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THE HÂRTIBACIU TABLELAND. GEOMORPHOLOGICAL RISKS

FLORINA GRECU*, MARIA SANDU

The Hârtibaciu Tableland (4,000 sqkm, 80 km long and 50 km wide) is a distinct subunit of the Transylvanian Tableland. Sarmatian and Pannonian sedimentary formations represent an alternation of impermeable marly-claey strata and permeable strata of sands, loosely cemented sandstones and conglomerates with a monocline structure, locally disturbed by folds of a general E-W or N-S orientation. The grade of fragmentation in point of energy and density of slopes, geodeclivity, climate and edaphic conditions, as well as human intervention reflect in the diversity of present-day geomorphic processes. A hierarchy of geomorphic risk classes – high, moderate and low, has been established based on slope dynamics, as the outcome of a combination of main criteria (type of dominant process, volume of material dislodged by erosion, landslides and human activity). Transition from one class to another has rather a limited value for predicting process evolution.

The normal evolution of natural processes in agreement with slope balance at a certain moment, tends to stabilise the terrain. Whenever extreme natural phenomena cause imbalances on slope, bringing about changes of relief configuration and producing material damage or casualties, geomorphological hazards develop.

Key words: *Hârtibaciu tableland, geomorphological risks.*

Introduction

The Hârtibaciu Tableland (4,000 sqkm, about 80 km long and 50 km wide) lies in the south-east of the Transylvanian Tableland (*Fig. 1*), between the Târnava Mare Valley in the north, the Visa Valley and the lower course of the Cibin in Sibiu Depression in the west, the Olt Valley in the south and the Transylvanian Subcarpathians in the east. Structural-lithological, morpho-graphical-morphometrical and hydrographical particularities, as well as human activities join in individualising the tableland from a geomorphological viewpoint.

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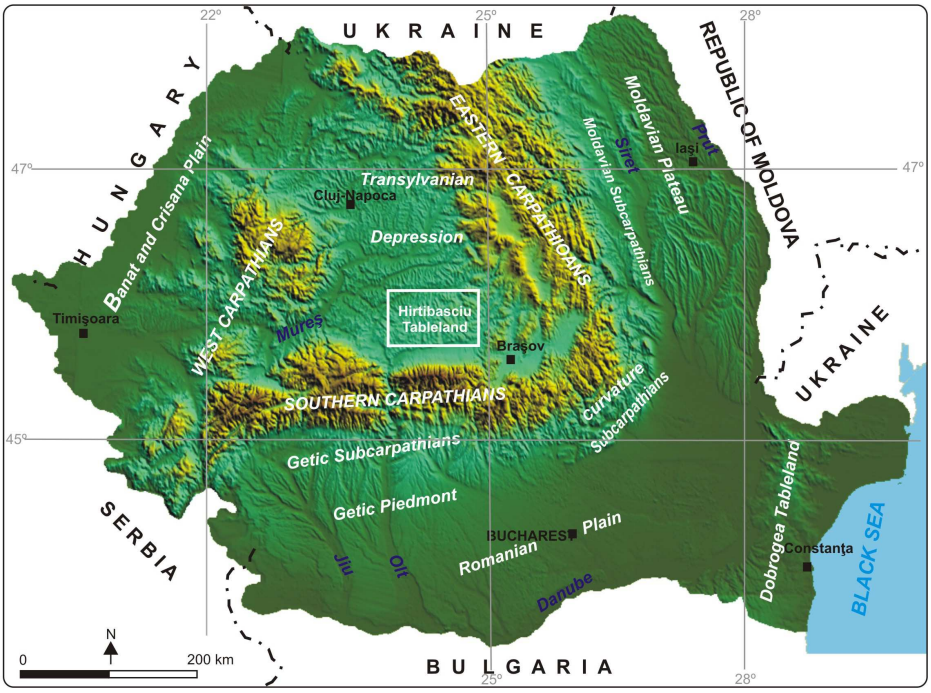

Fig. 1. Location of Hârtibaciu Tableland

Its main characteristic is high slope dynamics. Denudation is an indicative of marked fragmentation, differentiating a relief underlain by Sarmatian rocks in the south of the tableland and by Pannonian ones in the northern part. The contact between these formations is visible not far north of the Hârtibaciu drainage net, running almost parallel to the tableland in the median and the lower course of the basin. Instability on slope is mirrored also by land-sliding associated with gullying. In terms of the expansion, frequency and intensity of present-day geomorphological processes, themselves tributary to the precipitation regime, type of slope and human intervention (deforestation, plantation of fruit-trees, and cultivation of crops), six types of geomorphological risk classes have been distinguished: high, moderate, and low.

Morphographical and Morphometrical Particularities

Hillsides – high of 550-600 m in the west and 700 m in the east are the main land forms. There are also two erosion surfaces: an upper surface (Proştea Mare-David, 1945, or Amnaş-Posea, 1969) situated in the western part of the

tableland at ± 600 m alt.; and a lower surface (Hârtibaciu surface – Grecu, 1992) at ± 500 m alt. in the west and ± 625 m alt., in the east. Usually, the two surfaces are linked by wide saddles in the source area, built by sub-sequent modelling.

Locking at the distribution of registered values, it emerges that relief fragmentation is closely intertwined with lithology. Average fragmentation density runs between 2-3.5 km/sqkm, with a relief-energy of 90-300 mm/km. Declivity, which depends on the degree of fragmentation and lithological make-up, varies from 5° to 10° on structure-controlled surfaces, up to 55° on the well-developed cuesta scarps; on terraces and levelled surfaces slopes dip by 2°-5° only. Ordinary values range between 15° and 25°. (*Fig. 2*)

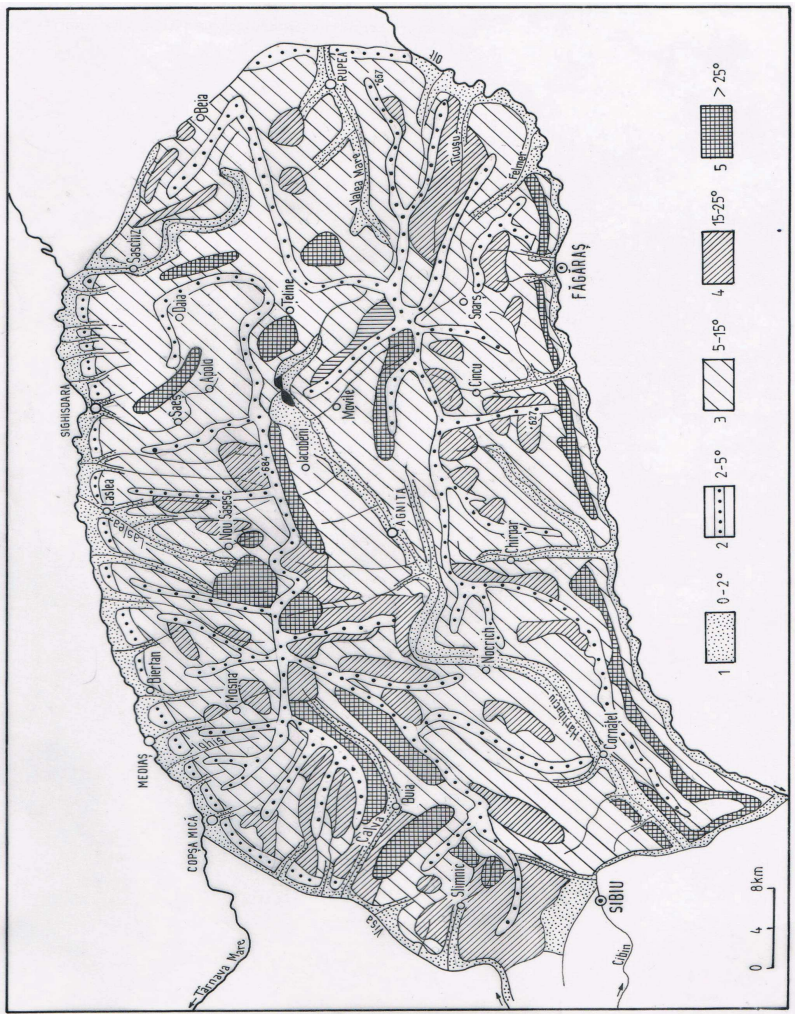

Fig. 2. Slope map

Structure and Rock Particularities

Sarmatian sedimentary formations occur between the Olt and the Hârtibaciu Rivers, while Pannonian deposits underlie the area between the Hârtibaciu and the Târnava Mare (Vancea, 1960). They consist of an alternation of impermeable strata (marls and clays) and permeable strata (sands, loosely-cemented sandstones and conglomerates) with a locally disturbed monocline structure of E-W or N-S orientation, generally. The succession of anticlines and synclines is blurred by the low declivity slopes of the few landforms generated by a folded structure represented by the mildly dipping monocline folds (Grecu, 1992). A peculiar feature is the cuesta relief. Its high incidence is due to strata inclination, strong relief fragmentation caused by the density of the subsequent secondary network, and the recurring contacts among the intercalations of different horizons (marls, clays, sands, sandstones and less frequently conglomerates).

Present-Day Geomorphological Processes

Landslides, here and there gullying and sheet wash, have the highest incidence on the Hârtibaciu Tableland (*Fig. 2*). Present-day modelling depends on the regime of precipitation (600-700 mm/year), variety of rocks, types of slope and vegetation coverage. There are various types of landslide-triggered mechanisms, depth and size of discharged material, forms, age and degree of stabilisation in the area (Gârbacea, 1964; Gârbacea, Grecu, 1981; Grecu, 1982, 1983, 1992, 1997).

The massive glimee-type landslides (dislodging a material cover thick of 5-20 m and over) are particularly severe at Saeş (1,550 ha), Movile (900 ha), and Saschiz (615 ha) (Grecu, 1983, and Gârbacea, 1964, respectively) (*Fig.3a, Fig. 3b*). Smaller glimee-affected areas can be seen on either bank of the Hârtibaciu River, where they cover the whole of the usually deforested slope (eg. at Movile and Cornățel), hang over it (Țeline), or affect the watershed (Apold) (Grecu, 1992). Deep slides, in their turn, cover wide areas everywhere on the Hârtibaciu Tableland, the material moved being 2-5 m thick. However, their incidence is higher in the southern part of the tableland where the substrate consists of clay-marly rocks (*Fig. 4*).

a

b

Fig. 3. Glimee-type landslides: *a* – Movile landslides (2009), *b* – interfluve Apold landslides (May 2012, F. Grecu)

Fig. 4. Modelling of north – Făgăraş cuesta through gully erosion (2009)

Lanslides are associated with gullying. The latter occur mainly in the north of the Hârtibaciu River and in the NW of the homonymous tableland (at Şeica Mare, Axinte Sever, etc), where deep erosion is precipitated by the sandy-clay substrate (Făgăraş cuesta) (*Fig. 5*). Aggressive gully and ravine occurrences are recorded with a higher frequency in the upper drainage basins or in the case of torrential organisms developed on cuestas. Beginning from the Pleistocene to the present-day, landslides represent the major modelling processes. Deep erosion is rather a recent process, triggered by human activity (forest logging, farming, etc). The relief modelling process is particularly severe in March, May, June and July (Grecu, 1992).

Fig. 5. Present-day modelling processes in the Hârtibaciu Tableland: 1 – scar up to 10 m: a) active; b) fixed; 2 – scar between 10 and 25 m: a) active; b) fixed; 3 – monticles (glimee)(5-20 m-thick dislodged material); 4 – deep landslide (2-5 m-thick disloged material): a) active; b) fixed; 5 – sheet-wash; 6 – gullies (2-5 m): a) active; b) fixed; 7 – ravines (over 5 m deep): a) active; b) fixed; 8 – small-fixed valley (torrential organisms); 9 – summits with hillocks and saddles; 10 – flat summits; 11 – erosion outlier; 12 – saddle; 13 – terrace; 14 – floodplain; 15 – alluvial fan; 16 – reservoirs

Categories of Geomorphological Risk

Geomorphological risk is defined as a probability for the occurrence of some phenomena liable to changing the dynamic balance of slopes hence visible effects on the environment. Like changes can be influenced or unleashed by climatic and anthropic factors. The impact of their action is distinctively different in terms of rock and structure, types of slope, edaphic, hydrogeological conditions and degree of vagetation cover (Coteț, 1978; Burton *et al.*, 1978; Torry, 1979; Chowdhyry, 1980; Alexander, 1991; Mac, Irimuş, 1991; Bălteanu *et al.*, 1996; Grecu, 1997; Sandu, 1994, 1998 etc.).

The Map of geomorphological risk (grounded on present-day geomorphic processes) has a complex character. It makes a synthesis, based on repeated investigations, of a set of geomorphic factors, highlighting the dynamics of the Hârtibaciu Tableland relief. The maps used to make it as close to reality as possible were: map of morphostructure and morpholithology; map of land use; map of slopes; map of soils, and map of slope exposition.

This Map of geomorphological risk is an important achievement, because 1) it foreshadows risk-prone areas; 2) it can be used to inventory natural areas and resources with a view to their adequate use; 3) it shows the degradation of unstable or fragile environments; 4) it facilitates the zonation of areas fit for construction works; 5) it defines and assesses the constraints or limitations posed by natural landform.

The elaboration of geomorphological risk maps for the southern part of the Transylvanian Tableland is an old-standing preoccupation, particularly with authors who have long been engaged in the study of slope dynamics (Sandu, 1994; Grecu, 1997).

The categories of geomorphological risk (*Fig. 6*) in the Hârtibaciu Tableland are grouped by degree of stability and dynamics of moving material, intensity and frequency of landslides associated with gullying and impact of human activity. The six categories of geomorphological risk have been listed under three risk classes: high, moderate and low (large-scale mapping 1:25,000, 1:50,000 depicts risk classes). The scale used for the particular case of the Hârtibaciu Tableland (1:4,000,000) allowed for generalisations without belittling the scientific substance.

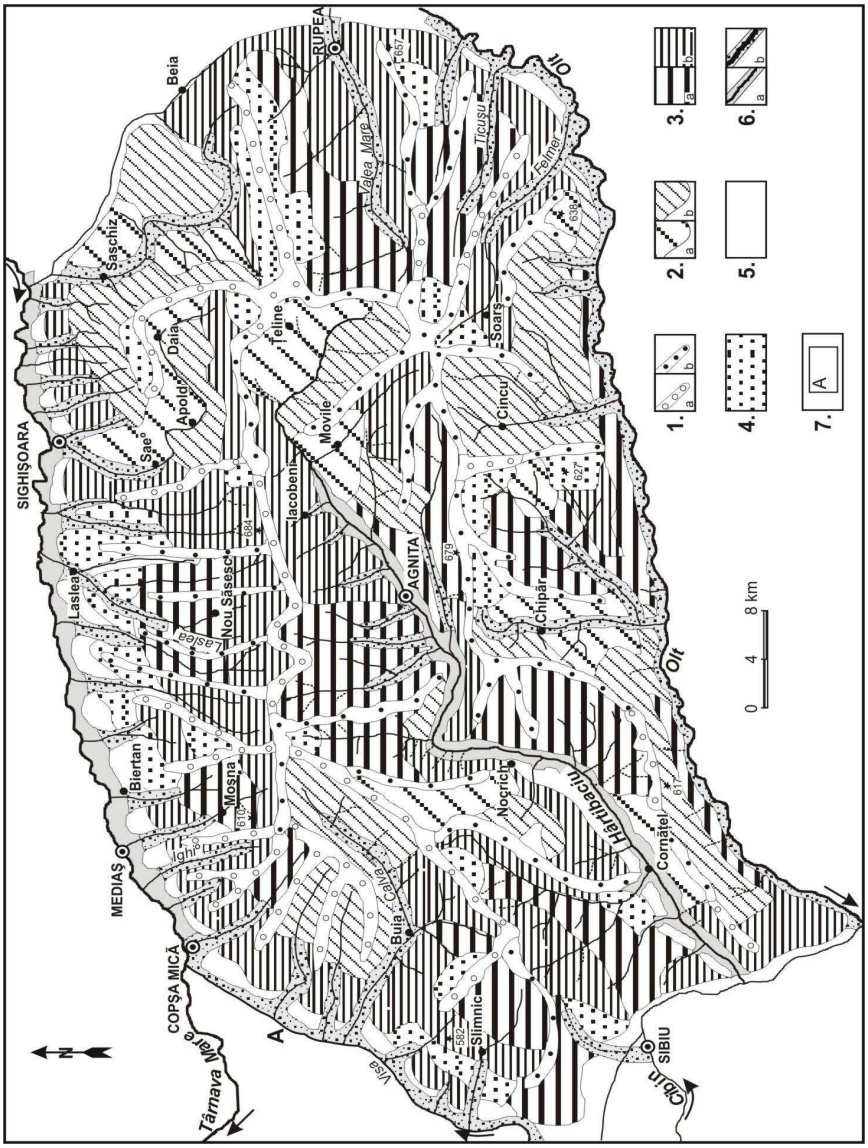

Fig. 6. Map of geomorphological risk in the Hârtibaciu Tableland: 1 – risk-free afforested summits (a); b) low-risk deforested summits narrowed by the extension of headward ravines and landsliding; 2 – slopes at high risk from: a) monticle-like (glimee) landslides thick of 5-20 m, sometime over 20 m; b) deep landslides thick of 2-5 m, frequently associated with gullying; 3) slopes at moderate risk from: a) annual reactivation of deep slides and of gully source areas; b) gullying associated with rock-and-soil falls; 4 – slopes at low risk from periodic reactivation of sliding and reduced sheet wash; 5 – risk-free slopes; 6 – major channels at high risk from periodic flooding (a); at moderate risk (every two years) (b); 7 – Localitation in *Fig. 1*.

High Geomorphological Risk involves two situations:

– *slopes at high risk from glimee-type massive landslides (5-20 m-thick dislodged material).* With a lithological substrate consisting of sandy marls, clays, loamy clays, a 200-250 m relief energy, 3-3.5 km/sq km relief fragmentation and declivity of 25°-20° up to 55°, slopes have a high morphodynamic potential. As a rule, these slopes, currently found at Saeş, Movile, Saschiz, Ţeline, Cornăţel, Nocrich, Chirpăr and Cincu, are deforested, with unproductive lands;

– *slopes at high risk from deep slides (2-5 m-thick dislodged material) are frequently associated with gullying*. In this case, the slope substrate contains sandy clays, relief energy ranges from 100 m to 150 m, density of fragmentation varies between 2.5-3 km/sq km, and declivity registers 15°-45°. Representative areas stretch out east and south-west of Saschiz, west of Ţeline, west of Movile, south of Soarş, south of Cornăţel, in the upper basins of the Calva, the Slimnic, etc.

At high risk from periodic floods stay also the major channels of the Târnava Mare and the Hârtibaciu rivers (*Fig. 7*). In the case of the Olt River (outside the Hârtibaciu Tableland) the erection of dams and the formation of reservoirs after 1987, have depleted periodic flood-induced risk, now at moderate levels.

Moderate Geomorphological Risk

This category of slope have the same rock substrate as above, relief energy of 80-120 m, density of fragmentation 2-2.5 km/sq km and declivity of 15°-35°, even 45° in some places.

Moderate geomorphological risk involves two situations:

– *slopes at moderate risk from the annual reactivation of deep landslides and of the source area of ravines which occupy the middle portion of slopes*. Like slopes (south of Nou Săsesc, east of Ţeline, north and south of Agnita, south of Nocrich, etc.) have been deforested and are used as orchards and pastures;

– *slopes at moderate risk from gullying, associated with frequent rock-and-soil falls*, are found between Saeş and Nou Săsesc, on the righthandside of the Hârtibaciu between Agnita and Brădeni, on the righthandside of the Ticuş, the Felmer, etc.

The Târnava Mare and the Hârtibaciu river channels on the Hârtibaciu Tableland also fall into this category of risk.

Fig. 7. The Hârtibaciu riverbed (May 2012, F. Grecu)

Low Geomorphological Risk

This category comprises the main summits and in part their deforested secondary extensions. Risk is due to the headward advance of ravine sources and the reactivation of old scarps. Also at low risk from periodic reactivation of old slides and weak sheet wash stand segments from the median third and the upper part of slopes. These slopes have usually the lowest morphodynamic potential (5°-15°, here and there 20°-25°). Field investigations have shown that periodic reactivation of landslides can be stablised over a relatively short time-span (2-3 years) if grasses are planted

Conclusions

Delimiting classes of geomorphological risk is fairly relative, because transition from one class to the other depends on the evolution of slope processes.

The Map of geomorphological risk forecasts the emergence of two distinct categories of processes: 1) processes conformable with the natural, normal evolution of the relief in terms of its state of equilibrium at a given moment, and 2) extreme processes, that bring about visible changes in its state of dynamic equilibrium (often relating to heavy precipitation, the undercutting of a slope foot, etc).

Under normal circumstances, geomorphological processes evolve in keeping with the state of slope equilibrium at a given moment, tending to stabilise the terrain. When extreme phenomena disrupt this equilibrium, altering the relief

pattern by destroying existing forms and engendering new ones, causing material damage and casualties, we are faced with geomorphological hazard situation. Therefore, maps of geomorphological risk, apart from their scientific value, may become a practical tool for the interdisciplinary commissions entrusted the licencing of territorial planning projects; at the same time, the private sector should have a say in the assessment of hazard-prone situations.

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PEDOLOGICAL CHARACTERISTICS OF THE CENTRAL EASTERN AREA OF PLOIEŞTI PLAIN (WESTERN PART OF PLOIEŞTI CITY)

RĂZVAN OPREA*, ALEXANDRU NEDELEA, MONICA OPREA

The aim of this study is to characterize the soils in an area situated at the western edge of Ploieşti city (the central-eastern part of the Ploieşti Plain). In order to map the 58 hectares expected to be turned into a municipal park we performed five soil profiles, which were analyzed both morphologically (color, texture, structure, neoformations, skeleton, gleyzation, pseudo-gleyzation, morphological thickness, consistency in dry state and compactness) and analytically (calcium carbonate, pH, organic carbon and total humus content). Based on our findings, we were able to divide the soils into two ecological groups (chernozems soils and thin soils), which reflect properly their physical, chemical and biological properties, as well as their specific utilization and management (Florea, 2003).

Key words: *pedological study, ecological characteristics of soils, the Ploieşti Plain, Romania.*

Introduction. Methodological Aspects

The present investigation has been accomplished at scale 1:10000, which makes it a large-scale pedological study (Florea *et al.*, 1987). Its purpose was to characterize the soils located in the western part of Ploieşti city, close to Ploieşti West railway station, an area projected to host a 58 ha theme park. The 1:5000 topographic plan was used as a cartographic basis.

The number of soil profiles and borings performed on the field was established depending on the complexity of the terrain and soil cover, as well as on the representative fraction of the base map. Thus, preliminary scouting highlighted a low degree (class I) of land complexity. Class I of land complexity includes smooth natural regions, plains and lowlands, very weekly dissected, with low pedological diversity, lacking forest vegetation or with forests that account for less than 20% of the area (Florea *et al.*, 1987).

According to the *Pedological Studies Elaboration Methodology* (Florea *et al.*, 1987), the minimum number of main and secondary soil profiles per 100 ha for scale 1:10000 and class I of land complexity is 3.7, which means that for the 58 ha area projected for the future municipal park 2.1 profiles are

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necessary. Morphological analyses (color, texture, structure, neoformations, skeleton, gleyzation, pseudogleyzation, morphological thickness, dry consistency, and compaction), the identification of carbonates (using HCl solution) and pH determination (for some of the horizons – using the test paper and 0.5 indicators) were accomplished in the field. At the same time, samples were taken from the A horizons of P1 and P2 soil profiles (at depths of 10-30 cm and 20-40 cm) in order to run laboratory analyses. The aim was to establish the pH values (to compare them with those obtained in the field), as well as to determine the organic carbon content (%) and the total humus content (%), by using the wet-oxidation procedure.

Natural Pedogenetic Conditions, Land Use and Soil Characterization

The pedogenetic conditions of the investigated territory (*Fig. 1*) are given in a synthetic form in the *Table 1*. Five soil profiles were performed in the field, part of them with the pedological probe, with the intention to preserve as much as possible the integrity of the land. These profiles were characterized according to the methodology that is currently used in Romania (Florea *et al.*, 1987; Florea & Munteanu, 2003).

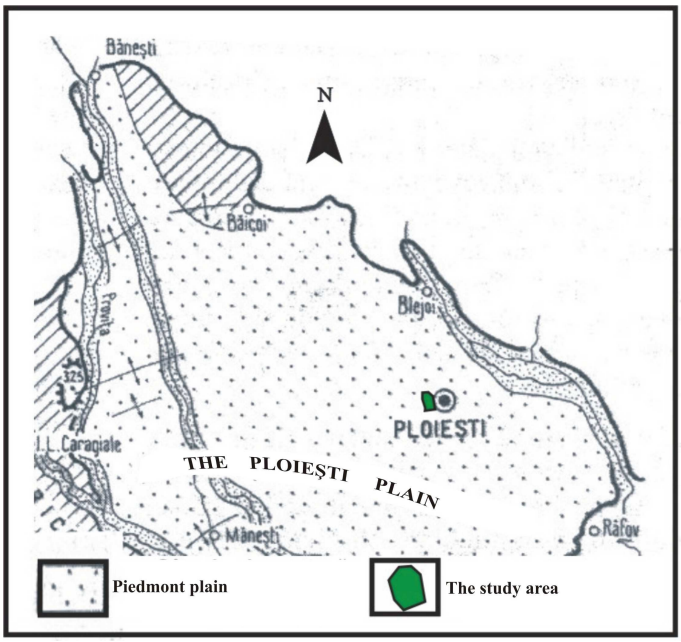

Fig. 1. The Ploiești Plain – Geomorphological map
(Popescu *et al.*, 2005)

Profile number 1 was accomplished on grassland, about 100 m southwest of the cobble road running parallel to the Ploieşti West railway station ($44^0 55' 23$ N; $25^0 59' 38$ E). Following the morphological analysis (*Fig. 2a, 2b*) the soil was defined as a clay chernozem (showing a Bv horizon) developed on a gravel horizon (Rp) lying at 110 cm. To a certain extent, it is also a rendzinic soil, as much as the Rp horizon is made up of stream gravel predominantly calcareous, with less than 10% of fine materials in the first 150 cm. It is worth noting that carbonate neoformations occur in the first 100 cm of the soil profile. The presence of calcium carbonate, identified through effervescent test, proves the soil is slightly leached. Sometimes, it is meso-calcareous, because effervescence starts at 63 cm deep when tested with HCl. The soil species (defined by the soil structure and skeleton content of two soil horizons – the A horizon and the first part of the B-horizon) are either loamy or loamy-clayey, and are devoid of skeleton or show low amounts of it (skeleton content ± 3-6%; size of skeleton particles 0.2-2 cm).

Table 1

Natural Pedogenetic Conditions and Land Use

Lithology	**Topography**	**Climate**	**Vegetation**	**Land use categories**	**Soil alterations through agricultural use**
Old psefitic stream deposits (aluvio-proluvial) with predominantly limestone rounded gravel	Low and smooth piedmont plain formed at the contact with subsidence areas; the top of the terrace number 2 (Câmpina), lying on the Prahova's alluvial cone (Popescu et al., 2005); about 160 m altitude (altitudinal class – very low, 101-200 m); smooth or slightly rough land (bumps less than 0.5 m amplitude); horizontal or gently inclined areas (gradients less than 2^0)	(according to the values recorded by Ploieşti station) Mean annual temperature – 10.4^0C (*Very high class* of mean annual temperatures); July temperature is 21.9^0C; January temperature is – 2.7^0C; the mean annual number of freezing days is about 105-110; mean annual precipitation is 608.6 mm (*Medium class* of mean annual precipitation)	Agricultural lands and secondary grasslands with steppe features lying on the latitudinal zone of the forests with *Festuca valesiaca* and *Poa angustifolia*	Arable land with pastures	The appearance of a compacted horizon (plowing foot) as a result of agricultural land use

The sequence of soil horizons starts with Aţ (fallow horizon) and extends between 0 and 2 cm. It is followed by a compacted horizon (hardpan – plowing foot), 2 to 6 cm thick, which is explained by the fact that the area has been used as arable land. Down below, between 6 and 40 cm, it lies the mollic horizon (Am), the glomerular structure of which was deteriorated through agricultural use (even though some aggregates with macroscopic pores can still be identified). The present structure is grainy (medium and high) and even polyedric (very small and small); the color is dark (10YR 3/2-10YR 3/3 when dry and 10YR 3/1-10YR3/2 when wet, according to Munsell Soil Color Chart). Based on the color of this horizon and on that of the underlying one (Bv) the soil can be included in the Cernisols class, chernozems type. Bv is a loamy texture horizon, moderately compact, with neutral pH (± 7.0); organic carbon content is 1.73% and total humus content is 2.98%. Between 40 and 60 cm, there is a clayey horizon (Bv) with polyedric structure, of dark color, at least on the faces of the structural aggregates (10YR 3/4 in dry state and 10YR 3/2 in wet state), with loamy or loamy – clayey texture, highly compacted and slightly acid (pH between 6.5 and 6.8). Downwards, it follows the BC transition horizon (between 60 and 70 cm), which is polyedric or sub-angular, loamy-sandy or loamy, moderately compact, slightly acid to neutral (pH = 6.8) and produces a moderate effervescence (which indicates a $CaCO_3$ content ≤ 4%). Last comes the CCa horizon (with carbonate accumulation), which extends between 70 and 110 cm. It is unstructured, loamy-sandy, moderately compact and neutral (pH of approximately 7), showing carbonate neoformations (small veins, filaments or stains) and producing a short and violent effervescence (sizzles), as a result of the very high $CaCO_3$ content (≥ 40%). Below the CCa horizon, at depths higher than 110 cm, it follows the calcareous gravel (producing effervescence) made up of pebbles (0.2-2 cm) and cobbles (2-20 cm).

a *b*

Fig. 2. Clayey chernozem, slightly rendzinic, developed on gravel

Profile number 2 was located on grassland (Fig. 3a, 3b), ± 160 m southwest of the bridge passing over the heating pipe ($44^0 55' 13$ N; $25^0 59' 34$ E). Morphological analyses showed that we were in the presence of a chernozem developed on gravel formations lying at medium to deep levels (Rp at 85 cm). Like its predecessor, this also proved to be a sub-rendzinic and calcium-rich soil. Judging by the presence of calcium carbonate, identified through the application of effervescence test, the soil proved to be calcareous starting from the depth of 45 cm. The soil species (defined by the soil texture and skeleton content of the two specific layers – the A horizon in the first 20 cm and the upper part of the AC horizon) is loamy or loamy-sandy, while skeleton content is ± 3%.

The soil profile begins with the Aț horizon (fallow horizon), slightly compact, which develops between 0 and 2 cm. It is followed by a very compact horizon (hardpan), as in the case of the previous profile. Deeper, is the mollic horizon (Am), the glomerular structure of which has also been deteriorated under the influence of agricultural works. Consequently, the present structure is grainy (medium and high).

a *b*

Fig. 3. Mesolithic and sub-rendzinic chernozems

The dark color of the mollic layer and of the underlying AC horizon (10YR 3/4 when dry and 10YR3/2 when wet), allowed us to include the soil in the Cernisols class, chernozems type. Am horizon has a loamy structure, is moderately compact and has a slightly acid pH (± 6.5). The organic carbon content is 1.86%, while the total humus content is 3.20%. Between 43 and 72 cm it is an AC transition horizon, dark-colored (with values of less than 3.5 in the wet state), at least in its upper part, with a grainy and a polyedric structure, a loamy or a loamy-sandy texture, moderate compaction and slight or neutral acidity (pH = 6.8), which produces moderate effervescence. The CCa horizon follows, lying between 73 and 85 cm. It is unstructured, loamy-sandy, moderately compact and neutral (pH around 7).

It displays neoformations, produces violent and short effervescence, and has a CaCO3 content ≥ 40%. Beyond 85 cm it is the realm of calcareous gravel made up of pebbles (0.2-2 cm) and cobbles (2-20 cm).

Profile number 3 was also located on grassland, ± 20 m south-southeast of the bridge passing over the heating pipe ($44^0 55' 18$ N; $25^0 59' 37$ E). It shows very similar features to profile number 2, as it is also a mesolithic chernozem (Rp is found at 80 cm) and a sub-rendzinic and calcium-rich soil. From the point of view of the presence of calcium carbonate, revealed by the effervescence test, it is a calcareous soil producing effervescence starting from the depth of 40 cm. Soil texture is loamy or loamy-sandy and the skeleton is around 3%. As shown previously, this soil contains calcareous gravel starting from a depth of about 80 cm.

Profile number 4 was located on grassland, ± 270 m west-northwest of Ploieşti West railway station, half distance between the heating pipe and the cobbled road running parallel to the railway. This soil shows a mollic grainy and loamy horizon (Am) followed in the first 25-30 cm by calcareous gravel. Such soils are presently described as rendzinas, whereas in older works they are called chernozems of "*branciog*" type (formed on alluvio-proluvial deposits with rounded gravel, usually calcareous, lying at small depths of 20 to 40 cm).

Profile 5 was performed on plowed field, ± 320 m west of the second expanding portion of the heating pipe lying south of the natural gas station ($44^0 54' 53$ N; $25^0 59' 37$ E). Morphological analyses showed that this soil was a clayey chernozem (because of the Bv horizon). Although the digging did not reach the calcareous gravel, its existence at the bottom of the soil profile is certain, as long as pebbles and cobbles (2-20 cm) were seen in the furrows. By correlating this situation with that encountered at profile number 1 we can conclude that calcareous gravel shows up at ± 150 cm. This suggests that the soil is on the limit between very deep (gravel occurs in the first 150 cm) and extremely deep soils, and also on the limit of the sub-rendzinic variety.

These features do not alter the previously mentioned general qualities of chernozemic soils. Textural species points at a loamy to loamy-clayey soil. In comparison with profile number 1 this soil produces effervescence when tested with HCl at depths between 101 and 117 cm, which makes it a bati-calcareous soil (moderately leached). Other differences are the absence of the fallow horizon (Aț) and the existence of a plowed horizon (Ap), approximately 20 cm thick, at the top of the soil surface.

The Ecologic Characteristics of Soils and Their Importance for the Planning of an Urban Park

Starting from the sub-types, varieties and textural soil species, the soils of Romania have been included in several ecological groups (Florea, 2003). The

criteria supporting this classification are the following: soil type and sub-type, soil texture (parent material), hydric and saline regimes, edaphic volume and weathering degree.

These criteria are mirrored not only by the composition of the soil profile, but also by its physical, chemical and biological properties. At the same time, this classification has an ameliorative importance as well, as it mirrors the land use and management techniques.

The ecological group of chernozemic soils includes the mesolithic and batilithic chernozems. On the whole, these are deep soils (excepting the mesolithic sub-type) with an array of favorable physical, physico-chemical and biological properties, which are given by the moderate clay content and the relatively high humus content (medium content of organic matter in the upper horizon: 2-4%). In addition, these soils have a stable grainy structure, good porosity, slightly acid reaction (sometimes even slightly alkaline), high base saturation (> 76%), good water-holding capacity, good aeration capacity and proper nutrient content. All these encourage an intense biological activity, which explains their good fertility. In the case of the moderately deep soils (with calcareous gravel between 76 and 100 cm), represented by the mesolithic chernozems, the properties mentioned previously are also good, but water-holding capacity is relatively low. Anyway, the presence of calcareous material on the bottom of the profile encourages both the exchange of the bases and the quality of the humus. The total drainage of chernozemic soils is good, for which they are not affected by pseudo-gleyzation. On the other hand, phreatic level is very deep and therefore gleyzation processes are also absent.

The shortcomings are connected to several factors. Thus, the climatic water deficit recorded during the dry periods is also experienced by the soil cover (hence the necessity of irrigations). Given the pluvial and thermal characteristics of the investigated territory, the thermal regime of the soil is *mesic* (mean annual temperatures are greater than or equal to 8^0C, but less than 15^0C), while the humidity one is *udic* (during the “normal” years, the moisture control section, which for the analyzed soils lies between 20 and 60 cm, stays wet for a cumulated period of 90 days). At the same time, during “normal” years the moisture control section gets completely dry for less than 45 days in a row in the four months that follow the summer solstice.

The use of these soils as arable lands has generated other negative consequences as well. One of them is the existence of hardpan horizon (the plowing foot). Often it lies in the first 6-7 cm of the soil profile and is very compact. The resistance to penetration tested with the Cole-Parmer portable penetrometer was 4.5 kg/cm^2, while the consistency assessed in dry state was very high (the soil could not be broken with bare hands). The negative consequences of these properties are the following: water percolation and aeration are difficult, water-holding capacity drops, aero-hydrical regime gets

worse, the resistance to penetration increases and hinders the development of root system, and the glomerular or grainy structure of the topsoil degrades over time. Moreover these problems have been further enhanced by the practice of overgrazing. The compacted horizon can be destroyed by appropriate agricultural works, meant to loosen the fallow horizon (Aț) of the pasturelands. On the other hand, agricultural works will also seek to remove the rounded gravel from the mollic horizon, which hinder them to a certain extent, although this generally accounts for less than 5%.

The group of soils with low edaphic volume (in which gravel lies at less than 50 cm deep or which usually contain more than 40% rock fragments/gravel) includes a dark, intrazonal soil called rendzina. The low edaphic volume explains the low water reserve and the low amounts of nutrients. Consequently, this soil has a low to moderate fertility, even though the mollic horizon is rich in good quality humus (alkaline mull), and the degree of base saturation is high (more than 76%).

From the standpoint of their bearing capacity, all these soils fall into the category of the mineral soils, physically mature, which can easily support the load of agricultural machinery.

The lands that are supposed to be turned into a municipal park lie at the contact between the silvosteppe and the forest belt. In the past, the area was covered by patches of forest made up of Pedunculate oak (*Quercus pedunculiflora*) and Pubescent oak (*Quercus pubescens*), which are less resistant to drought, oak (*Quercus robur*), Turkey oak (*Quercus cerris*), lime (*Tilia tomentosa*), Field Maple (*Acer campestre*), Field Elm (*Ulmus minor*) etc. At that time, the shrub layer was composed mostly of European Cornel (*Cornus mas*), Common Dogwood (*Cornus sanguinea*), Common hawthorn (*Crataegus monogyna*), Wild Private (*Ligustrum vulgare*), blackthorn (*Prunus spinosa*) etc.

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COMPARATIVE ANALYSIS OF THE SOIL EROSION IN HILL BASINS (SĂSĂUŞ AND MISLEA)

RALUCA ALEXANDRU*, GEORGIAN CĂTESCU, FLORINA GRECU, MARIUS PAISA

The present study focuses on soil surface erosion and applying the Universal Soil Loss Equation with GIS techniques of spatial analysis on an area of two river basins. The erosion and the processes associated with it are studied with the help of digital terrain data and the USLE and RUSLE models are successfully applied within the area. Soil surface erosion occurs when detachable soils on sufficiently steep slopes are exposed to overland flow and/or the impact of rainfall.

The Universal Soil Loss Equation (USLE) predicts the long term average annual rate of erosion on a field slope based on rainfall pattern, soil type, topography, crop system and management practices but does not however predict the soil loss resulting from gully erosion. Five major factors are used to calculate the soil loss for a given site. Each factor is the numerical estimation of a specific condition that affects the severity of soil erosion at a particular location.

Key words: *GIS techniques, soil erosion, Universal Soil Loss Equation, Săsăuş River Basin, Mislea River basin.*

Introduction

Addressing and combating soil erosion assessment dates from the third decade of the twentieth century as a reaction against the effects of grubbing and massive deforestation (Iowa State University, 1926). In Europe, only the Austrian and Swedish agriculture has contributed to increase fertility in soils affected by erosion, due to their protective measures, but afterwards entered into decline.

Over time several stages have been revealed in the research models based on physical soil erosion, which allow an adequate and a quantitative estimate, taking into account both erosion and deposition on a regional scale.

During the simple models stage, the obtained results were completed by developing the Universal Soil Loss Equation (USLE), with the contribution of: Cook M. (1936), Zingg M. (1940), Smith R. M. and Whitt (1947), Musgrave W. G. (1947) and Wischmeier W. H. (1955-1958-1972-1976).The development of

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USLE equation was based on a rich database which was statistically processed. Subsequently from USLE several equations were derived, such as: MUSLE, RUSLE etc.

The development stage of empiric mathematical and deterministic models ended up with the elaboration of the following models: RUSLE (1979) that revises the USLE model, ANSWERS (Beasley and others, 1980), EPIC (Williams J. R., 1985), MORGAN (1995), AGNS.

In the stage of deterministic type models, with a physics base, in which the predominance of empirical equations was limited, the following models were noticed: CREAMS (Knisel W. G. and others, 1980 and Foster, 1981), ROSE (1984), LISEM (1984), WEPP (Foster and Lane,1987; Flanagan D., 1991), LANE (1994), EUROSEM (Morgen and others, 1997), EGEM, EROSION-3D, GLEAMS, KINEROS2, MOSES, MWISED, PESERA, SERAE, STREAM, SWAT, WATEM, CAESAR, WILSIM, WATEM, NRCS, etc.

Since the results of the process models WEPP and EUROSEM, weren't always the best compared to USLE or RUSLE, the review and improvement of the existing physical models represent actual lines of interdisciplinary analysis and connecting to experimental data (Morgan and Nearing, 2000).

In Romania, systematic research regarding surface erosion, performed with drainage plots were initiated by Staicu Ir. (1945), followed by Moțoc M. (1956, 1963, 1973, 1979, 1998), Stănescu P. (1979), Ionescu V. (1981), Ene Al. (1987), Savu P. (1980-1985), Ioniță I. (1990-2000), Pujină D. (1991-1998), Popa N. (2000-2009) etc. Along with the standard plot-level experiments (Rădoane N., 1987; Ioniță I., 2000) researches were also carried out on slopes and hydrographical basins, yielding valuable results (Stanescu P., Drăgan Livia, 1970; Moțoc M., Munteanu S., Băloiu V., Stănescu P., Mihai Gh., 1975; R. J. Bally, 1977; Grecu Florina, 1980; Gaşpar., Untaru E., Roman F., Cristescu C., 1982; Băloiu V., Ionescu V., 1986; Munteanu, S.A., Traci, C., Clinciu, I., Lazăr, N., Untaru, E., Gologan, N., 1993; Pujină Liliana, Pujină D., 1991-1998; Grecu Florina, 1996; Clinciu, I., Lazăr, N., 1997; Rădoane, N., 2003) etc.

Important contributions were made by specialists of the National Institute of Meteorology and Hydrology (INMH), especially those related to production and sediment transport in small and large river basins (Diaconu, Stănescu, Roşca, Miță etc.). Deterministic models have been developed (P. Stanciu, Zlate I., 1985) and water balance modeling was performed in experimental pools (M. Adler, 1993).

Studied Areas

The study area focused on Săsăuş and Mislea hydrographic basins (*Fig. 1*). These basins have many similarities in morphology, despite their location in different morpho-structural units. Both basins have approximately the same area (~200km^2), same shape, and order 6 on the Horton-Strahler hierarchy system.

Both basins have a dendritic structure, as evidenced by the existence of tributaries that flow the same direction with the main river; the confluence angles usually less than 90^0 (Coteț P., 1951).

Săsăuş morpho-hydrographic basin is located within the Romanian territory, and lies at the junction of the Hârtibaciu Plateau with the Făgăraş Depression, in the Transylvanian Depression, framed by the geographical coordinates 24°49'23" and 24°32'14" eastern longitude and 45°56'51" and 45°47'54" northern latitude (*Fig. 2*). Săsăuş basin is found in the southern part of Hârtibaciu Plateau, a clearly defined entity and delimited space in the geographical center of Romania. From a morpho-hydrographical point of view, Săsăuş River falls within Pârâul Nou river basin, a direct tributary to Olt River. The total length of the river Săsauş is 27 km, which drains a surface of 85 km^2 from the total study area of 232,21 km^2. The basin is bordered in the north, northwest and west by Hârtibaciu river basin, in the east by Cincu river basin and in the south by Olt river basin. In geological terms the basin area overlaps a Neogene sedimentary package belonging to Sarmatian and Badenian, uncemented rocks (sands and gravels) or weakly cemented rocks (friable sandstone, thin horizons of conglomerates, clays and marls).

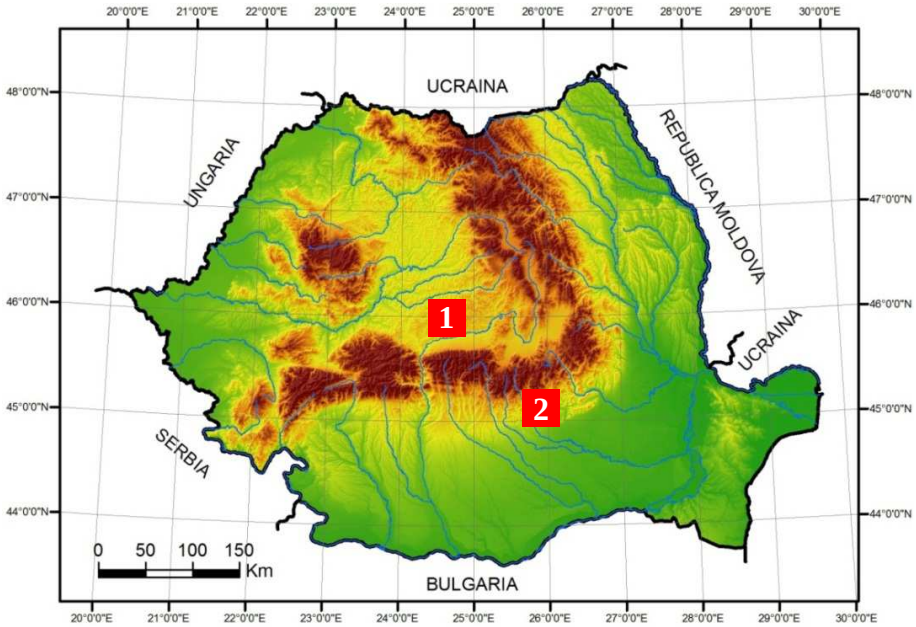

Fig. 1. Geographic location of Săsăuş (1) and Mislea (2) river basins within Romania

Mislea morpho-hydrographic basin is located in the south-eastern part of Romania, at the contact of the Curvature Sub-Carpathians with the Romanian Plain, framed by the geographical coordinates 45°11'25" and 45°03'12" northern latitude, 25°46'19" and 25°59'48" eastern longitude (*Fig. 3*).

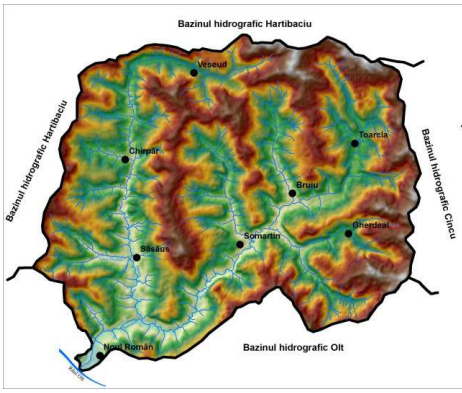

Fig. 2. Săsăuş hydrographic basin, hypsometric map

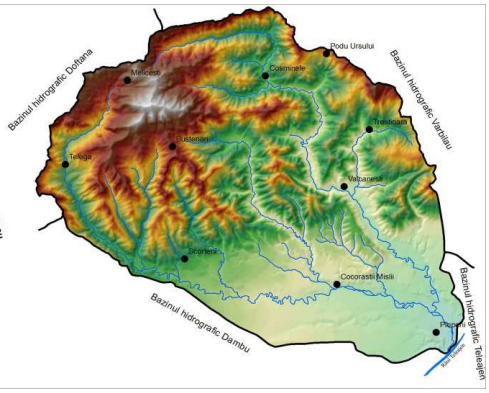

Fig. 3. Misela hydrographic basin, hypsometric map

The basin has a total area of 175 km^2 and is a part of Teleajen river basin. It is bordered in the north and east side by Vărbilău river basin, by Doftana basin in the east and Dâmbu basin in the south. From a geological point of view, Mislea basin overlaps the following structural units: Carpathian Molasses, consisting of sandstones, marls, clays, marl-limestone of Mio-Pliocene age and Tarcău nappe consisting of Oligocene and Eocene age formations (sandstones, shales, marls, breccias).

Techniques and Methods

Ability to erosion of an area broadly depends on two important factors: a) heavy erosivity b) soil erodibility. Currently, the research conducted by INCPA Bucharest (simulation models of water balance in soil, soil loss forecasting models for agricultural use by erosion and landslides) and also the Research and Development Center for Combating Soil Erosion in Perieni – Vaslui County, will improve the ROMSEM model (Romania Soil Erosion Model).

Table 1

Soil Erosion Models Developed in GIS (after Capolongo, Piccaretta, 2007 – with Additions)

USLE *(Universal Soil Loss Equation)*	Wischmeier and Smith, 1965
ROMSEM (Romanian Soil Erosion Model)	Moțoc and others, 1979
CREAMS (Chemicals, Runoff and Erosion from Agricultural Management Systems)	Knisel, 1980
EPIC (Erosion-Productivity Impact Calculator)	Williams, 1985
AGNPS (Agricultural Non-Point Source Pollution Model)	Young and others, 1989
WEPP (Water Erosion Prediction Project)	Nearing and others, 1989
KINEROS (Kinematic Runoff and Erosion Model)	Woolhiser and others, 1990
EROSION 3D	Schmidt, 1991, 1996
LISEM (Limburg Soil Erosion Model)	De Roo and others, 1996
USPED (Unit Stream Power Erosion Deposition)	Mitasova and others, 1996
RUSLE (*Revised Universal Soil Loss Equation)*	Renard and others, 1997
EUROSEM (European Soil Erosion Model)	Morgan and others, 1998
PESERA (Pan-European Soil Erosion Risk Assessment Project)	Gobin and others, 1999
SWAT (Soil and Water Assessment Tool)	Neitsch and others, 2001

For the development of the soil erosion model, topographic maps at 1:25.000 scale (1980 edition), the Romanian Soil Map at scale 1:200.000 and the Corine Land Cover data set from 2006 were used. For the study area these coefficients were calculated at pixel level, for the 20m resolution model. Implementation scheme of the equation is shown in *Fig. 4*.

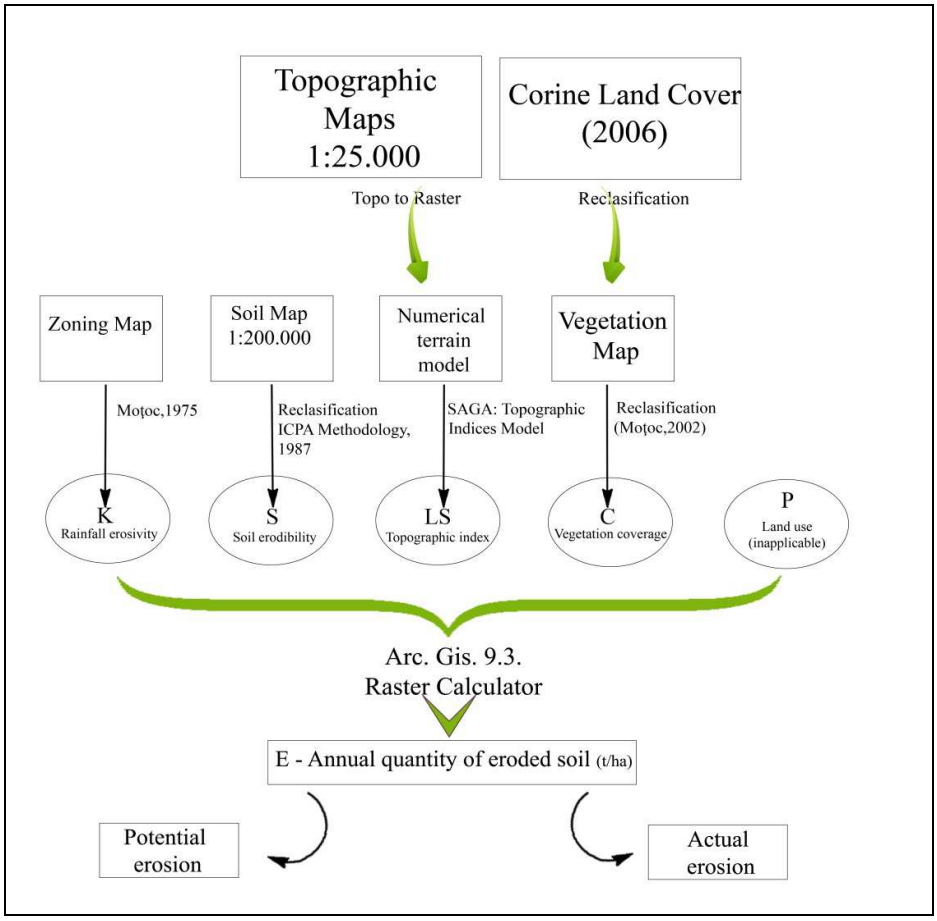

Fig. 4. The elaboration scheme of the erosion model explaining GIS methods (Alexandru, Cătescu, 2012)

Adapting the Universal Soil Loss Equation (USLE) to the specific Romanian conditions, was first attempted by Mircea Moţoc and collaborators in the year 1975. Based on the general equation for assessing potential soil erosion, $Ep = A \cdot L\alpha \cdot I\beta$ (corresponds to the situation when the soil isn't covered with vegetation and anti-soil erosion measures are not taken). Mircea Moţoc developed the actual erosion equation based on the formula presented above, which combines the influence of the slope length (L calculated in meters), slope steepness (I calculated in %) and soil properties in a single parameter:

$$E = K \cdot L^m \cdot I^n \cdot S \cdot C \cdot C_s ,$$

where: *E* = average annual actual erosion rate(t/ha/year);
K = correction coefficient for rainfall erosivity = 100 Eps • Ap / $L^{0,5} \cdot I^{1,45}$ (erosion of the standard erosion control plots);
Ap = pluvial aggressiveness = $e^{I15} \cdot H^{0,5}$;
L and *I* = length (m) and slope steepness (%);
S = correction coefficient for soil erodibility;
C = correction coefficient for crops effect;
Cs = correction coefficient for the effect of erosion control measurements; m = 0,3; $I^n = 1,36 + 0,97i + 0,381i^2$, where "i" is the average slope.

Rainfall Erosivity (K)

Rainfall erosivity represents the annual sum of the products between the energy of the erosive rainfalls (E) and their maximum 30 minutes intensities:

$$K = \sum_{i=1}^{n} E_i \cdot I30_i$$

where: E_i = the kinetic energy of every rainfall with a duration over 30 minutes during a year (MJ/ha);
$I30_i$ = the maximum intensity of the 30 minute rainfall (mm/h).

For the studied area, the K factor value was taken from the rainfall erosivity zoning map of Romania (Moțoc and others, 1975). This value ranges from 0.12 for the Depression of Transylvania, 0.16 for the Meridional Carpahtians, 0.14 for the Curvature Subcarpathians and 0.13 for the Romanian Plain.

Soil erodibility (S)

This factor was obtained starting from the soil map, taking into account the texture of every soil type, and following the reclassification proposed by ICPA (1987).

In the studied areas, soils fall under four classes of erodibility (*Fig. 5*):

- Erodibility class 1 is the most susceptible to erosion and includes: eroded soils, brown eu-mezobasic soils with sandy-clay texture, clay-loamy and clay textures. Within the Mislea river basin, this class is found especially on the slopes of Mislea, Lupăria, Telega and Cosmina valleys and in the Săsăuş river basin on the slopes of Valea Lungă, Valea Ilimbav, Valea Vizina, Gherdeal and Pârâul Nou Valleys.

• Erodibility class 0,80 is characteristic for brown acid soils with sandy-clay texture and its present only within Mislea River basin on the Măceşu – Plaiul Rotund interfluve.

• Erodibility class 0,70 is representative for reddish-brown luvic soils, clay-illuvial brown soils, black clinohidromorfic soils, pseudorendzines, brown eu-mezobasic soils, brown luvic soils with clayish texture, sandy-clay and clay textures. This type of class is present in both river basins, especially on the slopes of the following valleys: Cosmina, Doftăneț, Poiana Trestiei, Gherdeal, Valea Caprelor, Valea lui Trifan, Veseud.

• Erodibility class 0,60 is the class with the lowest tendency to erosion and includes alluvial soils, brown luvic, alluvial protosoils, albic luvisols, with loam-sandy and loamy texture. These soils are developing on the terraces and floodplains of the Mislea, Cosmina, Săsăuş, Şomartin and Pârâul Nou valleys.

The length (L) and slope steepness (I)

These factors were considered as a single factor ***(LS)*** based on the numerical altitude model, to help simplify the analysis in GIS. LS factor causes the influence of the relief on soil erosion and consists in determining the length (L) and slope steepness (S). For the studied areas, this factor was calculated based on the numerical model at a resolution of 20m altitude, applying the Topographic Indices function in SAGA GIS program (Moore, 2003). This factor estimates the highest values up to 400 and correspondes to the areas with the highest tendency to erosion. The highest values of this indicator are found along river thalwegs, ranging between 200 and 400 with the lowest values found on the interfluves, terraces and floodplains (*Fig. 6*).

The vegetation factor (C)

For the studied areas, the C factor was determined from Corine Land Cover data set (2006) which, after the reclassification, resulted in a number of five classes of vegetation: orchards; pastures, hayfields, grasslands; built area; arable land and forests *(Table 2).*

The corresponding values for factor C, were taken after Moțoc M. (1975), assigned to each class of vegetation and processed in GIS, which led to creating the distribution map of the C factor.

From the analysis of the two maps (*Fig. 7*), it results that the highest value of 0.50 is assigned to orchards, the value of 0.45 corresponds to arable land with a higher proportion in Mislea basin, the value of 0.30 corresponds to pastures, hayfields and grasslands with a higher proportion found in Săsăuş basin, 0.20 value represents the forests and the 0.02 value is attributed to the built perimeter.

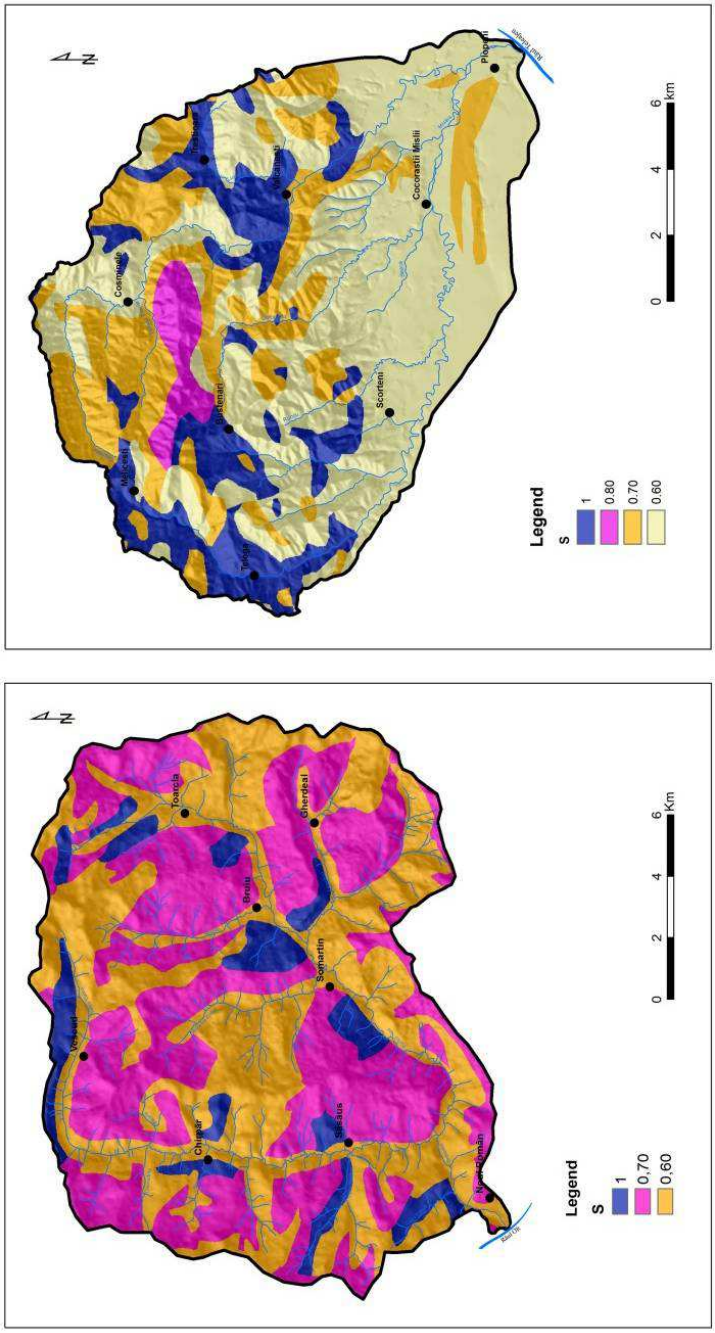

Fig. 5. The distribution of the soil erodibility Factor (S) within Săsăuș and Mislea river basins

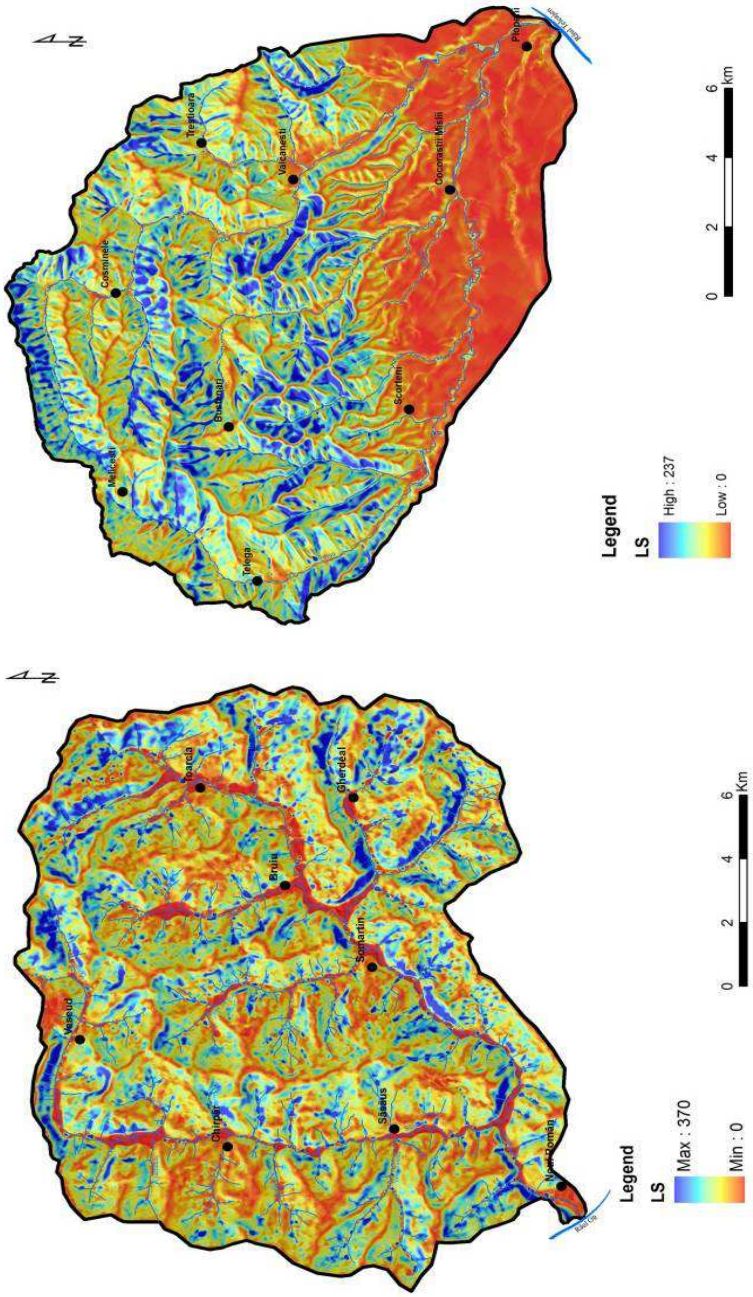

Fig. 6. The distribution of the length and slope steepness Factor (LS) within Săsăuș and Mislea river basins

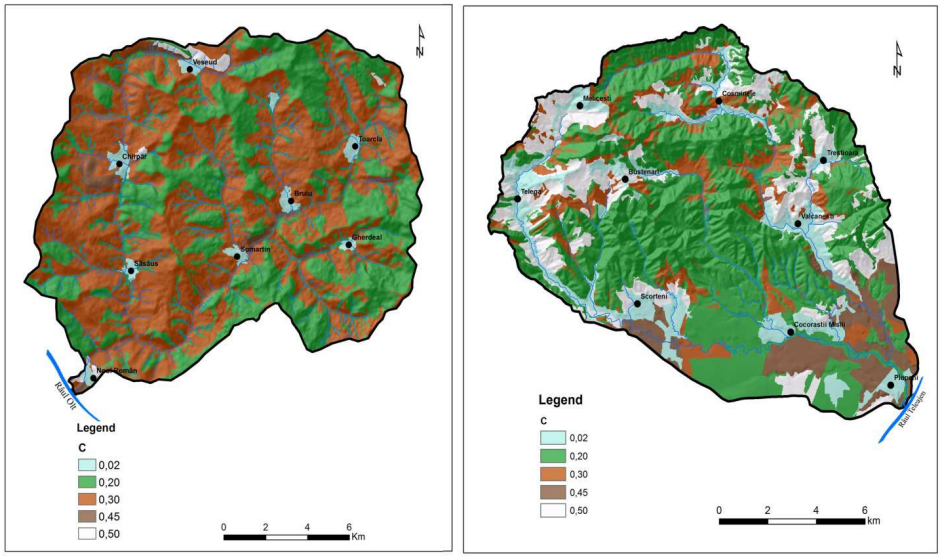

Fig. 7. The distribution of the vegetation coverage Factor (C) within Săsăuş and Mislea River basins

The Correction Coefficient for the Effect of Erosion Control Measurements (P/Cs)

This factor was not considered due to limited applicability and lack of data.

Results and Discussions

Maps of actual and potential erosion (*Fig. 8* and *Fig. 9*) resulted from the combination of rasters corresponding factors K, LS, S and C, respectively K, LS and S factors. From the analysis of the obtained maps the following observations emerged: the actual erosion model estimates an annual quantity of eroded soil ranging from 0 to 8.4 t/ha/year (Săsăuş Basin), and 0 to 13.5 t/ha/year (Mislea Basin). Most of Săsăuş Basin falls within the ranges of 0-1 t/ha/year, while the share of Mislea Basin erosion is given by the intervals 0-2 t/ha/year. The lowest erosion values (0-1 t/ha/an) can be found particularly in areas covered with forests and along the main river valleys of Săsăuş and Pârâul Nou.

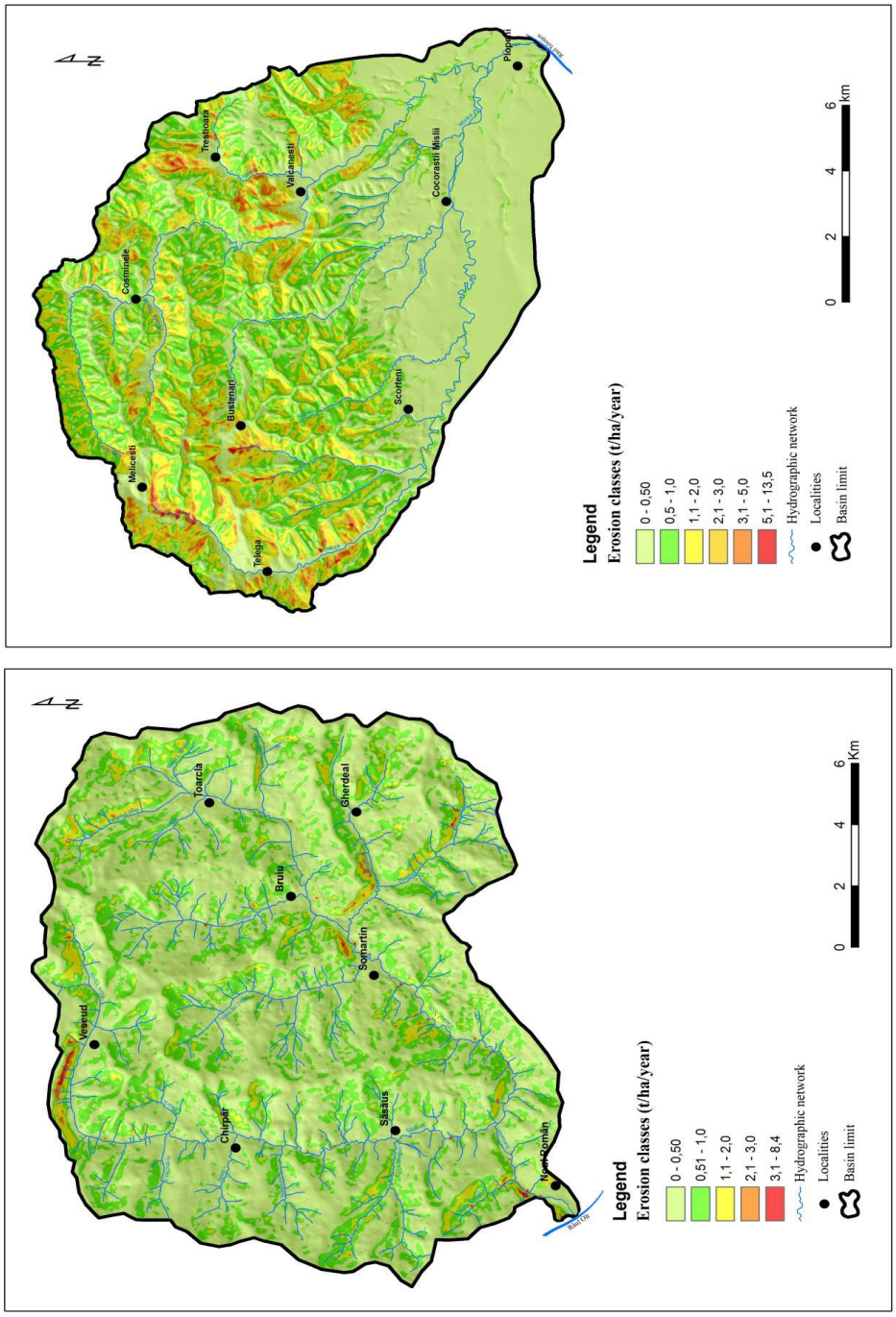

Fig. 8. Actual Erosion within Săsăuş and Mislea River Basins

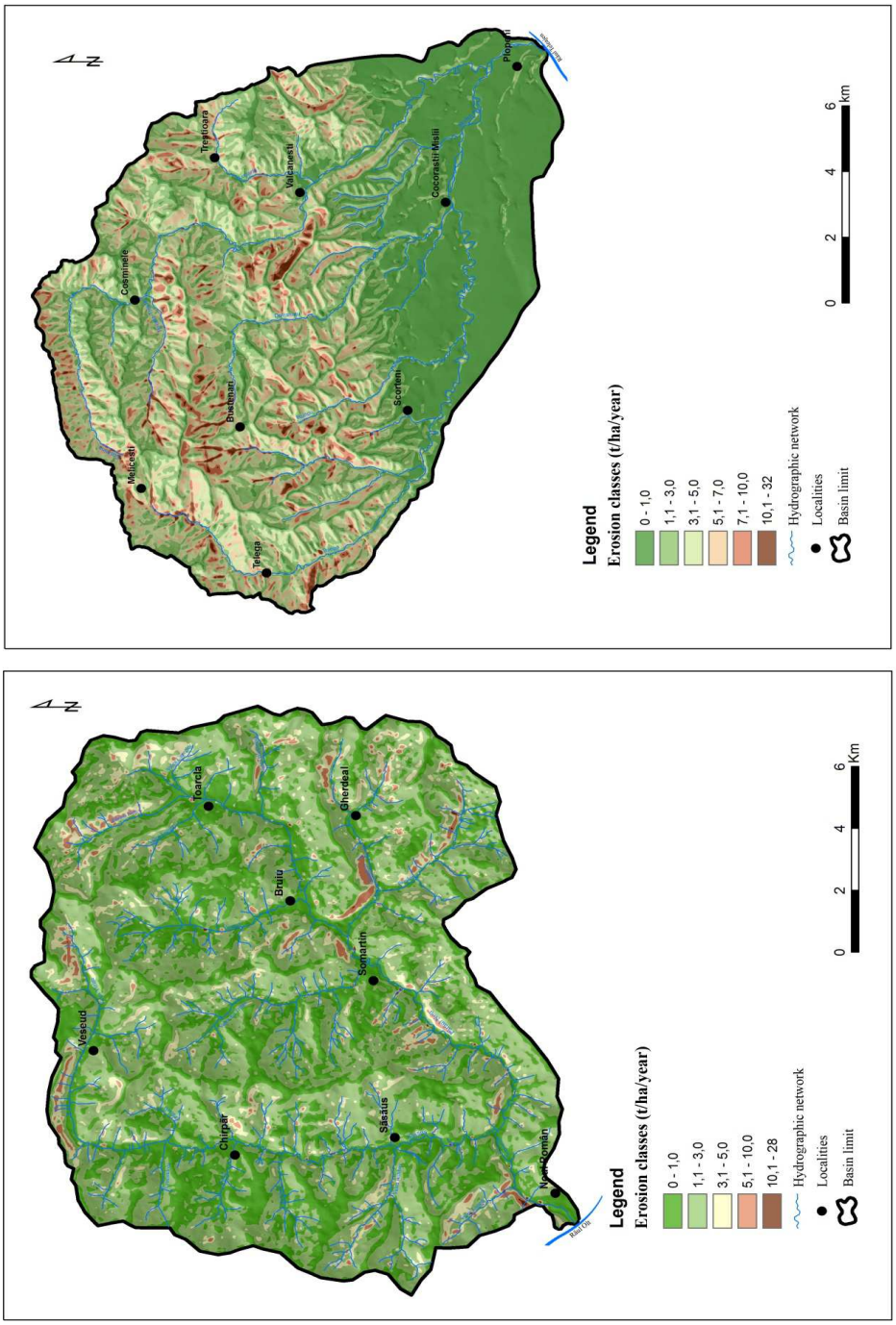

Fig. 9. Potential Erosion within Săsăuş and Mislea River Basins

Regarding Mislea Basin, the lowest values have a significant predominance in its southern region and along Mislea, Seaca Cosmina and Doftănețu Valleys.

Within both basins the following differences are noticed: the highest values of actual erosion within Mislea Basin correspond to torrential river basins with steep slopes and on the slopes of Cosmina and Telega valleys. Meanwhile, within Săsăuş basin, the highest values are distributed in compact areas in the southern part of the basin, along the Pârâul Nou, Valea Lungă, Gherdeal Valleys and in the northern region of Vizina Valley.

The highest values of the erosion correspond to the surfaces occupied by herbaceous vegetation (pastures, hayfields, grasslands) and orchards, overlapped on beds of clay, sandy-argillaceous texture soils and on very steep slopes. Following a scenario of potential erosion, where the vegetation factor (C) was removed, erosion values have resulted within the ranges of 0-28 t/ha/year for Săsăuş basin and 0-32 t/ha/year for Mislea basin. The lowest values generally correspond to those obtained in the case of actual erosion in both basins.

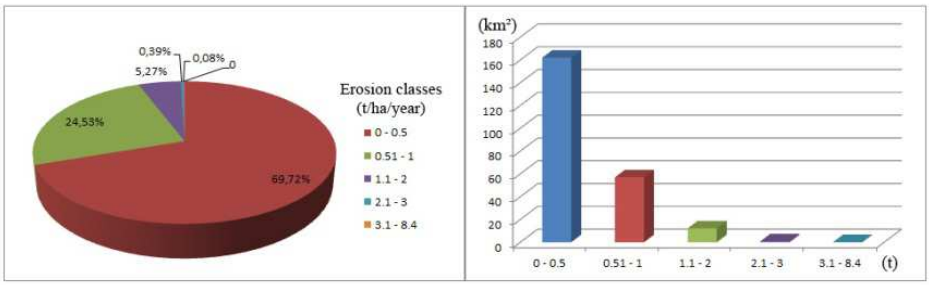

Fig. 10. The Cyclogram and Histogram of the Actual Erosion within Săsăuş River Basin

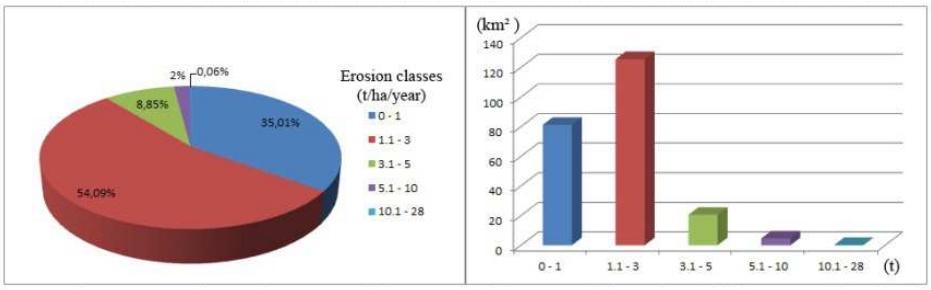

Fig. 11. The Cyclogram and Histogram of the Potential Erosion within Săsăuş River Basin

In the Săsăuş river basin, the highest values are found in areas consistent with those of the actual erosion, obviously with almost a triple amount compared to the initial value (Valea Lungă, Pandea, Gherdeal, Pârâul Nou, Valea Vizina between 3-28 t/ha/year). Mislea hydrographical basin has a higher degree of

potential erosion compared to Săsăuş, with 32 t/ha/year as a maximum value. The highest values can be found in the whole northern half of the basin, focusing on the slopes of Telega, Runcu, Doftănețu, Poiana Trestia and Lupăria. Considering the classification of ICPA for susceptibility classes it is noticed that following the correlation with the amount of eroded soil, Săsăuş river basin falls within the classes <1 t/ha/year and 1-8 t/ha/year, with a small or sometimes absent susceptibility to erosion.

Regarding Mislea basin, the situation is similar, but due to a higher amount of eroded soil (up to 13.5 t/ha/year), we also take into account a moderate susceptibility class (8-16 t/ha/year). Thus, for both basins one cannot speak of increased erosion, as its maximum values do not exceed 8 and 13.5 t/ha/year, so the development of a susceptibility map is not relevant.

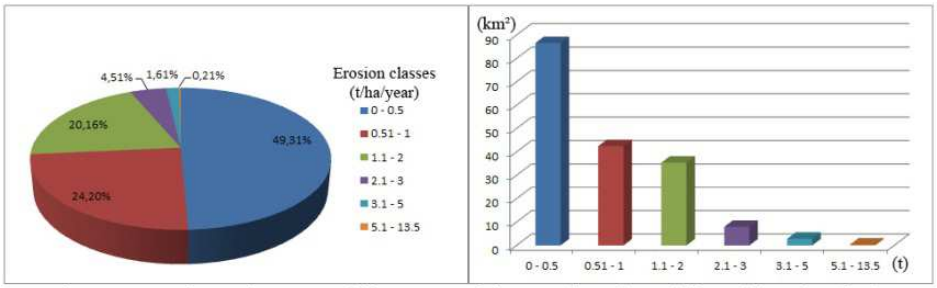

Fig. 12. The Cyclogram and Histogram of the Actual Erosion within Mislea River Basin

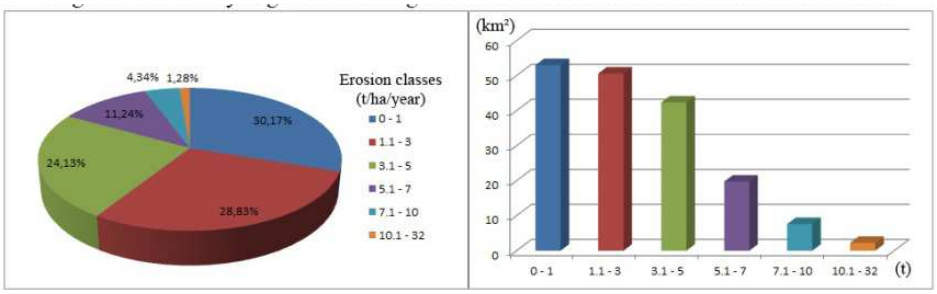

Fig. 13. The Cyclogram and Histogram of the Potential Erosion within Mislea River Basin

Conclusions

The method used was successfully applied, reflecting the reality on the field. This allows the assessment of the degree of surface erosion within the two analyzed basins and the design of protective measures for areas affected by high

erosion. After the analysis of the two basins the average of the surface erosion per year which resulted is of 0.6 t/ha.

This result concludes that the basins under study do not fit within a high risk erosion situation. Taking into account different scenarios for the level of vegetation coverage or land use, we can assess the effects of erosion on the landscape and propose strategies to combat erosion. Through the use of GIS techniques in this study, erosion is highlighted by obtaining maps of actual and potential erosion. Regarding these possibilities, we can carry out monitoring and maintenance on the slopes soil quality, which would allow for appropriate protection measures to be taken.

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L'URBANISATION D'UNE VILLE OASIENNE « BOUSSAÂDA » FACE AUX RISQUES D'INONDATIONS ET D'ENSABLEMENT

HADJAB MAKHLOUFI*, KHALFALLAH BOUDJEMAA, REDJEM ALI

L'un des problèmes engendrés par l'urbanisation galopante en Algérie, et à Boussaâda en particulier, est celui lié à la production du sol urbain. L'une des caractéristiques majeures de la ville de Boussaâda est sa croissance. Celle-ci peut être évaluée au regard de sa population. Mais, sans doute, c'est la configuration géographique qui impose cette expansion spatiale de cette ville. L'urbanisation anarchique et accrue depuis 1974, n'a pas tenu compte des contraintes naturelles qui commandent l'extension urbaine et rendent la ville de Boussaâda dans des situations vulnérables. Le risque est insuffisamment pris en compte faute de connaissance, mais plus encore à cause du coût du foncier ce qui permet aux populations les plus démunies de s'installer dans les espaces délaissées. C'est le cas des versants arides, des rives et des lits d'oueds et des zones d'ensablement. D'une façon générale, la mise de côté des contraintes naturelles et du risque par les politiques d'aménagement sont les facteurs essentiels de vulnérabilité. Cependant, les obligations d'aménagements sont à peine respectées, compte tenu des pratiques urbaines. Cette contribution analyse les problèmes liés à l'occupation anarchique des sols, ainsi que les risques qui en découlent et quelles sont les conséquences sur cet espace présaharien très fragile. Nous allons chercher la réponse à cette question à travers l'étude de la ville de Boussaâda.

Mots clés : *ville, géographie du site, contraintes, extension anarchique, risques et conséquences.*

Introduction

Les risques et les catastrophes sont d'actualité. En fait, le risque se définit comme la perception d'un danger par un groupe social ou un individu. À cet effet, il faut distinguer le cas des risques naturels de l'aléa, autrement dit du processus physique. Il peut s'agir de l'aléa climatique : fortes précipitations ou sécheresse accusée dans notre cas. Les fortes précipitations concentrées dans le temps sont à l'origine d'inondations, la sécheresse, suivie des vents forts et dominants agissant efficacement sur les sols fragiles et dénudés (désertification, ensablement). Les aléas se définissent par leur fréquence et leur intensité. La gestion du risque jusqu'à nos jours pour réduire l'impact de l'aléa est abordée par des solutions techniques. L'accent doit être mis sur la vulnérabilité, une autre composante du risque. Dans notre cas, les facteurs administratifs et politiques peuvent être aussi des aspects de vulnérabilité: par exemple, le

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manque de coordination entre les acteurs pour gérer le risque ou la crise, l'absence du programme de prévention ou une législation laxiste et mal appliquée. On prend conscience que lorsque le risque s'installe (inondation – Bâb el oued, séisme – Boumerdés… etc.).

Historique de la ville de Boussaâda

L'étymologie du mot « Boussaâda » veut dire cité du bonheur (*saada* en arabe). Sa position de nœud routier a contribué à la promotion de l'oasis. Mais l'histoire de la cité nous montre que sa fondation est liée à l'eau, à l'agriculture et à la croyance. Dans le cas de Boussaâda, l'hydraulique et la culture y étaient solidaires. À partir de là, l'oasis se développa. L'excellente position géographique de Boussaâda a permis au site depuis toujours de se présenter comme un relais routier important entre le Tell et le Sahara (*Fig. 1*).

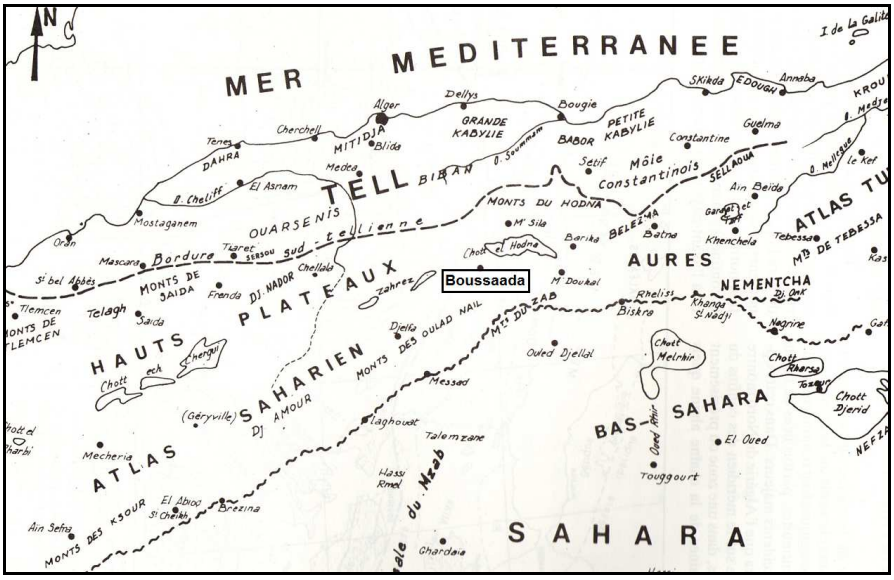

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Fig. 1. Localisation de Boussaâda dans l'ensemble géomorphologique du Nord de l'Algérie

Le cadre géologique

Les travaux suivants ont été consultés : Estorges (1959, 1961, 1965), Emberger (1960), Mahrour (1965) et Pouget (1979). La zone concernée est constituée de roches sédimentaires du Secondaire, Tertiaire et Quaternaire. Le

substratum géologique, outre son importance comme matériau originel des sols (roches mères), joue un rôle déterminant dans le façonnement des paysages (géomorphologie). Il est donc essentiel de préciser les principales unités stratigraphiques et surtout lithologiques.

Depuis le début du secondaire jusqu'aux formations continentales plio-quaternaire, on trouve les ensembles stratigraphiques classiques :

– Le Trias apparaît toujours sous le faciès classique de l'Afrique du Nord, en pointement diapiriques ou en injection dans les cassures (région Ain rich et Djelfa). Il présente le faciès habituel, argiles rouges, plus ou moins gypseuses, associés au gypse massif, sel et gypse. Telles sont les caractéristiques majeures du trias. La modestie de son affleurement ne doit pas sous-estimer son importance, comme source de sels solubles, que les eaux de ruissellement et les oueds se chargent de véhiculer ; on les trouve dans les sols et les eaux de la nappe phréatique, en aval. Mais, au point de vue structural (SL), la zone de Boussaâda fait partie de l'Atlas saharien et occupe la partie nord-orientale des monts des Ouleds nail (SS). La ville de Boussaâda est coincée entre le Djebel Kerdada et le Djebel Azzedine. La phase orogénique Maestrichtienne a contribué à la surrection générale de l'atlas saharien et les phases survenues au cours du tertiaire vont plisser ses formations jeunes et seront fortement érodées ; le matériel arraché va combler les creux intra montagnard et la plaine du R'mel de Boussaâda jusqu'à M'doukal. Au quaternaire, on assiste à une aridification du climat. L'alternance des pluviaux et inter-pluviaux va contribuer à la formation de croûte et encroûtement calcaire, avec en même temps la couverture de ces glacis par des masses sableuses, dont la dynamique éolienne est active à ce jour. Les unités lithologiques sont dans l'ensemble représentées par l'alternance de séries calco-dolomitiques, calcaires, marnes et calcaro-argileuses, grés et gréso-argileuses, datées jurassico-crétacé (*Fig. 2*).

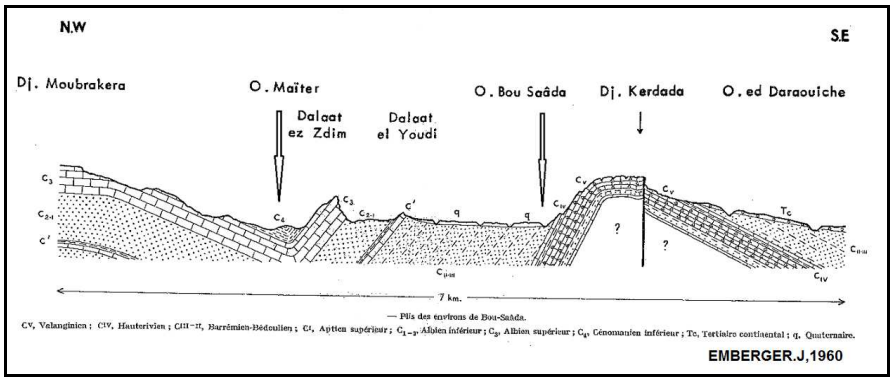

Fig. 2. Coupe géologique de la zone de Boussaâda

Dans tout l'atlas saharien, y compris la zone de Boussaâda, et après l'émersion définitive de l'atlas, débutera le cycle continental (tertiaire). Durant toute cette période, les sédiments secondaires ont été énergiquement plissés, puis ont subi l'action d'une érosion intense qui se poursuit sans discontinuité jusqu'à nos jours (alluvionnements récents). Cette action s'est traduit par une pénéplanation des reliefs avec corrélativement, l'accumulation de puissants dépôts d'origine détritique, tant à l'intérieure qu'a la périphérie des massifs (Emberger J, 1960). Nous sommes donc en face d'un schéma classique connu d'érosion sédimentation. Les épaisseurs des dépôts de piémont croissent avec la distance jusqu'au centre du relief érodé. Nous entendons par alluvionnement récent l'ensemble des dépôts après le Tertiaire continental ; se sont des nappes alluviales et cônes de déjection. Dans cet ensemble, l'oasis de Boussaâda se trouve ainsi enserrée entre deux chaines montagneuses et forme un couloir. L'aire comprise dans un rayon de 10 Km autour de Boussaâda comprend : au nord, le Djebel El Bateun, au pied duquel se trouve la nouvelle agglomération de Boussaâda ; au sud, séparée par l'oued, la ville s'appuie sur le Djebel Kerdada ; de l'est à l'ouest, les champs de dunes au nord de la ville, alignés perpendiculairement à l'oued Boussaâda qui causent l'ensablement d'une bonne partie de la ville.

Un climat capricieux et subdésertique

De prime abord, l'oasis de Boussaâda présente des constantes climatiques véritables, onze mois sur douze. Cette impression est trompeuse car Boussaâda jouit d'un climat d'ensemble du Hodna. Boussaâda est caractérisé par un climat continental méditerranéen. Les précipitations hivernales, printaniéres et automnales sont rares et irrégulières. L'été accuse un déficit pluviométrique, la moyenne étant de 237 mm par an. Si cette quantité est bien repartie elle est bénéfique tant aux hommes et aux animaux. Mais la zone du R'mel reçoit moins de 150 mm par an. Les pluies orageuses ne sont pas rares au courant de l'année et peuvent avoir lieu durant les mois de mars-avril/septembre-octobre-novembre et entrainer des crues impressionnantes de l'oued Boussaâda et Maitar, causant des inondations catastrophiques (Hadjab M., 1998). Celles-ci charrient tout sur leur passage (constructions, routes, ponts, champs, etc.). Certaines crues sont restées gravées dans la mémoire des populations. L'historique des inondations indique que certaines averses orageuses sont restées tracées dans les mémoires des boussaadiens. Le 21 septembre 1945 il a plu sans interruption pendant trois heures (28 mm), le 22 mars 1946 un orage de 24 heures a permis d'enregistrer 45,5 mm d'eau, en 1957 le 26 mai un déluge amenait en une heure 27,1 mm, alors que le 15 juin 1959, 45 mm s'abattait sur Boussaâda provoquant de graves inondations (Khallef.B, 2009). Les inondations

de 2007 ont causé des dégâts importants (destruction de deux ponts isolant des habitants à l'aval de Boussaâda et des pertes humaines). Les fortes pluies orageuses enregistrées le 21 septembre 2007 ont causé la mort de dix personnes dans la zone de Boussaâda. Les violents orages accompagnés de pluies torrentielles ont provoqué d'importants dégâts matériels, notamment l'effondrement de deux ponts, l'un sur l'oued Maitar et l'autre sur l'oued Maarif. D'importants axes routiers ont aussi été fermés à la circulation. Ils ont provoqué un véritable drame dans la mesure où dix personnes ont trouvé la mort. En effet, dans la commune de Slim, située à 60 km au sud de Boussaâda, les crues d'Oued Mesrane traversant la localité de Sekrane ont emporté un véhicule de marque 404 Peugeot à bord duquel se trouvaient 3 femmes, 2 enfants âgés de 3 et 4 ans et un adolescent de 16 ans. Le second drame a eu lieu dans la commune de Maarif, à une distance de 20 km au Nord de Boussaâda où un véhicule fut balayé par les crues dévastatrices de l'oued qui porte le nom de la dite commune. (*Tableau 1*).

Tableau 1

Les dégâts causés par les crues des oueds de la zone sud du Hodna (le 21 septembre 2007)

Localisation	Dégâts humains	Dégâts matériels
Boussaâda	5 morts	71 maisons détruites 310 familles sinistrées
Maitar	7 morts	5 maisons détruites 26 familles sinistrées 02 ponts détruits
Houamed	00	30 maisons détruites 47 familles sinistrées

Malgré l'historique des inondations et les dégâts actuels, les règles d'urbanisme ne sont pas prises en considération dans les instruments de l'aménagement et de l'urbanisme. Ces instruments imposent le respect des servitudes et leur inscription au sol, l'interdiction et/ou les conditions d'occupation. Mais la crue seule peut transformer l'oued paisible en une rivière déchainée. Cette situation est bien appréhendée par les populations, en s'appuyant sur le savoir faire local. Comme on le constate sur le terrain, les deux berges de l'oued au niveau de la ville sont occupées par les jardins de palmiers. Cette occupation a un double but : la garantie de l'eau d'irrigation et la protection de la ville traditionnelle (Ksar) des inondations. C'est la logique même de l'aménagement grâce au savoir faire local qui doit être pris en considération dans les études de l'aménagement des centres urbains. Or, depuis 1990 on assiste à une occupation anarchique de l'espace urbain par l'habitat illicite et non conforme aux règles de l'urbanisme (non respect des servitudes, zones à risques et zone dunaire) – *Fig. 3* et *Fig. 4.*

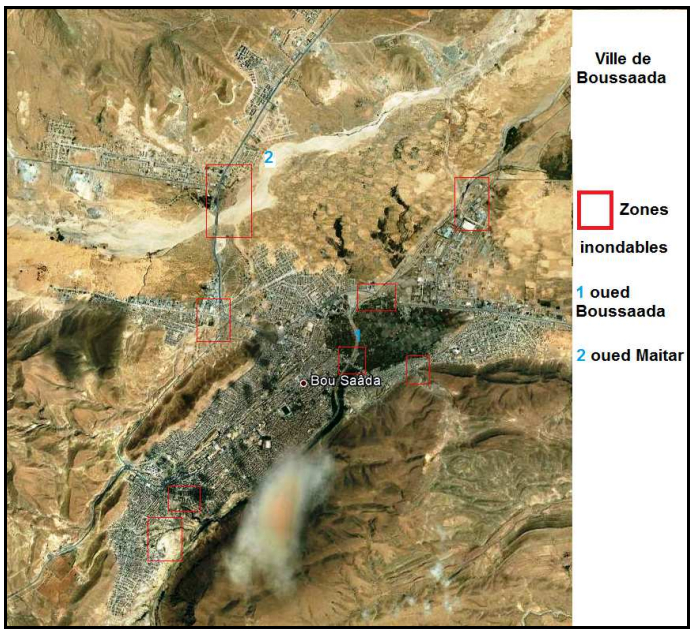

Fig. 3. Les zones à risques d'inondation à Boussaâda

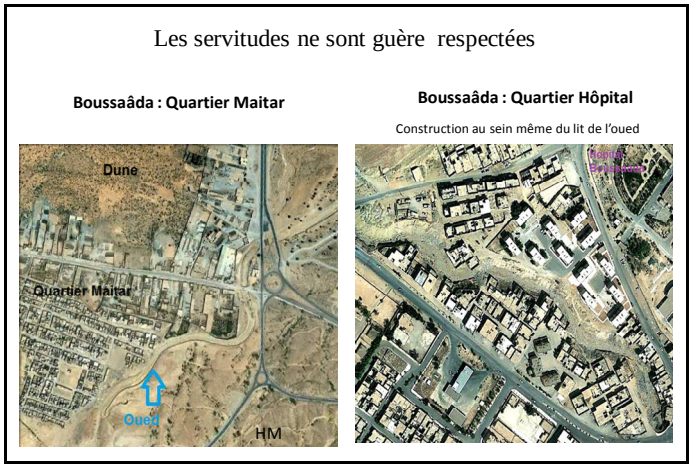

Fig. 4. Servitudes non respectées

L'urbanisation récente et les risques

L'urbanisation récente est liée aux politiques de développement depuis les années 1970, préconisées par les pouvoirs publics et cela grâce à la promotion de la ville de M'sila au rang de wilaya. Boussaâda a été rattaché et se classe

comme un deuxième centre important. D'ailleurs, la photo aérienne de 1972 et la carte topographique de 2004 montre parfaitement le sens de l'extension urbaine et la densité urbaine et même l'occupation du sol (*Fig. 5*).

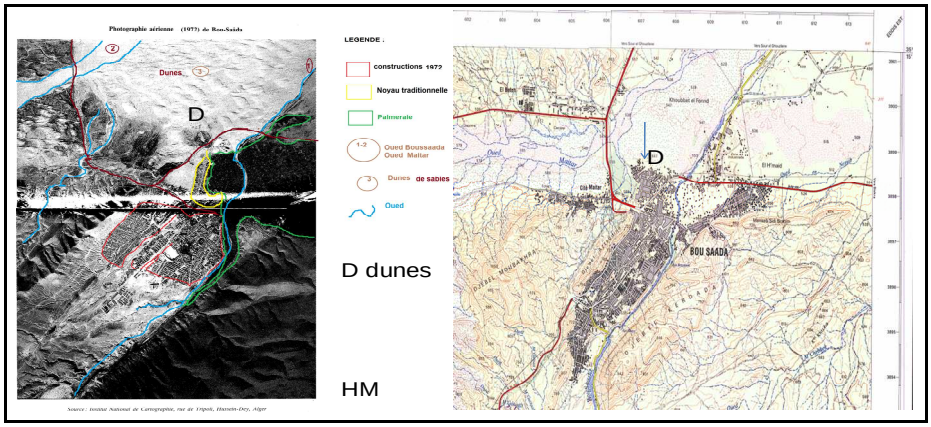

Fig. 5. Extension urbaine démesurée à proximité des rives de l'oued Boussaâda et Maitar et sur la zone dunaire (2004)

Les versants abrupts du Djebel Azzedine et même les talwegs ne sont pas épargnés. La progression de l'occupation de l'espace est mise en exergue par le schéma ci-dessous ; mais, ce qui est important de noter est que les lieux les plus vulnérables à l'inondation, à l'éboulement de blocs et à l'ensablement sont occupés par l'habitat illicite et les populations pauvres. Face à ces risques, les mesures de prévention et de protection ne sont pas encore rigoureuses, d'autant plus que les décideurs sont confrontés aux problèmes complexes d'une croissance urbaine et d'une évolution très rapide de la population (*Tableau 2*).

Tableau 2

Évolution de la population de Boussaâda, au cours des différents recensements généraux de la population et de l'habitat (RGPH)

Année	1966	1967	1987	1998	2008
RGPH	26021	50369	69620	102245	133589
Densité H/KM2	105	203	281	412	538

Source : DPAT – M'sila (2009)

Contrairement, l'habitat planifié occupe les meilleurs sites protégés et renferment la population la plus aisée de Boussaâda. L'habitat illicite occupe les zones les plus vulnérables aux risques d'inondation et d'ensablement. Les populations les plus pauvres habitent ces quartiers précaires (*Fig. 6*).

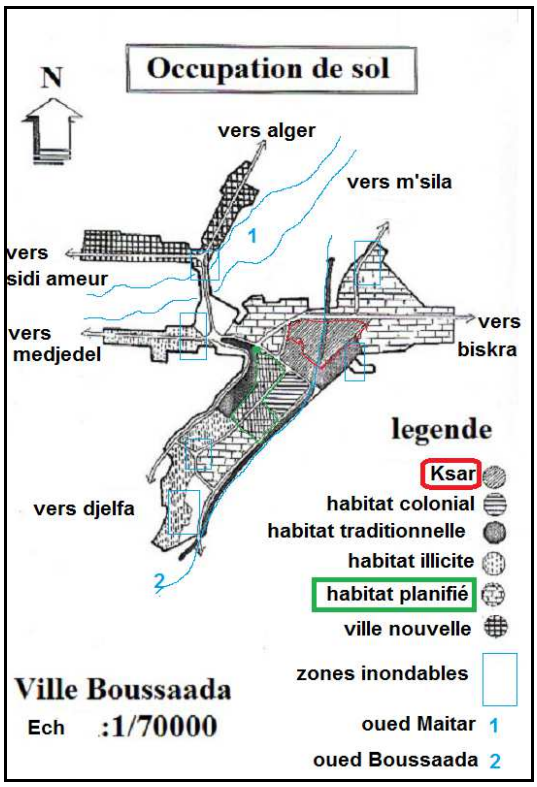

Fig. 6. L'occupation de sol par types d'habitat à Boussaâda (2010)

Les conséquences de l'occupation anarchique de l'espace

L'occupation progressive de l'espace urbain de Boussaâda n'a pas été faite selon les principes de l'aménagement urbain, malgré l'élaboration d'un plan d'aménagement et d'urbanisme (PDAU) en 1993. Les orientations réglementaires de ce plan visent la gestion économe des sols et l'adaptation de l'espace géographique naturel aux besoins des différentes activités humaines. Les conséquences des inondations et de l'ensablement sont considérées comme des événements imprévisibles, se sont manifestés et se manifestent encore d'une façon irrégulière en fonction des conditions climatiques. Aujourd'hui, on cherche à les maitriser et surtout on les considère de plus en plus comme risque qu'il convient d'évaluer et de gérer en fonction des contraintes administratives, physiques et environnementales. Mais, il faut considérer le risque en termes d'aménagement et de gestion du territoire (Saint Laurent D., 2008) qui oblige à réfléchir sur les modes d'occupation. Dans notre cas, on note l'incohérence de

la planification et du développement urbain, par rapport à la configuration topographique du site. D'ailleurs l'occupation urbaine actuelle est saturée et se présente sous la forme d'un rectangle (*Fig. 7*).Cette configuration de l'étalement urbain est imposée par les contraintes du relief (Djebel Kerdada et Djebel Azzedine et la présence du cordon dunaire.

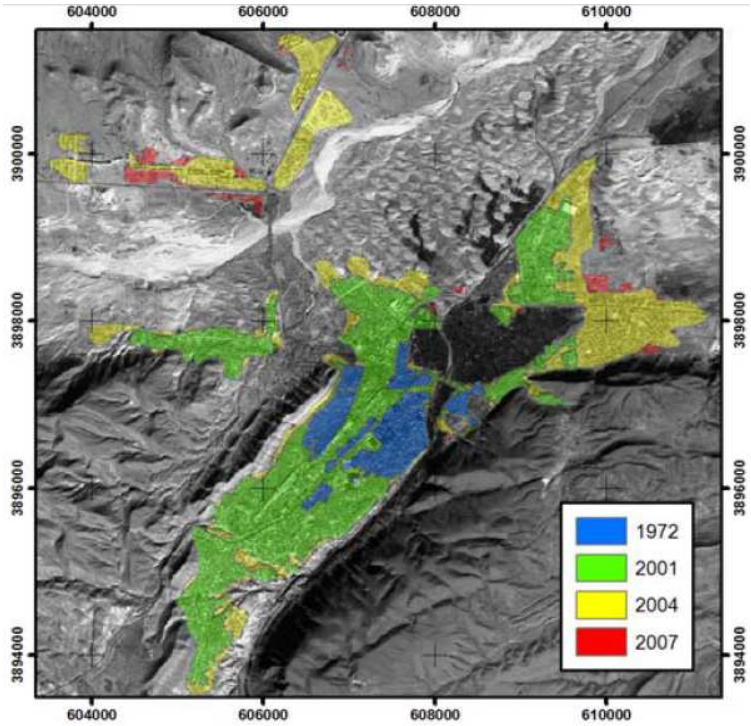

Fig. 7. Evolution de l'extension de l'espace urbain de Boussaâda (1972-2007)
(Source: Salmon, M. *et al.*, 2009)

La révision du plan de l'aménagement et de l'urbanisme en 2004 a préconisé : l'extension urbaine sur le cordon dunaire, l'axe RN 46 – Sidi Ameur et Ain Diss et a 3 Km de la ville, derrière le Djebel Kerdada (Ancienne route Boussaâda-Biskra) et choisies comme des zones d'extension future. Dans les trois cas, l'essentiel est de trouver des espaces libres, sans pour autant penser aux contraintes naturelles (ensablement et inondations pour les deux premiers cas et substratum rocheux pour le dernier cas) et aussi la contrainte financière, car les opérations d'aménagements exigent des investissements lourds (financement de nouveaux équipements, AEP, energies, services et VRD). L'article de presse du quotidien *El Watan* est très significatif pour évaluer le coût du financement du projet.

EL WATAN – Actualité – GHELLAB Smail

Le Quotidien indépendant – le 29-9-2007 : 23H41 / **Inondations de M'sila**

La région la plus affectée en matière de travaux publics au niveau national conséquemment aux intempéries de la semaine écoulée est sans conteste la wilaya de M'sila.

Cette dernière a enregistré, selon les premières estimations de la direction des travaux publics de M'sila, des dégâts dans le secteur estimés à1,3 milliard de dinars. Cela constitue 52% des dégâts matériels enregistrés par le secteur des travaux publics au niveau national, lesquels ont été estimés à 2,5 milliards DA. Le ministre des Travaux publics, Amar Ghoul, en visite dans la wilaya de M'sila jeudi, en a fait l'amer constat en se rendant sur les lieux sinistrés à travers la wilaya. Le volume des eaux qui a déferlé sur la wilaya durant les deux jours de la semaine passée, drainé par 12 oueds, a été estimé à 30 milliards de mètres cubes des eaux qui ont eu raison des ouvrages et des infrastructures affectés déjà par les inondations du mois d'avril de la même année. Conséquemment à cela, il y a eu destruction de 4 ponts stratégiques, 2 situés sur la RN45 reliant M'sila à Boussaâda, l'un enjambant l'oued Maïtar au niveau du village Maârif où la puissance des eaux a été telle qu'un tronçon de 600 mètres linéaires (ml) de la route et sur une profondeur de presque 8 m a été systématiquement arraché. L'autre pont se trouvant sur la RN45 s'est effondré après avoir été submergé par les eaux durant presque 5 jours. Pour la seule année 2007 (avril et septembre), plus de 25 morts ont été enregistrés. À ce jour, cela ne semble pas avoir suscité une quelconque réaction des pouvoirs publics pour en identifier les causes et se prémunir de la perte en vies humaines. D'aucuns diront que la vie de ces populations ne pèse rien sinon pourquoi, s'interroge-t-on, n'a-t-on rien fait pour pallier cette situation qui est, nous a-t-on expliqué, de nature hydraulique et résidant dans la domestication des eaux de surface

Enfin en pratique, l'acquisition des terrains n'obéit à aucune démarche administrative réglementaire. Actuellement, les quartiers périphériques posent des problèmes de sécurité et de salubrité (Maïtar, Sidi Slimane et El Baten). Cependant, la morphologie actuelle de ces quartiers et le nombre d'habitants sont une contrainte pour revoir et intervenir, afin d'aménager et de réduire les zones à risque. Pour prévoir, évaluer et faire prendre en compte objectivement le risque d'inondation et d'ensablement par les aménageurs, il faut leur offrir d'autres possibilités, celles des sciences de la nature et en particulier de la géomorphologie (Zebiri A., 1994). L'implantation de l'école et du lycée n'a pas

tenu compte de l'aspect géomorphologique du versant Nord du Djebel Kerdada et des talwegs, comme le montre bien la photo ci-après (*Fig. 8*):

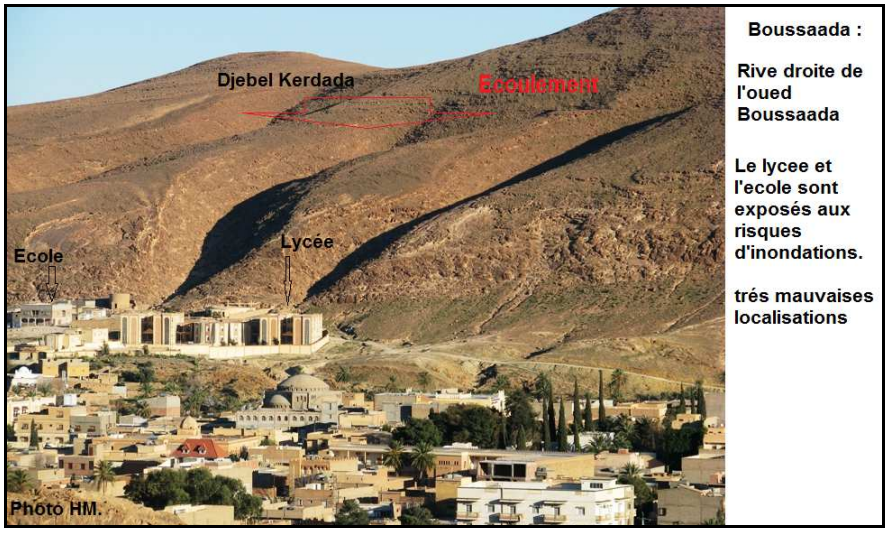

Fig. 8. Le versant Nord du Djebel Kerdada et les talwegs

Conclusion

L'apparition des risques d'inondations a travers le monde, et le problème des inondations dans le bassin méditerranéen était préoccupant après la catastrophe de Vaison-la Romaine du 22 septembre 1992 (France) et en particulier en Algérie, après les inondations de Bâb el oued (Alger), le séisme dans la région de Boumerdés, la désertification et l'ensablement dans la zone steppique, ont fait prendre conscience aux pouvoirs publics de transformer ces environnements dynamiques et de les adapter, selon les besoins des différentes activités humaines. Mais, malgré cette prise de conscience, les solutions préconisées sont purement techniques. Une étude que nous menons est en cours, elle fait clairement apparaître la tension entre la planification territoriale urbaine et la gestion des risques. Les projets en cours dans la zone de Boussaâda, à notre avis, visent des solutions localisées et non d'ensembles pour la gestion des difficultés des risques d'inondations et d'ensablements, au regard des politiques de l'aménagement du territoire et qui ne sont pas nécessairement bien adaptées. « Le risque quelque soit son origine (naturelle, anthropique, sanitaire, sociale ou économique), sa genèse et, indépendamment de la probabilité de son occurrence, ne peut être appréhendé dans toute sa complexité, que s'il est associé à la notion de territoire » (Gorra Gobin C., 2008).

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WORLD MANUFACTURING INDUSTRY: STRUCTURAL AND SPATIAL SHIFTS

IRINA RODIONOVA[1]

The article estimates countries' and regions' positions on the world ranking hierarchy in the manufacturing industry. The research is focusing on the characteristic of structural and spatial shifts of the world manufacturing industry. These trends have led to the restructuring of the world economy and main shifts in the manufacturing locations both at regional and global levels occurred. Developing countries have got a great chance to become active players in the world economy. Structural shifts occur suddenly both in manufacturing location and in the industrial composition in the recent decades. There have been shifts in the HT-industry composition. The shift to developing Asian countries is revealed.

Keywords: *industry, structural changes, manufacturing, spatial shifts, high-tech.*

The modern world industry differs by a rather diversified structure. In the end of the 20th century and the beginning of the 21st century the rapid development of the service sector, the labour productivity growth in the industries and the strengthening of the international competition in the world market of goods have led not only to the reduction of the secondary sector, but also of the share of directly manufacturing industry in the world gross national product. However since the beginning of the 2000s, the share of the secondary sector of economy in the world gross national product and the manufacturing industry share began again to increase. This evolution is due, first of all, to the rapid development of the industry and the growth of employment in the secondary sector of economy and in the sphere of industrial services in China and some other developing countries ("new industrialized" Asian countries – NIC, India, Brazil, Mexico etc.).

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Changes in the Structure of the World Manufacturing

The ongoing changes in the structure of the industrial sector of developed economies differ by their nature from those which occur in developing countries. These changes also differ by speed and nature due to regions' size. The implementation of new technologies and other scientific and technical progress achievements in the production process, the boost of efficiency and quality indicators of production in different countries accurately reflected changes of branch structure of manufacturing industry in the world. Many new industries were formed (bio-industry, manufacture of laser technology, modern medicine and microbiological drugs, etc.). Technological innovations gave birth to microelectronics. Therewith some well-defined stabilization and even a slight decline in production in "traditional" industries of developed countries were observed (production of food and beverages, textiles, basic metals, chemicals and chemical products). The highest growth rates were noticed in production of means of communication (radio, television and communications equipment), computer and office equipment, electrical equipment (*Table 1*).

Among developing countries, the most intensive processes of growth in manufacturing industry occurred in recent decades in China, Mexico, Brazil, India and in the "new industrialized" Asian countries, where the same engineering sub-industries were highlighted, though in the group of less developed countries within the above mentioned states the most significant growth rates were observed in traditional industries - food and beverages and textiles.

Data provided in the following table (*Table 1*) illustrate the obvious increase in the share of communications equipments industry (radio, television and other communication equipment), as well as in structure of the world manufacturing as a whole (structure of world manufacturing value added – MVA) in the selected country groups.

Table 1

Structure of Manufacturing Value Added (MVA) in Selected Country Groups (in %)*, 1995-2009

ISIC (Rev.3) – Branch	Industrialized Countries**		Developing Countries		World	
	1995	2009	1995	2009	1995	2009
Food and beverages	10,8	8,1	15,4	12,2	11,8	9,7
Tobacco products	0,7	0,4	2,8	2,4	1,2	1,2
Textiles	2,4	0,9	5,8	4,4	3.2	2,2
Wearing apparel and furniture	2,5	0,7	3,5	2,7	2,8	1,4
Leather, leather products and footwear	0,7	0,2	1,6	1,2	0,9	0,6
Wood products (excl. furniture)	2,4	1,4	1,8	1,1	2,3	1,3
Paper and paper products	3,7	2,4	2,4	2,1	3,4	2,3
Printing and publishing	6,0	3,9	2,3	1,4	5,1	2,9
Coke, refined petroleum products, nuclear fuel	3,1	2,2	7,7	5,0	4,2	3,3
Chemicals and chemical products	10,0	8,8	10,1	11,0	10,0	9,7
Rubber and plastics products	3,2	2,4	3,4	3,5	3,3	2,8
Non-metallic mineral products	4,0	2,5	6,2	4,9	4,5	3,4
Basic metals	5,3	3,6	7,0	10,1	5,7	6,1
Fabricated metal products	7,2	5,0	4,4	3,5	6,5	4,5
Machinery and equipment n.e.c.	9,5	7,4	5,5	5,3	8,5	6,6
Office, accounting and computing machinery	1,8	4,4	1,6	2,0	1,7	3,5
Electrical machinery and apparatus	4,2	4,0	3,3	5,7	4,0	4,6
Radio, television and communication equipment	5,9	27,1	4,7	10,2	5,6	20,7
Medical, precision and optical instruments	2,5	2,7	1,1	1,3	2,2	2,2
Motor vehicles, trailers, semi-trailers	7,7	6,6	4,7	4,8	7,0	5,9
Other transport equipment	2,5	2,5	2,0	2,7	2,3	2,6
Furniture; other manufacturing	3,5	2,8	2,7	2,4	3,7	2,7
Total	100,0	100,0	100,0	100,0	100,0	100,0

Source: UNIDO, *Industrial Development Report 2011. Industrial Energy Efficiency for Sustainable Wealth Creation*, Vienna, Austria, 2011 (http://www.unido.org).

* Percentage shares of individual branches in total MVA at constant 2000 prices.

** This report defines developed countries or developed economies as the group identified as "high-income OECD countries" by the World Bank and developing countries or developing economies as all other economies.

Changes in the industrial structure of developed countries, which have recently entered the new post industrial stage determined, in essence, the structural changes in the global industry. In 1995, dominant manufacturing sectors at the world-wide level were food and beverages (11.8 percent), chemicals and chemical products (10 percent) and machinery and equipment (8.5 percent). Radio, television and communication equipment's share in manufacturing rose to 20.7 percent as a result of the surge in demand for electronic goods (*Table 1*). In developing countries this share rose from 5.9 percent to 27 percent.

Specific processes occurred in the same period in post-Soviet space, particularly in the CIS countries, which restructured their entire economies by transition "from a planned to a market" system. During the 1990-1998 period of economic recession in Russia, its industrial output declined by 60 percent and reached its lowest point in August 1998 – 37 percent from 1990 levels. Almost 10 years later, in 2008, the country registered an important development and economic up-rival its industrial production barely overpassing however (on average) 66 percent of the level in January 1990. In other words, in spite of the recovery and reconstruction of the whole country industry, Russia had not a strong and mature economic system, when the global economic crisis appeared. Moreover, it should also be noted the fact that the rate of growth of manufacturing industries (excluding the iron and steel) significantly lagged in the 2000's behind the growth of the economy as a whole, and their share in industrial production declined in the following period. On the first place in the structure of manufacturing industry in Russia there is the metallurgical production and manufacture of fabricated metal products (above 22 percent), and on a second place the production engineering – concentrating also about 22 percent (including the share of electrical, electronic and optical equipment accounts for only about 6%).[2] Other CIS countries displayed a very similar situation in the years 1990-2000's.

As for the developing countries, the structure of their industry also changed. Noticeable changes have especially been registered, due to changes, for only a few of them, such as Brazil, Mexico, the Asian NIC and countries such as Korea, Singapore, Malaysia, Thailand and others of the "first" and "second wave" respectively. At the same time in the industrial structure of these states a shift toward development of knowledge-intensive branches occurred. The proportion of developing countries in the worldwide manufacturing increased significantly (reaching 35%) over the past decade. Over 1990-2010, global MVA grew with 2.8 percent, from 4290 billion dollars to 7390 billion (*Table 2*).

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[2] "Russia in Figures: Brief Statistical Review. Short Stat", *Book / Federal Service of State Statistics (Rosstat)*, M., 2009-2011.

Table 2

Manufacturing Value Added Levels, by region, 2005-2010
(US$ Billions unless otherwise Indicated)

Region / Country / Economy	2005	2008	2009	2010	Share of World MVA, 2010 (Percent)
World	6570	7350	7020	7390	100
Developed economies	4710	5010	4600	4760	64,4
Developing economies	1870	2340	2410	2630	35,6
Regions:					
East Asia and the Pacific	966	1290	1390	1540	20,8
China	646	920	1015	1134	15,3
Europe	148	176	164	169	2,3
Russian Federation	67	71	63	64	0,9
Latin America and the Caribbean	373	423	397	423	5,7
Brazil	111	121	116	129	1,7
Middle East and North Africa	183	217	216	229	3,1
South and Central Asia	149	185	194	210	2,8
India	91	113	119	131	1,8
Sub-Saharian Africa	47	53	52	54	0,7
South Africa	27	30	28	28	0,4
Least developed countries	24	30	32	34	0,5

Calculated of: UNIDO, *Industrial Development Report 2011. Industrial Energy Efficiency for Sustainable Wealth Creation*, Vienna, Austria, 2011, p. 16.

Developed countries recorded a 1.7 percent MVA growth and a 2% GDP growth, highlighting their waning reliance on manufacturing as a source of growth and the increased role of services such as finance, insurance and real estate in the total GDP. In contrast, the manufacturing sector in developing countries has been buoyant, with a remarkable 5.6 percent annual growth rate in MVA over 1990-2010, slightly higher than the 4.8 percent GDP growth rate. Thus China, Asian NIC and other states (with priority to manufacturing industries) significantly strengthened their positions in the global economy.

In 1990, developing countries were producing about 20 percent of the world GDP. By 2010, this share had risen to 30 percent. Global manufacturing has been shifting from developed to developing economies even faster, with economies such as China, India and Taiwan Province of China building strong manufacturing sectors. In 1990, developed countries accounted for 79.3 percent of the global MVA, and for 72.7 percent in 2005. Their share was of 64.4 percent in the global MVA in 2010[3].

[3] UNIDO, *Industrial Development Report, 2011*, Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria, p. 142-143 (http://www.unido.org).

The Effect of 2008-2009 Economic and Financial Recession

Over the 1990-2010 period, global MVA grew by 2.8 percent annually, from $ 4,290 billion to $7,390 billion. The 2008-2009 economic and financial crisis affected manufacturing more in developed countries than in developing ones. Experts of UNIDO consider on their turn the impact of the 2008-2009 economic and financial recession on manufacturing as an important issue to debate. Global MVA registered an average growth of 3.1 percent per year in the 2000-2008 period, reaching at the end of it 7350 billion dollars. In 2009, the global recession led to a 4.6 percent drop, to 7020 billion dollars. The crisis affected developed countries to a larger extent, with MVA falling with 8.1 percent from 2008 to 2009. Economic growth in developing countries slowed to a rate of 2.9 percent in 2009, down from an average of 6.8 percent a year over the previous eight years. The positive growth in developing countries over 2008-2009 masks sharp disparities. The economic and financial crisis affected each developing region differently. MVA grew by 7.7 percent in East Asia and the Pacific and by 4.8 percent in South and Central Asia but in other regions.

World manufacturing value added (MVA) peaked at 7390 billion dollars in 2010 (18.2 % of global GDP) after a sharp drop in 2009, during the global economic and financial recession. MVA's share in GDP declined (from a value of 17.7 percent in 1990 to 16.6 percent in 2010) in developed countries and rose from 18.4 percent to 21.5 percent in developing countries[4]. The financial crisis exacerbated the MVA decline in developed countries, but MVA continued to grow in developing countries.

To sum it all up we should notice the fact that in most developed countries, changes in the structure of industrial production (before the current financial and economic recession in the global economy which appeared since 2008) were a process of gradual restructuring and adjustment of the economy through the introduction of scientific and technological progress in the transition to post-industrial stage of development due to increasing income of population. Priority is given, in the first place, to the most high-tech industries and branches. In the CIS countries (and many other countries with the same "transition economies") ever since the early 1990's, changes in the structure of industry determined the transformation of the economic mechanism and the restructuring of the economy, amplified in the present by general economic problems encountered by this group of countries. For groups of less developed countries structural changes in the industrial sector of the economy expressed in the process of changing the organization and methods of production on a large-scale, in changes in productivity and in the industrial structure due to the deeper involvement of these countries in international division of labor[5]. The multinational companies also have a strong influence on

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[4] UNIDO, *Industrial Development Report, 2011*, Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria, p. 149 (http://www.unido.org).

[5] RODIONOVA, I., *World Economy: Industrial Sector*, Moscow: RPFU, 2010.

the placement of production facilities on their territory, which strongly came through, for example, in changing of industrial structure in Asian NIC countries with their export-oriented economies. On the contrary, in the less developed countries there were no significant changes in the industrial structure.

Leaders of the world manufacturing

Most of the technological capacity and industrial production (in value terms) remain concentrated in the developed countries (67% in 2009). At the same time China, very significantly increased its share in world manufacturing value added (MVA), occupying the third place in the world ranking, primarily due to the rapid growth of gross production (*Table 3*).

Table 3

Leaders of the World Manufacturing (MVA) and Russia, 2009*

Country	Share of world MVA (percent)	Share of MVA in GDP (percent)	Share of world manufactured exports (percent)	MVA per capita (US$)
USA	23,70	14,8	8,6	5334
China (and Hong Kong)	14,53	35,7	15,7	754
Japan	14,45	20,7	5,6	7929
Germany	6,17	21,7	10,3	5250
The Republic of Korea	3,16	29,4	3,7	4562
United Kingdom	2,91	12,1	3,0	3330
France	2,65	12,6	4,3	2989
Italy	2,43	15,3	3,9	2894
India	1,70	13,7	1,6	99
Taiwan	1,68	26,2	2,1	5101
Brasilia	1,66	13,7	1,0	594
Canada	1,54	12,7	2,1	3236
Mexico	1,42	15,2	2,0	911
Spain	1,39	13,6	2,0	2178
Turkey	1,04	20,3	0,9	950
...				
Russia	0,89	15,8	1,1	444

Source: UNIDO, *Industrial Development Report 2011, Industrial Energy Efficiency for Sustainable Wealth Creation*, Vienna, Austria, p. 192-199 (http://www.unido.org).

* Value added in 2000 US dollars.

Informatization, according to the leaders of China, is an important strategic resource element, determining the prospects of the entire economic and

social modernization. It is worth emphasizing the fact that the position of China in the world economic system was supported previously by low production costs in the supply of products to foreign markets shallow redistribution (textiles, sportswear, toys) whereas nowadays is provided mostly by increased export earnings from trade in high-tech products.

The current situation in Russia shows it as a consumer of the simplest and most popular technologies. In the present rating our country occupies the 18th place, and it accounts for only about 1% of world production of manufacturing industries.

The data presented in table 2 (*Table 2*) illustrate the different performance of leading countries on such indicators as share of world MVA, share of MVA in GDP, share of world manufactured exports, MVA per capita. The analysis shows that yet again Russia has no advantages (we have a ten-fold gap from the leaders). For example, Japan's MVA per capita for 2009 corresponds to 7929 dollars (at constant 2000 US dollars prices), Switzerland – 7384 dollars, Singapore – 6996 dollars, the U.S. – 5334 dollars whereas Mexico – 911, China – 754, Tunisia – 476, Russia – 444, Indonesia – 295, India – 99, and Nigeria – only 23 dollars[6].

It is also worthwhile to note the fact that the top five leaders of the world industry account for approximately 60% of the world production of manufactures (and the share of the first 15 countries for 80%), indicating a high level of concentration of production capacity to a group of leading countries. Excepting China this group also includes South Korea, India, Taiwan, Brazil, Mexico and Turkey. In countries that create and widely use in practice innovative technologies diffusing them in the branches of parent TNCs worldwide, return on assets l is larger in manufacturing industries than in capital-intensive extractive industries and low-technology manufacturing industries

Largest Developing Economy Manufacturers

Manufacturing in developing economies is highly concentrated. The share of manufacturing value added of the 15 world leading economies account for 83 percent of total production of the developing countries in 2010 (73.2 percent in 1990). The increase is attributed mainly to China, which has emerged as an industrial

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[6] RODIONOVA, I., STEPANOV, A., *The Aspects of the Formulation of the Theoretical Approaches for the Model of Innovation Developmenrt of Russia: the Analysis of Structural Shifts of the World Manufacturing Industry and High Technology* // Economic Vestnik of Republik of Tatarstan, no. 1, 2012.

power of the world – more than tripling its share within the developing countries' MVA over 1990-2010, from 10 to 43 percent[7].

China also enjoyed faster average growth of MVA than other large developing economy manufacturers during that period. Having experienced a reduced decline in market share, Taiwan Province of China remained the fourth largest manufacturer among developing economies.

In other words, the most impressive results were achieved by the countries that have managed to provide national economic benefits from the globalization of world markets for high-tech products, on which they won a strong position and a significant profit as compared to domestic production costs of high technology products and services (the so-called technological rents).

At the same time in modern Russia the simple use of the intellectual, technical, scientific and technological capabilities of previous years without its building and development dooms the industry and economy to the inevitable and growing backlog. It is worth remembering that this is happening against a background of accelerating the practical application of scientific knowledge embodied in the innovation, and strengthening of scientific and technological capabilities in many countries not only in the economically highly developed ones.

Current Trends in the Global Industry

Knowledge-intensive industries and high technology now plays a major role in the development of economy and social sphere. They materialize the bulk of research and development. They determine the demand for scientific research (and, hence, contribute to the further development of science) and create a base material and offer real innovation and information for all sectors of the economy. The importance of innovation development course was understood long ago by the European Union and the USA.

In recent decades, the global industry (in addition to changes in industrial structure leading towards increasing share of high-technology industries) varies directly the structure of high-tech or knowledge-intensive industries. It is known that the classification of industry or production of a number of high-tech branches adopted in the scientific literature is quite conditional. This group of industries recorded more than a certain fixed level relative cost of R&D in the production of products. This is the proper measure of research intensity, which is determined by expenditure on R&D (including gross value of production per unit).

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[7] UNIDO, *Industrial Development Report 2011, Industrial Energy Efficiency for Sustainable Wealth Creation*, Vienna, Austria. 2011.

Analysis of data showed that in the 1980-2010 period the structure of production of high technology products has changed in the direction of increasing the production of means of communication. These are structural changes in the industry of developed countries that joined the post-industrial stage of development, and these changes were crucial for structural shifts in the global economy.

The largest manufacturers of high-tech products of all types are still the USA, EU, China and Japan; calculations showed that, in the worldwide overall production of high technology products, in 2010, the leading countries were: United States (27.7 percent of the world production, in millions of current dollars), Japan (around 13 percent), China (around 19 percent), Germany (5,5 percent), South Korea (4 percent), Taiwan (4 percent), United Kingdom (3 percent), France (3 percent). The total share of EU countries amounted to about 1/5 of world production[8].

The share of high-technology products increased both in the structure of the manufacturing industry at the worldwide level and in the industrial sector of the economy of individual countries including developing states – particularly in China and the Asian NIC, and some countries in Latin America. These changes indicate an increase in industry and in the share of mechanical engineering, chemistry and other industries that use the latest achievements of scientific and technical progress.

Changes in the Structure of World Manufactured Exports

The development of high technology and the changes occurred in the structure of the world market reflected the priorities of science and technology policy in different countries.

Leading positions in world ranking in the export of hi-tech production are occupied by highly-developed countries including EU (especially if considering trade among EU countries). But it is necessary to note that China has taken first place (with 23.7 percent) leaving behind USA, Germany and Japan. Even if trade between China and Hong Kong was excluded the share of China exceeds 17 percent in the total of this world indicator. This share equals the volume of trade of such goods among all 27 countries within EU. Asian NIC (newly industrialized countries) have considerable share in world export of hi-tech products (*Table 4*).

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[8] "Calculated on the Database: Science and Engineering Indicators – 2012" (*Appendix Tables 6*), two volumes, Arlington, VA: National Science Foundation, 2012 (http://nsf.gov).

Table 4

Exports of High-Technology Goods, by Region / Country / Economy: 1995–2010 (%)

Region/country/economy	1995	2000	2005	2010
World	100,0	100,0	100,0	100,0
World excluding intra-EU and intra-China/Hong Kong	80,0	80,1	77,8	76,4
EU (total)	31,1	30,0	31,0	28,9
China and Hong Kong (total)	6,9	8,5	18,2	23,7
United States	17,0	17,2	11,5	11,6
Germany	7,5	7,5	8,0	7,5
Taiwan	4,1	5,0	5,3	5,7
Japan	14,7	10,4	7,0	5,0
Singapore	6,8	5,3	5,1	4,9
Korea, South	4,2	4,6	4,8	4,7

"Calculated by: Science and Engineering Indicators – 2012", (*Appendix: Tables 6-18*), two volumes, Arlington, VA: National Science Foundation, 2012.

Thus it is necessary to consider that even in the conditions of the present world financial recession the rates of growth of China haven't considerably decreased (especially in comparison with other countries of the world). The epoch of the cheap Chinese goods comes to an end, China facing a new level of development of manufacture. In 2009 it overtook for the first time the former leader Germany in volume of export of goods, and export of hi-tech products. Thus China has already come out on a top position in the world for the volume of foreign trade and the export of production of mechanical engineering and electronics (1590 bln dollars and 933,4 bln dollars accordingly). In 2010 mechanical engineering and electronics production amounted to 60% in the total export of China.[9]

Conclusion

In conclusion we would like to underline the the fact that information technologies play a more and more important role in the world economy. Moreover, the so-called "digital rupture", that is a backlog of the poorest countries from the rich ones by volumes and quality of use of these technologies, is gradually reduced. Those countries which have managed to get advantages of globalization of the world markets of hi-tech production have achieved the most considerable results.

The Asian vector in the world industrial development clearly stands out. Though from the point of view of the characteristics of the spatial organization

[9] www.crirussian.ru – China International Broadcasting Network – CIBN, "*Economical Bulletin* Programme", February 2011 г.

of industrial production at global level – disparities still remain on a line "North"-"South" (developed-developing countries).

Nevertheless the world industry faces a spatial regrouping of the worldwide dominant regions in creation and exchange of industrial production, distribution of the capital, technologies and production capacities.

The former leader of the world industry, the North American region led by the USA, has lost its position. As a whole the European region (EU countries) has strengthened its rank in manufacturing industry. The CIS countries (including Russia) have weakened very considerably their positions in the world industry. Meanwhile the "Asian" or the "Far East pole" has had the most active upward dynamic, gaining practically the leading position in the world on manufacture of many kinds of industrial products (fast developing China, Japan, Korea, Taiwan, Singapore, Malaysia, Thailand, etc.).

In the open economy conditions the Russian goods proved to be noncompetitive on foreign markets, quickly lost competitiveness on internal one as well, being superseded by import. In these conditions entire branches start to lack financial resources, situation that sooner or later leads to their irreversible technological degradation or a total disappearance. A positive tendency is however the fact that after years of reforms Russia is in a search for sale markets.

Considering the weakness of the industrial potential of the Russian Federation, the strategy based on the trade of technologies can become productive. However, the activity of the Russian applicants on the foreign markets of technologies is still insignificant.

If radical measures to innovate economy are not undertaken during the transition period, Russia and other CIS countries can remain at the level of the developing states, basically exporting raw energy resources. It is necessary to create by common efforts an innovative economy of the Commonwealth of Independent States, through modernization of industrial and technological base and labour productivity growth.

In the conditions of the modern crisis the necessity of the transition to the innovative model on the basis of interstate cooperation has sharply appeared, whose synergetic effect will help the CIS countries to pass to an advanced technological pattern. Nowadays a priority is the creation of a single market of the CIS countries. The use of intellectual, scientific, technical and technological potential of the last years without its escalation and development in modern Russia and other CIS countries dooms the industry and economy of our countries to an inevitable and accruing backlog. Thus it is worth to remember that the practical use of scientific knowledge embodied in innovations accelerates and strengthens at the same time, scientific, technical and technological possibilities for a variety of the countries, not only the advanced ones.

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FORMATION HISTORIQUE ET GENÈSE DES TYPES CANONIQUES DE L'HABITATION DOMESTIQUE DU HODNA ORIENTAL

BOUTABBA HYNDA*, FARHI ABDALLAH

Le présent papier se focalise sur l'étude de la formation historique et l'analyse architecturale des types canoniques d'habitat domestique dans la région du Hodna oriental en Algérie. Cette recherche diachronique prend en charge l'évolution de l'habitation depuis le début du 19ème siècle avec les Guitounes (premières tentes nomades) jusqu'au début du 21ème siècle et la consécration des Diar charpenti (habitations en charpente, modernes et ostentatoires). Par l'étude de ces différents types, l'objectif n'est pas seulement de rendre compte de l'évolution de chacun de ces savoirs spécifiques, mais plutôt de renseigner sur la façon dont ces derniers pourraient éventuellement s'articuler dans sa production. Autrement dit voire si la logique d'un niveau pourrait avoir une influence sur un autre, de détecter les traits caractéristiques d'un niveau qui pourraient rester pertinents à un autre. L'approche utilisée est la typologie analytico-historique qui analyse l'espace architectural en mettant l'accent sur les facteurs intrinsèques et extrinsèques qui ont contribué à sa formation

Mots-clés: *habitation domestique, type d'habitat, analyse spatiale, facteurs extrinsèques, contexte économique, Hodna, Algérie.*

1. Introduction

Les mutations brutales des conditions socio-économiques qu'avait connue le Hodna oriental depuis le début des années 1990, ont suscité un certain nombre de changements fondamentaux qui se sont matérialisés sur les plans urbain et architectural par l'apparition d'un nouveau type d'habitat domestique connu sous le nom de « *Diar Charpenti* ». Un type d'habitation qui semble être exogène, dans toutes ses expressions stylistiques, à l'architecture domestique locale et par rapport aux us d'une société semi nomade introvertie qui s'est récemment fixée sur le sol. D'anciens nomades, les Hodnis sont donc passés d'un habitat ambulant (la tente) à plusieurs autres types d'habitat plus au moins endogènes, jusqu'à « *Diar charpenti* »; et ce dans un laps de temps relativement court.

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Convaincus par le fait que toute tentative d'interprétation ne serait fructueuse que dans son cadre historique et parce que bon nombre de chercheurs tels Rossi, A. (1977), Panerai, PH. *et al* (1980), Dieudonné, P. et Bradel, P. (1985), attestent que toute possibilité de s'interroger sur l'espace en dehors du travail historique serait vaine, nous essayerons de retracer dans le présent papier, le fil historique et la chaîne conductrice à ce nouveau type d'habitat en examinant, à l'aide d'une typologie analytique et historique, les différents maillons architecturaux (les types canoniques) de l'habitation individuelle dans le Hodna.

Ce papier tente, non seulement de mettre en évidence la genèse de ce nouveau type d'habitat, mais aussi les conditions extrinsèques qui ont conduit à sa formation.

2. La zone d'étude : une fraction rurale du Hodna oriental

Des bords verdoyants de la Méditerranée à l'immense désert algérien, se succèdent trois grandes zones longitudinales : L'Atlas Tellien caractérisé par son relief varié et complexe, les hauts plateaux steppiques et l'Atlas saharien dominant le grand désert. S'étalant d'un seul tenant, la zone médiane constitue l'un des plus vastes ensembles des zones arides et steppiques. Au cœur même de cette zone steppique s'étale le Hodna (Sebhi, S. 1987). La zone d'étude est la fraction Est du Hodna ; elle englobe cinq localités du Hodna oriental: Berhoum, Magra, Belaiba, Djezzar et Barika (*Fig. 1*)

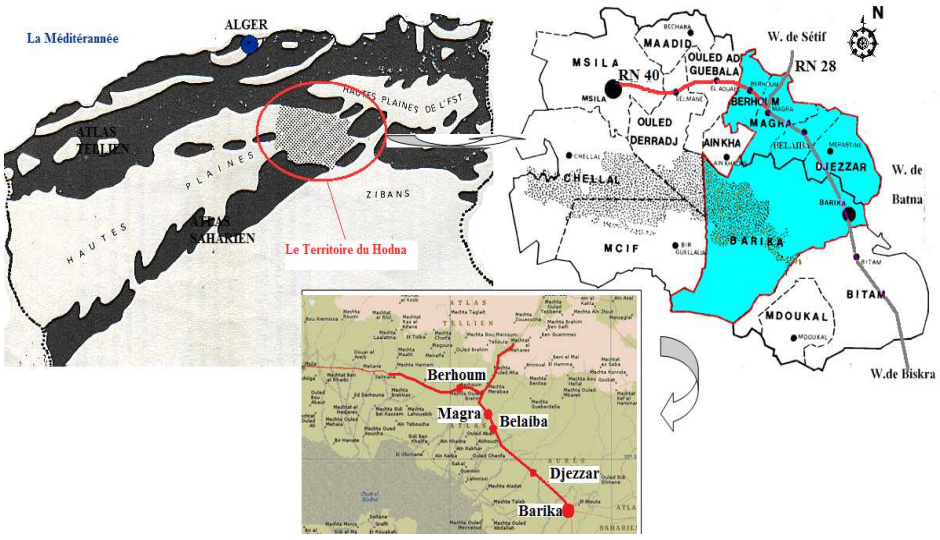


Fig. 1. La zone d'étude, une fraction du Hodna oriental (*Source :* Sebi, S., 1987)

3. Presentation de la méthode d'analyse

La typologie historico-analytique compte parmi les outils méthodologiques les plus utilisés dans la recherche architecturale (Dieudonné. P. *et al*, 1985). Elle est reconnue comme étant le moyen scientifique par excellence qui permet la connaissance et la compréhension des modèles canoniques. Cet instrument méthodologique ne se limite pas uniquement à une seule définition, mais nécessite des redéfinitions permanentes de la typologie, en fonction des recherches entreprises et des objectifs préalablement émis (Aymonino, C., 1975). Cette recherche, à travers l'analyse des types canoniques d'habitat domestique, adhère à deux thèses, celle de « la pensée » chère à l'école vénitienne et défendue par Aldo Rossi (1977) qui valorise l'explication historique. Ce que Philippe Panerai appelle « historicisme » est ce caractère explicatif, faisant intervenir un faisceau complet de données économiques, fonctionnelles et politiques en vue de déterminer l'ensemble des phénomènes externes générateurs d'une morphologie ; et celle du « Spécifiquement architectural », largement soutenue par les auteurs du « système de l'architecture urbaine ». Ce qu'André Chastel (1978) dénomme « *la nécessité d'une connaissance de l'objet avant de passer à son interprétation, la nécessité d'un travail préliminaire d'élaboration des types* » est considérée par Claire et Michel Duplay (1982) comme essentiel.

Dans cette recherche, la notion de « type » a été considérée selon la définition de Christian Devillers (1974), admise par Philippe Panerai (1980) et reprise par Henri Raymond (1985), comme « *abstraction de propriétés spatiales communes à une classe d'édifices, une structure de correspondance entre un espace projeté ou construit et les valeurs différentielles que lui attribue le groupe social auquel il est destiné* ». De ce fait, l'analyse a considéré les types nommés par la société Hodna et s'est appuyée sur les investigations personnelles sur site et sur un fond documentaire représenté par les documents officiels coloniaux (Archives du gouverneur, 1856; Sénatus-consulte, 1863; l'Atlas de l'Algérie et de la Tunisie, 1928, rapport des généraux qui ont gouvernés le Hodna); travaux de géographes (Despois, J., 1953; Lacrois, N., 1906; Raskow, E., 1938; Feilberg,. C.-G., 1944).

4. L'habitation preleminaire du Hodna : l'organisation spatio-urbaine – une transcription de la structure sociale prévalente

Par habitation préliminaire l'on vise les deux types d'habitations qui ont marqué la période coloniale : l'habitation ambulante et les premiers types d'habitation fixe temporaires et permanents

4.1. Le type ambulant – "Le guittoune" : une incidence d'un mode de vie pastorale

Les fondements économiques de la société Hodnia consistaient essentiellement en la pratique de l'élevage et au nomadisme pastoral. La tente ou l'habitation nomade et ambulante appelée « Guittoune » dans cette région, répondait parfaitement à ce genre de vie. D'après les documents officiels français (archives du gouverneur, 1856; Sénatus-consulte, 1863) jusqu'à la deuxième moitié du XIXème siècle, aucune construction fixe et en dur n'avait été dénombrée dans le Hodna oriental en dehors des centres urbains de l'époque. Les Hodnis se rassemblaient dans des groupements de 40 à 60 tentes agglomérées et disposées en rond, autour d'un espace central appelé « M'rah ». Ces campements étaient connus sous le nom de « Douar » (cercle) – *Fig. 2*. En cherchant à contrôler et à mieux encadrer les nomades, la colonisation procéda à la destruction interne du groupe tribal. À cette dislocation sociale correspondit une désintégration spatiale et au *douar* succédèrent des petits groupements de 3 à 6 tentes isolées matérialisant les campements de ménages à base de familles patriarcales. Ces hameaux temporaires et mobiles étaient connus sous le nom de « Nezla ». Ces dernières quittèrent le groupement en cercle pour une organisation plus individualiste, favorisant la disposition linéaire. Les tentes qui composaient les Nezlas s'implantaient suivant une organisation basée sur une à deux files.

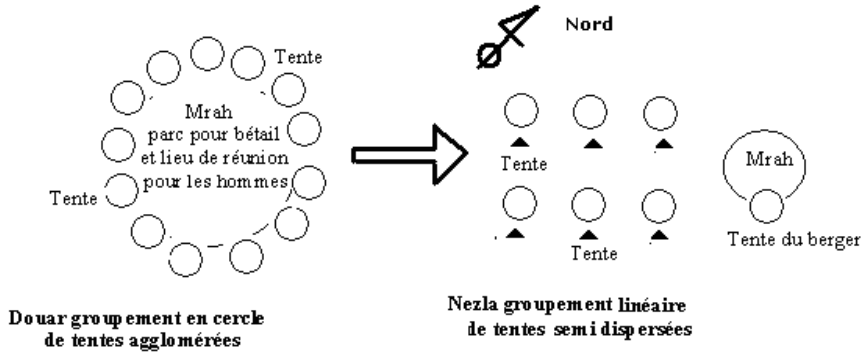


Fig. 2. Le mode de groupement : passage du « Douar » à la « Nezla »
(*Source :* Boutabba, H., Farhi, A., 2009)

Selon Lacrois. N., (1906); Raskow. E., (1938); Feilberg. C.-G., (1944), l'habitation ambulante ou le « guittoune » Hodni ressemblait, à quelques différences constructives, à celui de l'Afrique du Nord. Il s'agit d'un espace dont la superficie variait de 12 à 50 m^2, couvert d'un tissu et composé de deux parties séparées. La première, semi-privée, est destinée au chef de famille, à ses fils aînés et éventuellement à la réception des étrangers. La deuxième, essentiellement privée, est affectée aux

femmes et aux enfants. Cette division sexuée et bipartite de l'espace entre « hommes », « femmes » et « bétail » a engendré sa division fonctionnelle.

Le progrès de l'économie agricole aux dépens de l'élevage amorça dès 1872 (Bulletin officiel, 1895) le mouvement de construction d'habitations fixes, qui a connu son apogée dans le Hodna oriental au début du siècle passé (entre 1900 et 1910).

Le recensement de 1911 utilisé par Bernard, A. (1921) et De Flotte de Roquevaire, R. (1928) soulignait le recul des tentes habitées tout au long de l'année. En 1936, ces mêmes statistiques coloniales annonçaient un net repli des habitations mobiles qui ne représentaient que le 1/5 du total du parc d'habitation de la commune mixte de Barika. Le mode de groupement de ces habitations d'hiver était connu sous l'appellation de « mechta ». Ces dernières groupaient un nombre variable de gourbis, allant de 3 à 4 et pouvant atteindre quelques fois 25 à 30 et même davantage, en ordre très lâche.

4.2. Le gourbi : d'une habitation fixe, temporaire et complémentaire du type ambulant à une habitation fixe et en voie de permanence

La permanence du campement d'hiver près des cultures était à l'origine de la construction d'un ou deux gourbis servant d'entrepôt ou de chambre. Le gourbi n'a jamais été le successeur direct du « guittoune », d'ailleurs il ne l'avait jamais remplacé complètement. Il était d'abord et dans un premier temps une habitation d'hiver. Le gourbi n'était donc qu'une habitation complémentaire de celle-ci qui témoigne de l'ère de transhumance et de semi nomadisme (*Fig. 3*). C'était une construction fruste, composée d'une seule pièce en dur, de modestes dimensions de 3 à 4 m de long sur 2 à 2.5 m de large et de même hauteur. La porte de 1.50 m de haut sur 0.7m de large constitue la seule ouverture. *« Mais de construction provisoire qu'il était, il est devenu avec le temps une demeure permanente pour sédentaires permanents.* » (Lacheraf, M., 1971).

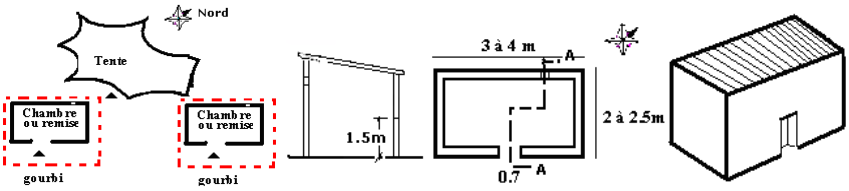


Fig. 3. Le gourbi annexe d'une tente : dimensions et orientation
(*Source :* Boutabba, H., Farhi, A., 2009)

La promulgation de la loi Warnier (1873) qui rendait aliénables la terre « arch », entrava sérieusement la libre errance du nomade Hodni, qui se trouva

obligé en quelque sorte d'abandonner le nomadisme et son corollaire, le « guittoune », pour adopter une ébauche d'habitat fixe qui tend à s'éterniser à longueur d'année : le gourbi qualifié de deuxième génération (*Fig. 4*). Ce dernier avait les mêmes caractéristiques morpho-métriques et précaires de constructibilité que son prédécesseur temporaire, à la différence d'un rajout d'ordre spatial en l'occurrence – un espace provisoire de forme plus ou moins circulaire à l'image de la tente appelé « acha » avec des dimensions plus restreintes et construit en matériaux légers faisant office de cuisine : une hutte de branchage autour de laquelle étaient parsemés un à deux silos semi enterrés servant à la conservation du grain.

Fig. 4. Le gourbi deuxième génération (*Source :* Boutabba, H., Farhi, A., 2009 ; cliche : www.photos-algerie.fr)

4.3. Le deuxième type d'habitation fixe « Diar Sathi »: une demeure permanente pour sédentaires

Le type « Diar Sathi » (*Fig. 5*) ressemblait dans son orientation et dans sa conception au gourbi de deuxième génération. La hutte de branchage, cet espace éphémère, léger, de forme circulaire, servant de lieu de préparation des repas est devenu dans ce type, la petite pièce rectangulaire de dimensions réduites, mitoyenne à la pièce principale, formant avec elle un angle droit et conservant la même fonction. Du coup elle avait pris une appellation de « dar » puisqu'elle est en dur et se voit rajouter le qualificatif de « N'ouel » puisqu'elle sert principalement à la préparation des repas. La seule vraie innovation spatiale qui a permis la distinction de ce type de son précurseur et qui lui a valut la promotion au rang de « nouveau » type est l'ébauche d'un espace semi privé, servant d'espace de transition entre un intérieur formé par le bloc « chambre- cuisine » et l'extérieur la « Mechta ». À ce stade, cet espace en question était un enclos dont la forme est proche du quart du cercle. Du point de vue fonctionnel, l'introduction de ce type d'habitation fixe engendra les premières divisions fonctionnelles, quoi que

d'une façon très élémentaire et sommaire. Force est de constater que l'espace pour « dormir » s'est peu à peu détaché de l'espace de préparation mais pas carrément séparé de celui-ci dans le sens que celui-ci pouvait, dans certains cas, servir aussi pour dormir, alors que l'inverse n'était pas toujours vrai.

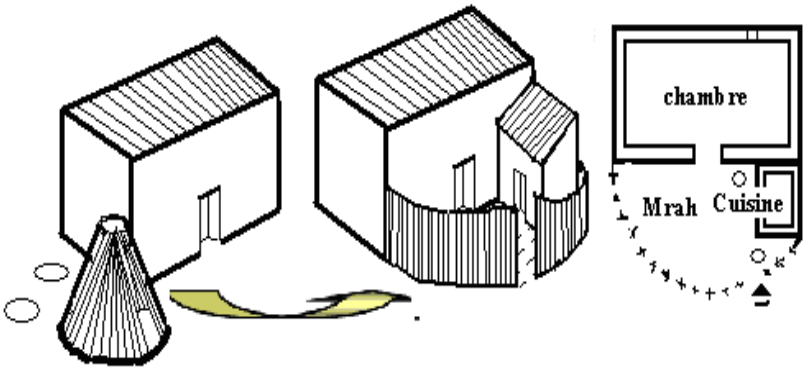


Fig. 5. Diar Sathi type courant : formation volumétrique et forme définitive (*Source :* Fait par l'auteur 2009, selon la description de DESPOIS, J., en 1953)

Cette configuration spatiale à savoir « une pièce-cuisine » était très répandue au Hodna à cette époque, nous la signalons dans notre recherche par « Diar Sathi » de type courant, pour la différencier d'une autre configuration spatiale très simpliste apparue dans la même période, que nous avons désigné de « Diar Sathi » de type rare (*Fig. 6*). Cette dernière consistait en un jumelage de deux chambres semblables, deux logis mitoyens et indépendants l'un de l'autre, probablement destiné à deux frères placés sous l'autorité de l'aîné.

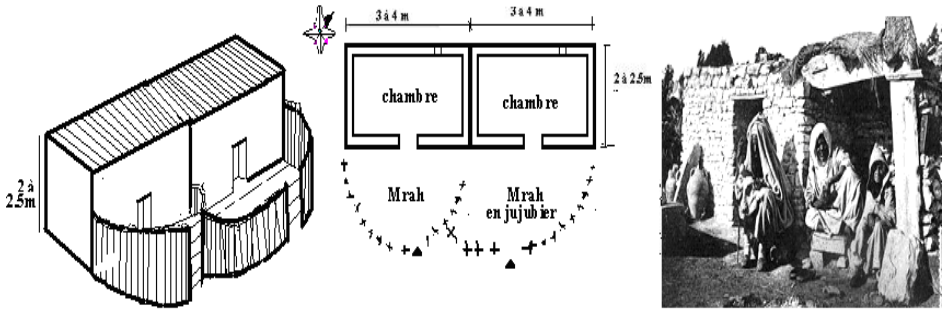


Fig. 6. Diar Sathi : type rare Deux chambres jumelées (*Source :* Boutabba, H. et Farhi, A., 2009 ; cliche : www.photos-algerie.fr)

À la différence du sous-type « Diar Sathi type courant », l'on pense que le type rare n'est pas le dérivé direct du gourbi deuxième generation, vu qu'il ne reconduit pas les mêmes caractéristiques et par conséquent n'est pas un des maillons de la chaîne continue de l'habitation Hodnia. Au contraire, l'on pense qu'il s'agit d'un dérivé du gourbi première generation, ou simplement l'assemblage de deux d'entre eux auxquels il a été ajouté l'enclos et, par là, l'on déduit deux trajets typologiques différents émanant de la tente. (*Fig. 7*)

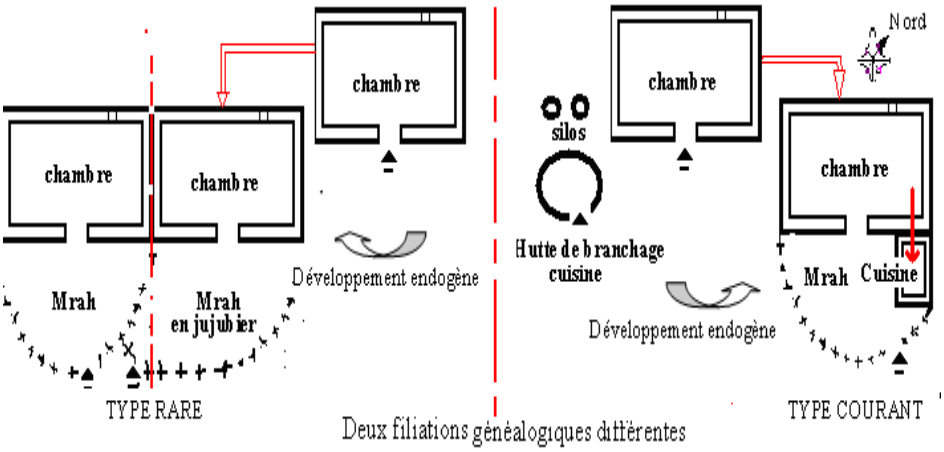


Fig. 7. Les ascendants typologiques des sous-types « Diar Sathi » type rare et type courant (*Source :* Boutabba, H. et Farhi, A., 2009)

4.3.1. « Diar Sathi » type intermédiaire : symbole de l'introversion et du repli domestique

Selon la tradition orale recueillie sur place, le type courant des « Diar Sathi » se verra rajouter latéralement, aux alentours de 1948, un espace de même forme et de même dimension que le premier espace « Dar », conçu probablement lorsque les conditions économiques sont favorables. Dans les deux premiers cas, ce rajout spatial, en abritant de nouvelles fonctions en l'occurrence la réunion et le tissage, donna naissance à une nouvelle division fonctionnelle, d'où son appellation par « Dar el aeyel », intégralement traduit par « la chambre de la famille ». (*Fig. 8*)

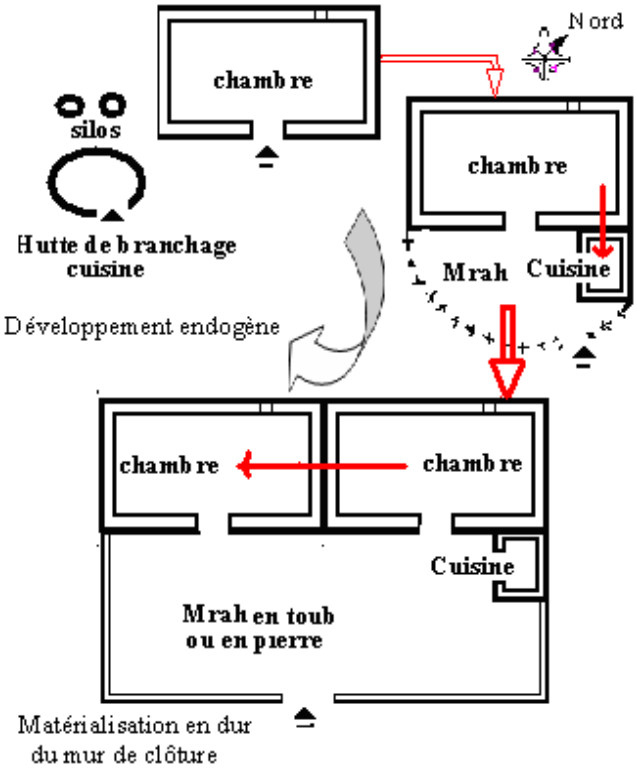
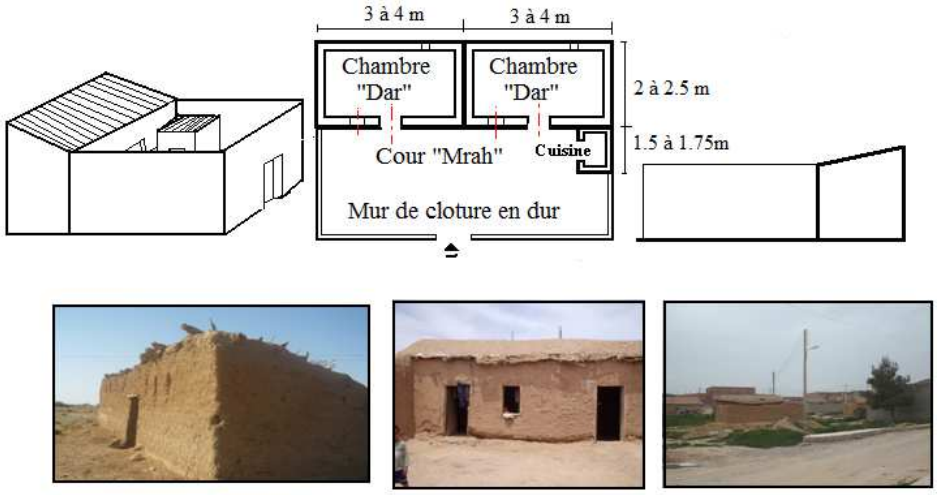


Fig. 8. Schéma généalogique de « Diar Sathi » type intermédiaire
(*Source :* Boutabba, H. et Farhi, A., 2009)

Ce « nouveau type » désigné par « Diar Sathi type intermédiaire » est caractérisé par la concrétisation totale de l'espace semi privé « Mrah ». En effet d'un enclos de jujubier il est passé, selon la richesse de la famille qui l'habite, à un espace de forme régulière, délimité par un muret soit en brique, soit en pierre sèche. Les pièces constitutives – les diar, ensemble de « Dar- » du type intermédiaire – conservaient les mêmes dimensions que celles des types précédents, à savoir 2 à 2.5 m de large sur 3 à 4 m de long. D'après nos investigations effectuées sur place, c'est avec l'apparition du type intermédiaire des « Diar Sathi » qu'avait commencé l'introversion proprement dite et le repli de l'habitation Hodnia. En plus de la matérialisation en dur du mur de clôture qui était de même hauteur que ceux des « Diar » et qui empêchait la relation visuelle entre l'intérieur de la maison et de son extérieur, les fenêtres sur cour avaient fait leur apparition, assurant ainsi à des pièces longtemps privés d'un minimum de confort la ventilation et aération. (*Fig. 9*)



Dar Sathi type intermédiaire à Berhoum | Dar Sathi type intermédiaire à Belaiba | Dar Sathi type intermédiaire à Magra

Fig. 9. Diar Sathi : type intermédiaire (*Source :* Boutabba, H. et Farhi, A., 2009 ; cliches : mêmes auteurs)

La façade sur cour se voit ainsi chargée d'ouvertures. Chaque pièce dispose d'une porte et d'une fenêtre sans signes architecturaux marquant la fonction et la prédominance d'une porte ou pièce sur les autres. Les portes conservaient encore la même petite hauteur de 1,50 m, ce qui obligeait les habitants à se baisser pour les traverser. De même, les fenêtres avaient des dimensions retreintes de l'ordre de 50cm de hauteur et de largeur, sans doute pour éviter d'affaiblir des murs déjà fragilisés par la nature des matériaux de construction utilisés.

4.3.2. « Diar Sathi » type amélioré : habitation des agriculteurs Hodnis

Les agriculteurs de la tribu des « Ouled Nadjaa » de Berhoum et de la tribu des « Ouled Amor » de Magra profitant des vastes terres fertiles aux bord des oueds de Menaifa (Berhoum) et de la Soubella (Magra), étaient les premiers, après ceux du centre urbain de l'époque – Barika, à mener une vie complètement sédentaire. Ils étaient parmi les premiers à avoir amélioré leurs habitations en procédant par le rajout d'autres pieces, passant ainsi « du type intermédiaire » au type « amélioré ». Ce dernier était donc obtenu en dédoublant le module du type intermédiaire par rapport à l'axe longitudinal, ainsi la porte se voit transformée vers le côté transversal. L'on constate ainsi l'existence de maisons Sathi du type amélioré, constituées de 3,4 ou 5 pièces qui ouvraient sur une cour fermée par un mur généralement de même hauteur. (*Fig. 10*)

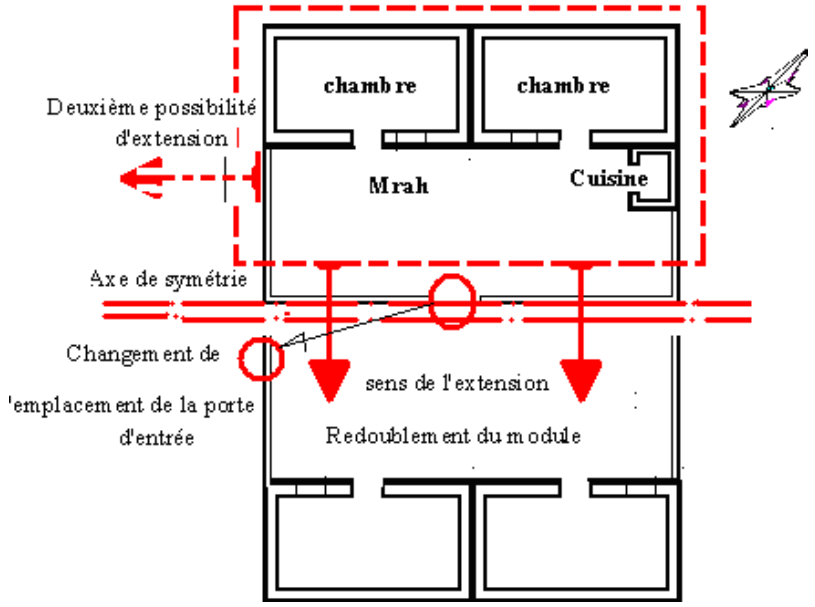


Fig. 10. Schéma d'évolution du type intermédiaire au type amélioré
(*Source :* Boutabba, H. et Farhi, A., 2009)

L'identité de ce type réside dans :

– La surface des chambres qui sont plus spacieuses que celles des type précédents formant des rectangles de 5 m × 3 m, ce ci étant généralement imputé soit à l'utilisation du peuplier qui est le seul arbre susceptible de fournir des poutres longues, d'autant plus qu'il présentait, à la différence du reste du Hodna, une abondance dans la zone d'étude notamment dans les régions de Magra et de Berhoum, soit le recours à la structure fondée sur un poteau central (Rkiza) portant une béquille analogue à celle de la tente (Despois, J., 1953).

– La hauteur de la bâtisse varie de 3 à 4.5 m;

– La hauteur des portes est de 1.80m. Elle ne gène plus les utilisateurs.

– La surface la plus importante est celle de la cour;

– La matérialisation de certains espaces tels que l'écurie avec un simple auvent de branchage et le makhzen (la remise), un espace rectangulaire de 01 mètre de hauteur réservé à l'approvisionnement du grain, qui occupait un coin dans l'une des pièces contrairement aux silos de grains parsemés indifféremment dans le M'rah des types précédents.

– L'introduction d'une cheminée à l'européenne, maladroitement aménagée dans l'un des angles de l'une des chambres et généralement dans Dar « el ayel », ou la chambre familiale.

Une grande nouveauté d'ordre spatial est introduite par ce type : elle réside dans l'aménagement, dans certaines maisons appartenant à des gens aisés, d'une chambre d'invités, « Dar Dhiaf », destinée aux invités masculins. Ouvrant sur l'extérieur, cette pièce faisait corps avec le reste de la maison (*Fig. 11*)

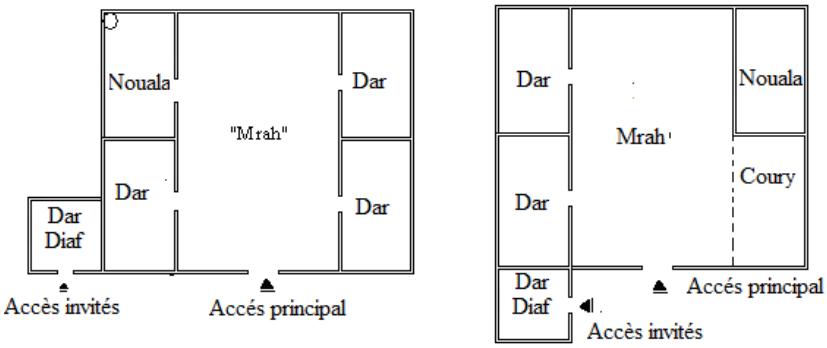


Fig. 11. Différentes positions de beyt Dhiaf dans une des Diar Sat(e)hi du type amélioré (*Source :* Boutabba, H., et Farhi, A., 2009)

En général et mise à part « Dar dhiaf », les pièces étaient occupées de manière polyvalente et aucune spécialisation ne les différenciait, les chambres étaient conçues pour dormir, manger, prendre sa toilette et pratiquer le tissage. La précarité du mobilier ainsi que sa mobilité avaient sans doute fortement contribué à cette poly, fonctionnalité des pièces.

Quant à la nouveauté d'ordre constructif, elle résidait dans l'emploi de la tuile cylindrique emprunté aux tribus montagnardes de l'extrémité orientale du Hodna – « *on ne faisait ni brique cuite ni tuile* » (Despois, J., 1953). Par l'utilisation de la tuile cylindrique comme matériau de couverture les maisons qualifiées de « type amélioré » n'étaient plus appelées Diar Sathi mais « Diar Karmoud » ou « maison à tuiles », soutenant ainsi la classe supérieure de ce type d'habitat.

4.4. Le troisième type : « Diar Kraib » ou maison à toiture à double pente

Diar Kraib avaient la même conception que Diar Sathi, elles se distinguaient surtout par le matériau dont elles étaient faites et par leur mode de couverture plus que par leurs fonctions. Les pièces constitutives de la maison au nombre de 2, 3, 4 ou plus, s'ouvraient sur la cour et s'ordonnaient autour d'elle dans une composition centralisée définie par les façades intérieures. Le toit en double pente exige une charpente, or dans le Hodna, cette dernière était absente sauf dans les grandes maisons de pisé des Ouled sidi Hadjeres du Hodna occidental. Pour le reste des localités, les Diar kraib étaient soutenues par une poutre faîtière appuyée sur les deux pignons et parfois, lorsque les pièces sont spacieuses, par un poteau central (Rkiza). (*Fig. 12*)

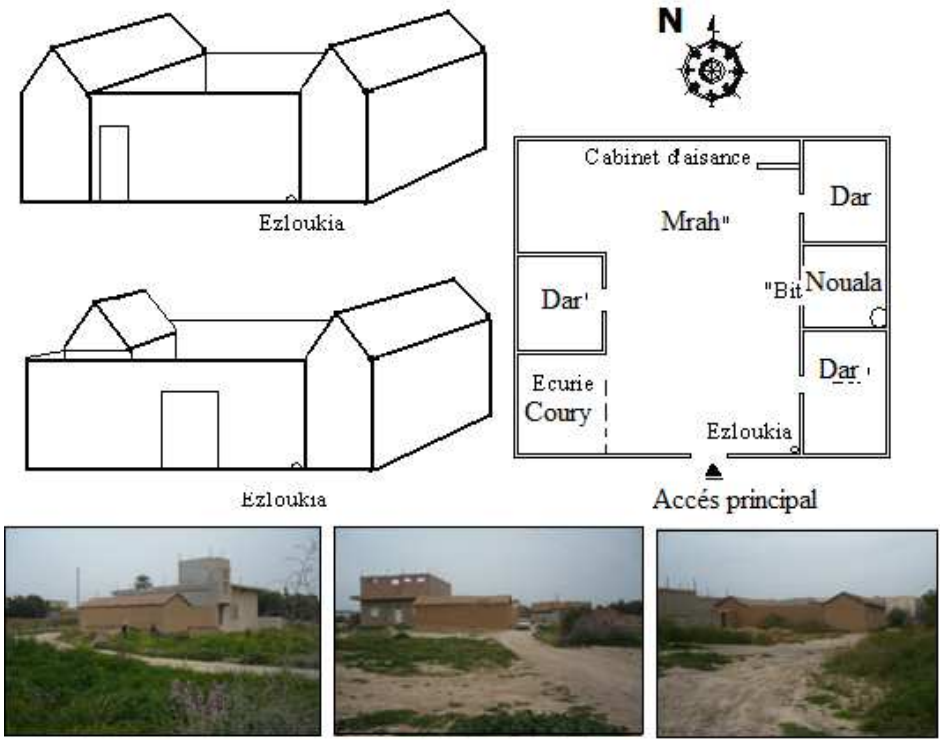


Fig.12. Type « Diar(s) Kraib » à Magra et à Berhoum (*Source :* Boutabba, H. et Farhi, A., 2009 ; cliches des auteurs)

Ce type d'habitation est resté opérationnel dans le Hodna jusqu'aux premières années de l'indépendance, où il n'avait pas vraiment disparu mais, s'est vu accompagné par un autre type: "Diar Be Reboe".

4.5. Le quatrième type : « Diar Berboe » : maisons des riches agriculteurs Hodni

Du point de vue conceptuel, « Diar Be Roboe » se démarquaient des Diar Kraib par une extension transversale de la cour en occupant le troisième côté de la maison. Etymologiquement « ReBoe » en arabe signifie 1/4, d'où cette appellation faisant référence au côté de la maison qui n'est pas occupé et donc pas couvert. Ce type d'habitation était celui du riche cultivateur Hodni. On ne comptait qu'une seule maison de ce type à Magra et deux autres à Berhoum. Ce nouveau côté était occupé par la cuisine, le cabinet d'aisance et le makhzen qui occupe un espace à part. On remarque la pénétration de « dar dhiaf » dans le corps de la maison, mais gardant un accès de l'extérieur (*Fig. 13*).

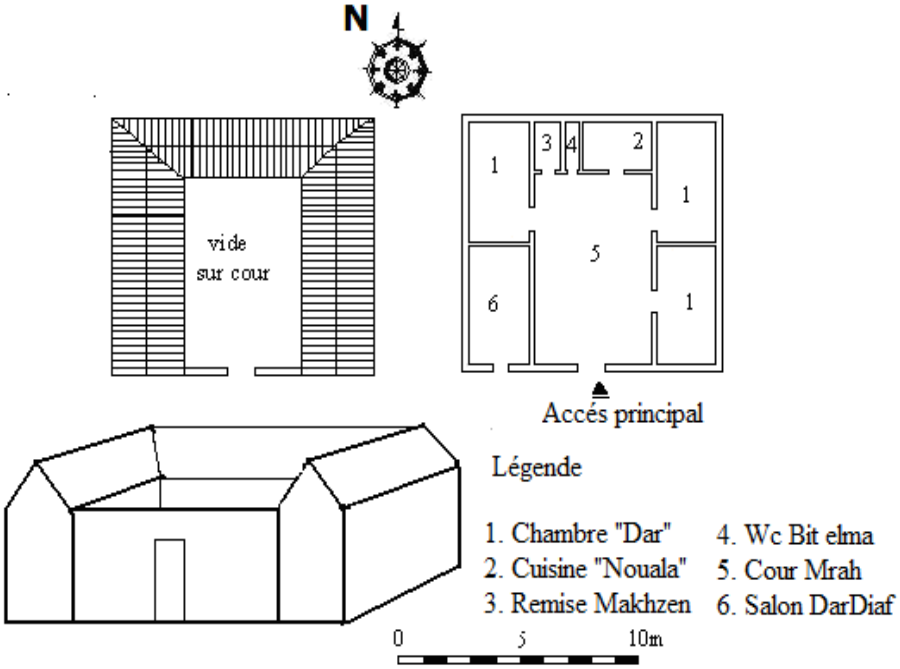


Fig. 13. Type « Diar(s) Berboue » (*Source :* Boutabba, H. et Farhi, A., 2009)

La représentation du premier stade, « le gourbi » unique pièce à tout faire est bien réelle et cautionne l'idée du type originel generalise, dont dériveraient tous les types ultérieurs.

Le schéma d'évolution historique montre la croissance de l'habitat. La partie droite du schéma traduit l'évolution de l'habitation courante la plus répandue. Cette évolution est dite endogène étant donné que la définition d'un nouveau type semble une extension du type antérieur qu'elle ne modifie pas puisqu'elle procède par adjunction, ne déstructurant pas l'organisation précédente et en particulier celle de la chambre. Le mode de croissance endogène régit la formation des types nouveaux et les agrandissements individuels opérés sur une même maison transformée. La production de l'habitat neuf et celle des transformations relèvent de la même logique. D'ailleurs, le type qualifié d'intermédiaire était le type le plus répandu dans le Hodna oriental jusqu'au début du siècle dernier. C'était le type courant du nouveau sédentaire Hodni.

Le type intermédiaire « deux pièces – cuisine » peut être considéré comme un type de base, ayant servi de noyau d'évolution à l'habitat rural des nouveaux sédentaires. Le schéma généalogique ci-dessous montre le potentiel de croissance, aussi bien transversale que longitudinale, de ce type intermédiaire à partir de sa cour et de ses murs latéraux (*Fig. 14*).

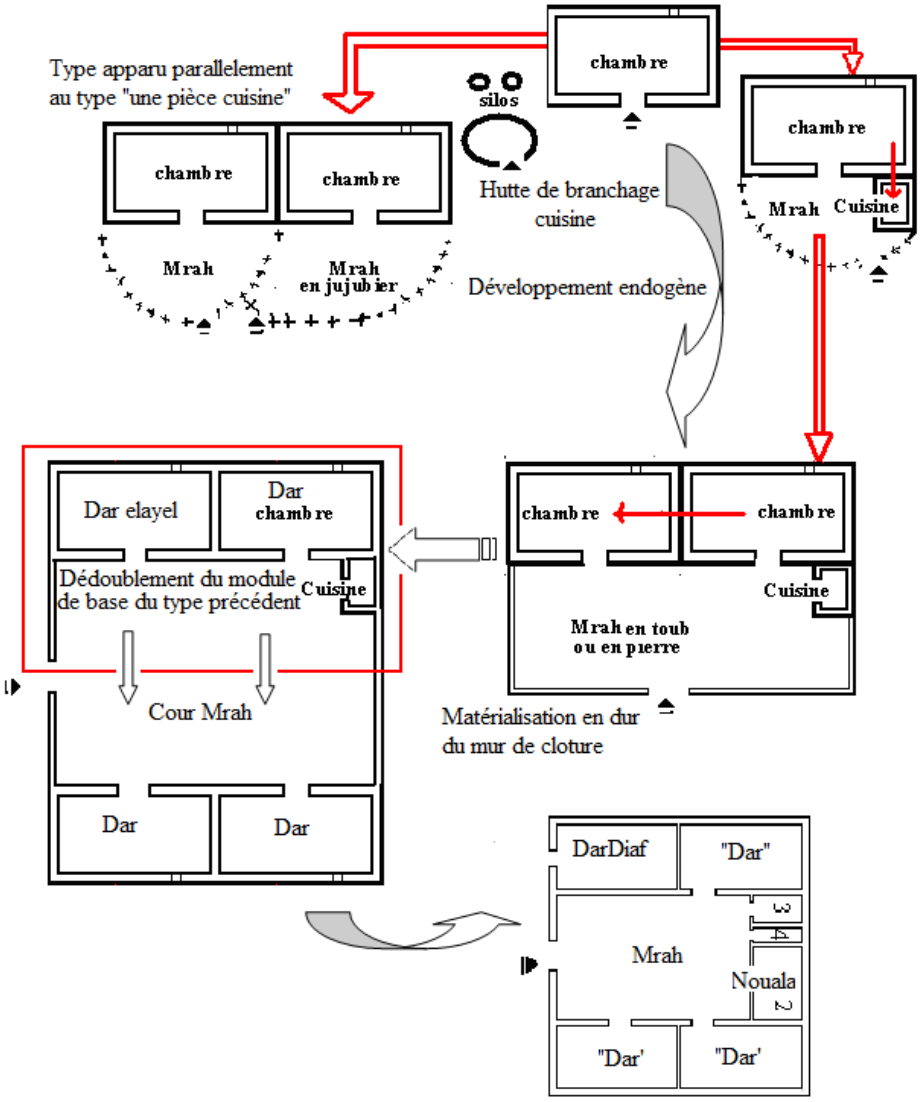


Fig. 14. Schéma généalogique des types préliminaires du Hodna oriental
(*Source :* Boutabba, H. et Farhi, A., 2009)

C'est donc dans ce sens que « le type intermédiaire » (les deux pièces- cuisine) est considéré comme un type de base:

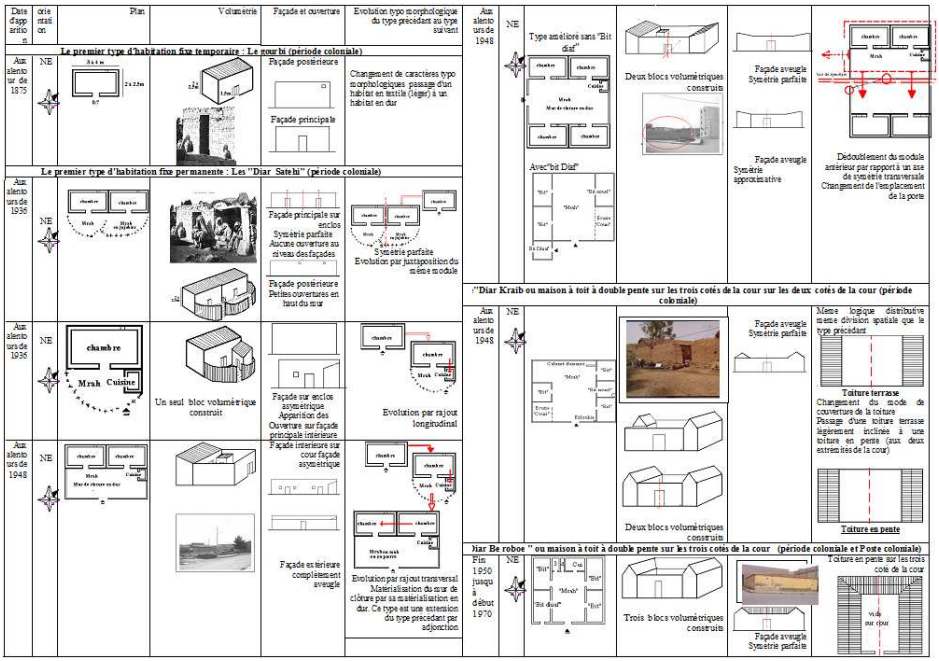
– Type effectif des nouveaux sédentaires (anciens éleveurs).

– Noyau de départ, support d'adjonctions ultérieures;

– Type générique permettant de comprendre l'habitat de ces nouveaux sédentaires et de son extension.

Tableau 1

Evolution généalogique des types d'habitat domestique préliminaires du Hodna oriental



Source : Boutabba, H. *et al.*, 2009

5. L'Habitation post coloniale: des ruptures socio-spatiales brutales

Au lendemain de l'indépendance, l'État Algérien optait pour une stratégie d'industrialisation poussée de certaines branches, placées toutes au Nord du pays, ce qui avait donné naissance aux premières disparités régionales. Pour palier à ce déséquilibre, une industrie de base, en aval de celle située dans les zones portuaires, fut redéployée vers l'intérieur du pays, ce qui avait encouragé les ruraux déracinés des steppes, des plaines et des montagnes, qui se sont agglutinés beaucoup plus massivement autour des villes mais aussi autour des simples centres ruraux de colonisation (Preanant, A., 1980, p. 95). Les Hodnis récemment sédentarisés affluaient en masse vers les anciens centres de Barika et de M'sila. Pour faire face à cet exode rural, l'État commença la construction des villages socialistes dans le cadre de la plus grande opération d'envergure qu'avait connu l'Algérie rurale – « la Révolution Agraire ». Le Hodna était l'une des régions – pilote pour la révolution agraire et à l'instar des zones telliennes la région est entrée dans le grand mouvement de cette révolution avec un capital de

7 villages socialistes réalisés sur 20 villages programmés (Benatia, F. *et al.*, 1983). Ainsi, le Hodna assista à l'amorcement du grignotage de la structure sociale de ses habitants et de la structure spatio-architecturale de son habitat. Si la « Mechta » est une progéniture de la « Nezla » qui est elle-même progéniture du douar primaire des tentes des anciens nomades Hodni, le village socialiste est un intrus propulsé par l'État Algérien dans le but d'asseoir une nouvelle idéologie et de transformer l'habitat. À cet effet, la charte d'Alger (1964) précisait que « *la révolution a non seulement pour tache de liquider tous ses survivances (structure tribale, patriarcales, semi féodales) mais d'en prévenir le retour. Fondamentalement, il s'agit de faire de l'Algérien le citoyen conscient d'une nation moderne* » (cité par Leca, 1981, p. 95). La zone d'étude était limitrophe de ces villages socialistes et s'est vue très influencée par cette idée de modernité. Le développement spatial des différentes agglomérations s'est orienté vers les rues rectilignes et du coup, les maisons se trouvèrent côte à côte accolées les unes aux autres.

5.1. Le cinquième type : « Diar Belwizdad » ou l'imposition politique d'un modèle exogène

Ce nouveau type que les Hodnis nommaient « Diar Belwizdad » était destiné dans sa globalité à une transformation radicale de la paysannerie, en structurant de nouveaux rapports sociaux à travers de l'organisation de la production et l'unité d'habitation proposée.

Sous couvert de modernité et d'une « phobie écœurante » du traditionnel, son espace était calqué sur le type de villages agraires propulsé par l'état et conçu par des spécialistes loin de la réalité socio-spatiale des Hodnis. La maison à cour centrale, qui caractérisait l'ère précoloniale, était considérée comme « archaïque » et s'est vue délaissée au profit d'une nouvelle conception : la maison à couloir, ou « Diar Belwizdad ». D'ailleurs, les Hodnis comparaient le couloir autour duquel s'articulaient les différentes chambres (Diar) à une rue de la capitale (la rue Belwizdad) jalonnée, sur ces deux rives, par des locaux accolés les uns aux autres.

Le type « Diar Belwizdad » était caractérisé par une disposition simpliste dont l'axe est un couloir sur lequel s'ouvre le double alignement des pièces. La partie couverte était généralement composée de quatre chambres « Diar » (*Fig. 15a*) parfois de cinq ou six (*Fig. 15b*), disposées deux à deux, suivies d'une cour « Mrah » abritant dans l'un de ses angles un cabinet d'aisance « bit elma ». La relation avec l'espace public se faisait soit directement par la porte d'entrée située au milieu de la façade, soit par l'intermédiaire d'un espace semi privé: « Sdara » (*Fig. 15c*). Cet espace faisait office de véranda qui, lorsque l'habitation occupait une parcelle d'angle dans l'ilot, était munie en plus d'une porte cochère

(*Fig.15c; 15.02*). Parfois « Sdara » se limitait à un enclos inutilisable, délimité par de murs de petites dimensions (*Fig. 15.01*). Lorsque ces habitations ouvraient sur des rues commerçantes, les chambres donnant sur la façade sont transformées en locaux (Hanout), afin de subvenir aux besoins de la famille, (*Fig. 15.03*) car les conditions économiques des Hodnis dans les années 1980 étaient encore dérisoires.

Fig. 15. Dispositions spatiales des « Diars Belwizdad » (*Source :* Boutabba, H. et Farhi, A., 2009 ; cliches des auteurs)

Les habitations de type « Diar Belwizdad » étaient composées d'un rez de chaussée généralement surmonté d'une toiture plate, quelques fois en pente (cas des plus anciennes habitations); quant à la façade, elle commandait dans une simplicité remarquable le plan. Elle présentait généralement une certaine symétrie par rapport à un axe qui coïncidait avec le milieu de la porte principale d'entrée. Ce type avait connu plusieurs extensions verticales. Il est resté dominant jusqu'à la fin des années 1980, où le Hodna a vu l'apparition d'un autre type d'habitat domestique.

5.2. Le sixième type « Villa sur garage » : les riches demeures des années 1990

Alors que le pays souffrait de la grande crise économique des années 1980, la région du Hodna prenait son envol économique par le développement de l'économie dite « informelle », qui se propagea avec force dans divers domaines au

point de constituer un puissant soubassement socio-économique (Benchenouf, D., 2006). Ceci a suscité de grands changements dans la structure sociale des habitants de cette région. D'habitants nomades, pauvres et déshérités, ne vivant que des rentes dérisoires cumulées du travail de la terre et du pastoralisme, les Hodnis, nouveaux « trabendistes » (Telemcani, S., 2008; Koné, B., 2009) de haute gamme se sont transformés en richissimes commerçants suite aux évasions fiscales immenses, ce qui permettait un commerce informel d'envergure allant de la pièce détachée aux matériaux de construction, aux engins mécaniques jusqu'à la « casse ». Un commerce qui exigeait des localisations spatiales particulières, qui devaient répondre aux nouvelles exigences de délivrance de marchandise, de stationnement, d'engins de transport généralement privés et surtout répondre aux qualités requises de discrétion. Les routes nationales RN 28 et RN 40 étaient considérées par ces « barrons » non seulement comme adresses facilement repérables par les clients potentiels qui viennent de toutes les régions du territoire national mais aussi comme des lieux propices à la bonne santé commerciale vu l'importance des routes qui permettent la relation avec différentes wilayas du pays. Dès lors, les bords de ces routes se trouvent transformés principalement en lieux privilégiés d'implantation de hangars de stockage de marchandise. Habiter n'était pas le souci principal.

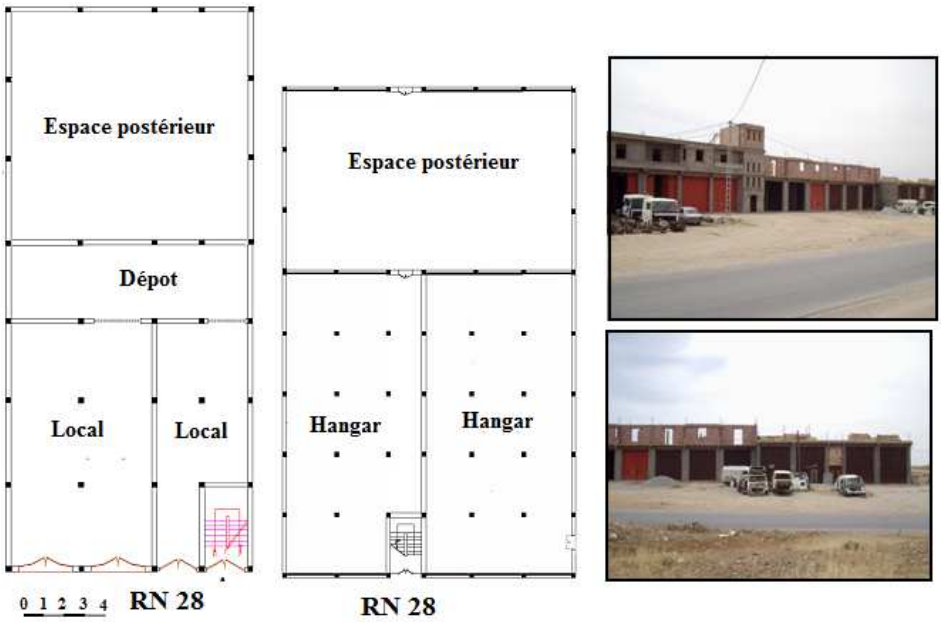


Fig. 16. Dispositions spatiales préliminaires du type « Villas sur garage »
(*Source :* Boutabba, H. et Farhi, A., 2009 ; cliches des auteurs)

Ce type d'habitat domestique était donc caractérisé par de fortes surfaces foncières dépassant les 1000 m^2, pouvant atteindre parfois les deux hectares, partagées entre de vastes surfaces bâties au sol de l'ordre de 500 m^2 en moyenne et d'immenses espaces non bâtis postérieurs. La partie bâtie se limitait, à l'exception faite d'une cage d'escalier occupant tantôt l'une des extrémités du lot, tantôt sa partie centrale, à un rez de chaussée. Ce dernier était divisé, en suivant la trame de la structure porteuse, en plusieurs hangars prenant accès de ces routes nationales et donnant de l'autre côté vers l'espace postérieur. Cependant, vu l'intérêt économique colossal que représentaient ces hangars, habiter « sur place » devenait une nécessité. Au rez de chaussée sont venus s'ajouter d'autres étages, conçus sous forme d'immeubles de plusieurs appartements, desservis d'une façon indépendante par une cage d'escalier.

Au premier niveau se dresse le corps de logis. Il prend généralement accès à partir de la route nationale, rarement d'une route secondaire ; directement via une cage d'escalier ou indirectement en traversant en plus, soit l'espace non bâti postérieur, soit un des locaux du rez de chaussée voué au stationnement de véhicule particulier du maître de la maison.

À l'étage, l'organisation spatiale se distingue par de larges espaces: des pièces spacieuses, de nombreux espaces de réception, de plusieurs salles de bains, de grandes cuisines et de grandes terrasses, selon des logiques distributives qui rappellent l'architecture moyen orientaliste en vogue : halls monumentaux de distribution et foules d'éléments architectoniques d'ostentation. Les villas sont implantées non pas directement au sol, mais sur de grands locaux, d'où leur nomination par les Hodnis de « villas sur garage » (*Fig. 16* et *Fig. 17*).

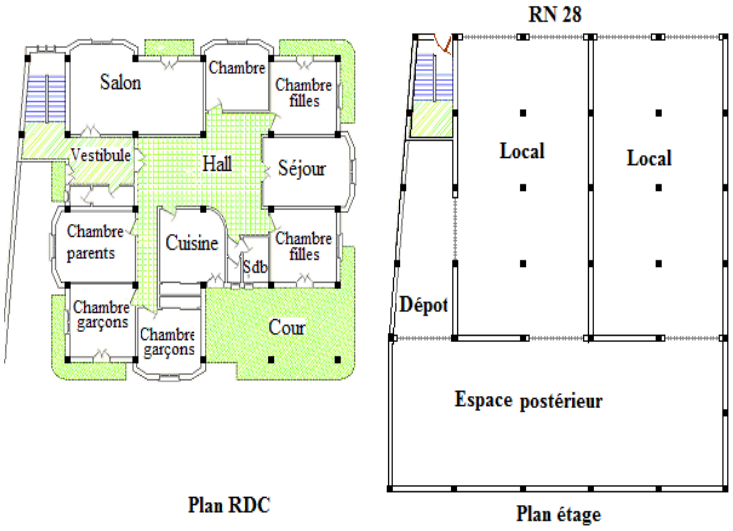


Fig. 17. Dispositions spatiales d'une habitation du type « Villas sur garage » dans la localité de Belaïa (*Source :* Boutabba, H. et Farhi, A., 2009)

De l'extérieur, ce type d'habitation domestique formalise les traits architecturaux d'une urbanité grandissante sur un site d'accueil encore rural, avec plusieurs étages de l'ordre de trois à quatre, qui affichent une tendance à l'extraversion de leurs espaces domestiques par l'utilisation de baies vitrées avec vitrage « stop sol », terrasses, loggias et balcons; autant de lieux typiques partiels de référence urbaine qui cependant, d'un point de vue pratique restent quasiment inutilisables sauf dans certains cas pour l'aération et l'éclairage de l'espace intérieur. Quant à la toiture, elle est restée plate, depuis sa promotion comme « symbole de modernité » par le type précédent des « Diar Belwizdad ». D'ailleurs c'est sa transformation en pente qui va principalement distinguer ce type d'habitation des « villas sur garages » des années 1990 de celui de son successeur de la décennie suivante : le type « Diar Charpenti » (*Fig. 18*).

Fig. 18. Enveloppes extérieures de quelques résidences du type « Villas sur garage » dans la localité de Belaïba et Magra (*Source :* Boutabba, H. et Farhi, A., 2009)

5.3. Le septième type « Diar Charpenti » : une architecture de l'importation

La décennie 2000 est caractérisée au Hodna oriental, en plus de l'économie parallèle, par l'émergence en force de l'économie formelle et légale, représentée

par l'entreprise privée. En effet le désengagement de l'état au lendemain de l'ajustement structurel imposé par l'institution de Berton Woods (Grim, 2008), avait été traduit au niveau du Hodna par l'ouverture à l'importation des biens de l'étranger. Sur le plan social, la minorité riche, « les anciens barons de l'informel », a pris le « leadership » non seulement économique, mais aussi social. Du fait de son contact avec l'étranger, elle a emprunté les emblèmes et les symboles d'une modernité factice sous toutes ses apparences extérieures. Les nouveaux comportements sociaux s'organisent désormais principalement autour de la consommation et des apparences (Boukhobza, M., 1991), focalisées notamment sur un nouveau cadre bâti « Diar Charpenti » (*Fig. 19*), exploité par excellence comme moyen de démarcation par rapport au reste de la population.

En réalité, ce nouveau type d'habitat domestique des « Diar Charpenti » ne manifeste pas de nouveaux traits spatiaux par rapport à celui qui l'avait précédé. Sa démarcation réside essentiellement dans son enveloppe extérieure qui semble faire table rase à l'architecture autochtone, en ne signant aucune forme traditionnelle.

Un pastiche architectural qui semble ignorer l'esprit du lieu. L'adoption d'une architecture extravagante et à caractère ostentatoire qui ignore les références locales semble faire défi de l'esprit d'une société très conservatrice. La tendance à l'extraversion et l'adoption d'éléments architectoniques appartenant à d'autres civilisations et notamment à l'architecture occidentale moyenâgeuse des résidences fortifiées et des châteaux forts semble prendre place dans des sites à fort degré de ruralité.

Fig. 19. Enveloppes extérieures de résidences : type « Diar Charpenti »
(*Source :* Boutabba, H. et Farhi, A., 2009 ; cliches des auteurs)

De même, l'imposante volumétrie de ces « Diar Charpenti » renvoie à des emprunts appartenant à la civilisation asiatique, à travers la toiture faite de plusieurs pentes en pagodes, généralement surplombées par une imposante pyramide centrale à base heptagonale, parfois de deux pyramides superposées à base rectangulaire dominant la cage d'escalier, terminées par une stèle. Ce sont ces innombrables charpentes caractérisant la toiture qui ont valu à ce nouveau type d'habitat domestique sa dénomination de « *Diar Charpenti* » et ont permis sa distinction par rapport aux autres types qu'avait connue la région depuis la fixation au sol de ses habitants aux alentours de 1875 (Despois, J., 1953; Cote, M., 1983; Sebhi, S., 1987) jusqu'à l'heure actuelle.

6. Conclusion

Depuis la sédentarisation des habitants aux alentours de 1875, le Hodna a vu la matérialisation de plusieurs types d'habitat domestique, groupés distinctivement, selon une segmentation historique. Ainsi, le type ambulant « le guittoune » est passé, sous l'impulsion de l'administration coloniale, de son mode originel de groupement (pour se plier au désir hégémonique de l'administration coloniale, du) du « Douar » à la « Nezla » et de la « Nezla » à la « Mechta ». Bien qu'il soit ambulant, non dur et précaire, le « guittoune » matérialisait déjà une division sexuée et bipartite de son espace. La spatialité des premiers types préliminaires, temporaires et permanents, n'était que la transcription sédentaire du type ambulant. Les premiers types préliminaires constituaient le noyau primaire de tous les autres types préliminaires de l'ère coloniale qui allaient succéder. Cet état de fait s'explique par l'adjonction du module de base qui ne déstructure nullement l'organisation précédente. La seule modification observable se manifestait au niveau du mode de couverture qui n'était incliné que d'un côté (Diar Sathi) puis cette inclinaison a regagné le deuxième côté constituant ainsi la toiture à double pente (Diar Kraib). La distinction d'un type à l'autre se faisait, aux yeux des Hodni, selon le mode et le matériau de couverture de l'habitation (Diar Karmoud). En occupant le troisième côté, de la cour, jusque là inexploité, le type « Diar Berboue » matérialisait l'évolution définitive, complète et terminale du type initial. Ils constituaient les derniers témoins spatiaux d'une évolution endogène du module primaire, un type qui matérialisait la concordance des pratiques spatiales aux pratiques sociales. Ils étaient tirés d'une évolution successive, plus au moins lente dans le temps qui a duré presqu'un siècle (1875-1970). Les types « Diar Sathi » avec leurs trois variantes, « Diar Kraib » et « Diar Berboue » émanaient d'une même logique spatiale à savoir la maison à cour centrale.

La période poste coloniale des deux décennies 1970-1980 était caractérisée par un bouleversement politico-social dont les répercussions socio-spatiales et

architecturales étaient colossales, au point de modifier un modèle d'habiter qui est resté stable tout au long d'un siècle d'existence, au profit d'un autre, appelé la maison à couloir, un type 'intrus' au Hodna, matérialisé par le type « Diar Belwizdad ».

La période d'instabilité politique qu'avait connu l'Algérie durant les années 1990 avait permis au Hodna de connaître les prémisses d'un envol économique qui allait changer le cours de l'histoire de cette société. Sur le plan urbain, les deux routes nationales qui sillonnent la région RN 28 et 40 étaient des lieux propices à la bonne santé économique et se trouvaient du coup squattés par un nouveau type d'habitat domestique, « Villas sur garage », qui matérialisait une fois de plus une rupture avec les types précédents de part leur mode de groupement (le long de ses axes commerciaux) et de leurs distributions spatiales autour de deux espaces – l'un purement de transition : le couloir, l'autre d'occupation: le hall. Cependant cette rupture semble atteindre, d'un point de vue stylistique, son apogée en englobant l'enveloppe extérieure, par l'adoption des Hodnis d'un type nouveau d'habitation « Diar Charpenti ».

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THE ENDOGENOUS AND EXOGENOUS PERCEPTION OF BUCHAREST CITY. A CONNECTING ELEMENT IN THE RURAL-URBAN RELATIONSHIP

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Seen from a geographical point of view, this paper outlines the importance of urban perception from both an endogenous as well as an exogenous perspective not only for the strictly administrative area of the city, but also in terms of exceeding those limits to the rural area. The authors chose as a case study a complex city with a manifold population and a diversified and mosaic structure, in the same time the most important economical, political, administrative, social, cultural and educational pole in Romania, namely Bucharest. Therefore, at constant periods, respectively 2006, 2008 and 2010 the urban image could be analyzed at different scales of spatial and temporal levels, with a clear outside and inside perspective, using observation and survey approach. Considering the rich data collected in the three year period, we focus in this paper on the overall image of the city, while making at the same time reference to the importance of the perception in the rural-urban context.

Key words: *urban perception, urban image, rural-urban interface, Bucharest.*

Introduction

The present paper deals in an original way with already known and intensely debated concepts, but without being discussed as elements based on a subtle interdependence. The *urban perception* is a commonly used tool in behavioral geography, whose foundations were laid in the early 60[s] of the XX century. Behavioral geography is a branch of the socio-urban geography, analyzing mainly the decision making effects of each individual or human group in relation to the environment. In other words, this branch deals with active mental processing of knowing and understanding the close-by space. (Downs, R. and Stea, D., 1977) In time, the perception, hidden under the term of "urban image", has become increasingly interesting for the spatial analysis, the apogee being reached by Kevin Lynch (1960) and the team of researchers P. Gould/R. White (1974), whose contribution can be seen in the development of mental maps in

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geography. For a better understanding of this concept and its importance in the context of regional development, perception should be emphasized, as it will be understood in this paper as the capacity of filtering the information received out of the environment (see *Fig. 1, right*) (Werlen, B., 2000), or as the relationship between the objective reality and the imaginary world influenced by inner elements (emotion, knowledge, interests, etc.) and external stimuli of each individual[1] (see *Fig. 1, left*). (Stoian, D., 2011)

As an instrument of urban image and identity development, the urban environment perception is based on three different scales:

1. information field (extending from the environment in which an individual lives up to that in which he gained information indirectly – through media, books, other people),
2. contact field (core of the informational field, environment directly perceived by the individual), and
3. interaction field (the environment in which individuals come into contact by phone, letter, being mainly a reciprocal relationship) (Werlen, B., 2000).

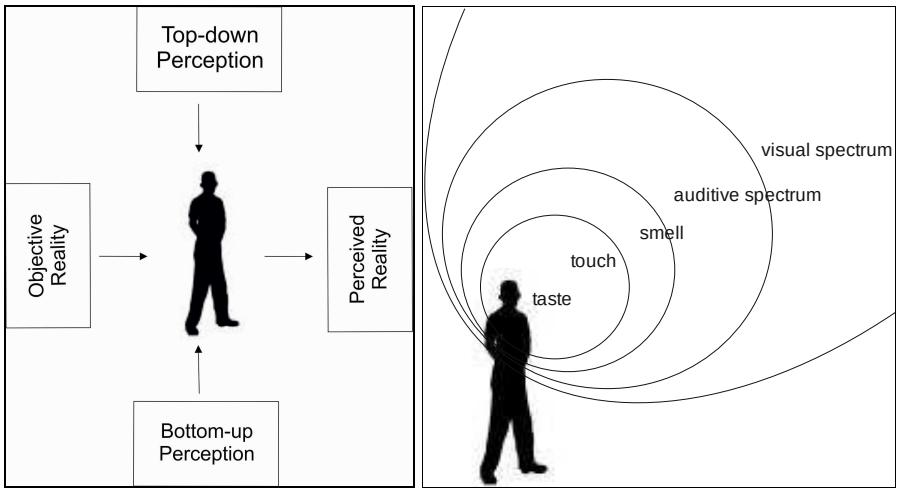

Fig. 1. Construction of urban image (left) (*Source:* Stoian, 2011); Environmental perception (right) (*Source:* after Werlen, B., 2000)

[1] In the social perception (but also in psychology, where the subject is analyzed out of the neuropsychological point of view) two key processes are taking place in shaping perception, respectively the top-down (indirect) and bottom-up (direct) perception. The first deals with the interpretation of the information and knowledge already accumulated by that time, while the second processes information gathered through the senses transmitted to the brain.

Ianoş (2004) develops in his study "*Dinamica urbană. Aplicații la oraşul şi sistemul urban românesc*"[2] the interaction between the objective reality of the city and the actors that processes the information, dividing them in two categories: direct observers (individuals who live and have they daily activities in the city), and indirect observers (those who form an indirect image of the place through the information received from media or third parties).

The image composed through direct and indirect perception represents finally an important component in the qualitative analysis of the living space and the relation between the city and the immediate peripheral regions, but also in stimulating branding and marketing activities. Therefore, in the first case the focus is set on the external quality resulting in a negative, positive or neutral image, having as a further result urban topofilia, topofobe or topoindiferent reaction (Ianoş, I., 2004), while in the second case the economic, social, cultural and political-administrative perception is highlighted.

An analysis of the urban image can't be strictly defined in the administrative limits of the city.

The influence exercised on the suburban area and also the urban – suburban mutual dependence, contribute as well at the topofile and topofobe processes. The same suburban space, defined by Iordan (1973) as the "area around an urban center having a close connection to it", known in the German literature as "Hintergrund" or "Umland" (Hofmeister, B., 1994), was lately confused with the term of "interface", a fix or variable area that constitute a bond between rural and urban space. In 1997 Siverstone, R. (quoted by Johnston, R. J. *et all.*, 2005), noticed that the suburban area represented "the attempt to marry town and country" exactly what is intended by the phrase **"rural – urban interface"**. Due to the evolution of human society, the suburban area in developed countries is no longer the main source of supply for the urban population. Its function changed into one of absorption of the urban inhabitants. Therefore it is important to extend the analysis upon the urban perception to the bordering area, being finally an important element of connection by sending information, opinion, feelings, etc. from the urban to the rural area. In other words, the positive or negative urban image can provide advantages and disadvantages in relation to the environment, a theoretical influence which may be seen as waves, where an urban pole plays the role of a central point.

Materials and Methods

To be able to determine the urban image and the way in which Bucharest city is perceived, a well known method in sociology and social geography has been used, respectively the questionnaire. The long-term study took into

[2] Engl.: *Urban dynamics. Appliance at Romanian cities and urban systems.*

consideration several analyzed factors and varied scales of time and space. First of all the study was divided in three single periods of time, at constant phases: 2006, 2008 and 2010. Queries have been taken at different spatial scales: at urban level, at district level, at micro-regional and at public square level. Along with these aspects the responders had been classified according to their age group, educational level, marital status or place of origin. The investigation of the overall image of Bucharest was embedded in a complex series of open and closed questions, designed to verify and to extend the general and particular aspects of the perception. Thus, the research has been enriched with matters about housing preference within the city, main factors that contributed to the urban image formation, satisfaction and dissatisfaction elements in regard to the resident district and Bucharest as a hole, attractiveness and unattractiveness of the central public squares and the reason for their attendance, and so on. To increase the level of objectivity, some elements have been studied out of two perspectives: the endogenous (through the responses of the residents of Bucharest) and exogenous (from the perspective of individuals living outside the city). In the three years, data were collected to a cumulative total of 1156 eligible questionnaires, 180 in 2006, 574 in 2008 and 405 for the year 2010 (see *Table 1*). If in 2006 the research had been focused on collecting information about the urban image within the city area and at district level with an accentuated view on the exogenous and endogenous opinion, in 2008 a thoroughgoing study searched for answers at micro-regional level. Because of the morphological and structural aspects 28 areas had been selected in the capital city as follows:

1. Splaiul Independenței – M. Kogălniceanu Blvd. – Regina Maria Blvd. – Universității Square – Carol I Blvd. – Mântuleasa Str. – Corneliu Coposu Str.
2. Calea Plevnei – V. Pârvan Str. – M. Kogălniceanu Blvd. – Regina Elisabeta Blvd. – Lascăr Str. – Ştefan cel Mare Ave. – Lascăr Catargiu Blvd. – Dacia Blvd. – Mircea Vulcănescu Str. – Dincu Golescu Str. – Witing Str.
3. V. Lascăr Str. – Dacia Blvd. – Calea Moşilor – Mihai Bravu Ave. – Calea Călăraşi – Mântuleasa Str. – Carol I Blvd.
4. Calea Călărăşi – Mihai Bravu Ave. – Baba Novac Str. – Câmpia Libertății Str. – Liviu Rebreanu Str. – Râmnicu Sărat Blvd. – Râmnicu Vâlcea Blvd. – Calea Vitan – Lucian Blaga Str. – Unirii Blvd. – Dimitrie Cantemir Blvd. – Corneliu Coposu Str.
5. Dimitrie Cantemir Blvd. – Mărăşeşti Str. – Mircea Vodă Str. – Splaiul Unirii – Plugarilor Str. – Calea Văcăreşti – Tineretului Blvd. – Calea Şerban Vodă

6. Dimitrie Cantemir Blvd. – Calea Şerban Vodă – Mărăşeşti Str. – Istrati Str. – Gazelei Str. – George Coşbuc Blvd. – Libertății Blvd. – Splaiul Independenței
7. Libertății Blvd. – George Coşbuc Blvd. – Gazelei Str. – Fabrica de Chibrituri Str. – Spătarul Preda Str. – Progresului Str. – Calea Rahovei – Petre Ispirescu Str. – Drumul Sării Blvd. – Geniului Blvd. – Splaiul Independenței
8. Mircea Vulcănescu Str. – Dacia Blvd. – Lascăr Catargiu Blvd. – Ion Mihalache Blvd. – Ion Mincu Str. – Aviatorilor Blvd. – Constantin Prezan Blvd. – Mărăşti Blvd. – Expoziției Blvd. – Aviator Popişteanu Str. – Clăbucet Str. – Calea Griviței – Orhideelor Ave. – Calea Plevnei – Witing Str. – Dincu Golescu Blvd.
9. V. Lascăr Str. – Dacia Blvd. – Calea Moşilor – Colentina Ave. – Plumbuita Str. – Râul Colentinei Str. – Şipca Str. – Barbu Văcărescu Str. – Circului Alee. – Ştefan cel Mare Ave.
10. Colentina Ave. – Gherghiței Str. – M. Dracea Str. – Vasile Predescu Str. – Dragonul Roşu Str. – Doamna Ghica Str. – Pantelimon Ave. – Iancului Ave.
11. Mihai Bravu Ave. – Iancului Ave. – Pantelimon Ave. – Doamna Ghica Str. – V. Lascăr Str. – Vergului Ave. – Basarabia Blvd.
12. Camil Ressu Blvd. – Liviu Rebreanu Str. – Lotrioarei Str. – Lunca Mureşului Str. – Liviu Rebreanu Str. – Nicolae Grigorescu Blvd. – Constantin Brâncuşi Str. – Baba Novac Str. – Mihai Bravu Ave. – Basarabia Blvd. – 1 Decembrie 1918 Blvd. – Postăvarului Str.
13. Octavian Goga Str. – Calea Vitan – Fizicienilor Str. – Camil Ressu Str. – Nicolae Grigorescu Str.
14. Olteniței Ave. – Urcuşului Str. – Pridvorului Str. – Calea Văcăreşti – Izvorul Rece Str. – Drumul Găzarului – Sergent Nițu Vasile Str. – Giurgiului Ave.
15. Progresului Str. – Constantin Istrati Str. – Cuțitul de Argint Str. – Calea Şerban Vodă – Pieptănari Blvd. – Bachus Str. – Cârlibaba Str. – Amurgului Str. – Alexandria Ave. – Antiaeriană Str. – Calea 13 Septembrie
16. Drumul Găzarului – Emil Racoviță Str. – Turnu Măgurele Str. – Pogoanelor Str. – Acțiunii Str. – Giurgiului Ave.
17. Emil Racoviță Str. – Turnu Măgurele Str. – Drumul Jilavei – Adierii Str. – Drumul Cheile Turzii – Olteniței Ave. – Stolnici Str. – Săvineşti Str. – Lunca Bârzeşti Str. – Olteniței Av. – Nițu Vasile Str.
18. Alexandriei Ave. – Amurgului Str. – Cârlibaba Str. – Bachus Str. – Pieptănari Blvd. – Giurgiului Ave.
19. Aviatorilor Blvd. – Mircea Eliade Blvd. – Calea Floreasca – Gh. Tițeica Str. – Barbu Văcărescu Ave. – Circului Alee – Ştefan cel Mare Ave.
20. Pantelimon Ave. – Vergului Str. – Morarilor Str.

21. Pallady Str. – Nicolae Grigorescu Str. – Drumul Lunca Cetății – Drumul Lunca Bisericii
22. Prelungirea Ghencea – Condorului Str. – Drumul Cooperativei – Nandru Str. – Bulgăraş Str. – Valea Oltului Str. – Valea Ialomiței Str. – Drumul Taberei – Sibiului Str. – Cara Anghel Str.
23. Drumul Taberei – Valea Ialomiței Str. – Valea Oltului Str. – Timişoara Blvd. – Valea Cascadelor Str. – Iuliu Maniu Blvd. – Geniului Blvd. – Drumul Sării – Ghencea Blvd.
24. Iuliu Maniu Blvd. – Piscul Crăsani Str. – Lacul Morii Str. – Virtuții Ave. – Arieşu Mare Str. – Baia de Arieş Str. – Lacul Morii Str. – Splaiul Independenței – Cotroceni Blvd.
25. Splaiul Independenței – Virtuții Ave. – Calea Crângaşi – Calea Giuleşti – Orhideelor Ave.
26. Calea Crângaşi – Lămâiului Ave. – Fiordului Str. – Chitila Triaj Str.
27. Turda Str. – Mareşal Averescu Str. – Mărăşti Str. – Bucureşti-Ploieşti Ave. – Ion Ionescu de la Brad Str. – Gh. Ionescu Şiseşti Str. – Bucureştii Noi Ave. – Griviței Str.
28. Pipera Ave. – Nordului Ave. – Elena Văcărescu Str. – Gârlei Str. – Madrigalului Str. – Gheorghe Ionescu Ave. – Sileşti Str. – Jandarmeriei Str. – Bucureşti-Ploieşti Ave. – Aerogării Blvd. – Berca Str. – Avionului Str.

In this presentation we will focus only on the overall perception of Bucharest city, analyzed for the three years, exemplifying the perception deviations at local and regional level, following the structure below:

1. Overall image of Bucharest city and the determining factor in shaping it.

   a. Overall perception from the inner perspective (2006, 2008)
   b. Overall perception from the outer perspective (2006)

2. Urban image at district level.

   a. Perception of districts from the inner perspective (2006)
   b. Perception of districts from the outer perspective (2006)
   c. Housing preference (2006, 2008)

3. Urban endogenous image at micro-regional level (2008).

Table 1

Questionnaire centralization for the years 2006, 2008 and 2010

	Total no. of questionnaires	Inhabitants	Non-inhabitants			Educational level			Age group			
			Wallachia and Oltenia	Transylvania	Moldova and Dobruja	primary studies	secondary education	higher education	≤ 30	31-45	46-59	≥ 60
2006	180	124	18	22	16	29	49	46	41	29	30	24
2008	574	574	0	0	0				234	159	105	76
2010	402	402	0	0	0	40	143	219	175	127	49	51
TOTAL	1156	1100	18	22	16	69	192	265	450	315	184	151

Results and Discussion

Bucharest has faced important changes in the urban structure and morphology during its history, visible present today in the mosaic appearance of the city. Especially the brutal intervention of the socialism era led to significant functional and aesthetic disruptions, a heritage whose negative effects are felt even after 20 years after the regime change. However, Bucharest remains a major pole of attraction at national level being its primer political, administrative, educational, cultural, social and economic function. The city has been shaken in the recent years and the drastic changes transformed a predominantly industrial city to one in which the service branch dominates all other activates. The effects of the recent changes are visible at both direct and indirect level of perception. In the first category we are talking about those changes easy to be observed in the environment such as the new skyscraper built without an actual urban planning that doesn't match with the surrounding building line, the overcrowded traffic due to a rising number of cars staying in direct opposition to a city unable to meet the housing needs for parking spaces and infrastructure. As a secondary

category one should mention those unnoticeable items, as for example noise or gas emissions. (Peptenatu, D. *et all.*, 2010)

Given the complexity of the perceptive sensations and the theoretical foundation of the urban image, in recent years an attempt had been made in understanding and exemplifying of those. A first effort in determining the urban image of Bucharest revealed the fact that the overall perception tends to a rather negative opinion of both its inhabitants as well as of its visitors. (see *Fig. 2*) More exactly, 50% out of the 180 opinions for the year 2006, considered the urban image of the city acceptable; while around 25% considered the same image unacceptable and only ¼ of the respondents had a good or a very good view on Bucharest. However no major deviations had been registered between exogenous and endogenous perception differences.

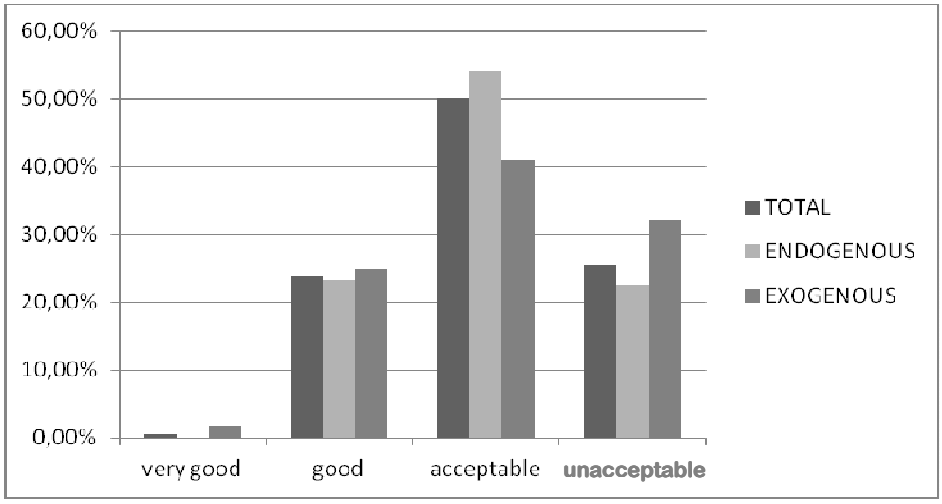

Fig. 2. Exogenous and endogenous image of Bucharest city, 2006

Among the main factors which determined the formation of the overall positive image stood the physiognomy and the general economic condition of the city should be mentioned, meanwhile the general state of cleanliness and infrastructure were the main factors in building a negative perception of Bucharest.

In 2008 a slight change is to be noticed, so that over 43% of the respondents consider the capital city having a good or a very good image, while the remaining 57% tend to agree Bucharest having an acceptable or an unacceptable image. (see *Fig. 3*)

The main factor of dissatisfaction remains the overall state of cleanliness and the infrastructure. A much lower share in forming an acceptable or an unacceptable image had the city physiognomy, the economic situation and particularly the high price of various life aspects, the size of the city or issues

concerning the public safety. A good and a very good view are due to the physiognomy and surprisingly because of the state of cleanliness and infrastructure. An important fact in this case is the economic situation underpinning the job opportunities.

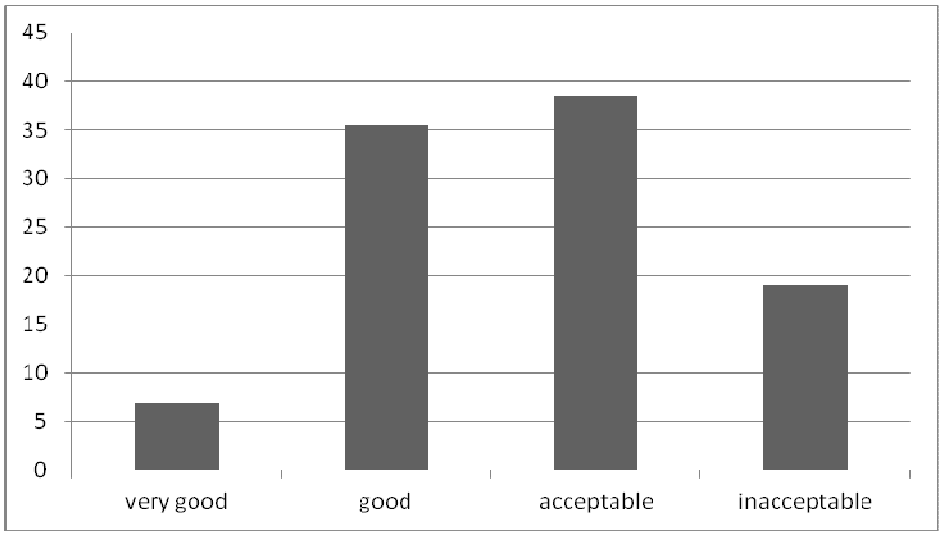

Fig. 3. The urban image of Bucharest – endogenous perspective, 2008

The analysis of contentment and satisfaction at district and subdistrict level shows for both years, 2006 and 2008 similar maximum and minimum values. Negatively percived from inside as well as from outside there are districts like: Ferentari, Rahova, Berceni, Grivița, Giulești and Crângași. On the opposite side one could remark the districts of Primăverii, Drumul Taberei, 1 Mai and Vitan. In most cases it is easy to identify some similarites between the disreputed and the appreciated districts and the long term history of the same areas. Where the Rahova and Ferentari districts are to be found there lived even since the middle age a population belonging to the lower level of society (Giurescu, C. I., 2009). In the same aspect, the Primăverii and Floreasca districts got their fame in the first half of the nineteenth century. (*Magazin Istoric*, 2005)

Considering the neighborhoods with low attractivity in living and leaving aside the differences in the number of quastionaires for the two study years 2006 and 2008 it is to be noticed a partial overlapping of oppinion (see *Fig. 4* and *Fig. 5*). Ferentari is keeping its first position in the both analyzed years[3], followed up close by the Pantelimon-Salaj district (especially for 2008) and Berceni (especially in 2006). The fragmentation of the residential areas and the

[3] Data from endogenous and exogenous view were taken into account.

higher number of respondents within the study of 2008 reveals some more repellent neighborhoods, especially in the central part of the city.

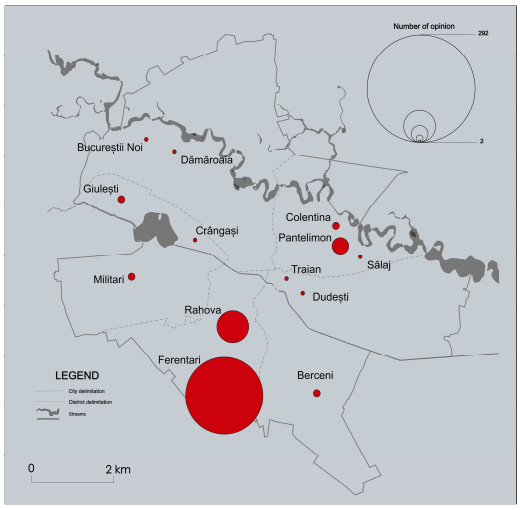

Fig. 4. Neighborhood with low attractiveness in living, 2006

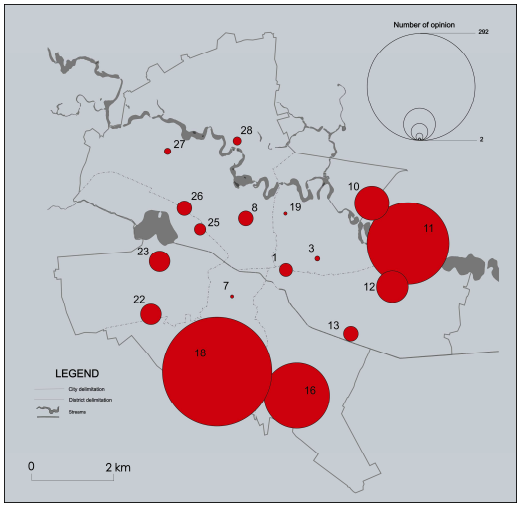

Fig. 5. Areas with low attractiveness in living, 2008

By analyzing the urban perception, the research reaches its maximum valence in understanding the housing options, the migratory flow and the quality of life and living. This illustrates that not only the economic and demographic

statistical data are of importance in geographical determining but also the study of public opinion can prove to be an important factor in the territorial dynamic.

Aknowledgments

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WHAT MEANS "BALANCE" IN THE CENTER-PERIPHERY MODEL

PAUL-RĂZVAN ŞERBAN*

The paper considers the issue of balance in models used to determine economic growth (regional growth). Several indicators on labor market and migration were selected and analyzed by the instrumentality of ANOVA and ArcView. How to propagate social and economic changes from one region to another (from center to periphery or in outlying regions), which factors underly the spread of these changes, how change occurs and which are the effects of polarized regional development on peripheral areas were questions that we tried to respond. The case study is about relationships between Bucharest and the rural area and the cities of surrounding regions.

Key words: uneven evolution, complexity theory.

1. Introduction

System's environment or landscape is changing due to modifications emerged in the system, resulting that system's evolution changes the landscape for other systems, transforming their possibilities and potential for development. One consequence of this is that the interaction among systems does not imply a sole direction of causality because of systems' modifications as a result of interaction (Walby, 2003). Complex systems do not respond to change in a smooth manner. Depending on the length of period for observation, a change in a trajectory can be interpreted as a change to a distinct path through a bifurcation point. (Sanders, Wegener, 1983, 1992). The components of systems are connected and causally inter-relates, but this deterministic evolution accumulate differential increases that cannot be indefinitely perpetuated. Those differences in evolution have spatial foundation, sending us to the centrality – favored location in relation to the others.

Complexity theorists see self-organization as a critical balance between order and chaos and, according to Potts (2000), in economics the degree of connection is essential for understanding the nature of this balance. An ordered

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system is defined as one with low connectivity. In such a system a change at the level of any component has a limited impact on the rest of the system which, as a whole, remains practically unchanged: low connection implies a high degree of order and a high degree of stability of the system. Complex systems do not evolve randomly but tend to converge towards a particular state, trajectory, shape, etc. One of the hypotheses which explain this reality is the anti-chaos theory formulated by Kauffman.

O'Sullivan provides a definition of complex systems based on their ability to self-organize. Thus, complex systems organize themselves, without direction from higher level, into emergent phenomena that are neither completely ordered nor completely random, but having a non-random structure, combined with sufficient unpredictability for novelty in themselves. The theory of self-organized criticality, formulated by Per Bak, explains the nonlinearity of evolution in time, the critical state of the system being that which amplifies small disturbances, creating avalanches of all sizes.

Bifurcations are mainly the exception in systems' evolution, the frequency of events of a certain magnitude is given by an inverse power law, concludes Per Bak (1996). These points of inflection, that have important consequences on the evolution of the economic system, are quite rare and have a low lasting influence, compared with periods that are included in the main trend. So, disorder and hazard master system only small periods of time and order and determination take long periods of time. Concerning systems' behavior at points of bifurcation there are two main streams: one supported by Allen, Engelen, Sanglier (1986), which give a great importance to random and fortune that are not deviations from the average of predictions, but new states of organization, new directions of evolution and another, oriented by Prigogine and Stengers' insights (1986), which grants a certain degree of probability for one "choice" of evolution's direction and another degree of probability for a different "choice", selection mechanisms not being totally random but asymmetric. Instead of a reality about the evolution of the process, the second direction supports an uncertainty about the further evolution, described by probability distributions. Whilst the initial conditions are known, at the point of bifurcation there are still many opportunities, but some ways are more likely than others. If until the bifurcation point complex systems behave deterministically from that point the evolution is probabilistic.

2. The Model

Using data indicators on labor market and migration we check how center-periphery model works and what the decision makers do in order to adapt to different external changes. Peripheral regions are half industrialized regions with small manufacturing industries that use low-level technologies. They are sparsely populated and resource-based industries dependent (population migrates to other regions in period of economic boom), while central region is dominated by services. The distribution of population, employees and migrants can be seen, statistically, in the following tables including frequencies of data intervals and cumulative weight on 2007-2009:

Table 1

Employees, 2007 and 2009

Bin	Frequency	Cumulative %	Bin	Frequency	Cumulative %
30	1	0.16%	30	1	0.16%
3829.75	578	95.39%	4140.458	579	95.55%
7629.5	13	97.53%	8250.917	13	97.69%
11429.25	4	98.19%	12361.38	3	98.19%
15229	1	98.35%	16471.83	2	98.52%
19028.75	3	98.85%	20582.29	3	99.01%
22828.5	3	99.34%	24692.75	3	99.51%
26628.25	1	99.51%	28803.21	0	99.51%
30428	0	99.51%	32913.67	0	99.51%
34227.75	0	99.51%	37024.13	0	99.51%
38027.5	0	99.51%	41134.58	0	99.51%
41827.25	0	99.51%	45245.04	1	99.67%
45627	0	99.51%	49355.5	0	99.67%
49426.75	1	99.67%	53465.96	0	99.67%
53226.5	0	99.67%	57576.42	0	99.67%
57026.25	0	99.67%	61686.88	0	99.67%
60826	0	99.67%	65797.33	0	99.67%
64625.75	0	99.67%	69907.79	0	99.67%
68425.5	0	99.67%	74018.25	1	99.84%
72225.25	0	99.67%	78128.71	0	99.84%
76025	1	99.84%	82239.17	0	99.84%
79824.75	0	99.84%	86349.63	0	99.84%
83624.5	0	99.84%	90460.08	0	99.84%
87424.25	0	99.84%	94570.54	0	99.84%
More	1	100.00%	More	1	100.00%

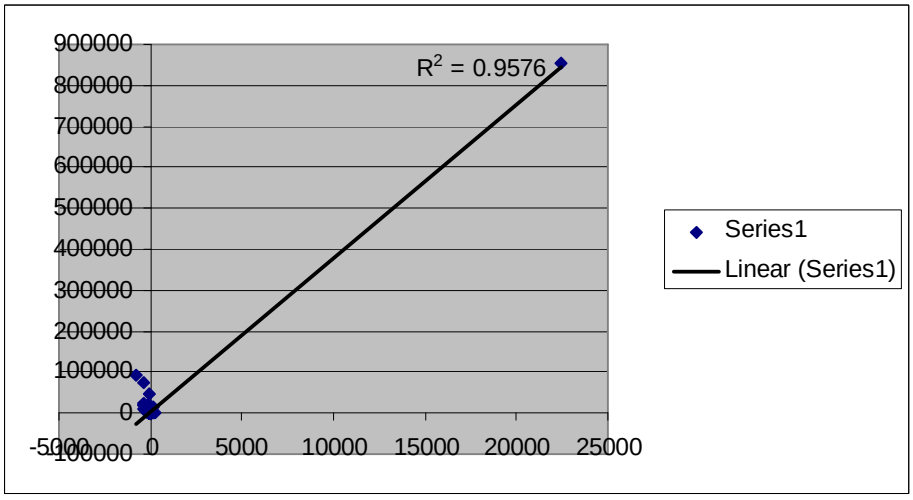
When we talk about complex systems we must consider their existence in time. It is in the intimate nature of complex systems to have some sort of memory of their past. Without memory systems might not be able to learn (the term “learning” having the meaning of process conducted by genetic algorithms – a memory that is activated when there are similar situations with those in the past) or to adapt to environmental changes and bring the complexity level that they have to the present. By incorporating the memory of its past in the future development, a difference between the random and complex system is made, the latter having as temporal reference the bifurcation which alters the trajectory of evolution.

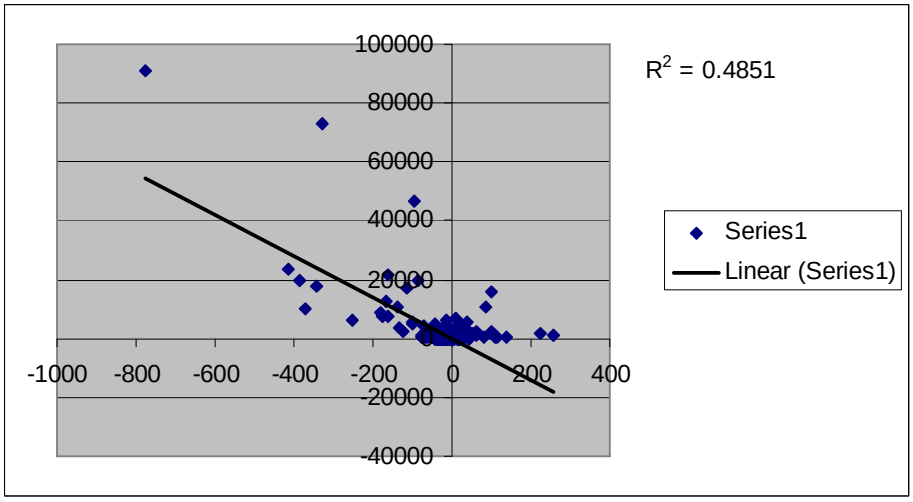
The notion of hysteresis has been raised to describe how external shocks may occur, changing economic structure (Cross, 1993, Katzner, 1993) leading to new insights into path dependency approach, agglomeration forces being self-enforcing. A transient high rate of unemployment, during a recession, can lead to a continuous high rate of unemployment due to loss of skills (or skills obsolescence) of unemployed, along with a deterioration in work attitudes. In other words, cyclical unemployment can lead to structural unemployment. The model of structural hysteresis of labor market differs from the one of prediction of a “natural” rate of unemployment or NAIRU, around which the “cyclical” unemployment is said to move without affecting the rate of “natural” itself.

It is incomprehensible that sudden changes occur in the relations and co-evolution of adaptive systems. Co-evolution, we are tempted to think, implies gradualism because of “history" of relations between systems. An explanation of the fact that small changes may have large effects on the systems is the instability of complex systems. A special type of representation of the evolution of complex systems is the design of several independent paths of development, a critical point in evolution being seen in the point where these paths diverge. (Kaufmann 1993, 1995)

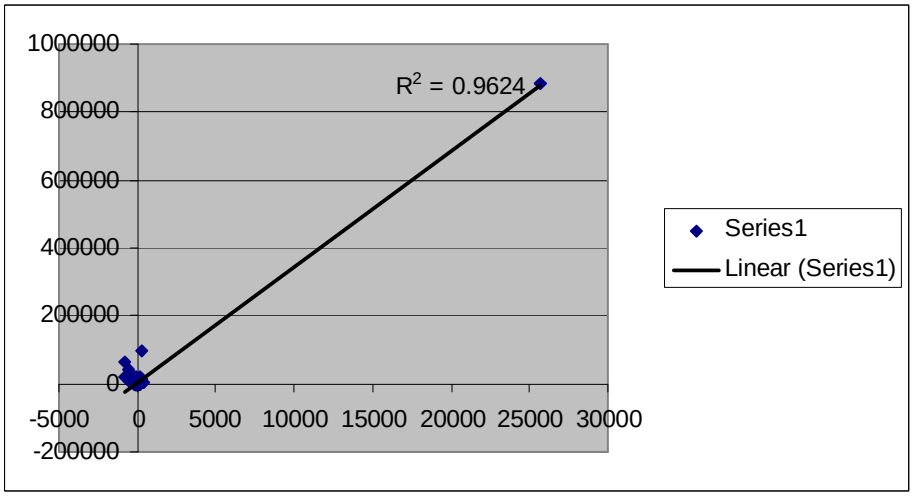
But bifurcations and evolution generally is strongly based on space, as Per Bak (1992) asserted, “in a <subcritical> state as changes in one part of the system have a sufficiently weak effect upon neighboring parts. In addition the state in different regions of the system is correlated only over short distances”.

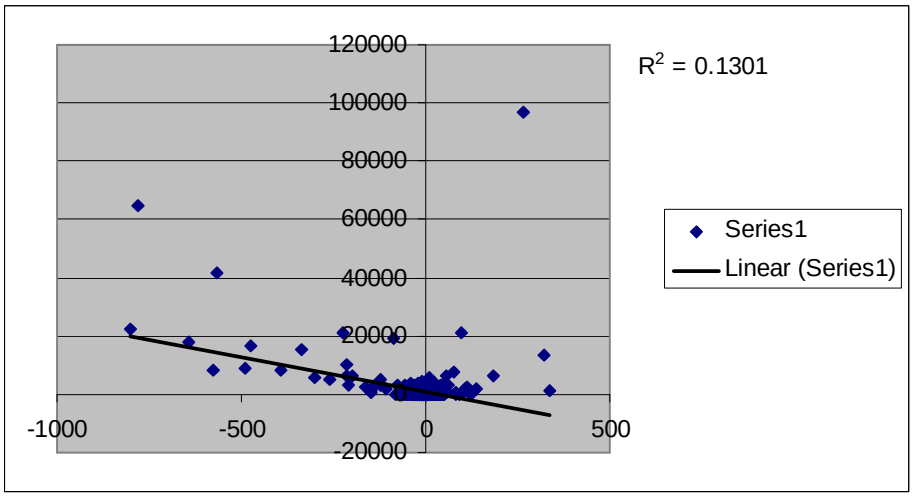
O’Sullivan remarks that geographical space configured and reconfigured systems over time. The space is uneven and there are cities which obviously attract economic flows. The polarizing role of Bucharest in migration of employees is stressed by the following graphs that plot regression lines and R squared in two cases: when data include (first) and when they do not include Bucharest (second).





Graph 1. The influence of migration on total employment (2007)





Graph 2. The influence of migration on total employment (2009)

Neighboring territories are connected with economic activity in the metropolis but, with the distance, influence is reduced. Duit (2008) considers that the bifurcation thresholds have the potential to produce enormous consequences for human welfare if they are flowing along the scale (eg, local-regional-global). Thresholds' probability is related to the degree of coupling between systems. The argument is that loosely coupled systems have more time to recover from failure and are therefore better able to amortize the potential thresholds, while tightly coupled systems do not allow for delay and therefore increase the risk of disturbances to magnify (Perrow, 1984).

The above affirmation translates into the following: depending on economic factors that led to an inflection point in economic development, spatial relationships can change the meaning of polarization in the weakening or disruption of the old and the emergence of others. The relational structure of the new spatial system holds "the traces" of the previous one and for a shorter or longer period of time (depending on the policies adopted and their radicalism) increases entropy.

The manner of acting on systems is based on the understanding of notion of scale in order to anticipate the ways of spreading the recession and the role to be played by decision makers in the self-organizing systems.

One of the meanings that has been acquired by the self-organization is the "systematic distribution by size" (Phillips, 1999) and the most obvious example from the geography of settlements is the distribution by size of cities (see Zipf, 1949), being an organization by mathematical laws, nonimposed by something or someone outside the system (O'Sullivan, 2004).

Complexity theory provides a good framework for Morcol, (2003) in solving a conceptual problem that has important implications for the theoretical division among sociologists and especially among public policy theorists. The question is whether participants in the network are interdependent actors or are constituted by the systems whose components are. This seemingly esoteric question has implications for ongoing paradigmatic debates between supporters and critics of rational choice.

What makes the city to be seen as a system far-from-equilibrium, creative state, is the dissipation resulting of parallel and overlapping plans. Planning parameters of the city emerge from planning activities which engage private and public actors. The plans of each actor, containing different configurations, compete and cooperate in a synergistic process until one wins and "masters" the rest (becomes the order-parameter of the plans). Activities will be mastered by the new order-parameters that will perpetuate. This is, in brief, the model of "parallel-distributed urban planning" achieved by Portugali (2000) from the theory of dissipative structures and stressing the properties of self-organization and emergence of complex systems (Morcol, 2003).

Decision makers resort to multicriteria analysis in order to determine the criticality of the criteria. They change a factor to see the effects. These criteria

are associated with weights of importance. Intuitively, one can think that the greater the weight of a criterion, the most critical the criterion should be. But it is not the case. It is important to distinguish here between the notion of critical and importance. Critical means that a criterion, with small changes in its weight, can produce a significant change in the final solution. There may be criteria with quite small weights of importance (for example, those which are not so important) to be more critical in a given situation than those with higher weights. (Triantaphyllou, E., A. Sanchez, 1997, Triantaphyllou, E., 2000)

Conclusions

Relations among components have a bearing on the evolution of the system and the importance of components in the system is given as both absolute and relative or relational value which include types (positive or negative feedback) and intensity (strong or weak) of relations. The importance of a component makes a change of it to be incorporated in the evolution of the system, and when it comes to reaching a critical threshold in the evolution of a component that can destabilize the system. There are critical thresholds for both local and global results from interactions at different levels and components of thresholds' overflow across several levels.

Acknowledgment

Invest in human resources!

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THE INFLUENCE OF LANDFORM ON HUMAN SETTLEMENTS AND LAND USE IN THE LOPADEA HILLS

IOAN MĂRCULEȚ*, CĂTĂLINA MĂRCULEȚ

The morphographic and morphometric freatures of the Lopadea Hills (about 320 km^2), the area's major and derived relief, facilitated the building of 39 rural settlements and one town, Ocna Mureş. The following types of settlements in the Lopadea Hills: 21 settlements (52.5%) in the main, large peripheral valleys, on terraces and in floodplains; 5 (12.5%) villages in the secondary valleys, tributaries of the peripheral ones; 14 villages (35%) in the upper reaches of lower-order tributary valleys, occupying small basinettes or confluence areas. Landform features and the region's socio-economic potential have stamped their mark on land use. Land use structure in Lopadea Hills: arable lands, pastures and hay-fields, forests, vine-yards, settlements, orchards, etc.

***Key-words**: landform, human settlements, land use, Lopadea Hills.*

A part of the Târnava Mică Hills, the Lopadea Hills[1] (about 320 km^2) are bounded by the Mureş River in the north and west, the Târnava and the Târnava Mică rivers in the south and Valea Fărăului (with Valea Alecuş its tributary) and Valea Pănade (a tributary of the Târnava Mică) in the east (Mărculeț I., Mărculeț Cătălina, 2003). Although the marginal corridors of the Mureş and the two Târnave rivers are distinct morphological units, yet they make an organic socio-economic whole with the limitrophe hills.

1. Landform Characteristics and Their Role in Settlement Pattern and Development

The morphographic and morphometric landform features of the Lopadea Hills have exerted, among other physico-geographical factors, both a favourable

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[1] The relief sub-unit, situated in the north-east of the Târnave Plateau between the Mureş, Târnava and Târnava Mică Rivers, was in time named Dealurile Lopadei (Hills) (MIHĂILESCU, V., 1969, *Geografia României*, III, *Carpații Românești și Depresiunea Transilvaniei*, 1987; MĂRCULEȚ, I., MĂRCULEȚ, CĂTĂLINA, 2003; BADEA, L. *et al.*, 2006), Podișul Târnăvenilor (Plateau) (ȘONERIU, I., 1976), Dealurile, Mediașului (Hills) (TUFESCU, V., 1974), Podișul Lopadei (Plateau) (*Enciclopedia geografică a României*, 1982; POSEA, GR., BADEA, L., 1984; SOROCOVSCHI, V., 1996; BUZA, M., MĂRCULEȚ, I., 2002 ș.a.), Mureş – Târnava Mică and Târnava Mică – Târnava Mare Interfluves (SAVU, AL., 1980) and Dealurile Fărăului (Hills) (Pop Gr. P., 2001).

and a restrictive influence, contributing significantly to the development of the 40 settlements in the region: maximum altitude 548.2 m (the Podina Hill, north of Lopadea Nouă settlement), minimum altitude 240 m (the Mureş floodplain), top level difference as against the Mureş and the Târnava Mică floodplains, 308.2 m and cca. 200 m, respectively, relief energy of the hills 241-280 m along the Podina – Țuculeu – Creasta Beței – Cornul Șoimuşului – Măgura Mihalțului summit on the lefthandside of the Mureş and 141-160 m along the Pietrişului – Bisen – Turdaşului – Crucea Colcerului – Coasta Zăpozii summits situated in the central-eastern part.

The density of fragmentation varies between lowest values (0.0-0.50 km/km^2) in the south-west along the Creasta Beței – Cornul Șoimuşului – Măgura Mihalțului – Măgura Cisteiului summits dominated by marl and sand deposits, and highest values (0.75-1.0 km/km^2) along the Pietrişului – Bisen – Turdaşului Summit and on the lefthandside of the Mureş, between the settlements of Păgida, Ocna Mureş and Noşlac. Declivity is concordant with the fragmentation gradient, decreasing sharply from east and north-east to west and south-west (N. Josan, 1979).

All in all, the unit largely overlaps the anticline folds in the west of the Târnava Mică Hills, undergoing significant relief modelling processes, e.g. developed asymmetrical valleys, true subsequent depressions parted by major, 470-540 m-high, summits usually north-west-south-east oriented. Secondary summits with saddles and monticles (350-450 m alt.) perpendicular to the main ones, branch off in a north-east – south-west, here and there north-south direction (Josan N., 1979).

In the north of the Lopadea Nouă Depression, drained by the Râtu Brook, stands the Ocna Mureşului and Băgăului hilly unit, the highest sector of the study-area (450-550 m alt.), including the following individual hills: Coasta Zăpozii, 522,7 m; Podina, 548 m; Tăuşoru, 524 m and Țigla, 490.2 m. In the south are the Bucerzii and the Pănade Hills modelled into folded Mio-Pliocene formations of tight anticlines and synclines (Ocnişoara – Blaj, Pănade – Bălcaciu). The drainage basins developed here, which have deeply fragmented the region, look like asymmetrical depressions sometimes with a boggy bottom. Interfluves in this sector are low, preserving erosion outliers, e.g. the Chicei Hill, 468 m, the Pârva Hill, 472 m, etc.

Marginal Valleys are intensely populated and have a special economic importance, lands are used mostly for agriculture and major communication lines cross the area. A real drawback is moisture caused by an elevated ground level, precipitation and flooding which seriously deplete crop outputs and damage constructions, as it happened especially in 1970 and 1975 when the majority of settlements located in the Mureş, Târnava Mică and Târnava valleys were hit by the floods. In May 1970 the Mureş flow reached 1,580 m^2/s at Ocna Mureş and 2,450 m^3/s at Alba Iulia (some 24 times the multiannual mean of 71.4 m^3/s at Ocna Mureş and 103.2 m^3/s at Alba Iulia). On June 1975, the top flow value on the Târnava was 1,350 m^3/s at Mihalț (a settlement on the lefthandside of the Târnava at cca. 2 km upstream of its confluence with the Mureş), that is nearly 43 times the multiannual mean (31.4 m^3/s) (Morariu T., Bogdan Octavia, Maier A., 1980).

Downstream of its confluence with the Fărău Valley, the area covered by the middle and the lower terraces of the Mureş is quite small: t_1 (8-12 m) – at Cisteiu de Mureş, Ciumbrud, Sâncrai, Rădeşti and Leorinț; t_2 (18-25 m) – at Gâmbaş, Rădeşti and Meşcreac; t_3 (30-40 m) – at Ocna Mureş, Micoşlaca, Ciumbrud, between Rădeşti and Sâncrai and at Căpud –, t_4 (50-60 m) – at Rădeşti – and t_5 (80-90 m) – at Ciumbrud, Rădeşti and Căpud (Josan N., 1979; Buza M., 1996). In the north of the Lopadea Hills, the Mureş has a wide floodplain (max. 2.7 km at Cisteiu de Mureş, down to the stream channel) preserving traces of the old meanders and showing several alluvial fans shaped by the tributaries springing from the Apuseni Mountains (*Fig. 1*).

In the Târnava Mică Valley, only small terraced areas (t_1, t_2) have been preserved between Pănade Village and the confluence of the Târnava Mică with the Târnava Mare. These terraced areas were mapped out at Pănade, Iclod and Petrisat (Buza M., 1997). The relative absence of terraces on the righthandside of the Târnava Mică is the result of the permanent shifting of the River northwards, engendering a steep slope and narrowing the floodplain (by some 100-200 m down to the stream channel).

The Târnava Valley, about 15.2 km long, is cut into the lower step of the lower erosion level which Josan named “valley level” (1979). The rather smooth river terraces, formed of Pleistocene sands and gravels, were mapped by Josan N. (1979) and Buza M. (1997), who delimited the following terraces: t_1 (18-25 m) north of Cistei; t_3 (30-40 m) in the surroundings of Bucerdea Grânoasă Village; t_4 (50-60 m) east of Cistei, and t_5 (80-90 m) east of Bucerdea Grânoasă. The Târvana floodplain, which contains Holocene sands and gravels, is 1-4 m higher than the river, and prone to flooding.

The source areas of **secondary valleys** lie inside the unit. They are generally subsequent with a radial flow pattern, have a steep questa slope affected by numerous modelling processes (mainly landslides) and a larger and milder dipping slope cut into structure-controlled surfaces.

The alternation of highly pervious rocks (Sarmatian and Pannonian sands and gravels) with impervious rocks (clayey marls), together with the action of external natural agents and some anthropic actvities have favoured the onset of vast weathering processes (gullies, lenticular slides, rock-and-soil falls, monticles, mudflows, etc.) which in most cases are restrictive for the development of such settlements as Peţelca[2], Căpud, Zărieş, Cornu, etc. (Mărculeţ I., Mărculeţ Cătălina, 2004a).

[2] The effects of present-day relief modelling and the relative isolation of some of the Lopadea Hills villages are mirrored by the demographic situation of Peţelca Village featuring marked population aging and depopulation: 452 inhabitants in 1977, 280 in 1992 and 186 in 2002 (MĂRCULEŢ I., MĂRCULEŢ CĂTĂLINA, 2004b).

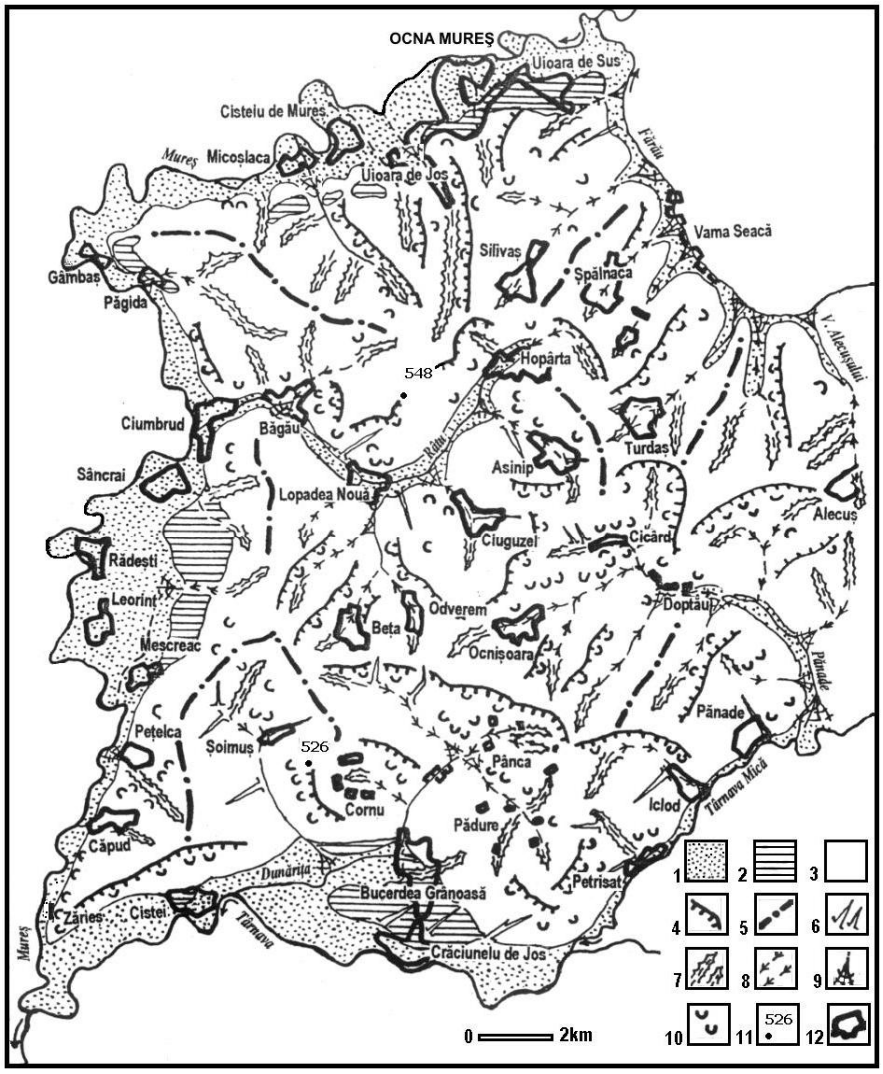

Fig. 1. Landform and settlements in the Lopadea Hills: 1. floodplain; 2. terraces; 3. slopes; 4. questa; 5. rounded interfluve; 6. gullies; 7. torrential formations; 8. deepened thalweg; 9. alluvial fan; 10. landslides; 11. level; 12. settlement

2. Distribution of Settlements in Terms of Landform Particularities

All the 40 settlements found in the Lopadea Hills are medium-and-small-sized villages, with only one town among them, namely Ocna Mureș. Densities of

about 8 villages/100 km^2 are higher than in the Transylvanian Depression (1.3 villages/100 km^2). The overall village area occupies 1,280 hectares, over 90% of it extending at altitudes below 400 m.

Broadly speaking, the Lopadea Hills settlements are located as follows:

Twenty-one villages (52.2% of all) in the **main peripheral valleys**:

- Ocna Mureş (10,270 inhabitants), Uioara de Sus (1,359 inh.), Uioara de Jos (1,279 inh.), Cisteiu de Mureş (710 inh.), Micoşlaca (349 inh.), Gâmbaş (543 inh.), Păgida (126 inh.), Ciumbrud (1,365 inh.), Sâncrai (863 inh.), Rădeşti (719 inh.), Leorinț (320 inh.), Meşcreac (277 inh.), Pețelca (202 inh.), Căpud (352 inh.) and Zărieş (8 inh.), in the Mureş Valley;
- Pănade (713 inh.), Iclod (1,844 inh.) and Petrisat (594 inh.), in the Târnava Mică Valley;
- Crăciunelu de Jos (2,092 inh.), Bucerdea Grânoasă (2,235 inh.) and Cistei (638 inh.), in the Târnava Valley.

In terms of landform, the situation is the following:

- on terraces and in the floodplain: Ocna Mureş, Uioara de Sus, Meşcreac, Crăciunelu de Jos and Cistei;
- in the floodplain: Cisteiu de Mureş, Micoşlaca, Gâmbaş, Sâncrai, Rădeşti, Leorinț and Zărieş;
- on terraces: Bucerdea Grânoasă;
- partly in the floodplain, on terraces, alluvial fans and tributary valleys: Uioara de Jos and Păgida;
- partly in the floodplain and on some tributary valley slopes: Ciumbrud, Pețelca, Căpud, Pănade, Iclod and Petrisat (*Fig. 2*).

Apart from landform particularities, which account overwhelmingly for the wide diversity of village form and morphostructure, the presence of roads of communication and of drinking water has also contributed significantly to the development of these settlements.

A number of five villages (12.5% of the Lopadea Hills settlements): Băgău (569 inh.), Lopadea Nouă (1,053 inh.), Hopârta (345 inh.), Doptău (devoid of inhabitants) and Vama Seacă (234 inh.), occur in the **secondary valleys**, basically tributary to the above peripheral ones. These valleys are either rather narrow, without terraces, or large floodplains. Most of the villages are seen in the flat colluvial-deluvial areas and partly in the wide floodplain sectors. Some settlements situated alongside the main valleys, also branching out on secondary valleys (the Băgău, Hopârta, etc.), have an elongated, compact structure (I. Mărculeț, Cătălina Mărculeț, 2003).

Fourteen villages (35% of all) are located in the **upper sectors of lower-order tributary valleys** and occupy small basinettes or confluence areas: Silivaş (255 inh.),

Șpălnaca (263 inh.), Asinip (156 inh.), Turdaş (275 inh.), Ciuguzel (655 inh.), Cicârd (depopulated), Ocnişoara (37 inh.), Beța (304 inh.), Şoimuş (82 inh.), Cornu (21 inh.), Pădure (25 inh.), Pânca (19 inh.) and Alecuş (171 inh.). Because of the landform they are in general polygonal-areolar or elongated in shape with one or several ramifications. The majority are compact or spread out, and only a few hamlets (Pânca, Pădure and Cornu) are scattered.

Like other sub-units of the Târnave Plateau (e.g. the Hârtibaciu and the Secaşe plateaus), interfluves are devoid of settlements (with the exception of some households in a few hamlets located on the interfluve between the Râu Brook and the Târnave River), mainly because of the lithological substrate which is responsible for ground water lying at great depth.

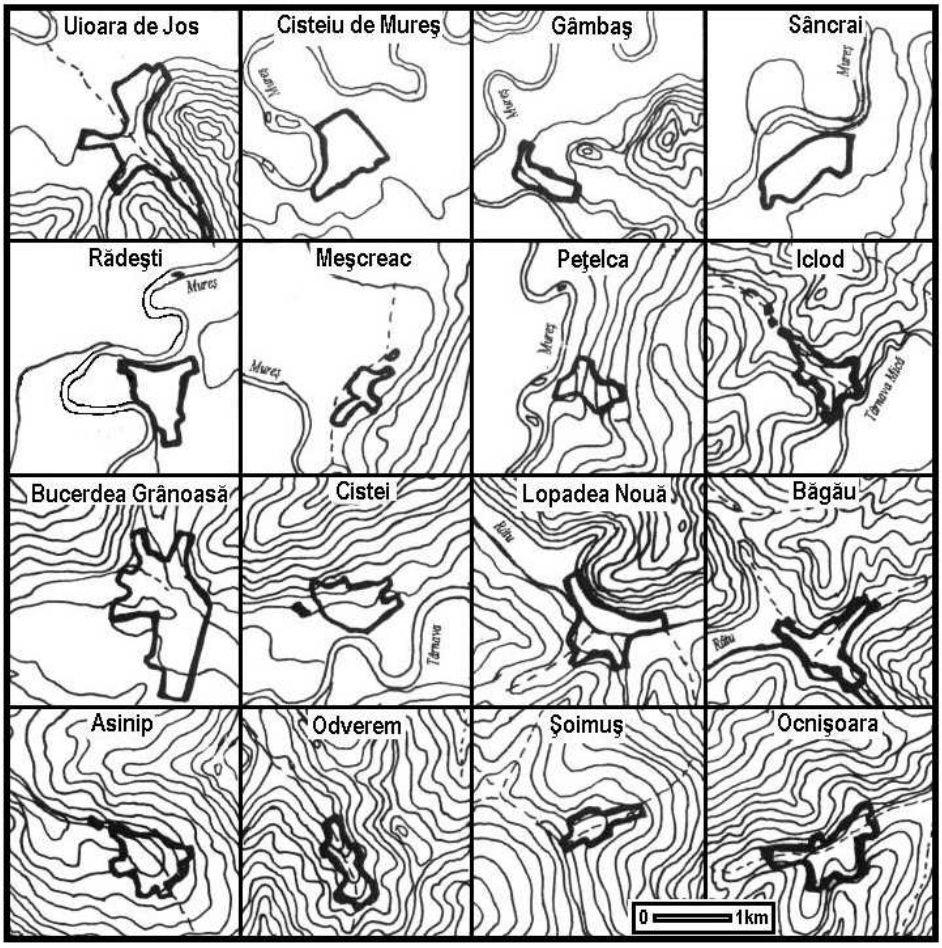

Fig. 2. Location of some Lopadea Hills rural settlements in terms of landform

3. Landform – Related Land Use

The genetic types of landform, its morphology and morphometry, alongside the other environmental elements – climate, vegetation, soils, etc., are closely interrelated and have a great influence on land use. Land use structure in Lopadea Hills: arable lands (cca. 40%), pastures and hay-fields (cca. 35%), forests (14%), vine-yards (cca. 3.5%), settlements (cca. 4%), orchards (cca. 1%), etc., lands with other uses and unproductive lands (cca. 3.5%), *(Fig. 3*).

The floodplains of the peripheral valleys – the Mureş, Târnava Mică and Târnava, have a wide range of economic uses (*Fig. 4*). At its contact with the channel, the low floodplain is covered with willow, osier, poplar, reed, club rush, etc., plants of low economic value; in the same situation are the patches of grazes affected by excess of moisture and flooding.

The high floodplain (2-4 m above the river), sheltered from periodic flooding, is covered with arable land cultivated with cereal crops, vegetables, technical plants and fodder plants. The flat ground proved suitable to the construction of railways and highways.

The lower terrace scarps are planted with superior vine (*Riesling italian, Traminer roz, Fetească albă şi regală, Muscat Ottonel* etc.)[3]. The surface of terraces is dotted with settlements and has very productive arable lands.

On mild slopes they grow mainly cereal plants (maize, wheat and barley); on steep slopes one finds grazes and hay-fields with hair grass, feather grass, bird's-foot trefoil, hop clover, yellow clover, etc. The forest vegetation of steeper slopes and of high interfluves consists of *Quercus pedunculata*, common oak, maple, crab (*Malus sylvestris*), wild cherry tree, etc.

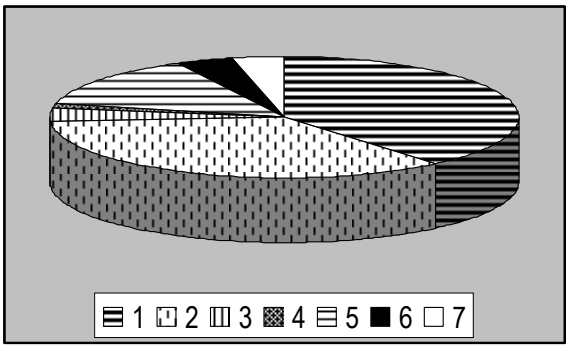

Fig. 3. Land use structure in Lopadea Hills: 1. arable lands; 2. pastures and hay-fields; 3. vine-yards; 4. orchards; 5. forests; 6. settlements; 7. other terrains

[3] Some vine-yards are seen also on several high terraces and on the righthandside of the valleyslope of the Râtu Brook.

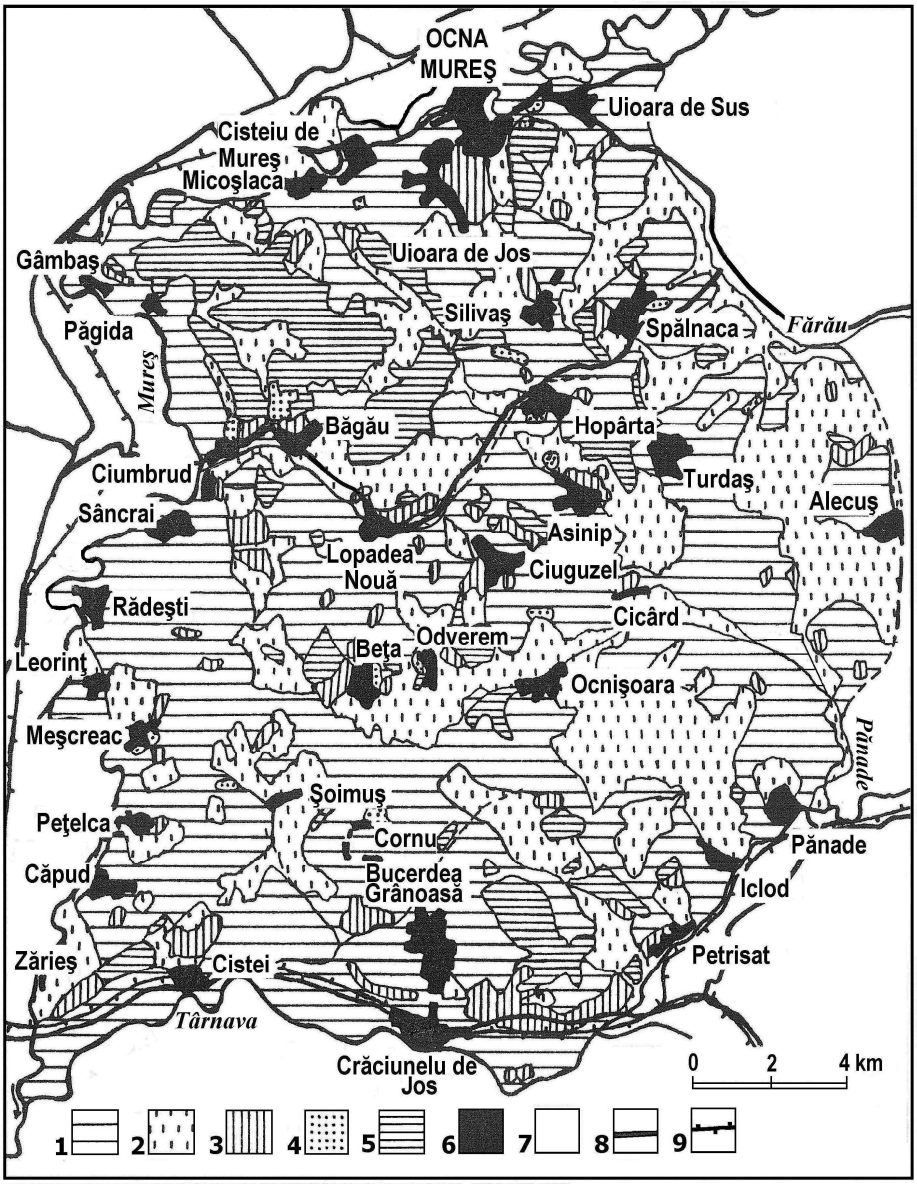

Fig. 4. Land use in Lopadea Hills: 1. arable lands; 2. pastures and hay-fields; 3. vine-yards; 4. orchards; 5. forests; 6. settlements; 7. other terrains; 8. road; 9. railroad

Conclusion

The absence of towns in the Lopadea Hills should not be blamed on landform alone, but like in other units, on the relative isolation of the region – the main roads, linking the towns of Târgu Mureş, Ocna Mureş, Aiud, Teiuş, Alba Iulia, Târnăveni and Blaj, were built in the unit's peripheral valleys (the Mureş, Târnava Mică and Târnava) – and to the absence of substantial natural resources for the development of economic activities, other than agriculture, necessary for a town to exist.

Most settlements lie in the large valleys, with extended floodplain and terraces, a favourable location for development. Inside the study-unit, lithology, morphometric elements, slopes and density of fragmentation, as well as relative isolation proved a drawback to their expansion. This exclusively rural region of the Târnave Plateau, relatively isolated and subjected to present-day modelling, is currently undergoing depopulation, a process begun in the latter half of the 20th century.

The relief also bears on the type of land use. Thus, floodplains and lower terraces are covered mainly with arable land, while on slopes pastures and hay-fields prevail.

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INDUSTRY DYNAMICS AND THE CHANGE IN THE OCCUPATIONAL PROFILE OF POPULATION IN BRAŞOV, RÂMNICU SĂRAT AND CÂMPULUNG MUNICIPALITIES

SUDITU (POPESCU) SIMONA, PLOAIE (TEODORESCU) MIHAELA, PAKULAR (MOLDOVAN) CRISTINA*

After 1989, the transition process, by means of which Romania went over from a planned economy to a market economy has involved a constantly changing of the dynamics of industry, and hence, of the occupational profile of the population in all areas of the country, regardless of population size and of the level of economic development. The main processes that have led to changes in the industrial profile of the cities were economic restructuring and privatization, in most cases accompanied by de-industrialization and economic decline.

The transition from a socialist economy to a market economy, involving a process of significant restructuring, is an ongoing continuous phenomenon.

Key words: *industry, population, economic restructuring, employees, economy.*

Introduction

Until 1989, Romania, like other former communist countries of Central and Eastern Europe, developed an economic system based on the monopoly of state-ownership, characterized by centralized economic structures – super-centralized management, a reduced proportion of private property, neglection of social needs and an increased share of the secondary sector. The enforced development of manufacturing and energy industries led to the emergence of industrial giants in urban centers and to the underdevelopment of the tertiary sector.

After 1989, the process which has brought about the country's transition from a planned economy to a super market economy has involved constant change in the dynamics of the industry, and hence, in the occupational profile of the population. Restructuring and privatization are two essential components of the process of transition to a market economy, two fundamental components of the economic reform.

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The economic restructuring is part of the transition process aimed at economic reform, with a view to creating a functional market economy. "The restructuring process performance targets both the internal and the external competitiveness of the market economy." (Marin *et al.*, 2005).

The industrial restructuring specific for the process of transition is marked by gradual dissolution of the mode of production and its gradual replacing with another, by the change of operating mechanisms, of the political, legislative and financial concepts and of the relations between levels of decision. (Popescu, 2000)

The actors involved in the process of restructuring are: the capital (industrial enterprises, companies, different industries), the labor force (employees, trade unions) and the state (government, economic policies, legislation).The process of restructuring may target/involve the diminution of personnel and/or in the number of business units, a higher specialization of the company (by removing those businesses that are not related to the core business of the company), the buying of companies burdened by debt, the liquidation of those highly intensive industrial units, resisting against attempts of upgrading or adjustment to new markets and last, but not least, industrial de-location involving first of all strategic land planning.

In the Romanian industry, in most of the cases, the process of restructuring and privatization has led to de-industrialization. De-industrialization is "a process of reducing the number of units of industrial enterprises and of industrial employment in urban centers" (Candea *et al.*, 2006). In the scientific literature, the de-industrialization phenomenon was defined by Rowthorn (1997) as "the decline in industry employment as a percentage of total number of employees".

1. Industry Dynamics in Râmnicu Sărat

Throughout the communist period and especially between 1951-1989, when the national economy development was conducted based on the five-year plans, which supported huge investments in industry, Râmnicu Sărat has registered a significant progress in economic terms. After 1968 in south eastern Romania an industrial site took shape, perhaps too large for a medium sized town, namely Râmnicu Sărat. On this location, in the framework of the rigid, centralized system specific for the socialist economy, a range of goods was manufactured: cigarettes, iron castings, fasteners for the electrical industry, brake linings, friction and sealing rings, furniture, regenerated mineral oils, diesel and fuel oil, mixed fodder, canned meat, vegetables and fruits. (*Fig. 1*)

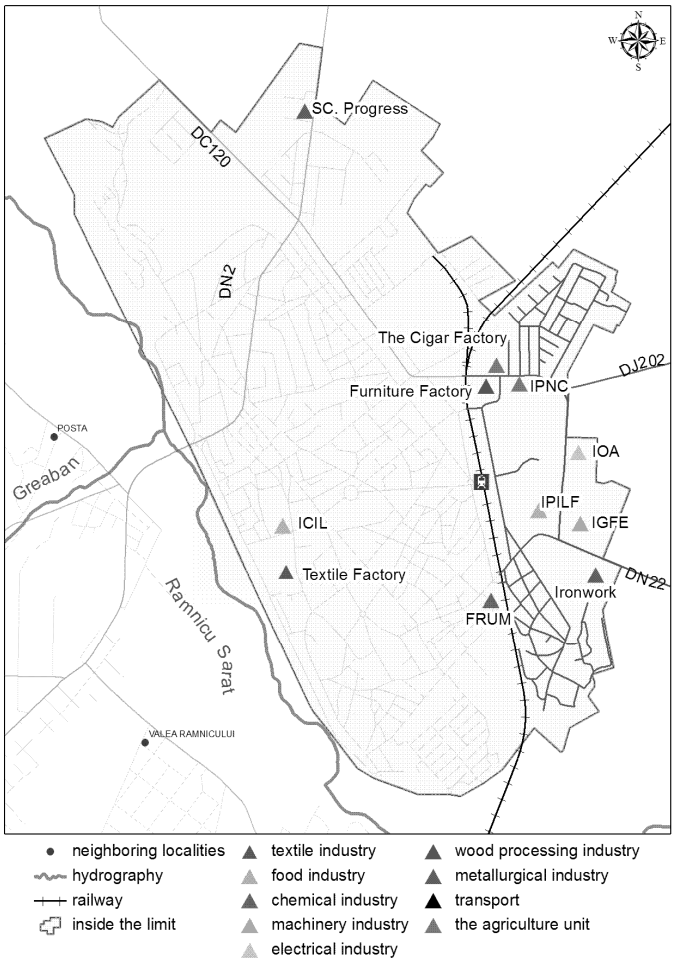

Fig. 1. Industrial area of Râmnicu Sărat during the communist period

The changes in the economy after 1990 entailed by the process of restructuring and privatization are reflected in the industrial sector and the labor market of the city by: loss of employment security, decrease of employment diminution of and significant increase of unemployment, downsizing of the activity rate and even closure of many enterprises, the emergence of areas of brownfield type. (*Fig. 2*)

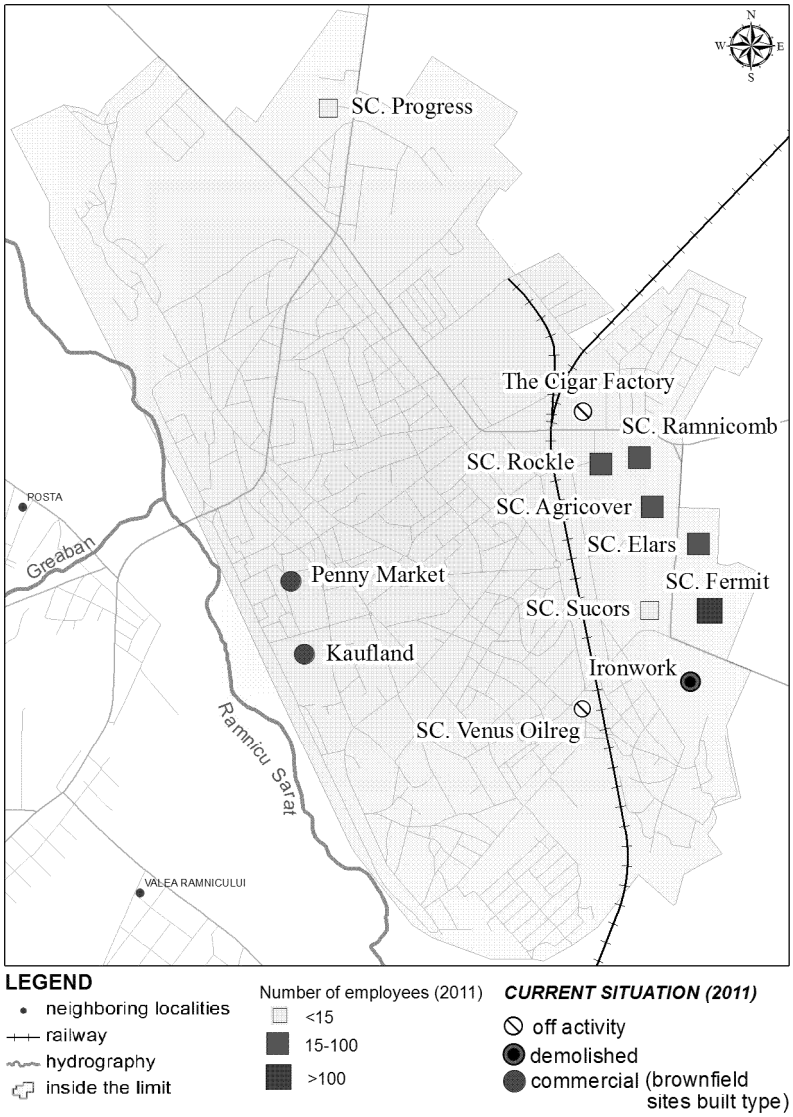

Fig. 2. Commercial areas built on brown-field type of sites

Statistics on the number of employees in the studied town's economy highlight a continuous increase in the number of employees between 1960 and 1990. (*Fig. 3*)

The dynamics of the number of employees in the period 1991-2009 shows the reaction of the town's economy to the changes coming after 1990. The lay-offs started in the years 1991-1992 affected all the economic sectors of the city.

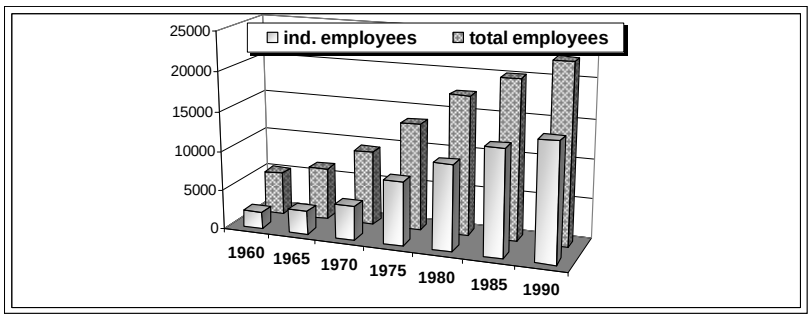

Fig. 3. Evolution of the number of employees in industry and of the total number of employees. Source: DJS Buzău

Throughout the period 1991-2009, the evolution of the number of employees registered a decrease of 60, 5 percent (from 15,396 employees in 1991 to 6074 in 2009). This development indicates an obvious downturn in the economy and a high level of de-industrialization. (*Fig. 4*)

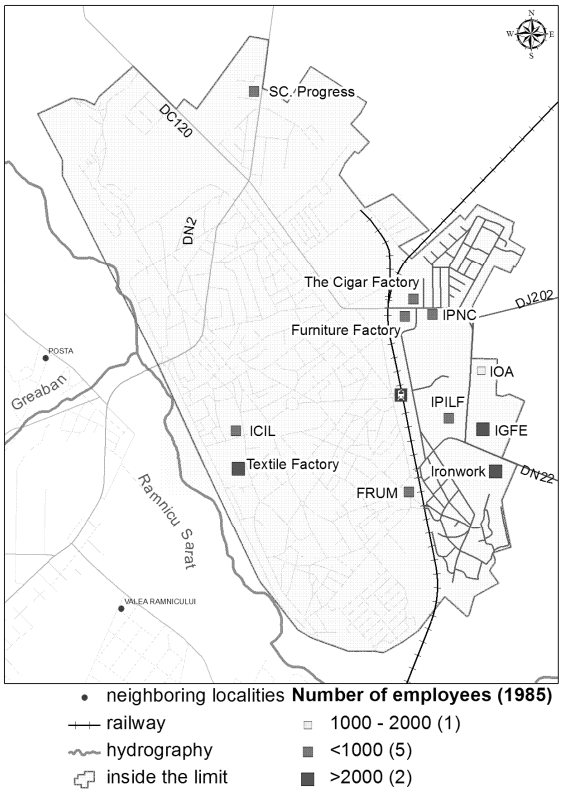

Fig. 4. Number of employees of the businesses in Râmnicu Sărat

2. Industry Dynamics in Braşov

The post-communist period is characterized by several stages in the economic evolution of the city of Braşov.

The years 1990-1995 saw a relative stability of state-owned companies. It was a period that witnessed several labor protests and lobbying to maintain the number of employees even if the labor productivity had dropped significantly. There was a slight increase in employment in these companies and an increase in production. The turnover, however, fell by about 50 percent. Private companies were limited, with few employees and a low turnover. They had as main profile especially wholesale and services.

The years 1996-2000 are characterized by a dramatic fall of the employee's number and by the unemployment's rise to alarming levels. It reached unprecedented values, i.e., more than 8 percent. State-owned companies reduced their number of employees and the smaller ones were closed or privatized. It is the period in which the scales are tipped in favor of private companies and 55 percent of the gross domestic product is contributed by the industry.

After 2000 the economic situation reached an equilibrium in Braşov. The number of foreign investments rises, this being the period in which many foreign-owned companies set up branches in Braşov. The number of unemployed decreased until it reached the point of labor shortage. There was a rise in the number of small- and medium-sized enterprises, due to tax incentives offered by the state.

Until 2008 Braşov economy followed an upward trend, the boom period being the one from 2000 to 2008. During this period the most important growth is to be observed in the service sphere, but also in some industries. The wood processing industry made a spectacular leap. The raw material is provided by the domestic timber production, provided by the large forest areas in the county of Braşov, but also in the neighboring counties.

Other branches that have been on an upward trend belong to the food processing industry, due to increased consumption in this period. Romania's economic policy has encouraged consumption in all areas, which led to increased productivity in all sectors that create consumer goods.

On close examination of the sectors of the economy, it is noted that in 2009 there was a total of 34 companies in the farming sector, 940 companies in the manufacturing sector, 1273 construction companies, 4422 trade companies, 4561 companies providing services and 660 companies providing transport services . If we were to make a comparison with 1990, the obvious conclusion to be drawn is that there was an increase in the number of companies and a decrease in the number of employees in these companies.

The share of economic branches has changed radically in the period of transition. In 1990 industry represented 56 percent of the total economy of Braşov. At the end of 2009 the share of industry in the city's economy was of only 7.9 percent (*Fig. 5*).

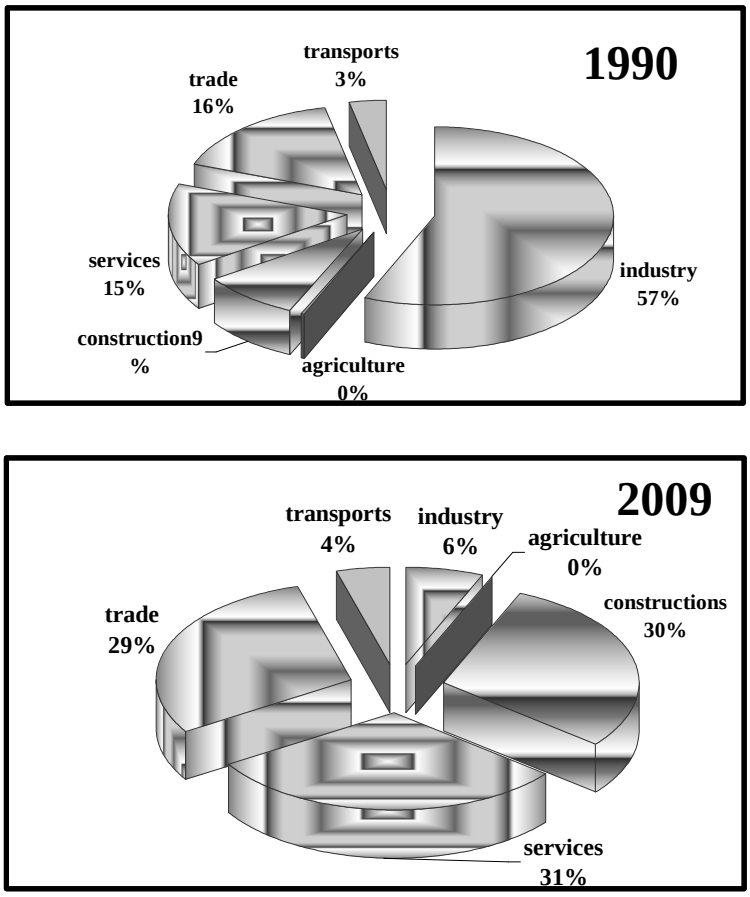

Fig. 5. Share of economy branches – Braşov

According to the graph chart above, services rank on the first place in the economy of Braşov. Of these, tourism plays an important role, with a large number of companies that have as their main activity tourism. Of the 4530 companies providing services, 691 companies deal in tourist activities, i.e., 15 percent of all available services. Considering all the economic branches tourism represents only 5.8 percent, a small percentage compared to the natural and human resources within the area.

Trade ranks second, retail taking the upper-hand. The two branches of the national economy exceed 6o percent in the framework of the economy of Braşov. Thus, we can conclude that the tertiary sector is prevailing in the economy of Braşov. Construction activities suffered a major setback after 1990, managing to recover only after 2005. At present, as a consequence of the collapse of industry, trade companies have come to rank third among the branches of the economy of Braşov. At the

opposite end one should remark companies involved in food farming with a share of only 0.2 percent. Compared to 1990, there are significant changes as shown in the chart below.

The number of employees varies according to the changes occurring in the city's economy. The total number of employees registered in the municipality of Braşov increased slightly by 1.4 percent in the years 2000-2002. In 2002 the highest number of employees in the city was recorded in manufacturing (42.8 percent), followed by trade (14.1 percent).

In 2009 the structure of employees by sectors of the economy was distributed as follows: agriculture 0.6 percent, industry 25.8 percent, construction 15.6 percent, commerce 27.5 percent, services 27.3 percent, other 3.2 percent. (*Fig. 6*) It is noted that most of the employees work in the sphere of trade and services, more than 50% compared to the industry, where the employees' share represents only a quarter of all employees.

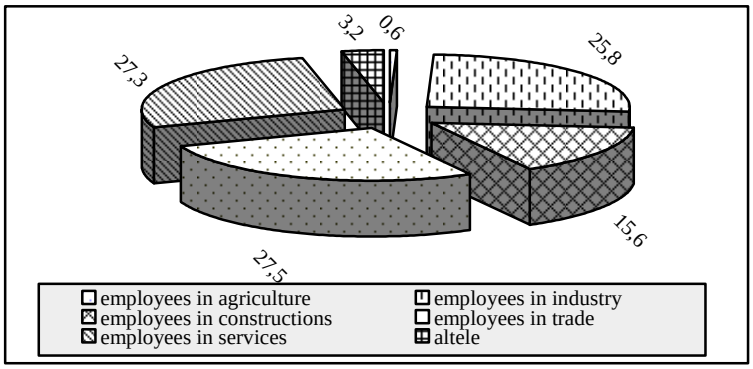

Fig. 6. Share of employees on economy branches – Braşov 2009th

3. Industry Dynamics in Câmpina

Clearly dominated, prior to 1990, by industry, mainly machine building industry, the economic structure of the area of Câmpulung depression has undergone profound changes during the period that followed, entailing negative effects on both productivity and employment rates.

The development of industrial activities in the socialist, respectively, communist period, generated and supported the transfer of labor from agriculture to industry. The complex transformations in the political and economic field occurring after 1990 following the transition to a market economy through privatization, have led to reduction and afterwards to disruption of its capacity of industrial production.

The downturn of the industry has left its mark on the manufacturing activity carried out on the three large industrial sites, the ARO Automotive Company, the Artificial Yarns and Fibers Mill and the Mining Company.

In the early 90s over 13,900 people were employed in the traditional automotive manufacture, i.e., about 50% of the existing labor on the local labor market.

Since 1966, when the first SUV model was designed, until 2002 there were over 360,000 cars manufactured. Before 1990 more than 90% of production was exported to over 110 countries. By diversifying models, an annual output of 13,104 pieces was reached in 1978, compared with the period after 1990, when less than 3000 pieces (in the year 1999) and only 1,000 (in 2002) were manufactured. For reference, in the same years the number of employees dropped from 7,500 in 1978 to 3,840 in 2002.

The attempt to re-launch the manufacturing activity by dividing the company into five companies failed and the investment in upgrading worth 2 million Euro, provided under the privatization contract in 2003, never materialized.

Object of several subsequent commercial transactions, the automotive company's site with an area of over 48 ha was then turned into the Câmpulung Industrial Park. Following the rehabilitation of its infrastructure, the industrial park currently disposed of production facilities and storage areas between 1,000 and 30,000 square meters, its own railway track with a length of 3.5 km, an office area and conference rooms with a total area of 3,500 sq. m.

The Nobel Automotive Company, with the largest share of economic activity in the park, at present manufactures components for the automotive industry.

The Synthetic Fibers and Yarns Mill, were classified, after a series of unfavorable total external contracts, among the first 10 state-owned firms to be liquidated, registered laid off of over 2,000 employees, and display an abandoned site in an accelerated process of decay, in spite of the fact that twenty years ago they had the most modern technology to produce synthetic fibers in the country.

The Câmpulung Mining Company has, in its turn, been affected by the negative effects of the national policies pertaining to the mining sector. Thus, so far until total cessation of activity, the Company has fired over 5,000 employees.

The mismatch between the components of economic reform, the restructuring measures which once implemented proved to be ineffective, the low degree of efficiency and competitiveness and the high energy consumption are just some of the causes that led to the economic decline of the industrial sector, which thus became the main branch generating unemployment (*Fig. 7*).

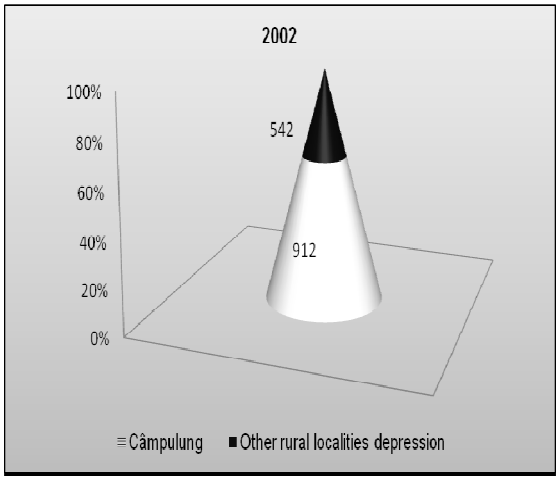

Fig. 7. Number of unemployed in the town of Câmpulung

Analyzing the collected statistical data, (*Fig. 8*) it can be concluded that a decrease by 57 percent in the proportion of people employed was registered in 2008, when the recorded average number of employees in total economy was of 11,052, compared to 1991, when their number was of 25,507.

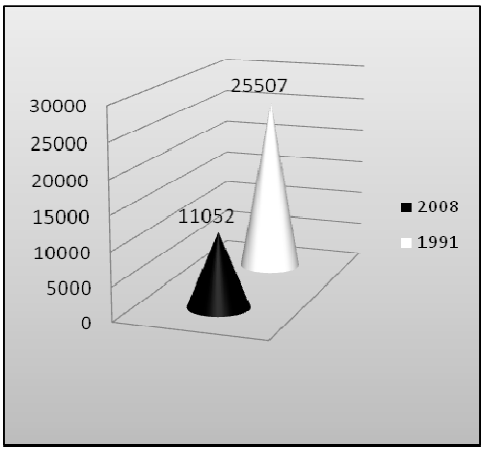

Fig. 8. Number of employees registred in Câmpulung

Of the four major industrial giants, only the former Binders Factory, today S.C. Holcim (România) S.A. – Câmpulung Cement, located at Valea Mare Pravăț was successfully privatized.

Simultaneously with the decrease in the number of former state enterprises, the private sector has developed, a vital factor in the functioning of market economy, by the constantly positive evolution of the number of small- and medium-sized enterprises.

Thus, if in 2002 there were 1431 traders operating on the market, in 2006 there were 2138, while in 2008, their number exceeded 2500 (*Fig. 9*).

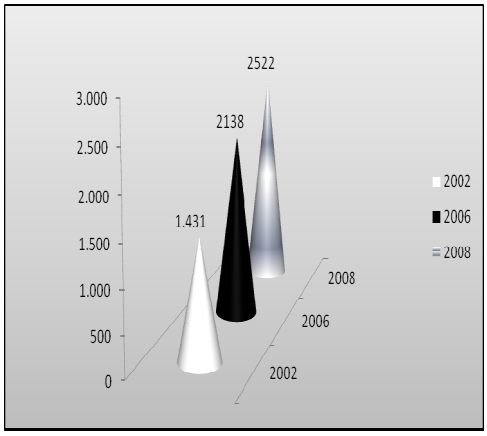

Fig. 9. Number of economic agents in Câmpulung

The poorly developed tertiary sector before 1990 has followed an upward curve, thanks to the new possibilities for diversification of the economic profile, with significant growth in trade and retail businesses, finance and banking, insurance, consulting, telecommunication and education.

The significant and growing share held by trade activities in the town's economy is supported by companies engaged both in retail and in wholesale trade, the retail market being provided by shopping malls and supermarkets such as Lidl, Penny and Kaufland.

The main branches active in the local industry are those manufacturing: car components – SC Complete Automotive Systems SA, plastics – SC PETKING SA, SC Duton Muscel Plast SA, hand tools, MG SRL SC Montana, building materials – SC Ceramus SA, medical instruments, pharmaceuticals – SC Velfina SA, wood products, textiles, food. Following the privatization of the former ICIL, the Danish dairy producer Nordex Food has made significant investments in renovating and refurbishing the old Lactag Factory.

The accessible opportunities for local entrepreneurs have led to some timid attempts to re-launch local tourism. Thus several tourist guesthouses have been set up, most built by European funding programs. In the framework of the extensive program called "Iezer Tourism" in present in its early stage, the first ski track in the area was inaugurated on Matau Hill, at an altitude of over 950 m.

The economic and human resources, the geographic position and the business opportunities which oriented and made investors decide to develop businesses in this area may still represent favorable conditions to attract foreign investments in the future.

Conclusions

The period of restructuring affecting the economy of the analised urban areas displays as its main feature an increasing number of companies, mostly privately owned, the closing down or privatization of state-owned companies and the decrease in the number of employees in all fields. If in big cities, such as Brasşov there is a prevalence of the economy of services, in small towns, such as, Râmnicu Sărat, the share of the tertiary sector is still fairly low.

The changes in the economy after 1990 due to restructuring and privatization processes are reflected in the industrial sector by reduction of the activity and even the closure of many businesses, which led to the emergence of brownfields.

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THE ROLE OF THE ENVIRONMENT IN TRIGGERING THE SYRIAN CRISIS

VASILE POPA*, OCTAVIAN COCOŞ

The Syrian Arab Republic, located in Southwest Asia, is bordered by Irak, Jordan, Israel, Lebanon and Turkey; displaying to the west it has a 180 km long coastline on the Mediterranean Sea. From 1963 to 1970 Syria was governed by the socialist Baath Party, and since 1970 it has been ruled by the Al Assad family (Hafez al-Assad and Bashar al-Assad, the latter since the year 2000), who had the same political orientation. The delay in political and democratic reforms, in a country placed since 1963 under a state of emergency, the government inefficiency in dealing with the socio-economic problems, as well as the events that occurred in Tunisia, Egypt or Lybia, have led to the outbreak of violent protests, first in the city of Deraa, in March 2011, then in Baniyas, Latakia, Horms, Hama, Aleppo or Damascus, which resulted in more than 9000 casualties. Moreover, in Syria the natural environment is a restrictive factor for the social-economic development as more than half of the country is semi-arid or arid, enjoying less than 200 mm of precipitation per year. As far as the soil cover is concerned, in the areas where precipitation is less than 250 mm per year aridisols are common. Syria has a population of about 22 million people, while the annual growth rate is 2%. In the last decades the population has increased more than four times in comparison to the figure registered in 1960, when it numbered only 4.5 million inhabitants. This proves the state's inefficiency in adopting family planning measures, aimed at regulating the growth in accordance with the natural resources. The present political crisis, generated by people's complaints, has been triggered by the serious drawbacks of the democracy, the inefficient management of the population growth and the slow socio-economic development, which can be explained by the restrictive geographical environment, so vulnerable to degradation and possessing limited resources.

Keywords: *Syria, political crisis, restrictive geographical environment, anthropogenic pressure, economic situation.*

Introduction

The Syrian Arab Republic is a country in Southwest Asia, bordering Iraq, Jordan, Israel, Lebanon and Turkey, while to the west it has a 180 km long coastline on the Mediterranean Sea (fig. 1). Syria covers 185,000 km^2, including the 1,295 km^2 which are under Israeli occupation since 1967 (the Golan Heights). Owing to its good geographical location, which granted it significant commercial benefits, this region was inhabited in ancient times by Arameans, who established their capital at Damascus. The city was to develop into a prosperous and

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influential center, while Aramaic became a language of trade, which was used throughout the Middle East. Later the territory was ruled in turn by the Assyrians, Babylonians, Persians, Macedonians, Seleucids, Romans, Byzantines, Arabs, crusaders, Ottoman Turks and French. Twelve years after gaining its independence on April 17, 1946, Syria concluded a union with Egypt (United Arab Republic), which was not to last long (between 1958 and 1961). In 1967 the war with Israel broke out in the aftermath of which Syria lost the Golan Heights.

Between 1963 and 1970 the country was led by the Baath Party, of socialist inspiration, period during which it was taken over by the Al Assad family (Hafez al-Assad and Bashar al-Assad), who had the same political orientation. The delay of political and democratic reforms in a country that has been under an emergency state since 1963, the government's inefficiency in dealing with the socio-economic issues, and the political events that have occurred in Tunisia, Egypt and Lebanon, led to the outbreak of violent protests on March 2011. The riot started in the city of Deraa, and then it spread in Baniyas, Latakia, Homs, Hama, Aleppo and Damascus (*Fig. 1*), finally resulting in more than 9,000 casualties *(BBC News, 2012*).

Even though the crisis trigger has been the authoritarian regime, the conflict is rooted in the restrictive environment, which has been subjected more and more to an intense anthropogenic pressure, as a result of the significant population growth. In consequence, the living standards of the population have dropped; unemployment has grown, especially among the younger generation, and poverty has left its imprint upon the people.

Fig. 1. Syria – General map

The Physical Background

In Syria, the natural environment is a restrictive control for the socio-economic development. More than half of the country's area is either semiarid or arid (*Fig. 2*), as a great part of it receives less than 200 mm of rainfall per year, or in some places even less than 50 mm (Ali *et al*., 2007). In many regions, the summer temperatures often exceed 40^0C, while the sandstorms, so common during the interval February – May, cause severe damage to agriculture. Water resources are scarce. The Euphrates (Al Furat), originating in eastern Turkey, which is the longest and the most import watercourse, accounts for 80% of the Syria's water resources. The river crosses the country on 610 km, having an average discharge of 583 m^3/s (BCS, 2011). The other rivers, like Orontes (Nahr al-Asi), Barada, Sinn, Al-Awaj or Queiq, generally have average discharges less than 6 m^3/sec. In arid lands the valleys have a temporary flow.

In order to ensure the necessary water for agriculture and other uses (hydropower generation, flow regulation) a number of hydrotechnical engineering works have been accomplished. Of these, the most important is the Tabqa dam on the Euphrates, lying upstream the Ar Raqqah city, which came into operation in 1973. The dam gave birth to a large reservoir called Al Assad (Buhayrat al Assad), with an area of 665 km^2 and a water volume of 14 billion cubic meters. In the areas where surface flow is insufficient or inexistent, groundwaters have been used since ancient times to meet the water demands of the population. At present, of the 1.3 million irrigated hectares, 726.000 ha, i.e. 55.8% of the total, depend on the groundwaters. The most important springs are the following: Ain al-Zarqa (5110 l/s), Ain al-Fegy (4801 l/s), Baniyas (1027 l/s), Al Nasriyeh (700 l/s) and Barada (526 l/s) (BCS, 2011).

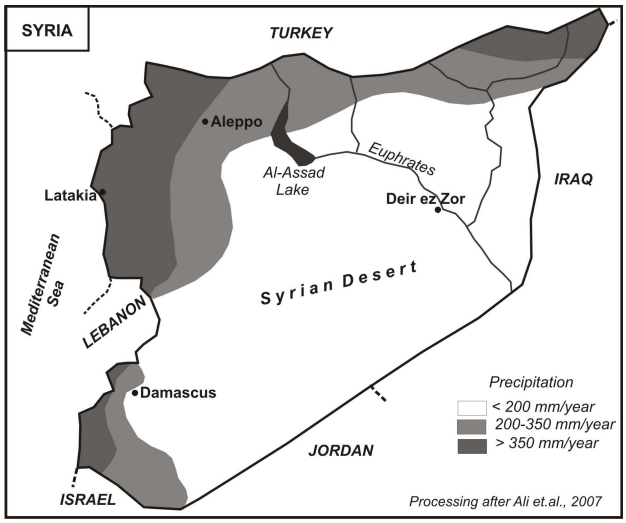

Fig. 2. Syria – precipitation distribution map

Most of the country displays a desert and a semi-desert vegetation, with sparse grass, shrubs and trees. The forests, which account for slightly more than 3% of the Syrian territory, are found in the wetter lands in the west. As far as the soil cover is concerned, where annual precipitation is less than 200 mm, aridisols prevail. They cover 47.5% of the area and are prone to erosion. The entisols (soils of recent origin) account for 16.9%, while the inceptisols (immature soils) hold 21.7%, being found especially in the north and northwest (IFAD, 2007). The increasing anthropogenic pressure, mainly through overgrazing and grain cultivation, have led to accelerated erosion. Thus, it is estimated that 17.3% of the Syrian territory is affected by soil degradation (FAO, 2003).

Population Dynamics and Structure

At present Syria has about 22 million inhabitants and a population growth rate of 2%. If in 1960 the population counted 4.5 million inhabitants, in the last fifty years it has grown by more than four times (*Table 1* and *Fig. 3*), which proved the inefficiency of the government in adopting family planning measures so as to maintain the growth in the limits imposed by the environment potential. The Alep Governorate, with its 5.9 million inhabitants is the most populated, being followed by the Governorates of Homs, Hama and Idlib, with about 2 million people each, and Damascus, with 1.78 million inhabitants (BCS, 2011). The highest population densities are found along the seacoast, in the area of Damascus and Aleppo, as well as in the Euphrates Valley. Thus, against an average density of 118 inhabitants/km^2, the highest value is specific for Damascus Governorate (13,000 inhabitants/km^2), while the lowest for Deir ez-Zor (30 inhabitants/km^2). As far as the age pyramid, 38% of the population is less than 15 years old, and only 3.3% is older than 65 years. At the same time, birth rate is 24‰, death rate is 3.5‰ and life expectancy at birth is 75 years.

Table 1

Syria – The Main Demographic Indicators

	1950	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**
Total population (million people)	3,4	4,5	6,3	8,9	12,3	15,9	20,4	24
Annual population growth rate (%)	2,6	3,4	3,3	3,3	3	2,4	1,9	1,6
Birth rate (‰)	51,2	50,1	46,8	45,4	38,4	29,7	23,9	20,7
Death rate (‰)	20,5	18,1	12,5	8,3	5,3	3,8	3,5	3,6
Life expectancy at birth (years)	47,6	51	58,1	64,8	70	73,5	75,3	76,8
Population younger than 25 years (%)	58,8	61,4	65,8	68,3	67,3	62,5	57,3	50,4

Source: The Population Division of the Department of Economic and Social Affairs of the United Nations

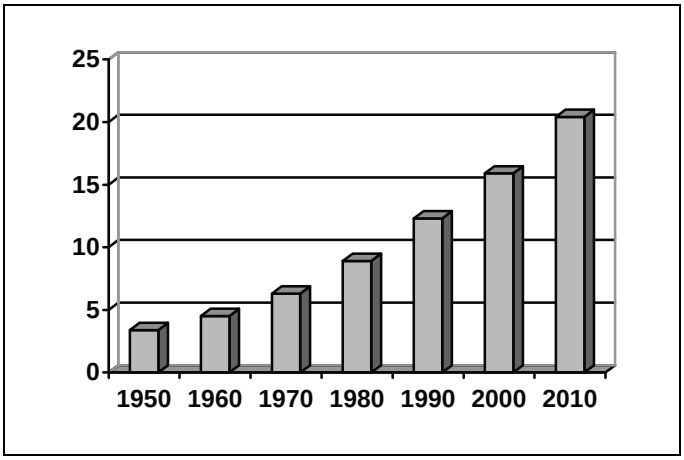

Fig. 3 Syria's population between 1950 and 2010 (million inhabitants)

The Arabs, who are spread throughout the country, account for more than 90% of the Syrian population. They are divided into several religious communities, of which the most numerous are the Sunnites (74%). The rest are Shiites/Alawites, Christians and Druzes. The members of the Alawite community, to which belongs the president's family, hold the entire political power, despite the fact that they are a minority (Rivlin, 2011). This is another reason why most of the population is dissatisfied.

The main ethnic minority in Syria are the Kurds, who account for about 6% of the population. Most of them (80%) live in the northern and northeastern parts of the country. Generally, non-Arab people (Kurds, Armenians, Turkmens, Circassians and Assyrians) are grouped in their own villages or neighborhoods and are found especially on the territories north of Aleppo and in Al Jazirah region. They have preserved their cultural elements expressed by religion, language, costumes, architecture and agricultural practices. Approximately 56% of the population live in the cities. The highest urban sprawl can be seen in the case of Aleppo and Damascus.

The Economic Situation

In 1946, when Syria achieved its independence, its economy was less developed. Later on, as soon as the Baath Party came into power a series of economic reforms were initiated, among which the nationalization of the banking system. With the increase of crude oil prices in the 1970s, Syria experienced a change of direction, from a traditional agricultural economy to one dominated by services and industry. Up to the 1990s the manufacturing

industry was largely controlled by the state and during that period some economic liberalization reforms were implemented (McGowan *et al.*, 1987).

In comparison with the other Arab states in the region, Syria has a more diverse, yet scarcely developed economy. Its underground reserves consist of phosphates, hydrocarbons (oil and natural gas), chromium, iron ores, manganese, gypsum, salt, marble and other natural building stones. Discovered in 1956 in the northwestern part of the country, and exploited more intensively beginning with the 1970s, the oil reached a peak production of 610 thousand barrels per day in the mid-1990s. Subsequently, production began to decline, reaching at present 385 thousand barrels per day.

The certain oil reserves are estimated at 2.5 billion barrels and those of natural gas at 300 billion cubic meters m^3 (BPSR, 2011). Even though in the last years Syria has become a net importer of crude oil and oil products, the internal production still ensures 40% of the state budget, while oil exports account for another 25% (IFPRI, 2011).

However, the diminishing of oil revenues has determined the Al Assad regime to initiate an economic and financial liberalization, and to cut down subventions. These unpopular measures strongly affected the average people, who were forced to sustain price increases for oil and food. Thus, without adequate subventions the oil price grew by 42% between December 2008 and September 2010 (Hurault, 2011).

In Syria's development economic plans agriculture has always been a main priority, in as much as the state has strived to ensure food for its population. The rapid expansion of the cultivated land, which started in the 1970s, together with the increased productions, has stimulated the rest of the economy. Because most of the area is arid and semiarid, only 6 million hectares, i.e. 32% of the territory can be cultivated. Wheat, which is grown on 1.6 million hectares, is the main crop of the country, followed by barley, cotton, sugar cane, tobacco, sunflower and peanuts (BCS, 2011). Stockbreeding is practiced under nomadic and semi-nomadic conditions, taking advantage of the 8.2 million hectares of pastures, i.e. 44% of the country's area, but it is also practiced in specialized farms. The largest livestock populations are the sheep (15.5 million heads) and the goats (2 million heads) (BCS, 2011).

In the last decades the increase of agricultural yield has been partly capable of coping with the population growth. As far as the agricultural products are concerned, their yields, prices and trade were long controlled by the government and the climatic conditions. The droughts that continue many years in a row are quite common in Syria, where they impact the entire economy. Here, the Euphrates and its tributaries, Balik and Kabur, have the highest irrigation potential. Water is a scarce resource, as it happens everywhere in the Middle East. Precipitation is not only low, but it varies considerably from

year to year, making the agriculture a risky venture, because the crops may be compromised during the hot and dry summers.

Before the Tabqa dam was built, Syria had only 550 thousand hectares of irrigated lands (McGowan *et al.*, 1987). At present, this area has increased to 1.34 million hectares, i.e. 22% of the cultivated land (BCS, 2011). Another initiative in the agricultural field has been the increase of cultivated areas by 594,500 ha starting with 1986, by clearing the land of rocks (IFAD, 2007). The frequent droughts of the last decades (IFPRI, 2011) have had serious economic implications: the increase of prices and agricultural product imports on the one hand and the reduction of the GDP and population incomes on the other hand. The severe droughts have pushed 2-3 million people in an extreme poverty, most affected being those in the northeastern part of the country. Consequently, tens of thousands of people were forced to leave their households for Damascus or other big cities (Rivlin, 2011).

Agriculture is the economic sector most affected by drought. Cereal growing and sheep breeding suffer the most, which explains the waning productions. Wheat, which is the main staple, recorded a production decline by 25% in 2009 and 33% in 2010, in comparison to 2006 (when the yield was 4.9 million tons). This made necessary that significant amounts of wheat (1.56 million tons in 2009) were imported from other countries. Moreover, on the international market the price of agricultural products, as well as the one of the energy, is expected to increase. Under these circumstances, the food security, i.e. the ability of the state to meet the food demand of the population, is seriously threatened.

Conclusions

The present political crisis, caused by the dissatisfaction of the population, was generated not only by the serious deficiencies of democracy, but also by the inefficient coordination in managing the birth rate and the socio-economic development within a context of a restrictive geographical environment, extremely vulnerable to degradation and displaying limited natural resources.

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THE ENVIRONMENTAL IMPACT OF TOURIST ACTIVITIES PERFORMED IN THE SPA RESORTS OF VÂLCEA SUBCARPATHIANS

ANA-MARIA ROANGHEŞ-MUREANU*

The local environment has a positive influence for tourist trips, both through the conditions it offers, and through its high attractivity. This is the main reason why tourism should play an important part in the conservation of the environment and the mantainance of its high standards (both in the area of tourist resorts, and in their sorroundings). The main interests in the field of tourist activities should be well aware of the fact that the natural resorces which are used in this domain are limited.

Destructive actions derived from tourist activities are manifested mainly through the inadequate usage of the environment's resources, in recreation and leisure purposes, and they are increased by the human intervention upon spa resources, which is often quite brutal. Therefore, the development of tourism should be made along with the idea of a sustainable development of the region, which is based on natural resources and their protection.

Key words: *tourist activities, spa resorts, environment, Vâlcea Subcarpathians.*

1. Introduction

Vâlcea Subcarpathians are located between Topolog and Olteț rivers. They are a complex association of landforms, which, along with the geological formations and the favourable climate are bench marks for catalyizing the emertion of mineral springs. Thus, the evolution of this region is based on the neotectonic areas that would give birth to the axial bulging from Slătioara entry, in the east, to the Târgu Jiu subsidence area, in the west (after Dinu, 2002).

The natural frame along with its components (climate, relief, hydrography, vegetation, fauna, natural reserves) contributes to the attraction of significant tourist flows and influences the development of the tourist activity in the analised space. It is its very obvious steep mountains and the smoothness hearth of the current depressions and mount passes among the basinet – depressions that characterize the region. (after Ielenicz M., Pătru Ileana, 2005).

The advantageous natural conditions offered to its residents, the good transport infrastructure, a high level of life security and also a very dense population are the main reasons why the Vâlcea Subcarpathians region is an

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important contact region for commercial exchange. The economy of this region has been adapted to commercial trade from early times. Intense economic activities have been sustained with Transylvania, due to the proximity of the Olt river passage, which made the entire area, generally speaking, and also the trade center of Râmnicu Vâlcea, in particular, to play a special part, not only for the local commercial exchange, but also for the inter-regional trade.

One of the main attractions of Vâlcea Subcarpathians are their numerous spa resorts (*Fig. 1*), widely known for their thermal springs and the beauty of the landscape, which are recommended for both rest and healing properties. Besides the treatment of many diseases, these resorts offer a wide variety of leisure possibilities, such as hiking or practicing different sports.The tourist offer includes more than 11.000 accommodation places in hotels, villas, guesthouses, campsites and rural households registered in the Romanian spa tourism system.

Setting goals (both general and specific) is an important stage which aims to establish directions for action, such as: identifying tourism resources, quantitative and qualitative evaluation of the elements of tourism potential which can be considered as main attractions, the determination of the tourist valuing level of the region. Also, an analysis and synthesis study on a large scale was requiered, which is supposed to contribute, by its content, structure, methods, and procedures, not only to bring light upon the numerous aspects concerning Spa tourism, but also to draw the attention towards the mineral riches that are found all over our country's teritory, including the area in question. This thing was noticed by analysing the favourable natural potential for the development of Spa resorts in this area, process in which the available human resources played a significant part as well.

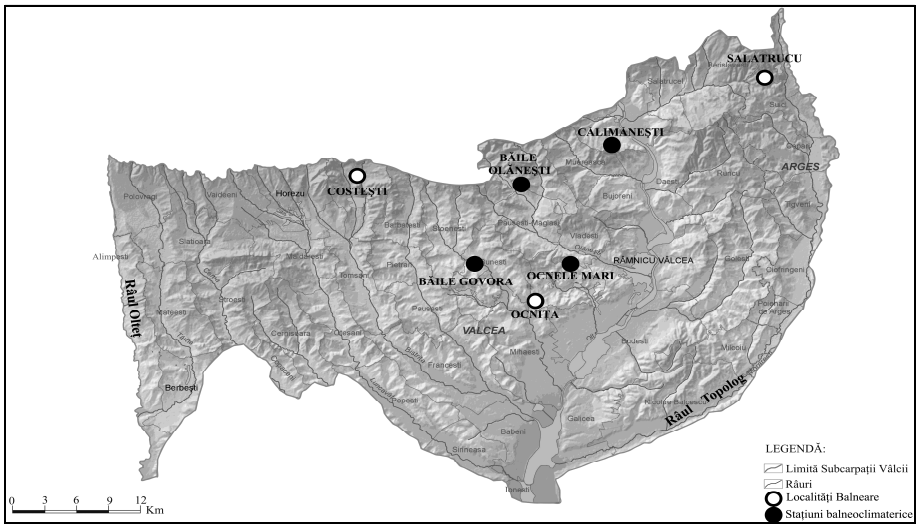


Fig. 1. Spa resorts in Vâlcea Subcarpathians

The neccesity of elaborating this paper work derives from the fact that in its content are presented several types of tourism that could have a certain influence over the natural environment. The purpose was to elaborate an analysis of the tourism attractivity, as well as of the diffenrent ways and methods of promoting this potential, without causing any damage to the envinronment.

2. The Environment – A Key Factor in the Development of Tourism Activities

In the western side of the Olt river, especially at Ocnele Mari, there are a few blocks of salt which have been pushed towards the surface. The presence of these salt blocks has determined the appearence of salt accumulations on small areas. Downstream of Călimăneşti, large terraces present themselves as an aisle depressional passage of considerable dimensions. Due to the appearance of many hydrotehnic amenities in this sector, the meadows and the nearby terraces are covered by lakes.

The environment makes the tourist heritage of a nation (Ciangă N., 2001), playing an important part for both humans and their activity. The environment contributes substantially to the development of tourist activities. As long as tourism and the environment co-exist in harmony, the environment takes many advantages from tourism. There are many examples of such situations, most of which can be grouped in one of the two main directions: the conservation and the rehabilitation of the environment. Air and water quality, the diversity of flora and fauna, as well as the landscapes are inevitably affected by tourist activities, when they are deployed inappropriately.

Activities that already have a tradition in the area, such as the chemical industry, woodworking and agricultural products are going through a process of “redimensioning” and readaptation to the recent internal and international market requirements, and also of developing new activities related to the existing ones. The local industry is the main source of pollution due to the technological equipment with chemical profile producing heat and electricity, also used in wood processing. For instance, environmental pollution in Râmnicu Vâlcea area is due to the storage of waste heaps of ashes from Govora CET in the Olt river banks, which affects in the first place the quality of water, but also soil and air (in extreme drought conditions and windy periods) (*Fig. 2*).

Fig. 2. Industrial Chemical Govora (*Source:* Roanghes Ana)

At the same time, air pollution in the area is also caused by the local chemical industry. The main sources of pollution are the burning processes in the heating installations (from an average total of 144764 establishments, 20.14% use coal, 63% use wood, 9.91% use natural gas, and only 6.4% are connected to the local heating system), local traffic (20756 – vehicles are within public property, 54786 – vehicles are private property[1]), and transit traffic.

Therefore, the Olt valley is not only an important circulation route, but also an access way for the air mass circulating from north to south and spreading the polluting elements on vast surfaces, or, on the contrary, being responsible for their persistance over the soil's surface. The construction of dams for hydro-energetical purposes on the Olt and its tributary rivers: Topolog, Olăneşti, Bistriţa along with the erosion preventing works that have been done in the small river basins, are major interventions in the geographic landscape. The Olt and its tributary rivers have become an important source of energy and of water supply for the settlements and the industry in the area as well as for the irrigations needed in the agricultural sector, or for pulling flooded areas from underwater, fishing and other leisure activities.

[1] Recorded for the year 2008.

The two components, the environment and local tourism should mix together, without causing any damage to one another. Tourism by its nature involves the environment. Tourism activity influences the environment, but sometimes the environment can also influence back tourism activities. But we can certainly say that the effects of tourism on the environment are very diverse and imply a series of factors which are the direct impact of the economic development or factors generated by the frequent and intensive use of the natural environment for leisure activities.

3. Tourist Activities in Spa Resorts within Vâlcea Subcarpathians

Tourism does not offer only a reason for the conservation of both natural environment and human resources, but it also provides the economic support which is necessary for the actual conservation program: part of the profit obtained from tourist activities could be invested in the protection of the natural environment. (Glăvan V., 1996)

The outburst of tourism circulation, the participation of larger and larger masses of people in this activity, the diversity of the motivations which determine the increase of the tourism demand have led to the multiplication of tourism forms. The contouring of these various tourism forms, of their theoretical and practical importance, offers the scientific basis for the main decisions concerning the development and diversity of the tourist offer, its alignment to the possible changes in the structure of the demand.

In the current social-economical context of the area of Vâlcea Subcarpathians, a limited number of tourism forms are performed, and some of them (rural tourism, for example) are still in an incipient stage. It is not less true the fact that, in the conditions of the expansion of the number of services offered in the field and their adaptation to the international requirements, the forms of tourism which are practiced in the local area could be well diversified. From urban tourism, which includes a large range of cities (e.g. mining towns – Ocnele Mari, Spa towns – Băile Olăneşti, Băile Govora, Călimăneşti, the county capital city – Râmnicu Vâlcea) to mountain tourism, people have shown a lot of interest in combining the spa treatment (as the main purpose for their visit for a spa resort) with the large range of leisure activities that can be practiced in the area.

Natural tourist sites which are characteristic to the region are variate. These can be of geological provenance (certain types of rocks – limestone system from Costeşti, salt deposits from Ocnele Mari), natural sites provided by the relief (the peaks, the gorges, the waterfalls, the caves and limestone systems at Olăneşti and Cheia, the limestone carvings made by Olteț and Bistrița rivers),

biogeographic tourist sites, such as forest-parks, botanical gardens, botanical and forest reserves, zoo parks, trout farms, national parks (Buila-Vânturarița National Park, Munții Cozia Natural Rezervation), as well as tourist sites linked to the water (mineral and thermal springs in Olăneşti, Govora, Călimăneşti-Căciulata).

Particularly interesting are also the religous sites (hermitages and monasteries) that were built in the XIV and XVII ceturies, around the region, and which attract a large number of tourists (e.g. Iezer, Frăsinet, Pahomnie, Pătrunsa, Cozia, Bistrița, Dintr-un Lemn), and the ethnographic tourist sites as well (The Local Architecture Museum from Bujoreni north from Râmnicu Vâlcea along Olt river course). These can provide the tourist who has come in the region for Spa treatments with various possibilities for leisure activities.

Tourists are attracted to traditional local activities, such as fairs, which gather every week or month many residents from near-by villages, as well as they are to religious pilgrimages that reunite for 1 to 3 days a large number of christian believers from around the region, and even from around the country. Among the most popular events are the celebrations of the patron saints of the sorrounding churches (Cozia, Hurez). The artistic festivals that involve music, folklore and theatre take place more rarely nowadays and only in those villages with an ancient ethnographic tradition, such as Vaideeni and Horezu.

The diversity of the traditional art in the region, the incredible abilities shown in wood processing (e.g. the wooden houses from the Peasent's Museum in Bujoreni), the art of decorating small objects by carving them (especially spoons and forks), the art of creating traditional musical instruments (simple flutes decorated by sculpting, at Vaideeni), attract numerous tourists, thing that can be a menace for the natural environment.

As for what concerns internal tourist circulation, after year 2000 this registers a massive decrease as a consequence of deterioration of local life conditions, of the constant damage caused to the material support that sustains tourist activities and of the even more weaker standards of the offered services. Starting with 2002 many properties have been asserted and most part of the accommodation units, such as guest houses and villas, were restituted to their former owners. Consequently their capital becomes private. What follows next, between 2004 and 2008, is a period in which private owners invest in the refurbishment of the accommodation units, offering to tourists modernized buildings, which has led to an increased number of visitors in this area (e.g. the case of Olăneşti, Govora or Călimăneşti-Căciulata resorts).

Overall, the density of the tourist circulation at the level of spa restorts in Vâlcea registers an obvious higher level in 2008 (602.7 tourist per 100 inhabitants), than the one registered in 1998 (307 tourists per 100 inhabitants) (*Fig. 3*)

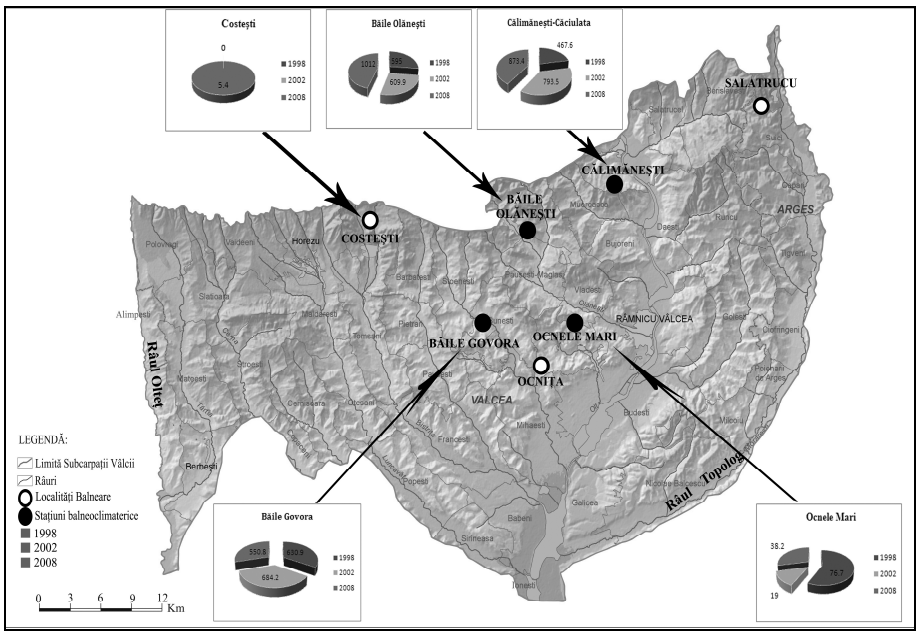


Fig. 3. Tourist circulation density (1998, 2002, 2008) (*Source:* DJSV processed data)

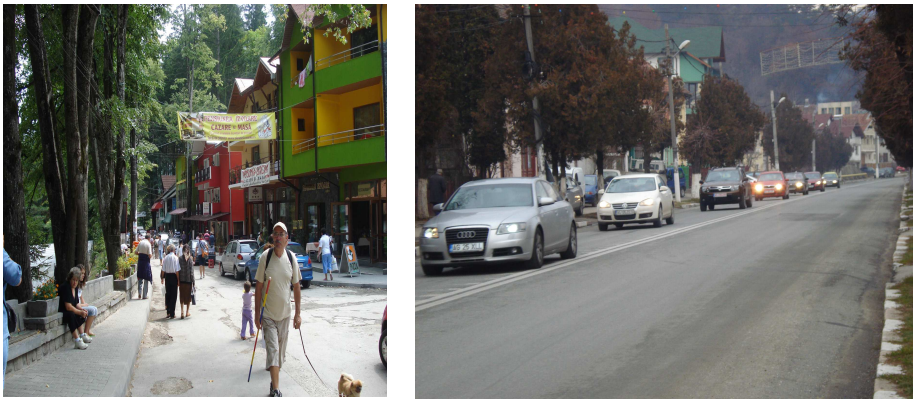
The analysis at the level of each spa resort emphasizes a clear hierarchy in this sector, as it follows: Govora, Olăneşti and Călimăneşti-Căciulata resorts are far superior to Ocnele Mari and Costeşti resorts. Therefore, for the year 1998, Govora resort registered a total value of 630.9 tourists per 100 inhabitants, Olăneşti resort – 595 tourist per 100 inhabitants, and Călimăneşti-Căciulata 467.6 tourists per 100 inhabitants, while Ocnele Mari resort registered only 76.7 tourists per 100 inhabitants and Costeşti did not register a single tourist. As for year 2008, there was an increase in the density of the tourist flows towards spa resorts in this region: 5.4 tourists per 100 residents in Costeşti, and over 1012 tourist per 100 residents as it is the case of Olăneşti resort.

4. The Impact of Tourism Activities on the Environment

Tourism is one of the most important industries with a continuous development, as more and more people are getting interested in exploring new destinations. This is the reason why the analyzed area, one which has proven to be very rich in special natural resources, attracts even more visitors by providing them with the opportunity to take advantage of the treatment with diverse mineral waters, mud packing or thermal baths.

Tourism is a space and tourism resources consumer, participating constantly at the damage of the natural environment and of the tourism background. This damage is caused either by the direct “pressure” exerted by tourists over the landscape, the flora and fauna, or by other tourist sites built in the area, which does not put in good use the resources of the region and the main tourist attractions. The destructive effects of certain leisure activities are manifested basically by the incorrect use of the environment, and by a brutal intervention of humans in the natural landscape.

Most part of the damage caused to the environment as a consequence of tourism activities (*Fig. 4*) is caused by the large number of visitors that came to certain destinations where the capacity of the accommodation units has been exceeded. There are several ways to affect the natural environment, from the irrational building of certain units destined to tourism activities, investments that end up by enlarging the area occupied by the accommodation units and treatment sectors (Olăneşti, Călimăneşti-Căciulata), transpassing the main principles of exploitation of the natural resources (Govora, Ocnele Mari) to traffic pollution (Călimăneşti-Căciulata, Olăneşti).



a *b*

Fig. 4. Images on the ways of environment degradation and the overcrowding of touristic resorts: a) overcrowding – Băile Olăneşti; b) automobile traffic in Călimaneşti-Căciulata resort (*Source:* Roanghes Ana)

The impact of tourism activities causes both direct damage, such as the alteration of landscape (due to the placement of the buildings, the materials used in their contruction and even the design elements), the alteration of air quality, the distruction of pastures, trees and flora (due to the large number of tourists coming to wooded areas, and development of infrastructure), pollution of the atmosphere, a high level of noise and indirect damage, such as the excessive use of water flows for water sports, and the development of the infrastructure in general. Furthermore, we can even distinguish certain malfunctions such as the penetration of the inhabited zones by touristic paths of intense circulation, with

a negative impact over the environment: pollution, noise, and accidents. Water pollution has serious consequences upon the environment. Wastage throwing in the river banks have been stated, and also the placement of accommodation units right in the river bed (e.g. in Olăneşti, two hotels have been built right in the river bed of Olăneşti water course) (*Fig. 5*).

a *b*

Fig. 5. The deterioration of the river bed Băile Olăneşti spa resort:
a) Hotel Central; b) Hotel Stogu (*Source:* Roangheş Ana)

Furthermore, the wastage does not affect only the water quality, but also the phreatic water sheet and the soil itself. The main consequence can be observed precisely in the case of spa resorts by the alteration of the existing hydromineral resources, which can lead even to the blocking of the water source in the resorts (as it is the case in Costeşti, where the mineral water spring has been covered due to landslides and the lack of interest of the local authorities towards the problem).

The hydroenergetic constructions and dams built in the Carpathian and Subcarpathian sector of the Olt river, have led to irreversable modifications of the natural environment, such as the changes that occurred in the way people use the local fields in agriculture (including forests as well), in village constructed area – new locations for roads and railways (made on the Olt valley), the construction of dykes and other modifications of the lower river bed (especially those made along tributary rivers of rank 1 and 2), the apparition of leisure areas (around Râmnicu Vâlcea and Călimăneşti), and many other similar actions (the protection of the hermitage from Călimăneşti, which was built by Neagoe Basarab, and placing it on an artifical 6 meter high island above the level of Călimăneşti Lake). The numerous buildings and roads that have been made for the development of the region also cause significant damage to the surrounding environment. In most situations, the landscape protection protocol is not followed, the main damage being caused by deforestation (as it is the case in Cozia Mountains) or by limestone quarries (at Pietreni-Costeşti).

The exploitation of raw materials (limestone, lignite, salt, building materials) represented an important part for the development of the local settlements in the area, but also an inevitable source of damage for the environment. The most important side of the situation is to put into practice the measures which have been settled for the conservation of the environment, so that the exploitation of the resources would be sustainable and also generate profit for the local communities. These measures are urged by the numerous aspects of environmental damage, which reaches its highest level at Ocnele Mari. Here, the old salt exploitation wells have turned into abandoned lakes. Other negative aspects are represented by soil cracks, vertical and lateral water erosion, landslides, the clogging of local salt lakes.

Conclusions

Spa tourism is highly important for the resorts in Vâlcea Subcarpathians, as it is the main pillar of the local economy. The over-exploitation of the hydromineral resources and the continuous development of the infrastructure represent the main problem for the local environment. The impact of tourism towards nature can be minimized only by informing the tourists about environmental protection and rational exploitation of mineral resources. This training is also required for local tourism workers. Furthermore, some detailed studies upon the impact of tourist activities and the protection of tourism valuable natural resources are required, especially because the landscape in this region has an unique value that cannot be replaced.

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DIVERGENT AND CONVERGENT POPULATION'S PERCEPTION ON THE ROMANIAN INSURANCE MARKET

CRINA DIMA*

This paper aims to analyse the perception of the Romanian population on the insurance market, by emphasizing the role of insurances in the social context and, in the same time, the importance of understanding its structural elements and the degree in which the Romanian population has been able to assimilate this system. The study relies on statistical sources made available by the Media Xprimm – the most important press group in the insurance market, the Annual Report of the Insurance Supervisory Commission (2009) and quantitatives and qualitatives surveys carried out in September 2009 in Bucharest and some large cities. The author paid special attention to the way in which the insurance market is perceived by various socio-professionals categories such as employees, employers, free lancers and unemployed correlated them with the degree of knowledge each of these social categories has about the types of insurance on offer by the companies. The analysis points out the existence of an increasing insurance market, appreciated to be positive and favourable by the respondents in Bucharest and nationwide; however, the research also showed a moderate level of awareness on specific types of available insurances.

Keywords: *risks, risk perception, protection, insurance market, Romania.*

Introduction

The interconnection between the science marked by interdisciplinary and the current insurance industry is given by the probability of the risk to occur and the impact generated by the effects thereof on the population. Hence, the importance of human geography on the social role and impact of insurances from a causal perspective and the space-time dimension of the social-economic system in geographic view.

Given the multitude of aspects (natural, social or economic and financial) and from the perspective of the population and the life environment the risk is the main element that connects the geography to the insurance system, the human factor being centre of gravity

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The perception on risk is a complex process influenced by numerous factors. People usually select, organise or interpret certain significant and coherent images on daily life triggered by certain external stimuli (Brun, 1992)[1].

The literature reveals several approaches to the risk perception. Some authors (Dake, 1992)[2] focus on the analysis of the possible results of a chance-based event. Vaughan & Vaughan (1996)[3] underlines that risk is a condition containing the likelihood of deviation from a desired, expected or hoped result. In social terms, Wildavsky (1991)[4] defines the risk perception as a contraction process which may take on various forms from the consumers' images, positioning to services, physical properties of the product itself, pricing through advertising, etc

There are further approaches of risk from a cultural point of view, as a cultural phenomenon (Douglas and Wildavsky, 1983)[5] or as a cognitive phenomenon (Slovic, 2000)[6].

Risk perception depends on the various origins that the term takes – uncertainty, fear or unknown event. Due to a factor-based analysis the author performed, the surveys showed that the quality of services provided by the life insurance companies would be influenced by factors such as: prices, employees' competence, products and services, technology, confidence, advertising or management (Upadhyaya, Badlani, 2011:1021)[7].

Last but not least, the importance of geography through the active role of the new systemic concepts, G.I.S. technology, in gathering, analysing and interpretation of data on risk management (subscription and assessment functions, reinsurance procedure, reaction to disasters, marketing and strategic planning).

G.I.S is seen as a very practical tool (Raichel W)[8] in the insurance industry. This technology enhances the ability to make a fast and accurate localisation by geocoding and the provision of full information on natural risks.

In Raichel's opinion, *Geographic Insurance* was thought as an "insurance industry" that uses a set of tools and specific techniques for defining the phenomenon.

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[1] BRUN, W. (1992), "Cognitive Components in Risk Perception Natural Versus Man Made Risks", *Journal of Behavioural Decision Making*, 117-132.

[2] DAKE, K. (1991), "Disposition in the Perception of Risk; an Analysis of Contemporary Worldviews and Cultural Basis", *Journal of Cross – Cultural Psychology*.

[3] VAUGHAN & VAUGHAN (1996), *Fundamentals of Risk and Insurance*, Library of Congress Cataloguing in Publication Data, John Willey & Sons Inc. United States of America.

[4] WILDAVSKY, A. (1991), *The Rise of Radical Egalitarianism*, The American University Press.

[5] DOUGLAS, M., WILDAVSKY, A. (1983), "Risk and Culture", *An Essay on the Selection of Technological and Environmental Dangers*, University of California Press.

[6] SLOVIC, P. (2000), *The Perception of Risk*, London/Sterling.

[7] UPADHYAYA, D., BADLANI, M. (2011), "Service Quality Perception and Customer Satisfaction in Life Insurance Companies in India', *International Conference on Technology and Business Management*.

[8] RAICHEL, W. (1994), "Insurance Geographics", *G.I.S. in Business Conference*, Insurance Service Office Inc., New York.

Geography identifies, due to its structural inter-disciplinarity, the possible types of risk within the social stage and provides the means for their assessment defining and proving in the same time the social importance of this huge economic-financial system for the protection of the general population. All of this is possible due to the applicability of the quantitative and qualitative, inductive, deductive, cartographical as well as the synthetic and comparative analysis methods that exist within geography, as well as the new complex methodology of systemic concepts (e.g. factorial analysis that determine variables that have an explanatory-progressive role on social phenomena)[9], stimulated by the new paradigms of social epistemology.

As a "*science synthesising the natural and social factors*" (Vintilă Mihăilescu)[10], geography integrates the analytical complexity of the geomorphologic (natural factors) processes with the greater *unity in diversity* of population (social factors), emphasizing the complementarity and connectivity with the insurance system.

The Romanian Insurance Market in the Context of European Union accession

Intensely developed after 1990 and perfected in accordance with the standards of the European structures in 2007 (at the same time with Romania's accession to the European Union), the Romanian insurance market is permanently diversifying and expanding, having a constant territorial distribution.

The most important specific indicator underlining the development and expansion of the insurance market are the gross written premiums. According to the 32/2000 Law, these are the *premiums collected and collectable, including the reinsurance and collectable premiums related to all the insurance and reinsurance agreements coming into effect in the reference period prior to the deduction of any amount thereof*[11].

The statistical data emphasised the size and expansion of the insurance market in Bucharest and the Ilfov County, which is the reason the percentage of the respondents in this region adds up to 68.5%. As a matter of fact, this region accumulated in 2009 44,4% of the market share in terms of total volume of gross written premiums, both in general insurance and life insurance segments. The same data shows that the North-Western region adds more than 900 million RON, followed by the Central region with values between 800 million RON and 900 million RON out of the total volume of gross written premiums. (*Fig. 1*)

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[9] Vert, C. (1995), *Analiza geodemografică*, University of Timişoara, Timişoara.
[10] Mihăilescu, Vintilă (1968), *Geografia teoretică*, Editura Ştiinţifică Bucureşti, Bucharest.
[11] *Law 32/2000*, as amended in 2004, art.2/13.

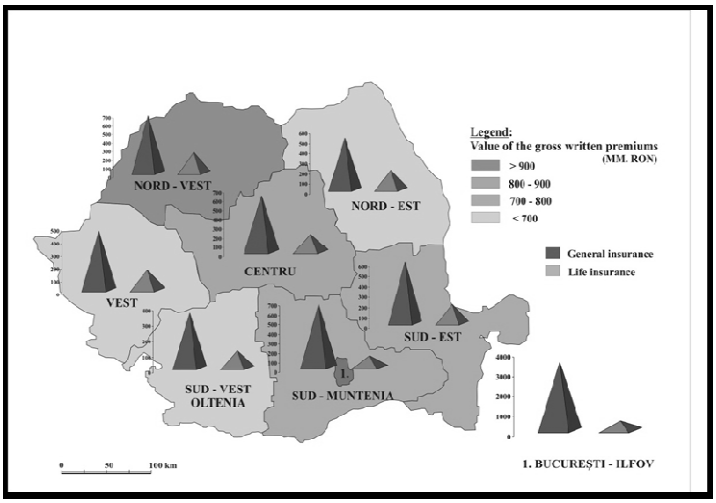

Fig. 1. Territorial distribution of the gross written premiums (2009)
Data source: Media Xprimm

Recently, more and more research companies and institutes have initiated complex surveys of the Romanian insurance market with the emergence of some important international players on the market.

"Ensight" made a detailed analysis of the concentration patterns of the Romanian insurance markets based on the data from the Insurance Supervisory Commission's reports. Based on the data provided by the *Annual Report of the Insurance Supervisory Commission* (2009), the results of the Ensight survey also reveal that 55% is held by the corporate sector (legal entities) acquired from general insurance products (*Fig. 2*).

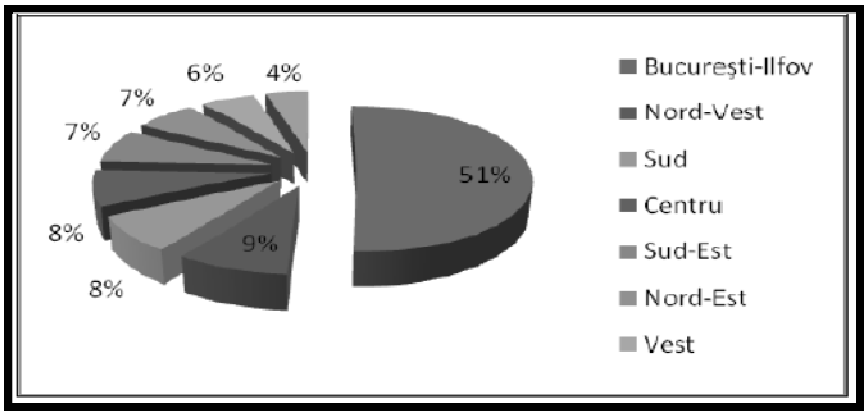

Fig. 2. Distribution of the gross written premiums in general insurance by development regions (2009) (*Source:* Ensight, Management Consulting)

Population Perception of the Romanian Insurance Market – Research Design AND Analysis

This analysis aims to assess the population`s degree of perception over the Romanian insurance system. Given that there is are series of subjective factors (understanding, perception) overlaid with the heterogeneity of the complex insurance system existing in a still developing market, undertaking this analysis is quite a delicate matter. Lacking a referential framework for this analysis, the author tailored the study based on the official data available (Media Xprimm and the general data of the National Institute of Statistics), as well as on personal investigations. In order to emphasise the relevance of the study, which focuses on the analysis of population perception of the Romanian insurance system, the correlation of the two research methods was required: ***qualitative*** (open interview with insurance brokers) and ***quantitative*** (*face-to-face* questionnaire method). In this case, the focus will be put on the results of the questionnaire.

Starting with the five objectives of any fundamental research (exploration, description, explanation, understanding and prediction) and adapting them to this study, the general objectives are:

- exploration and survey of the Romanian insurance market through a general description of this system, giving details on its structure and spatial-temporal dynamics;
- investigation of specificities, decisional mechanisms that lead to signing the insurance agreements, identification of the target groups that will have a certain risk-related behaviour;
- explaining a series of connections (correlations) among variables.

Depending on the duration of data collection, a *cross analysis* was chosen as it allows for a group to be studied at a certain point in time. The hypothesis brought forth by the study is that *the Romanian insurance market is still in progress and its maturity depends on internal decisional factors, the transparency of the contracting clauses but also on the promotional strategies used.*

The structure and theme of the questionnaire aim at emphasising some particularities regarding the types of insurance and their costs. Considering certain heterogenic territories inhabited by similar urban/rural population profiles, the author made a special emphasis on the *convergence of perceptions* and representations that those particular population groups have over the dynamics and structure of insurances. The scope and contents of the investigation had to be adapted to the research trend and they were based on various types of questions. In order to realize a pertinent analysis and to structure the information, the set of questions contained the two types of questions: closed and open.

Convergence and Divergence of Perception on the Romanian Insurance System

The importance and predilection of the types of insurance vary with the insurer's profile. Life insurance, buildings insurance and auto insurance (*Fig. 3* and *Fig. 4*) are predominant among the employees and employers (around 24%), while home insurances are first among free lancers (51%). Retired people are more interested in health insurance (34%) and buildings insurance (29%) (*Fig. 5* and *Fig. 6*).

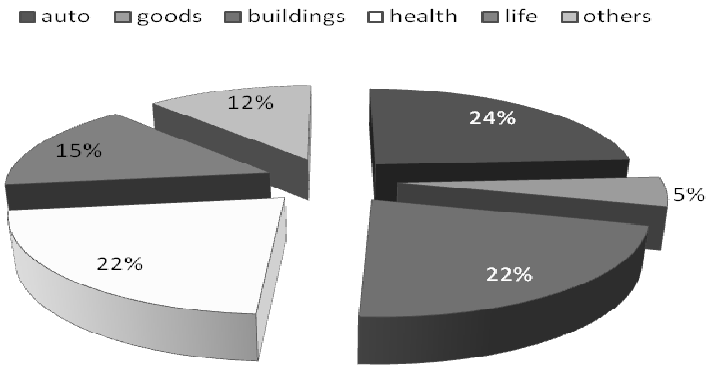

Fig. 3. Importance of insurance types as seen by employees

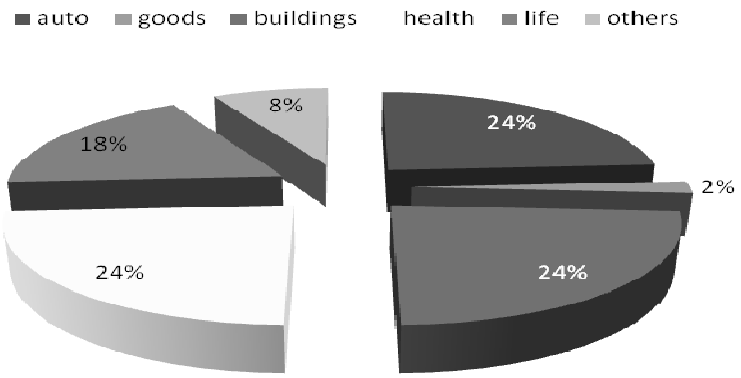

Fig. 4. Importance of insurance types as seen by employers

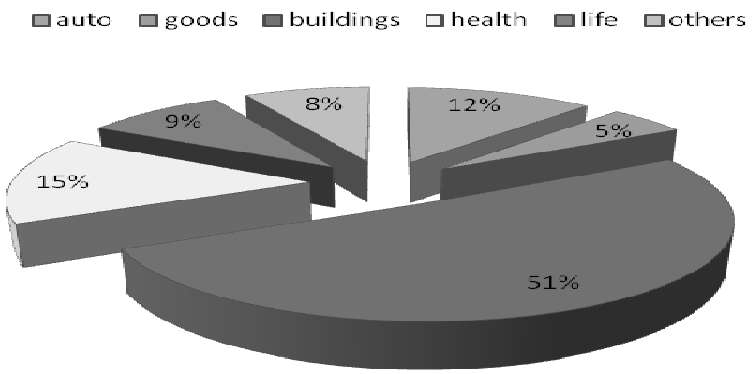

Fig. 5. Importance of insurance types as seen by free lancers

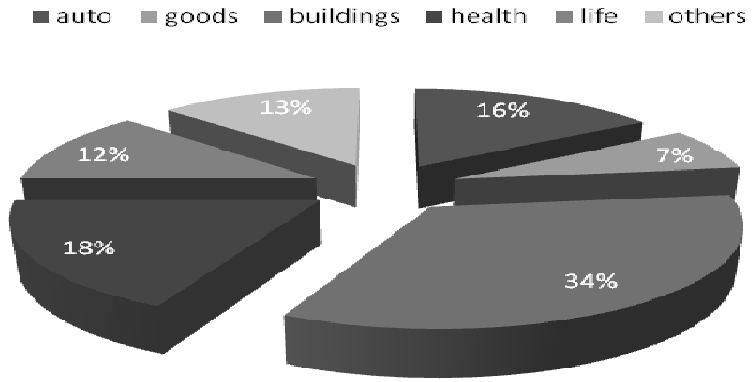

Fig. 6. Importance of insurance types as seen by retired persons

Generally, the signing of insurance policies depends on several motivational factors. It is known that educated and professional trained people are better informed and tend to insure their assets, and they are also interested in other types of policies (life insurance, health insurance, etc.).

The increase in life standard, socio-professional status and having a career corroborated with access to information and sources via the Internet and other IT tools are deemed potential factors in the decision-making mechanism regarding the choice of various insurance agreements. At first glance, differences can be seen between the two variables considered. In order to test certain connections between the two variables, two questions were raised.

Is there any connection between the choice of an insurance type and the education level of the interviewees? Does the conclusion of an insurance agreement depend on the education level?

Following the above mentioned profile valid only for a part of the Romanian society, the author was able to check whether there is a connection between the conclusion of certain agreements (health insurance in our case) and the highly-educated population.

We rely on the assumption that certain types of insurance are concluded following a *pattern* of the insured person. For instance, those with a high level education, especially those working within multinational companies, have a certain mentality and organisational *corporate* culture, and benefit from certain facilities, will have the tendency to conclude several types of insurance.

In order to check certain connections among these types of insurance and those that received a high education, the author chose to carry out the analysis by means of *Crosstabs* and the chi-square test.

Thus, the cross tables (Tables 1a, 1b) show differences between different types of insurance taken out, depending on the level of education.

The chi-square test was done in order to check the association between the two categories of variable. The test provides a statistical comparison between the observed internal frequencies and the theoretical frequencies corresponding to the independence hypothesis. Is there a connection between the level of education of the target group and the conclusion of a life or health insurance agreement? The internal frequencies for the two variables' independent hypothesis were calculated.

Hypothesis

H_0:there are no statistically significant differences between the two variables, and there is no difference between the values compared;

H_1: there are statistically significant differences between the two variables

The statistical difference of chi-square is given by the size of the significance test. If this is lower than 0.05, we reject the null assumption and the two variables are declared as inter-connected.

More than half of the highly educated people declared they had taken out health insurance agreements. When the internal frequencies found were analyses (*Table 1.a.*), differences appeared between the persons who had taken out health insurance agreement and those highly educated. The theoretical internal frequencies calculated (Expected count) vary slightly.

The association tests (chi-square and Likelihood Ratio) confirm the presence of some associations. The significance tests (*Asymp.Sig. (2-sided*) of the two association measurements are lower than 0.05.

Tabel I.a

Cross table with higher educated people (ST_SUP) and health insurance agreements entered (SANAT)

			ST_SUP		Total
			yes	No	
SANAT	No	Count	76	45	121
		Expected Count	63,8	57,2	121,0
		Residual	12,2	– 12,2	
	Yes	Count	135	144	279
Total		Count	211	189	400
		Expected Count	211,0	189,0	400,0

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7,044	1	**,008**		
Continuity Correction	6,477	1	,011		
Likelihood Ratio	7,111	1	,008		
Fisher's Exact Test				,009	,005
Linear-by-Linear Association	7,026	1	,008		
N of Valid Cases	400				

a. Computed only for a 2x2 table
b. 0 cells (,0%) have expected count less than 5. The minimum expected count is 57,17.

The values of Chi-square obtained were lower than 0.05. Therefore, the null assumption is rejected and the existence of significant connections between the conclusion of some health insurance agreements and highly educated people is declared. Following the statistical tests performed, it can be concluded that people that have received a higher education tend to enter into health insurance agreements.

Conclusion

The trend of the Romanian insurance market is an incremental one; according to experts, the expectations lay in the important insurance companies, mostly those related to life insurance segment and in the same time there is a tendency of transferring of responsibilities from the state to the private sector. The average insurance expenses were in 2004 of 12.5 EURO for life insurances compared to the 56.6 EURO allocated in the first place, and 11 EURO/inhabitant in 2007.[12] (*Ziarul Financiarul. Bănci şi Asigurări*, 16.06.2008).

[12] *Ziarul Financiarul. Bănci şi Asiguări*, 16.06.2008.

The insurance market both in Romania and in the Central and Eastern European countries is under continuous development while crystallizing its specific role of social and economic protection that it promotes under the circumstances of an accelerated economic crisis.

Following the current geographical trends towards a continuous expansion of its cross-disciplinarity by the complex methodology applied, the human geography through the specificity of the object studied is highly interested in the interferingly-active and complex role of insurance in the social life, creating a new approach and perception of the connected interrelations generated on a social level by the great economic-financial insurance system.

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OBSERVATIONS SUR LA PERCEPTION TOURISTIQUE DES PRINCIPAUX GÉOSITES DU DÉFILÉ DU DANUBE EN ROUMANIE

DANIEL IOSIF*, CONSTANTIN NISTOR

Le géosite peut être considéré une portion de la géosphère ayant acquis, par la perception ou l'exploitation par l'homme, une signification particulière en termes scientifiques, culturels, historiques, socio-économiques ou scientifiques. La présence des géosites dans un territoire dénote une géologie / géomorphologie intéressante parce qu'ils sont les principaux facteurs déterminants. Les géosites sont des formes du relief qui délivrent des informations grâce auxquels nous pouvons décrypter l'histoire de la terre et/ou d'appréhender son évolution. Depuis l'apparition de ce champ nouvel d'étude, beaucoup de recherches ont été réalisées en appliquant cette méthode qui permet d'analyser et de valoriser les sites géographiques d'un territoire donné. Ce papier fait des courtes observations sur la perception touristique de quelques géosites présents dans les plus spectaculaires gorges du Danube, c'est-à-dire dans la région connue sous le nom des Portes de Fer grâce à son paysage.

Mots-clés : *géosite, perception touristique, Danube, Roumanie.*

1. Introduction

1.1. La région d'étude

Le Danube traverse longitudinalement, sur 2.860 kilomètres de longueur, un continent dont la largeur arrive à 1.600 m. Sa direction générale Est-Ouest correspond au sens général du plissement alpin.

Le Défilé des Portes de Fer (*Fig. 1*), le dernier et le plus majestueux des étranglements pannoniques du Danube, se compose en réalité de plusieurs portes successives. Sur 140 kilomètres, le fleuve y descend de 21 mètres (de 64 m au-dessus du niveau de la mer à Baziaş à 43 m à Drobeta Turnu-Severin) avec une pente très peu raide de 0,14‰. Ici, le Danube se présente comme une vallée transversale dans les Montagnes de Carpates et, du point de vue géologique, cette région est la plus importante de la Roumanie parce qu'elle dispose des traits uniques en ce qui concerne la morphologie, la paléontologie et la

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structure. La vallée coupe des structures géologiques diverses en âge, tectonique et lithologie des roches: à partir des schistes cristallins et des roches éruptives paléozoïques jusqu'aux roches sédimentaires miocènes, pliocènes et quaternaires (Posea 1964, Răduescu, Ilie 1970, Popp 1985).

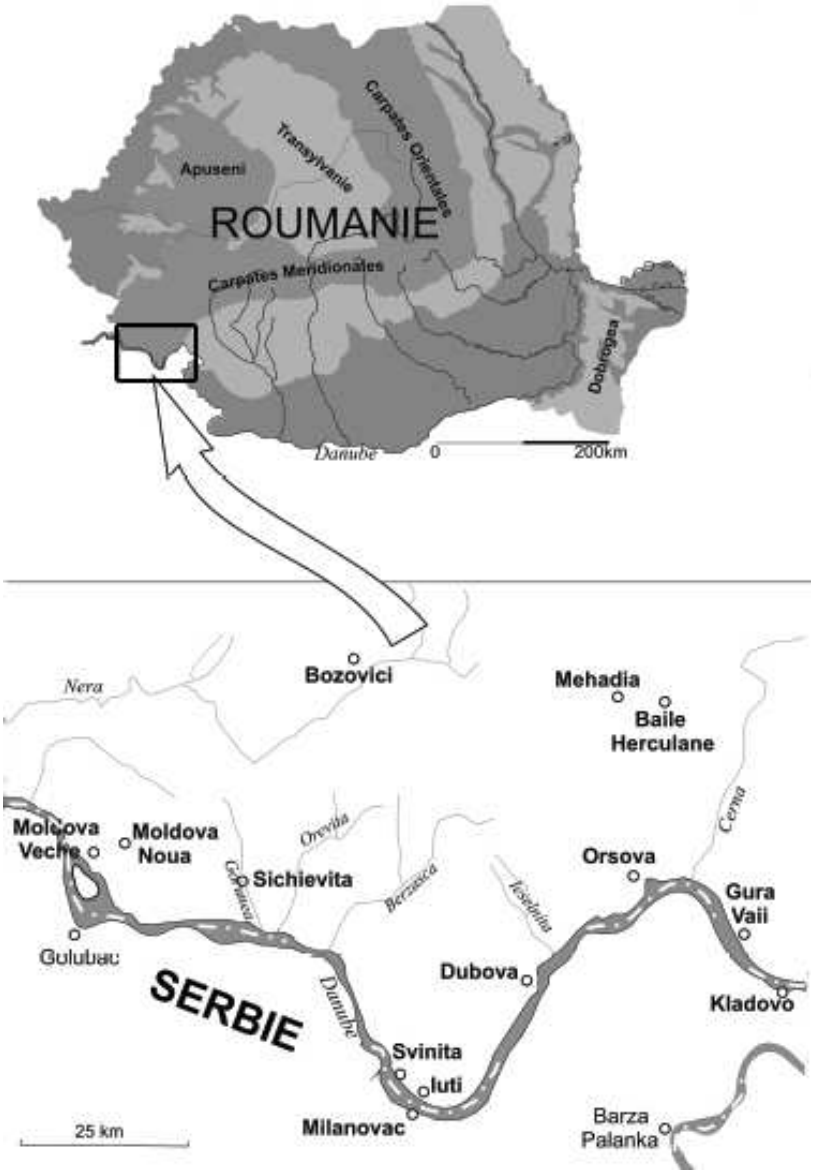

Fig. 1. La localisation géographique des Portes de Fer en Roumanie

Dans ces conditions lithologiques-structurales, le défilé présente des secteurs étroits (Cazanele Mari – « Les Grands Chaudrons », Cazanele Mici – « Les Petits Chaudrons » etc.) qui alternent avec des secteurs plus larges et de petits bassins (Berzasca, Orşova, etc).

Le massif qui se constitue autour de ce défilé a été étudié par le géographe roumain G. Vâlsan (Vâlsan 1919). C'était lui qui a nommé ces montagnes *Les Monts des Portes de Fer*, c'est-à-dire le groupe montagneux se situant entre la vallée de Timiş-Cerna au nord et celle de Timok au sud. Tout cela représente un massif unitaire du point de vue lithologique et structural d'un coté et d'autre du Danube. Celui-ci est très semblable aux Alpes en ce qui concerne la construction géologique, le deux massifs ayant une zone gneiss-granitique paléozoïque qui présente une région centrale fortement plissée et entourée par des calcaires mésozoïques. Les altitudes sont comprises entre 800 et 1.200 m et le massif entier fait la liaison entre les Carpates et les Stara Planina.

Entre Baziaş et Turnu-Severin, le Danube a créé l'une de plus intéressante région géologique de la Roumanie. Si nous ajoutons que la même région possède un vaste patrimoine culturel (traces archéologiques qui indiquent le peuplement permanent depuis 7000 avant J.C.), nous pouvons établir le grand potentiel touristique. Ce potentiel est analysé plus bas en termes des *géosites*.

1.2. Le cadre théorique

Le terme *géosite* peut être quasiment considéré comme un synonyme du terme *géotope*. Les *géotopes* représentent un large spectre de disciplines spécifiques des géosciences. C'est pourquoi ceux-ci ont été classés selon leurs caractéristiques géologiques et géomorphologiques. Par exemple, les géotopes géomorphologiques se rapportent plus précisément à la valeur géomorphologique d'une forme de relief. Nous notons le fait que d'autres auteurs utilisent le terme de *géomorphosites* (Panizza 2001), de *sites* (Hooke 1994) ou *biens géomorphologiques* (Carton, Cavallin *et al.* 1994) dans un sens très proche (Carron 2009). Selon Panizza et Piacente (Panizza, Piacente 1993) le géosite est une „portion de la géosphère ayant acquis, par la perception ou l'exploitation par l'Homme, une signification particulière en termes scientifiques, culturels/historiques, socio-économiques et/ou scientifiques".

La littérature présente deux définitions pour les géosites. La première est dite restrictive (Strasser, Heitzmann *et al.* 1995, Grandgirard 1997, 1999) car celle-ci tient compte seulement de la valeur scientifique d'un objet géomorphologique. Quant à la deuxième, la définition large (Panizza, Piacente 1993, 2003, Reynard 2004, 2005), celle-ci prend en considération tous les valeurs du paysage géomorphologique.

Étant donnée la forte relation entre le cadre naturel et la culture de la région étudiée, on doit mentionner que les mêmes Panizza et Piacente (Panizza,

Piacente 2004) ont mis en évidence certaines composantes culturelles (au sens strict) d'un territoire (biens archéologiques, historiques et architecturaux) et le contexte géomorphologique dans lequel celles-ci s'inscrivent. *La géomorphologie culturelle* s'intéresse, dans sa définition large, aux géotopes comme composantes du patrimoine culturel d'une part et aux géotopes géoculturels comme composante culturelle, d'autre part.

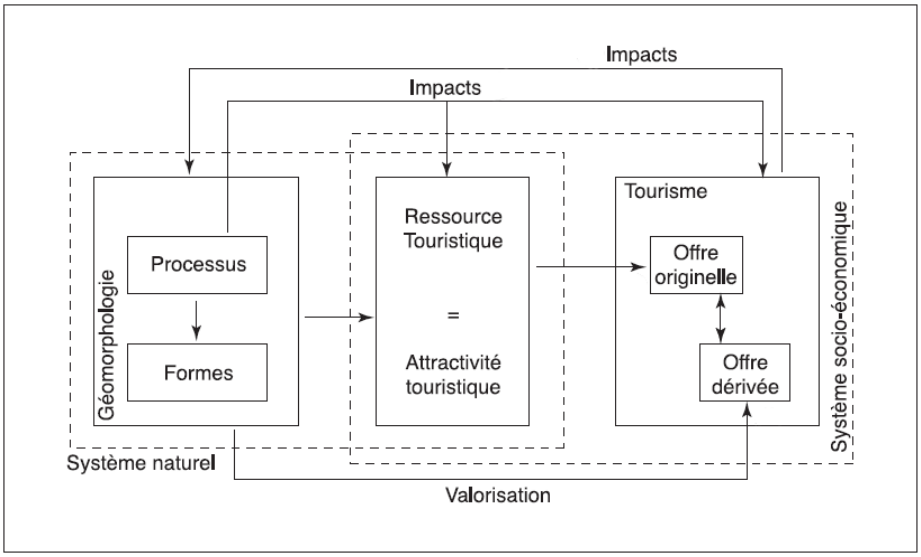

Fig. 2. Les relations entre la géomorphologie et le tourisme (après (Cendrero, Panizza 1999, Reynard, Holzmann *et al.* 2001)

En tant que composante essentielle des paysages, les géosites constituent une ressource touristique (*Fig. 2*). Autant comme processus qui se déroulent (ex. l'érosion hydrique) ou formes (ex. les gorges), ceux-ci offrent ou peuvent offrir un potentiel de développement touristique à un lieu. Ce potentiel n'est pas figé. Il se modifie en fonction de l'évolution morphologique, politique ou économique du lieu. En effet, les géosites représentent des composantes culturelles (au sens large) de l'offre touristique, au même titre que le patrimoine biologique, archéologique, historique ou architectural. C'est là l'objectif de ce papier : de voir quelle est la perception touristique des quelques géosites du défilé du Danube. La liaison entre le tourisme et les géosites s'appelle *géotourisme*, un tourisme inspiré par les beautés naturelles d'une région, notamment les curiosités géologiques, botaniques ou les vestiges archéologiques.

2. Méthodologie et données

La recherche concerne certaines observations sur la perception touristique des géosites du défilé du Danube. Les données principales qui ont été interprétées sont représentées par une série de questionnaires effectués au cours du mois de juillet 2011 dans le défilé de Danube. Les 105 questionnaires remplis ont visés seulement les touristes présents ici car leur opinion est la plus pertinente en ce qui concerne une telle analyse.

Le questionnaire utilisé est adapté d'après un questionnaire de Comănescu et Nedelea (Comănescu, Nedelea 2010) et il est structuré dans 16 questions qui mettent en évidence les activités des touristes dans cette zone, l'avis des touristes concernant l'infrastructure touristique, l'élément le plus important du point de vue touristique de la région et la demande touristique des visiteurs. À la fin, les touristes doivent donner leur opinion à propos des facteurs qui dégradent les attractions touristiques et en quelle mesure ceux-ci sont utilisés dans l'industrie touristique actuelle. En ce qui concerne les principales attractions touristiques, nous avons choisi 10 géosites emblématiques pour cette zone. Ceux-ci touchent également les sites naturels [les Cazanes du Danube – voir (*Fig. 3.1.A*), la grotte de Ponicova, l'amphithéâtre naturel de Şvinița, la colline de Trescovăț et l'île de Moldova Veche) et anthropiques (le monastère Sainte Ana, le monastère Vodița, le visage de Decebal, la forteresse de Trikule – voir (*Fig. 3.1.B*), le golf de Cerna; (*Fig. 3.2*)].

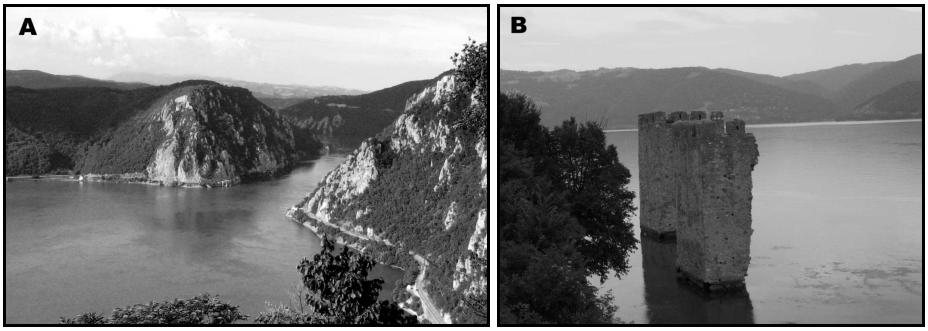

Fig. 3.1. Deux géosites importants du défilé du Danube: A) Les gorges du Danube et le bassin de Dubova; B) Les ruines de la forteresse Trikule
(Photos réalisées par Constantin Nistor, 2011)

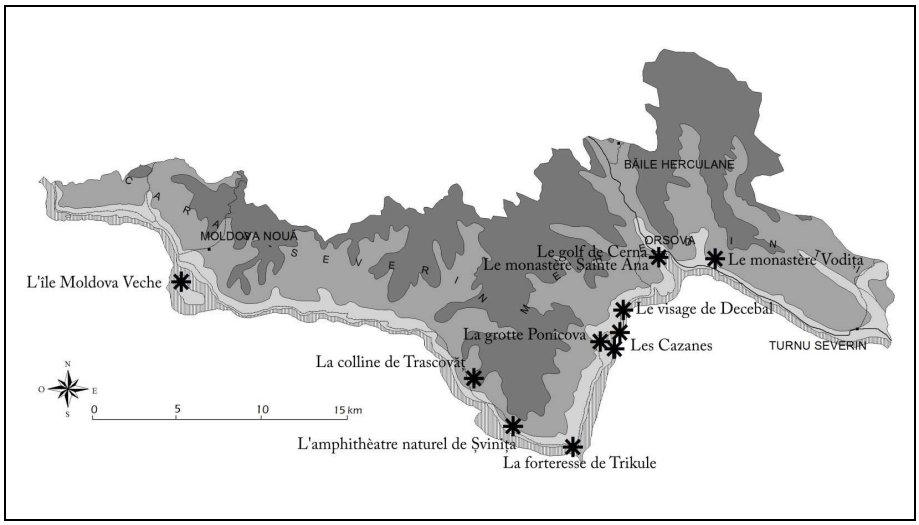

Fig. 3.2. La carte des dix géosites présents dans notre analyse

Les démarches effectuées pour obtenir les résultats ci-dessous peuvent être échelonnées comme il suit :

I. Une étude concernant la littérature basée sur la théorie des géosites. On mentionne ici la partie théorique c'est-à-dire l'inventaire, l'évaluation et la valorisation de ces géosites ;
II. L'analyse géographique de la région d'étude, les principaux traits géologiques et géomorphologiques et aussi un regard sur l'activité touristiques actuelle ;
III. Création de la fiche questionnaire et mise en place de l'échantillon didactique ;
IV. Création d'une base de données et puis l'analyse statistique des données obtenues.

3. Résultats et discussions

Après avoir défini quels géosites seraient susceptibles d'avoir un grand prise aux touristes, quels sont les plus préférés par les visiteurs et quelle est l'infrastructure qui serve ces géosites, il est préférable de montrer premièrement

le profil des interrogés. Le *tableau 1* présente l'âge, le sexe, la nationalité, les études et le lieu de naissance des interrogés. Il y a aussi trois autres réponses en ce qui concerne les détailles des séjours touristiques des visiteurs. Plus de la moitié des touristes interviewés (51%) avait entre 21 et 40 ans et était de sexe masculin (61%). 96% ont été roumains et seulement 4% d'une autre nationalité, c'est-à-dire allemands. Un peu plus de la moitié des touristes avait des études universitaires.

Tableau 1

Le profil des interrogés, les détails du séjour et le désir d'y revenir

L'âge de l'interrogé				**Le sexe**		**La nationalité**		**Les études**		**Lieu de naissance**	
<20	21-40	40-60	>60	M	F	Roumaine	Autre. Laquelle?	Lycée	Faculté	Urbain	Rural
3%	51%	46%	0%	61%	39%	96%	4% Allemande	42%	58%	70%	30%
Quelle est la fréquence de vos excursions dans le défilé ?						**Habituellement, quelle est la durée de votre excursion?**			**Reviendrez-vous ?**		
Mensuel	Saisonnier	Annuel	Moins une fois par an			1 jour	1 weekend	Entre 3 et 6 jours	Oui	Non	Je ne sais pas
13%	20%	29%	38%			13%	47%	40%	73%	0%	27%

À l'égard de la fréquence de leurs excursions dans le défilé, le plus grand pourcentage est revenu aux touristes qui viennent dans cette zone moins une fois par an. On considère ce résultat très pertinent sachant que la région touristique analysée n'est pas une zone très consacrée en Roumanie (comme, par exemple, la vallée de Prahova). Une autre réponse intéressante est celle qui indique le désir d'y revenir. Aucun touriste n'a dit *non*, mais 27% d'entre eux ne sont pas sûrs qu'ils y retournent.

Selon la plupart des touristes interviewés, la région des gorges du Danube en Roumanie bénéficie d'une bonne et raisonnable infrastructure touristique (*Fig. 4*). Les dernières années, beaucoup de secteurs routiers ont été modernisés. Également, dans les principales villes de la région (Orşova et Drobeta Turnu-Severin) le nombre des chambres d'hôtel a augmenté rapidement. Les touristes croient aussi que le phénomène touristique est le même depuis plusieurs années. Il y a aussi des personnes qui le considèrent en croissance (*Fig. 5*). Cette constatation peut être mise en relation avec la dernière : si l'infrastructure augmente, on a l'impression que tout le phénomène touristique augmente.

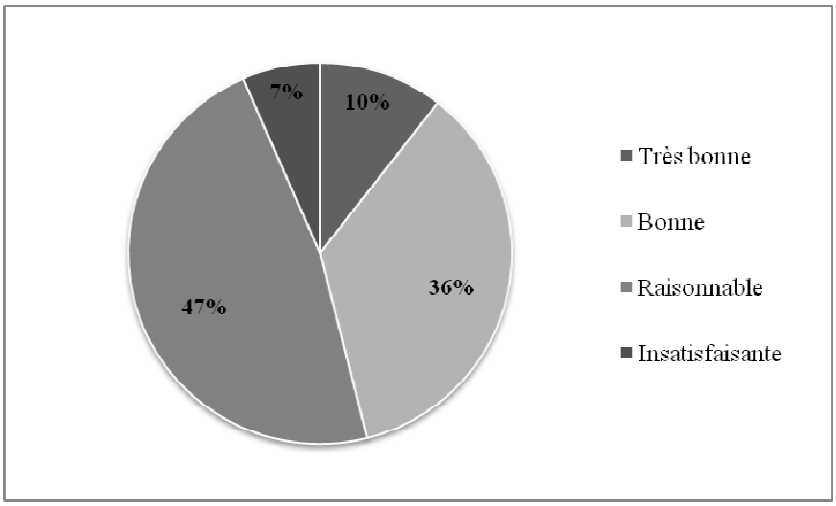

Fig. 4. La perception des touristes concernant l'infrastructure touristique dans les gorges du Danube en Roumanie

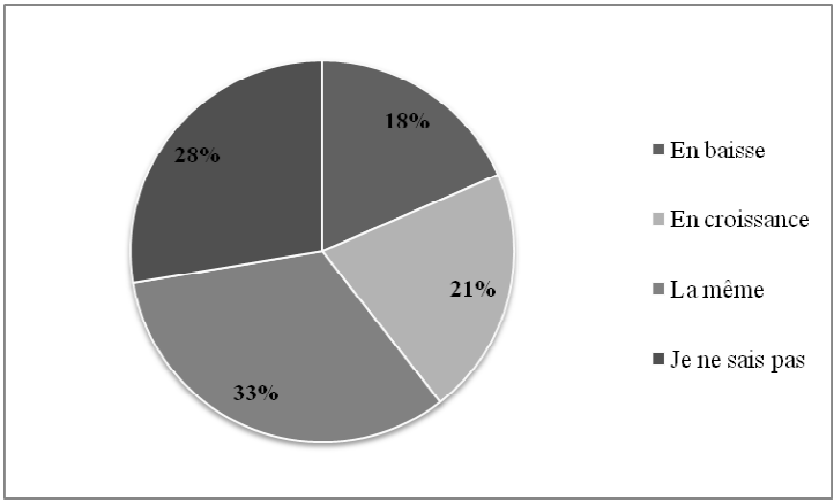

Fig. 5. L'opinion des touristes à l'égard du phénomène touristique actuel

La *figure 6* nous montre les préférences des visiteurs qui arrivent dans cette région. Un tel résultat est très important pour une analyse touristique d'une zone parce que celui-ci met en évidence les points forts qui suscitent le plus grand intérêt chez les touristes.

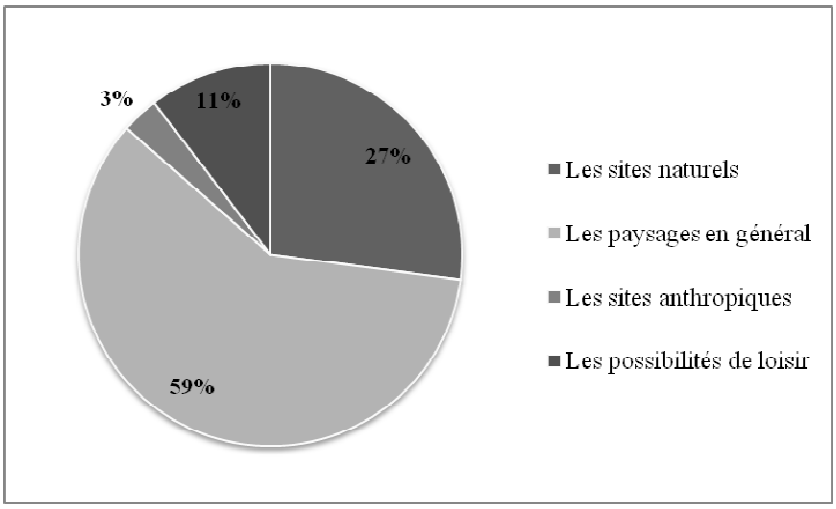

Fig. 6. La préférence des visitateurs du point de vue touristique

Sachant qu'il s'agit d'une région hydrologique avec des gorges nous nous attendons que le paysage joue un rôle majeur pour le domaine touristique. Nos résultats sont dans cette direction : 59% de touristes préfèrent les paysages généraux contre les sites naturels et anthropiques et les possibilités de loisir.

Les paysages naturels sont une ressource, un laboratoire d'analyse, un média extraordinaire de valorisation pour les Sciences de la Terre (Marthaler 2003). Ceux-ci expriment de multiples façons, de la plus évidente à la plus mystérieuse, comment le temps et les mouvements de notre Terre sont inscrits dans l'espace. Marthaler (Marthaler 2003) a publié un article où il analyse le paysage du point de vue touristique, c'est-à-dire comment les faits géologiques (la mémoire de la Terre) peuvent se dévoiler devant le touriste par les images paysagères panoramiques. Cela est une bonne idée pour le paysage des Portes de Fer sachant qu'ici se trouvent le plus spectaculaires gorges du Danube. De plus, le touriste peut apprendre différentes choses à propos du temps géologique et, spécialement, de la géologie et de la terre roumaine.

Le deuxième choix des touristes concerne les sites naturels. Donc, on peut dire que plus de trois-quarts des touristes qui ont choisi de consacrer leurs vacances au bord du Danube veulent voir les splendeurs de la nature danubienne. En effet, à une question concernant les activités majeures pratiquées par les touristes, la plupart d'entre eux ont répondu *les randonnées*. Ainsi, on peut arriver à une petite conclusion et dire que les touristes viennent dans la région des Portes de Fer pour de beaux paysages, pour la nature.

Les Cazanes représentent l'objectif touristique principal dans cette zone, comme le montre la *figure 7*. Plus de la moitié des touristes interrogés ont dit que ce géosite les a touché le plus. Cette réalité a été connue depuis longtemps mais

il n'y avait aucune recherche sur celle-ci. Cette réalité nous souligne l'écart impressionnant entre celui-ci et le deuxième et troisième géosite touristique (le visage de Decebal et le golf de Cerna, les deux avec 12% à la première option).

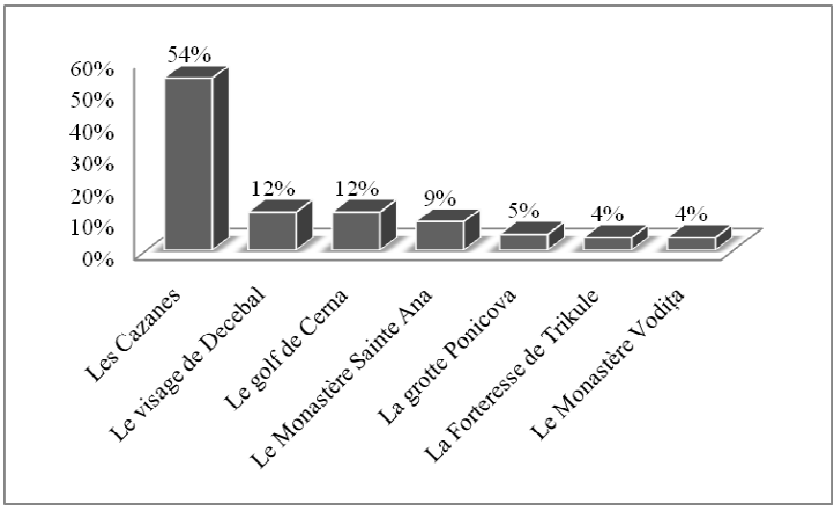

Fig. 7. La première option des touristes en ce qui concerne le géosite qui les a touché le plus

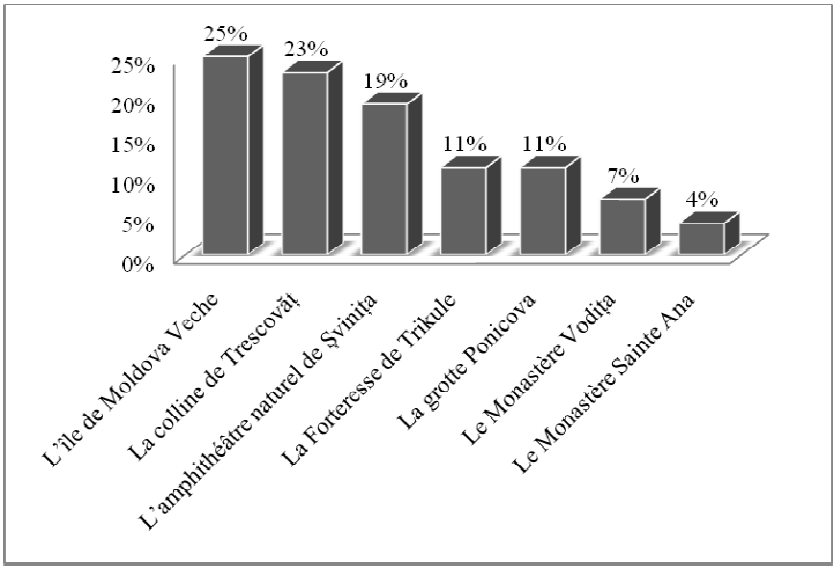

Fig. 8. La première option des touristes en ce qui concerne le géosite qu'ils veulent voir

Mais cette région dispose aussi des géosites moins connus par le public. Ainsi, il y a toute une série de géosites très importants du point de vue géologique (et pas seulement) dont les touristes ne savent pas. La *figure 8* nous indique la première option en ce qui concerne les géosites lesquels ils veulent voir. Tous ces géosites ne présentent pour le moment aucune valeur touristique. Leurs valeurs sont purement scientifiques et, parfois, didactiques.

4. Conclusions

Ce papier a présenté les opinions des touristes concernant la région touristique des Portes de Fer. Pour faire une courte conclusion, on remarque que:

- l'infrastructure touristique est bonne et raisonnable ;
- le phénomène touristique est le même depuis plusieurs années, voire en croissance ;
- la plupart des touristes visitent cette zone pour ses paysages et non pas pour les caractéristiques culturelles/historiques ;
- l'objectif touristique principal est représenté par les gorges du Danube (les Cazanes);
- les touristes sont ouverts à découvrir d'autres géosites intéressants (île de Moldova Veche, la colline volcanique de Trescovăţ, l'amphithéâtre naturel de Şvinița, etc.) si l'infrastructure est raisonnable.

Comme l'utilisation touristique de sites naturels d'intérêt pour les sciences de la Terre exige la prise en compte des composantes de l'offre et de la demande, cette analyse permet de concevoir, mettre en place et modifier au besoin l'utilisation touristique des sites pris en compte. Le travail sur ce domaine est au début et il est nécessaire de continuer les recherches en cette direction, parce que les résultats obtenus peuvent aider les activités concernant la mise en place d'un tourisme durable.

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REMONTÉE DE LA NAPPE PHRÉATIQUE DU SOUF. CONSÉQUENCES ET SOLUTIONS ENVISAGÉES

ISHAK MESSEKHER*, NABIL CHABOUR, MOHAMED REDHA MENANI

Le phénomène de la remontée de la nappe phréatique, dans les régions du Sud algérien et en particulier dans la région d'Oued Souf, a pris des proportions alarmantes, concernant la pollution et la dégradation de l'environnement. La remontée de la nappe phréatique a fait que le niveau de la surface des eaux souterraines dépasse, parfois, le niveau du sol, notamment, au niveau des ghouts. Ces derniers sont des dépressions creusées par les paysans, pour permettre aux racines des palmiers d'atteindre, facilement, la zone saturée de la nappe. Cette remontée a provoqué la formation de marres d'eau stagnante, ce qui a pour effet la dégradation des habitations, l'eutrophisation des eaux et de là les mauvaises odeurs, la pollution de la nappe superficielle et l'apparition de maladies. Il s'agit, en grande partie, d'un problème d'assainissement rendu difficile du fait de la nature géographique de la région, présentant un système hydrographique endoréique. Le surplus de l'eau emmagasiné dans la nappe phréatique provient des eaux des nappes profondes (Continental Intercalaire et Complexe Terminal). Le problème réside dans la mauvaise gestion des eaux et de l'absence d'un réseau d'assainissement. Des projets de luttes contre cette remontée ont été programmés et ce depuis les années 90 et qui consistent justement en l'assainissement, le drainage et l'épuration des eaux.

Mots clés : sud algérien ; Oued Souf, remontée des eaux ; zone aride ; assainissement .

1. Introduction

Cette contribution s'inscrit à la suite de travaux entrepris aussi bien dans un cadre de recherche scientifique (Cote, 1993-2001), dans un cadre de suivi régulier du système aquifère par l'Agence Nationale des ressources hydrauliques (ANRH, 1993-1999), l'Agence des Bassins Versants du Sahara (ABHS, 2004), de la Direction de l'Hydraulique de la Wilaya (DHW, 2004-2006) et de la Direction de l'Environnement (DE, 2003) que d'étude d'engineering afin de résorber le problème de remontée des eaux dans la région du Souf, plus particulièrement dans la zone de la ville d'El Oued (Bonnard et Gardel, 1998-2006) (Hydroprojet Ouest, 2000-2004). En effet, depuis plus de trois décennies, la

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vallée du Souf est confrontée à un épineux problème aux dimensions multiples et aux conséquences dévastatrices sur l'écosystème. Le recours aux eaux souterraines plus profondes par l'exploitation de forages captant les aquifères du Continental Intercalaire (CI) et du Complexe Terminal (CT) du grand système aquifère du Sahara septentrional (SASS), pour la satisfaction des besoins d'irrigation et d'AEP et l'extension de l'urbanisation dans certaines agglomérations suralimentées en eau (plus de 450 l/j/ habitant) mais insuffisamment couvertes par des réseaux d'assainissement, a accéléré la hausse des niveaux hydrostatiques des nappes phréatiques et la formation de lagunes, accentuant ainsi le phénomène de la remontée des eaux. Cette situation d'excès d'eau a perturbé l'écosystème oasien et a engendré une situation de crise aux conséquences catastrophiques multiples : contamination et pollution de la nappe phréatique par des rejets d'eaux usées massifs ; asphyxie et dépérissement de palmeraies, transformées en marais où les roseaux prennent la place des palmiers ; détérioration du tissu urbain traditionnel et menace d'effondrement de certaines constructions en matériaux locaux ; inondation de certaines parties basses de la ville d'El Oued ; apparition d'épidémies et de maladies parasitaires à transmission hydrique.

Ainsi, une attention particulière a été accordée à la nappe phréatique, qui sera étayée et largement étoffée dans le cadre du mégaprojet initié par le ministère des ressources en eau, et notamment à travers les 58 forages situés au niveau de la ville d'El Oued. Ces forages s'inscrivant dans le lot portant référence : « Lot N°3 : Drainage vertical des eaux résiduaires et mesure de luttes contre la remontée » (ONA, 2007 ; Messekher, 2010).

Dans le cadre de ce projet des mesures destinées à stopper ou à inverser le phénomène de la remontée de la nappe phréatique ont été appliquées dans la région. Les résultats du suivi des fluctuations de la nappe effectué durant la période 2007/2008, confortent la perduration du phénomène, notamment en zone urbaine, alors qu'à la périphérie, des rabattements de la nappe pour un usage agricole se font sentir.

2. Situation géographique

La Wilaya d'El-Oued est située au Nord-Est du Sahara Septentrional (*Fig.1*). Elle est occupée dans sa quasi-totalité par une chaîne de dunes (grand erg oriental), étant limitée au Nord par la zone des chotts (Mérouane et Melghir) et au Sud par l'extension de l'Erg oriental.

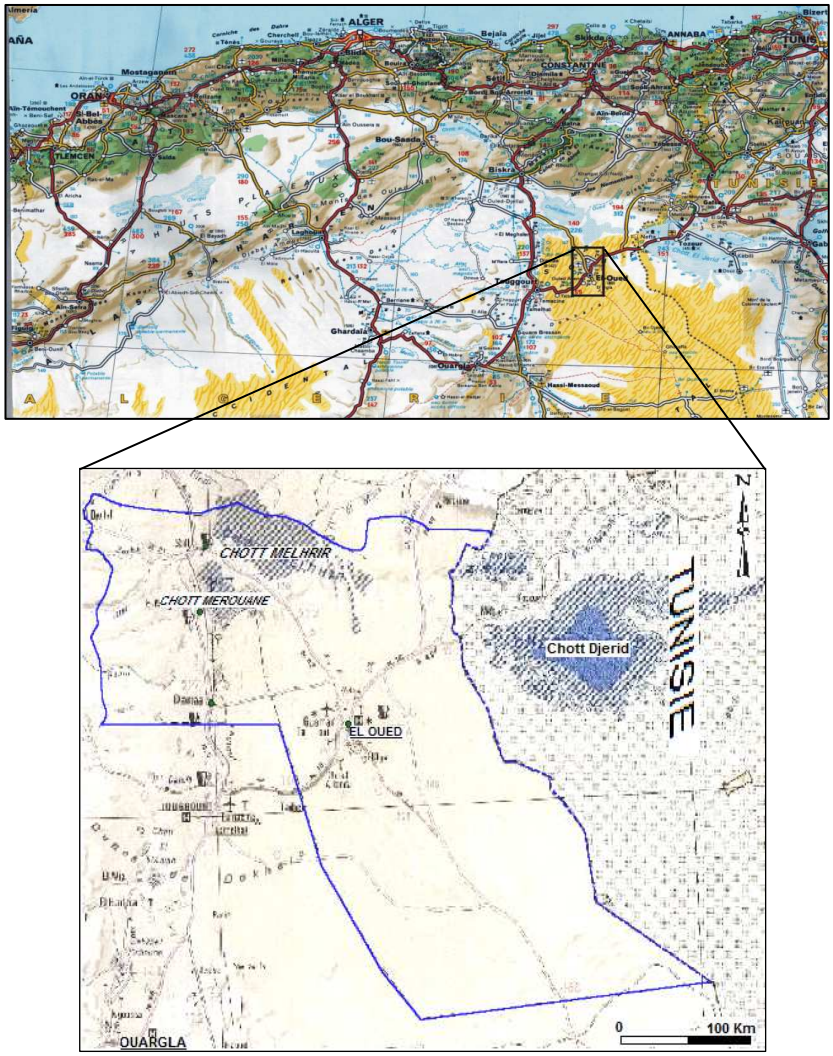

Fig. 1. Situation géographique de la zone d'étude

L'économie de la région est essentiellement basée sur la phœniciculture dont une grande partie est localisée dans les ghouts. Avec un nombre avoisinant les 10 000 ghouts, cette culture occupait une aire de 9500 ha entre 1990 et 2000 notamment dans le sud de la zone d'étude. La spécificité du système de culture utilisé était fondée sur la plantation des palmiers au fond de vastes cratères (ghouts), réalisés par l'homme (*Fig. 2*), et permettant aux arbres de puiser directement par leurs racines l'eau de la nappe phréatique proche. Le système d'irrigation traditionnel qui reposait sur les ressources de la nappe phréatique,

assurait un équilibre entre les besoins et les ressources en eau. Ce système de culture est bien adapté au milieu (erg), mais fragile parce qu'il est étroitement lié au niveau de la nappe, dès que le niveau de celle-ci s'abaisse (cas au milieu du XXe siècle), ou s'élève (cas actuellement), l'arbre risque de mourir d'insuffisance ou de trop d'eau. La vallée du Souf (*Fig.1*) qui est concernée par cette étude s'étend sur 3000 km² et présente une configuration géographique caractérisée par une topographie plane et sans exutoire. Les altitudes varient de 75 m à El Oued à – 6 m à Meghaier qui est située à environ 150 Km au NNW d'El Oued.

Fig. 2. Vues de Ghouts (in Remini, 2008)

3. Hydroclimatologie

Sur le plan orographique, le Sahara septentrional, auquel est rattachée la zone d'étude, est limitée sur les bordures, par des reliefs qui sont principalement des chaînes montagneuses (l'Atlas saharien) et des plateaux (Dahar, Tademaït, Tnirhert, etc.). Avec un réseau hydrographique relativement peu dense et à moitié fossilisé, ce bassin s'individualise en trois sous-entités qui sont les deux sous-bassins du Grand Erg Occidental et du Grand Erg Oriental et le plateau de la Hamada El Hamra.

Le réseau hydrographique est marqué par la présence de chotts situés dans la partie Nord de la vallée, dont les plus importants sont chott Mérouane et chott Melghir (point le plus bas d'Algérie : – 34 m) et qui constitue le réceptacle endoréique des oueds qui descendent du flanc méridional de l'Atlas saharien.

La vallée du Souf est caractérisée par un climat aride avec un été chaud et sec (moyenne de Juillet 34°C), un hiver plutôt doux (janvier : 11°C). La température moyenne annuelle avoisine les 22°C, et les écarts diurnes de température sont importants en toute saison (ONM, 1990-2000).

La vallée est caractérisée également par une faible pluviosité. Les précipitations moyennes annuelles sont de l'ordre de 70 mm ; la région du Souf est située entre les isohyètes 60 et 80 mm (*Fig.3*). Le mois de janvier est le mois

le plus pluvieux (env. 15 mm) et juillet le plus sec (moins d'un mm en moyenne). Une très forte évaporation caractérise également le climat de la région (classé comme climat hyper aride dans le climogramme d'Emberger).

La région d'El Oued à l'instar de tout le Sahara présente une année hydrologique caractérisée uniquement par une période sèche, même pour le mois de Janvier qui est marqué par la température la plus basse (10,67°C) et la précipitation la plus élevée (14,65 mm).

Le bilan hydrique pour une période de 30 ans (1976-2006) de la vallée de Oued Souf enregistre un déficit moyen annuel estimé à 1057,79 mm (ONA/HPO/BG, 2004).

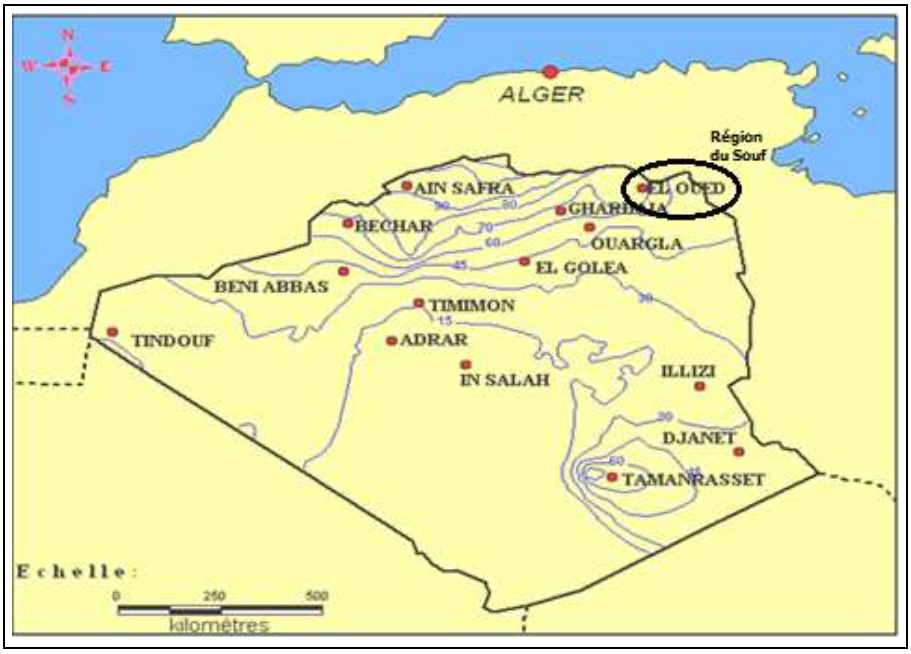

Fig. 3. Carte en isohyètes moyennes annuelles (mm) au Sahara algérien (ONM, 1998)

4. Définitions sommaires du cadre géologique et hydrogéologique

4.1. Le Système aquifère du Sahara Septentrional (SASS)

Le cadre géologique de la vallée du Souf est indissociable du cadre régional qui est celui du bassin du Sahara Septentrional. Le Système Aquifère du Sahara Septentrional (SASS) désigne la superposition de deux principales couches aquifères profondes (*Fig. 4*) : la formation du Continental Intercalaire (CI) la plus profonde, et celle du complexe terminal (CT) (Bel et Demargne, 1966)

(Bel et Cuche, 1970) (Guendouz, 1985). Ce système transfrontalier recouvre une étendue de plus de 1 million de km² dont 700 000 se trouvent en Algérie, près de 80 000 en Tunisie et 250 000 en Libye (OSS, 2003).

4.2. L'aquifère quaternaire

L'aquifère quaternaire du Souf présente une épaisseur moyenne de 40 mètres, de géométrie variable (dépressions, dômes et sillons) . Il affleure au Nord-Ouest de la région de Foulia et se situe à moins de 10 mètres de profondeur aux extrémités Nord-Est de la région d'étude.

Les formations récentes du Quaternaire forment l'aquifère détritique de la nappe phréatique, il est surtout sableux avec parfois du gypse et des argiles localisées particulièrement dans la partie Nord-Est où il se termine par une croûte gypseuse. Son substratum est argileux (imperméable). Le sommet de ce substratum est sableux par endroits et gypsifère en d'autres.

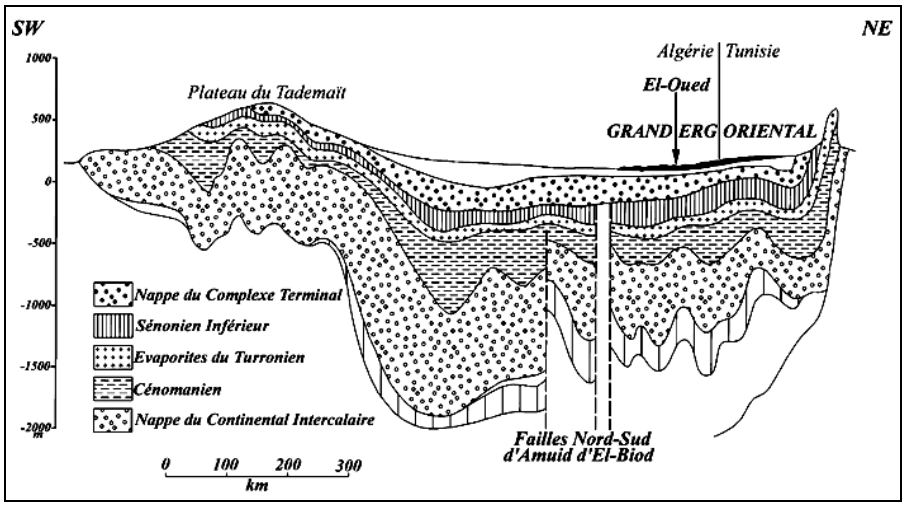

Fig. 4. Coupe hydrogéologique du SASS (in Moula, A. S. *et al*., 2005)

Etant le siège de nombreux mécanismes hydrogéologiques et hydrochimiques, la nappe phréatique du Souf a été étudiée et examinée depuis bien plus d'une décennie. Une campagne de prospection géophysique réalisée par l'Entreprise Nationale de Géophysique (Senoussi et Aquat, 1992), ainsi que de nombreux rapports de suivi et de surveillance établis par la DHW d'El Oued, l'ANRH, et l'ONA, ont constitué une précieuse base de données pour la connaissance de la géométrie de cet aquifère et l'étude de l'évolution de la surface piézométrique et des mécanismes régissant son hydrodynamisme.

Concernant la vallée du Souf dans son ensemble, les mesures piézométriques effectuées par BG – HPO entre 2001 et 2006 ont constitué une base de données appréciable que nous avons complété par des mesures effectuées par COSIDER TP en 2006 (dans le cadre du projet de lutte contre la remontée du niveau de la nappe phréatique- lot « drainage vertical »), sur 58 forages situés dans leur majorité au niveau de la ville d'El Oued. Le traitement de l'ensemble de ces relevés piézométriques a permis la réalisation d'une carte piézométrique actualisée basée sur un relevé des niveaux d'eau effectué sur 177 puits.

5. Aperçu sur la qualité des eaux de la nappe phréatique

Les eaux de la nappe phréatique du Souf, de qualité chimique très dégradée, sont caractérisées par une minéralisation très élevée (Moulla *et al*, 2005). Les faciès chimiques prédominants sont sulfatés à chlorurés sodiques, typiques des régions évaporitiques et sont répartis d'une manière diffuse à travers toute la vallée.

La présence des nitrates dans les eaux souterraines est généralement considérée comme un indicateur de pollution d'origine agricole. Ils proviennent également de l'azote organique du sol ainsi que des eaux usées domestiques non traitées. La teneur admissible fixée par l'OMS est de 45 mg/l. Selon cette norme, la plus grande partie de la zone est au-dessus du taux acceptable pour l'eau de boisson. Les rares endroits où le taux de nitrates est inférieur à 45 mg/l sont :

- les plantations irriguées par des forages du CT au domaine Daouia, à Foulia et à Hobba par dilution des nitrates par l'eau des nappes profondes,
- dans les ghouts ennoyés recouverts de roseaux et au niveau du rejet d'El-Oued par utilisation des nitrates par les roseaux,
- quelques points localisés où la dénitrification a pu s'effectuer correctement.

6. Chronologie et suivi du phénomène de la remontée de la nappe phréatique

Les premiers signes d'une remontée de la nappe phréatique sont visibles dans les ghouts, car la profondeur de l'eau y est, en temps normal, de l'ordre de 1 à 2 mètres. Une remontée de 1,5 mètres aura comme conséquence l'apparition de traces d'humidité. Au-dessus, on observera l'apparition de roseaux puis d'eau stagnante.

Cote (1998) a observé en 1993 le développement de plusieurs zones présentant des signes de remontée tels que ghouts humides, ghouts envahis de roseaux ou ghouts ennoyés (*Fig. 5*). Ce sont, de la plus petite à la plus grande, les zones de : Mihouensa – Oued Alenda – Reguiba – Hassani Abdelkrim/Z'Goum – Ourmes/ Douera – El Oued/Ogla à Guemmar.

Fig. 5. Etendue d'une remontée

Le phénomène de remontée de la nappe phréatique dans la région du Souf est complexe et s'étend pratiquement sur un demi-siècle. D'après les données contenues dans les rapports de Marc Côte (1993-2001), complétées par BNEDER (1992-1993 et 1994) ; ANRH (1993) ; ANRH (1994), l'inventaire des Forages et l'enquête sur les débits (ANRH 1999), on peut établir l'historique suivant :

Avant 1956

- Toute l'eau utilisée pour l'alimentation humaine, animale et l'agriculture provenait de la nappe phréatique. L'augmentation de la population et l'extension des cultures ont eu comme conséquence une surexploitation avec en corollaire un abaissement lent et progressif de la nappe. Dans les années 1940, la baisse était déjà de l'ordre de 0,5 m au sud d'El-Oued, 1 m à El-Oued, 1,5 m à Kouinine et 2 m au nord de Kouinine.

- ***De 1956 à 1993***

– En 1956, un premier forage moyennement profond captant le Complexe Terminal (CT) a été creusé pour l'AEP d'El Oued et entre 1957 et 1969, environ un nouveau forage par année a été exécuté dans le CT .

– En 1969, suite à de fortes pluies, une remontée générale de la nappe a été constatée avec l'inondation de 150 ha dans la région de Magrane et Hassi-Khalifa. La nappe est progressivement redescendue par la suite.

– De 1970 à 1980, environ 2 forages par année ont été réalisés dans le CT et dès 1980, on observe les premiers ghouts ennoyés à El Oued et une montée progressive et persistante de la nappe phréatique aux portes d'El Oued, ce qui en 1985 alarme les autorités locales.

– Entre 1980 et 1997 une centaine de nouveaux forages sont réalisés dans le CT. En 1986 et 1987, trois forages profonds, au Continental Intercalaire (C.I.), ont été exécutés, deux d'entre eux sont exploités pour l'alimentation en eau potable (AEP) d'El Oued, le troisième à Khalifa, pour l'agriculture, est fermé. Ils sont fortement artésiens, et les débits, de l'ordre de 200 litres/seconde, sont de 5 à 10 fois plus importantes que ceux des forages dans le CT.
– En 1993, la nappe avait ennoyé la palmeraie sur 25 km dans le couloir Kouinine – Robbah. Un réseau de surveillance de la nappe phréatique est mis en place et une série de recommandations émises (recommandations, reprises de l'Etude hydrogéologique de la région d'El Oued – Contributions au problème de la remontée des eaux de la nappe phréatique ; ANRH 1993).

- ***Entre 1993 et 2000***

– Une série d'investigations ont été entreprises pour connaître les caractéristiques géométriques, géologiques, physico-chimiques et bactériologiques de l'aquifère et un important travail de recensement et supervision des forages existants a été entrepris.

- ***2002 – 2003***

– L'évolution du niveau de la nappe phréatique a été modélisée pour les 18 chefs-lieux des Communes de la vallée du Souf. Les projections à l'horizon 2030 indiquent qu'en l'absence de réseau d'assainissement, la nappe pourrait monter plus de 6 mètres à El Oued et que dans cette ville la nappe monterait encore de 2,5 m même avec un réseau d'assainissement. Dans les autres chefs-lieux, la montée est moins importante mais un réseau d'assainissement serait nécessaire pour stabiliser la nappe.

- ***Post 2006***

– Consécutivement aux études précédentes et afin de résorber la remontée de la nappe phréatique, des travaux de fonçage de puits et de drainage horizontal sont réalisés (une cinquantaine de forages dans la ville d'El Oued). D'autres mesures, liées beaucoup plus aux comportements des populations vis à vis de ce problème et à même de contribuer à limiter la remontée de la nappe phréatique peuvent être envisagées. Ces mesures sont exposées en dernière partie de cette note.

7. Profils de la nappe phréatique

Les profils de la nappe phréatique montrent les fluctuations du niveau piézométrique, indiqué en bleu, par rapport au terrain naturel en vert sur la figure 6, et font ressortir les zones où la remontée est la plus significative.

Le profil 1 : Il passe par les principales agglomérations. La nappe ennoie les ghouts près de celles-ci. Au Nord, elle s'approche de la surface du sol.

Le profil 2 : La nappe est profonde à l'ouest et au centre, très proche de la surface du sol près de Magrane. Elle est déprimée sous les zones de cultures.

Le profil 3 : À l'ouest et à l'est la nappe reste relativement proche de la surface notamment au voisinage des agglomérations de Taghzout et Hassani Abdelkrim, au centre elle s'en éloigne significativement.

Le profil 4 : Il met en évidence la remontée sous les zones d'alimentation que sont la plantation Daouia (irriguée à partir du CT) et l'agglomération d'El Oued.

Le profil 5 : Situé le plus au sud, il représente la nappe dans son état quasi naturel sauf à Oued Alenda où une dotation en AEP et des rejets massifs font monter la nappe localement.

Entre mars 1993 et avril 2006, une montée du niveau de la nappe phréatique a été constatée :

- Au niveau des plantations irriguées par les forages du CT de Foulia (1.4 m) et du domaine Daouia (3 m).
- Près du rejet de la ville d'El Oued au H090 (4.5 m).

Sous les agglomérations connectées au réseau d'alimentation en eau potable (AEP) et aux environs de celles-ci, le niveau monte parfois fortement (40 cm à 80 cm/an à El Oued) par infiltration des eaux (arrosage, eaux usées, pertes des réseaux).

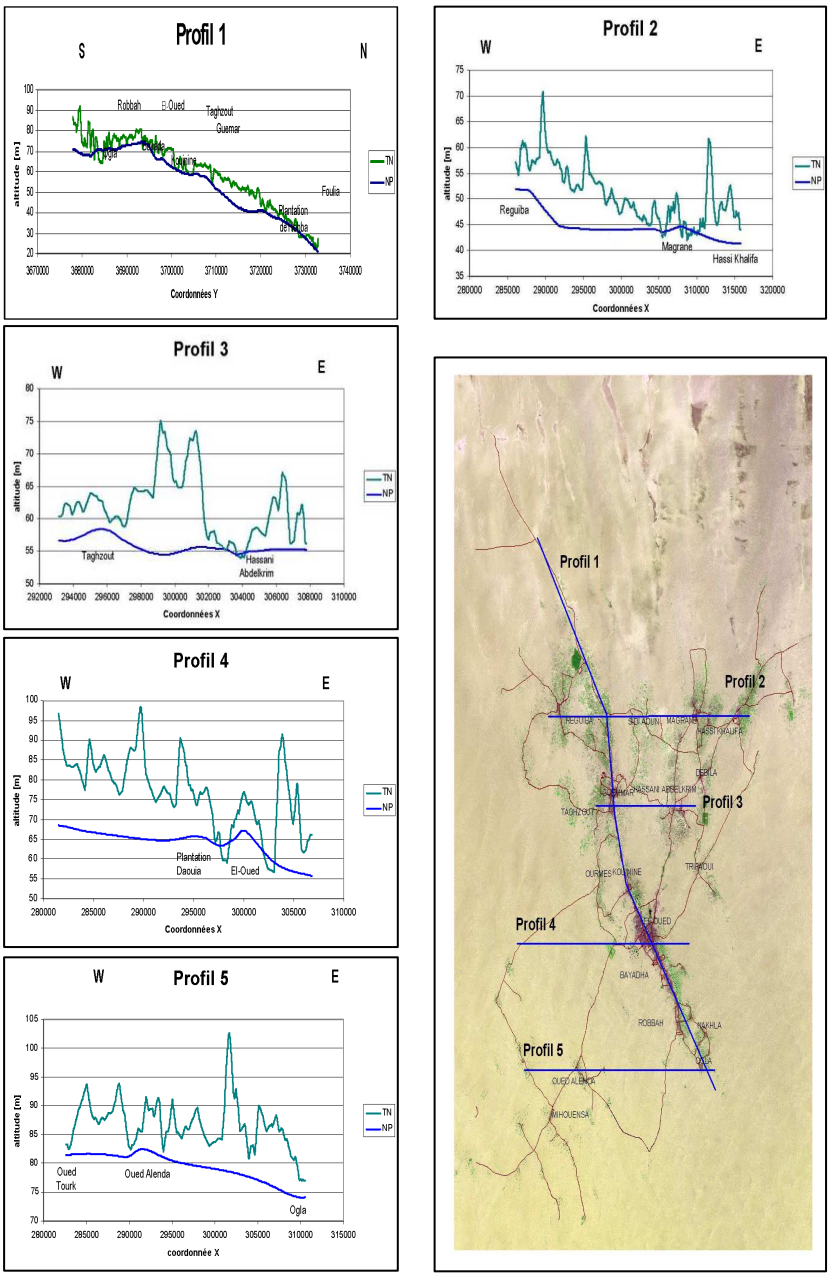

Fig. 6. Carte de situation (à gauche) et profils dans la nappe phréatique
(TN : Terrain naturel ; NP : Niveau piézométrique)

Dans la quasi-totalité du reste de la zone d'étude, un rabattement a par contre été observé, atteignant 5,8 mètres au NE de Guemmar, 2,1 mètres dans la région de Reguiba, 1,9 mètres dans la région de Hassi Khalifa, 1,7 mètres au sud de Nakhla et 1,7 mètres dans la région de Oued Turk. La baisse du niveau de la nappe phréatique est bien réelle dans les zones agricoles.

8. Cas particulier de la ville d'El Oued

Les mesures piézométriques effectuées en avril 2002 dans la ville d'El Oued mettent en évidence une montée de la nappe phréatique qui peut dépasser 0,5 m en un an (entre avril 2001 et avril 2002) dans les parties hautes de la ville.

Le bilan d'eau établi pour l'année 2001 présente un solde positif de 22000 m3/jour (260 l/s) entre les entrées provenant des forages au C.I et au C.T et les sorties constituées de l'évapotranspiration, du drainage et de l'assainissement (BG, 2001).

De l'eau s'infiltre sous la ville à raison de 260 litres/seconde. La plus grande part s'écoule dans le sous-sol en direction des points bas et du Chott où elle s'évapore. Le solde, environ 10% qui n'a pas pu s'écouler (à cause de la faible pente et malgré une perméabilité relativement élevée) fait monter le niveau de la nappe de 0,5 m/an en moyenne.

Les relevés des niveaux d'eau des 58 forages de la ville d'El Oued, nous ont permis de dresser des cartes piézométriques relatives aux campagnes de mesures de février/mars 2007 et mai 2008 (relevés de l'ABHS Ouargla).

L'allure globale de la surface piézométrique reste sensiblement la même, avec un sens général d'écoulement s'orientant vers le nord-est dans les zones basses de la ville au lieu dit Sidi-Mestour. Nous avons noté que la remontée est toujours présente notamment dans la partie sud et sud-ouest de la ville où elle atteint en certains endroits plus d'un mètre, par contre en certains endroits la tendance est au rabattement avec une valeur maximale de – 0.60 m enregistrée dans la partie nord-ouest de la ville.

De crainte de voir l'équilibre déjà rompu devenir irréversible, plusieurs projets ont été envisagés pour contrecarrer le phénomène de la remontée de la nappe phréatique. C'est à cet effet qu'un programme qualifié de « méga-projet » visant l'étude, la réalisation et la gestion de mesures correctives en vue de pallier à ce phénomène a été adopté.

9. Mesures destinées à stopper ou à inverser le phénomène de remontée de la nappe phréatique. Mesures de correction

La pente de la nappe phréatique est faible et bien que la transmissivité soit élevée, les quantités d'eau qui s'écoulent vers l'aval sont peu importantes. Les apports d'eau extérieurs (C.I, C.T. ou rejets) restent pratiquement sur le site et font monter le niveau de la nappe en remplissant les pores du terrain, créant un dôme.

Pour arrêter ou inverser le phénomène de remontée de la nappe phréatique il faut surtout limiter les apports d'eau et/ou augmenter les sorties d'eau dans les zones affectées.

9.1. Actions pour limiter les apports d'eau

L'étude d'assainissement des eaux résiduaires, pluviales et d'irrigation ainsi que les mesures complémentaires de lutte contre la remontée de la nappe phréatique ont été réalisés par l'ONA (Office national de l'assainissement) en collaboration avec les bureaux d'études et de conseils HPO/BG (Hydro-projet ouest et Bonard et Gardel) en 2004.

9.1.1. Réduction des fuites AEP

Le taux de fuites varie fortement d'une localité à l'autre. En 2001, le taux de fuites dans une ville comme El-Oued est de l'ordre de 30 % ce qui peut être considéré comme normal, l'action principale pour réduire le taux de fuites a été la limitation des heures de distribution d'eau, ce qui n'est pas forcément évident.

D'autres actions devront être prises, notamment :

- Pose de compteurs à la production et à la distribution.
- Diagnostic d'AEP et programme de recherche et réparation des fuites.

9.1.2. Réduction de la consommation

La consommation est relativement importante. L'arrosage des jardins se fait régulièrement avec l'eau de l'AEP. Dans les zones ou la nappe est déficitaire, l'arrosage des jardins avec l'eau de l'AEP ne pose pas de problèmes, par contre dans les zones touchées par la remontée de la nappe phréatique, le rôle des zones vertes et jardins dans les zones urbanisées est négatif lorsque ces derniers sont irrigués à partir du réseau d'AEP (Khellef, 2006).

Action à entreprendre :

- Sensibilisation de la population.
- Interdiction de l'irrigation depuis le réseau d'AEP.
- Instauration d'une tarification progressive.

9.1.3. Limitation des plantations agricoles irriguées depuis le CT

L'eau de lessivage des sols des grands périmètres agricoles est responsable de la remontée de la nappe phréatique au niveau des domaines de Mehri, Hobba et Akfadou. L'eau du CT étant relativement salée (entre 4 et 5 g/l dans la région du Souf) (OSS, 2003), environ 5000 m^3/ha/an sont nécessaires pour le lessivage des sols. En l'absence de drainage, pour une plantation de 100 ha, 500 000 m^3 par année rechargent la nappe (ONA/HPO/BG, 2004).

Actions à entreprendre :

- Sensibilisation des irrigants.
- Création d'un organisme de gestion des espaces irrigués.

9.2. Actions pour augmenter les évacuations d'eau

9.2.1. Réseaux d'eaux usées

De la totalité de l'eau entrant dans une habitation, seule une vingtaine de litres par habitant et par jour est évaporée par les habitants et le ménage. Le reste est restitué comme eau usée ou utilisée pour le jardinage. Les systèmes de fosses septiques et puits perdus permettent une réinfiltration de l'eau usée localement et participent à la remontée de la nappe phréatique. La connexion au réseau d'assainissement de l'ensemble des habitations est une des conditions de réduction des réinfiltrations et par là même d'évacuation des eaux usées.

9.2.2. Réseau de drainage

Un réseau de drainage permet de contrôler la hauteur de la nappe phréatique. Il existe deux sortes de drainage : le drainage vertical et le drainage horizontal. Un réseau de drainage vertical, consiste en un réseau de puits dans la nappe phréatique équipés de pompes. En fonction du niveau souhaité, l'on pompe plus ou moins. Il est possible de varier la quantité d'eau pompée en fonction des besoins agricoles. Un réseau de drainage horizontal consiste en une série de drains qui ne seront effectifs que quand la nappe atteindra leur niveau.

9.2.3. Développement d'espaces verts irrigués à partir de la nappe

La plantation d'arbres dans des zones où la nappe phréatique se trouve à moins de 5 mètres de profondeur ne demandera, à terme, pas d'irrigation, les racines puisant directement dans la nappe. Le développement d'espaces verts irrigués depuis la nappe phréatique doit être bien étudié. L'irrigation d'une ou deux rangées d'arbres sur plusieurs kilomètres coûte cher en termes d'irrigation et d'entretien pour un effet faible sur la nappe phréatique si l'irrigation est réalisée à partir de puits captant la nappe phréatique et contre-productif si l'irrigation est réalisée à partir de camions citernes remplis à partir de forages captant les aquifères du CI ou du CT.

9.2.4. Développement de zones agricoles irriguées depuis la nappe phréatique

Le développement d'exploitations agricoles irriguées depuis la nappe phréatique à l'intérieur ou aux alentours des zones touchées par le phénomène de remontée de la nappe joue un rôle important pour stabiliser ou inverser la tendance à la remontée. Sous l'effet de l'évapotranspiration, ces exploitations rejettent dans l'atmosphère 10000 à 15000 m3 d'eau/ha par an (ONA/HPO/BG, 2004).

9.2.5. Remblayage des ghouts

Le remblayage des ghouts ennoyés n'est pas une mesure pour inverser le phénomène, mais permet de limiter la prolifération de moustiques et de décharges en milieu urbain. Il évite que l'eau de la nappe se charge en sels par évaporation.

10. Conclusion

La vallée de Souf possède une réserve d'eau souterraine très importante qui est emmagasinée dans la nappe phréatique, la nappe du complexe terminal (CT) et du continental intercalaire (CI). Le système d'irrigation traditionnel qui reposait sur les ressources de la nappe phréatique, assurait un équilibre entre les besoins et les ressources en eau. Le développement économique dans les régions du Souf et l'accroissement démographique ont induit une forte demande en eau. Le recours aux eaux souterraines plus profondes par l'exploitation de forages captant les aquifères du CI et du CT, destinées aux besoins d'irrigation et d'AEP et l'extension de l'urbanisation dans certaines agglomérations suralimentées en eau (plus de 450 l/j/ habitant) mais insuffisamment couvertes par des réseaux d'assainissement, a accéléré la hausse des niveaux hydrostatiques des nappes

phréatiques et la formation de lagunes, accentuant ainsi le phénomène de la remontée des eaux. Cette remontée aux conséquences dramatiques et désastreuses tant sur le plan environnemental que socio-économique se poursuit à un rythme inquiétant de 50 à 60 cm par an (voir plus par endroits), surtout au niveau de certains quartiers de l'agglomération d'El Oued. D'une manière générale, les anomalies hautes correspondent aux villes et aux zones de cultures irriguées à partir des nappes profondes tandis que les anomalies basses correspondent aux zones agricoles éloignées des agglomérations et irriguées à partir de la nappe phréatique. Les variations de niveau piézométrique indiquent que le phénomène n'est pas stabilisé et que la tendance est à la hausse notamment en zones urbaines.

La dimension du problème est telle que sa résolution doit nécessairement s'appuyer sur une gestion intégrée, à travers les mesures correctrices énumérées et où le volet participatif des populations locales doit prendre une place importante.

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RECENZII

VASILE POPA, *Geografia statelor Asiei – Geography of Asian Countries*, Edit. Universitară, Bucureşti, 2012, 412 pages, 76 figures, 16 tables

Geografia statelor Asiei can be considered within the range of monographic works focusing on the complex knowledge of the Earth through the domains of physical geography, geo demography, settlements and economic geography for a certain area, in this case for the Asian continent.

Its author Vasile POPA, lecturer at the Faculty of Geography, University of Bucharest, outstands through the high leveled teaching skills and scientific content of his lectures, grace to his erudition and vast knowledge of regional geography at the worldwide level, of cultures and civilizations history. Consequently his initial proposal for the publication of a lecture in regional geography materialized through this book which turned out to be a study that overpasses in a great extent the rigors of a common lecture becoming a real monographic, encyclopedic work and a real instrument of analysis.

The regional geography perspective focuses on each country belonging to the six great regions of the continent (according to a classical regionalization): East Asia (6 countries), South-East Asia (11 countries), South Asia (8 countries), South-West Asia (18 countries), Central Asia (5 countries) and North Asia (Asian Russia). For each country, both general and regional geographic aspects are analyzed according to the classical structure of such studies: the introductory part (geographic position and special characteristics imposed by the historical development), physical geography (geology and geomorphology, climate, hydrographic elements, flora and fauna), population and cities, economy (industry, agriculture, tourism and transports).

Each section is dedicated to a country and is illustrated through an expressive and clear physical and/or economic map, easily to read, in order to create in reader's mind a zoning of different geographic aspects.

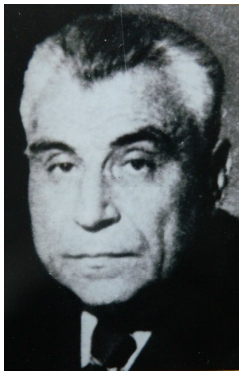
An essential attribute of this study is the updated information and statistical data presented at the 2010, 2011 level as well as the references which include recent titles and works elaborated by research institutes of reference for different domains.

Written in a clear and expressive style the work recommends itself through its geographic content. Focusing on a region of great interest at the worldwide level it impresses through its exceptional documentation and the high level of its scientific content.

Geografia statelor Asiei can be considered consequently a useful book not only for geographers but also for all those interested in Terra's "destiny".

PhD Prof. FLORINA GRECU

CELEBRATING 110 YEARS SINCE RAUL CĂLINESCU'S BIRTH – UNIVERSITY PROFESSOR DR. DOC. OF THE FACULTY OF GEOGRAPHY, UNIVERSITY OF BUCHAREST



Professor Dr. Doc. Raul Călinescu is a personality of the University of Bucharest who carried out modestly and perseveringly the duties connected with his scientific research field or with the education of tens of student series (some of them becoming renowned teachers or researchers).

He was a son of Oltenia, where he attended renowned schools, getting the finest education. Then he graduated the University of Cluj, with degrees in geography and nature sciences fields, his mentors being famous savants in geography or biology, as Professor George Vâlsan (the most important organizer of the geographical school within this institution – at the time, geography had just started its modern direction after the Great Union). His diligence, sense of duty and theoretic knowledge, along with a sizable volume of practical studies helped him to become employed as assistant by the Botanical Institute (after one year of college) and then by the Institute of Geography of the above mentioned university, whose director was professor George Vâlsan. He graduated gloriously the faculty in 1926, with a zoogeographic thesis on Oltenia region that may be considered the premise of the young geographer's upward way. Then he completed his pedagogic training (the capacity examination in 1935) teaching (between 1927

and 1937) in many famous high schools of Bucharest – St. Sava, Gh. Lazăr, M. Viteazu etc. At the same time, he did research for his PhD thesis entitled "Zoogeographic contributions on amphibians and reptiles from Romania" and presented it publicly at Cluj, in 1930 (distinction "Magna Cum Laude"). The complex ideas and connections, along with the illustrations (especially the specific biogeographic maps) of this PhD thesis made him one of the youngest specialists (29 years old) in a new and interdisciplinary direction in our country. Therefore he was given the docent title by the University of Bucharest in 1937, and then he was appointed assistant at the Zoology Laboratory of that institution. Two years later, he was assistant at the Physical Geography Laboratory of the Faculty of Sciences, University of Bucharest, his main activities focusing on Biogeography, a subject taught for the first time in our country by professor G. Vâlsan (he studied thoroughly these aspects within a lecture published in 1934, focusing on the relations between the physical components and the living exponents in order to understand the complexity of the geographic systems).

By 1940, 40 years since graduation, he was already renowned for his research materialized in many national and international scientific communications, 70 published papers, or in the lectures and practical studies he taught his students. His most important studies refer to the biological characteristics and the evolution of spatial distribution (biotic habitat) of many fauna (horn viper, marmot, scorpion, jackal, steppe polecat, lizard) and flora (wild lilac) species. Other remarkable contributions are the biogeographic syntheses (steppe in Oltenia, mammals of Romania, Dobruja and Black Sea, biogeographic regions, fresh water and terrestrial fauna of Cadrilater, etc.), the zoogeographic map of Romania, many methodical and methodological papers (the geographic method used in biological research, the theory of pendulousness and the biogeography, the international rules of biogeographic nomenclature, the guide of amphibian and reptile recognition in Romania, etc.), two original analyses of monograph type dedicated to some less known areas (the Island of Snakes and Ada-Kaleh), and many popularization papers (about hunting, or about rare flora or fauna species in Romania).

All his results proved that he was a remarkable scientist and teacher. He was member of many national or international scientific organizations (the Science Society of Cluj 1925, the Society of Romanian Naturalists 1927, Deutsche Geselschaft für Saugetierkunde of Berlin 1929, the American Society of Mammalogists Baltimore U.S.A. 1930, the Royal Romanian Society of Geography 1934, the Society of Animal Protection 1940) or of the Romanian Academy of Science 1935. He was appointed assistant professor in Biogeography at the Faculty of Sciences, University of Bucharest, in 1940. 16 years later, he became full professor, among the few teachers kept after the 1948-1952 "political reform".

His last period of activity is notable for his research, publications and university concerns.

Until 1956 he keeps the previous communication and research lines focusing on the causal study of the distribution (including understanding the economic importance) of plants or animals, on the one hand; and on printing the general data fund of biogeographic character taught to the students, from a naturalistic and experienced point of view on the other hand. His work was consequently a natural result of combining biological and geographical realistic training, showing interest for each component in relation to the issues involved *(Biogeography of Romania* – 1942, *Elements of Biogeography* – 1945, *Between Biogeography and Anthropogeography* – 1947, *Vegetation and Fauna of Romania* – 1955). However, in 1944 the professor joined the large group of geographers (professors V. Mihailescu, V. Tufescu, N. Al. Rădulescu, T. Morariu, N. Popp, etc.) who founded the Institute of Geography of Romania, actively participating in organizing, structuring and implementing complex study programs in our country. The institute entrusted him with biogeography study in 1948.

Between 1956 and 1962 he distributed his concerns between work at the Department of the faculty, teaching lectures of Plants Geography, Animals Geography, Biogeography (issue is focused on combining information from the Soviet school and what he acquired over the years – especially from the European and Romanian area) – some of them were printed – and activities at the Institute of Geography (he was in charge of several contract themes, some articles, and also the chapter "Vegetation and Fauna" in volume I of the Geographical Monography of R.P.R., including the biogeographic maps and profiles of the Annex which were the first syntheses of that kind).

After 1962, by the reorganization of research units at the Department of Geography, Faculty of Geology-Geography, he was appointed head of the Department of Geographical Special Sciences. This included more teams (Geomorphology, Pedology, Biogeography, Climatology, Hydrology), whose leaders were working directly with Professor Raul Călinescu. As a result, management tasks added to the didactical ones, leading to a distinct concern to ensure a climate conducive to research, publication of results and students' education, especially since the didactic team, included at first specialists for geographical area and later on politically involved persons belonging to different generations and various university training places, some with ministerial or political functions. However the professor has never become a Party member. His strengths in the organization of the Department were his diplomacy in relations with the team heads to which he gave full autonomy, a relative closeness with those in power, both from inside and from outside the Department, a relatively severe discipline imposed to the young, finding ways to coalesce sometimes divergent interests. Some of the most important achievements of the department during his leadership are still advertised nowadays. In this respect, one should mention the founding and the developed of laboratories for all important subjects of the Department, which are the result of scientific

interest in teaching coexistence of specialist teams with the department head (Geomorphology unit – where a pool for the functional and experimental studying of relief forms existed was achieved by the following teachers: Posea Grigore, Ilie Ion, Popescu Nicolae, Grigore Mihail but, unfortunately, after the year 2000 this pool had been dissolved instead of being further developed; Biogeography – standing based on some collections of plants and animals brought by the professor from the Biology Faculty or other sources; Soil Science by prof. Nicolae Florea, Hydrology – by teachers I. Pişotă and V. Trufas.; Meteorology by teachers Stoenescu Stefan, Elena Popescu, Ciulache Sterie). Moreover in 1964 Eşelnița-Orşova Geographical Resort was established (Professor's work was associated with the support of Professor Grigore Posea – General in the Ministry of Education, locally with the work of Prof. Petcu Andronic and the actual contribution of young staff of Department). Other contributions were the organization of a complex interdisciplinary research plan, the orientation and restructuring of the scientific journal of the faculty, the encouragement for the involvement of all teachers in preparing PhD students (after 1968). Raul Călinescu remained consequently one of the new leaders and marked the beginning of a reorientation towards a modern teaching system (especially in the theoretical content of the training through practice-related activities) and the development of complex programs of specialized training in practice carried out every six months and almost for all years of study. Proffesor's merit was that he supported all these initiatives by encouraging them sometimes through direct interventions and that he was always opened to any initiative. He led all Department members in a good scientific research, education, interdisciplinary collaboration and compliance with the University hierarchy.

Management activities were combined with didactical ones – teaching courses were restructured based on his ideas, but also based on newly penetrated Western European trends. He was preoccupied at the same time with the organization and management of spring study field trips in the Danube Delta and supervising of practical activities that took place every summer at the Eşelnița Geographical Resort. He was followed up in the progress of work and practical training by three assistants. At the same time he was assisted in the highly-regarded universitary lectures and the examination requirement for students' review for exams.

Research results obtained during the decades were reported in a few synthetic works both designed and made by biologists such as: *Biogeography of Romania* (1969), *Biogeography (1972)* or with a bio-geographic profile such as: *Maps* (1974), *Romanian Danube Valley Geography* (biogeographic containing chapters), etc. One should also add the participation on conferences and other scientific events (Bucharest, Tulcea, etc.) and the publishing of popularization articles or books.

After retirement, he was still an active presence in some scientific sessions of biological or geographical nature.

During his life, those who knew him have issued different opinions depending on the relationship established with him. Many were those who have appreciated his knowledge and scientific achievements – over 85 articles, 6 dissertations, 30 themed works, many biogeographic maps, etc. Seen as the greatest Romanian biogeographer, prof. Calinescu had a distinct contribution to zoogeography and based his work on his dual training (biology and geography), a thorough research in the field, laboratory and special investigations. He was esteemed not only for the place he earned in biogeography, but also for his conduct and diplomacy. There were also those who referred on some aspects aimed at his intimate life or too much tacit understanding regarding those in power. To some extent some have used him as a cover for "survival" in college; others have claimed some works or activities disappearance of their teacher. Unfortunately, few works have been preserved of what he has left. His biogeography courses served as the basis for some papers published at a later date while the lab he created suffered enormous changes in content and structure afterwards. At the same time many of the books from his personal library were taken after his death at the Resort, for which he made great efforts to become an important research unit in spite of the fact that for some reasons it does not bear his name yet.

He was my teacher (1959-1951) and head of department (1965-1968). I remember him as a very well trained teacher, punctual, with apparel proper for the moment and place, very dynamic with personal or collective tasks, too tolerant of those of higher social or political position, intransigent or even ironic with his subordinates of mediocre training. *He was a follower of G. Vâlsan's ideas (whom he worshiped), a pioneer of biogeography and research connection to geographic systems, but these were unfortunately less carried on by the followers.*

PhD Prof. MIHAI IELENICZ[*]

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ACORDAREA TITLULUI DE *PROFESOR HONORIS CAUSA*
AL UNIVERSITĂȚII DIN BUCUREŞTI

PROFESORULUI ERIC FOUACHE
30 IANUARIE 2012

Laudatio

Născut în anul 1965, Domnul Profesor Eric Fouache a absolvit Departamentul de Geografie Fizică din cadrul Universității Paris 4 în anul 1987. După doi ani (1989) obține şi diploma de masterat (DEA) la aceeaşi universitate. Doctoratul îl obține în 1994 pe un subiect de geomorfologie si geografie istorică asupra Greciei Occidentale şi Peloponesului (*Recherches sur l'alluvionnement historique en Grèce Occidentale et au Péloponnèse : géomorphologie et géographie historique*, cu mențiunea : *Très honorable avec les félicitations*, coordonator Prof. J. Dufaure de la Universitatea Paris 4.

Curriculum academic

Din anul 2002 devine profesor universitar (Professeur des Universités) la Universitatea Paris-Est Créteil. În prezent, Prof. Eric Fouache predă geografie fizică şi geoarheologie la Universitatea Paris-Sorbonne.

Prof. Eric Fouache este o personalitate a lumii geografice franceze, cunoscută şi apreciată de specialiştii geomorfologi la nivel international. Cariera sa didactică este dublată de una ştiinţifică de un înalt nivel. Rezultatele remarcabile obţinute pe plan ştiinţific şi didactic au atras atribuirea a numeroase responsabilităţi şi funcţii pe care le îndeplineşte cu multă conştiinciozitate şi rigurozitate.

Activitatea didactică a Domnului Profesor Eric Fouache a început în anul 1992 (Allocataire Moniteur Normalien). Este titularul cursurilor de Geografie Fizică şi de Geoarheologie ţinute la Universitatea Paris-Sorbonne, cursuri ce vizează anii doi şi trei de licenţă, precum si cei doi ani de masterat (M1 et M2). Până în prezent, Domnul Profesor a coordonat numeroase memorii de masterat (DEA) în geomorfologie şi memorii de licenţă.

În ceea ce priveşte coordonarea lucrărilor de doctorat, Domnul Profesor Eric Fouache se ocupă cu conştiinciozitate de tezele pe care le coordonează. Astfel, patru doctoranzi au devenit deja doctori în geografie. În acest moment, Profesorul are sub îndrumare şase teze, dintre care una în cotutelă cu facultatea noastră.

Dintre celelalte numeroase activităţi didactice, mai amintim pe scurt:

– coordonator programe Socrates-Erasmus între Paris Ouest şi Harokopio (Atena) şi Paris Ouest şi Bucureşti;
– membru în cadrul juriului Şcolii doctorale a mai multor universităţi pariziene (Paris 1, Paris 4, Paris 7).

Activitate de cercetare

Domnul Profesor Eric Fouache s-a impus ca un specialist de marcă, de renume internaţional în domeniul geomorfologiei. El şi-a desfăşurat activitatea de cercetare în mai multe laboratoare. Astfel, încă din timpul studiilor de licenţă, îl găsim membru al Laboratorului de Geografie Fizică al Universităţii Paris 1. Devine apoi membru asociat al Laboratorului de Biogeografie şi Ecologie, UMR 8505. Din 2002 până în 2008 deţine funcţia de Director al l'EA Geodinamica Mediilor Naturale. Din 2005, timp de 3 ani, este membru al comitetului ştiinţific „Istoria şi arheologia Balcanilor" (Histoire et archéologie des Balkans). În prezent, este membru al l'EA GENKO la Universitatea Paris Ouest şi membru al UMR al Universităţii Paris-Sorbonne, responsabil de cercetările ce vizează geoarheologia şi paleogeografia.

Cercetările sale se concentrează la ora actuală pe două direcţii:

– Analiza dinamicii geomorfologice a peisajelor balcanice, mediteraneene şi din Orientul Mijlociu;
– Studii asupra legăturilor dintre mediu, credinţe, culte, societăţile Greciei Antice (geografie culturală şi istorică).

Rezultatele activităţii ştiinţifice desfăşurate de Domnul Profesor Eric Fouache s-au materializat prin numeroase expuneri la conferinţe interne şi internaţionale,

articole publicate, cărți publicate, volume editate. Astfel, domnul Profesor deține un bogat CV ce cuprinde numeroase participări cu comunicări, dintre care cele mai importante în Atena, Roma, Lyon, Grenoble, Paris, Jiroft (Iran). În 1999 publică volumul *L'alluvionnement historique en Grèce Occidentale et au Péloponnèse : géomorphologie, archéologie, histoire* pentru care primeşte premiul Roger Coque al Societății Franceze de Geografie.

În 2006 publică volumul *L'évolution des paysages en Adriatique et en Méditerranée Orientale* pentru care primeşte premiul Eugène Gallois al Societății Franceze de Geografie. Ca editor, Eric Fouache publică opt volume, cu subiecte preponderent din câmpul geomorfologiei şi geoarheologiei.

Activitatea ştiințifică desfăşurată cu un real interes şi devotament este exprimată şi prin volumul foarte mare al articolelor publicate în diverse reviste de specialitate, din Franța sau din străinătate: peste 70 de astfel de articole. Domnul Profesor a scris şi publicat în diferite limbi, dintre care amintim: franceză, engleză, rusă, croată, persană, turcă.

Remarcabile sunt, de asemenea, contribuțiile cu capitole la lucrări colective de popularizare, precum şi prezentările realizate în calitate de specialist în cadrul unor emisiuni radiofonice (ca *Europe 1* sau *Radio Suisse Romande)* sau în cadrul unor interviuri (pentru *Le Monde, France Info, Libération*).

Colaborarea cu Facultatea de Geografie a Universității din Bucureşti

Colaborarea cu Facultatea de Geografie a Universității din Bucureşti a început în anul 2005, odată cu Simpozionul Italo/Român de geomorfologie de la Mangalia, devenit ulterior, din 2009 JGM (simpozionul geomorfologilor din cinci țări – italo-româno-belgo-franco-grec, la care participă însă specialişti din AIG). A urmat apoi conferința internațională regională de geomorfologie de la Braşov *Landslides, Floods and Global Environmental Change in Mountain Regions* (2008) şi Simpozionul de geomorfologie de la Sinaia din 2010 (al JGM, organizat de Departamentul nostru de geomorfologie, în coordonarea subsemnatei), ocazii cu care a fost invitatul facultății noastre. Menționăm că Profesorul Eric Fouache a militat pentru actuala componență a grupului de lucru JGM sub egida AIG. Astfel, simpozioanele anuale s-au constituit într-un dialog între geomorfologii români şi Domnia Sa, susținându-ne în diferite situații, precum în acordarea de burse.

Domnul Profesor este membru al comitetului Ştiințific al Revistei de Geomorfologie şi a fost coordonatorul programelor Socrates-Erasmus dintre facultatea noastră şi facultățile din Universitățile Paris XII, Paris Ouest între anii 2006 şi 2011. Din anul 2010, legăturile Domnului Profesor cu facultatea noastră s-au consolidat, realizându-se şi o cotutelă de teză între Departamentul de Geografie, Universitatea Paris Ouest şi Facultatea de Geografie, (Departamentul

de Geomorfologie-Pedologie-Geomatică), Universitatea Bucureşti: coordonatori Eric FOUACHE şi Florina GRECU, doctorand Daniel IOSIF.

Avându-se în vedere întreaga activitate Ştiinţifică şi didactică, pasiunea, spiritul inovator şi entuziasmul pentru cercetarea geografică în general şi cea geomorfologică în particular, interesul şi larga deschidere spre colaborarea cu geografii români, colaborare pe care doreşte să o continue şi diversifice, sentimentele de prietenie şi apreciere manifestate faţă de Facultatea de Geografie a Universităţii Bucureşti, propunem ca d-lui prof. **Eric Fouache** să i se atribuie titlul de **Profesor Honoris Causa** al Universităţii din Bucureşti.

Prof. univ. dr. FLORINA GRECU
30 ianuarie 2012

INTERNATIONAL CONFERENCE ENVIRONMENT, LANDSCAPE, EUROPEAN IDENTITY – ANNUAL SCIENTIFIC MEETING OF THE FACULTY OF GEOGRAPHY

The International Conference Environment, Landscape, European Identity – Annual Scientific Meeting of the Faculty of Geography was held in Bucharest between 4th and 6th of November 2011. The conference was organized by the Department of Regional Geography and Environment, within the Faculty of Geography-University of Bucharest, with the support of Centre for Environmental Research and Impact Studies, Transdisciplinary Research Centre Landscape – Territory – Information Systems, Association for Biodiversity Conservation, University of Craiova-Department of Geography, and the National Authority for Scientific Research.

The topics of the Conference Environment – Landscape – European Identity were: environmental sciences (environmental quality in residential and metropolitan areas, environmental impact assessments, mapping environmental quality), conservation biology (conservation planning, modelling species distribution, management of the European Natura 2000 network), landscape (historical mapping for landscape reconstruction, landscape decomposition, landscapes' third dimension – landscape metrics, enforcement of the European Landscapes Convention), regional geography and geopolitics (regional and inter-regional development, cross-border cooperation, cultural models – European identity, geopolitical structure changes), geomorphology, pedology, GIS applications, human geography (rural and urban environments – economy, policies; territorial disparities – consequences and solution; sustainable development of human settlements), tourism (tourism role in the development of regional politics, use of modern technologies in evaluating touristic potential, quantitative and qualitative methods used in touristic assessment and prognosis), hydrology (management and evaluation of water resources, hydrological phenomenon, urban hydrology, politics for managing flood risks), meteorology and climatology (local and applied climatology, climate changes, climatic indicators for managing risks and resources, agrometeorology).

The Conference was attended by over 150 participants from 24 countries, with a total number of oral presentations and 29 posters. The Conference was opened by the Professor Ioan Pânzaru – Rector of the University of Bucharest. Each section was opened by a plenary session were scientific personalities gave lectures on the topic of mainstream subjects in environmental and landscape

research. The plenary speakers were Professor Bosse Legerquist – University of Gothenburg, Sweden; Professor Dan Bălteanu – Institute of Geography, Romanian Academy; Professor Alexandre Buttler – Ecole Polytechnique Federale de Lausanne, Switzerland; Professor Ioan Ianoş – University of Bucharest, Faculty of Geography, Romania; Dr. Lucian Drăguț – West University of Timisoara, Romania, and Dr. Bogdan Suditu – Ministry of Regional Development and Tourism, Romania.

The audience came from various fields – geographers, architects, planners, chemists, economists, mathematicians, etc.), thus the debates were full of consistence. This lead to the development of potential inter-disciplinary directions in the environmental and landscape researches, which can be approached by research teams from various European countries.

The papers presented in the current special issue approach topics of both theoretical and practical importance, regarding the assessment of environmental components and their favorability and restrictiveness for human activities; the use of GIS techniques in environmental and landscape analysis; quantification of resources' usage in human processes and their sustainable development; analysis of changes in urban and rural landscapes; the development of methodologies for the complex assessment of environmental components.

The full papers were published in the special issue of Procedia Environmental Sciences. A number of 42 papers were sent for peer review, of which following two revisions 27 were selected for publishing. The papers have been subjected to a peer review realized by the editors and invited reviewers, being selected only those papers which bring a significant contribution to their respective field. The Editors are grateful to all authors and reviewers for their outstanding contribution to this special issue, and to the Conference participants who by their presentations, and discussions contributed to the emerging of new ideas in the field on environment, landscape, and European identity.

We wish to acknowledge the financial support of the Conference sponsors: National Authority for Scientific Research, National University Research Council (PN II Idei 1949/2008, PN II Idei 1925/2008, and PN-II-RU-TE-2011-3-0285), and Intergraph Computers Services (developer of geospatial solutions).

PhD Prof. ILEANA PĂTRU-STUPARIU
PhD Prof. MARIA PĂTROESCU
PhD Assist. prof. CRISTIAN IOAN IOJĂ
PhD Assist. prof. LAURENȚIU ROZYLOWICZ

TEZE DE DOCTORAT SUSȚINUTE ÎN PERIOADA
IULIE 2010 - NOIEMBRIE 2011
– SISTEMUL BOLOGNA –

Nr. crt.	Numele şi prenumele doctorandului	Data susținerii publice	Titlul tezei de doctorat	Profesor coordonator
1	Voicu Dumitru	02.11.2010	Potențialul turistic al dealurilor şi podişurilor dintre Mureş şi Târnava Mare	Prof. univ. dr. Mihai Ielenicz
2	Cârciumaru Emil Gheorghe	02.12.2010	Geneza, evoluția şi dinamica actuală a bazinului morfohidrografic Vedea	Prof. univ. dr. Floare Grecu
3	Hociung Cristian	04.11.2010	Studiul şi managementul fenomenelor naturale de risc şi hazard de pe teritoriul județului Suceava	Prof. univ. dr. Costică Brânduş
4	Preda Claudia Elena (Bălăceanu)	04.11.2010	Impactul poluanților produşi de termocentralele pe cărbune asupra solurilor. Studii de caz: termocentralele Doiceşti, rovinari şi Deva-Mintia	Prof.univ.dr. Floare Grecu
5	Timotin Victor	27.09.2010	Dezvoltarea durabilă şi ecoturism în Parcul Natural Făgăraş	Prof. univ. dr. Silviu Neguț
6	Trancă (Popescu) Georgiana	28.09.2010	Restructurarea economică în municipiul Craiova şi impactul acesteia asupra forței de muncă	Prof. univ. dr. George Erdeli
7	Bănuță Annemarie Daniela (Iojă)	29.09.2010	Calitatea mediului în spațiile rezidențiale din municipiul Bucureşti	Prof. univ. dr. Maria Pătroescu
8	Chițu Zenaida Daniela	14.10.2010	Predicția spațio-temporală a hazardului la alunecările de teren utilizând tehnici SIG. Studiu de caz arealul subcarpatic dintre Valea Prahovei şi Valea Ialomiței	Prof. univ. dr. Mihai Ielenicz
9	Anton Lazăr	11.11.2010	Religie şi dezvoltare locală în Munții Banatului	Prof. univ. dr. Ioan Ianoş

10	Necula Simina Garofița (Mita)	20.11.2010	Activitățile non-agricole și dezvoltarea rurală durabilă în sectorul subcarpatic dintre Buzău și Slănic	Prof. univ. dr. Melinda Cândea
11	Panțu Florentina	30.11.2010	Sisteme teritoriale mediolitorale pe țărmul românesc sudic al Mării Negre (între Capul Tuzla și Vama Veche	Prof. univ. dr. Emil Vespremeanu
12	Tatomir Emanuel	17.12.2010	Dezvoltarea turismului cultural cu deosebire a celui religios și de pelerinaj în țara Făgărașului	Prof. univ. dr. Ion Marin
13	Pascariu Gabriel	27.01.2011	Structura și dinamica sistemelor de așezări umane în procesul de planificare teritorială (cu o aplicație în cazul României)	Prof. univ. dr. Ioan Ianoș
14	Carablaisă Gheorghe Sorin	31.01.2011	Relația climă-poluare în municipiul Drobeta Turnu-Severin	Prof. univ. dr. Sterie Ciulache
15	Grigore Elena	02.07.2011	Potențialul bioclimatic al Podișului Dobrogei de Sud	Prof. univ. dr. Nicoleta Ionac
16	Abdula Melia Ana	03.02.2011	Studiu fizico-geografic al complexului lagunar Razelm-Sinoe	Prof. univ. dr. Emil Vespremeanu
17	Stoian Roxana Mihaela	31.03.2011	Impactul antropic asupra parcurilor naturale din România	Prof. univ. dr. Ioan Ianoș
18	Avram Sorin Iliuță	04.07.2011	Extinderea franjei rur-urbane a orașului Craiova și impactul asupra mediului	Prof. univ. dr. Maria Pătroescu
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