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CONTENTS

GEOGRAPHY OF SETTLEMENTS

TOURISM

UNIVERSITY OF CRAIOVA **Series: Geography**
UNIVERSITATEA DIN CRAIOVA **Seria: Geografie**

Vol. 13 (new series) – 2010
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EMM. DE MARTONNE'S WORK *LA VALACHIE* AND ITS INFLUENCE UPON THE ROMANIAN GEOGRAPHICAL SCHOOL

OPERA MARTONNIANĂ *LA VALACHIE* ŞI INFLUENŢA SA ASUPRA ŞCOLII GEOGRAFICE DIN ROMÂNIA

Răsvan STROE[1]

Abstract: The work *La Valachie* belongs to Emm. de Martonne's early period, the author being the most prestigious geographer at global level in the first half of the 20th century. The book represents a synthetic treatise on a part of Romania, to which, besides the data supplied by Romanian naturalists, the most important contribution is offered by the author himself through his direct field research, choosing and valorising the itineraries that were the most promising from the scientific viewpoint. At present, this work presents geographical and historical relevance at the same time. If the chapters on population and economy can help exploring the realities corresponding to more than a century ago, the physical geography part opened the road and the research directions for the generations of Romanian geographers of the last century. The French scholar is the first geographer to realize modern scientific studies in Romania and, directly knowing the Romanian space, he will proceed to the first division on regions of the southern Romanian relief, which is mostly admitted by the later researches. This article realises a review in a time arch with an opening of more than one hundred years, aiming to catch de Martonne's influences on the evolution of the Romanian geography, with a special view on geomorphology, the final regional table emphasizing the present limits and denominations of the relief units and subunits, where most of the registrations of the great French geographer are confirmed.

Key-words: geographical division on regions, limits of relief units, influence of the classical French geography
Cuvinte cheie: regionare geografică, limitele unităților de relief, influența geografiei clasice franceze

The illustrious French geographer Emmanuel de Martonne (1873 – 1955), being less than 30 years and experiencing about 10 years of geographical activity, published and brought in front of that time's scientific criticism one of the most valuable regional synthesis concerning a part of the Central Europe. Study field approached mostly by the German geography, Mitteleuropa, in its south-eastern part, became thus the research space of a French geographer who was to become the most prominent scientific authority during the first decades of the 20th century.

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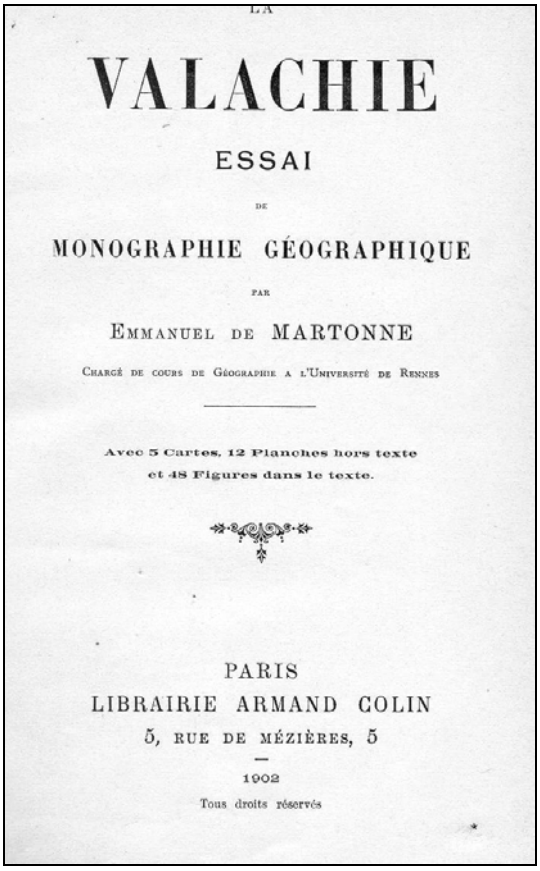
The author of the present paper holds in the personal library an exemplary of this valuable geography book (Fig. 1) from the beginning of the 20th century and he considered that the writing and publishing of this paper is more than a duty: a pious homage brought to the precursors, among whom de Martonne is the first and the most important foreign geographer that dealt with Romania.


LA

VALACHIE

ESSAI

DE

MONOGRAPHIE GÉOGRAPHIQUE

PAR

EMMANUEL DE MARTONNE

CHARGÉ DE COURS DE GÉOGRAPHIE A L'UNIVERSITÉ DE RENNES

Avec 5 Cartes, 12 Planches hors texte
et 48 Figures dans le texte.

PARIS
LIBRAIRIE ARMAND COLIN
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1902
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Fig. 1. Emmanuel de Martonne's *La Valachie. Essai de monographie géographique*

The following lines of the present paper aim at recalling his work *La Valachie*, because few copies still exist at present and, generally, the paper is forgotten or it is quoted from...quotes. The influence of the French geographical thinking on the activity of the Romanian researchers from the first half of the past century is mostly evoked in the last part, after a table presented at the end of his work, which will be also commented in the finishing part of this paper.

Research model for the regional geography during decades, *La Valachie* was defended at the Paris Faculty of Letters and it was printed during the same year, 1902. The other work, which also dealt with a part of the Romanian land, *The*

Transylvanian Alps, was presented in 1905 at the Paris Faculty of Sciences, but it was published two years later.

In the *Preface* of the work, the author states: *This book is the result of the work conducted during more years devoted to Wallachia and it represents a complete study, at the level allowed by the Romanian and the foreign sources*. From the map sketch that shows the itineraries of the author, it results that he used the train to travel in different parts of the southern Romania. He insisted on certain areas considered as *key-ones*. The author was mostly interested in the mountain massifs, the sub-mountainous regions, the Danube Valley, the Bărăgan, as well as in the capital of the Old Kingdom.

In the same *Preface*, the author says that he always tried to combine the analytical method (detailed study of every geographical element) that was so characteristic to the German school at the beginning of the past century, with the synthesis of the geographical space, the only one able to offer the veridical picture of a land and its unique originality.

The thanks addressed to the Romanian part are directed towards the naturalist scholars of the time: C. Alimăneşteanu, Gr. Antipa, S. Haret, St. Hepites, G. Iannescu, L. Mrazec, but he also names the political figure Take Ionescu. The readers are warned about the Romanian orthography (used during the epoch), the author preserving all Romanian names in the official writing, with the exception of the name of Bucharest (Romanian *Bucureşti*, but written *Bucarest* in French).

The first chapter deals with the general features of the relief, the resemblances and the differences as compared to Moldavia and Bulgaria (connected to the orientation of the hydrographical network, the age and the geological evolution). Based on the hypsometrical analysis, he notes that 25.2 percent of the Wallachian surface is located below 50 meters absolute altitude, 44 percent – below 100 meters and 65 percent – below 200 meters; only 3.6 percent of the surface is located above 1,000 meters, while 0.2 percent is situated above 2,000 meters of altitude.

If this represents the lowest of the three Romanian *countries*, then what is the origin of the name *Muntenia*? The answer is also given by the author in the chapter about population, underlining the fact that the space located under the eaves of the mountains was always the most densely populated one and, from there, the population went massively towards the Danube Plain, especially during the last centuries.

The climate and the biogeography represent the subjects of the second chapter, which completes the physical-geographical individuality of Wallachia. The author fully benefited of the meteorological data from the last decades of the 19th century, but also of the papers written by the first Romanian botanists. In fact, this is the first regional correlative synthesis concerning the climate and the biogeography of the southern Romania, which ends with global assessments: transition region between the continental and the Mediterranean climates, between the forest domain within the Central Europe, the Russian steppe and the vegetal

world of the Eastern Mediterranean. *Wallachia ows its specific character to this position and to its relief.*

The Wallachian divisions, namely the third chapter, represent, as the author admits, the first attempt of natural division and show the difficulties generated by the specification of the extension of different areas.

The division and the identification of the relief units and subunits within the southern Romania represent the first general geomorphologic division on regions, followed at more that 35 years later by the similar exhaustive preoccupations, materialised in a number of maps of the relief units in the whole country, which were realised by Vintilă Mihăilescu. On their basis there were conducted the divisions on regions, with the needed corrections, during the last four decades of the 20th century, following the complex geographical studies that were mostly connected to the PhD thesis. In the final part of the chapter, the author approaches the popular division into *Oltenia* and *Muntenia* and its relations with the history, the relief, the climate and the biogeography.

The fourth chapter analyses the Carpathian Arch, namely its relief that is closely connected to tectonics. The author reaches the conclusion that towards the end of the primary times, a series of dislocations already marked the directory lines of the present Carpathian relief. The staccato movements continued during the entire Tertiary and the author states that, judging by the amplitude of the seismicity noticed in the last centuries, the rising movements also occur at present.

The contribution of the erosion to the Carpathian relief modelling is described in the following chapter. The longitudinal valleys are tectonically marked, but the transverse valleys demonstrate the amplitude of the erosion, in connection with the mass raising of the Carpathians.

The subject would be retaken in *The Transylvanian Alps* (1907), with new observations, arguments and conclusions, nevertheless remaining in the dominant conception of the time: the catchment, generally placed at the beginning of the Quaternary, after the last Wallachian raisings and the subsidence of the Getic basin.

In 1899, de Martonne had published the article *Asupra istoriei Văii Jiului* in Paris and in 1902 he also approached in the same manner the issue of the Olt Valley *less wild, less narrow, but just as uncommon*.

For de Martonne, the Carpathians are in an advanced erosion stage, but the natural forces that contributed to the display of the present aspects did not always work to the present extent and in the present rhythm. If the action of the watercourses modelled the ensemble of the mountainous mass, the Quaternary exareaction cut the high ridges and gave them the characteristic crenellated shapes.

Although he minutely studied and mapped some mountainous areas (the Parâng and the central Făgăraş), paradoxically he did not noticed the levelling surfaces (*as it descends, the ridge looks like a kind of flat and rounded saddle and, at the same time, the view opens*). This is the only allusion to the Borăscu, Râu Şes and Gornovița surfaces, which became classical after the releasing of the study concerning *The Transylvanian Alps*. It is surprising the fact that around 1900, de Martonne did not notice the multi-staging of these levels and that he discovered them

around 1905, by applying the Davisisan theory. Thus, the dictum of Immanuel Kant becomes true again: *the idea is architectonical, it creates the science.*

The 6th chapter deals with the climate of the Carpathians, on the basis of the few stationary observations and even on certain personal assessments, trying a brief classification of the types of time within the mountainous area.

The vegetal and animal life forms within the Carpathians represent the object of a well-structured chapter, on the basis of the Romanian references from the end of the 19th century.

In the 8th chapter, which bears the title *The human life in the Wallachian Carpathians*, the focus is laid on the life of the mountain people, on the shepherd's shelters and practices and the author reveals the amplitude and the ethno-historical importance of the transhumance. The following is a relevant quote (p. 117): *During their periodical migrations from the mountain to the plain, the Romanian shepherds, most of which are Transylvanian ones, seem to show us the symbol of the long evolution that led to the population of the entire Wallachia by Romanian people*. By consulting the Romanian and the foreign references concerning the shepherd occupation at the Romanian population, de Martonne also gives us the first cartoscheme of the sheep paths in the southern Romania, which will be retaken, profoundly studied and developed by some Romanian geographers (Mara Popp, 1942).

In the following chapter, the author states again the presence of a number of mountain blocks that make up *The natural divisions of the Wallachian Carpathians*, for which he specifies the limits and the general tectonic-structural relations with the relief.

All issues concerning the Carpathian relief, which were presented in *La Valachie*, would be retaken after the field campaigns conducted during the summers of 1903 and 1906, in de Martonne's great work *The Transylvanian Alps*. Seen after the passing of more that 100 years, this work *does not display decreases, only certain lacks signalled by the author himself and they are caused by the topographical maps of the time, by the totally insufficient geological research and by the geographical conceptions of the time* (Gr. Posea & R. Stroe, 1987). In the concluding part of this study, de Martonne considers the Southern Carpathians as a mountain chain that is older that it had been thought for a long time, namely they represent *a false Alpine chain*.

Chapter 10 deals with the geography of Oltenia, namely of that part of Wallachia that was known under this name after 1800 but was noted on the foreign maps of the time (even today) as the *Small Wallachia*. The author considers that Oltenia is more harmoniously shaped than Muntenia, the hilly region occupying here proportionally a much wider surface.

The hillocks of Muntenia represent the subject of the next chapter. In 1899, within the article entitled *On the evolution of the Jiu Valley*, de Martonne formulated the theory on the basis of which *the Subcarpathian depressions have tectonic origin and date back to the end of the Tertiary*. This idea was entirely confirmed in 1901 through the geological study of L. Mrazec on the surroundings

of Tismana and Câmpulung. For de Martonne, in 1902, the Subcarpathian depressions are discontinuously lined, as they are missing westwards of Dâmboviţa, between Costeşti on the Bistriţa and west of the town on the Apa Târgului.

It is significant the fact that after only a few years he recognises an entire Subcarpathian area at the southern border of the Carpathians, from Baia de Aramă to the land of Vrancea. Although the morphological and geological local studies were at the beginning, his genial intuition, undoubtedly expressed in the two chapters dedicated to the Subcarpathians in *The Transylvanian Alps*, was to be confirmed by the generation of the Romanian geographers from the first half of the 20th century. As N. Popp (1939) finished his geomorphologic study on the Subcarpathians between the Dâmboviţa and the Prahova: *The Subcarpathians mean instability, erosion, accumulation, all these three element at the paroxysm and the paroxysm in the Quaternary*.

In 1902, in *La Valachie*, de Martonne stated: *The hillocks of Muntenia represent a troubled region, sometimes even bearing mountainous aspect, difficult to be set apart from the Carpathians proper* (p. 160). It is important to recall the fact that at the middle of the ’60s, the geographer Vintilă Mihăilescu differentiated a Carpathian – Precarpathian interference region between the Slănic of the Buzău and the Prahova, located on the last fingerings of the Paleogene flysch.

In any case, the Subcarpathians represent a complex and interfering land, being one of the most original Romanian regions, a result of the foredeep movements during the last folding waves, in which the hills alternate with the depressions; they get individualised through a dense population and a complementary economy.

The 12th chapter deals with the field of Muntenia (the denomination consists of contradictory terms, knowing that the mountain and the field are geographically opposed; probably this is the reason for which it was not accredited by the Romanian geographers, starting with G. Vâlsan). On the other hand, the French geographer does not refer to the entire plain of the Lower Danube, but merely at the part located eastwards of the Olt, this delimitation being taken and sustained with arguments 13 years later by G. Vâlsan.

The first divisions on regions of the Wallachian relief are interesting, in the framework in which the plain occupies almost half of the area (more than 35,000 sq. km of the total surface – 78,000 sq. km). Thus, in 1883, Gr. Cobălcescu differentiated four regions: the mountains, the hillocks, *the plain area* and *the Danubian terrace*, while Sabba Ştefănescu, in the paper *Memoriu relativ la geologia judeţului Dolj* (1883), incorporates to the plain the last two regions differentiated by Cobălcescu, under the general denomination of *the plain region*.

For de Martonne, *the plain* really is only a plateau, which is a little lower than that located westward of the Olt and is made up of gravels covered by loess and crossed by a number of wide valleys (tributary to the Danube). Also, he does not accept this denomination in the chapter *La Roumanie* from the Central Europe (vol. II) of the great and peerless *Géographie Universelle* from the ’20s and the

'30s of the 20th century, which represented one of the works of the shining pleiad of the French geographers of the time.

In the last mentioned paper, he argues that this region is rather a couloir than a plain (probably comparing it with other European plains). In reality, it cannot be asserted that the unit is entirely a creation of the Danube, as, through downstream wedging out, at Brăila there is maintained only one fluvial bridge of the 5 – 7 terrace levels in Oltenia. In fact, not even one fifth of the Plain of Muntenia is made up of the Danube terraces and the morphological situation differs in comparison with that of the Plain of Aragon, for example, where there appears only one couloir (of the Ebro) that is strictly connected to the bilateral development of the Plio-Quaternary terrace system. We briefly mention that the issue gets more complicated if we take into account the fact that the Bulgarian geographers denote the calcareous plate located in the north of the neighbouring country with the name of the Danube Plain (Dunavska Ravnina); this unit really is a structural (erosional-structural, to be exact) plain, as compared to the plain situated north of the Danube – an alluvial plain that is morphogenetically different. Nevertheless, in a wider geographical context, there can be spoken about the Lower Danube Plain, with the two component regions. We also mention that for many of the European geographical schools, the upper limit of the plains can surpass 300 meters of altitude.

Chapter 13 is dedicated to the (lower) Danube Valley and it begins by evoking the importance of the great river in the life of the Romanian people, for whom the Danube is *a kind of divinity*. The author dwells on the formation of the Defile, finally conceived as a result of the eastern catchment (the Cerna and another river that discharged into the Getic Lake deviated a watercourse that discharged into the Pannonian lake). *The thalweg swells that the navigation fights here represent the last runs of these prehistorical Niagaras*.

Downstream of the *Porțile de Fier* (*Iron Gates*), from Severin to Calafat, the Danube left traces of a remarkable erosion, because a real water trombe would have flooded the defile (through the drainage of the Pannonian Lake). The escarpment between Rogova and Pătulele, under which the Blahnița (stream that slowly carries its water from swamp to swamp) flows, represents the effect of this erosion and the proof of a Danube course on this route.

This movement of a powerful river that carves its riverbed into inconsistent rocks (mostly sand and marls here) would be, in de Martonne's opinion, the true meaning of the law of Locz, according to whom a river deepens its thalweg into hard rocks because once engaged in this type of rock, the river carves in place. We can add that this is exactly the case of the Danube in the defile and, if a catchment did exist, it would have been possible only at the eastern end of the defile, at the *Porțile de Fier* (English *the Iron Gates*). Concerning the present route of the great river downstream of the Porțile de Fier, besides the explanation offered by de Martonne, apparently the tectonic component (faults, neotectonic movements, see D. Paraschiv, 1961) played an important part in the movement of the Danube towards west and in the appearance of the eastern branches from *Ostrovul Corbului*

and *Ostrovul Mare*, sectors which were abandoned by the Danube and were subsequently weakened.

Between the settlements of Bistreţu and Giurgiu, de Martonne states, the Danube strongly erodes and accumulates at the present, just as it did downstream of the Porţile de Fier during the diluvial period (the glacial epoch). The side motion of the fluvial current described meanders towards north or south, deviations from the general west-east line of the river, which were increased by braidings that marked isles and branches. The enlargement of the main branch often led to the transformation of the isle into a swamp, flooded during flash flows. All big rivers that discharge into the Danube show the tendency of forming alluvial banks, which can change the position of the river mouth. Thus, in 1879, the Jiu moved its confluence 15 kilometres eastwards, carving a new valley that it still uses to flow into the Danube. On the other hand, the small watercourses, such as the Călmăţui, get lost in the micro-depressions of the floodplain, which discretely shows old small branches of the Danube; this is the origin of the Suhaia lake.

In the next chapter, the author informs about the regime of the Lower Danube and that of its tributaries, on the basis of the few data existing at the time, and realises a number of charts.

The chapter dedicated to the ethnography of Valahia is captivating and it is admiratively and accurately written. The author shows that the allochthonous elements (Jews, Greeks, Hungarians, Bulgarians, Gipsies) are to be found only sporadically, because a compact mass of foreign language speakers does not appear anywhere, as it happens in other parts inhabited by Romanians (Transylvania, Moldavia, Dobrudja). *Can it be said that the Romanian population is pure, safe of any mixing?* – the French scholar asks himself. He also responds that no people ever got round the mixing occurred during the historical periods. This corresponds to the present scientifically demonstrated conception, according to which the somatic differences among people are not significant, only those related to culture and mentalities being dominant and persistent.

Nevertheless, the language remains; it descends from the Latin, which is a miracle in the Eastern Europe, and has its origins in the west of the continent, being carefully preserved and representing the vehicle of the new modern culture that develops between the Carpathians and the Danube. At the end of the chapter, there is discussed the geographical origin of the inhabitants, because of the circulation of certain theories related to the supposed *no man's land* remained northwards of the Danube after the Roman withdrawal until the arrival of the Hungarians in Ardeal or to the multitude of Slavic, Greek and Turkish words in Romanian (but the author who was learning the Romanian language remarked that their frequency is reduced as compared to the Latin originated ones).

An important part in the persistence and the homogeneity of the old Dacian-Romanised population was played by the transhumant shepherding, coming from the heart of Transylvania to the Danube, the Sea and the Dniester. The Romanians, as shepherds, are mentioned only in the 12th and 13th centuries, but their presence seems to date long before these centuries.

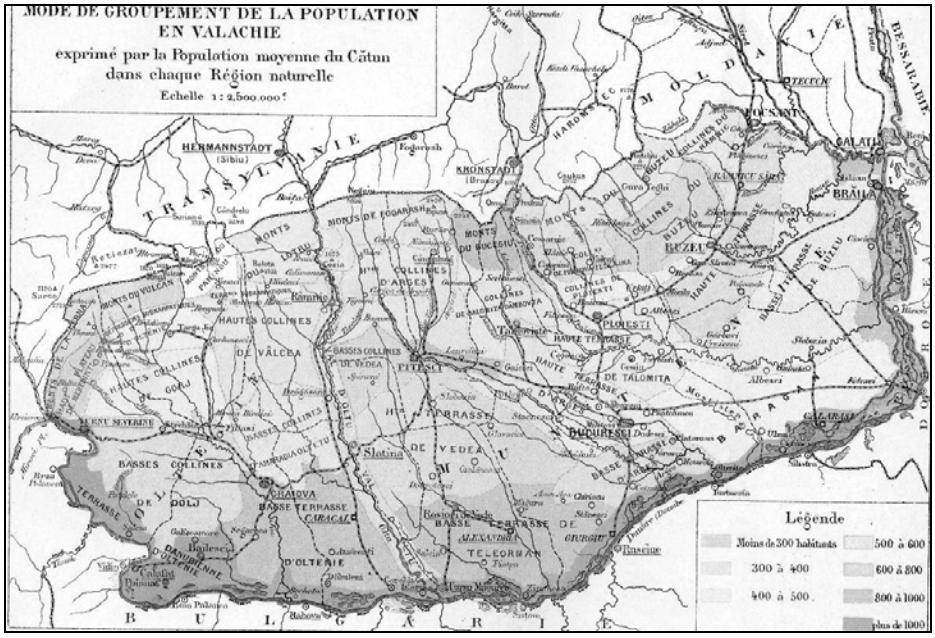

Fig. 2. The population grouping in Wallachia *(Source: Emm. De Martonne, La Valachie)*

Two dense chapters are dedicated to the southern Romanian village and peasant. According to the author, in Wallachia there were two main types of rural settlements: the hamlet (Rom. *cătun*) (up to an average of 200 – 300 inhabitants), specific to the mountainous areas, to those characterised by the presence of forest and vineyards and the village proper (more than 300 inhabitants), mostly present in the plain areas.

There are explained certain particular types of settlements (the *târlă* type) within the low areas, as well as the huts (Rom. *bordei*) and the types of houses. Two cartoschemes reproduced after D. G. Crăiniceanu reflect the very low presence of the huts in the west (Mehedinți) and the high occurrence in Bărăgan, while the wooden houses had an inverse complementary repartition (the maximum being reached in Oltenia). In 1892, the huts were numerous (50,000), 15,762 of them being located only in the Dolj district. The image of the Romanian peasant from 1900 is mentioned with focus on his material life (property, food, and costumes), the moral life (family), the birth, the wedding, the funeral, the folklore and the popular literature.

The material life of the peasant in Wallachia is generally rather wretched, the author says. However, the wealth of the oral literature and the fidelity to the old costumes within the Romanian lands prove an interesting and rich spiritual life.

These last chapters, as well as those that end the monograph, prove that the author analysed all geographical aspects, among which the relief and the human geography receive ample approaches. All very good French geographers who activated until after the half of the 20th century excelled in these two specialities.

Chapter 19 presents the Wallachian economic life, this characteristic accentuating at present the historical importance of the book, along with the geographical one. We shall not insist on the sub-chapters that it comprises, but they offer the image of an economy in full expansion, with one of the most important cereal productions in Europe and with oil exploitations of global importance.

The repartition of the domestic animals (horses, cattle, sheep, pigs), on the basis of the statistical data published in 1989, is caught in four chartoschemes that contour every county, framed in one of the seven groups of animal density (from 1 to 7 heads/animal owner). The cereal culture is rendered by analysing on counties at 100 ha of the total surface how many are cultivated with cereals, then at 100 ha of cereals how many are seeded with wheat and how many with maize. The scale of the percentage starts at less than 10 percent and ends at mote than 70 percent.

The analysis underlines a dominance of the surfaces occupied by wheat in the plain and of those cultivated with maize in the hilly area, from Mehedinți to Prahova. The Phylloxera invasion occurred between 1884 and 1898 reduced the vineyard production to a sixth. There was created a viticulture service that started to remove the damages by planting certain strong Mediterranean varieties.

Chapter 20, the industry, starts with the so-called spontaneous, household industry (furrier's trade, wood processing etc.). The underground resources that were known and exploited at that time are briefly dealt with, the author dwelling more on the oil extraction and processing. The other industries are shortly presented in only one page – the great modern industry was, however, *in statu nascendi*.

The last chapter is dedicated to the Romanian towns. The French author differentiates: Carpathian towns, Danubian towns and *villes – carrefour* (towns located at the crossing of the circulation lines) in the plain. In 1900, Wallachia had a population of 3.8 million inhabitants and held 15 towns with more than 10,000 inhabitants, 6 towns with more than 20,000 inhabitants, 5 towns with over 40,000 inhabitants and just one town with about 300,000 inhabitants (Bucharest – 282,071 inhabitants in 1899). Taking into account only the settlements with more than 10,000 inhabitants, the urban population was estimated at 19 percent of the total.

The geographical classification realised by de Martonne is accompanied by another one concerning the evolution of the historic generations of towns, many of them starting with the Middle Ages, from the market-town or fair stage, when they served as appeal centres for the neighbouring settlements.

Bucharest astonishes the author through its rapid growth after the union of the Principalities and through its occidental style buildings from the last decades of the 19th century, while its cultural importance was known up to the middle of the Balkan Peninsula.

The conclusions of the French scholar underline again the mixing of the natural and human particular features that render the geographical personality of the southern Romania.

The illustrative material of *La Valachie* comprises 21 photo reproductions of the best technical quality and very characteristic, intermingled with 48 sketches

worked by the author. One hundred ninety-five papers in Romanian, French, German and Hungarian made up the References of Wallachia, along with the author's travels and experience, to which there are to be added the consulting and the valorisation of 16 general and thematic different maps.

In Observations *on the maps* that were annexed at the end of the volume, de Martonne comments the sources and the aims of every thematic map realised by him. The first colour map, *Wallachia and the southern Carpathian Arch*, contains numerous geographical data, despite the fact that it is a general and hypsometric map, scale 1:1,200,000. Thus, if the hydrographical network and the railways were drown after the map of Romania at the same scale, by G. Iannescu, on the other hand, the schematised hypsometric curves were realised after maps at large scales 1:50,000 and 1:200,000, while, in the areas for which they had not appeared, after the German and the Austrian maps at scale 1:300,000. On this map there are represented 10 hypsometric levels from dark green (0-50 meters) to brown and dark brown (1,500 – 2,000 meters) and white (more than 2,000 meters). The settlements are mapped after the conventional signs selected by the author, according to the 1899 census. The names of the relief units, such as they were considered by de Martonne, are applied in the respective spaces.

Apparently this map laid at the basis of the plates no. 95 and 97 (Central Europe, respectively the Danubian States) of the Atlas realised by Paul Vidal de la Blache in 1902 (with whom the university geographical education starts in France; he was de Martonne's father in law).

The geological map was realised by the author and he considered it a sort of inset of the previous map. This map schematically shows in black and white the main characteristics of the geology of the southern Romania. For this map there were used the international geological map of Europe, of Hungary and the large scale maps for certain mountain massifs, which were realised by Romanian geologists.

The precipitation map is based of the map realised by S. Hepites – The pluviometric regime in Romania, 1900, but the author analysed all values registered between 1884 and 1898.

The botanical and forest map is inspired by two principles: the extension of the vegetal formations is more representative than that of the floristic limits and the phyto-formations are often well characterised by one or two species that are dominant. The basis of this map was represented by the beginning of the publishing of the forest map, scale 1:200,000. The author differentiates for the first time the transition steppe (the sylvo-steppe) from the steppe proper, but the proposed limits are not those accepted today (at de Martonne, the foresteppe/Rom. *antestepa* and the steppe covered almost the entire plain in the southern Romania).

Realised at scale 1:2,500,000, just as the other two previous maps, the population density map (Fig. 3) is really a bicolour reproduction of the colour map, scale 1:1,200,000, which was published in the same year (1902) in B.S.R.R.G., according to the data of the census that had been realised three years earlier. The mentioned colour map is attached to a less-known study 161 pages long, which

entirely occupies the quoted bulletin, under the name of *Researches on the geographical distribution of the population in Wallachia* (text entirely in French). As the French geographer mentions, this map has the same topographical sources as the first mentioned colour map (from *La Valachie*) and it is realised at the same scale. The author also used the Official guide of the urban and rural communes, as well as the geographical dictionaries on counties (those published by the Geographical Society). The inset expresses the average number of inhabitants of the rural settlements (villages; an oversight of the author explains the use of the term hamlet/Rom. *cătun*).

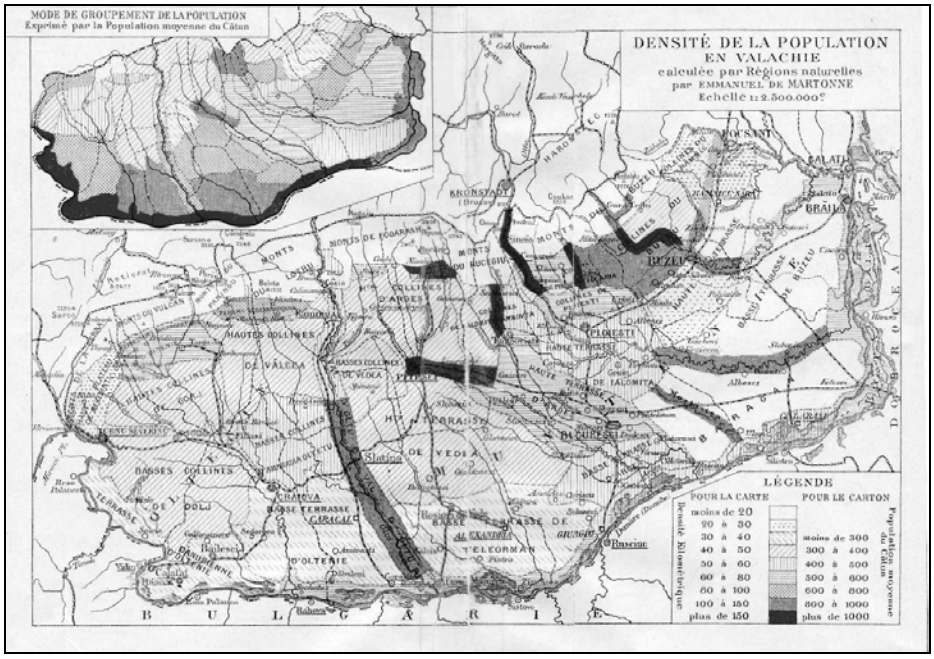

Fig. 3. Population density in Wallachia *(Source: Emm. de Martonne, La Valachie)*

As de Martonne shows in the study published in B.S.R.R.G. (1902), for him, the research of the population repartition is the most important part of the human geography and, consequently, he enumerates the principles and the manner in which the population density is approached in more European countries, materialised in the profile maps. The author concludes that, from the geographical point of view, the best computation does not refer to the report of the population number to the surface of a district or of an administrative region, but to the natural units. *The division of Wallachia into natural units is the fundament of our work*, the geographer scholar states. There follows a new theoretical incursion in the meaning of the *natural region* and the author starts from the large relief units, which he subsequently divides and subdivides. The paper displays a manner of mixing the research of the relief with its population pattern and its exploitation, which is likely to offer the geographical table that is the closest to reality.

The population density map shows, at least for the beginning of the 20th century, two large areas of maximum density (above 80 inhabitants/sq km, with smaller areas characterised by more than 200 inhabitants/sq km): under the eaves of the mountain (the main maximum in the Muntenia Hillocks) and along the Danube, downstream of the Jiu river mouth.

At the same time, there were two areas of minimum population density (under 10 inhabitants/sq. km.): the mountains and the steppe plain.

At less than a decade and a half, G. Vâlsan delimitates the natural units of the Romanian Plain, but, as the author himself states, the dominant criterion was the morphologic one. Still, the Romanian researcher started from the delimitations of the units offered by de Martonne and put in circulation a series of local popular denominations.

To conclude, even after more than a century from the appearance of *La Valachie*, the lecture of de Martonne's work can represent a remarkable information source, both for geographers and for the large public and it still remains a model of regional geographical monograph.

Annex

Statistical Table: The regions, the surface, the population

No.	The region	The surface		Forest ratio %	The population		Population density inhab./sq. km.	Average inhab. no. / rural settlement
		Sq. km.	%		Inhab. no.	%		
1	**THE CARPATHIAN MOUNTAINS**	8,659.4	11.10	74.0	41,409	1.30	4.7	373
2	**The Buzău Mountains**	2,047.8	2.60	75.0	18,737	0.60	9.0	312
3	The Buzău valleys	55.3	-	-	7,382	-	133.5	0
4	The Prahova valley	42.5	-	-	6,871	-	161.7	0
5	Between the Prahova and the Buzău	1,290.8	-	-	4,484	-	3.6	0
6	Eastwards of the Buzău	649.2	-	-	0	-	0.0	0
7	**The Bucegi Mountains**	950.5	1.20	70.0	6,865	0.20	7.0	980
8	**The Făgăraş Mountains**	2,262.8	2.90	-	10,123	0.20	4.6	310
9	The Brezoi – Titeşti Basin	140.0	-	25.0	7,646	-	54.6	297
10	The Făgăraş Mountains	2,202.8	-	81.0	2,477	-	1.2	353
11	**The Lotru Mountains**	1,458.6	1.80	87.0	1,771	0.40	1.1	354
12	**The Parâng Mountains**	590.8	0.70	61.0	0	-	0.0	0
13	**The Vâlcan Mountains**	747.7	0.90	87.0	2,100	0.05	2.8	700
14	**The Cerna Mountains**	681.2	0.80	48.0	1,813	0.04	2.6	604
15	**THE HILLOK AREA**	23,825.9	30.70	21.0	1.314.20	43.00	55.1	424
16	**THE HILLS OF MUNTENIA**	10,616.1	13.00	28.5	672,020	24.90	63.2	390
17	**The Hills of Râmnic**	1,180.6	1.50	32.9	53,707	1.40	45.6	488
18	The Subcarpathian escarpment	402.2	-	-	34,629	-	86.1	587
19	The Râmnic hills, stricto senso	778.4	-	-	19,078	-	24.5	374

20	**The Hills of Buzău**	2,165.0	2.70	20.7	157,157	4.10	72.1	369
21	The Subcarpathian escarpment	414.4	-	-	46,013	-	111.1	511
22	The Buzău valley	119.6	-	-	20,720	-	173.3	267
23	Northwards of the Buzău	845	-	-	38,318	-	39.5	
24	Southwards of the Buzău	414.4	-	-	46,013	-	111.1	
25	**The Prahova – Teleajen Hills**	907.6	1.20	17.2	92,660	2.40	102.2	718
26	The Prahova valley	52	-	-	19,303	-	371.2	0
27	The Teleajen valley	82.4	-	-	21,036	-	267.3	0
28	Între Prahova şi Teleajen	430.1	-	-	26,243	-	61.2	0
29	Westwards of the Prahova	178.6	-	-	7,546	-	42.1	0
30	Eastwards of the Teleajen	166.1	-	-	19,432	-	117.5	0
31	**The Ploieşti Hills**	653.4	0.80	20.0	47,099	1.20	72.0	448
32	**The Ialomița and the Dâmbovița Hills**	1,486.3	1.90	36.5	82,393	2.10	55.4	505
33	The Ialomița valley	88.8	-	-	20,744	-	239.0	0
34	Eastwards of the Ialomița	494.9	-	-	25,637	-	52.0	0
35	Westwards of the Ialomița	904.6	-	-	38,997	-	43.2	0
36	**The high Hills of the Argeş**	3,006.5	3.80	46.5	188,154	4.90	60.0	406
37	The Subcarpathian Depressions	141.8	-	-	15,222	-	107.2	363
38	The high hills, stricto senso	2,644.5	-	-	120,984	-	45.7	
39	The escarpment of the Argeş hills	220.2	-	-	52,130	-	236.9	840
40	**The low hills of the Vedea**	1,216.9	1.60	25.0	50,850	1.30	41.7	250
41	**THE OLTENIAN HILLS**	13,209.6	17.40	18.3	652,180	21.30	49.3	463
42	**The Subcarpathian depressions**	1,308.9	1.70	16.0	96,061	2.50	73.4	495
43	The Subcarpathian terraces	244.0	-	8.0	21,018	-	86.2	488
44	The Subcarpathian depressions	1,064.9	-	17.0	75,043	-	70.4	495
45	**The high hills of Vâlcea**	3,299.3	4.20	-	168,066	4.40	50.9	388
46	The Olt valley	608.3	-	9.0	35,058	-	57.6	394
47	The high hills, stricto senso	2,691.0	-	29.9	131,691	-	48.9	380
48	**The high Mehedinți tableland**	741.4	0.90	22.0	14,985	0.40	20.2	227
49	**The Amaradia – the Olteț low hills**	1,808.0	2.30	18.0	97,421	2.50	53.8	388
50	**The high hills of Gorj**	2,186.0	2.80	25.0	96,462	2.50	44.1	417
51	**The low hills of Dolj**	3,866.0	4.90	8.8	179,185	4.60	46.3	775
52	**THE PLAIN AREA**	35,973.5	46.50	-	1,428,572	46.80	39.6	651
53	**THE MUNTENIAN PLAIN**	31,240.1	40.30	6.5	1,185,934	39.00	38.1	622

54	**The high terraces of the Buzău**	3,165.6	4.00	1.5	103,190	2.70	32.5	648
55	The Râmnic valley	60.8	-	-	16,482	-	268.7	0
56	The Buzău valley	126.0	-	-	14,715	-	116.7	0
57	Northwards of the Râmnic	413.6	-	-	10,140	-	24.5	0
58	Between the Râmnic and the Buzău	700.0	-	-	11,343	-	16.2	0
59	Southwards of the Buzău	1,865.2	-	-	60,680	-	26.9	0
60	**The low terraces of the Buzău**	5,909.8	7.60	3.6	165,000	4.30	29.8	527
61	The Buzău valley	215.4	-	-	17,052	-	79.3	0
62	The Ialomiț valley	535.6	-	-	63,112	-	117.9	0
63	Between the Buzău and the Ialomița	4,349.6	-	-	71,742	-	16.5	0
64	Northwards of the Buzău	809.2	-	-	13,094	-	16.2	0
65	**The Bărăgan**	4,260.6	5.40	2.0	45,358	1.20	10.3	482.5
66	The Mostiștea valley	155.0	-	-	19,904	-	128.4	0
67	Eastwards of the Mostiștea	3,161.0	-	-	18,381	-	5.8	0
68	Westwards of the Mostiștea	944.0	-	-	7,073	-	7.0	0
69	**The high terrace of the Ialomița**	2,852.7	3.60	13.0	0	4.00	54.0	545
70	**The low terrace of the Argeș**	1,812.1	2.30	7.0	9,7608	2.50	53.8	734
71	**The high terrace of the Argeș**	3,184.4	4.10	11.2	234,631	6.10	73.8	557
72	**The low terrace of the Teleorman**	4,817.0	6.20	4.5	149,749	3.90	31.0	1,218
73	**The high terrace of the Vedea**	5,257.7	6.70	9.0	238,552	6.20	45.4	607
74	**THE OLTENIAN PLAIN**	4,713.6	6.10	5.2	240,589	7.90	53.2	755
75	**The Olt valley**	931.6	1.20	10.0	97,785	2.30	105.1	664
76	The upper part	499.2	-	-	51,409	-	104.5	565
77	The lower part	439.4	-	-	46,376	-	105.6	824
78	**The Oltenian terrace**	3,782.0	-	4.0	142,804	3.90	37.8	840
79	**THE DANUBE VALLEY**	9,155.4	11.70	8.7	268,688	8.80	29.2	820
80	**The Severin basin**	131.6	0.02	2.0	12,418	0.03	94.0	823
81	**The Danube terrace in Oltenia**	3,276.8	4.30	4.0	110,280	2.90	33.6	1,040
82	**The Danube valley, upper section**	1,411.8	1.80	6.6	93,807	2.40	66.4	1,750
83	**The middle section**	1,569.5	2.00	12.0	88,639	2.30	56.5	1,022
84	**The lower section**	2,725.7	3.50	8.0	65,544	1.70	24.0	969
85	**The pond**	1,635.7	10.00	11.0	0	-	0.0	0
86	**The Danube terrace**	1,090.0	1.40	5.0	65,544	1.70	58.3	969

SUMMING UP

No.	The region	The surface		Forest ratio %	The population		Population density inhab./sq. km.	Average inhab. no. / rural settlement
		Sq. km.	%		Inhab. no.	%		
1	**THE CARPATHIAN MOUNTAINS**	8,659.4	11.10	74.0	41,409	1.3	4.7	373
2	**MUNTENIA REGION**	41,856.2	54.00	12.2	1,857,954	60.5	44.2	511
3	**The hills of Muntenia**	10,616.1	13.00	28.5	672,020	21.9	63.2	390
4	**The plain of Muntenia**	31,240.1	40.30	6.5	1,185,934	39.0	38.1	622
5	**OLTENIA REGION**	17,923.2	23.10	15.6	892,769	29.2	49.6	517
6	**The hills of Oltenia**	13,209.6	17.40	18.3	652,180	21.3	49.3	463
7	**The plain of Oltenia**	4,713.6	6.10	5.2	240,589	7.9	53.2	755
8	**THE DANUBE VALLEY**	9,115.4	11.70	8.7	268,688	8.8	29.2	820
9	**TOTAL WALLACHIA**	77,554.2	99.90	23.0	3,061,020	99.8	39.5	520

NOTES AND COMMENTS

There was translated the table from the work *La Valachie,* from pages 366-368. Moreover, every area, relief unit and sub-unit was given a number in a raw, in order to be able to discuss about them again and find the equivalent from the present geomorphologic divisions. The numbers that mark the areas are the result of the assiduous work of the author to measure on different types of maps and then calculate in sq km. It is the first and the most important numbering of the areas and number of inhabitants on relief units in Romania. However, there are reasons for doubt regarding the veracity of the data regarding the above-mentioned areas. If, on the whole, we can accept the rough numbers, there is still the issue of the limits of each subunits, in many cases being transitory subunits, without a clear delineation up to the last sq km. With respect to the number of inhabitants and population density, if in general the estimations could be twice or three times bigger today, there are still subunits where the number of inhabitants was larger in 1899 (for instance the low Hills of Dolj, the High Hills of Vâlcea stricto senso, Amaradia-Olteț low Hills and most probably other too). Moreover, the mean number of inhabitants of the villages in the subunits dropped in many cases, except for the umland of the municipalities, as a result of the social and historical detour from the communist period (collectivisation and forced industrialization with their effects, deserted and old villages).

1. THE CARPATHIANS refer in this case only to the Romanian territory of that time, the border with the Austrian-Hungarian Empire of that time 'running over' the Carpathian ridge; here, as well as in the work *The Transylvania Alps,* the author avoids the last name, although it is present in the title of the book that was printed in 1907.

2. The Buzău Mountains include, in the author's opinion, the entire area eastwards of the Prahova valley, up to the Milcov valley (the former border with

Moldova Principality); today, it means the Ciucaş Mountains, the Buzău Mountains and the southern third of the Vrancea Mountains.

3. The Buzău - the Bâsca valleys refer to the transversal valley of the Buzău, from the border to the north of Pătârlagele (where it flows out of the mountainous area) and the Bâsca downstream of Gura Teghii.

4. The Prahova valley, from Predeal to Comarnic.

5. Between the Prahova and the Buzău, including today the Ciucaş and Siriu mountains.

6. Eastwards of the Buzău, i.e. beginning with the Podul Calului Mountains, it also includes the Penteleu and Vrancea Mountains south-east from the Bârsa - the Buzău confluence, up to the vicinity of Zăbala valley.

7. **The Bucegi Mountains,** which in the author's opinion, include the entire area between the Dâmbovița and the Prahova, including the upper valley of the Dâmbovița, which was not considered as a subunit.

8. **The Făgăraş Mountains** with the border along the highest peaks, just like the other massifs, did not take into account a vast mountainous area; hence, the mountainous units are not figured with their real surface.

9. The Brezoi-Titeşti basin, with broader limits than those accepted today, elongated on the north-south direction (correct it is south-west – north-east).

10. The Făgăraş Mountains, stricto senso are not divided into the main northern ridge, oriented on a west-east direction, and the southern lower summits, oriented on a north-south direction.

11. **The Lotru Mountains** (name given by G. Murgoci in 1898, from the homonymous river), includes the present day Lotru Mountains (Ştefleşti) and Căpățânii.

12. **The Parâng Mountains,** between the Olteț and the Jiu, and only to the ridge (the remaining northern area belonged to the Austro-Hungarian Empire – meaning that in reality, it covered a larger area).

13. **The Vulcan (Vâlcan) Mountains** are represented only to the border along the ridge.

14. **The Cerna Mountains:** not what we understand today, i.e. the mountains westwards of the homonymous valley (including Dobra Peak, 1929 meters), are in fact the Mehedinți Mountains, including the eastern half of the Godeanu Mountains (Godeanu Peak, 2,229 meters).

15. **THE HILLY AREA** is divided in two main regions: Muntenia Hills and Oltenia Hills; if the limits of the hills towards the mountains and the plain are generally the ones proposed by de Martonne, today the entire area is divided according to the present conceptions into various geomorphologic regions: the Subcarpathians, the Getic Piedmont, the Mehedinți Plateau.

16**. MUNTENIA HILLS** stand, in the author's opinion, the entire hilly area of Muntenia, broader in the western part of Muntenia and shrinking gradually towards the east.

17. **The Râmnic Hills**, between the Câlnău and Milcov valleys, with Deleanu Peak (664 meters) and Dumitreşti Depression – along the Râmnicul Sărat, not marked by the French author.

18. The Subcarpathian embankment is in fact a piedmont glacis, densely populated, as the author notes.

19. The Râmnic Hills, stricto senso are in fact complex Subcarpathian hills, with a raw of foothill depressions, interior hills, depressions within hills and external hills.

20. **The Buzău Hills** cover the entire hilly area westwards of the Buzău (from Sângeru settlement, in the upper basin of the Cricovul Sărat), over the Buzău and the Slănic valley up to the Câlnău; the sub-units proposed by de Martonne were not used by the Romanian geographers.

21. The Subcarpathian slope begins at the Tohaneanca valley (the right tributary of the Sărata) and stretches up to the Câlnău valley, Zilişteanca settlement; of course, it is also a piedmont glacis.

22. The Buzău valley, north of Pătârlagele and up the confluence with the Slănic (north-westwards from Buzau) is, in the author's opinion, a particular sub-unit, densely populated.

23. North from Buzău, it is an area with the same structural and morphological structure as the one in the Râmnic Hills, peaking in Bisoca Hill, 970 meters and Dâlma Hill, 819 meters.

24. South from Buzău, there is a complicated structural and morphological subunit, with only one depression – the one along the Nişcov valley (acting as a depression among hills); it includes Ciolanu, 563 meters and Istrita Hills, 749 meters.

25. **Prahova – Teleajen Hills**, according to de Martonne, begin at the springs of the Cricovul Sărat and are delineated in the south by a parallel that passed north of Măgurele; they are characterised by three structural elements: two Paleogene dikes, that sinks towards south-west (Homorâciu and Văleni) and the Neogene basin from Drajna.

26. The Prahova Valley, delineated by the author between Comarnic and Campina, based mostly on the higher population density.

27. The Teleajen Valley, between Maneciu and Văleni.

28. Between the Prahova and the Teleajen valleys, mostly a hilly subunit (with no depressions), reaching the maximum height in Măceşu Hill, near Slănic town (815 m).

29. Westwards from the Prahova (originally, it was mistakenly assumed as eastwards), there is the Provița Valley and the hills that surround it; this sub-units was not naturally obvious, and it could have been included to the unit no. 32.

30. Eastwards from the Teleajen, there are two hills in the central part of the Ivăneț – Văleni Dike (Predeal-Sărari area).

31. **Ploieşti Hills** are the last Subcarpathian hills, partially sunk, from Măgurele up to north of Ploieşti, between the Prahova and Tohaneanca valleys.

32. **The Ialomiţa and the Dâmboviţa Hills**, between the Proviţa (a tributary of the Cricovul Dulce), over the two mentioned valleys and the springs of the Potopu (Sabar), include, according to the present divisions, the Subcarpathian hills between the Dâmboviţa and the Prahova, but they also include in the south-west the eastern extremity of the Getic Piedmont (the Cândeşti Piedmont).

33. The Ialomiţa valley is the axis of the unit no. 32 and is detached as a subunit between Pietroşiţa and north of Târgovişte.

34. Eastwards of the Ialomiţa, there are the hills stretching on the eastern side of this valley, dominated by Ruşeţu Hill (602 meters).

35. Westwards of the Ialomiţa, stretching much more in the north (Stoieneşti on the Dâmboviţa, at the mountain foot), and in the south (up to Găieşti), absolutely artificially, but having as axis the entire Dâmboviţa valley within the hilly area.

36. **The Argeş High Hills** include both the Subcarpathian hills and the north-eastern part of the Getic Piedmont, lying eastwards from the Olt.

37. The Subcarpathian depressions are, according to de Martonne: Arefu (along the Argeş valley) and Câmpulung; although it was later proven that the folds structure is not present on the line that connects the west of the town with Slătioara Hill (west of the Olt), it is considered now as a Subcarpathian area, at least due to its position, general morphology and economic function.

38. The High Hills, stricto senso include what we are calling today the Argeş Piedmont, the western part of the Cândeşti Piedmont (Cândeşti Platform according to George Vâlsan) and the northern half of the Cotmeana Piedmont (up to Piteşti parallel), while in the north they come into contact with the Făgăraş Mountains, according to the author.

39. The talus of the Argeş Hills refers to the Argeş valley between Piteşti and Găieşti (especially the left bank), with dense population, vineyards and orchards.

40. The lower hills of the Vedea, southwards of the Drăgăşani-Spineni-Piteşti line, roughly delineated in the central part by what is now called the Cotmeana Piedmont (Cotmeana Platform according to George Vâlsan).

41. **OLTENIA HILLS** cover, according to the author, almost two thirds of the region lying westwards from the Olt.

42. **The Subcarpathian depressions** include the entire area in the north of Oltenia, between the Motru and the Bistriţa, the Olt tributary.

43. The Subcarpathian terraces are placed by the author eastwards of the Gilort, from Novaci to Costeşti, as a narrow succession of small depressions (of areolar erosion in softer rocks, exerted by the rivers that exit the mountain) and separating hills on the same west-east alignment.

44. The Subcarpathian depressions, stricto senso (in the northern part of Gorj), with two well-shaped depressions: Tismana (sub-mountainous) and another one between hills, at Târgu Jiu, the lowest depression (under 200 meters) in all Subcarpathian system.

45. **The high hills of Vâlcea**, generally comprising the northern half of what we call the Olteț Piedmont, but, at the French geographer, it also includes the eastern half of the Amaradia – the Gilort interfluve.

46. The Olt valley, between Călimăneşti and north of Drăgăşani, forms, according to the author, a separate subunit.

47. The high hills of Vâlcea, stricto senso come in direct contact with the Carpathians between Costeşti and Călimăneşti, the southern limit being drawn north of the Drăgăşani parallel.

48. The high plateau of Mehedinți, well delimited by de Martonne, considered by the author as a high hillock region, but really a crystalline and calcareous plateau logically belonging to the Southern Carpathians, as the local inhabitants, which use the expression *to the mountain*, also see it; the hillock region classification used by the French author influenced the Romanian geographers because of the lower altitude (400 – 700 meters) as compared to the Carpathian areas and of the existence of permanent settlements network. Nevertheless, it must not be forgotten that a classic of the Romanian geography, Vintilă Mihăilescu, exegete of the Romanian relief, never shared this idea.

49. **The Amaradia – the Olteț low hills**, detached by the French geographer, correspond to the southern half of the Olteț Piedmont and the limit towards the plain is unanimously accepted (the Craiova – Balş – Slatina line).

50. **The high hills of Gorj** would define the hills between the Coşuştea Valley across the Motru and the Jiu until eastwards of the Gilort.

51. **The low hills of Dolj** comprise a little more than what we now call the Bălăcița Piedmont, unit that, according to the author, extends towards south-west of Plenița, not far from Cetate.

52. **THE PLAIN AREA** is generally that accepted at present, more precisely it generally has the northern limits established by the French author.

53. **THE PLAIN OF MUNTENIA**, between the Olt and the Danube, is what G. Vâlsan (1915) would call the Romanian Plain, which does not includ the Oltenian Plain.

54. **The high terraces of the Buzău** comprise for G. Vâlsan the Plateau of the Râmnic (north of the river) and the western part of the Buzău Plain, denominations which define subunits with certain limit variations from an author to the other, but still preserved to the present date.

55. The Râmnic Valley is arbitrarily detached by the French scholar from Râmnicu Sărat to Ciorăşti.

56. The Buzău Valley, between the Buzău and west of Făurei, with no other justification, just as the previous one, than the higher population density as compared to the surrounding fields; at Vâlsan, both valleys belong to the Buzău Plain.

57. Northwards of the Râmnic, presently known as a relatively narrow piedmont plain.

58. Between the Râmnic and the Buzău, subsequently known under the name of the Râmnic Plain (at G. Vâlsan – the Râmnic Plateau, extended between the Buzău and the Putna valleys).

59. Southwards of the Buzău (presently the Buzău Plain) up to the Ialomița Valley.

60. The low terraces of the Buzău, as a reply to the high terraces of the Buzău from the hillock region, without evident morphological justification, from the lower Putna to the Ialomița, include what is today known as the Lower Siret Plain (according to the proposal of G. Vâlsan, 1915, p. 52, subsequently to other authors: the Lower Siret Plain), the Bărăgan of Brăila anf the Bărăgan of the Călmățui (at G. Vâlsan, on the plate no. 1 – the Siret Floodplain and, respectively, the Buzău Plain).

61. The Buzău Valley, between Făurei and the confluence with the Siret, artificially detached by the author and presently considered a part of the Lower Siret Plain.

62. The Ialomița Valley, from the west of Urziceni to Țăndărei, differentiated only through the higher population and settlement density.

63. Between the Buzău and the Ialomița, which more extended than what is presently called the Plain of Brăila and the Bărăgan of the Călmățui, as extension towards west and north.

64. Northwards of the Buzău, corresponding to the south-west of the Lower Siret Plain and to the east of the Râmnic Plain.

65. **The Bărăgan**, with the initial meaning of steppe plain southwards of the Ialomița and up to the west of Mostiştea – such as it is also delimited by G. Vâlsan, but extended by de Martonne to the sylvo-steppe area (also known under the name of the Mostiştea Plain, according to V. Mihăilescu, 1922) up to the springs of the Mostiştea and the confluence of the Dâmbovița and then of the Argeş with the Danube; the first authors were against the extension of the Bărăgan northwards of the Ialomița, but V. Mihăilescu would extend it up to Brăila and the Siret.

66. The Mostiştea valley, which represents an artificially delimited subunit on more intense population reasons.

67. Eastwards of the Mostiştea comprises the Bărăgan within the limits later proposed by G. Vâlsan.

68. Westwards of the Mostiştea (subsequently, at V. Mihăilescu, the Mostiştea Plain).

69. **The high terrace of the Ialomița**, through which the author included the northern part of the Plain of Vlăsia (thus named by G. Vâlsan), but also the east of the divagation area (also named by Vâlsan) – presently the Plain of Gherghița, to which there are to be added the south of the Plain of Ploieşti and the east of the Plain of Târgovişte.

70. **The low terrace of the Argeş**, presently including the south-east of the Găvanu– Burdea Plain and the Plain of Câlnău.

71. **The high terrace of the Argeş**, although altimetrically equivalent in average with the first, with the exception of what is presently called the Plain of

Târgovişte, further includes the Subsidence Plain of Titu and the southern part of the Plain of Vlăsia, while the western limit is given by the author on the Neajlov (thus, it also comprised the east of the Găvanu–Burdea Plain).

72. **The low terrace of the Teleorman**, largely corresponds to the Burnaz Plain, thus called by G. Vâslan after a popular denomination (*burnaz* = stout man, in Turkish, because of the higher altitude right near the Danube, in the continuation of the Ruse – Varna syneclise).

73. **The high terrace of the Vedea**, including the High Plain of Piteştilor, the Boianu Plain and the Găvanu –Burdea Plain (name given by the people, but put in circulation by G. Vâlsan) (from the genetic viewpoint, they are very different, from the terrace plain in the north to the terminal piedmont plain in the south, Gr. Posea, 1987).

74. **THE OLTENIAN PLAIN**, which, according to the French scholar, begins at the Desnăţui valley (downstream of Radovan village), thus comprising only the eastern half of what is presently known as the Oltenian Plain.

75. **The Olt Valley**, from Drăgăşani (much inside the Getic Piedmont) to north of Izlaz (Moldoveni), would form a separate unit because of its morphological couloir aspect, being more developed westwards of the river (the terraces of the Olt show an important dextrorotatory development).

76. The upper part of the Olt Valley is not delimited on the map, but, assessing from the computed surface, it appears that its limit was established (otherwise totally arbitrary) by de Martonne north of the settlement of Drăgăneşti.

77. The lower part of the Olt Valley, displays a more symmetrical development.

78. **The Oltenian terrace** (on the map: the low Oltenian terrace) is made up of the eastern part of the Băileşti Plain and of the Romanaţi Plain, really being a tabular plain, with the exception of the southern part, consisting of the Danube terraces.

79. **THE DANUBE VALLEY** is detached by the author as a separate region, from Turnu Severin to Brăila, comprising both the floodplain and the terraces of the Danube.

80. **The Severin Basin**, from Turnu Severin to Hinova, less extended in surface; a population of 12,418 inhabitants (?) was assigned to it, thought only the town accounted in 1899 for a number of 18,626 persons.

81. **The Danube terrace within Oltenia** (more precisely, the Danube terraces), in fact the largest and most developed terrace tops in Romania, which would be identified later by the Romanian researchers (Al. Dimitrescu-Aldem, 1911 and P. Coteţ, 1957); it comprises the Blahniţa Plain and most of the Băileşti Plain.

82. **The Danube Valley, the upper section**, an artificial denomination, probably taking into account the widening of the floodplain (it begins southwards of Calafat); it would end at Giurgiu and comprises, besides the floodplain, at least the lower terrace, 5-12 meters of relative altitude.

83. **The Danube Valley, the middle section** stretches up to Călăraşi and, just as the previous unit, it is marked by a number of ponds that were drained as a consequence of Stalinist decisions of nature dominance, without taking into account its laws and its revenge power.

84. **The Danube Valley, the lower section** stretches downstream of Călăraşi up to Brăila, being made up of two subunits:

85. The Pond, which comprises the two ponds of the Danube, of the Ialomiţa and of Brăila.

86. The Danubian terrace, consisting of the floodplain and the first terrace, to which there is to be added *the Hagieni Plateau*, thus named by G. Murgoci (1912), while the Brăila terrace was accredited by Al. Dimitrescu – Aldem (1911).

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CLIMATIC AND AGROCLIMATIC FEATURES OF THE SUMMER 2010 WITHIN OLTENIA

CARACTERISTICI CLIMATICE ŞI AGROCLIMATICE ALE VERII ANULUI 2010 ÎN OLTENIA

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Abstract: During the spring and summer of 2010, climatic evolutions were atypical. Following a severe 2009-2010 winter, the spring was cold and excessively rainy until March, normal from the pluviometric point of view in April and very rainy in May. The weather was cold in June, cool in July and it became normal in thermal terms in the last summer month, August, registering an upward average trend during both seasons. The cold weather started in the first part of the autumn of 2009, being a characteristic of the entire period. The rainfall regime registered higher values than the normal in June (very rainy), it was normal in July and less rainy in August. The combination between the thermal and pluviometric regimes during the analysed period led to the development of a real agroclimatic risk situation, as emphasized in the present paper. This analysis is useful for climatologists and agroclimatologists, emphasizing unusual aspects of the Oltenia climate.

Key-words: cold spring, cool summer, agroclimatic risks, Hellmann criterion, excess pluviometric regime
Cuvinte cheie: primăvară rece, vară răcoroasă, riscuri agroclimatice, criteriul Hellmann, regim pluviometric excedentar.

1. INTRODUCTION

Especially in the last 30 years, weather aspect was obviously related to climate changes in Oltenia. The climatic evolutions registered in the spring and summer of 2010 support this theory. The winter of 2009-2010 installed early and it was characterized by cold periods and blizzards; in pluviometric terms, it was a rainy winter. The cold winter weather continued also in March, as between the 5th and the 12th of the month, snowfalls and other climatic phenomena specific to winter affected the region and blizzards occurred between the 8th and the 11th. In March, there were broadcast five meteorological warning messages – yellow code for dangerous

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meteorological phenomena. We shall further analyse the climatic features of 2010 summer.

2. CLIMATIC FEATURES OF 2010 SUMMER

2.1. Climatic features of June 2010

The values of the mean monthly temperature oscillated between 15.1°C at Apa Neagră and 18.6°C at Dr. Tr. Severin and Calafat, while their deviations compared to the multiannual mean values were comprised between -2.9°C at Băileşti and -1.3°C at Polovragi. According to Hellmann criterion, June was cold (C) within most of the region, cool (Cl) in the Subcarpathian depressions and the Olt Couloir, at Rm. Vâlcea (Table no. 1).

Table no. 1

Thermal features (°C) of June 2010 in Oltenia

Meteorological station	Alt. (m)	Mean temperature June 2010	Normal value June	Δ=Tmed-N	Hellmann criterion	TMin	Tmin Date	TMax	Tmax Date
Dr. Tr. Severin	77	**18.6**	20.7	-2.1	C	**9.9**	3	**36.5**	13
Calafat	66	**18.6**	21.0	-2.4	C	8.9	2	36.3	13
Bechet	65	18.5	21.3	-2.8	C	8.1	2	35.8	12
Băileşti	**56**	18.2	21.1	**-2.9**	C	8.8	2	35.6	13
Caracal	112	18.5	20.8	-2.3	C	9.4	2	34.9	13
Craiova	190	18.2	20.6	-2.4	C	9.4	2	35.2	12
Slatina	165	18.3	20.5	-2.2	C	9.6	3	35.1	13
Bâcleş	309	16.5	19.0	-2.5	C	8.6	3	35.5	13
Tg. Logreşti	262	16.3	18.8	-2.5	C	7.0	3	34.0	13
Drăgăşani	280	17.3	19.4	-2.1	C	9.3	2	33.4	13
Apa Neagră	250	**15.1**	16.6	-1.5	Cl	**5.6**	3	35.4	13
Tg. Jiu	210	17.3	19.4	-2.1	C	6.4	3	33.7	13
Polovragi	546	16.4	17.7	**-1.3**	Cl	5.9	3	**30.6**	13
Rm. Vâlcea	243	17.6	19.0	-1.4	Cl	8.0	3	34.2	13
Parâng	**1585**	10.3	10.5	-0.2	N	1.9	2	25.9	13
Mean-Oltenia		17.0	19.1	-2.0	C	7.8		34.1	

(*Source: processed data*)

The values of the mean daily temperatures varied between 11.1°C at Polovragi, on March 1 and 28.8°C at Bâcleş, on 13.

The minimum monthly values varied between 5.6°C at Apa Neagră and 9.9°C at Dr. Tr. Severin, while their mean was 7.8°C. The coldest interval of June 2010 was between the 2nd and the 3rd, when there were registered the lowest thermal values. *The maximum monthly temperature values* varied between 30.6°C at Polovragi and 36.5°C at Dr. Tr. Severin and they were all registered on June 13.

The graph of mean temperature values *emphasizes a single warming period, between June 10 and 16, when the daily mean temperatures exceeded 25.0°C; the maximum values were above 30.0°C (maximum values ≥30°C were registered between June 8 and 17), while the climatic hot days threshold (≥35°C) was*

surpassed during the interval June 12 and 15. The general monthly mean for the region was 17.0°C and its deviation compared to the normal was -2.0°C, which allows us to classify this month as a cold month (C) within the entire region.

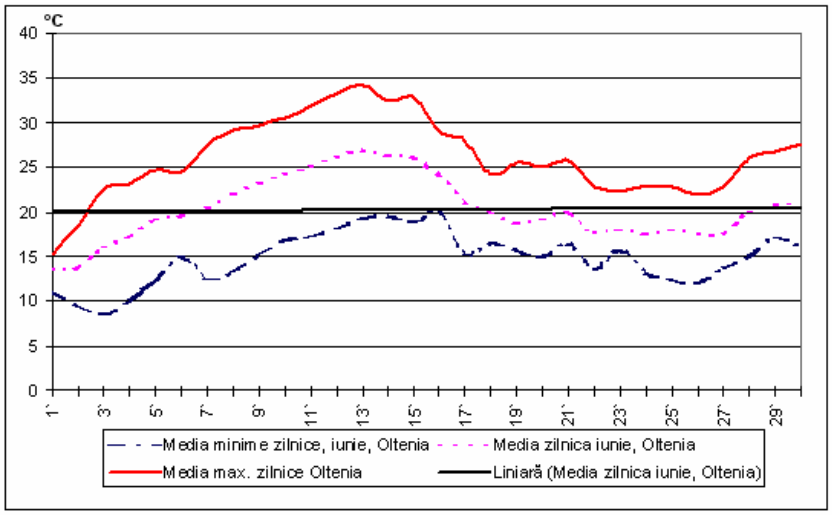

Fig. 1. Variation of the mean temperature values within Oltenia region: means of minimum daily temperatures, daily means, and means of maximum daily temperatures in June 2010 *(Source – processed data)*

Pluviometric features of June 2010

Monthly rainfall amounts oscillated between 64.8 l/sq m at Calafat, in the south-west of Oltenia, and 196.4 l/sq m at Polovragi; the deviations from the normal values were comprised between -13.7 l/sq m at Slatina, in the southeast of the region, and 84.1 l/sq m at Polovragi. The percentage deviations of the monthly rainfall amounts varied between -17 percent at Slatina and 123.2 percent at Dr. Tr. Severin. The classification of the types of pluviometric regime according to Hellmann criterion indicates a great variability – from less dry (LD) at Slatina to exceptionally rainy at Dr. Tr. Severin, Bechet, Apa Neagră, Polovragi, and Parâng (Table no. 2). This variability is mainly induced by rain showers, which generated great rainfall amounts in certain areas, while in the others they are insignificant due to the instability of the air mass and less to the atmospheric instability of frontal type. The data archives show that, on average, there were registered 2 days with significant rainfall amounts in the south of the region, 6-7 days in the hilly area and 10 days with poor rainfalls. The general rainfall mean for the entire region was 117.6 l/sq m and its deviation from the normal value was of 34.9 l/sq m, which, in percentage terms, is 42.3 percent, enabling us to classify the month as a very rainy month (VR) within the entire region.

Agroclimatic features of June

On the background of an optimum moisture regime of the soil, both during the period of water accumulation in the soil (November-March) and during the critical months (April-May), associated to a cold (C) thermal regime, there were

signalled 1 to 3-week delays in the phenological evolution of the crop plants within most of the region. At the same time, increased rainfall amounts (76-200 l/sq m) registered in June at the meteorological stations with agrometeorological program led to a favourable water supply of the soil within almost the entire agricultural territory of the country, both for autumn and spring crops. Thus, on June 29, 2010, the moisture storage accessible to autumn wheat (0-100 cm) and maize (0-50 cm) in Oltenia was optimum (AO), close to optimum (ApO) and satisfactory (AS) *(*Fig. 2 and 3*/Buletinul Agrometeorologic,* June 24-30, 2010*)*.

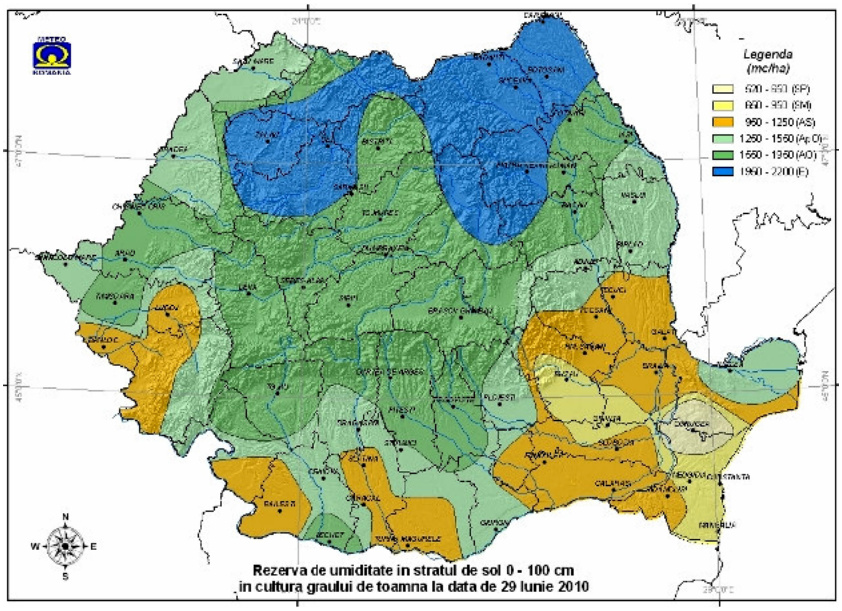

Fig. 2. Moisture storage in the soil 0-100 cm layer for autumn wheat, on June 29, 2010 (*according to ANM Bucureşti***)**

2.2. Climatic features of July 2010

The values of the mean monthly temperatures oscillated between 18.4°C at Tg. Logreşti and 22.2°C at Calafat; the deviations from the multiannual monthly means varied between -2.3°C at Tg. Logreşti and -0.5°C at Polovragi.

According to Hellmann criterion, July was cool (Cl) within most of the region, except for the areas where thermal inversions are frequent (phenomena registered also during the warm season, especially during night, which brings to lower minimum thermal values and, consequently, to lower daily means than in the neighbouring areas): Bechet, Tg. Logreşti, and Apa Neagră. *The monthly mean for the entire region* was 19.8°C, while its deviation from the normal was -1.4°C, confirming its classification as a cool month within the entire region. *The monthly minimum values* varied between 7.6°C, registered at Apa Neagră on the 8th and 14.5°C at Calafat, on the 30th.

The coldest mornings at different meteorological stations were registered on

July 5, 8, 9, 28, 29, and 30, when there were also registered the monthly minimum temperatures (Table no. 3); most of the minimum values were registered on July 8. Between July 12 and July 24, there were registered minimum thermal values of ≥20°C (tropical nights) at different meteorological stations.

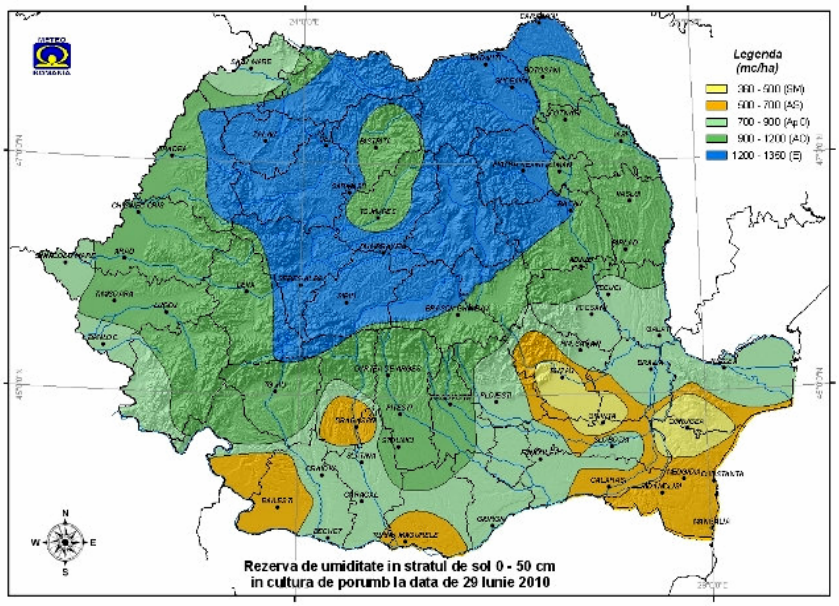

Fig. 3. Moisture storage in the soil 0-50 cm layer for maize, on June 29, 2010
(according to ANM Bucureşti)

The maximum monthly temperatures varied between 30.3°C at Polovragi and 36.1°C at Calafat and they were registered on July 16, 18, 22, and 23 (most of them on the 22nd and the 23rd).

In the interval July 11 – July 24, the maximum thermal values frequently exceeded 32°C, and thus, it developed a hot weather, while in the intervals July 17-19 and, then, July 22-24 and isolately or locally on the 14th, there were temperatures ≥35°C, which means dog days.

The graph rendering the mean temperature values for the entire region (daily means, daily minimum means, daily maximum means) indicates the hot period in the interval July 11-24 and a general easily increasing linear tendency, stressing a slow temperature increase, as it was the case during the previous months (Fig. 4).

Agroclimatic features of July

The specific agrometeorological features of July in Oltenia were: there were registered 13 days of hot weather (Tmax≥32°C), while the maximum temperatures close to the dog days threshold correlated with increased air humidity led to the increase of the bioclimatic index THI to critical values, ≥ 80.

Table no. 2

Pluviometric features[5] of 2010 summer in Oltenia

Meteorological station	Alt. m	June 2010					July 2010					August 2010					2010 summer				
		S	N	Ä=S-N	Ä%	H. Cr.	S	N	Ä=S-N	Ä%	H. Cr.	S	N	Ä=S-N	Ä%	H. Cr.	S	N	Ä=S-N	Ä%	H. Cr.
Dr. Tr. Severin	77	161.8	72.5	89.3	**123.2**	**ER**	44.6	49.3	-4.7	-9.5	**N**	**12.8**	38.2	**-25.4**	-66.5	**ED**	219.2	160.0	59.2	37.0	**VR**
Calafat	66	**64.8**	65.6	-0.8	-1.2	**N**	38.6	45.6	-7.0	-15.4	LD	14.8	35.6	-20.8	-58.4	**ED**	**118.2**	**146.8**	-28.6	**-19.5**	LD
Bechet	65	121.2	**62.3**	58.9	94.5	**ER**	44.6	46.6	-2.0	-4.3	**N**	16.4	37.9	-21.5	-56.7	**ED**	182.2	**146.8**	35.4	24.1	**R**
Băileşti	56	69.0	66.5	2.5	3.8	**N**	53.0	45.0	8.0	17.8	LR	82.2	39.0	43.2	**110.8**	**ER**	204.2	150.5	53.7	35.7	**VR**
Caracal	112	109.2	73.7	35.5	48.2	**VR**	**9.8**	53.8	**-44.0**	**-81.8**	*ED*	37.6	39.9	-2.3	-5.8	**N**	156.6	167.4	-10.8	-6.5	**N**
Craiova	190	83.0	71.2	11.8	16.6	LR	47.0	51.4	-4.4	-8.6	**N**	29.2	42.1	-12.9	-30.6	**VD**	159.2	164.7	-5.5	-3.3	**N**
Slatina	165	66.9	80.6	**-13.7**	**-17.0**	LD	45.2	57.5	-12.3	-21.4	**D**	53.0	46.8	6.2	13.2	LR	165.1	184.9	-19.8	-10.7	LD
Bâcleş	309	88.6	72.0	16.6	23.1	**R**	71.6	47.1	24.5	52.0	**ER**	10.8	**33.4**	-22.6	**-67.7**	**ED**	171.0	152.5	18.5	12.1	LR
Tg. Logreşti	262	89.6	72.3	17.3	23.9	**R**	84.6	49.5	35.1	**70.9**	**ER**	51.2	43.6	7.6	17.4	LR	225.4	165.4	60.0	36.3	**VR**
Drăgăşani	280	86.2	87.6	-1.4	-1.6	**N**	29.2	51.6	-22.4	-43.4	**ES**	41.4	46.4	-5.0	-10.8	LD	156.8	185.6	**-28.8**	-15.5	LD
Apa Neagră	250	175.8	99.2	76.6	77.2	**ER**	57.7	72.7	-15.0	-20.6	**D**	75.3	60.1	15.2	25.3	**R**	308.8	232.0	76.8	33.1	**VR**
Tg. Jiu	210	121.0	93.0	28.0	30.1	**VR**	75.5	61.9	13.6	22.0	**R**	59.4	64.3	-4.9	-7.6	**N**	255.9	219.2	36.7	16.7	LR
Polovragi	546	**196.4**	**112.3**	**84.1**	74.9	**ER**	**124.8**	88.9	**35.9**	40.4	**VR**	92.2	**76.5**	15.7	20.5	**R**	**413.4**	**277.7**	**135.7**	**48.9**	**VR**
Rm. Vâlcea	243	108.6	86.9	21.7	25.0	**R**	47.0	98.0	-51.0	-52.0	**ED**	**120.1**	69.4	**50.7**	73.1	**ER**	275.7	254.3	21.4	8.4	**N**
Parâng	1585	221.6	124.1	97.5	78.6	**ER**	163	132.1	30.9	23.4	**R**	156.4	90.6	65.8	72.6	**ER**	541.0	346.8	194.2	56.0	**ER**
Media Oltenia		117.6	82.7	34.9	42.3	**VR**	62.4	63.4	-1.0	-1.6	**N**	56.9	50.9	5.9	11.7	LR	236.8	197.0	39.9	20.2	**R**

(Source: processed data)

[5] S = monthly sum of the rainfall amounts (l/sq m); N = multiannual mean of the monthly rainfall amounts (l/sq m) calculated for the interval 1901-1990 and considered normal; Ä = S-N is the deviation of the monthly amounts (l/sq m) compared to the normal; Ä% = percentage deviation of the monthly amounts compared to the normal; H. Cr. = classification according to Hellmann criterion: ER = exceptionally rainy; VR = very rainy; R = rainy; LR = less rainy; N = normal; LD = less dry; D = dry; VD = very dry; ED = exceptionally dry

Table no. 3

Thermal features (°C) of July 2010 in Oltenia

Meteorological station	Alt. m	Mean temp. July 2010	Normal value July	Δ=Tmed-N	Hellmann criterion	TMin	Tmin Date	TMax	Tmax Date
Dr. Tr. Severin	77	22.1	23.0	-0.9	**N**	13.8	29	35.2	18;22
Calafat	66	**22.2**	**23.2**	-1.0	**Cl**	**14.5**	30	**36.1**	18;23
Bechet	65	20.9	23.0	-2.1	**C**	14.0	5;9;30	35.0	22
Băileşti	**56**	20.9	22.8	-1.9	**Cl**	12.8	9	35.0	18
Caracal	112	21.5	22.9	-1.4	**Cl**	14.3	28	34.2	23
Craiova	190	20.5	22.3	-1.8	**Cl**	12.0	8	34.4	18
Slatina	165	20.7	22.0	-1.3	**Cl**	12.6	9	33.7	16;23
Bâcleş	309	19.5	21.3	-1.8	**Cl**	9.8	8	33.1	22;23
Tg. Logreşti	262	**18.4**	20.7	**-2.3**	**C**	9.0	8	32.7	23
Drăgăşani	280	20.6	21.7	-1.1	**Cl**	13.0	8	34.1	22
Apa Neagră	250	18.5	20.5	-2.0	**C**	**7.6**	8	33.2	22
Tg. Jiu	210	19.8	21.3	-1.5	**Cl**	11.3	29	34.0	22
Polovragi	546	19.2	**19.7**	**-0.5**	**N**	8.7	8	**30.3**	18
Rm. Vâlcea	243	20.5	21.2	-0.7	**N**	13.6	29	34.0	22
Parâng	**1585**	12.1	12.5	-0.4	**N**	4.9	8	24.0	23
Mean-Oltenia		19.8	21.2	-1.4	**Cl**	11.5		33.3	

Pluviometric features of July 2010

Monthly rainfall amounts varied between 9.8 l/sq m at Caracal, in the southeast of the region, and 124.8 l/sq m at Polovragi, located in the Oltenia Subcarpathians. The deviations compared to the normal value were between -44.0 l/sq m at Caracal and 35.9 l/sq m at Polovragi, which, according to Hellmann criterion, renders a great diversity of pluviometric regime types – from excessively dry in the east of the region (Caracal, Drăgăşani, and Rm. Vâlcea) to excessively rainy on small surfaces at Tg. Logreşti and Bâcleş. This last feature was induced by isolate or local rainfalls generated by the instability of the air mass and less by atmospheric fronts. The general mean for the entire region was 62.4 l/sq m (Table no. 2), while its deviation was of only -1.0 l/sq m, which in percentage terms means -1.6 percent, underlining a normal pluviometric regime for the entire region (N). However, this aspect is less significant if we take into account the drought affecting the east of the region. Nebulosity regime was high due to the instability of the air mass and there were registered, on an average, 2 days with significant rainfalls ≥ 10 l/sq m. In the hilly area, there were about 7-8 such days and 15 days with generally poor rainfalls and frequent thunderstorms.

The greatest values were reached at Calafat (54.5 units) in 22 days, 7 of them being successive between the 10th and the 16th of July and 14 in the interval between the 11th and the 24th of July. At the same time, besides the days characterized by hot weather ($\sum T_{max} \geq 32°C$), there were also registered tropical nights ($\sum T_{min} \geq 17°C$), which affected the vegetative processes of certain crops.

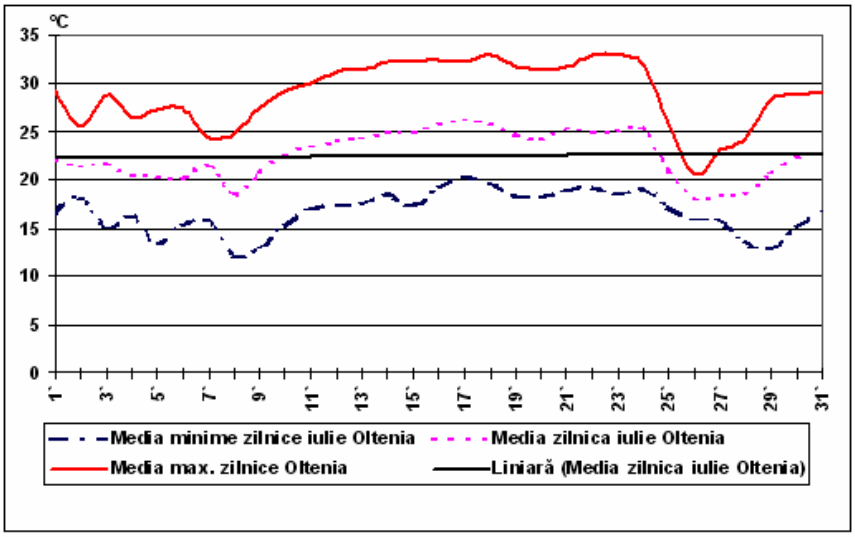

Fig. 4. Variation of the mean temperature values for the entire Oltenia region in July 2010: means of daily minimum temperatures, daily means and means of daily maximum temperatures *(Source: processed data)*

By the end of July, moisture storage at maize crops (0-100 cm) oscillated between 600 and 900 cubic m/ha in the centre of Oltenia (moderate drought – MD), between 900 and 1,200 cubic m/ha in most of the region (satisfactory supplying – SS), while in the north and extreme southeast, it was between 1,500-1,900 m^3/ha (supplying close to the optimum value – CO) (Fig. 5).

2.3. Climatic features of August 2010

Mean monthly temperatures were between 17.4°C at Apa Neagră and 21.7°C at Dr. Tr. Severin and their deviations compared to the multiannual means were between -2.7°C at Apa Neagră and +0.8°C at Polovragi. According to Hellmann criterion, August was cold (C) at Băileşti, Apa Neagră, and Tg. Logreşti and normal within most of the region (Table no. 4).

The general mean for the entire Oltenia was 20.0°C, with a deviation of 0.0°C, which allows us to classify it as a normal month from the thermal point of view.

The monthly minimum values oscillated between 8.6°C at Bechet and Apa Neagră and 14.9°C at Drăgăşani, while the mean of monthly minimum values was 11.2°C. Most of the minimum values were registered on the 21st and the 30th of August, when there occurred two significant cooling periods.

The monthly maximum temperatures were 33.3°C at Polovragi and 39.1°C at Bechet, while the mean of monthly maximum values reached 35.4°C. Most of the maximum values were registered on the 14th and 28th of August, namely in the hottest days of the month.

The graph rendering the mean temperature values for the entire region (daily means, daily minimum means, and daily maximum means, Fig. 6) indicates two main warming periods: August 10-17, when on the 14th it was registered the

maximum temperature, 28.2°C at Bechet, and August 24-28, when it was registered the maximum thermal value for the entire country, 39.1°C at Bechet and 39.0°C at Calafat.

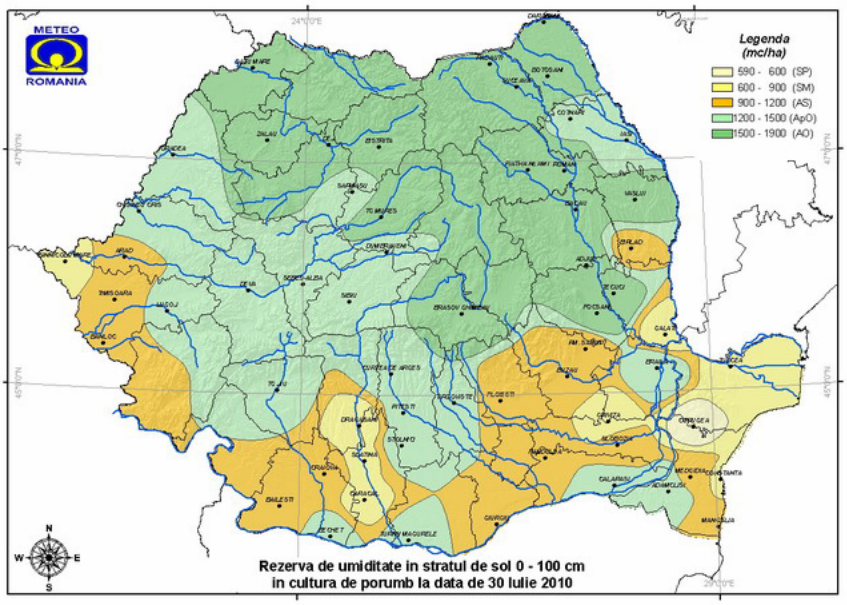

Fig. 5. Moisture storage in the soil 0-100 cm layer for maize, on July 30, *(according to ANM Bucureşti)*

Table no. 4

Thermal features (°C) of August 2010 in Oltenia

Meteorological station	Alt. m	Mean temp. August 2010	Normal value August	Δ=Tmed-N	Hellmann criterion	TMin	Tmin Date	TMax	Tmax Date
Dr. Tr. Severin	77	**21.7**	22.2	-0.5	**N**	14.1	30	36.6	15
Calafat	66	21.6	**22.7**	-1.1	**CI**	11.3	30	**39.0**	28
Bechet	65	21.1	22.4	-1.3	**CI**	**8.6**	30	**39.1**	28
Băileşti	**56**	20.1	22.5	-2.4	**C**	9.2	30	37.0	28
Caracal	112	21.3	22.4	-1.1	**CI**	11.4	30	37.0	28
Craiova	190	21.5	22.2	-0.7	**N**	12.3	30	36.2	28
Slatina	165	21.6	22.2	-0.6	**N**	12.8	24	36.1	14
Bâcleş	309	19.2	20.9	-1.7	**CI**	12.6	30	33.8	15
Tg. Logreşti	262	18.2	20.2	-2.0	**C**	10.4	21	34.4	14;15
Drăgăşani	280	21.5	21.5	0.0	**N**	**14.9**	30	36.4	15
Apa Neagră	250	**17.4**	20.1	**-2.7**	**C**	**8.6**	21	34.6	14
Tg. Jiu	210	20.0	20.9	-0.9	**N**	11.7	21	35.5	14;15
Polovragi	546	20.2	**19.4**	0.8	**N**	10.8	21	**33.3**	14
Rm. Vâlcea	243	20.5	20.5	0.0	**N**	13.8	21	35.8	15
Parâng	**1585**	13.4	12.0	1.4	**CI**	5.0	30	26.1	14
Media-Oltenia		20.0	20.8	-0.9	**N**	11.2		35.4	

It is worth mentioning that this value (39.1°C) represents the maximum thermal value for the entire summer 2010 in the whole country. We may also notice two insignificant warming periods – August 2-3 and August 6, when temperature reached maximum values of 35°C at Bechet and Băileşti, which means dog days on small areas in the extreme south of the region.

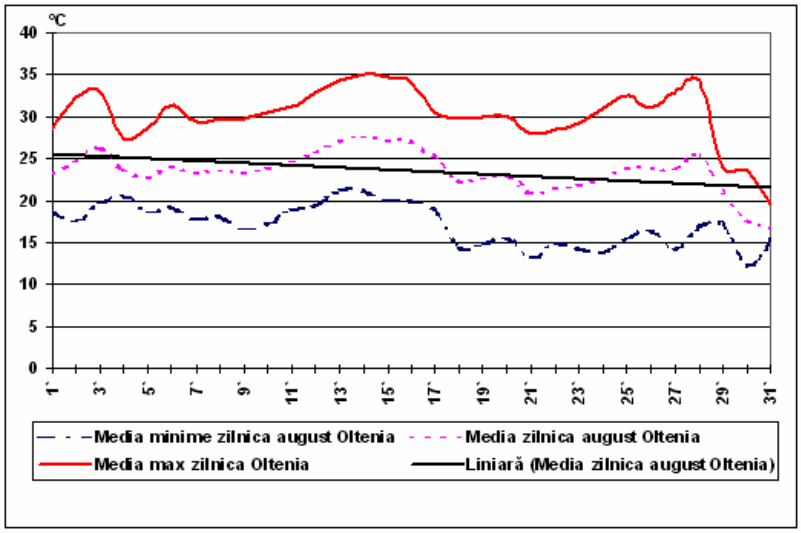

Fig. 6. Variation of mean temperature values for the entire Oltenia region: means of daily minimum temperatures, daily means, and means of the daily maximum temperatures in August 2010 *(Source: processed data)*

The most important cooling period was registered by the end of the month, August 30-31. On the 30th, the thermal minimum values decreased below 15°C, one below 9°C, which means the thermal regime characteristic to September developed two days earlier.

Pluviometric features of August 2010

The monthly rainfall amounts varied between 12.8 l/sq m at Dr. Tr. Severin and 120.1 l/sq m at Rm. Vâlcea. In the mountains, at Parâng, they reached 156.4 l/sq m. The deviations compared to the multiannual means oscillated between -25.4 l/sq m at Dr. Tr. Severin and 50.7 l/sq m at Rm. Vâlcea, while in the mountainous area, it was 65.8 l/sq m at Parâng. The percentage deviations were comprised between -67.7 percent at Bâcleş and 110.8 percent at Bechet. According to Hellmann criterion, the month was excessively dry (ED) in the western half of the Oltenia Plain, except for the area near Băileşti, where it was excessively rainy (ER), less rainy (LR) to normal (N) in the east of the plain, rainy (R) to less dry (LD) within the hilly region, normal in Tg. Jiu - Câmpu Mare Depression, and excessively rainy in the mountainous and submountainous area (Table no. 2). This diversity of classes is mainly induced by a great rainfall variability, which, in its turn, is generated by the type of air mass and atmospheric front instability. Consequently, important rainfall amounts affected

reduced areas, while on large surfaces, rainfalls missed or there were insufficient amounts over long periods of time.

Agroclimatic considerations for August

In the interval August 7-29, rainfalls were insignificant (except for two settlements), being registered 17 days without rainfalls. Under these circumstances, in the period with maximum water necessity in the case of maize (July), pedological drought with different intensity degrees (moderate, strong, and extreme) affected almost the entire region.

There was often noticed the temporary fading and rolling of the leaves during noon hours, their yellowing and drying, as well as stage perturbations in their evolution. By the end of August, the moisture storage in the 0-100 cm soil layer varied between 80 and 360 m^3/ha in the central part of the region (extreme drought – ED), between 350 and 650 m^3/ha within most of the region (strong drought – SD), 650 and 950 m^3/ha (moderate drought – MD) on small surfaces in the southwest and north, and between 950 and 1,250 m^3/ha (almost satisfactory) in the northern extremity of the region (Fig. 7).

The heat wave registered between August 24 and 28, 2010

During this summer, dog days phenomenon (temperature maximum values ≥35°C) was registered in just a few days compared to the previous years, when summers were excessively hot. Thus, *in June,* temperature maximum values ≥35°C were registered isolately on the 12th and on the 14th, and locally on the 13th (three days). The thermal maximum value of June was 36.5°C registered at Dr. Tr. Severin on the 13th.

In July, the thermal values ≥35°C registered isolatedly on 14, 17, 18, 22, 23, and 24 (6 days), but there were numerous days with maximum thermal values close to dog days threshold and THI≥80. The maximum temperature of July in Oltenia reached 36.4°C, on the 18th, at Calafat.

In August, temperatures ≥35°C, with isolate or local character, registered in 15 days, namely 3, 6, 10-17, and 24-28. Therefore, we notice the occurrence of two moderate heat waves. The first was in the interval August 10 and 17, which lasted for 8 days and the maximum value for the entire Oltenia reached 38.2°C at Calafat on the 14th. The second heat wave registered between August 24 and 28, 2010, lasted only 5 days, but it was more intense than the first. The maximum temperature reached 39.1°C at Bechet and it also represents the highest temperature of 2010 in the entire country. This second heat wave was followed by a rapid cooling of the weather, temperature oscillating between 10 and 14°C at all the meteorological stations, which means the development of a thermal regime characteristic to September starting with August 29. We shall further analyse the physical mechanism inducing this heat wave.

At the moment when the heat wave started, the distribution of the baric centers above Europe was as it follows (Fig. 8). The northern half of the continent was covered by cyclonic fields; in the south of the Scandinavian Peninsula, there was centered a cyclone of Icelandic origin, the central pressure registering 980 damgp, while the Atlantic Ocean and the Great Russian Plain were affected by another two cyclonic

centers. In the west of the continent, there was located the Azoric Anticyclone, which displayed a central pressure value of more than 1,020 hPa. East of the Black Sea, there acted the East-European Anticyclone with values over 1,015 hPa. Between these two baric formations, there developed a poor anticyclone belt (Romania was affected by it) displaying pressure values a little higher than 1,010 hPa. In the lower troposphere, Romania was affected by a western circulation, and the air mass was cPw+cT.

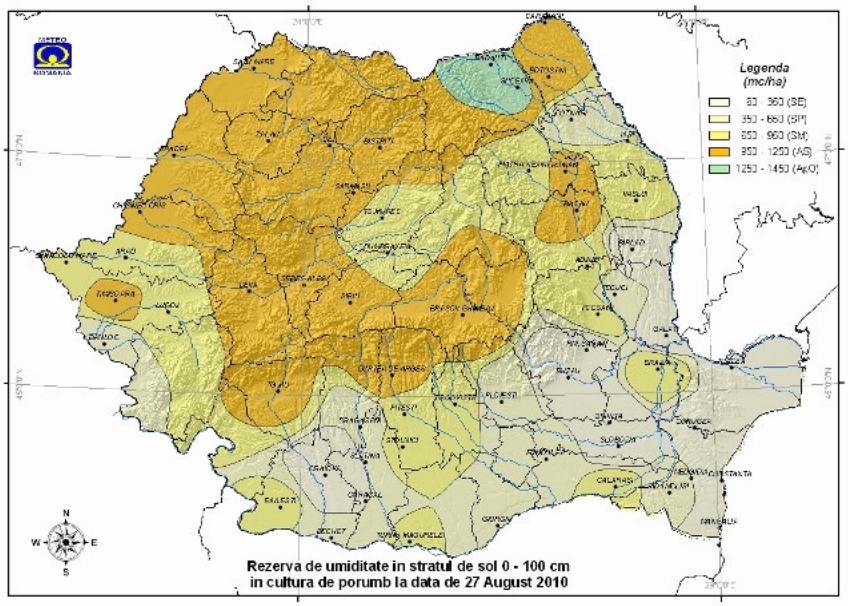

Fig. 7. Moisture storage in the 0-100 cm soil layer for maize, on August 27
(according to ANM Bucureşti)

At the level of 500 hPa, we may notice a vast low geopotential field that covered the northern half of the continent. Its center of 544 damgp was placed above the north of the Great Britain and the south of the Scandinavian Peninsula. In the southern half of the continent, there was a high geopotential field. At this level, for Romania, air circulation was western in concordance with the circulation registered in the low troposphere. At the level of 300 hPa, there occurred a strong western jet stream, which extended from the west of North America over the Atlantic Ocean to Austria and western Germany (Fig. 12). This type of situation persisted till August 28, 2010, and the circulation became easily south-western.

At the level of 850 hPa, we may notice the penetration of warm air within the entire low troposphere from northern Africa above Italy, the Adriatic Sea and Romania to Ukraine (the 15°C isotherm, Fig. 9).

The persistence of this situation determined the air warming on the continent and air circulation from southwestern sector in the last part of this interval intensified the advection of warm air from northern Africa.

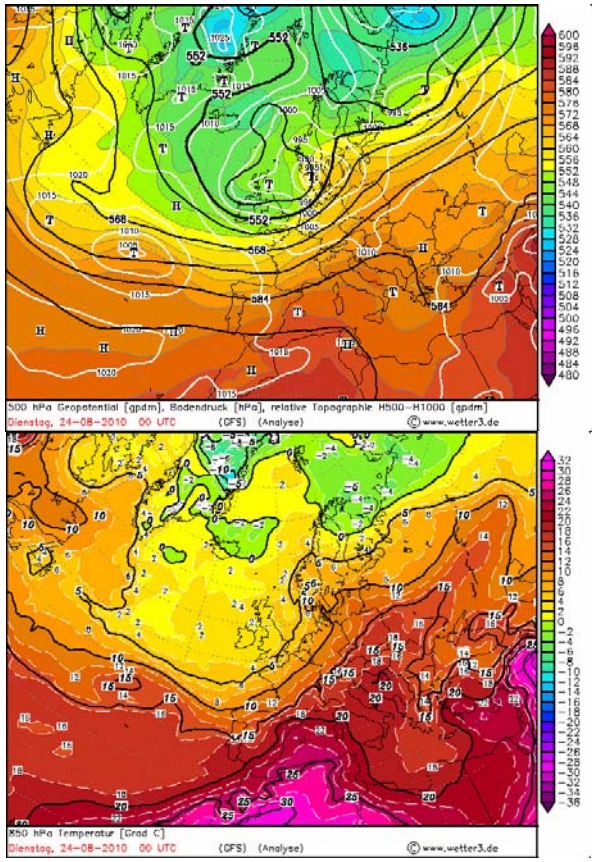

Fig. 8. ***Pressure map at surface level, geopotential field at the level of 500 hPa and relative topography 500/1,000 on August 24, 2010, at 00 UTC, when the heat wave started*** **(***according to Archiv, wetter3.de***).**

Fig. 9. ***Temperature field map at the level of 850 hPa on August 24, 2010, at 00 UTC, when the heat wave started*** **(***according to Archiv, wetter3.de***).**

At the moment the heat wave reached maximum intensity, on August 28, 2010, we may notice the interruption of the anticyclone belt above Romania and Ukraine and the positioning of the aforementioned cyclone in the east of the Russian Plain, as well as a cooling process of the weather in Central Europe (Fig. 10). The position of the jet stream (Fig. 13) also marked the position of the polar front (a cold front in fact), which brought to the intense cooling registered on the 29th and the following days. As usually in such situations, in front of the cold front, southwestern warm air advection intensified – cT (continental tropical) from northern Africa (Fig. 11). The climax of the warm advection coincided with the noon hours of maximum insolation and essentially contributed to the achievement of the maximum thermal value of 39.1°C at Bechet, in the south of the region.

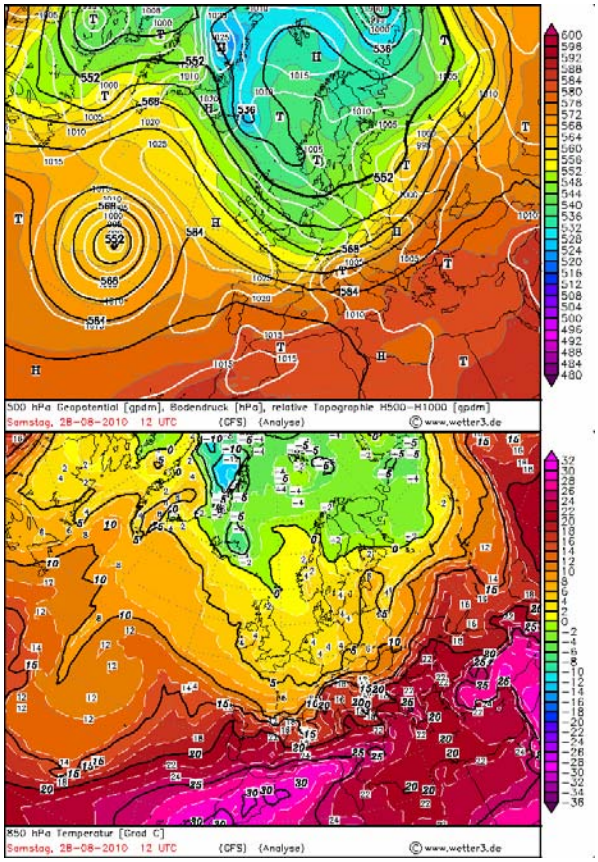

Fig. 10. ***Pressure map at surface level, geopotential field at the level of 500 hPa and relative topography 500/1,000 on August 28, 2010, at 12 UTC, when the heat wave reached maximum intensity*** **(***according to Archiv, wetter3.de***).**

Fig. 11. ***Temperature field map at the level of 850 hPa on August 28, 2010, at 00 UTC, when the heat reached maximum intensity*** **(***according to Archiv, wetter3.de***).**

3. PLUVIOMETRIC FEATURES OF THE SUMMER 2010

Total rainfall amounts registered during the summer varied between 118.2 l/sq m at Calafat and 413.4 l/sq m at Polovragi, while in the mountains, it reached 541.3 l/sq m at Parâng. The deviations of these amounts compared to the multiannual values oscillated between -28.8 l/sq m at Drăgăşani and +135.7 l/sq m at Polovragi, while the percentage deviations were comprised between -19.5 percent at Calafat and 48.9 percent at Polovragi. According to Hellmann criterion, the classification was from less dry (LD) at Calafat, Slatina, and Drăgăşani to very rainy (VR) at Dr. Tr. Severin, Băileşti, Tg. Logreşti, Apa Neagră, and Polovragi and normal at Craiova, Slatina, and Rm. Vâlcea. In the mountainous area, it was

excessively rainy (ER). The great diversity of pluviometric types reflects the great variability of the rainfall amounts during this summer, which was atypical from many points of view. The general mean for the entire region was 236.8 l/sq m and its deviation compared to the multiannual mean was 39.9 l/sq m, namely 20.2 percent, which classifies this summer as rainy (R) (Table no. 2).

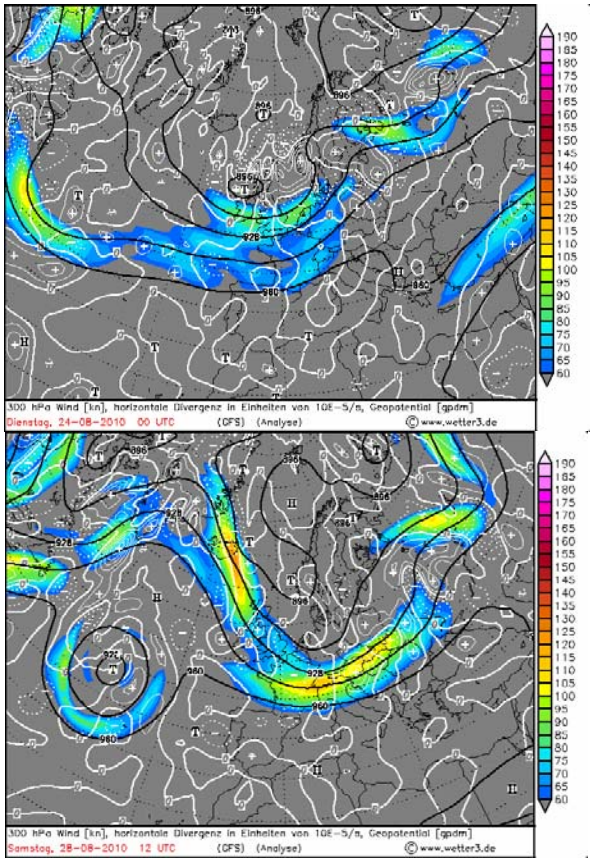

Fig. 12. The jet stream above Europe on August 24, 2010, at *00 UTC, when the heat wave started* (*according to Archiv, wetter3.de***).**

Fig. 13. The jet stream above Europe on August 28, 2010 at *12 UTC, when the heat wave reached maximum intensity* (*according to Archiv, wetter3.de***).**

The variation curve of the mean monthly rainfall amounts for the entire region in spring and summer displays a normal distribution ('Gauss' bell') emphasizing the rainy period registered in May and June, while the curve of mean temperatures for the entire region is upward displaying almost the same slope from March till August (Fig. 14).

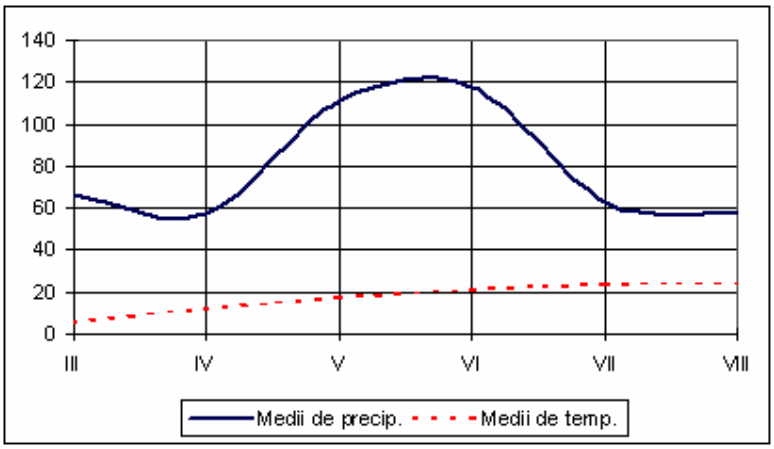

Fig. 14 Variation of mean rainfall amounts (l/sq m) and temperature (°C) for the entire region of Oltenia, in the spring and summer of 2010
(Source: processed data)

4. CONCLUSIONS

From the pluviometric viewpoint, the spring of 2010 was very rainy. It predominated moisture excess in the soil, which facilitated the presence of certain diseases and pest attack upon agricultural crops, favoured by the cool thermal regime. In April and May, the lower thermal values led to the decrease of the vegetation development rhythm, as well as to the delay of certain spring agricultural works (sowing, phytosanitary treatments). The complex interpretation of the data referring to the agroclimatic resources (thermal and hydric) of an agricultural zone allows us to characterize the favourability degree for a wide variety of species cultivated in our country according to the climatic and soil conditions, as well as to the necessities of these varieties. Each vegetation factor has the greatest influence on the agricultural species when it acts singularly or combined at certain intensity, according to the necessities of the plant.

The variable weather continued in summer; rainfall amounts reduced in July and August. June was generally very rainy (VR), July was normal in pluviometric terms and August less rainy (LR); there was registered a great variability of types according to the meteorological station and month.

The rainfall climax was reached in May and June, as it was normal, then the amounts decreased rapidly in July and August (Fig. 14), while temperature gradually increased. By the end of August, temperature decreased and, consequently, the thermal regime characteristic to September started on August 29.

The summer was marked by the presence of two moderate heat waves in August, which underlines the fact that such phenomena are possible even during cool summers. Although in Oltenia, the weather was generally cold (C) in spring and cool (Cl) in summer, at a global level, the thermal mean value for the entire

northern hemisphere was the greatest ever registered, thus, confirming the global warming process.

Presently, the registration of cold and cool periods, even at regional level, is considered beneficial for the general evolution of climate on the background of global warming.

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ANALYSIS OF BIOCLIMATIC INDICATORS IN WHITE DOMINANT AREA. CASE STUDY: THE NORTHERN SECTOR OF THE PARÂNG MOUNTAINS

ANALIZA INDICATORILOR BIOCLIMATICI ÎN SPAȚIUL MONTAN DE DOMINANȚĂ ALBĂ. STUDIU DE CAZ: SECTORUL NORDIC AL MUNȚILOR PARÂNG

George Laurențiu MERCIU[1]

Abstract. The main purpose of the study is to analyze the variability of certain bioclimatic indicators (*the Winter Scharlau Index, the Summer Scharlau index, the Relative Strain Index-RSI*, *the Wind Chill index*) in order to identify the degree of comfort felt by tourists in the white dominant area on the northern side of the Parâng Mountains. The necessity for this study is apparent in the context of the development of mountain tourism and that of winter sports tourism in the Parâng mountain resort in particular. The relevance of the results is also due to the analysis of the climatic parameters (temperature, relative humidity, wind) at two different moments in time during the tourist seasons (winter and summer). The Parâng Mountains feature a large area that favors skiing, which accounted for the tourist refurbishment of the white dominant area in the northern sector as early as 1960-1970. The typical features of the natural landscape and tourist accommodation facilities created in the Parâng mountain resort justify the heavy inflow of tourists from numerous regions in Romania in wintertime.

Key-words: Parâng, white dominant area, bioclimatic indexes, thermal comfort, winter sports.
Cuvinte cheie: Parâng, spațiul montan de dominanță albă, indici bioclimatici, confort termic, sporturi de iarnă

1. INTRODUCTION

An analysis of the thermal bioclimate is of special interest for decision-makers in the public health and the leisure sectors, but also to the population in general (Matzarakis A., Zygmuntowski E., Koch M., 2005, p. 190). The various types of comfort can be assessed by means of an analysis of the variability of bioclimatic indicators, which can be then put to practical use in areas with various economic destinations: agriculture, tourism (mountain resorts or spas etc.), urban and rural habitats. Climate information, of interest for the hospitality industry, must include – in addition to a general overview (average monthly and annual values of

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the climate elements) – information related to the thermal comfort and the factors that influence the weather (Blazejczyk K., Matzarakis A., 2008, p. 1).

In 1996, when celebrating the 100th anniversary of the modern Olympic Games, the World Meteorological Organization selected "Weather and Sports" as the theme of the World Meteorological Day, thus granting sports-applied meteorology an identity of its own (Pezzoli et al., 2000, p. 2).

In the 19th century, the link between sports and tourism developed thanks to the positive perception of sports as a fundamental activity to engage in one's free time; it gained new values, from the simple physical exercice to a competition-based, ludic and health-restoring activity (Di Marco, M., D'Intino, G., Oronzo, S., 2004 quoted by Iancu, Siddu, 2009, p. 64).

Throughout history, travelling for sport is evident, whether it involved journeying to the next village to play a game of football or in recent times (as mountains became an attraction instead of an object of fear) to go skiing (Matley, 1981 quoted by Nicula, 2008, p. 414). Sports have become an important part of leisure tourist activity, which is reflected by the rise in numbers of tourists who choose an active holiday (Iancu, Siddu, 2009, p. 64).

The development of winter sports tourism in the northern sector of the Parâng Mountains requires an analysis of the type of thermal bioclimate, in order to highlight the elements that favor or restrict tourist activity in that region. Although Parâng is a traditional destination for winter leisure activities, it was recently homologated as a mountain resort of national interest, whose status is stipulated in the Government's Decision 1205 of 07/10/2009.

2. METHODS

The analysis of the bioclimatic indicators was conducted using the variation of meteorological parameters during the 1971-2000 time interval, using data supplied by the Parâng weather station. In order to describe thermal comfort during both the cold season and in summer, several meteorological parameters were analyzed (average temperature, relative humidity, wind speed). Operationally speaking, multi-annual sets of data were used - the daily measurements of the above-mentioned parameters – and several bioclimatic indicators were calculated (winter and summer Scharlau indexes, RSI index – *relative strain index*, the Wind-Chill index) with the goal of highlighting the effects of thermal bioclimate on tourists in the analyzed mountain region.

3. RESULTS

3.1. The Winter Scharlau Index reflects the level of human discomfort felt because of skin exposure to the cold. The index derived by Scharlau reflects bioclimatic comfort when air temperature remains positive; the more the temperature decreases, the more intense the physiological sensation of cold becomes (Ionac, Ciulache, 2008, p. 29). The author established a correlation between critical temperatures and the level of humidity; each thermal value is matched by an air humidity value; in wintertime, the human body senses no

physiological discomfort generated by weather getting colder as long as temperature ranges from -5° C to 6° C and humidity stands at 40% or higher. When these critical temperature values - as mentioned by the author - are exceeded, the sensation of cold on the skin is sensed with varying intensity.

The Winter Scharlau index highlights that thermal discomfort caused by the cold is felt in all winter months, with a peak in December and a low in March (Table no. 1). The values of the winter index as calculated for the Parâng mountain resort indicate the normal wintertime conditions typical of mountain regions.

Table no. 1

Winter Scharlau index values as calculated for Parâng

Month	Average temperature	Relative humidity	Winter Scharlau index value	Critical Scharlau temperature	Comfort/ discomfort
November	-2	81	-4.4	2.44	Intense discomfort
December	-3.7	81	-6 .1	2.44	Intense discomfort
January	-5.8	82	-8.3	2.54	Intense discomfort
February	-5.6	86	-8.5	2.94	Intense discomfort
March	-3.1	83	-5.7	2.65	Intense discomfort

(Source: processed data)

In order to be able to estimate the length of time of the winter season, the number of winter days was also calculated; they are predominant in the months of December, January, and February and fewer in March (Fig. 1); one may conclude that winter sports can be played through to mid-March, and if the layer of snow endures, the winter season can last as long as through to late March or even early April.

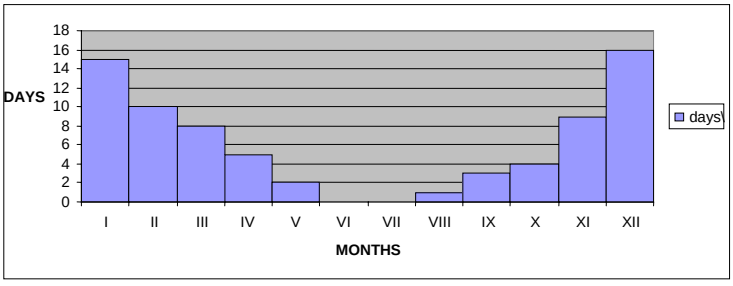

Fig. 1. The average number of winter days at the Parâng weather station (1971-2000)

The importance of winter days for tourist activity is explained by the fact that temperature peaks at no more than 0° C, which favors the preservation of the layer of snow.

It is common knowledge that several outdoors sports activities are strongly influenced by meteorological conditions (Pezzoli et al, 2000, p. 5). The impact of the main climatic parameters on the types of winter sports is synthetically described in Table no. 2.

Table no. 2

The index of meteorological elements' impact on the types of winter sports

Type of sports	Atmospheric pressure	Temperature	Wind	Precipitation	Cloudiness
Alpine skiing	1	4	3	5	4
Cross-country skiing	2	5	4	5	2
Bobsleigh	1	5	3	4	4
Ice skating (outdoors skating rink)	2	5	3	4	1

Legend of the impact index: 1 = low; 2 = mild; 3 = average; 4 = significant; 5 = important.
(Source: Pezzoli et al., 2000, MeteoSport – linea di ricerca in meteorologia applicata allo sport, p. 5)

3.2. The Summer Scharlau index is defined by the same author as indicating the degree of thermal comfort or discomfort in summer biometeorological conditions. K. Scharlau experimentally defined thermal comfort conditions during the warm time of the year as thermal comfort conditions in the warm season in between the limits of temperature (17°-39°C) matched against atmospheric humidity (values ranging from 30 to 100%) and in the absence of wind (Ionac, Ciulache, 2008, p. 32). Exceeding those temperature and humidity values generates a sense of physiological discomfort caused by the excessive heat and humidity.

The values reached by calculating the summer index indicate thermal comfort in the Parâng Mountains as a result of moderate temperatures in the summertime (Table no. 3). The analysis of monthly temperatures' evolution indicates the fact that summers are relatively warm, early springs are cooler and wet and autumns are long and relatively warm and dry. These climatic characteristics favor the development of mountain tourism and especially backpacking tourism in the northern region of the Parâng Mountains. The best time for indulging in backpacking tourism overlaps with the time intervals when temperatures in the analyzed area are higher (May-September) (Fig. 2). One may conclude that tourists in the analyzed mountain region can indulge in summer activities under the best of conditions throughout the warm season.

On a monthly basis, the peaks in the tourist seasons are December – January in winter (the time of best conditions for playing of winter sports, overlapping with

the time of school holidays and the Christmas vacations) and July and August in summer, the hottest months of the year (Fig. 3).

Table no. 3

Summer Sharlau index values as calculated for the Parâng resort

Month	Temperature	Relative humidity	Summer Scharlau index value	Critical Scharlau temperature	Comfort/ Discomfort
June	15	81	4.88	19.88	Well-being
July	17	80	3.09	20.09	Well-being
August	16.5	79	3.81	20.31	Well-being

(Source: processed data)

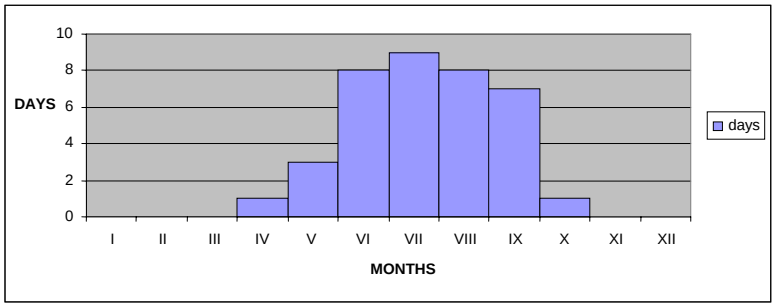

Fig. 2. The average number of summer days at the Parâng weather station (1971-2000) (*Source: The Parâng weather station*)

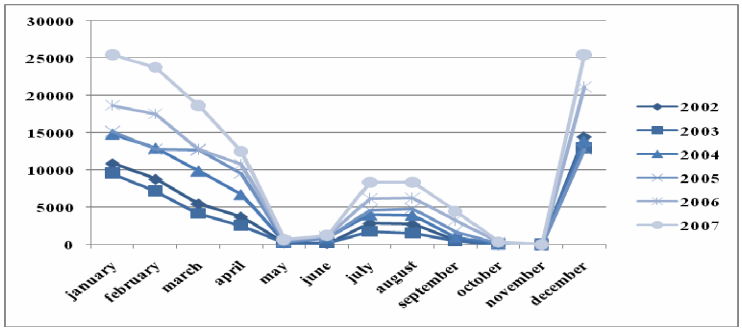

Fig. 3. Monthly evolution of accommodation capacity in service (seat-days) in the Parâng mountain resort during 2002-2007 (*Source: processed data*)

3.3. The Relative Strain Index (RSI) is one of the most relevant bioclimatic indexes; it indicates the real scale of human body heat exchanges under overheating conditions; it indicates not only the intensity of bioclimatic stress due to exposure to heat, but also the potential negative effects of extreme bioclimatic conditions on human psychology (Ionac, Ciulache, 2008, p. 35). Unlike the Summer Scharlau index, RSI values' fluctuation in time and space is more limited,

which better highlights the risk potential caused by overheating in the analyzed region. The results of calculations of the RSI for the Parâng resort indicate summer as the best time of the year for tourism, thermally speaking, as the values are similar to those calculated for the Summer Scharlau index (Table no. 4).

Table no. 4

Relative Strain Index (RSI) values as calculated for the Parâng resort

Month	Maximum temperature	Relative humidity	RSI index	Type of comfort
June	15	81	-0.14	Well-being
July	17	80	-0.09	Well-being
August	16.5	79	-0.1	Well-being

(Source: processed data)

3.4. The Wind Chill Index was calculated in order to highlight the conditions for playing of winter sports; by matching thermal values against the speed of wind, one can subdivide the cold season into shorter periods of time, divided function of the two indexes' values into different types of meteorological weather: cold weather, very cold weather and conditions for freezing. This climate index reflects the combined action of air temperature and wind speed (m/s) on human body heat, that is the intensity of heat energy the human body surface loses by means of various physical processes (radiation, convection, evaporation) (Ionac, Ciulache, p. 41). The Wind-Chill index values calculated for the Parâng massif (Table no. 5) indicate that the difficult months during the year are those in wintertime, with thermal discomfort peaking in January and February, the months when temperature drops to its lowest and wind reaches the highest intensity (7-8 m/s), which leads to very likely conditions for freezing.

Table no. 5

Wind Chill index values calculated for the Parâng resort

Month	Temperature	Wind speed (m/s)	Index value	Type of weather
November	-2	5	-11.2	Very cold
December	-3.7	6	-15.2	Very cold
January	-5.8	8	-21.1	Conditions for freezing
February	-5.6	7	-19.4	Conditions for freezing
March	-3.1	5	-12.6	Very cold

(Source: processed data)

The values resulting from calculating the Wind Chill index in the Parâng resort indicate conclusions similar to those obtained after calculating the Winter Scharlau index, that is that the climate in the northern Parâng Mountains is harsh as a result of very low temperatures and wind intensity, with no thermal comfort and bioclimatic stress reaching maximal values. Under those conditions, the strain placed on the body is heavy, and can only be withstood by young and vigorous

people. However, the conclusion can be reached that these weather conditions offer the premises for proper indulging in winter sports.

For a complex analysis of the favorable conditions for winter sports activities, it is important to have information on the amount and thickness of solid precipitation. The first snow layer is accumulated in the last third of October, and the last layer of snow at the end of the second third of April. In terms of consistency and thickness, the best-quality layer of snow in terms of winter sports-playing is the one during December-March (Table no. 6, Fig. 4).

Table no. 6

Snow layer thickness in the Parâng Mountains (1971-2000)

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Average duration of the snow layer (days/year)
Parâng	**42.5**	**56.5**	**51.2**	**13.7**	**0.8**	**0.1**	**0**	**0**	**0**	**0.2**	**5.7**	**21**	**238**

(Source: The Parâng weather station)

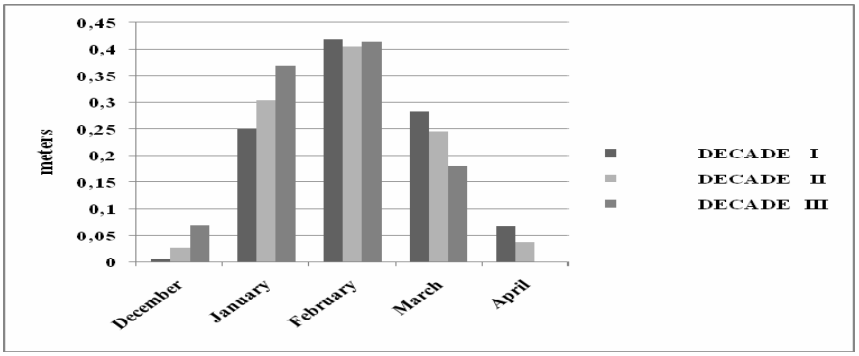

Fig. 4. Snow layer thickness in the Parâng mountains, divided in 10-day groups

The average duration of snowfalls and the average number of days with a snow layer exceeds 200 days a year, or 85% of the total number of winter days per year. These high values in terms of both snow layer thickness and the number of days with snow indicate favorable conditions for winter sports activities throughout the period. Unlike other mountain areas where snow guns are used in order to compensate the shortage of snow, Parâng is one of the few massifs where heavy snowfalls start early in the year (in autumn) as a result of direct exposure to humid air advections, inbound from the ocean (Micu, D., Mărăşoiu, D., 2009, p. 7).

4. CONCLUSIONS

The climate is a dynamic element with special tourist potential. In mountain tourism, natural conditions have a fundamental importance, ensuring the quality of services, integrating the location in the mountain area and offering favourable conditions for practicing winter sports, mostly ski. Also, the types of weather and climate condition can limit tourist activity.

Information on the climate and types of comfort is a present-time necessity for both the local population and for tourists. In this context the analysis of meteorological conditions becomes a particularly important aspect in order to highlight the characteristics of the climate of the residential and/or tourist spaces. The study of the fluctuation of the climate-touristic indicators is a necessary task in assessing the state of physiological and mental comfort, particularly for touristic activity. Holidays spent outdoors, with tourists resorting to playing of sports or indulging in various types of climatotherapy (heliotherapy, spa therapy etc.), are the most suggestive examples that indicate the dependence of the variability of weather and environment conditions. The strong seasonality of mountain tourism is the result of its interrelation with the favorability of thermal conditions and solid precipitation.

By highlighting the qualitative and quantitative features (by calculating the bioclimate indexes) the climate conditions in the area analyzed indicate favourability for tourist activities, playing of winter sports under the best of conditions, and engrossing in various types and forms of tourism in summer (backpacking, recreational caving, ecotourism and cyclo-tourism etc).

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ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT IN THE DANUBE FLOODPLAIN, THE DROBETA TURNU-SEVERIN – BECHET SECTOR

PROTECȚIE ENVIRONMENTALĂ ŞI DEZVOLTARE DURABILĂ ÎN LUNCA DUNĂRII, SECTORUL DROBETA TURNU-SEVERIN – BECHET

Mihaela LICURICI[1]

Abstract: The floodplain sector under analysis is located in the south-western extreme part of Romania, covering a distance of about 260 kilometres between the towns of Drobeta Turnu-Severin (westwards) and Bechet (eastwards) and extending on variable breadths, from a few tens of meters to more than 14 kilometres (with greater extension near the settlements of Ciuperceni and Cârna).
In the framework of its strategic and economic importance, of the food sources offered by the Danube floodplain and ponds, the human interventions within this unit were diverse and affected the balance and the metabolism of the natural ecosystems. In numerous cases, this type of intervention, under its multiple forms, led to irreversible changes of the environmental features.
The present paper aims at analysing the theoretical and actual conservation status of the most important flora, fauna and habitat elements that are characteristic to the Danubian environment, as well as presenting some examples of good practices or financing sources that might contribute to the improvement of this approach in the prospect of the region's sustainable development.
The SWOT analysis allowed for a general, synthetic assessment of the quality of the environmental sub-systems within the Danube Floodplain sector under analysis and of their development possibilities in concordance with the sustainability principles.

Key-words: the Danube Floodplain, human impact, protected area, Natura 2000, sustainable development, SWOT analysis
Cuvinte-cheie: Lunca Dunării, impact antropic, arie protejată, Natura 2000, dezvoltare durabilă, analiza SWOT

1. INTRODUCTION

The environment has a character perceived as a totally particular quality, a reflection of certain spatial-temporal realities that were permanently shaped and defined within the man – nature dialog. Entering the general framework, the floodplain environment is *not only an ensemble of material elements, but also the mental representation, the collective image, the psychic echo of the connection of people, communities, or groups with their place* (Roşu Al. & Ungureanu Irina, 1977). This permanent relation between the natural and the social and ethno-

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cultural dimensions shows great importance within the analysed space and it must be taken into account in all discussions about sustainable development.

As vast systemic ensemble, the environment results from the integration of three large equivalent systems: that of the ecological or abiotic support, the system of the vegetal and animal communities and the system of the human activities, through which the first two ones are modified, planned and used (Bertrand G., quoted by Roşu Al. & Ungureanu Irina, 1977).

The regional development became a major concern for the scientific research community, as well as a debate subject for the central and local authorities, for the entrepreneurs and the public actors. The space – as the support of the human activities, as well as *natural capital* – represents the objective form of material existence and expresses the order of the real world's coexistence, the spatial dimension being vital for the support of the social-economic systems (Berca M., 2000; Mohan Gh. & Ardelean A., 1993). The natural capital of the Danube Floodplain holds a productive capability that must be known through its functional cells in order to avoid the degradation under the human impact and to favour the sustainable use of its support capacity. The guarantee of the sustainable social-economic development in the Danube Floodplain space also implies being familiar with the ecological sustainability, the ecosystem integrity, the support capacity of the environment, the regional and local ecologic balance of the ecosystems (*Redimensionarea ecologică şi economică pe sectorul românesc al Luncii Dunării*, 2008).

The issues connected to the preservation of the biological diversity and to the sustainable development require a multidisciplinary approach, which underlines the need to protect the biodiversity and, at the same time, supports the economic development and the improvement of the human communities' living conditions (Vădineanu A., 1998; Vădineanu A. et al, 1999). The efforts made to preserve the biodiversity are sometimes in conflict with the human needs, both requirements being real and understandable.

2. ENVIRONMENTAL PROTECTION IN THE DANUBE FLOODPLAIN, DROBETA TURNU-SEVERIN – BECHET SECTOR AND SUSTAINABLE DEVELOPMENT

2.1. The national legislation concerning the environmental protection and the sustainable development

The issue of sustainability within the study area concerns the meeting of the immediate and future needs of resources and employment, at the same time with the minimization of the economic development impact on the biological diversity.

The concept of *sustainable development* can be applied in a number of ways. As some environmental economists define it, *development* refers to the improvement of the organization and not necessarily to the increase of the consumption of resources. The sustainable development is a useful concept for the conservationists, because it accentuates the need of the present development and the limitation of the increase (Primack R. et al, 2002). The investments in the infrastructure of protected areas, in order to improve the biological diversity preservation and to provide the local communities within the Danube Floodplain with new opportunities, would

represent an example of sustainable development and the same would do the efforts to promote certain less destructive forestry and fishing practices in the region. Purposely or not, the concept is sometimes misunderstood in order to achieve profitable activities, despite their impact on the environment. For example, the construction plan for a tourist and hunting complex that would imply significant deforestations in the Danube Floodplain cannot be drawn in the sphere of sustainability simply because the promoted activities would erase from the natural circuit certain surfaces with high biological or protection value.

Between the ideas that support the return to the wildness and those that propose the intensive arrangement of the floodplain, the aspects concerning sustainable development must be closely analysed in order to solve in the best manner the contradiction societal needs – biological diversity protection (Freeman R. E. et al, 2003). The efforts to reach the balance between the two elements are based on the initiatives of the local communities, of the conservationist organisations and of the government, initiatives that sometimes end by being transposed into environmental laws or regulations. These efforts can take multiple forms, but they would have to begin with individual or collective commitments concerning the prevention of the destruction of habitats and species, the aim being that of preserving valuable specific natural elements (Turner M. G. et al, 2001).

At theoretical level, the legislative documents related to the biodiversity preservation regulate the activities that directly touch the species and the ecosystems. Such acts establish when and where one can hunt, the characteristics and number of fauna elements that can be killed, the types of weapons, traps and other equipment in use, as well as the species that can be hunted. Similar documents concern the gathering of fish and plants from the aquatic environment. This is an attempt to efficiently use the natural resources, clearing the overexploitation risk.

Another theoretical legislative aspect concerns the regulation of the land use, as means of biological diversity protection. It includes limitations on the degree and type of land use, regulates the access and the potentially polluting activities. Vehicles and even people can have restricted access in the habitats and the areas with ecologically fragile resources, such as those used for nesting, the swamps, the sand dunes, and the sources of drinking water. The territorial arrangement plans must interdict the building within sensible areas, such as the floodable area. For major projects, such as barrages, channels, communication network etc., environmental impact studies must be attentively elaborated, as these documents assess the potential damages caused by the fulfilled projects.

At the same theoretical law level, there are to be mentioned the biological diversity protection strategies realised at national or at national level, through the declaration of biological communities as protected areas.

The environmental protection within the Danube Floodplain implies the maintenance of all natural processes in a state of balance that would allow the development of live in all its complexity (*Geografia României*, vol. I, 1983). The ideas concerning the need to preserve the landscapes and the biodiversity specific to the floodplain, as inherent components of sustainable development, materialised through the appearance of nature reserves (according to the *Law no. 5/2000 – Section 3 –*

Protected areas, which was subsequently amended and completed by other normative acts, among which the most significant are: GD no. 2151/2004 and GD no. 1581/2005 regarding the institution of protected nature areas regime for new zones; GD no. 1586/2006 concerning the framing of certain protected nature areas as wetlands of international importance; GD no. 1143/2007 regarding the institution of new protected nature areas; GD no. 1284/2007 and MO no. 1964/2007 in the framework of the Ecological Network *Natura 2000* in Romania). There is to be added an important number of protected nature areas declared through County Council Decisions, at the level of the territorial-administrative units bordered by the Danube (Fig. 1).

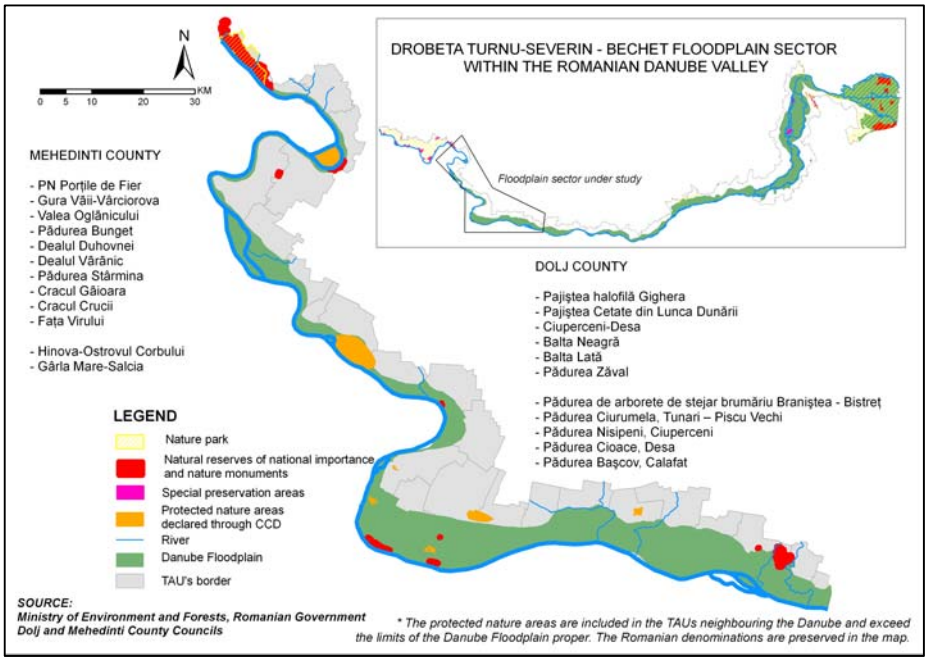

Fig. 1. The Danube Floodplain, Drobeta Turnu-Severin – Bechet sector. Protected nature areas of local and national importance

2.2. New forms of environmental protection in the Danube Floodplain. Case study: the Ecological Network Natura 2000

During the *Conference on Environment and Development* (Rio de Janeiro, 1992), when the *Convention on the biological diversity* was signed (also ratified by Romania through *Law no. 59/1994*), there was concluded that the effective protection of nature can only be realised on the basis of a comprehensive strategy, underlying on the principles of sustainable management (Schneider E. & Drăgulescu C., 2005) and the EU members decided to take effective measures for stopping the biodiversity decline. The preservation of the vulnerable plant and animal species, as well as of their habitats within the most representative natural spreading areas was seen as a requirement and, thus, the *Ecological Network Natura 2000* was founded.

The implementation of this process is based on two important aspects:

1. The designation of the sites on *strictly scientific* criteria. The characterization of the species and of the habitats included in the *Nature 2000* sites is documented starting from field scientific research and it is ended through the filling of a standard form (including data related to the biocenosis, biotope and other important aspects: ownership, management, vulnerability, geographical and legislative elements etc.), while their preservation status is to be monitored.

2. *The economic, social, and cultural realities of the area*. The aim of the Network is not to create certain *nature sanctuaries*, where all human activities are forbidden, but the achievement of the appropriate conditions for the man – nature balanced cohabitation. The development or the retaking of certain human activities can be an essential condition for the maintenance of some species or habitats of community interest. Their existence in a good preservation stage even in areas with heavy human impact ascertains the fact that the sustainable management of the natural resources is compatible with the human activities (Lazăr G. et al, 2007). *Natura 2000* represents a European network of the sites comprising natural elements that deserve to be preserved due to their numerous benefits, among which the presence of protected species is the most important. This does not mean strict protection or totally wild areas, where the human activities are forbidden. Many *Natura 2000* sites exist because of the human activities developed without affecting the species and the habitats.

The legal framework for the implementation of the *Network* is represented by two Directives of the European Commission: Directive 79/409/CEE regarding the preservation of wild birds (the *Birds Directive*), adopted on February 2nd, 1979, and Directive 92/43/CEE concerning the preservation of natural habitats, of wild flora and fauna (the *Habitats Directive*), adopted on May 21st, 1992.

These two directives were initially transposed into the Romanian legislation through the Law no. 462/2001 for the approval of the *Urgent Governmental Ordinance no. 236/2000 concerning the regime of the protected nature areas, the preservation of the natural habitats, of the wild flora and fauna*. Subsequently (2007), it was promulgated the Urgent Ordinance no. 57/2007, which repealed the Law no. 462/2001 and included more detailed provisions concerning the constitution of the Network *Natura 2000*, as well as the management of the sites and the control of the application of the legal regulations instituted for the sites. At the end of 2007, there appeared *The Order of the Ministry of Environment and Sustainable Development No. 1964/2007 concerning the institution of the protected nature areas regime for the Sites of Community Interest, as component of the Ecological Network Natura 2000 in Romania*, as well as *The Governmental Decision No. 1284/2007 concerning the declaration of Special Protection Areas as component of the Ecological Network Natura 2000 in Romania*. The exceptional natural capital

of the Danube Floodplain led to the protection of extended surfaces through their inclusion on this *Network* (Fig. 2).

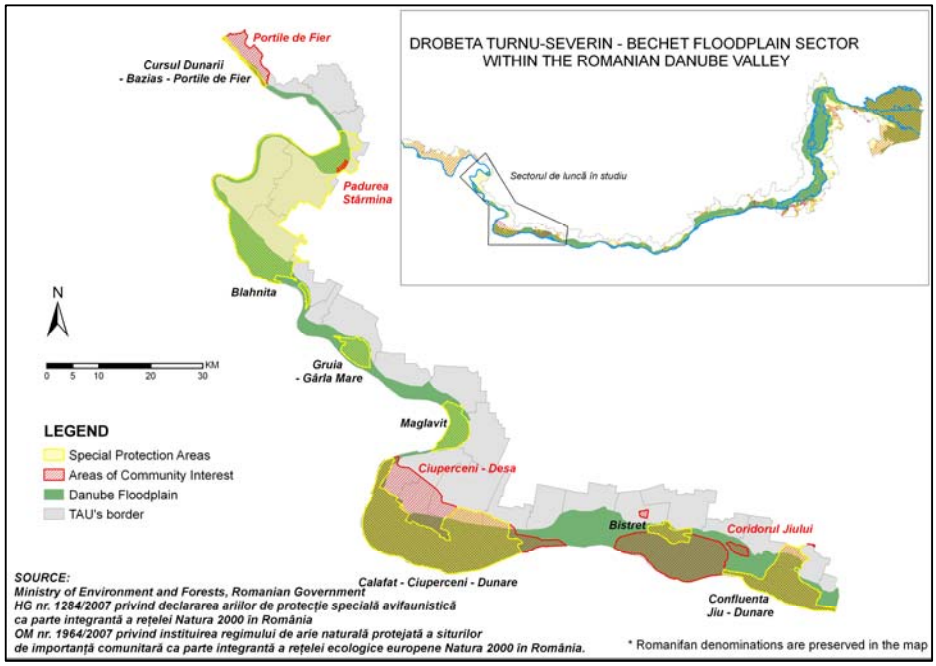

Fig. 2. The Danube Floodplain, Drobeta Turnu-Severin – Bechet sector. Elements of the ecological European network *Natura 2000*

Tables no. 1 and no. 2 concisely present the Special Protection Areas and the Sites of Community Interest that totally or partially fall in the Danube Floodplain, as well as their main characteristics.

Remarks concerning the Natura 2000 sites within the Danube Floodplain

The *Natura 2000* sites presented below are entirely characterised, even if often they only partially overlap the Danube Floodplain environment. The aspects presented in the two tables depart from the recordings and observations noted in the *Natura 2000 Standard Form.*

Five of the listed SPAs (Bistreț, Calafat - Ciuperceni - Dunăre, Confluența Jiu – Dunăre, Maglavit, Cursul Dunării - Baziaș - Porțile de Fier) are possible candidates to the RAMSAR status, each of them lodging more than 22,000 individuals of water birds during the migration period.

It is to be noticed the fact that most of the presented sites are not declared by the local or national legislation as protected areas, as the comparative analysis of the figures 1 and 2 can confirm. Some of them include protected areas declared through the Law no. 5/2000 (such as the Stârmina forest reserve, the Ciuperceni – Desa, Balta Lata, Balta Neagră reserves or the Porțile de Fier Nature Park), or through County Council Decisions (as in the case of the protected areas of local importance: Gârla Mare – Salcia or Hinova – Ostrovul Corbului).

Table no. 1

The main characteristics of the Special Protection Areas in the Danube Floodplain, Drobeta Turnu-Severin – Bechet sector

NO	INDICATIVE, DENOMINATION OF THE SITE	LAND COVER (type and percent)	IMPORTANCE	VULNERABILITY
1.	ROSPA0010 Bistreț (1,915.6 ha) – Dolj County	rivers, lakes (90); swamps (8); pastures (2)	It lodges important populations of certain protected bird species: a) number of species in Annex 1 of the *Birds Directive*: 24. b) number of other migrant species, listed in the annexes of the *Convention on migrant species* (Bonn): 72. c) number of globally endangered species: 7. The site is important for the nesting populations of the species: *Platalea leucorodia, Ardeola ralloides, Egretta garzetta, Aytya nyroca,Cyrcus aeruginosus.* In the migration period, it becomes important for all water species, while during the winter period it is important for wild ducks and geese.	Located in the flood-prone area, the site is covered by water each time the Danube flow gets very high. Within the site there are to be noticed the piscicultural activities, with direct and indirect negative impact on the aquatic bird populations from the area.
2.	ROSPA0013 Calafat - Ciuperceni - Dunăre (29,024.3 ha) – Dolj County	rivers, lakes (8), swamps (16), natural grassland, steppe (9), crops/arable land (11), pastures (2), other arable fields (3), broad-leaved forests (35), vineyards, orchards (5), transition forests (11)	It receives important populations of certain protected bird species: a) number of species in Annex 1 of the *Birds Directive*: 39. b) number of other migrant species, listed in the annexes of the *Convention on migrant species* (Bonn): 71 c) number of globally endangered species: 6 The site is important for the nesting populations of the species: *Ardea purpurea, Ardeola ralloides, Aytya nyroca, Botaurus stellaris, Burhinus oedicnemus, Caprimulgus europaeus, Chlidonias hybridus, Chlidonias niger, Ciconia ciconia, Ciconia nigra, Circus aeruginosus, Coracias garrulus, Egretta alba, Egretta garzetta.* During the migration period, the site becomes important for the following species: Ardeidae, geese, ducks (the last two also during wintering).	The site is situated in the flood-prone area and is covered with water when the flow of the Danube gets very high. The fishing activities and the poaching can make the site vulnerable.
3.	ROSPA0023 Confluența Jiu – Dunăre (21,999.9 ha) - Olt, Dolj Counties	rivers, lakes (17), crops/arable land (22), pastures (11), other arable fields (4), broad-leaved forests (40), transition forests (6)	It lodges important populations of certain protected bird species: a) number of species in Annex 1 of the *Birds Directive*: 34 b) number of other migrant species, listed in the annexes of the *Convention on migrant species* (Bonn): 77 c) number of globally endangered species: 5 The site is important for the nesting populations of the species: *Crex crex, Haliaetus albicilla, Ciconia ciconia, Burhinus oedicnemus*. In the migration period, it becomes important for the following species: *Tringa glareola, Pelecanus crispus, Platalea leucorodia, Plecadis falcinellus*, while during the winter it is important for the species *Phalacrocorax pygmaeus*.	The extension of the human-modified surfaces and the pollution of the watercourses have negative influences upon the bird species within the area.
4.	ROSPA0074	rivers, lakes (37),	According to the data, there are the following categories of protected bird species:	The human activities

	Maglavit (3,562.6 ha) – Dolj County	swamps (13), pastures (12), broad-leaved forests (36), vineyards and orchards (2)	a) number of species in Annex 1 of the *Birds Directive*: 35 b) number of other migrant species, listed in the annexes of the *Convention on migrant species* (Bonn): 89 c) number of globally endangered species: 5 The site is important for the nesting populations of the species: *Ciconia ciconia, Chlidonias hybridus, Himantopus himantopus, Recurvirostra avosetta, Ardea purpurea, Egretta garzetta, Emberiza hortulana.* During the migration period, the site becomes important for the species: *Aytya nyroca, Platalea leucorodia, Falco vespertinus, Pluvialis apricaria, Larus minutus, Philomachus pugnax, Phalacrocorax pygmaeus, Nycticorax nycticorax, Sterna hirundo, Tringa glareola.*	conducted within and in the surroundings of the site, the flooding of the area during the high-flow periods represent elements that increase the vulnerability of the site.
5.	ROSPA0011 Blahnița (45,286.3 ha) – Mehedinți County	rivers, lakes (7), swamps (6), crops/arable land (29), pastures (19), other arable fields (8), broad-leaved forests (16), vineyards and orchards (5), other artificial terrains (4), transition forests (6)	This site receives important populations of certain protected bird species. According to the data, there are the following categories: a) number of species in Annex 1 of the *Birds Directive*: 18 b) number of other migrant species, listed in the annexes of the *Convention on migrant species* (Bonn): 88 c) number of globally endangered species: 5 The site is important for the nesting populations of the species: *Botaurus stellaris, Ixobrichus minutus, Nycticorax nycticorax, Ardeola ralloides, Ardea purpurea, Egretta alba and garzetta, Aytya nyroca.* During the migration and the winter periods, the site becomes important for the water species.	The water pollution with nitrates originating in agricultural activities increases the vulnerability. The wild fauna, especially the avifauna, experiences important disturbances when the sheltering conditions and the silence are modified through the cutting of wood vegetation, the circulation with domesticated animals, the burning of the reed and of the crop remains. The extension of the reed endangers the maintenance of those species that require free water surfaces (the tern) or swampy areas (the stilt).
6.	ROSPA0026 Cursul Dunării - Baziaș - Porțile de Fier (10,120.4 ha) – Mehedinți, Caraș-Severin Counties	rivers, lakes (100)	This site receives important populations of certain protected bird species. According to the data, there are the following categories: a) number of species in Annex 1 of the *Birds Directive*: 12 b) number of other migrant species, listed in the annexes of the *Convention on migrant species* (Bonn): 62 c) number of globally endangered species: 3 During migration, the site is important for the following species: *Mergus albellus, Cygnus cygnus, Egretta alba, Aytya nyroca, Anas platyrhynchos, Phalacrocorax pygmaeus, Aytya ferina, Aytya fuligula, Bucephala clangula.* In the winter period, it becomes important for the species: *Mergus albellus, Cygnus cygnus, Egretta alba, Anas platyrhynchos, Phalacrocorax pygmaeus, Aytya ferina, Aytya fuligula, Bucephala clangula, Fulica atra.*	Vulnerability elements are constituted by the introduction of domesticated animals on the islets, as well as the fishing and hunting poaching actions. The protection of the habitats characteristic to the flora and fauna species is required in order to eliminate the negative impact of the disorganized and uncontrolled grazing, the osier cutting, the gathering of medicinal and aromatic herbs, the prelevation of

				construction material; there must be added the prevention of the water pollution with domestic waste and dejections from the households located upstream.
7.	ROSPA0046 Gruia - Gârla Mare (2,756.2 ha) – Mehedinți County	rivers, lakes (8), swamps (21), pastures (8), other arable fields (2), broad-leaved forests (35), vineyards and orchards (2), transition forests (24)	This site lodges important populations of certain protected bird species. According to the data, there are the following categories: a) number of species in Annex 1 of the *Birds Directive*: 19 b) number of other migrant species, listed in the annexes of the *Convention on migrant species* (Bonn): 89 c) number of globally endangered species: 6 The site is important for the nesting populations of the species: *Ayţya nyroca, Falco cherrug, Phalacrocorax pygmaeus, Nycticorax nycticorax, Phalacrocorax pygmaeus, Ardea purpurea, Egretta garzetta, Ardeola ralloides, Haliaeetus albicilla, Botaurus stellaris*. During migration, it becomes important for the following species: *Phalacrocorax pygmaeus, Phalacrocorax carbo*, while during wintering the site is important for the species: *Ayţya ferina, Phalacrocorax pygmaeus*.	The water pollution with nitrates originating in agricultural activities increases the vulnerability. The wild fauna, especially the birds, experiences important disturbances when the sheltering conditions and the silence are modified through the cutting of wood vegetation, the circulation with domesticated animals, the burning of reed and of the crop remains. The piscicultural arrangements affect the present bird populations, either nesting or in transit.

Source: Processing after the Governmental Decision 1284/2007 (Hotărârea de Guvern 1284/2007)

Table no. 2

The main characteristics of the Sites of Community Interest within the Danube Floodplain, Drobeta Turnu-Severin – Bechet sector

NO	INDICATIVE, DENOMINATION OF THE SITE	LAND COVER (type and percent)	IMPORTANCE	VULNERABILITY
1.	ROSCI0039 Ciuperceni-Desa (40,853 ha) – Dolj County	rivers, lakes (7), swamps (12), natural grasslands, steppe (7), crops/arable land (21), pastures (3), other arable fields (3), broad-leaved forests (30), vineyards, orchards (6), other artificial	There are to be remarked the habitats with *Salix alba* and *Populus alba*. The Ciurumela forest, located on the site of a former nursery is renowned through the giant acacia trees, which reach 70-80 centimetres in diameter and are 30-35 meters high, surpassing the naturally achieved dimensions within the origin area – North America. The acacia trees are important in fixating the moving sands that are a real problem in Southern Oltenia. At the shelter offered by the acacia forests, there gets installed an interesting vegetation, which includes a rare plant – *Molugo cerviana*.	Being located in the flood-prone area of the Danube, the site is covered by water when the flow of the river gets high.

		surfaces (2), transition forests (9).		
2.	ROSCI0045 Coridorul Jiului (71,394 ha) – Dolj, Olt, Mehedinți, Gorj Counties	rivers, lakes (16), swamps (11), crops/arable field (14), pastures (15), other arable fields (2), broad-leaved forests (38), transition forests (4).	The research underlines that the site is among the areas highly important for continental biodiversity preservation. Thus, although it holds only 0.5 percent of the national forest surface and 0.6 percent of the national surface, the site concentrates 9 of the 28 types of natural forest habitats that are protected by the Romanian and European Community legislation, among which 2 of the 6 that are on priority protection, disposed on 4 of the 11 phytoclimatic floors of Romania; other features: 56 of the 212 types of forest stations identified in Romania; 22 of the 50 forest formations, with 97 of the 306 forest types evidenced in Romania. The Jiu Valley is one of the main trans-Balkan migration corridors for the birds (the central-European-Bulgarian way) followed by an impressive birds number. Along with the sedentary ones, in the Jiu Corridor, there have been identified 135 of the 406 bird species observed in Romania, among which 114 are protected through Romanian and EC laws. The significant populations within the live inventory of the country, among which many rare sub-Mediterranean elements, other endemic and some protected offer remarkable specificity to the territory, which is underlined by: the concentration of vegetal associations with high bio-historical value, reflecting the interference of the southern thermophile elements with the central-European ones; the preservation of certain unaltered relict fragments of the archetypal forest structures located at the border of biogeographical areas or even disjunctively disposed or insularised by man (the greyish oak in the Braniştea Bistreţului Forest etc.); the lodging of important vegetal and animal populations whose preservation requires the appearance of special preservation areas and a strict observance of the protection etc. The sustainable capitalisation of this exceptional natural patrimony justifies and imposes: the use of the natural forest as a management standard for the applied silviculture that is close to the nature; the preservation of wild life, of certain relict natural habitats and of a local spring on important genes; the responsible management of the entire local natural patrimony and especially of the forest one; the maintenance of certain rare, uncommon forest landscapes; the officialising of a nature park that, through its multiple functions, would ensure the basis for the reconversion of the local labour force and employment in a field of national and international interest; the creation of a natural space for the ecological education and training; the promoting of ecotourism as a non-polluting income source, through the perpetuation of traditional local activities; the improvement of the decision-taking process, the sustainable environmental preservation, the protection of life and health and the increase of living quality.	The location of the site in three counties and nearby the city of Craiova requires the elaboration of a judicious plan of territorial arrangement, based on which the general urbanism plan of the afferent settlements could be periodically updated; in its turn, this set of documents would enable the elaboration of more detailed territorial plans. The elaboration of the territorial arrangement plan requires the harmonization of all present and future interests within this very heterogeneous space, in which the part of the forest fund (34 percent) and of the forest (33 percent) cannot decrease, just as in the case of other land cover categories that focus natural habitats protected through Romanian and Community laws. Thus, the pollution, the urbanization and other effects of the eco-destructive human intervention can be reconciled with the major requirements of sustainable development and of biodiversity preservation.

3.	ROSCI0173 Pădurea Stârmina (123 ha) – Mehedinți County		The value of this reserve is offered by the compact surfaces with butcher's broom (*Ruscus aculeatus*) and by the mix of different broad-leaved species. The landscape importance is not high, but the area located near the Small Danube is interesting.	The uncontrolled grazing prejudices the diversity of the elements within the grass cover.
4.	ROSCI0206 Porțile de Fier (124,293 ha) – Caraș-Severin, Mehedinți Counties	rivers, lakes (8), natural grasslands, steppe (2), pastures (10), other arable land (5), broad-leaved forests (69), transition forests (6)	The site is important for the preservation of the flora within the area of the Danube Defile (particularly the Danube *Cazane* and Moldova Veche Eyot), with nature reserves and vegetation bearing southern influences, the classic area of the plants *Tulipa hungarica* and *Campanula crassipies* (found on the list of the rare, respectively endangered species) and the Porțile de Fier - Gura Văii reserve, with the species *Prangos carinata* and *Dianthus serbicus*. The forest dominates the general landscape, the naturality index computed for *Porțile de Fier* site registering frequent values of 80 percent. On the site of the cleared thermophile forests there appeared thermophile shrubs, a secondary downy oak formation with a lot of hornbeam, manna ash and common lilac, to which there are to be added other sub-Mediterranean species. An important part of the mammals is given by the Microchiroptera, species of community interest, represented through the members of two families: Vespertilionidae (*Myotis bechsteinii, Myotis capacinii, Vespertilio murinus*) and Rhinolophidae (*Rhinolophus eurialis, Rhinolophus ferrumequinum, Rhinolophus blasii*). The carnivores are present both through large species (*Ursus arctos, Canis lupus, Lynx lynx*) and through small bodied ones (*Meles meles, Martes martes*). The herbivorous are best represented by *Cervus elaphus*, *Capreolus capreolus* and others. Of the 4,873 species recorded on the *Porțile de Fier* site, four gastropod species have special status (*Theodoxus traversalis, Anisus vorticulus, Herilla dacica, Helix pomatia*). The Insecta Class has five representatives with particular status, one in the Coleoptera order (*Lucanus cervus L.)* and the others in the Lepidoptera order (*Eriogaster catax L., Lycaena dispar rutilus Wernb., Parnassius mnemosyne wagneri Bryk, Kirinia roxelana Cr*.). The fauna of the site consists of 5,205 taxa, of which 4,873 are invertebrata and 332 vertebrata. Among the latter, high presence is to be noticed in the case of the Aves class (205 representatives), followed by the Pisces class (63 representatives), while the Amfibia class has a poorer representation (only 12 taxa). Among these species recorded in the *Porțile de Fier* site, the amphibian *Pelobates syriacus* and the reptiles *Testudo hermanni, Ablepharus kitaibelii, Lacerta praticola, L. muralis, L. taurica, L. viridis, Coluber jugularis* and *Vipera ammodytes* are strictly protected east-Mediterranean, respectively Mediterranean elements.	The small delta of the Nera represents, along with the Danube Delta, one of the youngest Romanian lands, which is in permanent development and, thus, it represents one of the most fragile ecosystems of the country. The balance can be rapidly disturbed through the direct action of certain factors, such as: the burning of vegetation, the high, prolonged water levels in relation with the floods, the invasive plant species; the indirect effects of other factors are also important: the pollution of the watercourses that cross the area, the increase of the sailing on the lower course of the river etc.

Source: Processing after the Order of the Ministry of Environment and Sustainable Development No. 1.964/2007 (Ordinul Ministrului Mediului şi Dezvoltării Durabile nr. 1.964/2007)

The major part of the presented *Natura 2000* sites do not have legally constituted administrative structures or an approved management plan. The exceptions are represented by *ROSPA0026 Cursul Dunării - Baziaş - Porţile de Fier*, for which the responsible is The Administration of the Porţile de Fier Nature Park (it has also realised the management plan) and *ROSCI0173 Pădurea Stârmina*, which is the responsibility of the Drobeta Turnu-Severin Forest Office, through the Şimian Forest Ward.

The delimitation of the sites on the basis of the topographical maps, scale 1:50,000, without including aerial photographs, underlined the requirement to re-digitize them on detailed maps or plans, with the use of the orthophotos, which would ensure the correlation with the present elements of the natural or man-induced environment and with the ownership situation, especially since compensatory payments are expected.

A very important aspect concerning the *Natura 2000* protected areas, but also those otherwise declared in the local or national legislation refers to their actual protection situation. Thus, in most of the theoretically protected sites within the Danube Floodplain the preservation and the protection are not real, enforced by law, but, when it is the case, it is rather a self-protection determined, among others, by the poor state of the infrastructure, which discourage the access. On the other hand, it is to be noticed the overwhelming lack of information of the local communities concerning the existence, the role, and sustainable capitalization possibilities of these protected areas.

Taking into account the principles on which *the Network* is organised, as well as the specific of the sites within the study sector of the Danube Floodplain, there can be concluded that *Natura 2000* represents a source of opportunities for the region:

- the development of an environmental-friendly tourism, of the agritourism based on tradition, local practices and ecological products;
- the continuance of the activities, in the case of the fish ponds, with the observance of the protection measures for the water bird species;
- the leisure activities near the fish ponds could be an option to increase the income, especially since financial support is offered through the *Fishing Operational Programme* for the sustainable management of the fisheries;
- there can be accessed European funds for the improvement of the infrastructure (guesthouses, access roads, observatories, information panels/points etc.).

2.3. Action projects for the environmental preservation and the sustainable development of the Danubian region

On January 21st, 2010, the European Parliament passed the resolution concerning *The European Strategy for the Danube Region*. Following the model of the *Baltic Sea Strategy*, this plan will have to promote the inter-regional cooperation, with the aim of developing the transport and energy infrastructure, as well as stimulating the economic growth and the sustainable social development. Related to the environmental protection, the resolution requires strategic and

impact assessments concerning the environment, including evaluations of the effects on the entire fluvial ecosystem; these actions must be a condition for all infrastructure projects in the transportation and energy domains.

The financing of the projects concerning the preservation/protection of the environmental components or the improvement of the living conditions within the predominantly rural space of the Danube floodplain relies of various sources. Only two of these financial instruments that play an important part in the sustainable development of the region will be mentioned. Firstly, there must be mentioned the financing originating in two EU funds – The European Fund for Regional Development and The Cohesion Fund (CF), the money being distributed on environmental sectors in the framework of *The Environmental Sectorial Operational Programme*. The second financial instrument is supplied through the European Agricultural Fund for Rural Development, which can be accessed after the passing of the *National Programme for Rural Development (2007 - 2013)*. In order to ensure the sustainable development of the rural spaces within the Danube Floodplain it is necessary to follow a limited number of fundamental objectives concerning the competitiveness of the agricultural and silvicultural activities, the land use and environmental management, as well as the quality of living and the diversification of the economic activities. The floodplain space can benefit from the measures regarded by the 2nd Pylon, which could support the farmers affected by the restrictions appeared as consequence of the legal appearance of the protected areas or *Natura 2000* sites. In this respect, there follows the compensation of the losses required by the conformation to the environmental standards imposed by the present legislation and this action may play a part in the sustainable development of the space on focus.

At the level of *the research projects with practical use in the Danube Floodplain*, during the last years and especially after the historical floods occurred in the spring of 2006, there existed certain significant demarches for the assessment of the environment of the Romanian Danube Floodplain and for the elaboration of proposals in the view of the capitalisation and protection of the natural and human capital hold by the region. In this framework, there is to be mentioned the study entitled *Redimensionarea ecologică şi economică în sectorul românesc al luncii Dunării*, realised by the National Institute for Research and Development Danube Delta, Tulcea in order to assist the Romanian Government in the process of strategic long-term planning for meeting the objectives imposed by the *Water Directive* and in the actual implementation of the requirements concerning the prevention, the protection and the diminution of the effects of floods. The study mentions that *the biological diversity, the functionality and the naturality of the ecosystems within the Lower Danube Floodplain represent a result of their evolution in time and of the succession of different "civilisations" that disturbed the balance of the initial environmental components* and that special attention must be paid to *the social management* of the environment in the Danube Floodplain (raising the awareness of the local communities and participatory activities that would involve them).

At the level of the floodplain sector on which the analysis of the environmental elements in the framework of sustainable development was particularised, there must be mentioned the project dedicated to ROSPA0010 Bistreț – *The management of a Natura 2000 site – Elaboration of preservation measures for the Special Protection Area Bistreț*, which developed in the framework of the Programme *NatuRegio. Nature Conservation and Regional Development in South – East Europe*. The project was proposed by the Romanian Ministry of Environment and it was implemented with the help of the Oltenia Museum (Nature Sciences Section), the University of Craiova (Geography Department) and the Dolj County Agency for Environmental Protection. The project aimed the assessment of the protected bird's populations within the site, of their habitats and ecological needs, as well as the impact of the human activities and of the risk phenomena on the avifauna. Besides the elaboration of the preservation measures for the bird species, which also take into account the particularities and needs of the human communities living near the site, the project proposed the expansion of the protected area and the inclusion of the western basins that are very important for the bird diversity. A significant component of this project was the permanent collaboration with the local actors (authorities and population). This was materialised through actions that aimed at raising the awareness and at involving the rural inhabitants, such as it was the case in the schools from Bistreț and Cârna settlements (Photo. 1). Indirectly, the conservative purposes were followed through the realisation and distribution of folders, posters and the placing of two information panels (Photo. 2).

Photo 1. Raising the awareness through activities conducted in the framework of SPA Bistreț connected project

Photo 2. Information panel placed in the centre of Bistreț settlement

3. INSTEAD OF CONCLUSIONS: SWOT ANALYSIS OF THE ENVIRONMENT IN THE STUDY SECTOR, IN THE VIEW OF SUSTAINABLE DEVELOPMENT

Without pretending to exhaust the problems of the region, some of these issues, along with certain solutions implied by the sustainable development demarche within the Danube Floodplain, Drobeta Turnu-Severin – Bechet sector were synthesised in the SWOT analysis (Table no. 3); it was realised in accordance with the three large criteria that correspond to the environmental subsystems.

Table no. 3

SWOT analysis of the environment in the Danube Floodplain, Drobeta Turnu-Severin – Bechet sector, in the view of sustainable development

CRITERION	STRENGHTS	WEAKNESSES	OPPORTUNITIES	RISKS
1. THE ECOLOGICAL SUPPORT AND THE BIOTIC SUBSYSTEM	▪ The floodplain – terrace contact provides very good habitation conditions; ▪ The varied micro-relief offers different possibilities of sustainable use; ▪ The presence of the hydrographical units and the location of the floodplain lead to the appearance of a favourable topoclimate for habitation and for various economic activities; ▪ The presence of mineral water (Ghighera); ▪ The Danube is an important transportation line; ▪ The relatively high soil fertility, in natural conditions; ▪ The specific and planted forests hold complex functions; ▪ The existence of complex and important habitats, which can be simultaneously preserved and valorised; ▪ Very high number of birds, many of which are rare or endangered at national or European level.	▪ The presence of the surfaces characterised by soils affected by gleyzation and salinization; ▪ The sand reactivation on certain deforested surfaces; ▪ In certain areas, the phreatic water hardness puts it at the potability limit; ▪ The neglecting of certain man-created relief forms (channels, dams, fisheries) and their degradation; ▪ The clogging of some basins, which is mostly noticed in the case of Bistreț Lake; ▪ The significant reduction of the fish and hunting fund; ▪ The degradation of certain ecosystems where the specific biocenoses were totally or partially destroyed and replaced with agro-ecosystems; ▪ Extended surfaces with randomly abandoned waste; ▪ The accentuation of drought.	▪ The possibility to use non-polluting energy forms: aeolian, energy, solar energy; ▪ The existence of extensive spaces available for afforestation, with all the benefits brought by the forest to the floodplain; ▪ Putting to good educative and tourist use the important natural museum represented by the preserved habitats and fauna elements specific to the Danube Floodplain; ▪ The valorisation of the soil conditions in certain areas for specific crops (apricots, peaches, grape-vine, peanuts etc.); ▪ The Danube offers opportunities for the development of the transportation sector.	▪ Flood occurrence; ▪ Downpours that alternate with long dry periods; ▪ Sometimes, very high temperatures during summer; ▪ Decrease of the bird diversity as a consequence of the changes occurred in the nutrition and nesting conditions; ▪ Continuation of the pollution with domestic waste in the absence of the specialized platforms or of a collecting system; ▪ The continuation of the illegal clearings would contribute to the appearance of soil erosion issues and to the flood risk increase; ▪ Drop of forest productivity as a consequence of climatic changes.
2. THE POPULATION, THE INFRASTRUCTURE AND THE SOCIAL-ECONOMIC FRAMEWORK	▪ 234,000 inhabitants, of which 130,000 live in urban settlements (Drobeta Turnu-Severin, Calafat, Bechet); ▪ The villages are diverse from the demographic viewpoint, the smallest one being Dunărea Mică (119 inhab.) and the larges one - Poiana Mare (11,149 inhab.); ▪ Availability of rural labor force; ▪ Overall homogeneity from the ethnic and religious viewpoints, with	▪ The accentuated demographic ageing at the level of most rural settlements is underlined by the high number of retired persons (sometimes surpassing the active population: Ghighera) and by the demographic decrease; ▪ Negative migratory balance in most of the villages; ▪ Low incomes of the population; ▪ The number of inhabitants that correspond to a doctor is high in the rural space (in many cases over 1,500	▪ The economic growth will lead to the improvement of the occupation degree and will attract the population in the area; ▪ The elderly persons can activate in certain sectors; ▪ Improvement of the energetic and hydraulic efficiency of the irrigation infrastructure through rehabilitation works; ▪ The diversification of the activities within the rural space can	▪ The continuation of internal and international migrations; ▪ The accentuation of the demographical ageing; ▪ Low professional mobility; ▪ Unwillingness to sign insurances; ▪ Poor capacity of EU funds absorption; ▪ The increase of the energy cost and the low hydraulic efficiency of the infrastructure

CRITERION	STRENGHTS	WEAKNESSES	OPPORTUNITIES	RISKS
	certain exceptions; ▪ High ratio of the households connected to the electric network; ▪ Access to the bus routes; ▪ Relatively high access to radio, television and mobile phone network; ▪ Relatively small distance to important urban centers, such as Craiova; also, it is mostly covered by rehabilitated roads; ▪ There are family doctor's offices in all communes; ▪ More than half of all villages benefit from the presence of elementary schools; ▪ Extended surfaces that are favourable to agriculture; ▪ Beginning of the development of the legal framework for rural financing; ▪ The existence of certain traditional products and activities specific to the Danube Floodplain; ▪ The presence of three important port-towns and the realization of other connections across the Danube (a future one at Rast).	inhab./doctor); ▪ High unemployment rate; ▪ High values of the demographic and economic dependency index; ▪ Low level of superior qualifications in any sector of activity; ▪ Low productivity level, which leads to general reduced incomes; ▪ Too many plots of agricultural or forest land and the existence of a high number of subsistence exploitations; ▪ Agricultural productivity under the potential; ▪ The new land and especially forest owners have limited capacities of property management; ▪ Difficulties in imposing the legislation to the private forest owners, who conducted illegal clearings; ▪ The trade networks are not yet developed to meet the needs of small exploitations; ▪ Non-functional irrigation systems; ▪ Poor development of services in the rural space; ▪ Poor usage of the tourist resources because of the deficiencies registered at the level of the infrastructure; also, there is no guest-house in the rural space; ▪ The basic rural infrastructure is poorly developed (roads, water supply/treatment, sewerage, gas); ▪ Limited access to the basic services (facilities for children, elderly etc.) ▪ Very low technical endowment in agriculture; ▪ The access roads to the Danube are	be supported; ▪ Instruction and appointment of a new generation of exploitation managers; ▪ The professional training helps to improve the competencies of the farmers; ▪ The fusion of the land plots and the appearance of exploitations can be supported through well directed actions and measures; ▪ The introduction of social-economic advisory services; ▪ Support programmes for the founding groups of producers; ▪ The orientation towards tourist activities that would put to good use the natural and cultural specific of the Danube Floodplain; ▪ The return to certain activities that were well developed on certain floodplain sectors in the past (eg.: silk-worms breeding).	will lead to the augmentation of the irrigation costs; ▪ The climatic changes and the natural calamities; ▪ The foreign competition on the market, sometimes even for the ecological products;

CRITERION	STRENGHTS	WEAKNESSES	OPPORTUNITIES	RISKS
		often very difficult to use; ▪ Low number of specialized medical offices, dentistries, pharmacies; ▪ Existence of paradoxical situations when old mentalities are preserved along with the easy acceptance of non-values.		
3. THE ENVIRONMENTAL PROTECTION	▪ High level of biodiversity associated to the agricultural fields, including large semi-natural grasslands, which can be classified as agricultural terrain with high agricultural value; ▪ The existence of numerous foreground species and habitats associated to the agricultural fields, displaying importance at national and international level (eg.: endangered bird species); ▪ The low agricultural consumption of chemical products favour the biodiversity preservation and the maintenance of a good water quality; ▪ The maintenance of some forest surfaces, which contribute to limitation of the erosion and to the biodiversity preservation; ▪ More than half of the floodplain sector is included in protection areas of national or European importance; ▪ The existence of strong financial instruments for the environmental protection.	▪ The population is an important polluting agent, especially through the domestic waste abandoned on the soil or in the water, correlated with the lack of specific infrastructure for sewerage and domestic waste management in the rural space; ▪ The near presence of more important pollution sources (eg.: at Kozloduy); ▪ Illegal clearings; ▪ The traditional agricultural practices that are important for the biodiversity preservation require a high volume of physical work and do not guarantee the economic viability of the farm; ▪ Low degree of awareness concerning the importance of the environmental-friendly agricultural practices; ▪ Low degree of awareness concerning the agricultural practices that reduce the pollution and enable the soil preservation; ▪ The ecological agriculture sector almost does not exist and the internal market is very small; ▪ Low degree of population awareness concerning the existence and the value of protected areas within the floodplain sector; ▪ The lack of management plans and of administrative bodies in the case of most declared protected areas; ▪ The lack of effective, real protection in the declared sites.	▪ The implementation of *Natura 2000* payments according to the EU Directives; ▪ Potential of improvement of the biodiversity preservation by means of training activities and counselling services; ▪ Potential of stimulation of the local communities in order to raise the awareness concerning the need of biodiversity preservation; ▪ Potential of increasing the forest surfaces through afforestation; ▪ Potential of extending the protected areas within the framework of *Natura* 2000, following the re-evaluation projects; ▪ Opportunities of natural potential capitalization through sustainable tourism forms associated with an adequate site administration; ▪ Possibilities to improve the water quality through investment in the water infrastructure within the rural space; ▪ Potential of improving the natural resources management through training and counselling activities, focused on environmental protection; ▪ Potential of stimulating the local communities to raise the awareness concerning the climatic changes issue.	▪ Accidental pollutions; ▪ Soil and landscape degradation; ▪ Continuation of clearings over the regeneration limit; ▪ Accidental radiation emissions at Kozloduy; ▪ Some agricultural tendencies imply higher contribution of chemical substances (eg.: high consumption of pesticides); ▪ Microclimate unbalances, following the climatic changes; ▪ The impact of natural disasters on biodiversity; ▪ The increased occurrence rate of the phenomena associated to climatic changes (eg,: floods, high temperatures, drought); ▪ Difficulties in raising the awareness of the population concerning the activities that are permitted/forbidden in different types of protected areas; ▪ Difficulties connected to the compensatory payments.

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WATER QUALITY INDEX - ASSESSMENT METHOD OF THE MOTRU RIVER WATER QUALITY (OLTENIA, ROMANIA)

INDICELE DE CALITATE A APEI – METODĂ DE DETERMINARE A CALITĂȚII APEI RÂULUI MOTRU (OLTENIA, ROMÂNIA)

Oana IONUŞ[1]

Abstract: The present paper aims at determining the water quality on the Motru river and at establishing its usage domains as water resource. The method consists in the computation of the Water Quality Index on the basis of the physical-chemical and biological quality parameters that were registered at the monitoring stations placed on the Motru river (Cloşani, Broşteni, and Fața Motrului). This index was computed for a long time interval (2000 – 2009) and it specifies the appropriate usage category, but it can also reveal the changes occurred at the level of the aquatic ecosystem. The novelty brought to the flowing water quality management consists in the underlining of the value of this index as potential indicator of the ecological state of the rivers.

Key-words: physical-chemical parameter, biological parameter, index, value, water quality, usage, the Motru river
Cuvinte cheie: parametru fizico-chimic, parametru biologic, indice, valoare, calitatea apei, folosință, râul Motru

1. INTRODUCTION

Water quality can be defined as a conventional ensemble of physical, chemical, biological and bacteriological features that are expressed as values and allow for the framing in a certain category, which expresses the possibility of its anthropic usage to meet a certain purpose.

The national framework for the establishment of the flowing water quality is presently represented by *The normative concerning the classification of surface water quality in order to establish the ecological state of the water bodies/Normativul privind clasificarea calității apelor de suprafață în vederea stabilirii stării ecologice a corpurilor de apă* (Order no. 161/February 16th, 2006) and by the methodology imposed by the *Water Directive* – The establishment of the ecological state of the surface water bodies. The Water Framework Directive was transposed in the Romanian legislation through the Law no. 310/2004, which modifies and completes the Law on Waters no. 107/1996.

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The Water Quality Index represents a numerical expression that is used in the flowing water quality assessment in the United States of America, Canada, Spain, France, Germany, Austria, Italy, Poland and Turkey.

Starting with 1965, Horton proposes the first computation formula with the intention of promoting an index that would comprise all data necessary for the establishment of the surface water quality (Liou et al., 2004).

The index was firstly used with the purpose of revealing the physical-chemical changes occurred at the level of the flowing water quality: *following the monitoring and quality management activities, there was attempted through mathematical methods to indicate the global quality state of the surface waters with the help of a qualitative index* (House, 1989).

The basic methodology used in the establishment of the value classes of the Water Quality Index was described for the first time by the Environmental Protection Agency, region 10, USA (periods: 1978/1979, 1979/80); it used various value intervals in order to set out the importance of each parameter in the computation of the index and, subsequently, it stipulated the establishment of a unique value - that of the index (Aroner, 2002).

In the '80s, on the basis of the methodology used by EPA, new limit values for the intervals were established depending on the local standards related to the flowing water quality (Hallock, 1990).

The water quality class is defined depending on the values of the physical, chemical and biological parameters and the establishment of the quality before the usage is crucial for various purposes, such as: drinking water, water used in agriculture, water used for leisure (fishing, swimming), or water used in industry (Sargaonkar and Deshpande, 2003).

The Universal Water Quality Index – UWQI was invented and then applied in order to ensure a simple method for the establishment of the quality of the surface water that is used for the water supply of the population (Hülya Boyacioglu, 2007). The subsequent development of the use of the Water Quality Index led to its use in the characterisation of the entire aquatic ecosystem (Cude, 2001).

Up to the present, at European level, three methods were intercalibrated for the *Geographical Intercalibration Group* Alpine area, in order to establish the ecological state of the sweet water through the usage of the phytoplancton as indicator - Brettum Index (BI) in Austria and Slovenia, PSI in Germany and Phytoplankton Trophic Index (PTI) in Italy (Lumb et al., 2006).

Study area

The Motru catchment area (S = 1,895 sq. km, L = 134 km) is located in the south-western part of Romania, within the Oltenian region. From the hydrographical point of view, it represents the largest sub-basin within the Jiu catchment area (direct tributary of the Danube, on the left).

The catchment's disposition in steps, on al altitudinal difference of about 1,700 meters (between 102 meters at the confluence with the Jiu and approximately 1,800 meters at the base of the Orlea Peak), makes the variety of geomorphologic units to influence the characteristics of the surface water drainage (Fig. 1).

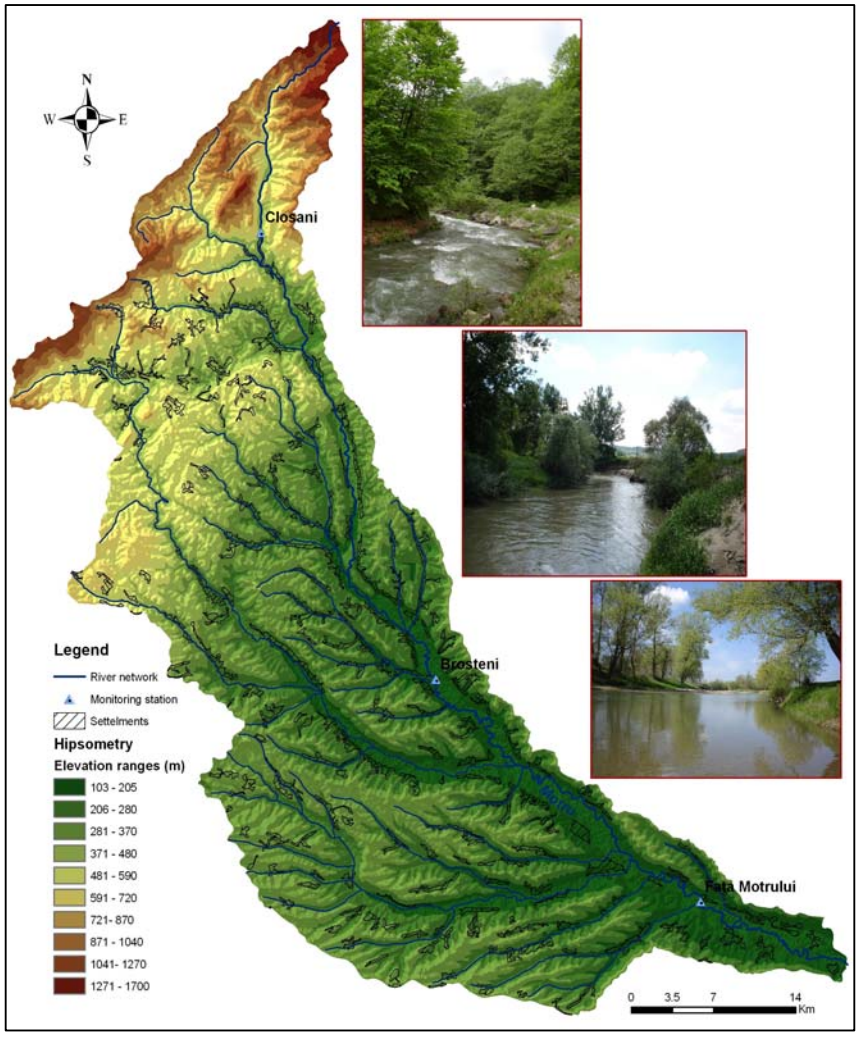

Fig. 1. Hypsometry of the Motru catchment
(processed after the SRTM elevation model at 90 meters)

The human stress on the surface water within the Motru catchment is mainly induced by the total number of inhabitants (111.068 persons), the urban inhabitants (32,314 persons) and by the organic loading that they generated through the industrial activities, land use and animal husbandry and, finally, through the degree of improvement of the hydrographical network.

2. DATA AND METHODS

According to the field literature, there are a number of computation formulas for the Water Quality Index, depending on the parameters that are considered, on

the comparative assessment methods and on the national norms concerning the establishment of the flowing water quality (Cude, 2001).

In most of the cases, this index represents a numerical expression used in the assessment of the flowing water quality, through the framing of the values in five classes on the interval going from 1 to 100; a certain quality state, respectively a usage domain correspond to each class (Adriano et al., 2006).

The raw values of each quality parameter must be compared with the standard threshold values that are taken into account for the computation of the index, in the view of the qualitative assessment. In all cases when the index must be determinate, the computation formula is the following:

$$WQI = 1/100\left(\sum_{i=1}^{9} q_i w_i\right)^2$$

WQI – the Water Quality Index

i – the quality parameter

qi – the registered value

wi – the rank of implication of the parameter in the computation formula

The values of the Water Quality Index that were thus obtained are distributed on a number of intervals, which render the quality of the respective water and the usage domain (Table no. 1): 10–25 percent - highly polluted; 26–50 percent - polluted; 51–70 percent - reasonable; 71–90 percent - good; 91–100 percent - very good (House and Ellis, 1987).

Starting with the year 2000, the environmental research centres tried to use a less difficult computation method and, presently, there are available two on-line computers: - WQHYDRO (Aroner, 2002);

- Monitoring the Quality of Surfacewaters, by Mr. Brian Oram, PG, According to the book *Field Manual for Water Quality Monitoring*, http://www.water-research.net/watrqualindex/index.htm, Pennsylvania, USA.

3. RESULTS AND DISCUSSIONS

The computation formula applied for the determination of the Water Quality Index on the Motru river includes nine physical-chemical and biological parameters that are registered by the local authorities (The Jiu Water Catchment Direction, The Laboratory for Water Quality Assessment) during any water quality measurement activity and it reflects, at the level of the value classes, the water usage potential.

The method chosen in the use of the Water Quality Index corresponds to that proposed by Harrison et al., 2000 and it involves four stages:

a. the selection of the parameters,

b. the bringing of the measurement units at the same scale,

c. the establishment of the weight of each parameter,

d. the computation of the Water Quality Index and the establishment of the usage domain.

Table no. 1

The interpretation scheme for the values of the Water Quality Index, on usage domains

Use score (percent)	PWS (Potable water supply)	FAWL (Fish and wildlife)	Industry	Recreation
100	No treatment required		Selected uses without treatment	
90		Suitable for all species of fish and wildlife		Suitable for all recreation activities
80	Minor purification		Minor purification if high quality water is required	
70		Doubtful for game fish. Supports populations of coarse fish	No treatment for most uses	Doubtful for direct contact sports
60	Conventional treatment			
50	Advanced treatment	Reasonable coarse fisheries	Advanced treatment required for most uses	Indirect and non-contact activities only
40	Doubtful use	Tolerant species only		
30			Only industries needing poor quality water	Non-contact uses only
20	Unacceptable	Unacceptable	Unacceptable	Unacceptable
10				

(Source: after House and Ellis, 1987)

a. The selection of the parameters was realised depending on the Global Quality Classes established through the *The normative concerning the classification of surface water quality in order to establish the ecological state of the water bodies/Normativul privind clasificarea calității apelor de suprafață în vederea stabilirii stării ecologice a corpurilor de apă.* During the last five years, the 2nd global quality class corresponds to the middle and lower sectors of the Motru water; this quality class is given by the chemical parameters of the nutrients.

At the same time, in the computation of the index there was not taken into account the microbiologic parameter – Total Coliforms, because it is monitored in the sections where the water is destined for the potable use.

Thus, the Water Quality Index for the Motru river is based o the following physical-chemical and biologic parameters:

- Physical parameters: Temperature (^{0}C), Slurry (mg/l).
- Chemical parameters: pH (U pH), Total phosphorus (mgP/l), Nitrates (mgN/l).

- Biologic/organic parameters: Oxygen saturation (percent),
Biochemical oxygen demand (mgO/l).

b, c. The bringing of the measurement units to the same scale and the establishment of the implication degree for each parameter were made in accordance with the previously presented methodology, which takes into account the importance of the parameter in the rendering of the sanogenesis state of the aquatic ecosystem. The value of the participation rank of each parameter in the computation of the Water Quality Index is:

- Oxygen saturation – 0.17;
- pH – 0.11; Biochemical oxygen demand (CBO5) – 0.11;
- Temperature – 0.10; Total phosphorus (P) – 0.10; Nitrates (NO_3^-) – 0.10;
- Slurry – 0.07.

d. The last stage was realised with the help of the on-line computer (http://www.water-research.net/watrqualindex/index.htm) proposed by Mr. Brian Oram from B. F. Environmental Consultants Inc., Pennsylvania, USA.

The computation of the Water Quality Index for the Motru river was realised through the introduction of the mean annual values of each quality parameter taken into account; the values were registered at the three monitoring stations on the Motru river (Cloşani, Broşteni and Fața Motrului).

The usage domain was established according to the quality intervals of the Water Quality Index (Table no. 2) in each section (50-74 percent – Moderate Quality and 75-94 percent Good Quality).

Table no. 2

Index value intervals and the corresponding quality category

Water Quality	Value intervals (percent)
Excellent	95-100
Good	75-94
Moderate	50-74
Marginal	25-49
Poor	0-24

At Cloşani monitoring station, located on the upper course, the Motru water quality is good, according to the mean annual values of the index during the 2000 – 2009 period (Fig. 2). The year 2007 is individualised through values that are closer of the interval characteristic to the moderate quality (WQI-84), fact which is explained by the decrease of the values of the chemical parameters (Nitrates: 2.094 mgN/l in 2006 and 1.749 mgN/l in 2007) and by the increase of the physical ones (slurry: 31.5 mg/l in 2006 and 29.2 mg/l on 2007).

In the middle and lower courses, because of the increased human impact on the water resources, the values of the Motru Water Quality Index show obvious annual oscillations (Fig. 3, Fig. 4). Thus, between 2000 and 2009 there are to be remarked the important variations registered during three years (2005, 2006, and 2007).

The low value of the index registered in 2006 at both monitoring stations (Broşteni – 88 percent in 2000, 80 percent in 2006 and 86 percent in 2007; Fața

Motrului – 87 percent in 2005, 81 percent in 2006 and 85 percent in 2007) is given by the contribution brought in the computation formula by two qualitative parameters (Fig. 5, Fig. 6): the biochemical oxygen demand (Broşteni – 1.25 mgO/l in 2005; 2.27 mgO/l in 2006; 1.31 mgO/l in 2007 and Fața Motrului – 1.5 mgO/l in 2005; 2.11 mgO/l in 2006; 1.35 mgO/l in 2007) and the nitrates (Broşteni – 0.704 mgN/l in 2005; 5.078 mgN/l in 2006; 2.811 mgN/l in 2007 and Fața Motrului – 0.912 mgN/l in 2005; 5.530 mgN/l in 2006; 3.134 mgN/l in anul 2007).

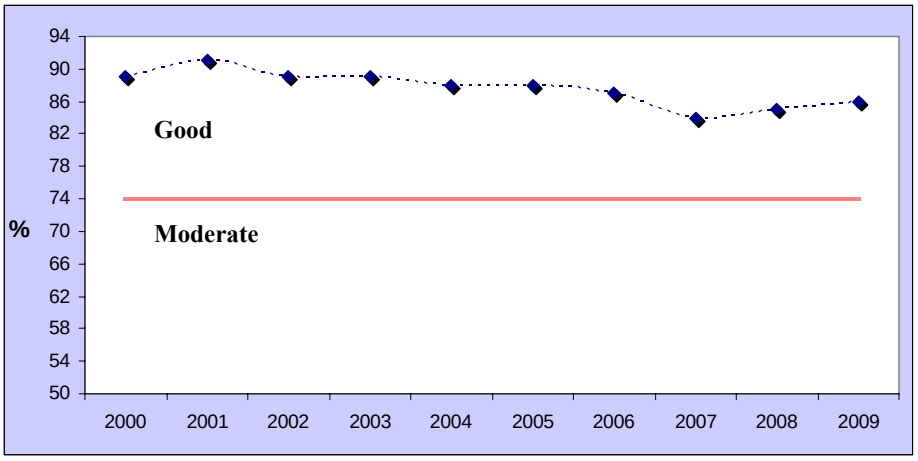

Fig. 2. The variation of the Water Quality Index on the Motru, at Cloşani station, in 2000 – 2009 period

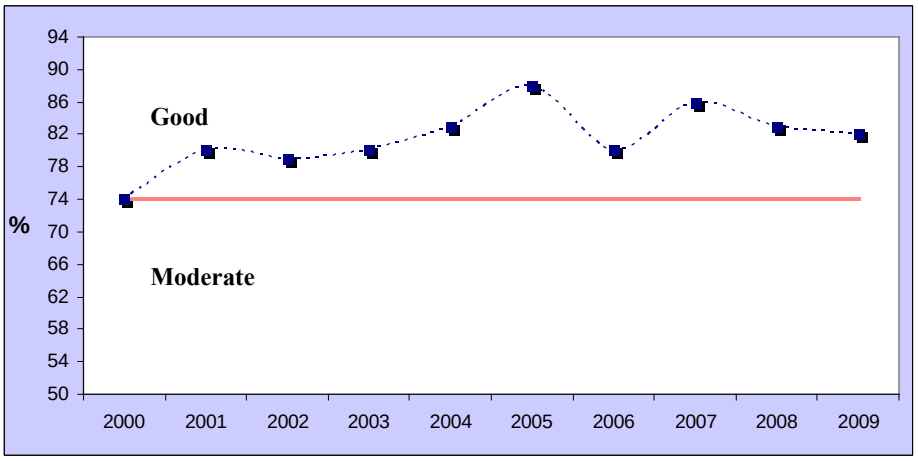

Fig. 3. The variation of the Water Quality Index on the Motru, at Broşteni station, in 2000 – 2009 period

For 2000, at both Broşteni and Fața Motrului stations, the value of the index corresponds to the moderate quality class. The nutrients, respectively the values of the nitrates are also responsible in this case for influencing the quality category

(nitrates: Broşteni – 5.525 mgN/l in 2000 and 3.418 mgN/l in 2001; Fața Motrului – 6.052 mgN/l in 2000 and 4.688 mgN/l in 2001).

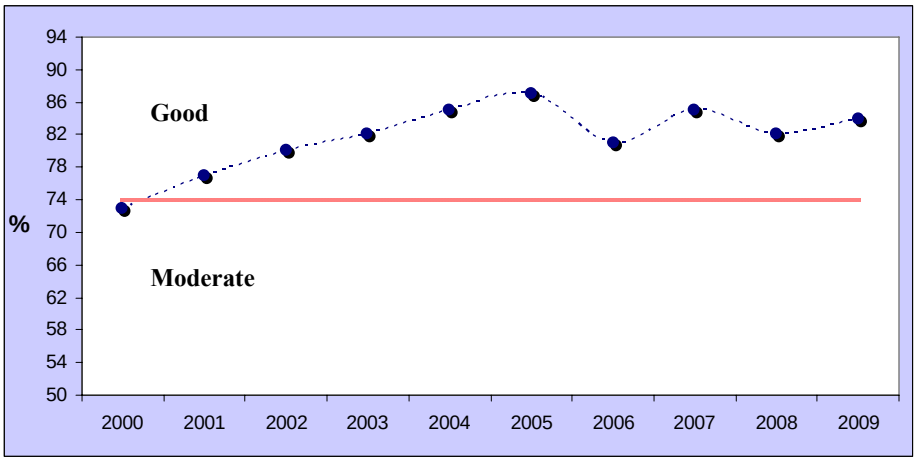

Fig. 4. The variation of the Water Quality Index on the Motru, at Fața Motrului station, in 2000 – 2009 period

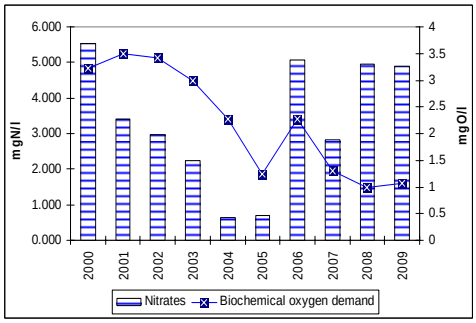

Fig. 5. The variation of the nitrates and of the biochemical oxygen demand at Broşteni station (2000-2009)

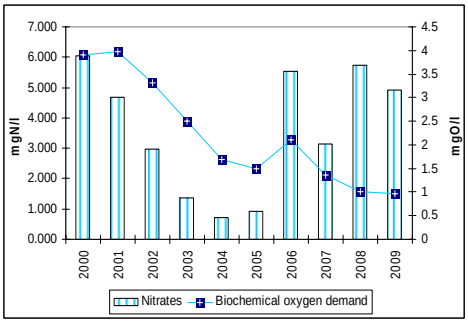

Fig. 6. The variation of the nitrates and of the biochemical oxygen demand at Fața Motrului station (2000-2009)

As underlined by the previous observations, the water quality of the Motru river is directly influenced by the regime of the biogenic and organic substances. The content of the biogenic elements within the rivers is connected to the appearance and the decomposition of the organic substances. As a consequence, the regime of the biogenic elements depends on the vital activity of the organisms (Trufaş V., 1985). In the water of unpolluted rivers, the concentration of nitrates often oscillates within the limits of a few tenths of mg/l.

The main cause for the loading of the flowing waters with nitrates consists in the eviction of the urban waste waters. This is the reason for which the content in $NO_3^{-o}$of the river water often surpasses 1 mg/l and even 10 mg/l.

The Broşteni and Fața Motrului monitoring stations are located downstream of the most important urban settlements (expressed in equivalent inhabitant number) within the Motru catchment area, respectively Motru and Strehaia towns.

Motru town (22,472 inhabitants in 2009) is the only settlement that has a waste water treatment plant, but although it is also foreseen with a secondary phase, because the aeration tanks lack the operation capacity, the efficiency of the treatment plant is reduced only to the mechanical stage. In Strehaia town (7,697 inhabitants in 2009), the sewerage system does not benefit of a waste water treatment plant.

According to the assessments performed by the Analysis Laboratory, Romania Waters National Administration – Jiu Water Branch, in 2009, on the pollution of the two town administrations (S. C. REZOPREST S. A. Motru and S. C. FLAPS Strehaia), there had been registered exceeds as compared to the limit values of NTPA 001/2002 to the following parameters: CBO5=165 mg/l, slurry=108 mg/l (Motru); CBO5=42 mg/l, chemical consume of Oxygen (CCOCr)=116,6mg/l and slurry=92 mg/l (Strehaia).

The interpretation of values corresponding to the Water Quality Index on the Motru, on the basis of the scheme proposed by House and Ellis (1987) allows for the establishment of the usage domain for the river water as natural resource. During the years when values above 90 percent were registered, the water of the Motru river was good for all recreation activities and convenient for all fish species and aquatic fauna, while in the case of the values comprised between 74 and 90 percent, the water situation was uncertain for aquatic sports that imply the direct contact with the water and for fishing, only supporting the population with sweet water fish species. The usage degree for industry and water supply was not established because the water of the Motru river is not used in this type of activities.

4. CONCLUSIONS

The use of the Water Quality Index in the determination of the water quality on the Motru river corresponds to the present tendencies within the field of water resources management; thus, it is attempted at a more important scale to assign chemical and ecological importance to the classical parameters related to the physical and chemical quality. The advantages of using this method were numerous, given the fact that the Water Quality Index:

- includes more variables in only one number;
- brings to the same measuring unit more parameters related to the water quality;
- offers the possibility to compare in temporal and spatial terms the quality of more water bodies or that of a single one;
- offers an image of the water usage degree is various fields/purposes.

Just as the European Union, through the *Water Framework Directive*, tries to stimulate the achievement of a good quality for all water bodies within its territory, at national and regional level it must be assigned great importance to the consideration of the global quality state, present and past, for the establishment of the adequate plans for the water resources management activities.

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DRAUGHT IMPACT ON AGRICULTURE. CASE STUDY: TELEORMAN COUNTY

IMPACTUL SECETEI ASUPRA AGRICULTURII. STUDIU DE CAZ: JUDEȚUL TELEORMAN

Alina CONSTANTIN[1]

Abstract: The paper aims at analyzing the draught effects on the agriculture in Teleorman county. The draught phenomenon was registered quite frequently during the last years in Teleorman county, triggering a series of negative effects on agriculture, such as considerable diminution of main agricultural crops production and decrease of the income of the big agricultural producers.

Key-words: draught, agriculture, Teleorman county
Cuvinte cheie: seceta, agricultura, judetul Teleorman

1. INTRODUCTION

In Teleorman county, the agriculture is an economic branch of utmost importance, with an old tradition, and the main activity for most part of the local population. The importance of agriculture as activity branch is the result of the agricultural potential of Teleorman county, with 499,844 hectares of agricultural fields, out of which 454,872 hectares are arable land (Teleorman Direction for Agriculture and Rural Development, 2008). Secondly, it is worth noticing the presence of the broad fields situated between the shallow valleys and fertile soils that together with the temperate-continental climate are the premises for important agricultural productions that meet the demands of the entire population within the county.

The agricultural production, unlike the industrial one, is highly insecure, greatly relying on the climatic conditions. From this point of view, Teleorman county presents a high climatic risk especially for the rainfall regime; consequently, both draughts and floods are frequent phenomena that affects the agricultural production.

For the last 10 years, draught had a major impact in the county, compared to floods, causing great material losses for the main agricultural productions.

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The studies of agriculture economy point out to the fact that the structural changes that took place after 1989 in Teleorman agriculture have triggered great changes in the crop structure. Consequently, the little peasant household became predominant with respect to the private ownership of the plot of land, being based mostly on auto consumption and to a lesser extent on the commerce of the products. This is why the agriculture became oriented mostly towards wheat and corn productions (Sima E., 2002, p. 8-9).

2. DRAUGHT IMPACT ON THE MAIN CROPS

At present, the cereals cultures, done predominantly by the private agricultural sector, are found on small areas, implying the minimum amount of money for ploughing and maintenance; hence, crops are not consistent, being directly influenced by the climatic conditions, and especially by draught. Consequently, the incomes of agricultural producers are in accordance with the low productivity, and the draught that extends from one year to another brings the impossibility for beginning the agricultural cycle.

The analysis of the data rendered in Table no. 1 and Fig. 1 indicates the following things: the wheat and rye production oscillated during the analyzed period between 5,373 kg/ha in 2006 (the most favorable year for wheat and rye during this period) and 719 kg/ha in 2003 (the draughty year for wheat during the analyzed period); the biggest production of barley and two-row barley was registered in 1989 – 5,337 kg/ha, while the lowest production was in 2003 – 967 kg/ha; the highest corn production was registered in 1982 – 5,049 kg/ha, while the lowest in 2000 – 355 kg/ha, this being the most draughty during the last 10 years; the production of sun-flower was the biggest in 1986 – 2,298 kg/ha, and the lowest in 1996 – 133 kg/ha, this year being the most unfavorable for this crop (Statistical Bureau, Teleorman County, 2008).

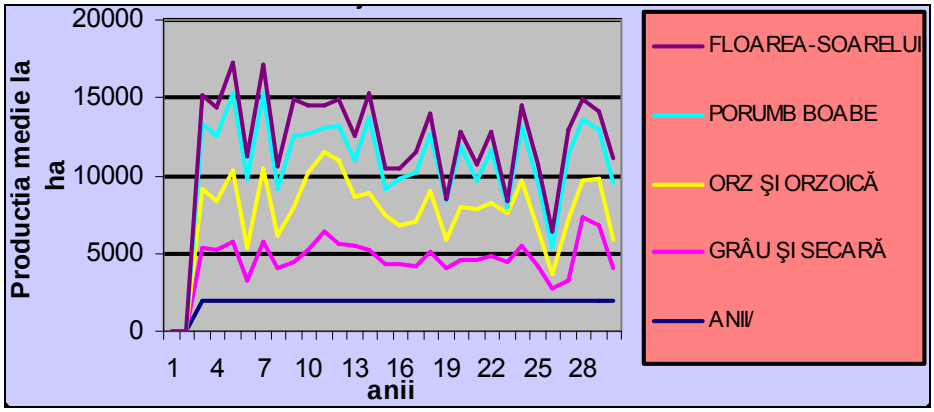

Fig. 1. The evolution of mean production per hectare for the main crops within Teleorman county

Table no. 1

Mean production per hectare (kg/ha) for the main crops within Teleorman county

Year	Wheat and rye	Barley and two-row barley	Corn beans	Sun-flower
1980	3,336	3,855	4,213	1,771
1981	3,215	3,223	4,160	1,741
1982	3,758	4,565	5,049	1,957
1983	1,306	2,027	4,489	1,483
1984	3,729	4,681	4,861	1,813
1985	2,076	2,089	2,978	1,398
1986	2,448	3,542	4,630	2,298
1987	3,295	4,972	2,421	1,864
1988	4,406	5,129	1,497	1,470
1989	3,670	5,337	2,216	1,651
1990	3,462	3,167	2,358	1,586
1991	3,295	3,624	4,755	1,602
1992	2,375	3,051	1,736	1,263
1993	2,305	2,524	3,030	647
1994	2,126	2,886	3,222	1,263
1995	3,120	3,943	3,637	1,244
1996	1,999	1,837	2,528	133
1997	2,568	3,401	3,900	974
1998	2,602	3,235	1,859	999
1999	2,871	3,316	3,471	1,150
2000	2,386	3,229	355	450
2001	3,510	4,139	3,502	1,414
2002	2,194	2,306	3,093	1,076
2003	719	967	1,662	1,001
2004	1,234	3,992	4,109	1,583
2005	5,373	2,351	3,848	1,345
2006	4,808	2,990	3,160	1,191
2007	2,072	1,810	3,695	1,542

Source: Statistical Bureau, Teleorman County, 2008

According to the data in table no. 1, the draughtiest years for the analysed years are 2000, 2003, and 2007, when there were registered the lowest productions per hectare. The reasons for such production, way too low for the potential of the agricultural land in Teleorman county are related to the unfavourable climatic changes during the last years: low quantity of precipitation in spring and prolonged draught during summer, the water deficit in the soil affecting the productions of cereals as well as other crops, small amounts of snow, correlated with the lack of necessary chemical fertilizers, as a result of their high price, as well as with the hail

that destroyed the cereal crops and other crops on thousands of hectares. There are also agricultural units that have so far productions of more than 4,000 kg of wheat and barley per hectare, because unlike most of the farmers and individual producers, the former strictly followed the specific technologies, ensured proper irrigation and administration of chemical fertilizers and treatments characteristic for each crop.

As a result of rainfalls that fall for several consecutive days during the summer of 2007, the high degree of moisture needed for wheat, exceeding 20%, the agricultural machineries could not begin the thrashing triggering a significant delay of the campaign for gathering wheat and rape. Apart from this delay, it is also worth mentioning the danger of the degradation of wheat fields due to the appearance of herbs among ears (Photo 1), especially on the lands where no herbicides were spread, on the one hand, and the overripping and fall of the wheat grains on the ground, due to high temperatures, which caused a significant diminution of wheat and rape production.

Farmers are ready to work at the maximum capacity of their machineries, using, as they say, 'every hour good for work', depending on the weather and ripping of wheat fields.

Photo 1. Wheat field with herbs near Saceni, Teleorman

In these conditions, the Teleorman farmers and individual producers add to the previous experience one more year: low productions of wheat, barley, two-row barley and rape per hectare, credits with extremely high interest offered by the banks, not to mention the extremely cheap price of wheat and barley offered by the processing companies, that do not cover the mere costs for the cereal production.

The mean annual temperatures registered at the 5 meteorological stations within Teleorman county during 30 years (Table no. 2), graphically presented in Fig. 2, point out to the evolution of this parameter during the analysed period.

Table no. 2

Mean temperature of the air (°C) – Annual means (1978-2007)

Year	Meteorological station				
	Alexandria	Roşiorii de Vede	Turnu-Măgurele	Videle	Zimnicea
1978	10.3	10.1	10.2	10	10.2
1979	11	10.9	12.2	10.7	10.8
1980	9.9	10	10.4	9.8	10.6
1981	11	10.9	11.4	10.8	11.6
1982	10.7	10.8	11.1	10.7	10.8
1983	11.1	11.2	11.7	11.3	11.4
1984	10.7	10.8	11.3	10.3	11.1
1985	10	10.1	10.6	9.8	10.5
1986	10.7	10.6	11.3	10.6	11.2
1987	10.4	10.2	11	10	11
1988	10.9	10.7	11.4	10.8	11.5
1989	11.7	17.8	11.9	11.7	12.2
1990	11.8	11.6	12	11.7	12.3
1991	10.2	10	10.8	10	10.7
1992	11.6	11.3	12	11.1	11.9
1993	10.8	10.5	11.1	10.5	11.3
1994	12.6	12.2	13	10.4	12.9
1995	10.9	10.6	11.4	11.1	11.4
1996	10.6	10.2	10.8	10.2	10.8
1997	10.3	10.6	10.6	9.9	10.5
1998	10.8	10.7	10.8	11.3	11.2
1999	10.8	11.6	11.9	11.7	12.1
2000	10.8	12.3	12.2	11.9	12.4
2001	10.9	11.7	11.6	10.8	11.3
2002	10.9	11.6	11.8	10.5	11.7
2003	10.9	11.1	11.4	11.4	11
2004	10.9	11	12.5	11.8	12
2005	10.9	10.7	11.2	10.6	11.1
2006	10.9	11.3	11.1	11.6	11.8
2007	10.9	12.7	12.3	12.6	12.8
Multiannual mean	10.8	11.1	11.4	10.8	11.4

The analysis of data in Table no. 2 and Fig. 2 indicates that the temperature oscillated between 9.8ºC and 13ºC during 1978 and 2007. In 1978, the air temperatures varied around 10ºC, and in 1980 and 1985, the mean annual temperatures were below 10ºC, while in other years (1981, 1982, 1983, 1988, 1989, 1990, 1992, 1993, 1995) they exceeded 11-12ºC, reaching even 13ºC in 1994

at Turnu-Magurele meteorological station. During the 2000-2007 period, the mean annual temperatures oscillated between 10 and 12ºC.

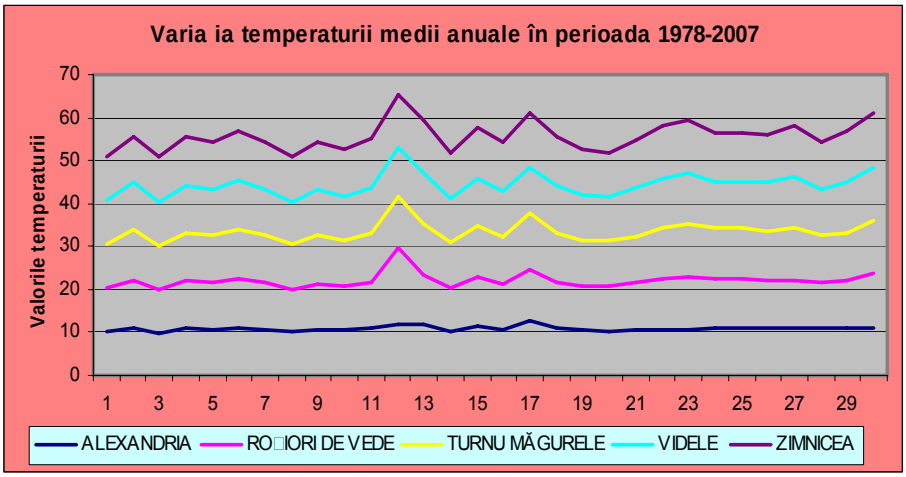

Fig. 2. Variation of mean annual temperature during the 1979-2007 period

Compared to these values, which give us a general background of the thermal potential, there are variations of the mean annual values, in this area, the hottest years being 2000 (12.4°C), 2004 (12.5°C), 2007 (12.8°C) and 1936 (12.2°C), while the coldest were 1942 (9.0°C) and 1980 (9.9°C). The mean multiannual temperature oscillates between 10.8 and 11.4ºC (Table no. 2).

The mean annual quantities of rainfall oscillate between 300 and 550 mm, reaching 600 mm in the northern part of the county.

The data in Table 3 indicate that the highest annual quantities of rainfalls were registered in 1984, 1991 and 1997, while the lowest ones in 1985 and 1992.

The rainiest years during the 1978-1997 period were 1978, 1979, 1984, 1991, 1997, and the draughtiest were 1985, 1989, 1992.

The mean multiannual rainfall quantity at Alexandria meteorological station during the 1997-2006 reached 549 mm/year. Compared to the multi-annual mean, there may be variations of the rainfall quantity from one year to another.

During the draughty years, the multiannual mean rainfall quantity may drop below 300 mm/year. Thus, in the year 2000, there were registered only 290.8 mm/year (Fig. 3). There were also some years when the mean annual rainfall quantity was double than the multiannual mean. This was the case in 1906 (843.5 mm) and 2005 (1061.1 mm).

For the 1997-2006 period, 2000 was the draughtiest year; it fell only 290.8 mm (the Archive of Pitesti Meteorological Service).

For the cereal crops, draught had a great impact on the wheat and corn fields, which are the main cereal plants related to the food safety of the population within the Teleorman county.

Table no. 3

Annual rainfall regime during the 1978-1997 period

Year	Meteorological station				
	Alexandria	Roşiori de Vede	Turnu Magurele	Videle	Zimnicea
1978	44.1	40.3	44.2	41.3	44.6
1979	54.8	47.5	50.8	57.4	51.4
1980	52.1	42.4	53.9	51	51.4
1981	47.7	43.5	42.3	45.3	38.8
1982	34.6	29.2	28.3	38.6	40.3
1983	39.1	35.3	35.6	35.7	42.5
1984	51	52.9	59	61.9	58.1
1985	28.7	31.3	25.9	27	33.7
1986	39.7	40.5	40.5	39.1	43.6
1987	46	46.6	46.2	48.1	46.7
1988	34.0	35.3	37.5	35.4	42.9
1989	34.2	35.2	31.6	27.8	36.2
1990	28.8	31.6	29.7	26.4	29.7
1991	51.5	42	54.1	60.8	51.6
1992	13.7	21.2	27.4	26.5	28.6
1993	36.5	28.6	35.3	34.9	33.8
1994	43.2	42.7	38.7	38.4	41.5
1995	50.9	47.4	44.7	30.7	48.7
1996	34.6	39.9	38.9	40.2	42.7
1997	53.2	44.8	45.2	58.3	62

Source: Archive of Pitesti Meteorological Service

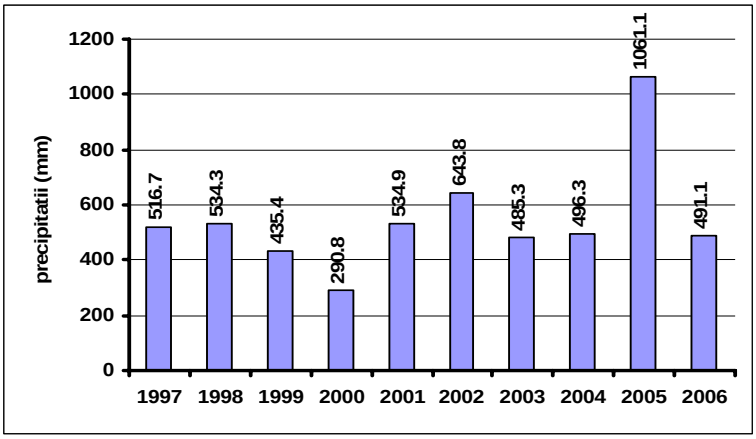

Fig. 3. Mean multiannual precipitations (mm/year). Alexandria meteorological station (1997-2006)

Since draught may appear in various periods during the year, and since the two crops have different vegetation cycles and water necessities, this extreme meteorological phenomenon may affect, during a year, only the wheat crops, or only the corn crop. Exceptionally, both crops may be compromised, as it happened in 2000, when draught extended over a longer period.

The draught from 2000 affected approximately 200-300 hectares, in 2001, the losses caused by the excessive and prolonged draught mounting to 1,000 bln lei (Statistical Bureau of Teleorman County, 2008). Regarding the vegetal production, cereal production decreased with almost 30% compared to the one in 1999 because of draught. This phenomenon was registered, with various intensities, from 2001 to 2003 and more recently 2007 (Statistical bureau of Teleorman County, 2008). In many settlements affected by draught from the Teleorman county, where more than 50 per cent of the wheat production was compromised, the harvesting operations were cancelled for some areas, because it would have cost more than the value of the crop itself. In other cases, the wheat dried by the draught was used as fodder for animals.

The losses that the small producers had for each hectare compromised by draught totalled in 2003 almost 6 mil lei/hectare, in case the minimum technology was used and up to 12 mil lei/hectare for larger farms, when the entire technological process was applied (Direction for Agriculture and Rural Development, Teleorman, 2008). Thus, there appears the situation in which, no matter the selling price for cereals, most of the peasants cannot cover the production costs and consequently, they cannot resume the agricultural cycle. Thus, a vicious circle is formed, when 'poverty brings poverty' and 'the Romanian village does not make the transition towards the market economy, but deepens its routes into subsistence'(Berca M., 2000, p. 9).

In the present century, the year 2007 may be considered as an extremely dry year (Photo 2), both as a result of the intensity of water deficit in the soil, and the length of the deficit periods and the large areas affected by soil draught (extreme, strong and moderate) on vast agricultural fields within the entire county.

Photo 2. Corn crop destroyed by draught in Zambreasca settlement, Teleorman county, 2007

'The complex agricultural draught (atmosphere and soil) that began from the first decade of the month of May (Photo 3) and which lasted throughout the summer, affecting mostly the hoeing cultures that were not irrigated was characteristic for this year. This year, more specific during the interval September, the 1st, 2006 – July, the 31st 2007, the pluviometric regime was critical in almost the entire country, which brings to the character of excessively draughty year'(Mateescu E., 2007, p. 2).

Photo 3. Field affected by draught in the month of May - Siliştea Gumeşti, Teleorman county, 2007

The president of the Agricultural and Forestry Science, Gh. Ionescu Sisesti and the academician Cristian Hera launched warning signals to the Agriculture Ministry: 'Unfortunately, in almost all the areas of the country, the agricultural crops are affected by draught… the situation in the country determines us to urge the Agriculture Ministry to declare the emergency situation' (Marinescu G., 2007, p. 7).

Unfortunately, not only draught affected the Teleorman farmers, but also the prices on the cereal market that do not cover the mere production costs, since so far, nobody was interested to create a wheat exchange market in Romania that should be correlated to the other exchange markets in the world, so that to eliminate the discrepancies during the last years, when the price of the wheat tone differed by dozens EUR or US$. For instance, in 2008, at Paris cereal exchange market, the wheat price was 168.5 €/tone, meaning 0.713 lei/kg, while in Romania the price for a kilogram varied between 0.3 and 0.45 lei (Mateescu E., 2007, p. 4). This means that for every tone, the Romanian producer in general and the one from Teleorman county in particular, lost almost 60 €. And if we consider the fact that the average wheat production in Teleorman was around 3,300 kg/hectare, it means that only from the price the farmers lost 196 €, which is almost four times higher than the area subsidy given by the European Union.

Taking into consideration the way things go right now, it appears that this year too the Romanian farmers will not have a better fate, the chronic decapitalization that appeared years ago growing stronger. And if the acquisition price for wheat is the lowest in the European Union, the price for 1,000 cubic meters of water, where irrigations are possible, exceeds the value of the production evaluated at the market price. Not to mention the prices for chemical fertilizers, diesel and other inputs. In this way, we can say that draught, hail and prices considerably limit the agricultural productions; in the future, there is the risk that farmers in Teleorman will not be able anymore to set up new crops.

3. CONCLUSIONS

Analyzing the above-mentioned aspects, we can say that Teleorman county faced a series of draughty periods (especially during the last year), that caused numerous losses to farmers, as well as low production of crops (such as wheat, corn and sun-flower).

The draught is representative for Teleorman county (especially the years 2000 2007); that is why there is an urgent need for measures to prevent and cope with the draught (re-establishment of the irrigation systems that were mostly destroyed) in order to diminish the costs.

The losses caused by draught were rather significant in Teleorman county, the cereal crops being the most affected ones.

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THE QUALITATIVE ANALYSIS OF THE WORKFORCE FROM THE PERSPECTIVE OF PROFESSIONAL DISEASE INCIDENCE IN THE PETROŞANI DEPRESSION

ANALIZA CALITATIVĂ A FORȚEI DE MUNCĂ DIN PERSPECTIVA INCIDENȚEI BOLILOR PROFESIONALE ÎN DEPRESIUNEA PETROŞANI

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Abstract: This paper is focused on the study of professional morbidity caused by risk factors from the mining sector in the Petroşani Depression but also on analysing its influence on the quality of the workforce. Professional diseases generated in the coal-extraction industry, belonging to the category of degenerative diseases, profoundly affect the miners' state of health, who still form a high proportion of the active population (40%). In this context, it is necessary to correctly identify the professional risks and to take measures to limit them, as well as to initiate actions to diagnose and to treat people ill with silicosis. At the same time, the high incidence of professional disease cases also impose a series of changes in the profile and distribution of the workforce.

Keywords: coal industry, risk factors, professional morbidity, the active population's state of health
Cuvinte cheie: industria minieră, factori de risc, morbiditate profesională, starea de sănătate a populației active

1. INTRODUCTION

The subject-matter of this paper is focused on describing the evolution of professional morbidity and the effects generated upon the quality of the workforce from the Petroşani Depression, as a consequence of the exposure to risk factors of people employed in the mining industry. At the same time, the changes in the profile and the distribution of the workforce against a background of professional disease have been highlighted.

The coal-extracting industry is among the most polluting economic activities, which can have direct effects on people's health, as a consequence of exposure to pollutant agents, or indirect ones, resulted from the above mentioned agents' action on water, soil and vegetation (Dumitrache L., 2004, p. 315-316).

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Ensuring and maintaining the active population's state of health are among the current preoccupations of specialists from the field of health and work security, who act in order to identify the professional risk factors and to know their influence on the state of health by identifying professional diseases early on (Todea A., Ferencz A., 2001, p. 1).

2. CHARACTERISTICS OF PROFESSIONAL MORBIDITY IN THE PETROŞANI DEPRESSION

Given the special conditions of work underground, employees in the mining industry are inclined towards a series of professional diseases, among which one notices a high incidence of certain affections of the respiratory apparatus, such as tuberculosis, pulmonary fibrosis (which represents an incipient stage of silicosis), silicosis, silico-tuberculosis (a complication of silicosis) and professional bronchial asthma.

Silicosis is a pulmonary disease caused by the presence of free-floating silicon dioxide dust inside the lungs, which triggers an inflammatory process and stimulates the progressive accumulation of collagen fibers around the silicon particles, which in turn leads to the forming of silicotic nodules whose growth in time compresses adjoining alveolae and affects the normal activity of the right ventricle, an affection known under the name of chronic pulmonary heart (Todea A., 2000, p. 12).

The causes of these diseases are multiple, as they are conditioned both by the work environment underground and on the surface (deficiencies in ventilation, exploitation technologies which cause the emergence of risk factors). These are compounded by the pollution of industrial towns in the depression, the moisture in the atmosphere, the ignorance of the real danger of contamination by people predisposed to professional diseases (the willful avoidance of periodic medical check-ups), but also a protective sanitary network equipped under the required level (in the depression there is only one section for diagnosing and treating professional diseases in the Vulcan hospital, in which only one specialist doctor is active). The pneumology section from Petroşani hospital was discontinued because there was no specialist doctor to staff it (Dr. Liliana Dârlea, medical doctor at Salvamin, *Zori noi*, *cotidian de opinii şi informaţii al Văii Jiului*, nr. 878, 1993, p. 4). The lack of interest of medical doctors specialised in the medicine of work in practicing in the depression causes the municipal hospital from Lupeni to be unable to have a pneumology section.

The situation of the evolution of professional disease cases in the depression was analysed on a rather large interval of time (fifty years), in order to take a causal perspective on the complexity of the phenomenon, also taking into account the tradition of the mining activity in the depression's history for two centuries.

Thus, between 1955 and 1967, the new cases of professional disease grew slowly, there being recorded a maximum in 1965 due on the one hand to the law passed in that period according to which any medical doctor had the right to diagnose silicosis, and on the other hand to the existence of different criteria for

diagnosing presilicosis stages. Subsequently, the decreasing tendency of recorded silicosis cases can be explained by the establishment of a convention among university centers on the diagnosis criteria in the conference on work medicine from 1967, but also by the existence of the Minister of Health's order according to which the factor of illness by professional disease affected the medical doctors' salaries. This period also coincides with perfecting equipment used for work underground (the introduction of wet perforation, a method which largely decreased the amount of dust in the work place) (Liliana Dârlea, 1993, p. 4).

According to statistical data, in the 1960s, the area of Hunedoara recorded the highest index of professional morbidity nation-wide, having almost 25% of the sum total of illnesses, against the background of a profoundly industrial type of economy, most cases of professional diseases being identified in the mining units of the Petroşani Depression (Sanitary and Demographic Statistic, Ministry of Health, p. 14). The big picture of professional morbidity was dominated by silicosis (86%), most cases being recorded in the mines of Petrila and Lupeni. Calculating the morbidity index of economic enterprises per thousand inhabitants yields there are high values: e.g. E.M. Aninoasa 2,320.9, E.M. 1,666.7, E.M. Vulcan 635.4, E.M. Uricani 1,697.0, E.M. Petrila 2,722.9 (Maxut Gh., p. 13-17). In the interval 1967-1980, the number of people diagnosed with it decreases gradually.

Table no. 1

The dynamics of professional morbidity cases in Petroşani Depression (1966)

Mining unit	Silico-tuberculosis	Silicosis suspect	1st-degree silicosis	2nd-degree silicosis	3rd-degree silicosis	Other professional diseases
E.M. Aninoasa	1	4	44	19	-	Pulmonary fibrosis (1)
E.M. Lupeni	5	4	68	33	1	-
E.M. Lonea	1	-	14	2	-	-
E.M.Dâlja	1	-	8	5	-	Pulmonary reticulosis (5)
I.S. "Vâscoza "Lupeni	-	-	-	-	-	Carbon sulfur intoxication (1)
I.M. Vulcan	3	-	15	5	-	-
E.M. Uricani	2	-	17	10	-	-
E.M. Petrila	4	4	69	39		Pulmonary fibrosis (1)
Băniţa Quarry*	1	-	-	-	-	-

Source: Sanitary and Demographic Statistic, Ministry of Health

*Limestone used to be extracted from Băniţa Quarry

According to the data provided by the Pneumoscopy Laboratory in the interval 1980-1990, on average, there were discovered twelve new silicosis cases every year, and in the interval 1990-1993 there were diagnosed between 20-25 new silicosis cases per year. Also considering the fact that every year there were detected excesses of the free-floating silicon dioxide dust, one can positively state

the existence of a real risk of silicosis among the miners in the coal-extraction area of Petroşani.

In 1993, there were recorded the highest values of professional morbidity cases in the area under study, which is explained by the Radiology Service's initiation of the operation of examining the 17,962 employees of the Coal Autonomous Authority within the periodical medical check-up (Vali Locota, "Matinal, Cotidian al Văii Jiului", nr. 1061, p. 8, 1994). On this occasion there were detected 134 pulmonary fibroses to keep under surveillance (the pre-silicogenous stage) and 47 silicoses. The most numerous cases of silicosis were discovered in the mines of Petrila and Lupeni, and the lowest incidence was recorded in the mine of Paroşeni (***The Statistic Department of Hunedoara Public Health Authority).

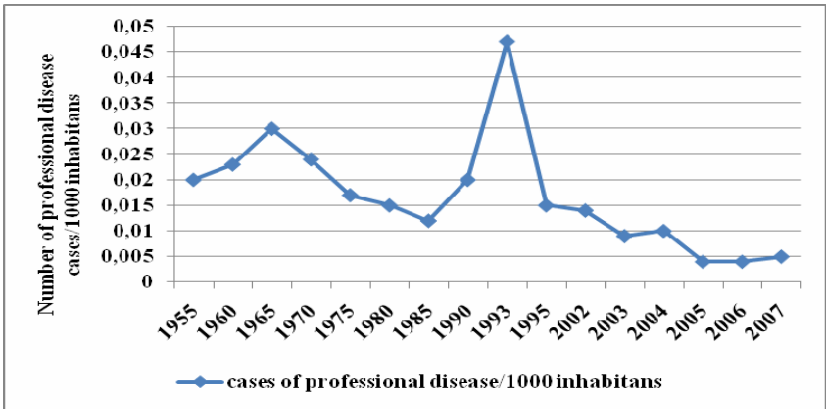

Fig. 1. The evolution of the professional morbidity index in Petroşani Depression
Source: Work Medicine within the Petroşani Center for Preventive Medicine, Bucharest Center for Sanitary Statistic and Medical Documentation

The most recent statistical data regarding the types of professional diseases generated by the underground work environment in the depression reflect that the highest incidence is to be found in patients who have bronchopneumopathy (the number of patients reported in 2005 is 11.6% higher that in 2004 – Table no. 2).

Table no. 2
Professional diseases in the Petroşani Depression and in Hunedoara County (2004-2005)

Disease type	Petroşani Depression		Hunedoara County	
	2004	2005	2004	2005
Chronic bronchopneumopathy	2456	2778	8589	9241
Pulmonary tuberculosis	198	185	679	580
Professional bronchial asthma	80	150	440	291

Source: The Statistic Department of Hunedoara Public Health Authority

The percentage of patients diagnosed with pulmonary tuberculosis manifested a slight decrease in 2005 due to the low number of beds in the pneumophysiology section of Vulcan town, but also to the poor communication between the population inclined towards professional diseases and the sanitary services.

Professional bronchial asthma featured a patient increase of about 46% compared to the previous year. The significant increase of professional bronchial asthma cases in the towns of the depression is due to the high number of employees in the mining industry, given that their long-time exposure to the damp environment of coal mines affects their respiratory ways; however, there is a high incidence of cases when asthma can occur as a secondary effect of silicosis (Todea, A., 2000, p. 34).

A comparative analysis of new cases of silicosis and silico-tuberculosis was performed by comparing the distribution of professional disease cases per mining unit within the depression to the number of cases recorded within the county and nation-wide, bearing in mind that out of the sum-total of new silicosis cases nation-wide only the cases triggered by the coal-extraction industry were taken into consideration, as there are other economic activities whose work environment favours the occurrence and evolution of silicosis among the employees. On the basis of the data obtained in the interval 2002-2007, one can state that the recording of new silicosis and silico-tuberculosis cases in the depression are the only cases reported nation-wide due to the coal-extraction industry, and within the county they represent 95% of the total number of silicosis cases (Table no. 3, Fig. 2). The highest incidence of these diseases is still in the cases of E.M. Petrila and Lupeni. Nevertheless, statistical data do not reflect the real situation, since numerous employees in the mining sector do not turn up at periodic check-ups for disease detection (where the case may be) or for indications concerning the stage of their illness. In the mining units from the upper Jiu Valley, the most numerous cases of silicosis were recorded in the mines of Petrila, Lonea, Livezeni, Lupeni, and cases of disease complication were recorded in Lupeni and Vulcan: 1st degree silicosis and tuberculosis, at E.M. Dâlja Petroşani 3rd degree silicosis and tuberculosis (***Bucharest Center for Sanitary Statistics and Medical Documentation, “A Study of Professional Morbidity in Romania”, statistical yearbook 2007, p. 8-9).

The maintenance of high rates of respiratory apparatus disease is to be noticed, due both to the perfectioning of diagnosis methods and to the increasing wear and tear on the work tools.

The difficulties in evaluating illness risks are inherent, due to the workforce fluctuation (people who leave the mine in incipient stages of pulmonary fibrosis, clinical signs of illness appear late, even 15-20 years after exposure, so that people involved are already at retirement age, given that in the mining industry retirement age is considerably lower, more specifically 45, due to heavy work conditions), but also to the workers' missing the regular medical check-ups in 65% of the cases.

Table no. 3

Distribution of new cases of silicosis and silico-tuberculosis (2002-2007)

Year	Petrosani Depression (number of cases)		Hunedoara County (number of cases)	Romania* (number of cases)
2002	E.M. Uricani	1		
	I.M. Paroşeni	1		
	I.M. Petrila	12		
Total	**14**		**16**	**14**
2003	E.M. Paroşeni Vulcan	1		
	E.M. Livezeni	3		
	E.M. Petrila	1		
	E.M. Lonea	4		
Total	**9**		**10**	**9**
2004	E.M. Vulcan	1		
	E.M. Livezeni	1		
	E.M. Petrila	5		
	E.M. Lonea	3		
Total	**10**		**12**	**10**
2005	E.M. Aninoasa	1		
	E.M. Livezeni	1		
	E.M. Lupeni	1		
	E.M. Petrila	1		
Total	**4**		**7**	**5**
2006	E.M. Petrila	2		
	E.M. Vulcan	1		
	S.E. Paroşeni **	1		
Total	**4**		**5**	**4**
2007	E.M. Dâlja Petroşani	1		
	E.M. Livezeni	1		
	E.M. Lupeni	2		
	E.M. Vulcan	1		
Total	**5**		**5**	**8**

Source: The Bucharest Center for Sanitary Statistics and Medical Documentation

* nation-wide there are represented only the silicosis cases triggered by the coal-extraction industry.

** The Power Plant Subdivision

The cause of absence from medical check-ups is the fear of being diagnosed with serious professional diseases, which would determine, as the case may be, the patient's retirement or sending the employees in other sub-sectors of activity, where payment is inferior.

Statistical data indicate that Hunedoara is among the counties with yearly records of late silicosis cases (on average, 5-6 cases a year, except for the years 2003 and 2007, when one notices a redoubling of advanced silicosis cases which

generate other diseases as well) (***Bucharest Center for Sanitary Statistics and Medical Documentation, "A Study of Professional Morbidity in Romania", statistical yearbooks: 2002 (p.35), 2003 (p. 30), 2004 (p. 28-29), 2005 (p. 33), 2006 (p.8, p. 30), 2007 (p. 8-9, p. 37).

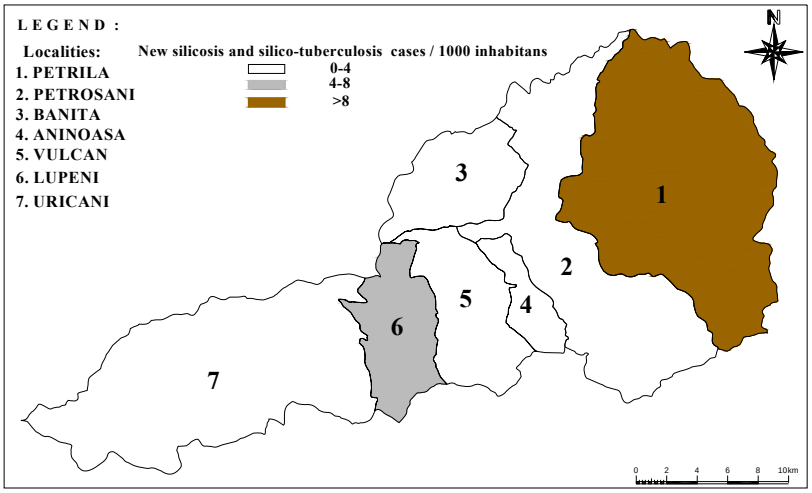

Fig. 2. A graphic representation of new silicosis and silico-tuberculosis cases in towns from Petroşani Depression (2007)

The individual illness risk is 1 in 5, higher for employees who have been longer on the job, for personnel working in sterile areas, as well as for people who smoke and drink alcohol.

Acute professional intoxications represent another segment of the phenomenon of professional morbidity in the depression. In the mining units of the coal basin of Petroşani, professional intoxications have as causing agents methane gas and carbon monoxide.

In the mines of the upper Jiu Valley, there occur frequent intoxications with methane gas accumulations. In 1991, in Lupeni mine, there were recorded 57 cases of methane gas accumulations in excess of 2%, but all of them were short-term and quickly dispersed; in Uricani mine, in 1992, there were recorded 162 cases of methane gas accumulations in excess of 2%, which led to the temporary suspension of work (Ion Mustaţă, Viorel Străuţ, "Zori de zi", nr. 832, p. 2, 1993).

The exploitable reserve of Paroşeni mine has strong methane gas emissions. Ventilation is permanently assured within normal parameters; however there were recorded 76 methane gas accumulations in 1992, yet none was so serious as to determine long-term interruption of activity. The causes of methane gas accumulations in dangerous concentrations were accidental interruptions in the electric power network (Ion Mustaţă, Viorel Străuţ, 1993, p.3).

Lupeni mine has a laboratory where they measure the parameters of the main gas accumulations, but lack of chemical reactives leads to the impossibility to perform measurements (Ion Mustaţă, Viorel Străuţ, 1993, p. 3). In the cases of

carbon monoxide intoxications, some were so intense as to cause death (e. g. I.M. Vulcan, out of a total of 16 cases, there were 10 deaths, I.M. Petrila with a total of 7 cases registered one death (***Bucharest Center for Sanitary Statistics and Medical Documentation, "A Study of Professional Morbidity in Romania", statistical yearbook 2002, p. 14).

Excessive exposure for a long time to risk factors such as the noise of machinery, devices, tools or vehicles determines the occurrence of professional diseases such as deafness and hypoacusis.

Table no. 4

Distribution of new cases of professional disease triggered by noise within economic agents

Year	Economic agent	Diagnosis	Causing agent	Total
2002	I.M. Paroşeni	Hypoacusis	Noise	4
	I.M. Vulcan	Hypoacusis	Noise	1
	I.M. Vulcan	Deafness	Noise	2
	E.M. Aninoasa	Hypoacusis	Noise	1
	E.M. Livezeni	Hypoacusis	Noise	2
	I.M.Petrila	Hypoacusis	Noise	1
	I.M. Petrila	Deafness	Noise	3
	I.M.Lonea	Hypoacusis	Noise	5
	Coal Preparation Expl. Coroeşti	Hypoacusis	Noise	1
	Power Plant Subdivision Paroşeni	Hypoacusis	Noise	4

Source: Bucharest Center for Sanitary Statistics and Medical Documentation, 2002

Professional hypoacusis and deafness represent the most frequent professional diseases caused by noise in the mining units of the upper Jiu basin, as well as in the sections of coal preparation and in the power plant subdivision of Paroşeni, where the noise intensity is very high (table 4).

3. CONSEQUENCES OF PROFESSIONAL MORBIDITY ON THE WORKFORCE QUALITY

A series of serious professional diseases from the big picture of morbidity in Petroşani Depression, such as silicosis or its complications, silico-tuberculosis, impose an evaluation of the employees' work capacity, which supposes not only the clinical, functional diagnosis, but also the work estimation evaluated within the context of biological and social factors. Recommendations are made according to the stage of the disease and according to the remaining work capacity, indicating accessible work forms, by exerting which the organism's functional levels can be increased or maintained (Todea, 2000, p. 37).

In the case of late silicosis diagnosis (stage 2 or 3), even if the patients do not feature respiratory functional difficulty and complications, they are to be taken out of the environment with a silicon risk and are to be redistributed to other subsectors of the mine in which risk factors have a limited or even inexistent action, which also attracts a lower income. This fact leads most employees into purposefully avoiding regular medical check-ups out of necessity to maintain high wages, even more so if in the depression, miners' families are large (they have 2-3

children, as a rule, and most of the female population is jobless, the main limiting cause in finding a job being the largely mining profile of the local economy, which justifies the higher percentage of male population in the total of job-holding population). In the case in which cases of silicoses are diagnosed in the patients who feature serious respiratory deficiency, or in the cases of silicosis with complications, employees can be recorded as having varying degrees of invalidity (Todea A., 2000, p. 37-38).

In the mining industry, maybe more so than in the other industrial sectors, due to the underground working conditions, the noise made by various power tools and machinery represents a more acute danger with effects both on hearing and on the entire organism. Sometimes, the level of noise in a mine is so high that some accoustic signals, especially the ones announcing danger, can be completely drowned out, which can lead to much more serious effects such as work accidents (Todea A., 2000, p. 65).

Noise directly reduces work capacity by reducing the possibilities for intellectual concentration, a reduction of movement precision and efficiency, a reduction or distraction of attention, an increase in energy expenditure for performing physical effort (Vlăduțescu Șt., 2004, p. 68). Noise generates extra tiredness, due to the organism's efforts to perceive verbal information, and especially due to cerebral overdrive (Todea A., 2000, p. 66).

4. PROGRAMS FOR PREVENTING AND LIMITING CASES OF PROFESSIONAL ILLNESS

Preoccupations regarding the reduction of professional morbidity cases are top-priority European directives manifested in the development and application of the concept of health and security in work, which should be applied in the Romanian legislation as well. The concept of health and security in work supposes several interconnected actions: estimating the professional risk of exposure to risk factors, training and informing both the employers and the employees about the professional risk, as well as protection of the environment in the economic unit vicinity (Todea A., Ferencz A., 2001, p. 2). These actions would allow the reduction of professional disease causes, as well as monitoring people diagnosed in order to ensure the limitation of disease evolution and in order to allow the diseased people continuation of their lucrative activity. Actions performed nation-wide concerning the limiting of professional morbidity cases must be distributed correctly and rapidly throughout the territory so that the efforts would have the desired effect.

The legislative priorities that impose themselves are connected with harmonizing legislation and ensuring its coherence in all European states according to Framework-Directive 89/391 as well as ensuring work protection to the employees in similar conditions throughout Europe. In this respect, modifications would be necessary in the legislation concerning exposure to physical pollutants (revision of the directive from 1986 regarding professional noise), establishing

capstone limits for chemical pollutants in the workplace, etc. (Todea A., Ferencz A., 2001, p. 2).

The Health Ministry launched in 2006 a national campaign of information and communication for health and security at work, an action within the framework of the PHARE Project EuropeAid/119644/DSV/RO -"Improving the efficiency of the Romanian system of work medicine, of supervision and control of professional diseases, of profession-related diseases and of accidents due to professional risk", organized under the slogan "Partnership for the employees' health" which had as main objectives raising the awareness both of employers and of employees concerning health and security in the work place, promoting the role of medical doctors in Work Medicine (www.ms.ro/comunicate-de-presă.php?com=1098) and so on.

Such actions must be doubled by the introduction and development of projects that necessitate ample activity, both medical (diagnosing, monitoring people who suffer from professional diseases, modernizing sanitary inventory) and ecological (reduction of the actions of risk factors: e. g. taking measures to reduce the formation and settling of free silicon, which represents the main cause of professional morbidity in the Jiu Valley mining basin).

5. CONCLUSIONS

The cases of professional morbidity in the mining sector in Petroşani Depression, categorized as degenerative diseases, seriously affect the state of health and implicitly the work capacity of employees. The importance of the actions that will be performed to limit the cases of professional disease, as well as to reduce the risk factors, results from the high percentage of employees in the mining industry (40% of the active population in the depression still depends on the coal-extraction industry). These actions must be implemented even more given that at present, when the government wants to keep the mines profitable as well as to implement in future a project to use to a higher degree the mining sector in order to reduce Romania's dependence on imported natural gas, will involve a high volume of workforce for a long interval of time, geological estimations regarding the degree of use of coal resources in upper Jiu Valley being of approximately 80-100 years. In the depression, the level of sanitary infrastructure and the presence of medical doctors are reduced as compared to the population's number and to the medical necessities. In this context, the attention paid to the cases of professional morbidity must become a priority as a result of the high frequency of cases of illness caused by the extraction industry. This situation is alarming in the perspective of correlation between the number of illnesses and the sanitary infrastructure, which reflects a huge discrepancy, even more so given that the cases of late silicosis associated with other diseases are frequent in all the towns in the depression.

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THE EVOLUTION OF POPULATION STRUCTURE IN TERMS OF AGE GROUPS AND GENDER. CASE STUDY: THE SĂRĂȚEL DRAINAGE BASIN (THE BUZĂU SUBCARPATHIANS)

DINAMICA STRUCTURII PE GRUPE DE VÂRSTĂ ŞI SEXE A POPULAȚIEI. STUDIU DE CAZ: BAZINUL HIDROGRAFIC SĂRĂȚEL (SUBCARPAȚII BUZĂULUI)

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Abstract: The age group structure of the population in the Sărățel drainage basin was highlighted by means of an analysis of the three big age groups: 0-14 years, 15-64 years and 65 years and older. It revealed a gradual rise in the ratio of the elderly population, the main cause being the migration of the population during the communist period, which strongly disrupted the demographic evolution of the area analyzed. The population pyramid for 2002 highlights a clear difference between the southern part of the basin (the villages of Joseni, Policiori and Scorţoasa) and the northern part (villages of Crevelești, Ghiocari and Budeşti), suffering from strong depopulation. The sex ratio highlights a trend towards a feminization of the area, as a result of social and historic events to have influenced these settlements in the long run.

Key-words: age group and gender structure, the Sărățel drainage basin
Cuvinte cheie: structura pe grupe de vârstă şi sexe, bazinul hidrografic Sărățel

1. INTRODUCTION

The structure of the population in terms of age groups and gender is relevant to the assessment of human capital, but also to identifying the capabilities to support economic activities that involve certain workforce characteristics (related to age, skills and training levels among others).

The need for an overview of population structure in terms of age and gender is easy to assess, taking into account the importance of those features in defining the role and place of each person in the process of population reproduction, economic activities and social organization in general (Sora V. et al., 1996, p. 75). It also exerts an influence on demographic indicators such as birth rates, fertility, and mortality rates, among others. Planning of educational activities, planning and outlooks of the workforce use, organizing service activities, population healthcare,

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and the specifics of consumption in general depend both on the size and on the population structure in terms of age groups (Sora V. at al., 1996, p. 77-78).

2. METHODOLOGY

In order to monitor the population's dynamics in terms of age groups and gender in the Sărățel drainage basin, an analysis was carried out of the three major age groups: 0-14 years, 15-64 years, 65 years and older, during the 1966-2002 time span, according to the available official data.

At the same time, for a better visual representation of the population structure in terms of age groups and gender by 2002, a population age pyramid was drawn for each village, using the regular five-year time periods: 0-4 years, 5-9 years, etc. For an overview as up-to-date as possible, a comparative analysis at commune village during 1966-2007 was also carried out.

In order to highlight the gender structure of the population, the sex ratio during 1930-2002 was also analyzed.

3. CASE STUDY: THE SĂRĂȚEL DRAINAGE BASIN

The Sărățel drainage basin is located in South-Eastern Romania, in the Central-Northern part of Buzău county. It comprises all of 26 rural settlements, grouped in the communes of Scorțoasa, Căneşti and Chiliile, and another 2 villages - Joseni and Scoroşeşti, part of the communes of Berca and Odăile, respectively.

Most settlements are small-sized, with the majority (73%) having less than 300 inhabitants; the villages of Scorțoasa, Policiori and Joseni alone are included in the medium-sized category, with more than 500 inhabitants (Stoica Ilinca-Valentina, 2009, p. 86). The present-time configuration and structure of the villages has been strongly influenced by the high level of migration typical of the communist period, with groups of migrants mainly heading towards the cities of Buzău, Râmnicu Sărat and towards the town of Berca. Smaller groups also left for Bucharest, Ploieşti, Braşov or other, farther cities. The present-time aftermath of the high volume of migration at that time consists in a shrinking of the population, low birth rates, a rise of mortality, a drop in the workforce, and therefore the active population, and the aging of land-owners, among others (Stoica Ilinca-Valentina, 2008).

4. POPULATION STRUCTURE IN TERMS OF MAJOR AGE GROUPS

By 1966, the most important ratio in all villages was the age group ranging from 15 to 64 years, ranging in importance from 57% (Deleni) to 69% (Ghiocari). By 1977 the importance of that group had dropped, with the exception of the villages of Poiana Pletari and Deleni, where that indicator featured an upward trend, and the village of Balta Tocila, where indicators remained unaltered.

The population aged 0 to 14 ranged from 21% to 34%, with the sole outstanding exception being the commune of Scorțoasa, where this age group made up for 13% of the population.

The age group in the 65-and-older category was the least represented (Fig. 1), making up for up to 14% of the total, with the sole exception being the village of Scorțoasa with 27% (which proved the onset of a process of demographic aging).

By 1977 the ratio of the population aged 0 to 14 had risen or remained equal to 1966 levels in 50% of the instances; in general, the growth rates were limited, with higher rates only registered in the villages of Scorțoasa (8.4%), Grabicina de Sus (6.8%) and Ghiocari (6.4%). At the same time, the other villages registered a drop in that indicator, with noticeable drops registered in Poiana Pletari (-15.2%) and Deleni (-12.4%).

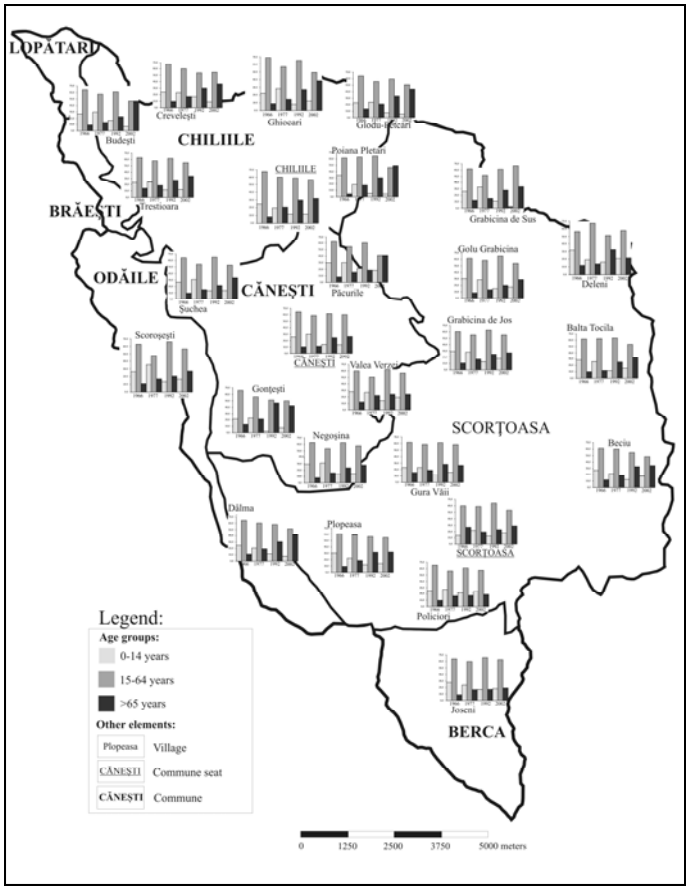

Fig. 1. The ratios of the major age groups of the total population (1966, 1977, 1992, 2002) (percent)

By 1992, in most cases (69.2%), the ratio of the age group ranging from 15 to 64 years had risen, in the context of a drop in birth rates, as a result of the waiving of the abortion law and a rise of the mortality rate.

The ratio of the 0-14 years age group dropped as compared to the previous period in all villages, to as low as an extreme 2% in the case of the village of Gonțeşti,

5% in Poiana Pletari, and 8% in Ghiocari and Glodu-Petcari, proving that demographic aging rate had grown steeper.

The ratio of the population aged 65 and older was on an upward trend in all settlements as compared to the previous period, with the steepest rises occurring in Gonțești (25%) and Deleni (19%). The smallest values of the respective indicator were registered in the villages of Policiori and Joseni (17%). The growth rates were very low in the case of certain villages such as Valea Verzei and Policiori.

By 2002 the population aged 15 to 64 was on a downtrend, with the exceptions being the villages of Deleni, Grabicina de Sus and Crevelești. As far as the village of Grabicina de Sus is concerned, the values of that indicator are insignificant, considering the number of inhabitants; as far as the two other villages are concerned, the main factor was the increase of migration.

At the same time, for the first time in the period analyzed, the group aged 65 and older registered similar values (Dâlma, Gonțești), identical values (Budești, Păcurile) or even higher values (Poiana Pletari), proving the expansion of the demographic aging process. The lowest ratio was registered in the villages of Joseni and Policiori (19%), with the other villages registering rates of 27 % and higher.

A situation apart can be noticed in the village of Păcurile where by 1992 the ratio of that group stood at 19%, and by 2002 it had risen to 41%, as a large part of the adult population was assimilated into the elderly group.

In the context of intense migration during the communist period, the balance previously secured by a positive natural population growth in rural areas was profoundly changed, so the full effects of socialist policies of placing cities foremost and supplying them with raw material and workforce coming from rural areas are now felt.

Overall, at commune level, it can be noticed that, if by 1966 the 0-14-years age group made up for 27.4%, by 2007 it had dropped significantly, especially in the commune of Chiliile (Fig. 2), where it only makes up for 9% of the total population, which can be explained by the low birth rates.

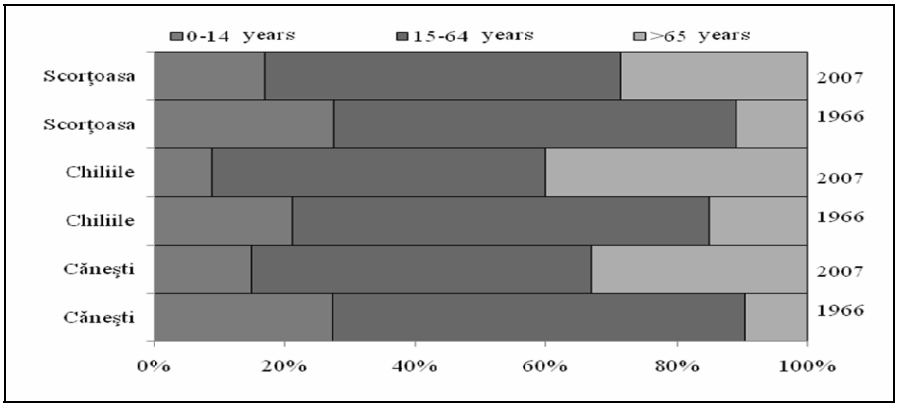

Fig. 2. The ratios of the major age groups in the communes of Căneşti, Chiliile and Scorțoasa (1966, 2007)

As far as the adult age group is concerned, a drop by more than 8% can be noticed, due to the poor representation, in the past two decades, of the young population group, which should substitute for the population aged 15 to 64. These drops, which characterized the young and adult age groups, resulted in the rise of the ratio of the elderly group, with 18% for the commune of Scorţoasa and more than 24% for the two other in 2007. In the context of enduring low birth rate and fertility, the ratio of this age group will rise.

5. POPULATION PYRAMID

The population pyramid is a graph that allows one to highlight the double effect of age and generation on the evolution of population in the long run (Zamfir Daniela, 2007, p. 137), allowing for a visual representation of the ratios between various age groups and genders, and a series of forecasts concerning their future evolution. In the area subject to this analysis, it is very difficult to establish correlations between the current structure of the population pyramids and events that caused their configuration because the area was the subject of intense influence by migration, and the normal course of evolution of these villages has been radically altered.

When analyzing the configuration of the pyramids one notices they are irregular in shape (Fig. 3), and cannot be included in the classical categories: triangular, bell-shaped or rectangular. However, in the case of certain villages (Scorţoasa, Balta Tocila, Grabicina de Jos, Şuchea) a hourglass-shape can be identified, characterized by a high ratio of the elderly and young populations and low ratios of the intermediate age groups.

One can also notice that none of the villages features any triangle-shaped pyramid, which would have indicated a young population, which highlights the degree of demographic ageing, in more advanced or more moderate phases, which affects most of these villages.

The decrease of the birth rate brought about a shrinking of the bases of the pyramids, but a slight recovery can be noticed in certain sectors (for instance Grabicina de Jos, Scorţoasa and Policiori, among others).

In the long run, modifications in the population's structure in terms of age groups and gender are caused by variations in population size. Overall, a clear difference can be noticed between the southern part of the basin (the villages of Joseni, Policiori and Scorţoasa) and the northern part (the villages of Creveleşti, Ghiocari, Budeşti), which is severely affected by depopulation.

At commune level, the territorial administrative unit to be most severely affected is Chiliile, where the villages of Budeşti, Ghiocari and Poiana Pletari are severely affected by demographic ageing, which has grown more acute in the context of depopulation. The base of the pyramid is all but inexistent, as well (Poiana Pletari, Budeşti), which proves that the young population is under-represented.

One can also notice that in certain villages the 65-69-year age group is very well represented, as they illustrate the high birth rates of the period before World War II.

In the villages of Scorțoasa, Joseni and Policiori the 30-34-years and 25-29-years age groups are well represented, mainly due to the effects of Decree no. 770 in 1966 concerning the ban on abortions. One could consider that these three settlements come closest to the natural state of things which would have been typical of the communities in the basin, were it not for the effects of socialist policies. These villages were not that strongly affected, as they are located in the southern region, where infrastructure is more developed and services are better organized as compared to the other villages, and migration was not as high.

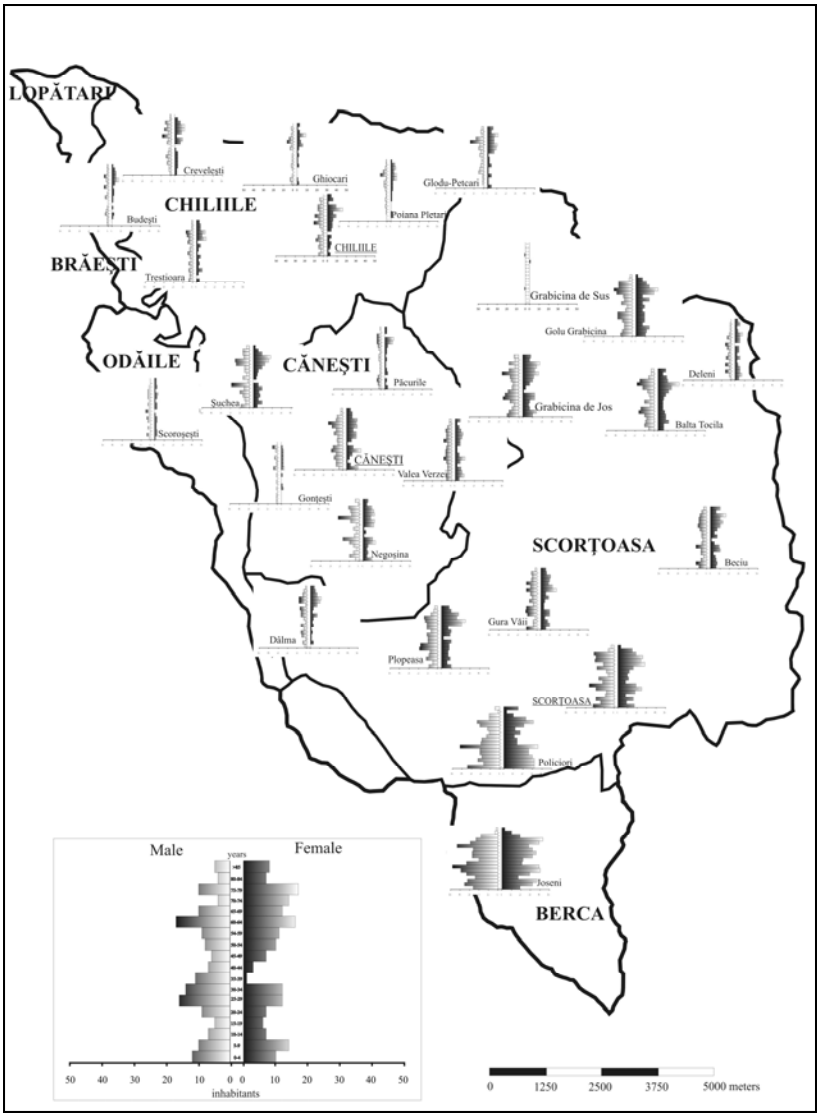

Fig. 3. Structure in terms of age groups and gender (2002)

6. SEX RATIO

In order to individualize structure in terms of gender, the sex ratio was calculated; it stands for the ratio between the number of men and the number of women. The sex ratio was analyzed, function of the available data, for five reference years: 1930, 1966, 1977, 1992 and 2002.

Overall, one can notice that the majority of the values tend to be sub-unitary (Table no. 1), which proves a trend towards a feminization of the area, as a result of social and historical events that have influenced these settlements over time, including the two world wars that caused a drop in the male population, and excess male mortality rate, among others.

Table no. 1.

Sex ratio

Settlement / Years	1930	1966	1977	1992	2002
Căneşti	86.8	92.1	85.1	92.9	101.6
Gonţeşti	92.0	95.8	83.8	73.1	122.2
Negoşina	95.6	92.0	77.4	101.3	107.9
Păcurile	84.2	91.7	67.1	100.0	88.6
Şuchea	85.4	85.6	72.9	105.2	104.7
Valea Verzei	83.3	99.4	81.1	84.5	95.7
Chiliile	102.1	90.8	86.5	84.6	96.6
Budeşti	85.3	106.7	94.5	100.0	81.8
Creveleşti	91.4	102.3	82.3	73.1	83.3
Ghiocari	-	93.0	81.3	75.0	78.0
Glodu-Petcari	92.6	87.0	72.8	87.6	78.0
Poiana Pletari	113.3	93.7	72.3	92.1	91.7
Trestioara	93.2	97.0	68.1	77.3	90.9
Scorţoasa	104.6	82.1	85.6	100.0	90.5
Balta Tocila	89.7	100.0	91.5	100.7	103.9
Beciu	95.3	79.2	87.3	85.0	87.3
Deleni	99.4	79.2	103.6	78.3	68.1
Dâlma	86.1	70.1	80.5	101.1	104.2
Golu Grabicina	-	96.5	83.1	98.8	98.4
Grabicina de Jos	98.4	84.6	98.8	106.0	94.3
Grabicina de Sus	82.3	86.3	76.7	113.5	200.0
Gura Văii	88.2	91.4	94.4	92.4	95.5
Plopeasa	86.4	81.4	86.9	94.6	94.8
Policiori	98.3	89.1	86.6	90.1	85.2
Joseni	84.3	72.9	91.8	92.5	98.0
Scoroşeşti	101.8	84.2	64.5	90.2	107.3

(Source: National Institute of Statistics and Economic Studies, processed data)

By 1930 male population was predominant in a mere 4 villages, but, as a result of the negative effects of the two world wars, by 1966 male population was

somewhat higher only in 2 villages, and by 1977 in 1, in the context of intensive industrialization, which brought about the migration of predominantly male population. By 1992 men were predominant in 5 villages, with that figure rising to 8 by 2002, in the context of a drop in migration rate.

Although female population is overall predominant, there are now villages with roughly balanced structures at the moment, such as Căneşti, Golu Grabicina and Joseni.

If one analyzes the structure in terms of gender of the large age groups by 2002, one can notice the existence in the area of "demographic regularity, which means the predominance of males among younger populations, with a switch to female predominance among elderly populations" (Rotariu T., 2009, p. 26).

7. CONCLUSIONS

The analysis of population structure in terms of age groups in the selected time span (1966-2002) highlights the gradual rise of the elderly population's ratio, the main cause being the migration occurring during the communist period (especially among the young population), which brought about a thorough modification of the demographic structure.

Population structure by 2002, highlighted by the population pyramid, indicates the drastic drop of certain age groups, or their ultimate absence, especially in the settlements in the central-northern part of the area analyzed, suffering from depopulation.

The sex ratio, which allows one to analyze structure in terms of gender, highlights a trend towards a feminization of the area analyzed, as a result of the effects of the two world wars and male excess mortality rate, among others.

Overall, one can notice the onset of a process of demographic ageing (unfolding in various degrees of intensity), with profound effects on the functional structure of the region, such as diminished capacity to farm the land, an increase in the untilled land areas and shrinking village surfaces, among others.

ACKNOWLEDGEMENTS

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L'HABITAT INSALUBRE AU MAROC Á LA FIN DU XX-ème SIÈCLE

HABITATUL INSALUBRU DIN MAROC LA SFÂRŞITUL SECOLULUI AL XX-LEA

Mohamed ANIS[1]

Résumé : Le but de cet article est de présenter certains éléments de l'habitat insalubre au Maroc à la fin du XX-ème siècle. Pour cerner l'habitat insalubre au Maroc dans toute sa complexité, une approche approffondie de sa problématique, de son contenu et des aspects qu'il revêt dans les différents tissus urbains s'avère indispensable; j'analyse ensuite les mécanismes de formation et de développement de ce type d'habitat; enfin, j'évalue les principales formes d'intervention publique (collectivités locales et opérateurs publics spécialisés) dans ce domaine.

Mots-clés : l'habitat insalubre, bidonvilles, population, Maroc
Cuvinte cheie : habitat insalubru, mahalale, populație, Maroc

1. INTRODUCTION

Dès qu'on aborde l'insalubrité, on se heurte à la difficulté d'appréhender ce concept et de définir ses contours. Si on s'accorde à reconnaître l'ampleur de l'habitat insalubre et à qualifier certaines de ses manifestations (bidonville, habitat clandestin, spontané, précaire, marginal, sous-intégré, sous-habitat etc.), on a encore des difficultés à avancer une définition précise permettant de l'appréhender.

En effet, l'habitat insalubre fait référence à la fois aux notions de vétusté du bâti, d'habitabilité, de sécurité et de sous-équipement du tissu urbain.

Souvent confondue avec la vétusté qui désigne "l'état d'un objet abîmé par le temps et qui n'est plus en parfait état", l'insalubrité est perçue comme un état statique négligeant sa dynamique d'évolution, car on sait que tout environnement est susceptible de connaître un mouvement de dégradation ou d'amélioration de son état initial d'insalubrité. Cette confusion tient au fait que l'insalubrité dans le bâti peut résulter de la vétusté, quoique celle-ci ne soit pas toujours l'unique facteur de la dégradation. Les conditions d'occupation ou d'environnement, d'une manière générale, peuvent contribuer à ce processus, et l'accélérer. Il faut noter cependant que les niveaux de dégradation, souvent fonction de l'un ou de l'autre de ces phénomènes, ou de leur conjugaison, ne sont pas toujours faciles à mesurer; cette

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situation étant liée à la difficulté d'établir des seuils d'insalubrité et de circonscrire leurs champs spatial et environnemental.

Cette difficulté n'est pas due uniquement au degré de fiabilité des outils et techniques pour mesurer le seuil d'insalubrité mais tient surtout à la diversité des contextes économiques, sociaux et culturels, que ce soit pour des pays de niveaux économiques différents ou à l'intérieur d'un même pays. Elles sont également liées aux perceptions souvent différentes de l'insalubrité par ceux qui la vivent et ceux qui l'évaluent de l'extérieur.

Cette double perception de l'insalubrité, introduit la notion d'habitabilité, concept subjectif, difficile à cerner et à évaluer, parce qu'il s'appuie sur des données difficilement quantifiables : le vécu et la culture dominante au niveau de l'espace en question. La notion d'habitabilité renvoie aussi bien aux éléments de confort, de durabilité qu'aux contitions d'occupation du logement qui sont fortement dépendantes de chaque contexte socio-culturel.

L'insalubrité est liée aussi à la notion de sécurité. Une construction dangereuse met en jeu la sécurité des personnes qu'elle abrite et celles vivant dans son environnement. Se trouve alors sous-jacente à ces notions celle du risque et du caractère relatif de son évaluation et du prix jugé acceptable pour s'en prémunir.

Les expressions de "sous-équipement" ou de "sous-habitat" sous-entendent aussi l'idée de l'existence de norme ou d'un niveau de standard au dessous duquel se situe une partie du parc logement. Se pose alors le problème des critères de définition de ces normes, leur traduction opérationnelle et les risques de leurs manipulations.

Ce qui précède montre à quel point il est difficile d'appréhender le phénomène d'insalubrité et les différents concepts utilisés pour la définir. L'insalubrité pose, en effet, des problématiques différentes selon les tissus et appelle des interventions multiples et variées en fonction d'espaces concernés et selon qu'elle se présente seule ou conjuguée à un autre phénomène. D'autre part, l'insalubrité ne peut être appréhendée en dehors du contexte socio-culturel d'une manière générale et de la perception qu'en ont les habitants concernés. Or, cette perception est intimement liée à l'histoire du site occupé, aux relations communautaires et de voisinage, à l'environnement socio-économique, bref à l'ensemble des élements qui constituent le modèle culturel.

En s'appuyant sur l'état plus ou moins satisfaisant des connaissances acquises sur l'insalubrité dans les types d'habitat les plus touchés à savoir : les bidonvilles, l'habitat non réglémentaire, les nouvelles Médinas et les Médinas anciennes, on peut recourir à une approche multidimensionnelle et multicritère, qui doit tenir compte, entre autres des orientations suivantes :

a. Une approche technico-économique devant analyser les causes de l'insalubrité et son évolution dans le temps : nature du sol et des fondations, matériaux de construction utilisés, infrastructures urbaines existantes, environnement du bâti etc.

b. Une étude socio-économique ayant pour objectif d'identifier, l'état de l'insalubrité : type, degré et conditions d'occupation du logement et du tissu, degré de couverture par les équipements et services urbains etc. Mais aussi, les

différentes perceptions de l'insalubrité par les habitants, d'une part, et l'impact social des opérations menées au sein de ces espaces, d'autre part.

c. Une analyse de l'étendue et des limites des textes juridiques, à travers : l'étude de leur contexte historique et de leurs filiations (en vue de dégager les enseignements pour les futures opérations de l'habitat insalubre), le recensement des différentes institutions concernées et de leurs attributions.

d. Une évaluation des formes d'intervention déjà conduites dans divers tissus et espaces, afin de dégager les limites et les enseignements nécessaires pour tester l'opérationnalité des outils et techniques utilisés, et s'interroger sur les possibilités de transferts des ces outils dans d'autres tissus et d'autres espaces.

2. LA DIVERSITÉ DES FORMES D'HABITAT INSALUBRE

L'habitat insalubre désigne diverses formes d'habitat, différentes du point de vue des caractéristiques du tissu urbain crée, de l'occupation du logement ou des habitants, mais aussi du point de vue de formation et développement. Sur la base de la particularité du statut foncier, des matériaux de construction utilisés, de l'organisation du tissu urbain et du processus de production, on peut distinguer plusieurs formes d'habitat insalubre :

- *les bidonvilles*

Les bidonvilles constituent la forme la plus visible dans le tissu urbain, ils regroupent une diversité des situations, des contextes et des configurations depuis le "spontané" jusqu'à l'organisé sur des trames d'accueil. Ils se caractérisent globalement par des matériaux de fortune (habitat précaire en carton, tôle ou bidons) ainsi que par l'inexistence d'infrastructures de base, notamment l'eau, l'électricité et l'assainissement.

L'occupation du sol est aussi très diversifiée, du "squatting" intégral jusqu' à l'occupation quasi-légale en passant par des statuts intermédiaires de location ou de vente de lot par un particulier. Mais, en règle générale, les bidonvilles s'établissent sur un terrain de statut domanial, habous ou collectif et se situent, essentiellement, à l'intérieur des périmètres urbains sous forme de noyaux éparpillés.

D'abord marginalisés par leur dimension et par leur localisation à la périphérie des périmètres urbains, les bidonvilles qui ont pris des proportions importantes, nonobstant l'effort sensible d'éradication, et cessé d'être un phénomène excentré, apparaîssent comme une composante importante de l'espace urbain (près de 8% de la population urbaine en 1982).

- *l'habitat non réglementaire*

L'habitat non réglementaire ou "clandestin" est une forme d'urbanisation récente qui occupe une place dominante de l'habitat insalubre depuis la décennie 1970-1980. Il se distingue des autres formes d'habitat précaire par sa morphologie générale, par sa structure et ses modes de production tout en les rappelant par son sous-équipement.

Hormis l'insuffisance, voire l'absence des infrastuctures (eau potable, électricité, assainissement etc.), ce type d'habitat se caractérise par des constructions réalisées en dur sur des terrains non viabilisés et non autorisés. Les

terrains lotis appartiennent en général à des particuliers, cependant l'habitat clandestin peut s'établir sur des terrains collectifs ou sur des terrains habous (cas de Témara ou de Dersa à Tétouan). L'accés à la propriété du terrain se fait sans titre de propriété, mais l'acte "adoulaire" est en vigeur dans les transactions.

La spécificité fondamentale de l'habitat clandestin se manifeste au niveau de la flexibilité dans la construction du logement (durée, phases et moyens sont modulés), dans le processus de construction (assuré par la petite entreprise artisanale sous le contrôle direct du promoteur de l'opération. Ce dernier achète le terrain, les matériaux de construction et suit les différentes étapes du chantier) et dans la forme d'occupation (cohabitation organisée, location, intégration de local comme atelier ou comme commerce au rez-de-chaussée, maximalisation de l'occupation de la parcelle etc).

- *les Médinas anciennes*

L'insalubrité dans le cas des Médinas anciennes se traduit par la vétusté du bâti (maisons dégradées, voire en ruine), par le sous-équipement, par des infrastructures obsolètes ou saturées et par des conditions problématiques d'occupation du logement (forte cohabitation, densité élevée d'occupation de l'espace). Parfois, le degré d'insalubrité dans certaines Médinas est plus préoccupant que celui qui caractérise les bidonvilles ou l'habitat clandestin. A Rabat, la densité moyenne du quartier Mellah dépasse les 1000 habitants à l'hectare et dans certains îlots les 2000 hab/ha. Le recensement de 1982 indiquait que 60% des ménages de ce quartier s'entassent dans des logements à une pièce et sont pour 90% des cas des locataires. Le sous-équipement atteint des proportions plus élevées que celles rencontrées dans le clandestin, 21% des ménages du Mellah ne sont pas branchés au réseau d'eau potable, 13% ne le sont pas pour le réseau électrique et 11% occupent des logements qui ne disposent pas de toilettes. Le même constat peut être vérifié dans d'autres Médinas anciennes comme celles de Marrakech, Meknès ou Fès.

Les anciennes Médinas sont gravement affectées par trois types de crises : celle de l'usure du temps d'abord, qui, faute de travaux de sauvegarde et de restauration, a raison de ces prestigieux joyaux de l'art urbain et de l' architecture traditionnels; celle, ensuite, de la pression produite par l'afflux massif d'une bonne partie de la population migrante qui y trouve refuge; celle, enfin, de la surdensification, de la surexploitation des réseaux et des graves déficits d'entretien de ces vieux tissus urbains. Ainsi fragilisées, les Médinas anciennes se classent presque intégralement dans la catégorie du sous-habitat.

- *les nouvelles Médinas*

Les nouvelles Médinas correspondent aux tissus d'habitat économique réalisés entre les deux guerres et destinés à accueillir la population marocaine. Construites selon des principes d'urbanisme, de voirie et des habitations traditionnelles marocaines. Ces lieux d'habitation ont connu par la suite des mutations profondes marquées par le départ des populations aisées et un mouvement de densification important.

Les nouvelles Médinas comme celle de Casablanca, le quartier Akkari à Rabat ou Fès El Jeddid se caractérisent par une densité élevée d'occupation, un sous-équipement, une dégradation du bâti et une importance du parc locatif de logement de taille réduite. La densité moyenne de la nouvelle Médina de Casablanca est de 1000 hab/ha pour 800 hab/ha pour Akkari à Rabat. La grande majorité des habitants de ces quartiers occupent des logements à une ou deux pièces (78% pour Casablanca et 59% pour Akkari à Rabat).

Dans la nouvelle Médina de Casablanca, 13% des ménages n'ont pas d'eau potable, 17% ne possèdent pas d'électricité et 15% ne disposent pas de toilettes. La nouvelle Médina d'Akkari présente des similitudes au niveau de la problématique, mais à une échelle physique plus réduite.

• *l'insalubre diffus*

L'habitat insalubre concerne, également, un secteur peu connu, car peu visible et existant de façon diffuse dans la ville. Ce type d'habitat est constitué par des locaux non destinés initialement à l'habitation : garage, arrière boutique, sous les escaliers ou dans le parking, buanderie, sur les terrasses des maisons et des immeubles. Toutefois, cette forme est surtout présente dans les grands centres urbains.

3. LES FACTEURS EXPLICATIFS DE FORMATION ET DE DÉVELOPPEMENT DE L'HABITAT INSALUBRE

Les facteurs explicatifs de formation et de développement de l'habitat insalubre sont multiples et interdépendants. Certains sont liés à l'environnement socio-économique et s'appliquent à l'ensemble des formes d'habitat insalubre, d'autres sont spécifiques au contexte urbain et, enfin, d'autres sont propres à chaque forme d'expression de l'habitat insalubre.

• *les facteurs socio-économiques*

Ces facteurs sont directement liés à l'importance de la croissance urbaine, à l'ampleur du déficit en logements, à l'inadéquation de l'offre en terrains équipés et en logements aux caractéristiques de la demande et particulièrement pour les ménages à faibles revenus.

Lors des trois dernières décennies, la croissance urbaine a connu un rythme rapide. La population urbaine qui représentait 29% de la population totale en 1960 est passée à 35% en 1971 et 43% en 1982. A partir des années quatre vingt-dix la population urbaine a dépassé la population rurale et au niveau de l'année 2000 elle représentera près de 57% de la population totale. Ainsi, la population urbaine qui était de 5 401 971 a atteint 8 730 399 habitants en 1982. Elle a été estimée à 11 734 habitants en 1990 et les prévisions pour l'année 2000 tablent sur le chiffre de 16 283 000 habitants, soit un rapport annuel moyen de près de 400 000 personnes pour la période 1982-1990 et 455 000 pour la période 1990-2000.

L'attraction du milieu urbain qui offre des opportunités d'emplois plus rémunérés que ceux du milieu rural, génère l'exode rural, élément essentiel et durable de la croissance urbaine qui se traduit par une augmentation continue de la demande en logements. Entre les années 1982 et 1990, la demande en logements urbains était de 70 000 à 80 000 unités par année, alors que la

production des logements autorisés n'a pas dépassé les 50 000 unités par année pendant la même période.

D'après certaines projections, pour faire face au déficit accumulé et aux besoins nouveaux dûs à la croissance démographique dans les villes et au renouvellement du parc ancien sur les 12 prochaines anneés, il faudrait construire chaque année près de 180 000 logements. Ainsi, les besoins en logements à l'horizon 2007 seront de 2 700 000 unités. En dépit de l'action de l'Etat à travers les opérations de lotissements et de construction de logements et celle du secteur privé dans le cadre de la promotion immobilière, le marché du logement urbain n'a pas permis de satisfaire la très forte demande, notamment celle des couches sociales a revenus modestes. Les recensements ont montré que plus de 70% des ménages ont des revenus inférieurs à 2 500 DH par mois, or les statistiques montrent que l'offre de logements pour cette catégorie se raréfie.

Le développement de l'habitat insalubre découle aussi des limites et des insuffisances des aménagements fonciers. L'offre en terrains équipés, malgré les efforts poursuivis, reste insuffisante et inadaptée aux différentes catégories de la demande. Ce phénomène est aggravé par l'épuisement des réserves foncières de l'Etat et la résistance accrue des propriétaires privés vis à vis de l'utilisation de leur terrain pour des projets d'habitat initiés par des organismes publics.

Par ailleurs, le financement institutionnel, par ses conditions d'accès contraignantes, ne couvre qu'une faible part des constructions de logements (18%). La faible intégration du secteur du logement dans le marché financier national situe le Maroc dans ce domaine légèrement en retrait des pays à revenus comparables.

• *les facteurs spécifiques au contexte urbain*

La croissance urbaine et l'exode rural ne peuvent pas à eux seuls expliquer tout. Les flux migratoires de la population rurale vers les centres urbains ne génèrent pas toujours et d'une façon automatique une demande en logements. En effet, les populations d'origine rurale suivent un itinéraire urbain avec des statuts d'occupation des logements et des niveaux d'organisation différents en fonction de leur statut matrimonial, de leur insertion professionnelle et de leur intégration urbaine. Les logements locatifs jouent un rôle déterminant dans ce processus, que ce soit dans les bidonvilles, les Médinas ou les nouvelles Médinas.

Les nouveaux ménages d'origine rurale qui arrivent sur le marché doivent se plier aux conditions du marché locatif : une fois et demi le *SMIG* mensuel pour accéder à un logement de deux ou trois pièces selon les villes. Ceux qui n'arrivent pas à remplir ces conditions sont obligés, soit de cohabiter aves d'autres ménages dans le tissu ancien (18% des ménages urbains étaient dans ce cas en 1991), soit de s'orienter vers le parc locatif dans les quartiers périphériques de type clandestin et bidonvilles non encore résorbés.

L'habitat insalubre apparaît donc, comme une variable de régulation du marché de logements qui prend une forme spécifique et particulière selon le contexte urbain. Il peut concerner des tissus urbains visiblement "intégrés" mais dont les conditions d'occupation des logements révèlent des formes d'insalubrité

(cas des Médinas et des nouvelles Médinas), mais aussi des formes "classiques" d'insalubrité comme les bidonvilles ou les quartiers clandestins.

Dans le mécanisme d'ajustement entre l'offre et la demande en logements, tous les éléments du marché contribuent à la transformation des caractéristiques du parc et de son occupation. Ainsi, les caractéristiques de l'habitat ne sont pas figées et l'insalubrité n'est pas un état statique, c'est plutôt un processus dynamique qui peut progressivement transformer un parc d'une situation "normale" répondant aux exigences d'habitabilité à une autre où ces exigences ne sont plus respectées.

Certaines études fort intéressantes sur Fès, Tétouan, Agadir ou Rabat ont montré le rôle fondamental joué par la Médina ou le clandestin dans la régulation du marché de logements. Ces études ont montré aussi la diversité des formes d'insalubrité dans l'habitat et l'incidence du contexte urbain sur leur évolution.

• *les facteurs propres à chaque type d'habitat insalubre*

Le développement de l'habitat insalubre est aussi lié à des facteurs propres à chaque type d'habitat. S'il est difficile de pouvoir déterminer avec précision tous ces facteurs, on peut, néanmoins, avancer quelques éléments permettant de les identifier. Pour les populations d'origine rurale, le bidonville apparaît comme une nécessité absolue d'un abri et son développement traduit l'insuffisance des revenus de ces ménages, même si le prix des baraques augmente. Si en 1982, il suffisait de 10 mois de SMIG brut pour accéder à la propriété d'une baraque de 30 m^2 dans un bidonville périphérique à Fès, en 1991 il faut plus de 2 ans et demi (32 mois) de salaire. Pour la même baraque à Casablanca ou à Rabat il faut compter un prix trois fois supérieur.

Le bidonville se présente comme un abri à très faible coût, mais aussi comme un environnement économique et socio-culturel compatible avec les aspirations et les possibilités matérielles des habitants : inexistence de coût d'équipement, de branchement à l'eau et à l'électricité, entraide communautaire et de voisinage, commerce et service facilement accessible en terme de coût et de relations socio-culturelles.

Concernant les Médinas et les nouvelles Médinas, l'habitat insalubre correspond à une dévaluation du parc existant qui, faute de renouvellement et compte tenu des conditions d'occupation, tend vers la dégradation. L'insalubrité se manifeste, dans ce cas, essentiellement par les conditions désastreuses d'occupation du logement que par l'absence d'infrastructures et de services urbains que l'on retrouve dans le bidonville ou le clandestin. Quant à l'habitat clandestin, il est l'expression des changements qui traversent la formation sociale urbaine. Il capte une grande partie des couches moyennes. C'est une forme de réappropriation de l'espace urbain en ce sens qu'il représente un modèle urbain alternatif porteur d'une nouvelle conception d'organisation et de gestion urbaine. L'origine géographique des habitants des quartiers clandestins révèle la prédominance des urbains. L'émergence de ces quartiers est le produit de la mobilité intra-urbaine que de l'exode rural. L'un des facteurs essentiels dans l'apparition et le développement du clandestin est la spéculation foncière dont la cause en est la forte demande foncière et l'augmentation rapide du prix du sol qui en découle.

4. LA LUTTE CONTRE L'HABITAT INSALUBRE: L'ACTION DES COLLECTIVITÉS LOCALES ET DES OPÉRATEURS PUBLICS

La lutte contre l'habitat insalubre, constitue depuis une quinzaine d'années, un des axes prioritaires de l'action des pouvoirs publics en matière d'habitat. Si les préoccupations de l'Etat en matière d'habitat datent du lendemain de l'indépendance, celles de lutte contre l'habitat insalubre dans une optique d'intégration urbaine ne se sont manifestées explicitement qu'à partir du Plan de Développement Economique et Social de la période 1973-1977.

La stratégie d'intervention de l'Etat est passé des opérations d'aménagement foncier destinées exclusivement à la résorption des bidonvilles à des programmes intégrées combinant à la fois la production de lots de relogement et de lots destinés au marché. Il faut signaler qu'à partir des années 1980, les pouvoirs publics ont réajusté leur action en mettant en place des programmes qui s'appuient davantage sur les actions d'organismes spécialisés et des collectivités locales.

• *les stratégies d'intervention publique*

Jusqu'en 1973, les actions menées par l'Etat ont été ponctuelles et de faible envergure. Il s'agissait particulièrement de la politique de *"démolition-recasement"* des bidonvilles qui concernait 18% de la population urbaine en 1970. Pour les autres types d'habitat insalubre (habitat clandestin et tissus anciens), ils n'étaient appréhendés qu'à partir des années 1980.

Avec le plan de développement économique et social de la période 1973-1977, les pouvoirs publics ont opté pour la stratégie de restructuration des bidonvilles, qui était en vogue à l'époque (suite aux recommandations de Vancouver en 1976) car appuyée financièrement par la Banque mondiale et l'USAID. Trois projets de développements urbains (PDU) ont été réalisés avec le concours de la Banque mondiale : il s'agit de la restructuration de Douar Doum à Rabat (21 000 habitants sur 18 ha), Saknia à Kénitra (38 000 habitants sur 48 ha), et Bordj Moulay Omar et Sidi Baba à Meknès (45 000 habitants sur 159 ha). Quant à l'USAID, il devait financer le projet de restructuration de Ben M'sik (80 000 habitants) à Casablanca. A la suite des manifestations sanglantes de juin 1981 qui sont parties des bidonvilles de Ben M'sik, le projet de restructuration initial sera enterré et remplacé par une opération de recasement dont la société *"Attacharouk"* aura la charge.

Les plans des périodes 1978-1980 et 1981-1985 (cette dernière a été étendu jusqu'à 1987), ont retenu comme principales options la poursuite de l'action de restructuration des bidonvilles et le renforcement du programme de l'habitat économique. En 1984, on assiste à la création de l'ANHI dont les attributions sont : la restructuration et le recasement des bidonvilles, la restructuration de l'habitat sous-équipé et non réglementaire et la réalisation de lotissements pour dédensifier les tissus anciens. Concernant la résorption des bidonvilles, deux types d'intervention ont été envisagés :

- l'une relative aux moyens et petits bidonvilles pour lesquels l'action consiste à apporter les équipements manquants à savoir la voirie principale, les réseaux d'eau et d'électricité afin de restructurer la trame foncière et améliorer par conséquent les conditions d'habitation;

- l'autre a trait aux grands bidonvilles pour lesquels le but visé, au delà de la réalisation des équipements de base, est de placer ces vastes quartiers bidonvillois dans le contexte de développement de l'ensemble de l'agglomération.

Depuis l'année 1987, la stratégie de restructuration a été abandonnée. L'ANHI a adopté comme mode d'intervention la production de lots équipés de relogement (recasement) et la mise en place de programmes intégrés combinant à la fois de lots de relogement et de lots destinés au marché. L'un des éléments importants de cette nouvelle stratégie réside dans le recours à la péréquation financière entre les différentes catégories de populations bénéficiaires. Ce qui permet à l'Agence d'atteindre un double objectif : l'équilibre financier de l'opération et l'intégration des couches de populations différentes dans un même tissu urbain.

Quant à la restructuration de l'habitat clandestin d'apparition récente, on note une certaine évolution dans le type d'actions, passant d'une intervention fragmentaire (particulièrement, en matière d'équipement en eau potable, électricité etc.) à des opérations de restructuration totale avec une tentative de régularisation foncière, pour aboutir, ensuite, à des opérations dites intégrées. Les premières opérations ont été gérées, d'abord, dans un cadre de maîtrise d'ouvrage directe par des Amicales et Associations de résidents des quartiers avec assistance technique de l'administration (exemple du quartier Monfleuri à Fès), suivies par d'autres gérées par les collectivités locales (exemple de Kariat Oueld Moussa à Salé). Enfin, certaines collectivités locales ont eu recours à des organismes spécialisés de l'Etat pour la gestion technique de ces types d'opération en maîtrise d'ouvrage déléguée (exemple du PDU de Dersa-Samsa à Tétouan). A la veille du plan d'orientation de la période 1988-1992, devant l'ampleur des besoins en logements pour le milieu urbain, et compte tenu de l'importance de l'investissement global que doit consentir l'économie nationale pour satisfaire les besoins en logements.

Les pouvoirs publics ont pris conscience, du fait, que l'effort important à consentir ne peut se faire que dans le cadre d'une révision structurelle des approches poursuivies et par la mobilisation massive de l'ensemble des forces en présence.

La mise en oeuvre d'une politique conventionnelle associant étroitement collectivités locales et opérateurs publics spécialisés et mobilisant les moyens et compétences des parties concernées constitue aujourd'hui l'un des fondements de la nouvelle stratégie de l'Etat dans le domaine de l'habitat. Son rôle demeure essentiel pour la mise en oeuvre de cette stratégie. Il lui revient à ce titre, d'encadrer le secteur par l'orientation, la planification et la coordination des interventions d'une part, et la prise en charge de la demande à caractère social (habitat insalubre), d'autre part. Pourvu d'une telle mission, L'Etat est tenu de veiller à la répartition équilibrée de l'action des intervenants à travers le territoire national.

- *evaluation des actions menées*

Les nombreuses opérations de résorption de l'habitat insalubre lancées et réalisées au cours de la dernière décennie présentent un large éventail d'expériences qu'il s'agit d'examiner globalement afin de mettre en évidence les résultats obtenus et d'évaluer les acquis et les limites. Concernant les Médinas anciennes et nouvelles,

elles n'ont pas connu d'intervention d'envergure comme celles des bidonvilles ou de l'habitat clandestin, elles ne feront pas l'objet d'évaluation.

- en matière de lutte contre les bidonvilles

D'après le recensement sur les bidonvilles, effectué par le Ministère de l'habitat en 1992, on a dénombré 1 008 sites de bidonvilles en milieu urbain. Ces sites sont constitués de 135 560 baraques ou zribas abritant 160 300 familles, soit 20% de moins par rapport au recensement de 1982. La part des ménages bidonvillois par rapport à la population urbaine totale est passée de 12,8% en 1982, à 7,8% en 1989 et 6,8% en 1992. Cette performance ne reflète que partiellement les efforts déployés pour résorber les bidonvilles car, malgré l'accroissement de la population bidonvilloise, de l'ordre de 5,7% par année, l'action menée a permis non seulement de réduire le bidonville en valeur relative mais également en valeur absolue.

Les actions menées par l'ANHI et plus récemment par les collectivités locales qui commencent à initier, voire même à réaliser des opérations de résorption de bidonvilles (exemple de l'opération Marjane de la Municipalité de Meknès, programme qui a fait l'objet d'une convention avec l'ANHI), ont produit un effet remarquable sur le recul du bidonville. Pendant la période 1982-1992 les opérateurs publics spécialisés et collectivités locales ont livré près de 167 500 unités de lots et de logements dans le cadre des opérations de résorption des bidonvilles.

Les nombreuses opérations de résorption des bidonvilles lancées et réaliseés au cours des quinze dernières années présentent un intérêt certain : d'une part, elles ont permis de loger décemment une population bidonvilloise estimée à plus d'un million de personnes dans les années 1980 ; d'autre part, quel que soit le mode d'intervention, ces opérations ont constitué une véritable école de formation pour les opérateurs publics, en raison des nombreuses innovations qu'elles ont connu dans divers domaines (montage technico-financier, gestion technique et financière, recouvrement des coûts, mode d'intervention, mode de financement etc.).

Le recasement sur terrain loti fut la forme d'intervention la plus pratiquée durant la période 1980-1987, grâce à ses avantages tant au niveau de la technique de réalisation qu'aux niveau financier et délais de réalisation. Face aux difficultés de déplacement de population et aux problèmes de pénurie foncière et d'esthétique urbaine, des programmes intégrés ont été mis en place, combinant à la fois, une politique de relogement en habitat collectif (pour réduire la contrainte relative à l'épuisement des reserves foncières), une politique de restructuration (pour éviter les impacts sociaux : pas de déplacement de population, sauvegarde du voisinage etc.) et enfin une politique de recasement sur des lots équipés pour réduire les délais de réalisation et faire disparaître au plus tôt le fléau des tissus urbains existants.

- en matière de lutte contre l'habitat clandestin

L'enquête nationale réalisée en 1983 par le Ministère de l'Habitat et la Banque mondiale a révélé l'ampleur du phénomène de l'habitat clandestin au Maroc. Au début des années 1980, ce type d'habitat concernait 13% de la population urbaine (soit 1,3 millions d'habitants) et couvrait une superficie de 3 000 hectares avec une densité moyenne de 310 habitants par hectare. Cette population était implantée en majorité dans des grandes villes de plus de 30 000 habitants.

Deux sortes d'action ont été menées dans les quartiers clandestins :

- une action de planification et de régularisation foncière dans certains quartiers où le marché foncier est actif et où les terrains urbanisables sont en attente. L'objectif des pouvoirs publics dans ce cas, est l'élaboration d'un plan d'aménagement qui tient compte de la réalité existante, révise les plans de lotissements et formule les variantes. Le but est d'arriver à un compromis qui bloque le phénomène spéculatif. Le quartier Monfleuri à Fès puet être cité en exemple (3 400 constructions ont été réhabilitées et près de 15 000 logements ont été réalisés) où la mise en place d'une amicale par les propriétaires sous l'égide des autorités locales a abouti au redressement du quartier. Cette forme de régularisation a introduit une rationalité technico-économique au sein du système de production du sol et du logement qui a bouleversé le contenu social du quartier.

- une action de restructuration des tissus bâtis existants en améliorant leurs équipements et en mettant en place les équipements manquants. La priorité est donnée à l'équipement primaire (voirie et assainissement). C'est le cas de l'opération de Kariat Ouled Moussa à Salé qui a été pilotée et gérée par la commune rurale de Bouknadel (Maître d'ouvrage), qui a confié les travaux d'eau potable, d'électrification et d'assainissement à la Régie d'Eau et d'Electricité (RED) de Rabat en maîtrise d'ouvrage déléguée, la commune assurant elle même, la réalisation de la voirie.

L'opération réalisée à Kariat Ouled Moussa a ouvert d'autres horizons pour d'autres projets de restructuration de quartiers clandestins, comme en témoignent les cas de Jnanate et Sahrij Gnaoua à Fès, Ijennane à Safi et Dersa-Samsa à Tétouan. Ce dernier cas est considéré comme une opération pilote, reproductible comme modèle pour lutter contre le sous-équipement des quartiers clandestins. Il s'agit d'une opération intégrée par excellence, combinant à la fois quatre actions : *la restructuration* des tissus existants et la régularisation juridique des terrains et des constructions, *la prévention* qui consiste en la réalisation d'un lotissement d'habitat sur environ 60 ha pour les familles aux revenus moyens et bas, *l'aménagement concerté* par la réalisation des infrastructures principales d'assainissement, de voirie et d'éclairage public et, enfin *l'équipement hors site* d'intérêt urbain. Le maître d'ouvrage est la Municipalité de Tétouan, qui a confié la gestion technique du projet en maîtrise d'ouvrage déléguée à l'ANHI pour les travaux d'assainissement, de voirie et du foncier et la RED pour les travaux d'eau et d'électricité.

5. CONCLUSIONS

L'évolution de l'insalubrité impose de nouvelles réflexions et des démarches innovantes qui ne soient pas seulement d'ordre technique, réglementaire ou procédural, mais qui nécessitent une vision plus large de l'intervention sur la ville. L'expéricence et les actions développées au Maroc peuvent contribuer à l'élaboration de nouvelles stratégies pour prévenir et traiter l'insalubrité de l'habitat dans toutes ses formes. Dans un contexte d'accroissement des besoins en legements et d'urbanisation rampante avec les contraintes d'épuisement des reserves foncières et de rareté des capitaux, la conjonction des efforts de l'Etat, des organismes publics

spécialisés et des collectivités locales est une nécessité absolue. Le concours de ces partenaires pour avoir des chances de produire l'impact nécessaire sur la crise urbaine mérite cependant d'être concerté et coordoné. L'ampleur du phénomène d'habitat insalubre suppose des réponses, des initiatives et des opérateurs aussi pluriels, agissant non pas en ordre dispersé mais synergiquement.

Enfin, il faut souligner que la lutte contre l'habitat insalubre ne peut être efficace sans une participation active des populations concernées. Ceci ne peut se réaliser qu'en s'appuyant sur les initiatives locales, et notamment sur le mouvement associatif qui peut épauler les actions des collectivités locales et prolonger les interventions des opérateurs publics. Il est nécessaire aussi de prendre en compte les besoins réels de la population et son information à toutes les phases de la conduite des opérations ; ainsi que la recherche de nouvelles formes d'implication effective des populations concernées.

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HISTORICAL LANDMARKS REGARDING THE SPATIAL EVOLUTION OF CRAIOVA MUNICIPALITY

REPERE ISTORICE ÎN DEZVOLTAREA SPAȚIALĂ A MUNICIPIULUI CRAIOVA

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Abstract: The importance of this study resides in revealing the geographical, historical and cultural conditions in which Craiova municipality extended its territory, but also the level of development that generated it. The process of territorial extension signified the change in the relations between the city and its contiguous territory, especially during the last hundred years, emphasizing an urban reality full of discrepancies, the consequence of the stochastic way in which the urban dynamics took place towards the periphery.

Key words: historical evolution, spatial development, Craiova municipality
Cuvinte cheie: evoluție istorică, dezvoltare spațială, municipiul Craiova

1. INTRODUCTION

Craiova municipality lies on a vast amphitheatre, on the left escarpments of the Jiu river, connecting the North-Western part of the Romanian Plain with the Getic Piedmont, in the North-Eastern part of Dolj county, at 44°19'30" North latitude and 23°50'45" East longitude, at altitudes comprised between 70-75 metres in the West and 135-140 metres in the East.

With a total area of 8141 hectares in 2009, Craiova extended its geographical perimeter by including the villages situated nearby within the city's heartland according as its urban and economical development flourished: Popoveni, Bordei, Şimnicu de Jos, Mofleni, Balta Verde, Făcăi, Cernele, Izvoru Rece, Rovine; the major internal metamophoses also refer to restructuring and assigning new functionalities to several spaces within the built-up area.

Representing the most important regional pole of nowadays Oltenia, Craiova developed at an important junction of commercial roads over the centuries; the role of commercial center marked the evolution of the medieval bourg towards the modern city.

In order to identify the stages that marked the spatial evolution of the city, there has been made a comparative analysis of the historical documents existent at

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Dolj County Headquarters of the National Archives, of relevant cartographic documents during the 18th and the 19th centuries, found at the Library of the Romanian Academy, but also by consulting the geographical bibliography.

2. THE SPATIAL DEVELOPMENT OF CRAIOVA MUNICIPALITY

2.1. The very first traces of inhabitation

The archaeological discoveries demonstrated the presence of the first human communities on Craiova's territory from Neolithic, about 6,000-2,500 B.C. (Georgescu et al., 1977, p. 8). These communities founded settlements in the Western part of Craiova, at Cârcea, Şimnicul de Jos, Şimnicul de Sus, in some central parts of the city, at Făcăi and on the right bank of the Jiu river, at Bucovăţ; most of these settlements were also inhabited during the period previous to the Metal Ages (about 2,500-2,000 B.C.).

Subsequently, the archaeological and numismatic discoveries emphasized the presence of ceramics, utensils and weapons in the areas of: Şimnicu de Jos, Craiova, Făcăi, but also Podari, Cârligei-Bucovăţ, Bucovăţ, Leamna, Işalniţa from the period going between the Metal Ages and the Bronze Ages and then until the Iron Ages; these evidences testify the permanence of inhabitation within this area, determining the becoming, crystallization and consolidation of the Thracic-Getic basis in the area.

Given its dimensions, one of the most important Getic-Dacian settlements in Dacia Malvensis was called *Pelendava* (later on *Pelendova*, if taking into consideration the denomination of the Roman civil settlement in Tabula Peutingeriana); the compound toponym was on the one side connected with the location in the Jiu river meadow (*peled-*, meaning *moist, to flow*), but on the other side hinting, by the suffix *–dava (settlement, village, place)*, at the fortification from Cârligei-Bucovăţ. The archaeological traces prove that Pelendava subsequently entered under military influence and administration of the *pagus* in Răcari, while the Roman camp, together with the Roman road were placed near Mofleni and Bucova monastery (Tudor, D., 1968, p. 313).

Besides the vestiges of the ancient Roman *Pelendava* found in contemporary Craiova, i.e. Mofleni neighbourhood, there have also been villages of native Getic-Dacians, at Făcăi. Thus, the year 225 is considered to be the date of the first documentary mentioning regarding the oldest settlement within the heartland of the contemporary municipality (Tabula Peutingeriana).

In the years following 275, a peculiar phenomenon takes place in what concerns the spatial regrouping: while until the Roman Age the inhabitation nuclei gravited towards Bucovăţ-Mofleni area, during the post-Roman period they manifested a centrifugal tendency. The Northern extremity of the new Roman expansion (during Constantin the Great) is constituted by Brazda lui Novac, which could be traced at Leamna, in the forest of Bucovăţ and also, in the North-Eastern and Northern part of the city.

At the end of the 4th century, the Hunnish and Ostrogothic people entered Oltenia and settled here until the first decades of the 5th century, while at the end of

the 6th century, communities of Slaves entered and settled Westwards from the Olt river.

Hence, before the documentary testification during Feudalism (June, 1st, 1475), the archaeological evidences can attest at Craiova the existence of a settlement that had clearly surpassed the rural stage, having a certain economic and administrative importance, becoming a genuine polarizing center which had commercial relations with the Balkan Peninsula and Western Europe due to its favourable location at the crossroads between Transylvania and Vidin.

2.2. The evolution of the city during the Middle Ages

Medieval Craiova's development was influenced by an obvious demographical growth and social division of labour force. As stated in the first mentioning of the locality, the estate of Craiova belong to Craioveşti landowners.

The configuration of the city changes fundamentally during this period due to the development of Craiova as a bourg, the fair being initially located in Bucovăț area, but subsequently shifting towards the present Old Market of the city, at the intersection of the main commercial roads during that time: *Ocnei road*, descending from Ocnele Mari towards Craiova, following the road to Slatina, *the saline road*, *Vidin road* or the *hill road*, descending towards Calafat and *Bucureşti road*. The commercial core of the city was located around the heights surrounding Elca Vale, placed in the present Old Market area.

Fig. 1. The boundaries of Craiova lordly estate – 1761, 1:80 000
(Source: Ciobotea D. et al., 1999, p. 31)

Given the social-economic development, Craiova was in an incipient urban stage; moreover, placing *Bănia* to Craiova at the end of the 15th century meant assigning the settlement, besides the economic functions, political and administrative ones, that would create the favourable premises first of all for its

demographic growth, polarizing the rural population graviting around the city and furthermore, for its territorial extension.

As a consequence of the extensive character of the agriculture specific to this period, the perimeter of the medieval bourg included vast agricultural areas, mainly vineyards and orchards and especially in the Western and Southern parts of the bourg; they maintained their functions until the 18th century, as seen in Fig. 1.

Although lacking defensive walls or fortresses, Craiova represented a military and strategic nucleus during the Middle Ages, functions that were mainly exerted by the fortified churches and monasteries placed marginally.

2.3. Craiova at the beginning of the Modern period

In order to highlight the development stage of Craiova during this period, I have chosen to analyze relevant cartographic documents of the 18th and 19th centuries: Specht's Map, the Map of Schwantz, the Charta of Southern Romania (Szatmary Map).

During the first decades of the 18th century, Craiova developed in what concerns the urban public works, by building bridges made up of beams on the streets of the town and gutters used for the watter supply system. But, in the same time, Craiova endured the ravages of the Turkish invasions and suffered from the baneful consequences of the Russian-Turkish war, which altogether slowed down the general development of the town.

For instance, the temporary demographic decrease is also obvious in the plan mapped in 1790 (Fig. 2) because of a series of roads crossing the town with numerous outbacks in the areas between them; Bucureşti road, Calea Severinului and Amaradia Street were better populated. The old economic center of the bourg, the Old Market (in the South-Western part of the town) is represented as having only a few dwellings and constructions.

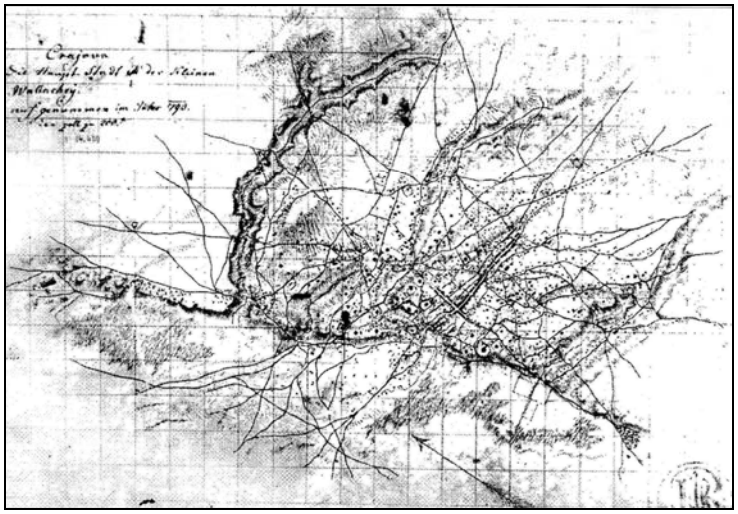

Fig. 2. The plan of Craiova, 1790
(Source: Ciobotea D. et al., 1999, p. 18)

Analysing the maps, it can be observed that Craiova ranked among some few urban settlements in Oltenia of that period, becoming one of the most developed towns, as a result of adding political, administrative and cultural functions to the inceptive commercial one. From a demographic point of view, statistics in 1735 declared a population of 4,000 inhabitants for Craiova, but it reaches 10,000-15,000 inhabitants in the period following 1821, i.e. 11,665 inhabitants in 1832 (Ciobotea D. et al., 1999, p. 23).

In *Specht's Map*, Craiova appears to be located exclusively on the left bank and on the first escarpment of the Jiu, the swampy meadow of the river, permanently exposed to flooding being avoided, constituting for the moment a spatial barrier, a topophobic area for the extension of the town towards the West and the South-West (Fig. 3); at that time, the characteristics of this location conferred a semicircular form to the town (Turdeanu Toşa, Ana, 1975, p. 146).

Fig. 3. The location of Craiova in a fragment of *Specht's Map*

The Map of Schwantz, on the other side, marks Craiova, together with Râmnic, as being part of *urbs* category and shows that the texture and the structure of the town was common for all the settlements of that time, the location of the dwellings being moreover determined by individual possibilities and not necessarily following a certain planning or systematization (Fig. 4). It can be distinguished a nucleus of the town with maximum agglomeration, from which the streets branch radially, with an absolutely anarchical distribution of the households.

Fig. 4. The representation and location of Craiova in *the Map of Schwantz*

During the 19th century, the town maintains as the main commercial center of Oltenia; in 1821, an extension of the town took place, also bringing an extension of the cultivated lands defavouring the forests near the town. The unsanitary huts dominance from the suburbs, the inadequat streets paving highlights the complex social stratification of premodern Craiova and increases the contrast between the urban slums of the city and its center (Fig. 5). In the internal structure of the city, the *slum* acceptance corresponded to the administrative division, this being part of a town during Ottoman period, in the 18th century; in Craiova including, their names were representative for the activities and main occupations of the residents or were crystallized around a church: Trăistarilor *Slum*, Tabacilor *Slum*, Cizmarilor *Slum*, Obedeanu *Slum*, Mântuleasa *Slum*.

In 1859, Craiova reached a population of 25,000 people and was bounded by eight barriers: Bucharest way towards Eastwards, Caracal and Calafat ways or Diului way Southwards, Bucovăț and Brestei Westwards, Cerneți or Severin towards the North-West, Amărăzii and for Vâlcea Northwards; Craiova was divided into three sectors: yellow, red, blue. It already started the process of modernization of the roads and building new ones, but the obvious development is seen beginning with the first railways.

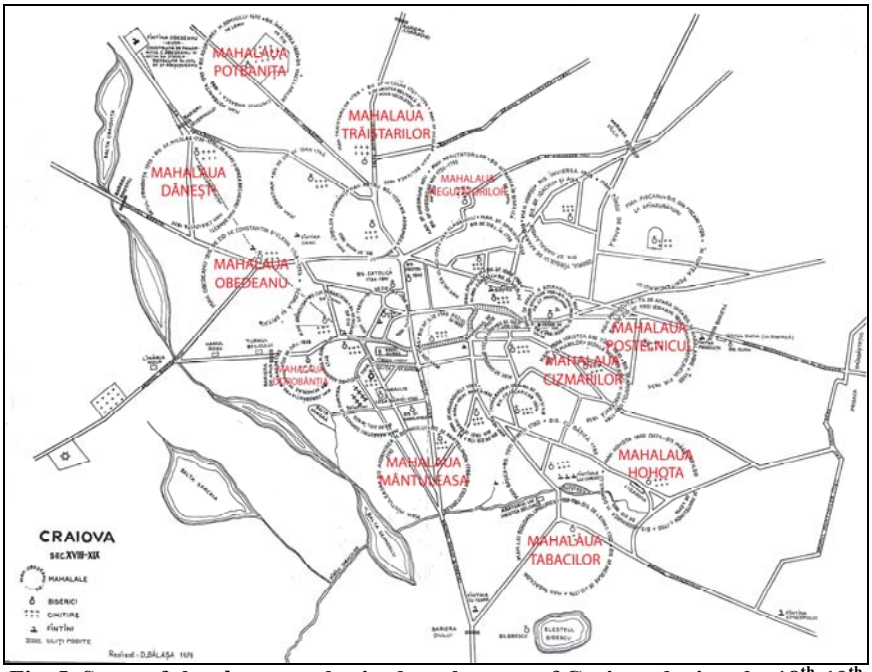

Fig. 5. Some of the *slums* emphasized on the map of Craiova during the 18th-19th centuries *(Source: Deaconu L., 1981, Annex)*

On the Charta of Southern Romania, also known as Szatmary Map, it is already obvious a radial-concentric pattern and tentacular extension of Craiova, along the main communication routes in the mid-nineteenth century (Fig. 6).

Fig. 6. The representation of Craiova and its surrounding area in *Szatmary Map*

2.4. The end of the 19th century, a period of great urban metamorphosis

At the census of 1899, Craiova already numbered 45,597 inhabitants and went over an early stage of industrial development. In 1910, the total population was 51,404 inhabitants. Population growth caused an "illegal process of expansion of the town, by constructions" (Deaconu L., 2001, p. 183). The territorial expansion, the transformation of the access roads to the city and the location of the constructions in the outskirts were done arbitrarily, disregarding the existence of built-up lands used in agriculture or vacant lands.

In addition, the lack of sanitation, drinking water, the unpaved and narrowed streets, without any alignment or systematization and the large number of unhealthy dwellings, the lack of facilities or utilities and made up of low quality materials determined Craiova to be one of the leading towns when dealing with the number of tuberculosis or typhoid fever patients, but also a town in which architectural, urban and territorial progress were rather chaotic.

In the early twentieth century, with huge financial effort, there took place in Craiova several public works: draining Craiovița and Geanoglu ponds, water delivery from Gioroc source, with a flow of 8,000 cubic meters per day (thanks to engineer W.H. Lindley), the campaign of paving the streets (1901-1904), the expansion and modernization of street lighting, the alignment and systematization plan of the city which projected radial circulation arteries linking the central area to the peripheries of the city.

On the eve of World War I, Craiova numbered 50,000 inhabitants and excelled at a national and regional level through an intensive commercial activity and an incipient stage of industrial development (being a famous center of processing agricultural products, textile units, ceramics, woodworking, chemical products, agricultural machinery etc).

As Vintilă Mihailescu stated, "the desire for isolation and natural beauty" led to a territorial extensive development of towns in this period, standing out the presence of numerous lordly mansions in the settlements near Craiova: Craiovița, Podari, Şimnic, Mischii, Gherceşti (Nicolae, I., 2002, p. 242).

In 1930, due to the infusion of modern development premises, the city's demographic trend emphasizes a population of 63,063 inhabitants, reflected by a territorial extension of the inhabited area of the city and a phenomenon of "agglutination" of nearby settlements; the villages declared suburban - Bordei, Gherceştii Noi, Bariera Vâlcii, Craiovița, Lascăr Catargiu, Românești will become 30 years later, the city's inland areas, actual neighbourhoods.

2.5.Craiova during the second half of the twentieth century

Regarding the changes of the territory, following the Act of 1904 which provided a surface of 11,180 hectares of Craiova, in 1940, Craiova had 4,492 hectares. Subsequently, the Royal Decree no. 3,924 of 1975 established the extension of the city at 1,724 hectares and other 95 hectares comprised in suburban communes: Bariera Vâlcii, Bordei, Craiovița, Gherceşti, Lascăr Catargiu, Popoveni, Mofleni. According to the General Urban Plan in 1990, Craiova municipality comprised 8141 hectares, of which 6765 hectares belonged to Craiova itself and 500 hectares to

Făcăi, Mofleni, Popoveni, Şimnicu de Jos, Cernele, Rovine, Izvoru Rece (Avram C. et al., 2005, p. 8).

From an administrative point of view and analysing diachronically, Craiova belonged successively to: Dolj county, *plasa* Jiului inferior (administrative unit) (1819-1831), Ocolu (1853-1861, 1864-1887), Amaradia-Ocol (1887-1908), Balta Verde (1908 -1943), Craiova (1943-1950). In the period 1950-1968, the city was part of Oltenia *region*, Craiova *raion* (Avram et al., 2004, p. 22).

In fact, the territorial expansion of Craiova is the result of important changes on the administrative map of the area. Gherceştii Noi, for example, a commune founded in 1930, was part of *plasa* Craiova between 1930 and 1950; it was included in Craiova since 1950 (Avram et al., 2004, p. 290). Craioviţa, a commune founded by the administrative law of March, 31st, 1864, was included in Craiova since 1965, just like it was the case for Făcăi, Popoveni. Cernele, a commune known as Troaca-Cernele after 1864, was abolished in 1871, its subunits being included to Breasta commune, also abolished in 1990, when it becomes an actual neighbourhood of Craiova, just as Izvoru Rece, Mofleni, Rovine (including the old village Troaca and Rovine), Şimnicu de Jos (since 1992).

During the second half of the twentieth-century, complex functional mutations restructured the peripheral area of the city manifested by the insertion of industrial platforms: the Chemical plant, Electroputere plants, 7 Noiembrie, the textile factory; this led to demographic growth due to a migratory increase realized by polarizing the labor force of the entire Oltenia, as a result of massive industrialization, but also to natural increase. Thus, on July 1st 1977, Craiova had 226,212 inhabitants, including suburban communes and concentrated 78% of the urban population of the county.

2.6. Current stage of territorial development of Craiova

Nowadays, Craiova has specific problems of housing construction dynamics in different peripheral areas of the city resulting from connecting unequal evolution of economic and social development within various parts of the city.

Given the uncontrolled spatial development of the city, in the peripheral areas, there are distinguished some spatial and socio-cultural differences between new residential areas outlined in the North and East, as compared with the old residential neighborhoods belonging to the South and West of the city (Fig. 7).

Thus, we can identify peripheral areas with predominantly residential functionality, resulting from the territorial expansion of Craiova and regrouping of some social categories, particularly with high incomes (Metro area, Selgros), dormitory suburbs, resulted from the installation of the external migrants coming to work on the industrial platforms (1 Mai neighbourhood, for example), tertiary peripheral areas, containing warehouses and having a predominantly commercial use (continuation of Calea Bucureşti and Caracal arteries) and peripheral areas including marginalized groups (Rroma community), grouped in the West and South-West of the city.

Because of the way in which the spatial extent of new residential neighborhoods took place, that have not pursued a systematic or organized

planning, the city's territorial expansion was made to the detriment of the industrial areas, now mainly under restructuring, but also by reducing the agricultural functional lands.

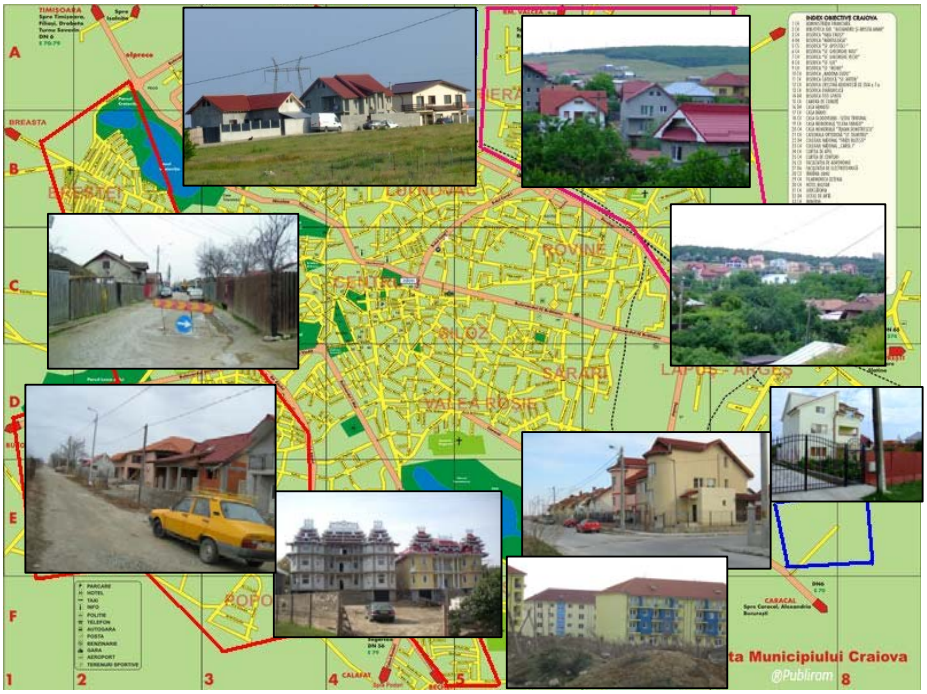

Fig. 7. Spatial and social-cultural discrepancies within the peripheral residential areas of Craiova municipality (Photos by Mara Cristina, 2009)

3. CONCLUSIONS

The territorial extension of Craiova took into consideration the structural heritage of the city, the economic, political and social urban factors which conditioned the formation of the medieval bourg at the intersection of main roads, the policies of the communist regime before 1989, with excessive emphasis on planning and massive industrialization. The agricultural profile of Craiova was maintained for a long time and constituted a slow down in the development of the city because of the lack of appropriate economic policies that could have given an impulse and could have capitalized Craiova according to its real economic possibilities.

In the future, local and decisional authorities should take into account the uncontrolled expansion of residential areas in the spatial development of Craiova, the existing contrasts in relation to various urban and social peripheral areas of the city, but also, a reorganization of the internal spaces within the structure of the city, functionally unclear or inconsistent (especially the restructuring industrial areas), in

order to achieve the sustainable development and a more judicious organization of the urban "organism".

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CITY TYPES IN THE FORMER INCA EMPIRE: CEREMONIAL CENTERS, CAPITALS, MINING TOWNS AND PORTS

TIPURI DE ORAŞE ÎN FOSTUL IMPERIU INCAŞ: CENTRE DE CEREMONIE, CAPITALE, ORAŞE MINIERE ŞI PORTURI

Hajnalka GÁTAI[1]

Abstract: The Andean region of South-America has been the cradle of big cultures and empires, up to the Inka empire as the last and biggest one, a synthesis of all the previous states of the region for more thousand years. A comparative essay of the pre-Inka imperial centres like Wari, Tiahunaco and Chan Chan, furthermore, Inka urbanization as the legendary lost city of Machu Picchu and the capital Cusco, with the new cities of Spanish foundation like Lima or the same Cusco, transformed into a Spanish colonial centre, can give a chronological view about the development of the urbanization in this region. A chapter apart presents special urbanizations like mining towns and ports. The study intends to depict the structure, the districts, the architectural style and the technical innovations of all these cities as well as the actual situation and the problems Lima must solve, a city that grew into a metropolis of the 21st century. In the end, some short reflections to remember the rural zone's story and actual difficulties in the Andean countries are given.

Key-words: urbanisation, Inca Empire, Spanish colonies, city types, development of cities
Cuvinte cheie: urbanizare, Imperiul Incaş, colonii spaniole, tipuri de oraşe, dezvoltare urbană

1. INTRODUCTION

The Pacific coast of South-America, the mountain ranges of the Andes, and the major part of western Amazon used to belong to an empire that, in its official language, was referred to as *Tawantinsuyu*, "*the land of the four regions*". The country that existed 500-800 years ago covered 4000 sq km, stretching in north-south direction. During the Spanish conquest, the territory of the Inca Empire formed part of the viceroyalty of Lima. After declaring independence from Spain, a number of different countries were established in the region. This vast area is now shared by 3 "classic" Andean nations: Peru, Bolivia, and Ecuador. Southern Colombia, north Chile and northwest Argentina cover the area of the former Inca Empire.

The region is characterized by geographic homogeneity (topographic, as well as climatic) from north to south, whereas in the east-west direction, it is very diverse. Considering this setup, the area can be divided into 3 great regions. *Costa*,

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or the *Pacific coast* is a few hundred kilometres wide. Because of the Humbold-Current it is extremely deserted and dry up to the north of Peru. *Sierra* is a range of high mountains in the Andes that splits into 2 ridges, showing volcanic activity, *Cordillera Negra* and *Cordillera Blanca*. In the south, the mountain range widens into the *Altiplano* plateau, a highland 3000 meters above sea level. Both the Altiplano and the mountains are dry, since they receive only a minimal amount of rain from east and no rain from the west at all. The dominant climate is *tierra fría*, cool continental. *Selva* is the tropical, subtropical area of Peru, located on the western margin of the *Amazon-basin*, hills and flat areas covered by rainforest.

The region's history and cultural-linguistic features are characterized by the same diversity. Throughout the centuries, great empires succeeded each other, they were the so-called cultural horizons: *Chavín:* 1000-100 BC, *Tiahuanaco-Wari*: 200-1000 AC, and *Inca*: 1200-1432 AC. During the intervening periods, smaller local nations and cultures emerged, such as *Paracas, Nasca, Moche,* and *Chimú*. Today, besides Spanish, the official language in most South-American countries, many people speak *quechua*, the official language of the Inca and *aymara* in the central region (Peru, Bolivia, and Ecuador). These two, along with their dialects, belong to the same language family; in Peru quechua, in Bolivia both quechua and aymara have been recognized as the second and the third official languages over the past decades. The ratio of quechua and aymara population is very high in the aforementioned countries. However, several other ethnicities exist, having their own language and culture, especially in the Amazon region. Imported slaves and the descendants of European immigrants also add up to this colourful setup, not to mention the infinite number of variants that the mixing of these ethnicities can produce.

Considering cultures before the Spanish conquest, both cities exercising their functions as centres as well as village communities were characteristic. Both types of settlements were found in early cultures prior to the Inca Empire, still it was during the Inca period that these settlements have become accomplished because the Inca Empire incorporated the legacy of formerly existing cultures. Inca city planning and architecture was influenced by Wari, Tiahuanaco, and Chimú heritage (such a city is *Macchu Picchu* that had been forgotten by the time of the colonial era). The Spanish colonizers reconstructed the occupied Inca cities in their own fashion, and also founded new ones modelled after those of the motherland (such examples are *Cusco* and *Lima*). During the colonial era, important mining towns (*Potosí*), industrial and trade centres (*Iquitos*), and seaports (*Guayaquil*) were also established. Systematically built centres, founded in the modern era like the formerly socialist cities of Central Eastern Europe are not typical. In the colonial era, the rural zone did not suffer major architectural and structural changes like most of the urban settlements.

Based on Hungarian and Spanish electronic as well as printed sources, the present study discusses the settlement types in chronological order, presenting the characteristics of first the urban (exemplified by the cities mentioned above), and then the rural sphere.

2. ANTEDECENTS: WARI, TIAHUANACO AND CHIMÚ

Inca city-planning and architecture could have dated back to traditions, far remote both in time and space, such as the capitals of Wari and Tiahuanaco, having the same names, in Central Peru near the present day *Ayacucho*, as well as in Bolivia on the *Altiplano* near *La Paz*, or Chan-Chan, the center of Chimú state along the coast of North-Peru, near *Trujillo*, respectively.

Wari was in its prime between 600 and 1200 AC. The city was built at an altitude of 2740 m above sea level, on the area of 750 ha and had a population of 50-70,000 inhabitants, according to the archeologists' estimations. The city's layout is extraordinary: its ceremonial centre, referred to as *Capillapata* by the locals and archeologists, is trapezoid shaped. It was surrounded by enormous walls as high as even 10 m, from which the main transport routes started. The geometrically structured sectors were connected by a major road network and a drainage system that transported water from mountain currents. Buildings had square, rectangular or round layout. As for their functions, buildings served different purposes depending on the sectors they were located in. They were either ritual, agricultural, and administrative centres, or houses and storage rooms. Ritual structures and burial chambers of nobles were constructed of sculpted, sometimes gigantic stone blocks, whereas the houses of commoners were built of rustic stones, in a simple fashion. Wari architecture was able to construct earthquake-proof walls. From bottom to top the walls narrowed. Great blocks were put on the outer wall and small stones were used to fill the inner gap, providing flexibility and also enabling it to move. Today parts of the walls are visible at the archeological monument. Some of them functioned as epimural roads, connecting parts of cities, stretching along the walls.

The beginning and demise of *Tiahuanaco* is, to this day, shrouded in mystery. The civilization that bears the same name is Wari's contemporary, though some scholars date it earlier. It covers 5 sq km, at approximately 4000 m above sea level. It had a population of an estimated 30-40.000 inhabitants, 115.000 together with the outskirts (Cedric, 2009). Sculpted stone blocks – sometimes gigantic stones weighing between 10 and 40 metric tons - were held together by ternary architectural cramps. In terms of precise stone-cutting, Tiahuanaco stonemasonry has accomplished a higher standard than the Incas'. Monoliths made of red sandstone, temples, and palaces can be found here, similar to the large statues of the Easter islands, and the static pharaoh statues in Egypt. Such an example is Gateway of the Sun (*Inti Punku, Puerta del Sol*), carved from a single 2,5 m × 3,5 m granite blocks, richly embroidered with reliefs, that was probably used for astronomic purposes (Photo 1). As for temples, the city has a step pyramid (*Acapana*), covered originally with andesite, that is aligned perfectly with the cardinal directions. Other temples were the temple *Kalasaya* ("Standing Stones"), the semi sunken *Templete Semisubterráneo*, and the temples *Putuni* and *Kheri Kala* (Fig. 1). The Puma Gate (*Puma Punku*) must have opened onto the city's port. According to certain theories, the level of Lake Titicaca used to be higher and its

surface area larger (Cedric, 2009). The ruin city was recognized as a World Heritage Site by UNESCO in 2000.

Photo 1. Gateway of the Sun (Inti Punku, Puerta del Sol), Tiahuanacu, Bolivia
(Source: Crystalinks, 2010)

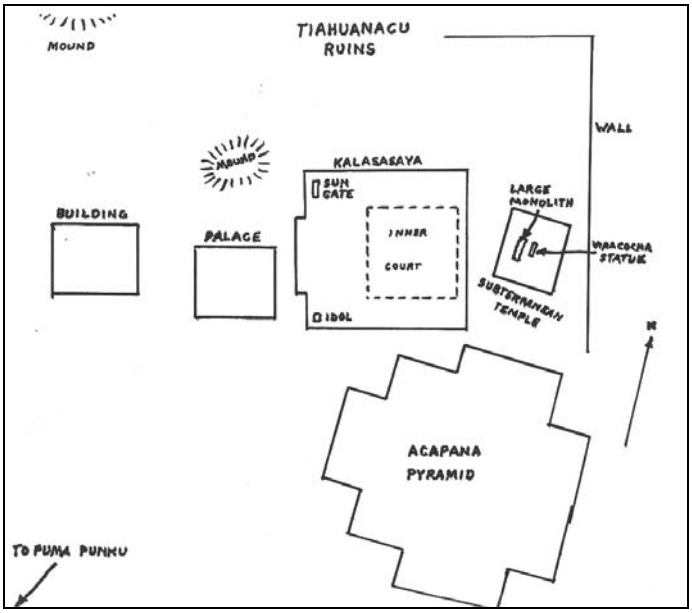

Fig. 1. Tiahuanaco's ceremonial center
(Source: Wendell C. Bennett's drawing, in Cedric L., 2009)

Chan-Chan is the world largest mud-brick settlement that covers an area of 20 sq km and a dense urban center of 6 sq km. It was the capital of Chimú and it is estimated that around 50-60,000 inhabitants lived in the city. The excavated citadel, the so-called *Tschudi* (*Nik-An*) Complex indicates that the city was divided into sectors, and that the walls of residences were ornamented with carvings. It also had several reservoirs, and a carefully laid out road network. However, adobe brick, of which the city was constructed, is not durable. Although clay is the ideal building material under dry climate, the occasional heavy rainfall and the salty air from the sea have eroded the ruins over the centuries.

Moreover, preservation of exhibitions and excavated areas requires really expensive technical procedures. Therefore, only a fragment of *Chan-Chan* has been excavated even up to now, archeologists know of 11 complexes altogether. Nevertheless, it is obvious that the sophisticated drainage system transported the sometimes periodical mountain rivers of the Andes to the city and the surrounding lands. The ritual center standing on the northern part of the city was the step pyramid, known today as *Huaca Obispo*. The palaces contain U-shaped rooms (*audiencias*), store rooms, and wells. The frieze-like reliefs of precise working depict stylized seabirds, fishes, and sea waves (Photo 2). Chan-Chan was justly admitted to the UNESCO World Heritage Site in 1986.

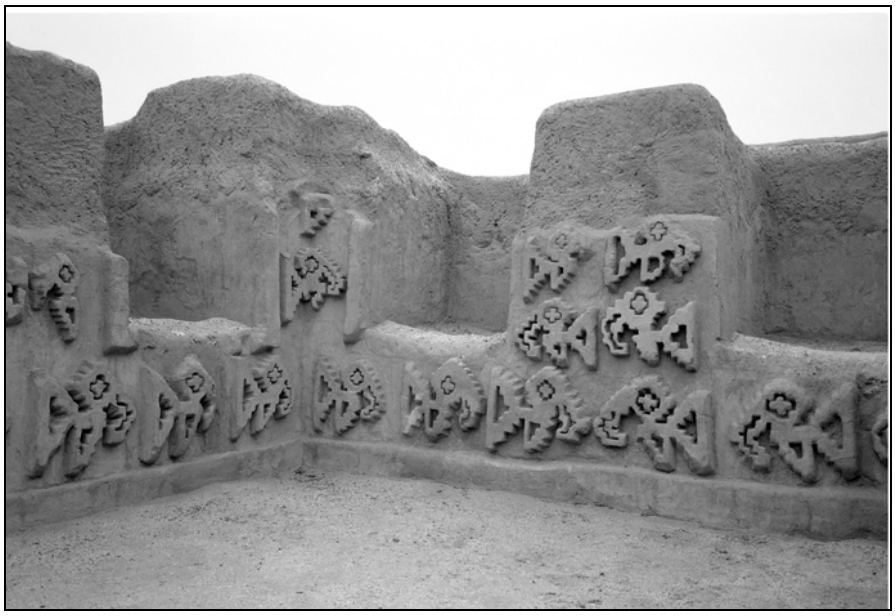

Photo 2: Tschudi-palace's reliefs, Chan-Chan, Peru
(Photo by Gátai Hajnalka, 2001)

3. INCA CITIES

The Inca, the ruling dynasty were presumably descendants of the Aymara nobility who settled in the Cusco-basin around the 12-13th centuries and seized

control of the local barbarian tribe, the Quechua. Concerning their origin and the foundation of cities, many legends survive: for example, *The Ayar brothers*, *Manco Capac*, and *Mama Ocllo*. These stories were used partly to justify the provenance of a posterior theocratic country's ruling class. Inca established their well-organized empire in Cusco and from there, their armies set to conquer. Starting with *Manco Capac* to *Huascar*, altogether 12 succeeding rulers are recorded in the chronicles. The ill-fated *Atahualpa* is not regarded a real Inca by the codices. In Peru and Bolivia he is not even considered as a ruler, though he is recognized as such, in Ecuador. Society comprised various noble classes (*panacas*, *orejones*), priests, privileged groups like clerks, soldiers, messengers (*chasquí*), and the commoners. Their economy was based on terraced farming and irrigation (potato, root crops, and coca), livestock raising (lamas), and pottery (textiles, ceramic, gold work, etc.). The official language was Quechua, the religion was polytheist. Their pantheon comprised the Sun, the Moon, the Evening Star, the elements, local deities. They added *Viracocha* divinity to the pantheon, a divinity of Tiahuanaco. The Inca was considered as the son of the Sun. They excelled in mathematics, astronomy – the legacy of Paracas and Nasca cultures - and medicine (brain surgery, mummification). In the field of arts, other accomplishments include drama, music, and gold work (adopted from the Chimú) (Wittman, 1987).

The four main routes set from *Cusco*, they were the axis of a carefully laid out road system. During the colonial era, Inca roads were used for mail service, and today trails are visited by many tourists. The roads divided the city into an upper and a lower part and into 4 further districts with 3 sectors (*Collana, Payan, Cayao)*, respectively. The reason for the Inca city-planning was to form a coherent unit with nature, and also to mirror the social hierarchy. Therefore, the upper part of the city was occupied by the king and the upper classes, whereas the lower part was inhabited by commoners. According to Bartolomé de las Casas, the famous priest and chronicle (Porras Barrenechea, 2008), the *Pachacutec Inca* mandated that the descendants of the first five Inca should get the lower, and those of the last five the upper part. Garcilaso de la Vega also accounts that the lower classes moved into the outskirts of Cusco, settling in quarters that corresponded to their native territories (*suyu*). This way the layout of the city reflected the setup of the empire (Fig. 2). The leaders of conquered peoples also had their own residences in the city center where they were required to spend about 4 months yearly. The most important structures of the town, several characteristics of which are similar to those of Wari, were located in the central plaza: the temple of the Sun and the Moon were adjacent to the residences of the priests, the virgins of the sun, and that of the king. The city was planned in the shape of a crouching puma. Its head was represented by three megalithic walls built in zigzags, the *Sacsayhuamán*. Some consider it a stronghold guarding over Cusco from the heavens, while others claim it to be a ceremonial centre (Photo 3).

Found in 1543, it lies at an altitude of 3400 m above sea level. At the time of the Inca rule, it had a population of 125.000 people that together with the outskirts

of the city could reach 225-300.000. The structures of Cusco had one level, built of diorite and andesite stone blocks.

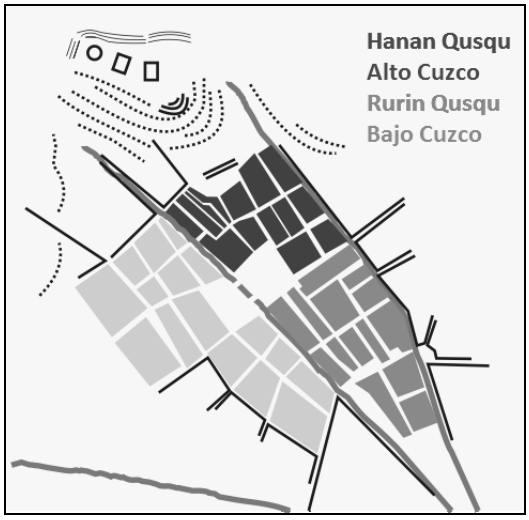

Fig. 2. Inca-city Cusco's map with the four main routes; above, Upper Cusco called Hanan Cusco (dark colour), right below, medium coulour Lower Cusco called Hurin Cusco *(Source: Wikipedia, 2010)*

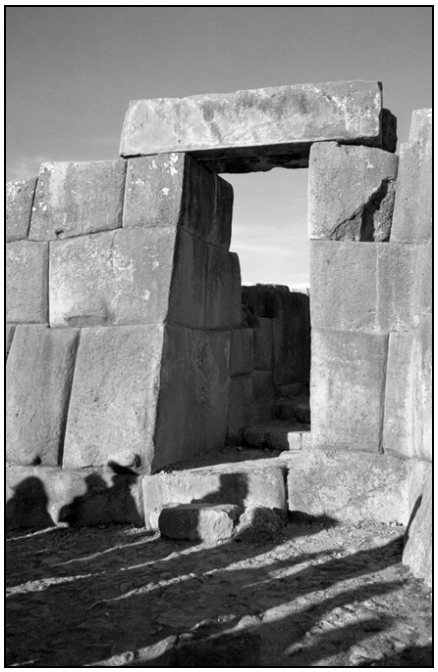

Photo 3. Megalithic walls; Sacsayhuamán, Cusco, Peru
(Photo by Gátai Hajnalka, 2001)

Stones were fit together without mortar. If the use of mortar was necessary, they used a mixture of clay and *ichu*, and Andean herb that was used to cover roofs. The Temple of the Sun (*Korichanca*) must be mentioned here as the most magnificent example of Inca architecture (Photo 4) that even now is a tourist attraction. The layout of the temple is both rectangular and semicircular arch. The trapezoidal walls are built in imperial style, meaning that the stones used were rectangular shaped blocks of equal size. The temple comprises a central court and niches (*aposentos*).

Photo 4. Temples built in imperial style in Peru, ancient city of Pisaq
(Photo by Gátai Hajnalka, 2001)

The ruins of *Macchu Picchu* provide information on Inca city planning and typology. The settlement is located near Cusco 2700 m above sea level. It is situated on the eastern slopes of the Andes, on a narrow spike, its area is located on more than 40 ha but its population may have amounted to 1000-1500. By the arrival of the Spaniards, the city has been depopulated and forgotten. Due to its fate, it is still extant and in a remarkable state of preservation. It was discovered in 1911 by the American archaeologist Hiram Bingham. Due to its destiny, it is the best preserved Inca city. On the basis of its layout, the precise engineering work excels; this was typical of every similar settlement of the empire (Photo 5). The palace of the Inca was located in the central plaza, the temple of the Sun abutted on the Sacred District ("sacred plaza"), the "Sun-tier" (*Intihuatana*), and several baths and fountains. Further on, there were houses, workshops, barracks, and storehouses.

The residence of the Chosen Women was situated in another corner of the square. These women were called the Virgins of the Sun (*Acllawasi*). They were the Inca's mistresses, the female servants – and that of the temple as well. Depending on their function, houses were constructed either of polished blocks of

stone or rustic blocks, and had stilted gable roof made of ichu. Deep precipices provide natural defences from 3 sides and *Huayna Picchu* guards the city towering above it behind. The hillsides outside the city walls have been terraced and the harvest provided the population. Water was transported from higher standing regions through a narrow aqueduct to the city's granite baths, fountains, and to the lands beside the Temple of the Sun. On the southern side a wall was erected, and the gateway to the city was located on the highest peak. Fissures in the city and in its surroundings most probably served as burial sites (Bray – Swanson – Farrington). The city was recognized as part of the UNESCO World Heritage Site in 1983.

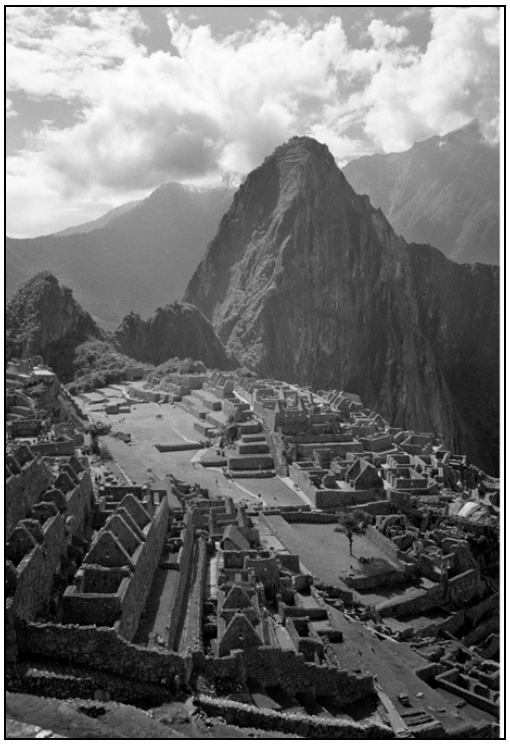

Photo 5. Machu Picchu with Huayna Picchu in the background
(Photo by Gátai Hajnalka, 2001)

In the valley of *Urubamba* ("the sacred valley of the Inca") the same layout can be observed in *Ollyantaytambo* (*tambo* was a small town located in the country that served administrative and military purposes) and in other settlements, especially in central regions. By approaching the peripheries, this typology can be perceived less and less (e.g. in *Ingapirka* Ecuador, county Azuay) (Photo 6). Where natural building materials called for different construction, the tambos were built in chimú fashion, using adobe brick fortified with ichu and alpakka wool (f.e. *Pachacamac* in Peru, near Lima).

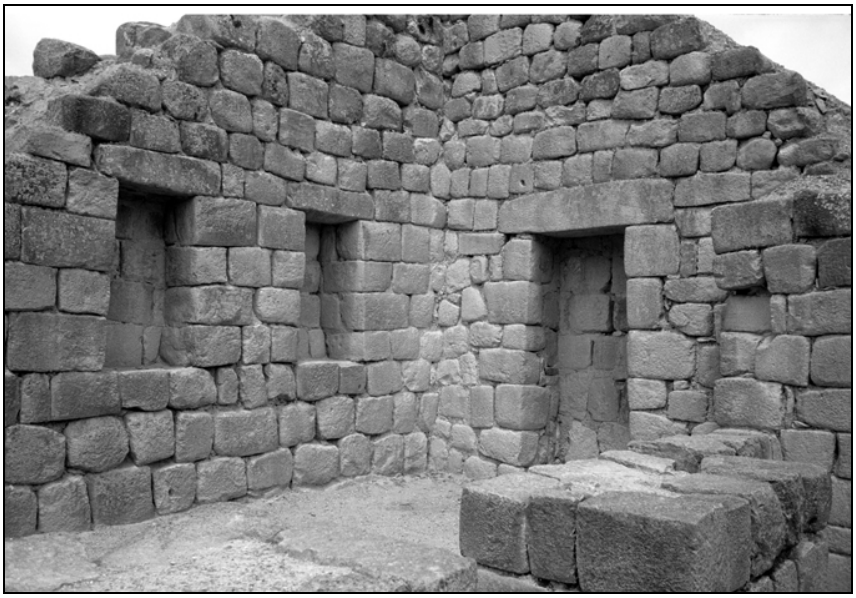

Photo 6. Ingapirca, Ecuador *(Photo by Gátai Hajnalka, 2001)*

4. SPANISH CITIES

The Spanish, arriving in Tawantinsuyu, were quick to reorganize and reconstruct the conquered areas. They left their mark upon the still standing Inca cities, but founded a city of their own in 1535, three years after their landing. Later, *Lima* became the capital of the province and that of Peru in 1821. Today this metropolis, together with its conurbations, has a population of more than 8 million.

The city was built on the two banks of the *Rimac* river; it originally had 22 streets and scarcely hundred houses. It was not until 75 years later that the bridge (*Puente de Piedra*) connecting the settlements was built. At the beginning of the 17th century, the city had a population of 16,000 people that increased to about 100,000 by the mid-19th century due to the flood of immigrants. The city has been expanding vigorously ever since, with 1 million of inhabitants in the mid-20th century, due to the intensive immigration. Today it is divided into 43 districts.

Spanish colonial cities are characterized by a chessboard layout that centres around the *plaza*, the main square. The plaza is referred to as *Plaza Mayor*, the main square, whereas in Latin-America, it is called *Plaza de Armas*, the square of weapons. The following style became general in the 16-17th century Spain. Spanish rulers decreed this perspicuous town-planning based upon geometric style, by following the traditions of town centre grouped around medieval, religious and administrative buildings as well as of renaissance and market-town models. Such examples include *Puerto Real* in Cadiz, Andalusia, *Santa Fé* in Granada, or *Jaén* in Mancha Real. Lima resembles mostly to *Sevilla*. The cathedral is located on the eastern side of the plaza next to the Archbishop's Palace and the Municipial Palace (*cabildo, municipio*), though the latter can stand on the opposite side as in the case

of Lima. Other public-civic buildings like law courts, the government palace (such as the Government Palace of Lima), and churches (the Jesuit *Compañia de Jesús* in Cusco) were situated on the main plaza as well. With its gigantic extent – it covers 20,000 sq m - the Plaza Mayor symbolizes one of the most significant metropolises of 16-17th century America, the capital of the largest Spanish viceroyalty (Trazegnies Granda). The plaza – and the city itself – has northwest-southeast aspect. This way the sun shines on the houses' façade in daytime and the unpleasant southern winds are held up by the buildings. The "City of the Kings" (as it was referred to) was the blend of Spanish provincial styles, at times combined with local, pre-Inca, and Inca features. (We must bear in mind that from the beginning, the population was multiethnic). Churches and palaces were mainly constructed in baroque style. Ecclesiastical architecture is sometimes marked by extravagant ornamentation (colonial or *churrigueresco* baroque, for example the church of *La Merced*). Palaces and houses in the city center on the other hand, could have rural Spanish or French features (*Palacio Torre Tagle, Casa Goyenche*). Also a recurring motif is the intricate bay window projecting outward from the façade. The continent's oldest bullfighting ring (*Acho*) was built in Lima in the 18th century, along with several parks. Lima was also called "city of gardens" in the colonial era. The Historic Center of Lima was declared a World Heritage Site by UNESCO in 1991 (Photo 7 and 8).

Photo 7. Characteristic colonial palace called Casa del Oidor in Lima
(Source: Wikipedia, 2010)

When it came to occupied cities, the Spanish acted on the same principle. They closed streets or opened new ones if it was necessary. Buildings were

destroyed only to be replaced by new, Spanish structures. Such an example is the Temple of the Sun in Cusco, or the rebuilt church of *Santo Domingo* following its partial demolition.

Photo 8. San Francisco baroque church, Lima
(Source: Wikipedia, 2010)

Sometimes they only altered the function of certain buildings. Modifications served ideological, as well as strategic purposes. Their goal was not only to reconstruct cities in Spanish style, but also to fragment the indigenous population, and to impede practicing their religion. Dwelling places did not require major changes, since Inca and Spanish style resembled in their main aspects: one entrance form the street, inner spheres divided by courts, etc. However, cityscape was significantly altered in Cusco by dividing the central plaza (today they are the *Plaza de Armas* and the *Plaza Regocijo*). Indigenous districts have survived on the peripheries, and sustained only minor changes (*Santa Ana, Santiago, Belén, San Cristóbal, San Blas, San Pedro*). Harvesting stones of conquered or abandoned settlements to build churches, cities or palaces was customary. The Spanish used the stone blocks of Tiahuanaco to build La Paz in Bolivia, and those of Chan-Chan to construct Trujillo. Along with Macchu Picchu, the Historic Center of Cusco was recognized as a World Heritage Site in 1983.

After interventions of the early period, no major constructions, investments, or changes were made in highland (formerly Inca) cities. The nobility of the

colonial era, then later, the upper middle class, preferred seaside settlements to Cusco. Cusco fell into decline, even though it was considered the most populous city on the continent until the end of the 18th century. The Bolivian *Potosí*, on the other hand, became popular and opulent on account of its seemingly inexhaustible silver mines.

Lima, on the other hand, continued progressing dinamically. Latin-America's first railroad was built between the capital and the port of *Callao*. Gas-light and telegraph were also installed. Meanwhile the social gap between districts has begun to widen, luxurious districts and slums developed. Following the early 20th century population boom, the clearance of slums, in almost complete shortage of public works and public security, was initiated at the beginning of the third millennium. Electricity has been installed in the past few decades and tap water is drinkable in more and more areas. Large-scale constructions are carried out to assist the development of new (and large) districts as *Villa El Salvador* or *San Juan de Lurigancho*. There are several problems that need to be solved: reorganization of the city's infrastructure, the chaotic state of public transport (Lima, which counts more than 8 million inhabitants, has no underground at all), and general environmental issues, including air pollution and waste disposal (Municipialidad De Lima, 2005). The harbor of Callao has developed to be an independent city by today.

5. MINING TOWNS AND PORTS IN THE 16-18TH CENTURY

Following the Spanish conquest and colonization, the newly organised viceroyalties, gradually became the new centers of the industrial revolution and the economic boom from subdued areas which were considered with European eyes as territories suffering laggings behind. Thus, they created such mining towns like the Bolivian Potosí, as well as industrial and commercial centers like the queen of Amasonia, the Iquitos of Peru or the port-town of Guayaquil in Ecuador.

Legend has it that the Silver Ore of *Potosí*, the *Sumaj Orcko* or *Cerro Rico* ("Rich Mountain") revealed its treasure to Inca *Huayna Capac*. When his vassals arrived to extract the silver, the mountain said: "Do not take silver from this hill, because it does not belong to you, it is destined for other masters". Another legend holds that a poor Native, named Diego Huallpa found ore in 1545 when the fire he lit melt silver out of the stone. Within 25 years, the city that is located in the middle of the Altiplano, 4,067 m above sea level, had a population of 50,000 inhabitants and earned the title "Villa Imperial" ("Imperial City") from Charles V. (Bolivianet, 2008). The city's layout is similar to others, founded by the Spanish (chessboard plan, rectangular plaza, baroque palaces etc.), except *Casa Real de la Moneda* (Royal mint house). Despite its harsh climate and secluded location, precious metal mining and the flourishing industry - money for the Philippines was coined here - transformed Potosí. By 1630, it expanded into a metropolis with a population of 160,000 which at that time equalled the size of London or Paris. Around 1650 the silver started to dry up and the city fell into decline. A hundred years later, extraction boosted the city's economy until the outbreak of the War of

Independence in the 19th century. The city has sustained 200 years of hardship, including outbreaks of war and the economic recession. Today Potosí covers 120,000 sq km and has approximately 165,000 inhabitants. The historic centre of the third city in the world respecting its height above sea level was recognized as a World Heritage Site by UNESCO in 1987 (Photo 9).

Photo 9. Oldtown of Potosí with the Siver Ore in the background
(Photo by Gátai Hajnalka, 2001)

The founding of *Iquitos* city dates back to 1757. Until the arrival of the Spanish, this region that is surrounded by the Amazone and its headwaters, was inhabited by Amazonian tribes (*iquitos*, *napeanos*, *yameos*). From the mid-17th century, aborigines were relocated by Jesuits into groups (*reducciones*). In order to homogenize the aborigines, the location of these camps was frequently changed. In 1860, the "city" had a population of only 300 persons. Once its strategic importance was discovered (it lies between *Nanay* and *Amazonas*), a port was built. Twenty years later, at the time of the rubber boom, local and European immigrants flooded the city. The abandoned little village started to flourish: several churches and public buildings were constructed, electricity was installed and the local railway line was laid down. Expansion continued with the discovery of oil deposits.

Today *Iquitos* is the "capital" of Peruvian Amazon, with an increasing population that already exceeds 400,000 persons. An International Airport, several universities, and a port can be found on the area of 5000 sq km that city covers. Land connection through the Andes to the coast, and the capital does not exist, though a railway line is intended to connect these areas (Photo 10).

Photo 10. Main square of Iquitos *(Source: Expatify, 2010)*

Founded in 1534, Ecuador's most populous city and biggest port, *Guayaquil* was named after a local chief. It is located at the mouth of the *Guayas*, where the rivers *Guayas* and *Babayoho* cross. With its population exceeding 3 million, it is one of the largest cities along the Pacific coast in South America. Being larger and more populous than the capital, *Quito*, *Guayaquil* covers 334,5 sq km, 8.1% (approximately 28 sq km) of which is the surface of rivers. Since 1547, it served as a Spanish port by which point/time shipbuilding had begun. *Guayaquil* was the first city to declare independence from Spain in 1820. Today, the economic capital of Ecuador is referred to as the "Pearl of the Pacific". Out of the 1000 most important Ecuadorian companies, 39% have their quarters in *Guayaquil*. The historical center is not built in pure colonial style, but reflects the continuous progress both in its style and its layout. Over the recent decades, public transport, utilities, and the cityscape have been improved, demonstrating Guayaquil's economic strength.

6. LIFE IN THE RURAL ZONES

Villages played an important role in the Inca economy, since cultivation took place here.

The village community (*ayllu*) formed the basis of the Inca social system. Being an agricultural society, the cohesive force of clans of families was

cooperative work on the land that they shared. The houses were in the property of the residents. They were given units of one-third of the lands surrounding the villages to cultivate. Farmlands were irrigated and – depending on the area – fertilized with guano or warp. The remaining two-thirds belonged to the Sun (priests) and to the Inca and were cultivated in a given order by the community. The carefully laid out road system enabled the transport of crops, silver, and gold even from the furthermost corners of the empire to Cusco. Roads were complemented with rope bridges, spanning chasms and canyons, and *tambos* (administrative buildings or stations along the road) that provided rest and relay for the messengers.

Village communities changed during the colonial era. The Spanish virtually distributed the land and the indigenous people among themselves. *Repartamineto* was granted to them by King Ferdinand in 1513 based on medieval Castilian customs. Elimination of common lands (*resguardo*) undermined the socio-economic base of Inca society during the colonial and republican era. Real estates – *encomiendas,* then *haciendas* were established. Population decline was the result of Spanish exploitation (many of them had to work in mine areas in the time of the industrial booming), others were devastated by unknown diseases (such as the flu) in the course of time, and the rest gradually impoverished. In hope that the city would resolve their problem, they moved to urban areas and the villages fell into decline.

Urbanization on the coast took place in the second half of the 20th century, though urbanization of rural areas fell behind during this time. To this day predominantly indigenous settlements, lived by indians in almost 100%, exist in Peru, Bolivia, and Ecuador (mainly in the Andes and the Amazonas) that have little contact with the outside world. Public utilities are not installed, education is not available, and telecommunication is not organized. On the other hand, major centers are surrounded by conurbations. Statistic show that every third Peruvian resides in Lima, and every fourth or fifth Bolivian and Ecuadorian lives in La Paz and Guayaquil, respectively.

7. CONCLUSIONS

The one-time Inca empire and it precursors were established under extremely diverse geographic and climatic conditions. Sophisticated cities like Wari, Tiahuanaco, Chan Chan, or later, Cusco served as the country's religious and administrative centres. The remnants show how advanced Inca engineering and architecture was, building cites with population of hundreds and thousands. Machu Picchu is a classic and clearly prevailing example of Inca city architecture. The prevailing tendency of urbanization in the colonial era was to reconstruct and reorganize these cities, and also to found new ones, like Lima. The Spanish style of city planning, the colonial baroque became prevalent. Generally speaking, the location of large centres shifted from the mountains to the coast in the course of time. The desolation of the rural zone that had a significant socio-economic rule during the Inca rule occurred simultaneously with urbanization, even following the

establishment of independent states. Nowadays, the majority of Andean population lives in cities – mostly in the capital and its conurbations – and in larger mining and industrial centres, or seaports. Therefore, difficulties arising from the size of metropolises present a serious problem to be solved.

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POSSIBLE PATHS FOR THE DEVELOPMENT OF TOURISM IN SREMSKI KARLOVCI

POSIBILE CĂI PENTRU DEZVOLTAREA TURISMULUI ÎN SREMSKI KARLOVCI

Nada VIDIC [1]

Abstract: Sremski Karlovci is an ancient town, a spiritual polis, situated in Serbia (Vojvodina). The town has a favourable geographical position for tourism. It is located along the Corridor X, 6 kilometres from Novi Sad, the capital city of Vojvodina, on the national road to Belgrade. Sremski Karlovci is located on the right bank of the Danube river, on the north-eastern slopes of the Fruška Gora Mountain. It has been declared a municipal town, the only one in the country, with 8,839 inhabitants. The main tourist resources of the town – the pillars of tourism are represented by the cultural heritage and nature (the Danube river and the Fruška Gora Mountain). Sremski Karlovci is a tourist resort with a potential that has not been used substantially. This paper will try to outline the possible ways for the development of tourism in this town.

Key-words: Sremski Karlovci, cultural heritage, the Danube, resources of tourism, the Fruška Gora Mountain
Cuvinte cheie: Sremski Karlovci, patrimoniu cultural, Dunărea, resurse turistice, Masivul Fruška Gora

1. INTRODUCTION

Urban tourism, as a complex form of tourism, records an increase in the entire world. Urban tourism can integrate all the potential urban destinations, according to the concept of integrated quality management (IQM). We would like to add – integrated quality of urban tourism management – IQUTM (Vidic, 2008). This concept provides more successful form of tourism on the extremely competitive tourism market.

The urban tourism of Sremski Karlovci, to which this paper is dedicated to, has not adopted this approach for the development of tourism. This has an immediate influence on the current situation of tourism in Sremski Karlovci. It can be concisely assessed as a controversy between a priceless and well-preserved cultural heritage and natural resources and the lack of their substantial tourist promotion.

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Writing about Sremski Karlovci is a very delicate job, because there are many things you will have to omit about a town with such a cultural and historic significance. This will happen in this paper as well, because it will show only the partial tourism significance of the cultural heritage of Sremski Karlovci and its natural tourist values. Conducting a research on Sremski Karlovci is a real challenge.

2. OBJECTIVES

The purpose of this paper is to show the possible paths for the development of tourism in Sremski Karlovci.

3. RESEARCH METHODS

In this paper, we used the analytical and synthetic method. Available domestic and foreign resources have been used. We observed and analyzed the practice of tourism in this town. Synthetic method led to the evaluation, suggestions and conclusions.

4. SREMSKI KARLOVCI – THE TOWN ON THE DANUBE RIVER, ON THE SLOPES OF THE FRUŠKA GORA MOUNTAIN

The name of Sremski Karlovci hides its geographical location. The town is located on the north-east part of Srem in Vojvodina, Serbia (Fig. 1). Its geographic position is extremely favourable for tourism, because it is located along Corridor X, on the Fruška Gora Mountain slopes, on the right bank of the Danube river, in the Fruška Gora Danube basin (Fig. 1). Its location is a significant element for the development of tourism. This town in the Danube Valley is six kilometres from Novi Sad, to the north, along a very busy road (Corridor X), 57 kilometres from Belgrade and 70 kilometres from the airport in Surčin. The town is also situated next to the international railway Budapest – Novi Sad – Sophia – Athens (Fig. 1).

Fig. 1. Tourism and geographical position of Sremski Karlovci – the Danube Valley and the Fruška Gora Mountain *(Source: Vidic, 2007, p. 58)*

The urban structure of the town develops from the right bank of the Danube river towards the Fruška Gora Mountain and follows partially the Ešikovac brook. The city, in fact, is 'climbing up' on the Fruška Gora Mountain and its urban matrix, to the east of the Danube, has a mountainous character. It provides a specific characteristic of the urban area and a specific experience when going sight-seeing on foot along the streets of Sremski Karlovci.

Today, Sremski Karlovci is a municipal town with a community of only 8,839 inhabitants. The area of the municipality is 5,054 ha.

5. THE BASIC PILLARS OF TOURISM IN SREMSKI KARLOVCI

These basic pillars refer to the following elements:

- Cultural heritage – the First Pillar of Tourism and
- Nature – the Second Pillar of Tourism (Table no. 1)

Table no. 1

Basic pillars for the development of tourism in Sremski Karlovci

The First Pillar of Tourism			The Second Pillar of Tourism	
Cultural Heritage			Nature	
Public buildings and their spiritual value	Museum Permanent and thematic exhibitions	Events	The Fruška Gora - horst mountain	The Danube River and its bank

5.1. Cultural Heritage – the First Pillar of Tourism in Sremski Karlovci

"Sremski Karlovci was first mentioned as a castle named Caron in 1308. Sremski Karlovci experienced a spiritual revival after 1713, when the seat of Eparchy was moved from the Krušedol Monastery to Sremski Karlovci by the decree of King Carl II and it was granted the rank of Patriarchy until 1920, when the seat was moved to Belgrade." (Vidic, 2007). This was a golden period for Sremski Karlovci, when it became a significant earthly and spiritual center. It was a real spiritual polis. The First Serbian Grammar School was opened here in 1791, the Seminary and churches were built alongside impressive architectural edifices, that were preserved until the present day.

The most representative architectural edifices were built during the 18th and 19th centuries. The following ones can be singled out because of their architectural impressiveness and cultural significance:

- The Patriarch's Court (1892-1894), (Photo 1), used to be the seat of the eparchy, and today it is the summer residence of the Serbian Patriarch and the seat of the Srem Eparchy. It comprises the Treasury of the Museum of Serbian Orthodox Church and the Museum of Serbian Orthodox Church (Photo 1); the Seminary (1794), the most impressive building and our oldest seminary; Stefaneum Palace (1903), dormitory for the students of the Seminary, which is now the headquarters of the Institute of Serbian People; Sremski Karlovci Grammar School (1791), the oldest Serbian grammar school; The Orthodox Cathedral of St. Nicolas (1762); the Upper Church, dedicated to the Entrance of the Holy Mother of God into the Temple (1746); the Lower Church of the Apostles St. Peter and St. Paul

(1719); the Roman-Catholic Church of the Holy Trinity (1768); Ilion Palace of the Patriarch Josif Rajačić, today is the Heritage Museum (1848); Drinking fountain "Four Lions"(1799). In the Peace Chapel (1817), it was signed the world famous Treaty of Karlowitz on the 26th of January, 1699. The building was built in the form of rotunda, with four doors positioned in the four cardinal points, and the talks were organized at the round table so that all negotiators were treated equally and since then the term "round table" has been introduced into the world of diplomacy (Vidic, 2007)[2] (Photo 2).

Photo 1. The Patriarch's Court
(Source: www.tixik.co)

Photo 2. The Peace Chapel
(Source: www.tixik.com)

This town has a very specific location for all the monuments because they are located centrally in the old part of the town, i.e. the Branko Radičević Square and the Karlovačka Mitropolija Square. In our country, a town setting with such an outstanding cultural value and impressiveness exists only in Sremski Karlovci.

Sremski Karlovci builds its cultural identity on the basis of the entire architectural and spiritual heritage and not on the individual cultural monuments, which is the case in most towns.

Whereas other towns are building their cultural identity, the cultural identity of Sremski Karlovci is represented by its cultural personality, it is unique. Its cultural personality can be observed in the fact that all the establishments in Sremski Karlovci have kept their original purpose since their construction.

All the visits and tours in Sremski Karlovci are organized in the center of the old town. So many impressive buildings on such a small area can represent a problem for the organizers of the sightseeing tours. Because of the fact that all buildings are close together, tour operators have to make a selective itinerary including only some of the spiritual establishments. The spirituality of this town has such a power that sometimes even visitors themselves are requesting the

[2] The Treaty of Karlowitz was signed on the 26th of January 1699 concluding the Great Austrian-Ottoman War (1683-1699). The Treaty was signed by The Ottoman Empire on the one side and the Holy League (Austria, Poland, Venice with the mitigation of England and Holland) on the other. On the 21st of January 2009 there was a celebration of the 310th anniversary of the Treaty in Sremski Karlovci. There were present the representatives of all four parties signing the documents.

programme to be shortened, overwhelmed with the strong spiritual impressions and the abundance of information.

Sremski Karlovci is also the town of events: "Brankovo Kolo" – literary event; School of Serbian Culture; Spiritual School "In Memory of Kornelije", The Christmas Celebrations in Sremski Karlovci; The Art Colony of Watercolours; Sremski Karlovci Art Salon; The Danube Art Colony; "Sremski Karlovci Grape Picking", The Kuglof Festival.

In addition to Heritage Museum, a significant touristic value can be attributed to the Museum of Bee Keeping "Živanović".

The town also has galleries: the Gallery of the Cultural Centre; the Gallery of the Institute of the Serbian People Stefaneum; the "Palette" Gallery; The "Under the Csarda" Gallery.

A continuous cultural development of Sremski Karlovci has been preserved in its original authentic form for several decades.

In the close vicinity of the old town, the Patriarch Rajačić opened the Court Garden – Arboretum with trees from all over the world. This is an open-air classroom for the grammar school students of Sremski Karlovci. The town also has a well-equipped sports and recreational center.

The first pillar of tourism in the urban tourism of Sremski Karlovci, which is the cultural heritage, is a prevailing motive of all forms of tourism: cultural tourism, educational tourism, event tourism, religious tourism, excursions and transit tourism.

The first pillar of tourism in Sremski Karlovci also comprises the cultural heritage sites outside the town, but belonging to its surrounding area. These are the monasteries of Fruška Gora: Gregeteg, Krušedol, Hopovo, Jazak (Fig. 1).

5.2. Nature – the Second Pillar of Tourism in Sremski Karlovci

The second pillar of tourism of Sremski Karlovci includes two significant natural entities: the Fruška Gora Mountain and the Danube River with its banks.

5.2.1. Sremski Karlovci and the Fruška Gora Mountain

The north-eastern slopes of Mount Fruška Gora give a partial mountainous characteristic to the urban structure of Sremski Karlovci, which has been described before (Fig. 1). This mountainous characteristic of the town can represent one of the possible paths of its tourism development since its tourism resources are not exploited enough.

Some resorts present attractiveness and have a tourist activity, among which the most famous is Stražilovo. It features the grave of the famous poet Branko Radičević who lived in Sremski Karlovci, which is visited by people as if they are going to a pilgrimage. The visitors are usually young people.

Stražilovo is situated at 4.5 kilometres distance from Sremski Karlovci. The visitors can find accommodation in modern bungalows and have their meals in the "Brankov čardak" restaurant (seating capacity: 50 guests inside and 100 guests outside).

The slopes of Fruška Gora above Sremski Karlovci feature the most famous vineyard area in Mount Fruška Gora having wines with geographic origin:

Karlovci Riesling, Karlovci Tovjan, Bermet, Ausbruch. The wines from Sremski Karlovci were exported into European cities at the time of its development.

The wine cellars in Sremski Karlovci became are almost cult places for wine tasting and tourist visits and they are a motive for developing wine tourism and wine tours.

The area of Sremski Karlovci is also famous for its well-kept orchards, which may also be a future tourism resource.

5.2.2. Sremski Karlovci and the Danube River with its Banks

There has already been mentioned that Sremski Karlovci is located at the mouth of Ešikovac Brook into the river Danube. This means that the town is located in the extremely attractive area of the Fruška Gora Danube area (Vidić, 2007)[3] (Fig. 1).

Sremski Karlovci was a famous river harbour on the Danube when it was a spiritual polis at the time of its spiritual height. However, the town is almost ignoring the existence of the river Danube and its bank from the points of view of traffic, industry or tourism. However, the authorities are almost ignoring the existence of the Danube river and its bank regarding the traffic, industry or tourism.

All the advantages of the river Danube as a hydrographical body and significant international European waterway and significant pan-European area were not part of the development concepts of the town. The river bank is not developed. The development concepts of the town did not include all the advantages of the Danube River as a hydrographical body and significant international European waterway and significant pan-European area, that is why the river bank is not developed.

The Danube bank features a hotel – the Hotel "Danube" (Photo 2, Photo 3) with 52 rooms and 105 beds. On the Danube bank there was built the “Danube” Hotel (Photo 2, Photo 3) with 52 rooms and 105 beds. This can be considered an important step in the activation of the tourism potential of the Danube in Sremski Karlovci area and in the strengthening of the Sremski Karlovci role in the Danube area. We consider this an important step in the tourism activation of the tourism potentials of the Danube in Sremski Karlovci.

As a Danube town, Sremski Karlovci still needs to create its international tourism position on the river Danube.

We think that in Sremski Karlovci the Danube river and its bank should be the priority in the future tourism development of this town, currently being an unused and totally neglected tourism resource for the tourism of Sremski Karlovci[4].

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[3] "Fruška Gora-Danube area is defined as a geographical area along the right bank of the Danube where the north part of the Fruška Gora foothill touches the Danube, its alluvial and inundation area. The length of this area is 81.4 km". This represents 7.22 % of the length of the river Danube in Serbia (Vidić, 2007, p. 58).

[4] The Municipal Assembly of Sremski Karlovci accepted a document: "Urban development plan of the river bank area – the area of sport and recreation – one of the development potentials of the Municipal Assembly of Sremski Karlovci in the area of tourism, April, 2007". The document plans the development of the bank area, sports and recreational complex with marines. The Master Plan of Fruška Gora and Sremski Karlovci was also developed.

Photo 2. The "Danube" Hotel

Photo 3. The Restaurant of the "Danube" Hotel on the Danube river in Sremski Karlovci
(Photo: N.Vidic)

6. TOURIST SERVICE AND PARTNERSHIPS IN SREMSKI KARLOVCI

The Tourism Organization of the Municipality of Sremski Karlovci, centrally- located in the old town, offers basic tourist services. In addition to its informative and promotional function, the Tourism Organisation of Sremski Karlovci organises visits, prepares and realizes tourism programmes with an extremely professional guiding service.

In the future tourism development of Sremski Karlovci, more attention should be focussed on better positioning of all activities, including local partner organizations in the field of tourism.

This, above all, includes the activities of the Society for the Preservation of Traditions and the Development of Sremski Karlovci. The members of this Society are people who mainly come from Sremski Karlovci or they want to help the development of the city, from Serbia and abroad. Here is a list of some of their activities:

- Summer School of Church Music "In Memory of Kornelije", which has existed for fifteen years,
- "Let's preserve beautiful houses and gardens",
- Collecting donations for the conservation of cultural heritage,
- Developing and arranging public green areas,
- Organizing concerts, theatrical performances, discussion forums, book promotions, art colonies,
- Awarding the November Charter,
- International Volunteer Camps whose actions helped arranging the town areas[5].

This old, historic town does not have adequate accommodation offer.

In the central area of the old town there are is the "Boem" Hotel and the "Danube" Hotel on the Danube river bank, as it has been mentioned before (Photo 2).

[5] Participants of the camp were volunteers from France, Spain, Canada, Poland, Belgium, Macedonia, Germany, the Czech Republic and Slovenia.

It is certainly not possible to expect expansion in tourism development without major investments into total infrastructure and accommodation offer in Sremski Karlovci.

7. POSSIBLE PATHS OF TOURISM DEVELOPMENT IN SREMSKI KARLOVCI

The complex attractive basis of Sremski Karlovci has an outstanding value which is not exploited enough for tourism purposes. We believe that the main reason for this situation lies in the tourism organisation elements.

The towns have museums, galleries, city halls. This town has all of them, and especially the following ellements: the Seminary – the oldest one in the country, the impressive building of the Patriarch's Court and Stefaneum, the Peace Chapel and the oldest Grammar School in the country.

Urban tourism of the town is based on the first pillar of tourism – cultural heritage. However, the tourism of Sremski Karlovci has a small importance in the urban development of the town. This is confirmed by the figures representing the number of tourist visits. According to the Tourism Organisation of the Municipality of Sremski Karlovci, the number of tourists is constantly increasing. There were 24,508 tourists in 2005; 24,940 tourists in 2006; in 2007 there were 35,247 tourists, and in 2008, there were 34,736 tourists. These numbers are extremely small and not proportional to the presence of extremely valuable tourism resources. Tourists coming to Sremski Karlovci spend only a few hours during the sightseeing tour of the town. This is a very disappointing indicator of the tourism development level of this town.

Having analyzed the tourism resource basis of Sremski Karlovci, we think that the possible tourism development paths of the town should be:

- establishing integrated urban tourism management,
- tourism and thematic profiling of the programmes tailored according to tourism demand, in both pillars of tourism,
- defining and realization of the tourism programmes which will increase the length of tourist stay to several days, and not only for a few hours,
- activation of the tourism resource basis of the river Danube and its bank,
- activation of the tourism potentials of the Mount Fruška Gora through ample tourism programmes in the area of Fruška Gora,
- strengthening tourism infrastructure and superstructure,
- more expansive tourism marketing.

Sremski Karlovci is a town-museum, with a rich historic heritage, well-preserved and protected, with outstanding nature but lack of tourism development. However, the tourism resources of this town are its outstanding capital and tourism can bring a real rise growth for it.

8. CONCLUSIONS

Sremski Karlovci is a town on the Danube river, a town-museum, in Serbia, Vojvodina, Srem. A rich cultural heritage of the town represents the first pillar of

tourism. This heritage is a basis for its cultural identity – its cultural personality. However, cultural resources of Sremski Karlovci are not well-promoted for tourism purposes. This is why there is a controversy between the pricelessly valuable and preserved cultural heritage and lack of its tourism promotion. In this paper, only the most impressive buildings were mentioned, which are the pillars of cultural tourism and are important for the perception of the value of cultural heritage in this town.

The second pillar of tourism in Sremski Karlovci is its natural surroundings: Mount Fruška Gora and the river Danube with its banks. This tourist attraction of Sremski Karlovci has been only a potential attraction so far. We think that its tourism activation is one of the priority paths of the future of tourism in the town.

Sremski Karlovci is an extremely significant town in the Fruška Gora-Danube area. The future paths of tourism development in this town should build the tourism position on the domestic and international tourism market.

A prosperous tourism development of Sremski Karlovci can be achieved on the conceptual basis of the integrated quality of urban tourism management – IQUTM. This concept should provide reaffirmation of the tourism territorial capital of Sremski Karlovci, on the suggested paths of tourism development and ensure its better tourism position on the extremely competitive tourism market.

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THE TOURISM IN THE BĂLĂCIȚA PIEDMONT

TURISMUL ÎN PODIŞUL PIEMONTAN AL BĂLĂCIȚEI

Mihaela OGLINDOIU [1]

Abstract: The Bălăciţa Piedmont can not brag itself with spectacular landscapes, neither with spas, but just with a few historical sights, some oases of silence and food made in traditional Oltenian style. A close exploration of every inhabited part of the region under study shows the lack of interest of the local authorities in developing the region. It can be said that, in the studied region, in time, if the transportation infrastructure is restored, if more money is invested in sights, agritourism and ecotourism will be practicable.

Key-words: rural tourism, archaeological vestiges, tourist infrastructure, promotion of the traditional values
Cuvinte cheie: turism rural, vestigii arheologice, infrastructura turistică, promovarea valorilor tradiționale.

The tourism represents one of the most important economic branches. Putting to good use the natural and human resources, the tourism can lead to the economic development of the area of the Bălăciţa Piedmont Tableland.

"*The tourism is a complex activity, able to lead to mutations also in the territorial profile development, from this viewpoint being considered an instrument that can attenuate the interregional imbalances that are seen at national scale*" (Melinda Cândea, G. Erdeli, T. Simion, D. Peptănatu*,* 2003*, Potențialul turistic al României şi amenajarea turistică a spațiului,* Editura Universității din Bucureşti.

In order to achieve a high-quality tourist product, the area must own remarkable natural and human resources, it must be connected with tourist areas that are already well-known (the Danube Gorges, the tourist region of Northern Oltenia) and it must offer entertainment possibilities, a good tourist infrastructure and a good road network.

The tourist resources within the Bălăciţa Piedmont Tableland could permit various types of tourism: rural tourism, agritourism, ecotourism. The rural tourism attracts persons that often demand modest accommodation, with traditional architecture, authentic food, visits to historical and cultural sites, beautiful landscapes. The agritourism implies spending one's holiday within a rural local community, in an agricultural household. The tourist may be involved in the

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traditional household activities (the vintage, the harvest of the fruit crop, milking the sheep or cows, the grain reaping) or he can choose not to get involved. To observe and to appreciate nature and the local traditions are activities that define the ecotourism.

At present, the local rural communities do not develop sufficiently the ecotourism activities, the exception being represented by the areas endowed with valuable tourist potential, where the rural tourism and the agritourism are mainly practiced (regions such as Maramureş, Bucovina, or the Apuseni Mountains).

Romania holds the most important tourist potential in Europe for the development of the rural tourism, which could represent an important source of income both for investments and for the State budget.

The rural tourism is still at the beginning, as the Romanian authorities do not recognize its importance and potential.

Here are some of the obstacles that hinder the development of tourism:

- the lack of infrastructure (especially of the roads) that would facilitate the access towards the places of destination;
- the lack of promotion;
- the lack of know-how – the knowledge that permits to offer to the tourists an experience beyond good accommodation and rich meals.

The Bălăciţa Piedmont does not attract tourists through its spectacular relief, but more through the historical elements of interest (vestiges, ruins, monuments, churches).

1. THE NATURAL TOURIST RESOURCES

Taking into account the area under study, i.e. a piedmont tableland, it is obvious that the relief is not spectacular. The Bălăcita Piedmont presents a low relief, with altitudes that do not surpass 300 meters; its morphology facilitated an intense pedogenesis, as well as a similar humanisation. The temperate-continental clime, with sub-Mediterranean influences, is favourable to the tourist activities. The succession of seasons only gives a totally different look to the landscape. In certain places, the hydrographical components create genuine oasis of silence, delight, purification. The watercourses that cross the relief unit, i.e. the Huşniţa, the Argetoaia, the Rasnic, the Desnăţui, the Drincea etc., enhance the beauty of the places. One can enjoy the presence of small water bodies even in places where nothing seems to indulge the eye. The water courses attract tourists of all ages, especially during summer, for swimming, sun baths, recreation and fishing. Although the riverbeds, riverbanks and beaches could be arranged, this kind of development lacks in the area under study, the tourism being practised in a temporary and unorganised manner, and with a small number of participants. In the week-ends, besides the local inhabitants who come here for fishing and swimming, the area hosts the tourists who wish to escape the agitation of the city and to find the tranquillity that they long after during the entire week.

The few lakes are places where the tourist can enjoy the coolness of water and the fishing (Dumbrava), as well as a ride in the boat or in the hydro-bicycle

(Râpa Roşie). Just one of all the lakes that exist in the Balacița Piedmont is used for tourism, i.e. the lake from Râpa Roşie (Photo 1), the others being left in their natural state. Some of the lakes in the piedmont could even host hunting contests (Fântânele Lake – Photo 2).

Photo 1. The Lake from Râpa Roşie

Photo 2. Fântânele Lake

Only one area with lakes is capitalized for tourism (Râpa Roşie), the others preserving their wild character.

The vegetation represents another element that could attract the tourist's view. The Piedmont hosts Balkan and Mediterranean southern vegetal associations, along the route, the tourists seeing small forest clumps of Turkey Oak and Hungarian Oak (*Quercus cerris* and *Quercus frainetto*), and forests of Pedunculate Oak, Holm Oak, as well as steppe meadows. The forest plays an important role in tourism, being a relaxing environment for tourists, generating oxygen and representing an oasis of tranquillity (it attenuates the noise).

The fauna is generally used for hunting and scientific tourism, but the tourists who only visit the area do not place much importance on this element. Whoever wonders through the forests might run into deer, wild-boars, squirrels, wolves, foxes. In the forest steppe area, near the agricultural fields, there appear: the hare, the dormouse, the ground squirrel, the field mouse, the grey rat, the steppe polecat, the quail, the partridge, the pheasant, the sparrow-hawk. In the piedmont lakes, especially in those artificially populated, the tourists can fish carps, chubs, barbells.

At the contact with the Oltenian Plain, near Plenița, there is located the nature reserve *Poiana Bujorului*, with forest steppe peony (*Palonia pereggina*). The Bucovăț fossiliferous site (Pliocene – Pleistocene molluscs) can be another attractive point for the research tourism. In the Stârmina Forest, on about 49.4 ha, there can be encountered the Balkan Beech (*Fagus moesica*), the Balkan Holm-Oak (*Quercus dalechampii*), the Silver Linden (*Tilia tomentosa*), the Tatarian Maple (*Acer tataricum*), the Field Maple (*Acer Campestre*). On the floor of the forest there appear shrubs (*Ruscus aculeatus* and *Ruscus hypoglossum*).

2. MAN-CREATED TOURIST RESOURCES

The man-created tourist resources within the piedmont can become tourist attractions. Although they had other destinations than the tourist one, with little

interest and money from the part of the local administration, they can be transformed in genuine tourist attractions. Following closely the area, one can say that these tourist resources are in advanced state of degradation and the notice-boards, the maps and the panels are missing. The only way a tourist can find more about this kind of objectives is to ask the local people about the history of the village.

The human-created tourist resources comprise archaeological vestiges, worship monuments, commemorative monuments, museums, architectural monuments, the rural settlements and the traditional popular architecture.

Vestiges of the Palaeolithic and of the Neolithic are present at Verbița, Verbicioara and Sălcuța. The Neolithic is represented here through the discoveries realised at Verbicioara and Sălcuța, the latter giving the name of a culture that was characteristic for the end of the 4^{th} – 3^{rd} millennium B.C. The Coțofeni culture realised the transition from the Neolithic to the Bronze Age (about 2500-1800 B.C.). It was thus named after the important discoveries realised at Coțofenii din Dos. The *Coțofeni Culture* with the Bronze Age is represented through bronze tools and clay pots discovered at Verbicioara, settlement where coulters made up of buck horns were found. The Bronze Age left behind the Verbicioara Culture (16^{th} – 13^{th} centuries B.C.), the culture of a sedentary population, which dealt with agriculture and with animal breeding. The Hallstatt Period is represented by the Basarabi Culture (9^{th} – 6^{th} centuries B.C.), through numerous traces of settlements located at Coțofenii din Dos, Vârtop, Plopșor, Teiu. During the second Iron Age, there appear Geto-Dacian settlements, the more important ones being located at Bucovăț, Coțofenii din Dos and Brabova. The Roman presence in the area left traces through camps, fortifications and settlements.

The precincts of Botoşeşti Paia settlement were inhabited since old times. On the Paia Valley there is a Dacian settlement and north of it there is a Dacian-Roman one. Near the area called Piscul Ciutacilor, on the northern slope of the valley, there were found Roman reliefs, statuettes made up of bronze and ceramics; northwards of the Botoşeşti Valley, there is a Dacian fortification. The continuity of living, the cohabitation, the subsequent assimilation of the populations that crossed the region (migratory people) are testified by historic proofs: iron hatchets, swords etc., located at Lazu, Vârtop, Vela. On the left bank of the *Răchita Seacă Valley*, in Brabova, there is a Dacian fortress with ditch and wave, while eastwards of the village there is another smaller fortification. In 1968, in Brabova village there were identified fragments of handmade ceramics, made up of rough black paste – brick decked with stripes of wave incisions, which were realised with the comb that dates to the 8^{th} – 9^{th} century.

The following list presents the historic monuments that are in the evidence of the National Institute for the Historic Monuments:

- *Brazda lui Novac* from Plopşor, defensive wave construction, Plopşor village, Sălcuța commune;

- the settlement from Verbița – *Eleşteu*, located 3 kilometres south-westwards of the church, civil inhabitation, Şopot village, Verbița commune, Neolithic, Roman period, 4th century;

- the prehistoric settlement from Sopot - *La Bărzuica*, civil inhabitation, Şopot village, Sopot commune, Bronze Age, Neolithic;

- the archaeological site from Coțofenii din Dos - *Dealul Botu Mare*, located 3 kilometres south-south-westwards of the church, habitation, Coțofenii din Dos village, Neolithic, Bronze Age, 5th – 2nd centuries B.C.;

- the archaeological site from Botoşeşti-Paia - *Piscul cazacilor*, located 3 kilometres westwards of the village, habitation, Botoşeşti-Paia village, Roman Period, 2nd – 4th centuries;

- the Dacian fortress from Botoşeşti-Paia - *Cetatea Micului*, located 2 kilometres eastwards of the village, civil habitation, fortress, Botoşeşti-Paia village, 1st century;

- the Dacian fortress Pelendava-Bucovăț, located in the former Cârligei village, civil habitation, fortress, Bucovăț village;

- the Latene settlement from Bucovăț - *La Jidovii*, located 200 meters southwards of the village, civil habitation, settlement, Bucovăț village, 3rd – 1st centuries B.C.;

- the Sălcuța settlement from Plopşor - *Piscul Cornişorului*, located 2.5 kilometres north-eastwards of the church, civil habitation, settlement, Plopşor village, Sălcuța commune, Neolithic;

- the fortress from Potmelțu - *Botu Cetății*, located 5 kilometres westwards of the village, civil habitation, fortress, Potmelțu village, Coțofenii din Dos commune, Roman Period, 2nd century;

- the Bronze Age settlement from Verbicioara - *La Cetate*, located 4 kilometres westwards of the church, civil habitation, fortified settlement, Verbicioara village, Verbița commune;

- the Dacian fortress from Voița - *La Cetate*, located one kilometre southwards of the village, civil habitation, fortress, Voița village, Brabova commune, 1st – 2nd centuries;

- the earthen wave from Cleanov – *Troianul*, earthen wave fortifications, Cleanov village, Carpen commune, Roman Period;

- the earthen wave from Lazu, on the terrace located eastwards of the village, earthen wave fortifications, Lazu village, Terpezița commune, Roman Period;

- the earthen wave from Terpezița - *La Mese*, earthen wave fortifications, Roman Period;

- the Roman wave from Orevița Mare, which continues towards Hinova, Şimian, Bălăcița and Livezile, earthen wave fortifications, Orevița Mare village, Vânju Mare, Roman Period, 3rd century;

- *Sf. Nicolae* Church from Tâmna, near the former local Hall, church;

- *Sf. Ioan Botezătorul* Curch from Dumbrava de Sus, Dumbrava commune, church;

- the settlement from Almăjel - *Fântânele Mari*, in the precincts of the village, civil habitation, settlement, Vlădaia commune, Hallstatt, Bronze Age, Neolithic, 9th – 8th centuries B.C.;

- the Sălcuța settlement of civil habitation, located at Corlățel, northwards of the village, on the Drincea riverside, Neolithic;

- the Verbicioara settlement from Dobra, located in the schoolyard, civil habitation, settlement, Bălăcița commune, Bronze Age;

- the Roman wave from Livezile, which continues towards Hinova, Şimian, Bălăcița, Orevița Mare, earthen wave, Roman Period, 3rd century;

- the Roman wave from Bălăcița, earthen wave, Roman Period, 3rd century;

- the Latene settlement from Oprişor - *La Carieră,* near the *Vinalcool* building, civil habitation, 4th – 3rd centuries B.C.;

- the Verbicioara settlement from Orevița Mare – *Cetate*, located 2 kilometres eastwards of the village, on the Măroiu Hill, civil habitation, Bronze Age;

- the Hallstatt fortified settlement from Orevița Mare - *Cetatea Latină*, on the slope located in front of the village, Hallstatt, 8th – 6th centuries B.C.;

- the settlement from Rocşoreni - *Piscul Barăngii*, located 300 meters eastwards of the village, civil habitation, Dumbrava commune, Roman Period, Bronze Age, 2nd – 3rd centuries;

- the Sălcuța settlement from Valea Anilor - *La Glămie*, located on the Drincea riverside, 2 kilometres eastwards of the village, civil habitation, Corlățel commune, Neolithic;

- the *Iulian Grosu* wooden house, Fântâna Domnească village, Prunişor commune, 1920;

- *Sf. Calinic* wooden church, Fântâna Domnească village, Prunişor commune;

- *Sf Apostoli* church, Gutu village, Prunişor commune, at the entrance to the village, 1863;

- *Sf. Nicolae* church, Greci village, Greci commune, located in the centre of the village, 1889, rebuilt in 1910;

- *Sf. Nicolae* church, Gvardenița village, Bălăcița commune, 1804;

- *Sf. Nicolae* church, Prunişor village, located in the centre of the village, 1842-1889;

- *Intrarea Maicii Domnului în Biserică* church, Rocşoreni village, Dumbrava commune, located in the centre of the village, 1787, rebuilt in 1892;

- *Naşterea Domnului* wooden church, Sălătruvc village, Greci commune, 1704, rebuilt in 1864;

- *Sf. Gheorghe* wooden church, Valea Ursului village, Tâmna commune, 1776;

- Stone crosses, Corzu village, Bâcleş commune, in the courtyard of the church, 19th century.

As architectural monuments, there can be noticed the worship places (Photo 3), few buildings with remarkable architecture having other destination (boyar's houses, fortified boyar's manors, schools).

Photo 3. ***The Dormition of the Mother of Jesus and of St. Nicholas*** **Church, Breasta**

The church was built in 1784 by the High Stewart's Wife Maria Bengescu, being repaired between 1904 and 1909 by the division general Ion Argetoianu and once again later, in 1939.

In Bărboi village, Greceşti commune, there is a school (built in 1924) on the facade of which there are paintings showing the rulers of the country. It is to be noticed the fact that the faces of all these rulers were erased during the communist period, and painted again after the fall of the communist regime.

The *Sf. Ioan Botezătorul* church from Greceşti was built in 1820 and painted later on by the apprentices of Grigorescu. In order to resist, the walls are realised with goat hair. In the courtyard of the church, there are buried the members of the Grecescu family, those who built the Grecescu Church and the Grecescu Hospital in Drobeta Turnu-Severin. The parish house, located in the courtyard of the Greceşti Church, was an archpriest office between 1924 and 1944.

Only one museum functions in the area under research, i.e. the museum of Cernăteşti. The fortified manor was built in the 14th century, by the Sward Brave Dimitrie Cernat, following the order of the ruler Mircea cel Bătrân. At the beginning of the 18th century, one of his descendents fortified the house and added one level; later on, after 1800, the manor was added a massive wall buttress. This fortified manor was abandoned and degraded in time, being repaired between 1967 and 1969. In 1972, the Cernăteşti Museum was founded in this manor.

The tourist who visits the area can see typical rustic houses, which, in most of the cases, have two rooms, a hall and an entrance room, all made up of adobe – a

mix of soil and straws that seems to have been thrown in a hurry over a wooden framework. The poverty of the inhabitants is reflected by the poor and degraded aspect of the houses. There are not the houses that attract the tourists here, but the people living in them; they are simple, welcoming people who do not have much school but who know how to make a stranger feel good in their poor household. The peasant household is made up of a dwelling, a warehouse and a store for the cereals, a stable for the animals, a shed for the tools, a cellar where they preserve the grape vine products and the food products. The structure of the household reflects the activities practiced by the inhabitants (cultivation of cereals, breeding of animals, viticulture). The presence of the cellars under the form of mud huts dug in the ground, on the outskirts of the village, is due to one of the occupations of the villagers, i.e. the cultivation of the grape-vine (Lazu, Orodel, Caraula); subsequently, these mud huts were abandoned and cellars were constructed in the precincts of the village. The interior of the peasant dwelling represent an important component of the popular civilisation.

The rustic architecture is enriched by the presence of the Medieval civil constructions, namely of the boyar's mansions, of the fortified manors and houses (the fortified manors from Brabova, Cernăteşti, the boyar's mansion from Igiroasa). Matei Basarab had a mansion and an itinerant residence at Fântâna Domnească, but the mansion was destroyed, the only thing left being the fountain that gave the name of the village.

The spectacular joining of the traditional architectural art with the Balkan architecture played an important role in the Medieval architecture within the Piedmont. The Romanian fortified manors prove the artistic sense and the deftness of the craftsmen who took elements from the architecture of the fortified boyar's houses. The buildings, which can still be admired in certain places in the country, posses an architecture that combines the features of the peasant houses, resulting an original synthesis. Generally, the fortified manors are tall buildings with whitewashed walls that are pierced by bulwarks, in other words they are small fortresses built to satisfy the needs of a family. Their name comes from the Turkish word "kule", which means "tower". The main fortified manors within the piedmont are the following:

- The fortified manor of the Izvoranu family (18th century), Brabova commune. The access is realised from Craiova, on the local road that leads towards Vânju Mare;
- The fortified manor of the Cernătescu family (18th century), Cernăteşti commune, 35 kilometres from Craiova.

The wooden churches located in villages such as Verbiţa, Verbicioara, Gogoşu, Corlate, Salcia, Rasnicul Bătrân, Cornița, Valea Ursului, Sălătruc, Fântâna Domnească are also important architectural monuments.

3. THE ETHNO-CULTURAL TOURIST RESOURCES

The cultural tourism concentrates on the cultural aspects, such as traditions, festivals, craftsmanship and handicraft art, music and religious activities. The

popular costume from the area of the piedmont has been almost entirely lost. The aged population seems to keep traditions, specific clothing, songs and traditional ring dances closed in a time chest, almost all being apparently forgotten; the aged people live the rest of their lives only working on the fields and taken care of their poor households. In the evening, when enjoying their only leisure time in front of the gates, they recall the happy moments, the ring dances, those occasions when the boys and girls, beautifully dressed in festive clothing, walked through the village. They say that nowadays only the thoughts and the needs scour the villages, as even the children forgot their parental house and the places where they used to run barefoot.

The popular traditions are still preserved in the villages within the piedmont. They are related to the moments of the life cycle, to the seasons, to the religious celebrations and to the agricultural works (*the Fate tellers,* the bounding of the bride by her godmother, the walking with the buckets to the fountain, the bringing of the ewer to the parents of the bride, *the mother of the rain* and *the father of the sun*).

The tourist is invited to come to these places and try different traditional folk dances; when feeling tired with the dance, he should head towards the table full with rich dishes and taste the fresh vine brought from the cellar, chosen from the best cask that has been specially kept for this occasion. Among other village traditions that are kept in the Bălăcița Piedmont we mention: The Feast of the Linden Tree (Carpen commune) and the Feast of the Reaping (Cernateşti).

In the villages of the piedmont there used to be practiced diversified handicraft art, such as: the pottery (Argetoaia), the manufacture of musical instruments (of ocarines and of Jew's harps, in the commune of Terpezița), the production of local brandy (Lazu, Sărbătoarea, Plopşor etc. – there was only one oven in the entire village and it was usually located near a spring, so that the alcohol vapours should get cold more rapidly; the earthen oven heated the big alembic where the fruits were put; the men of the village gathered there, around the alembic, and they started the singing and the entertainment), the wool spinning, the weaving. The revival of the handicraft art could have a positive impact on the development of the tourism in the area.

4. THE TECHNICAL AND MATERIAL BASIS

The tourist infrastructure must satisfy the demand through specific endowments. The tourist service is to comply with all the needs that the tourists have. The tourist services fall into two categories: basic services (accommodation, transportation, alimentation and treatment) and complementary services (information, cultural and sports activities, renting).

In the case of the Bălăcița Piedmont Tableland, two distinct areas are contoured: the Mehedinți area and the Dolj area. When it comes to the infrastructure investments, it is to be noticed a higher need for investments in the area of Mehedinți County, while the Dolj County needs a smaller capital. One of the causes of this difference is the fact that much more villages have water networks in Dolj that in Mehedinți; the roads in Mehedinți are degraded (most of

them not being asphalted and on certain segments being impracticable for the means of transportation), while in Dolj County the state of the roads is good, most of them being repaired during the last years. The tourist infrastructure in the area is missing almost entirely. The access roads are in precarious state, the accommodation and alimentation basis are more than modest. Because of the small number of tourists that cross the area, those who wish to get involved in tourism do not head very much their attention towards this area.

The local inhabitants are both suppliers and consumers of tourist services, representing the population segment that visits most the area of the piedmont. The higher number of local consumers, as compared to the outsiders, is explained by the poor promotion of the tourist services in the area, through mass-media, tourism fairs etc.

The most important accommodation basis is represented by the Râpa Roşie Tourist Complex. It is located 35 kilometres far from Craiova, on the administrative territory of Sălcuţa commune. The name of the place comes from the valley of the Desnăţui stream, which is made up of red clay agglomerations that slowly descend from the forest to the water.

The Desnăţui watercourse was modified through hydrological improvement works for the realisation of a dam lake. The lake is not present on any map. The complex has an accommodation capacity of 200 places in two villas, one of them functioning as a manor until 1989. The quality of the accommodation conditions is good, the rooms being endowed with modern furniture and central heating. The complex also has a restaurant with 300 places. The aliments used in the preparation of dishes come from their own breeding complex for swine, cattle and ostriches. Those who love nature can stay in tents within the complex. The complex has stables and paddocks, the tourists having the possibility to horse ride, in the careful company of specialised instructors, to fish in the lake (carps and hornbeams), to take a ride in the hydro-bicycle. Sports can also be practiced, the complex having a football field, a basketball field, and pools; there is also the possibility to practice table tennis and billiards. The owner of the pension plans to build a fitness hall, a massage room, a bowling room and even a ski and sledging track for wintertime. Other accommodation units within the Bălăciţa Piedmont are located at:

-Breasta – agro-tourist pension (two daisies) – Lex, with 4 accommodation places.

-Breasta – holiday village with 50 little houses, but with unsatisfactory accommodation conditions.

On the side of Vârtop Lake and at Râpa Roşie, there are also some private property holiday houses. In the piedmont, the public alimentation units for tourists are represented by the Râpa Roşie Restaurant, buffet-bars located in some villages, although these later ones do not serve food.

5. SUGGESTIONS REGARDING THE PROMOTION OF THE TOURISM IN THE AREA

In order to bring suggestions for the tourist development in the Bălăciţa Piedmont Tableland, it was first necessary to realise a SWOT analysis that would reflect the reality in the area under research.

The SWOT analysis shows the following aspects:

Strenghts	**Weaknesses**
- the existence of a space surplus in the households of the area, - the existence of the houses constructed in traditional Oltenian style.	- the lack of knowledge that characterises the possible local investors in the rural tourism, - the lack of advertising, - the poor palette of the agritourist services, - the lack or poor collaboration with the tourism operators.
Opportunities	**Threats**
- the existence of funds dedicated to the development of these activities, - the opportunities offered by the natural, cultural and historic conditions, - the existence of the system that deals with the rising of the tourism knowledge level.	- the existence of preconceptions, - the confusion between the notions of *guest* and *tourist*, - the low quality of services and the insufficient use of the opportunities offered by the rural tourism.

The following strategic objectives must be fulfilled, so that the tourism could develop in the area:

- the covering of the area with tourist services,
- the reinforcement and enlargement of the accommodation, alimentation, recreation and sports infrastructure,
- the consolidation and extension of the transportation and communication infrastructure, in order to ensure the access towards the sites and objectives of tourist interest.

The measures plan that must be followed in order to have a good tourist development is the following: to modernise and to enlarge the tourist capacity; to ensure the connection of the accommodation capacity to the utilities (drinking water, sewerage, waste management, TV cable, Internet etc.); to facilitate the realisation of new tourist structures with higher comfort degree, near the main access points in the area; to encourage and to stimulate the increase of the number of tourist structures in all rural settlements; to particularise the offers by underlining the specific of each village.

The cultural tourism implies the promotion and the introduction within the tourist circuit of the Dacian, Roman and Medieval vestiges in the area. It is necessary to develop and to diversify the sports and recreation offer, the realisation of new structures and the promotion of forms of adventure tourism (rafting, paragliding, canyoning, bungee-jumping), nautical entertainment on the lakes.

In order to promote the traditional values that are specific to the area, it is necessary to encourage the practising of the old occupations, traditions, handicraft arts; to create a village museum; to realise a network of handicraft workshops and stores for the traditional products; to continue the organisation of folk manifestations that are traditional in the area. At the territorial level, it is necessary

to develop the human resources for the tourist sector. In the village, the tourist activities are possible all the year long, in the time of the harvest, as well as afterwards, through the offering of the fruits and of their derivatives.

In order to satisfy the tourist, ten components must be taken into account:

1. the client's satisfaction and the stages of the sightseeing cycle;
2. the conceiving and the management of the facilities;
3. the elaboration of a menu, the safety and food health measures;
4. marketing notions;
5. the improvement of tax performances and of the financial management;
6. the communication during the stages of the sightseeing cycle;
7. the gathering of information during the stages of the sightseeing cycle;
8. the sale;
9. the satisfaction of the client and the environment: communicating the image of the place;
10. the tourist package centred on the specific market niche.

In order to increase the sightseeing frequency, the guests must be encouraged to come back to the pension. It is much easier and less financially demanding for a firm to advertise for persons that have already been its customers, than to find other clients. If the owner of the pension maintains the contact with its former guests (through postcards, e-mails or periodic news bulletins), there is the chance of them returning as clients of the pension.

The connections of the Bălăcița Piedmont with the surrounding regions are only realised by means of the roads. No railway crosses this relief unit. The road network in the Bălăcița Piedmont is the only one in the Getic Tableland to have west-east orientation. The location of the two important urban centres – Drobeta Turnu-Severin, in the west and Craiova, in the east – played an important role in this orientation. One of the obstacles that the development of the piedmont as a tourist area faces is represented by the lack of interest from the part of the local councils and mayoralties. The first step that could be done concerns the development of the communal roads infrastructure, which is very bad at the moment. At present, the Romanian tourism faces a period of decline, but this situation should increase the importance of agritourism. For the moment, the pensions generally develop only in the richest ethnographical areas, where the spirituality and the old traditions are best preserved. One of the impediments standing in the way of the rural tourism development is represented by the lack of money that should be destined for the development of infrastructure, especially for building new constructions or modernising the already existent ones. The dwelling fund in the Bălăcița Piedmont is poor, the houses are very old, and most of them only have the ground floor, while the materials used for construction are mainly the wood and the earth. The most important economic activity in the piedmont is the agricultural one, but it is developed only in individual households. The collaborations with the craftsmen would represent an advantage in the tourist development. Many tourists, especially those in holyday, wish to buy souvenirs from the region where they

spent their vacation. In order to satisfy this need, it is necessary to create a space for the sale of souvenirs. These kinds of stores satisfy the tourists, who leave with a keepsake of the visited places, but they also bring supplementary incomes. The methods through which the tourists' attention can be directed towards the traditional and art objects are various and include: decorating the rooms with traditional objects; information note – the tourist is informed that similar objects can be bought in the store of the pension; the inviting of craftsmen for folk art demonstrations; correct prices; showing the objects in public spaces (lunch rooms); guided tours that would bring in front of the tourists the living and working conditions of the craftsmen; their collaboration with the artists and craftsmen in the community.

The pension, together with the local partners, must realise varied tourist packages. Among the partners who could contribute to the realisation of a tourist package, we mention: historic places, museums, protected nature areas, restaurants, entertainment places (entertainment parks, bars, theatres, and cinemas), music and arts festivals. It is important that the owners of the pensions and the members of the community demonstrate the value of the tradition and of the places of interest within the area. The tourists enjoy spending money on art and handicraft objects, as well as other souvenirs that would remind them of the holyday. This shows to the local inhabitants that what they offer is valuable. The tourists wish to explore the areas that they visit, but quite often they do not have information concerning the things they might see or the activities they might do. The responsibility of the tourist operators and of the community members is to be informed and to be able to inform the tourists in their turn. Some of the branches of the rural economy (handicraft art, farms, rural attractions and the food sector) must be connected with the tourist sector. Any tourist who wishes to travel with no help from the part of a specialised guide needs maps, and it is also the pension that could offer him these instruments. Information will be supplied concerning persons, places and objects of interest and the tourist will be very happy with his discoveries.

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