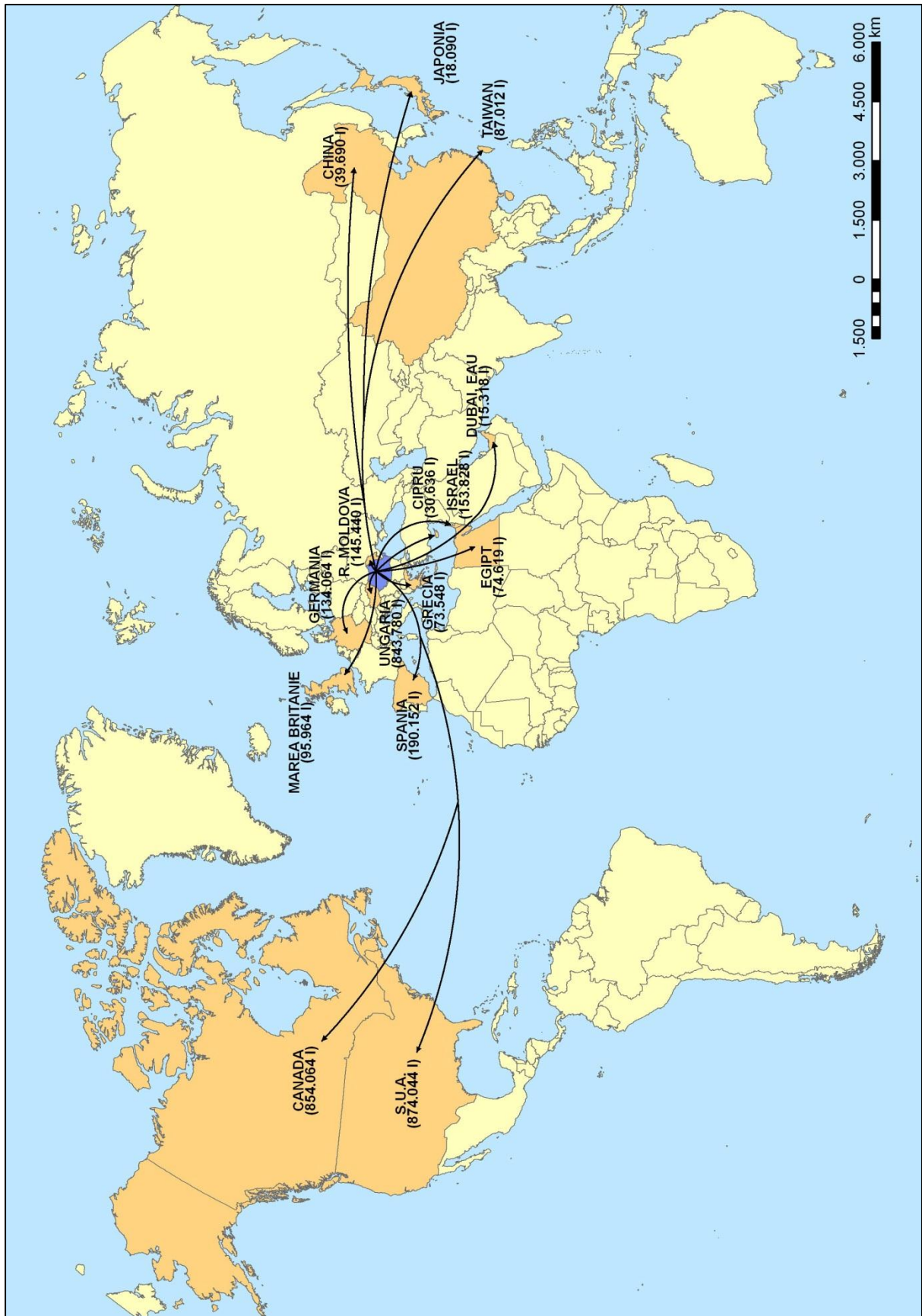


Fig. 6. States where Borsec mineral water was exported in 2011.

Within the tertiary sector, the most important activities are national and international mineral water trade, plus wood and prefabricated products trading, which in most cases takes

place within the grey and black markets, without any benefits for the authorities. Among the other products intended for sale one can find forest fruit, mushrooms, milk and dairy products, with very low prices, which raises questions in regards to the profitability of these activities, especially in the years with low productivity.

Through communication routes and transport, the Drăgoiasa-Tulgheș alignment sets connections with the localities of Suceava and Harghita counties, but also with other regions. The routes follow the valleys of Bistricioara, Vinului, Putnei and Neagra Broștenilor. These valleys' positions enabled a good development of communication routes, and also easy access between Moldova and Transilvania through Păltiniș, Iuteș, Creanga, Tulgheș and Țengheler passes.

The road network is made of a large array of roads, from national and county roads to communal and forest roads. With the exception of the roads administered by the forest departments (Borsec, Tulgheș and Broșteni), all the other roads are administered by the Regional Department of Roads and Bridges Harghita and Suceava.

The only national road is DN 15, connecting Turda with Bacău, while the county roads include the following: DJ 174, DJ 174 A, DJ 174 B, DJ 174 C, DJ 174 E, DJ 125, DJ 127, DJ 127 A and DJ 128.

The feasibility study for the future highway which will connect Moldova and Transilvania on the following route: Ungheni-Iași-Târgu Frumos-Paşcani-Târgu Neamț-Poiana Largului-Tulgheș-Ditrău-Târgu Mureș. Section no. 2 of the Ditrău-Tulgheș-Poiana Largului-Târgu Neamț highway goes through the analysed area.

Railway transport is currently nonexistent, but until 1991 there was a narrow railway connecting Borsec with Toplița, more than 50 km long, used for shipping mineral water, and, until 1960, wood.

A careful consideration was given to *tourism as a capitalisation factor of the natural touristic potential*, with a series of elements of great interest such as: relief forms, climatic conditions, hydrographic resources, flora and fauna, and the second component regarding the *man-made touristic potential* with cultural-historical, economic and ethnographic touristic objectives.

When it comes to the *touristic material base, the accommodation structure* heavily oscillated during the last decades, the existing statistical data emphasizing, for the reference period (1990-2011) a series of differences, from the point of view of the number of beds, but especially from the point of view of their distribution per accommodation form. In order to present the real situation of the lodging capacity in the field, we used three types of sources: statistical data from the National Statistics Institute, then data provided by the Ministry of Regional Development and Tourism, and data obtained through field research, which means the number of existing lodging units varies depending on the data source.

Borsec still is the most complex touristic area from the analysed alignment of depressions, with 15 accommodation units (93.8%) out of 16 from the entire microregion and 353 beds (97.7%) out of the 361 that exist in the area, 173 rooms in total, while Tulgheș has just one accommodation unit (6.2%) and eight beds (2.3%), with four rooms.

We consider as real the data from the field research, but even so the exact number is difficult to identify due to the numerous variants of unit management; from approved boarding houses, to those that are not homologated, with or without proper identification tags, from vacation houses to secondary residences.

According to the data presented in table 1, the total accommodation capacity of the Drăgoiasa-Tulgheș alignment is estimated at around 795 beds, with 348 rooms in total, in 44 units (29 boarding houses, with 448 beds, five lodges, with 57 bed, three camping sites, with 156 places, five villas, with 94 places, and two guest houses, with 40 beds).

In August 2011, construction started for a multifunctional spa complex which will provide, besides treatment, the opportunity to relax and spend your free time all year long, a complex with a total daily capacity of roughly 694 people.

Table 1

No.	Type of structure	Name of establishment	Category	Number of rooms	Number of beds	Address
1.	Boarding house	Codruța	2 daisies	4	12	Răchitiș Str., Bilbor
2.	Boarding house	Vâlcân	3 daisies	5	12	Răchitiș Str., Bilbor
3.	Lodge	Casa Țifrii	-	3	10	Valea Seacă, Capu Corbului
4.	Lodge	Vămanu	-	2	5	Vămanu, Bilbor
5.	Boarding house	Agnes	2 stars	4	9	3 Aleea Rotundă Str., Borsec
6.	Lodge	Făget	-	5	24	Nadășa Street, Borsec
7.	Boarding house	Chris	1 star	2	5	1 Cerbului Street, Borsec
8.	Boarding house	Ely	3 stars	11	27	12 Jókai Mór Street, Borsec
9.	Camping site	Eti	3 stars	60	120	100 Carpați Street, Borsec
10.	Boarding house	Fitness	2 stars	5	9	20 Cerbului Street Borsec
11.	Boarding house	Ghiocelul	3 stars	9	22	127 Carpați Street Borsec
12.	Boarding house	Intim	3 stars	5	10	6 Carpați Street, Borsec
13.	Boarding house	Kerek	2 stars	4	9	6 Nouă Street, Borsec
14.	Boarding house	Korona	3 stars	10	20	28 Carpați Street, Borsec
15.	Boarding house	Lizi	2 stars	5	12	14 Nouă Street, Borsec
16.	Boarding house	Muskatli	2 stars	5	12	35A Bd. 7 Izvoare, Borsec
17.	Boarding house	Nostalgia	3 stars	4	8	3 Primăverii Street, Borsec
18.	Boarding house	Palma	2 stars	16	35	4 Topliței Street, Borsec
19.	Boarding house	Roland	2 stars	5	10	123 Carpați Street, Borsec
20.	Villa	Sport	2 stars	20	40	Stadionului Street, Borsec
21.	Boarding house	Weber	3 stars	7	14	17 Cerbului Street, Borsec
22.	Boarding house	Vila Riki	3 stars	20	40	19 Jókai Mór Street, Borsec
23.	Boarding house	Roua	3 stars	5	12	10 Bd. 7 Izvoare, Borsec
24.	Boarding house	Trandafir	3 stars	12	24	65 Bd. 7 Izvoare, Borsec
25.	Boarding house	Silvanus	3 stars	16	32	6 Jókai Mór Street, Borsec
26.	Guest house	Talian	-	5	23	161 Carpați Street, Borsec
27.	Villa	Veverița	3 stars	5	20	3 Jókai Mór Street, Borsec
28.	Boarding house	Weber	3 stars	9	14	17 Cerbului Street, Borsec
29.	Villa	Strătan	2 stars	5	11	17 Bd. 7 Izvoare Street, Borsec
30.	Boarding house	Anton	2 stars	7	14	18 Cerbului Street, Borsec
31.	Boarding house	Floare de colț	3 stars	6	18	1 Izvorului Street, Borsec
32.	Villa	Anna	1 stars	4	12	17 Jókai Mór Street, Borsec
33.	Camping site	Irimescu	2 stars	12	24	119 Carpați Street, Borsec
34.	Villa	Iringo	1 star	5	11	Aleea Rotundă Street, Borsec
35.	Boarding house	BCR	3 stars	4	8	121 Carpați Street, Borsec

36.	Boarding house	Casa Floarea	3 stars	7	16	16 Cerbului Street, Borsec
37.	Guest house	Kölló	-	7	17	1 Izvorului Street, Borsec
38.	Boarding house	Iulius	3 stars	10	20	30 Bd. 7 Izvoare, Borsec
39.	Camping site	Vanda	2 stars	6	12	Creanga Pass, Borsec
40.	Lodge	Iris Galben	-	3	10	Valea Seacă, Capu Corbului
41.	Boarding house	Nicoleta	3 daisies.	4	8	377 Centru Street, Tulgheș
42.	Boarding house	Corbu	3 daisies	4	8	Valea Corbului Street, Corbu
43.	Boarding house	Putna	3 daisies	4	8	20A Putna Street, Tulgheș
44.	Lodge	Tizsas	2 daisies	4	8	Hagota, Tulgheș
TOTAL				348	795	

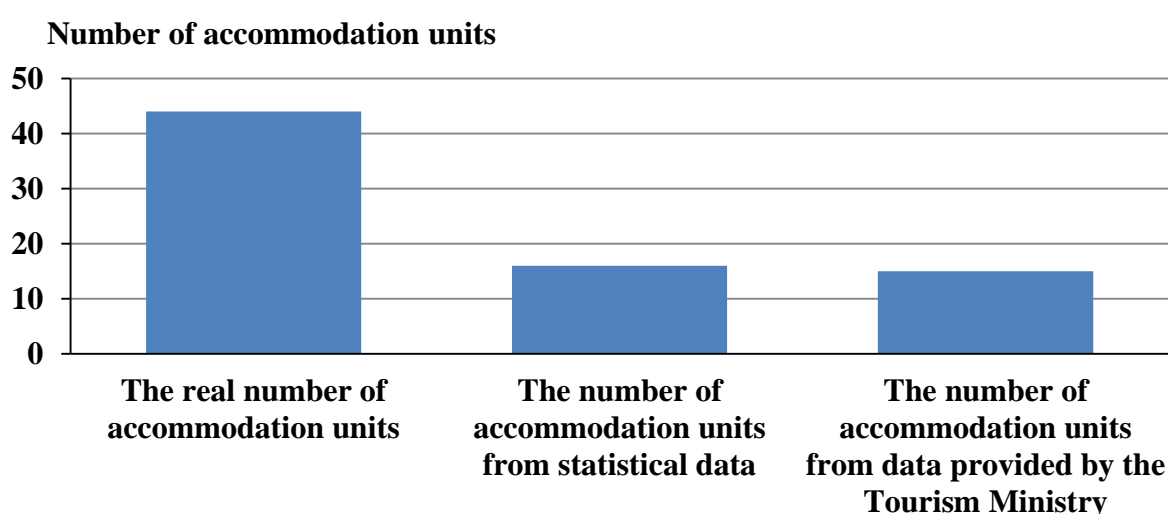


Fig. 7. The situation of accommodation units
(graphic composed with the help of data from field research, the Tourism Ministry and the National Statistics Institute).

Borsec also has had, since 16th December 2010, a ski area, named „*Speranța*” *Ski Complex*, made of three ski slopes.

Alongside the other components of the touristic material base, *the communication routes* has a considerable contribution, channeling touristic fluxes towards attractive locations, this study containing the descriptions of touristic paths that can be found on the touristic map.

The rehabilitation and modernisation of Borsec spa town is a necessity, that firstly implies creating a treatment base, for spa procedures that use mineral waters, as well as the development of the touristic infrastructure, touristic services and human resources base.

After studying prof. N. Ciangă’s work (1997), regarding Eastern Carpathians tourism, we quantified the touristic potential’s value, starting from the ideal model, that comprises all categories, subcategories and touristic elements, expressed as following:

$$V_t = \Sigma^{0-16} 1 + \Sigma^{0-5} 2 + \Sigma^{0-18} 3 + \Sigma^{0-8} 4 + \Sigma^{0-10} 5 + \Sigma^{0-8} 6 + \Sigma^{0-24} 7 + \Sigma^{0-11} 8 = 100$$

in which: V_t –touristic value; $\Sigma 1$ –morphotouristic fund; $\Sigma 2$ –climate-touristic fund; $\Sigma 3$ –hydrogeographic touristic fund; $\Sigma 4$ –biogeographic touristic fund; $\Sigma 5$ –cultural-historical

touristic fund; Σ 6 –folk touristic fund; Σ 7 –touristic material base; Σ 8 –touristic communication potential.

In the Drăgoiasa-Tulgheș alignment there are only four ranks: III- represented by Borsec spa town (44 points) and Ceahlău (45 points); IV- Corbu (31 points), Tulgheș, (32 points), Hăghimaș Mountains (37 points) and Căliman Mountains (31.5 points); V-Bilbor (29 points) and Bistriței Mountains (20.5 points); VI-Pălteniș (17.5 points), Drăgoiasa (19 points), Catrinari (8.5 points), Secu (14 points) and Giurgeu Mountains (17 points).

This evaluation clearly emphasizes the fact that the hydrographic potential is the one that predominates, through its mineral waters, the lowest mark being given to the touristic material base.

We may talk of *touristic circulation* only in the city of Borsec, where two time intervals have been taken into account: 1972-1989 and 2001-2010. The first interval saw a decrease of 41.6% overnight stays and 26.8% in the number of tourists. The vacation length had average values of 12 overnight stays/tourist in 1972 and 9.5 overnight stays/tourist in 1989. The second period (2001-2010), according to statistical data, shows a considerable decrease in the number of overnight stays (-88.5%) and tourists, by 72.5%.

The vacation's length had average values of 8.3 overnight stays/tourist in 2001 and 3.5 overnight stays/tourist in 2010. In 2001, most tourists stayed in villas (48.7% overnight stays and 49.1% tourists), while in 2010, the situation was reversed, most staying in boarding houses (68.6% of the overnight stays and 74.1% of the tourists).

Based on questionnaires filled in by tourists, the microregion experiences flows of persons of all ages, from school age children to people in their 50's and 70's. For the high mountain area, most visitors are young or adults between 20-40 years old, while in low areas, most visitors are adult and old.

In terms of place of origin, there are two main touristic circulation flows: internal circulation and international circulation. The first category, representing 70% of the tourists, arrives from Mureș, Suceava, Neamț, Bacău, Iași, Botoșani, Maramureș, Satu Mare Counties, while the second one (30%), from countries like Hungary (45%), Israel (11%) Austria (10%), Germany (10%), France (7%), USA (7%), Belgium (5%) and the Netherlands (5%), the main means of transport being the personal car, and the preferred accommodation units the boarding houses. In terms of satisfaction, most people were disappointed by the state of the infrastructure. When asked whether they wished to return to Borsec and the surrounding areas, the answers were vague, due to the above mentioned reasons. The tourists who decide to spend the night in Borsec are fewer than those who transit the area.

We must point out that we express our doubt in regards to the correctitude of the data provided by the National Statistics Institute. Furthermore, the data from the questionnaires that we handed out to the accommodation units were also inconclusive.

There were cases where those who run accommodation units flat out refused to collaborate, as they ran illegally, some answered the questions from the form, but provided false information. There are, however, cases (Villa Riki and Trandafirul boarding house) where we were able to get conclusive data, from the monthly earnings, in regards to the tourists that stayed at these establishments in the last seven years.

It is obvious from the graph that most tourists were registered in summer and winter (December), with a maximum in August and a minimum during transitional seasons (fall and spring). If until the end of 2010, most units ran only during summer (June, July, August), once the ski slope was opened, due to tourist demand, some of them remained open all year long.

The promotion of tourism in the Drăgoiasa-Tulgheș alignment is done in different forms. The most frequent promotion methods, for the accommodation units of the analysed space, are the internet, business cards and flyers.

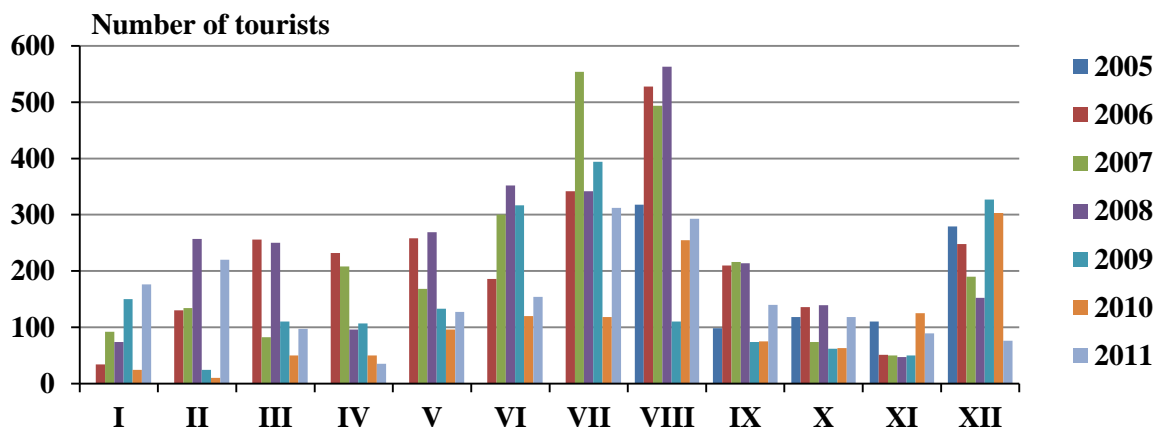


Fig. 8. Touristic circulation. The number of tourists registered during 2005-2011 at „Trandafirul” boarding house, Borsec.

Over the last decade, the education network from the Drăgoiasa-Tulgheș alignment has been dealing with several major problems, such as:

- decrease in the number of students, especially in small communities, where until recently there were kindergartens and primary schools, these being closed or amassed (ex. Secu, Drăgoiasa, Glodu, Capu Corbului);
- the endowment level of most schools in the region is below standards, the exceptions being the general schools from the commune centres and from Borsec, as well as the high school from Corbu.

Within the analysed space, there is single high school, with Romanian as its teaching language, focused on agriculture (Corbu Agricultural School Group), that currently attracts a large number of students from the adjacent localities (Bilbor, Borsec, Tulgheș), and even from the neighbouring county of Neamț (Grințieș, Borca). The students of Secu are part of the Kemeny Janos school, Toplița. Most students from Bilbor și Tulgheș go to highschoools in Toplița and Corbu („O.C. Tăslăuanu Theoretical Highschool and Mihai Eminescu National College). Starting in 2010-2011, the students of Glodu were amassed with those from Panaci commune.

The cultural life of the Drăgoiasa-Tulgheș area is extremely rich, with numerous community and religious events, pivotal in keeping the local community as a whole, and also representing potential venues for tourist attraction.

In terms of historical monuments, we would like to mention: „*St. Nicholas*” Church from Bilbor, the „*Schimbarea la față*” Wooden Church from Borsec, „*St. Archangels Michael and Gabriel*” Church from Tulgheș and two wooden chapels (*The Roman-Catholic Chapel of Secu* and „*St. Peter and Paul*” Wooden Chapel from Tulgheș).

The evaluation of the population’s health may be calculated with the help of the indexes: *the doctor provision index* and the *agglomeration index*.

In most rural settlements, only primary medical assistance is provided, with the exception of the villages of Suceava County and Secu village, where there are no such centers, assistance being provided by the medical dispensaries of Panaci and Toplița. For more complex medical services, the inhabitants must travel to the medical units from the neighbouring cities (Toplița City Hospital and Vatra-Dornei City Hospital).

In Tulgheș, there is a medical unit that provides assistance for the patients with psychiatric problems from Harghita County, as well as for those from the adjacent counties (Neamț, Mureș, Covasna, etc). This unit functioned as a tuberculosis sanatorium from 1957-1980.

6. THE GEOGRAPHIC LANDSCAPE UNDER THE INFLUENCE OF THE HUMAN FACTOR AND ACTIVITIES

In this chapter, we spoke of two types of landscapes: *derived balanced landscapes* and *degraded landscapes*.

The derived balanced landscapes have the largest extension and correspond either to the spatial sector in which the features of the geographic landscape are apparently natural, with a natural biological exploitation close to the initial state, or sectors where the currently stable landscape still suffered some considerable mutations. This type of landscape comprises the following subtypes: *pastoral*, *forest*, *agri-forest-pastoral landscape* and *agricultural landscape*.

The degraded landscapes only appear isolated within the depressions, being unstable in time. They appear mostly in Borsec Depression, in the Dealul Scaunul Rotund sector, due to the travertine quarry, and also due to the lignite mines in the western part of the depression, activities that led to considerable degeneration of the preexisting landscape.

After analysing the regional chorotype of the Drăgoiasa-Tulgheș alignment, we are in favour of a chorotype that is built by combining three synthetic organisation models: *centripetal*, *centrifugal* and *axial*.

SWOT analysis is the efficient method, used in strategic planning, in order to identify priorities and create a common vision in creating the development strategy.

This method represents a synthesis of the main strenghts, that can be arguments in sustaining the microregion's viability, weakness, with a restrictive effect on development, possible threats, whose effects must be confined as much as possible and opportunities.

Conclusions

The geographic-human analysis of a relatively small space, referring to the Drăgoiasa-Tulgheș depressionary alignment, which encompasses around 790 km², required a complex scientific endeavour, even though for some it may seem as an uninteresting mountainous region, it is actually a very complex microsystem, where the major role was played by the system's natural component, with the elements that that define and compose it, that acted, in most case, as favourability factors for the evolution of the territorial entity, which offered support for habitation, settlement diversification, their individualisation through specificity.

The Drăgoiasa-Tulgheș alignment represents a geographic entity where the underground riches constitute a dowry with large opportunities for capitalization.

Moreover, the hydrography, with its considerable mineral water resources, and the biogeographic elements „worked together” as favourability factors in the settlement network's individualisation, the relief introducing restrictions for crop growing, but offering favourable conditions for animal husbandry and refuge during harsh times. The climatic conditions limit the spontaneous vegetation, as well as crops, offering favourable elements in terms of tourism development.

The geographic position, natural framework and local resources impose taking into consideration the proposals regarding tourism development. This requires the finalisation and modernisation of access routes and also building touristic infrastructure for an intense capitalization of the touristic potential.

Summing up the information from the bibliography and from the field research, we come up with a few main ideas on the real situation, as well as on the development perspectives that must be supported for the area.

This paper offered me the possibility to use an interdisciplinary approach, which led to an in depth analysis of this space and the role of the geographic-physical factors and human resource in outlining a territorial identity for this area.

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