PRESENT ENVIRONMENT AND SUSTAINABLE DEVELOPMENT, NR. 1, 2007

CHANGES IN LAND USE IN THE DEPRESSION AREA OF BRASOV COUNTY AND THEIR IMPACT ON THE ENVIRONMENT FACTORS

Adrian Cioacă, Mihaela Dinu

Key words: land use, depression geosystem, environment factors, Braşov County.

Résumé. Dans tous les cas des dernières deux décennies, l`utilisation du terrain comprenant les communautés rurales du pays de Brasov a reçu des changement sévères. Cela est arrivé surtout à cause des changements de propriété après 1990, quand une bonne partie des terres a été retournée aux anciens propriétaires. On le sait, fonction des conditions de la forme du terrain, tous les parcelles de terrain n`ont pas été inclues dans le cadre des entreprises dans le passée , même si l`on ne le savais pas sur le territoire de la dépression. Apres cela le terrain retourné, a eu des différentes fonctions d`` impact selon le cas. Dans la plupart des cas,on a gardé la fonction traditionnelle, mais pour bien des situations quand les propriétaires ont perdu leur pouvoir économique dont il avaient besoin,les terrains ont cessé d`être cultivés. Au delà de ces circonstances, les nouveaux propriétaires ont commencé d`abandonner les parcelles de terrain, en introduisant des nouveaux…et donnant aux terrains des nouvelles utilisation. Pour conséquence, les changement dans l`utilisation du terrain diffère d`une communauté à une autre dans la zone de cette dépression.

1. General information on Brasov County.

Situated in the centre of Romania (the mathematic centre of the country is situated next to Dacia village, crossed by the parallel of 46º north latitude which passes through Jibert and Ormeniş and the meridian of 25º east longitude which passes through Făgăraş municipality), Braşov county stretches over 5 363 km^2, that is 2.2% of the surface of Romania (Geografia României, vol. III, 1987, p.211-213). This territorial-administrative unit in the south-east of Transylvania, includes either mountain massifs (*geosystems of low, medium and high mountains*, with altitudes of over 700 m, situated in the southern and south-eastern part of the county, covering about 40 % of its surface) as well as *depression geosystems* (60 % of the county surface, divided between *piedmont-hilly geosystems*, 20%, and *alluvial plain ecosystems*, 40%). Our study approaches only the space occupied by depression geosystems (Fig 1).

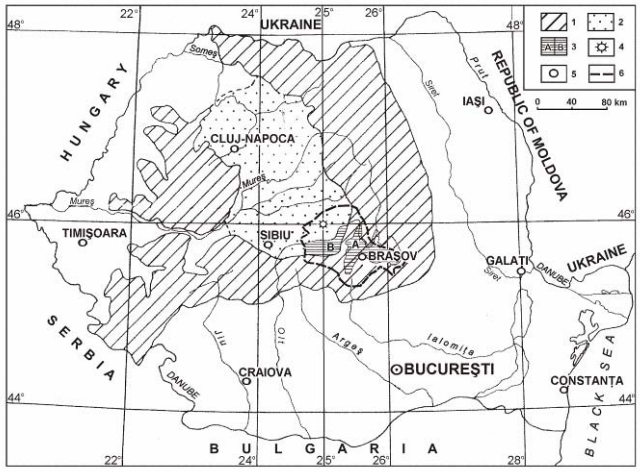

Fig. 1

Fig 1. The position of the depression geosystem in Braşov County with reference to the major Romanian landforms (1, the Carpathian unit; 2, the Transylvanian hill depression; 3, the depression geosystem: A, Ţara Bârsei; B, Ţara Oltului; 4, Romania's mathematical center; 5 major urban centers; 6 Braşov county outline)

From a geographical point of view, the piedmont hilly geosystems are situated on the southern side of the depressions, and the alluvial plain geosystems are situated on the middle course of the Olt river, forming the greatest part of the Braşov Depression (its eastern part, Ţara Bârsei, on the territory of Brasov County) and Făgăraş Depression (eastern part of Ţara Oltului, on the territory of the county). *Braşov Depression* is the largest intermountain depression in the *Romanian Carpathians***,** covering more than 2 000 km^2, (10.8% of the area of Eastern Carpathians, 0.84% of the surface of Romania). It is situated in the south-western extremity of the Eastern Carpathians, on the curvature area of the mountain arch, surrounded by the southern chains of Eastern Carpathians and Piatra Craiului and Bucegi massifs, in Southern Carpathians. *Făgăraş Depression* is the largest marginal depression of Transylvanian Plateau, with almost 1 800 km^2, covering the area from „porch" situated at the foot of the Southern Carpathians (Făgăraş Mountains) to the hilly unit (Hârtibaciu Plateau). Both depressions look like large alluvio-proluvial plains, with flood plains, terraces and piedmontan glacis, developed especially on the left side of the Olt, morphologically separated from the Perşani Mountains, but communicating by the

low gorges from Vlădeni and the narrow path cut by the Olt between Augustin and Racoş.

2. How did these alluvial plains appear.

The great landscape variety of the depressions is a reflection of the tectono-genetic diversity and the correlation with the Pliocene- Quaternary morpho-genetic phases of their sedimentation, as the Olt River only ensured the connection between them, but not a unitary geographical environment. Therefore, the tectono-genetic and morpho-genetic diversity is a result of the disposal, age and character of the tectonic activities they generated: in Braşov Depression, a fault line network of the foundation caused the fracturing and sinking of certain compartments of the central mountain mass of the Curvature Carpathian, at the end of Pliocene. On the other hand, Făgăraş Depression, situated to the north of the Carpathian fault, which is actually an epicontinental margin of Făgăraş Mountains, was sedimented initially in Oligocene-Pre-Badenian continental-lacustrine phase.

In both depressions, subsidence played an important role in the creation of a humid environment, with lacustrine waters, with slower colmatation in the Trasylvanian space (-1 to -2 mm/year) and with swampy environment, alternating, more or less with ephemeral lakes, but with a more intense sedimentation in the Brasov area (-3 to -5 mm/year). At the same time, another peculiarity of these alluvial plains is that fact that they were formed by rhythmical and successive accumulations, induced by the fluctuations of the quaternary climate, and this caused a vertical distribution of the landforms from piedmonts and glacis, cones or terraces, to very humid flood plains. The transition between the marginal mountain chains, corresponding to the border Carpathian area, and the low areas of the alluvial plains, is represented by two levels: the upper level, 750-850 m high, made up of isolated chains and hills and the lower level, 650-700 m high. The superior piedmontan glacis, the terraced glacis, the terraces, fluvio-periglacial cones and the Olt flood plain (400-500 m).

The sedimentary deposits are several hundred meters thick, about 300-450 m in Făgăraş Depression and 600-900 m in Braşov Depression, where the subsidence is very active today as well

(-3 to -5 mm/year). *The superficial deposits* in the piedmontan and alluvial plain of the Olt include: argillo- siallitice *accumulative crusts*, with the relatively intense argillisation, with loessoide elements in many cases. The same type of crust is found in the depression area, but it is less argillised and besides, it is carbonato-siallitic, as the loessoide deposits are very frequent here. In the area of both depressions, thick layers of alluvia, psephites, psammites, aleurites, pelites and fossil soils. They are visible on the banks of the valleys as piedmontan gravels, terrace gravels, lacustrine or aeolian sands, loess or loeossoide deposits with

intercalation of fossil soils. Those with predominant gravels and coarse sands are present especially in the flood plains of the depressions affected by subsidence (Braşov Depression). *The flood plains and the terraces* of the valleys are covered by alluvia, and the latter have also horizons of loessoide, loess, fossil soils and even prolluvia.

3.The morpho-climatic conditions for the alluvial plain formation.

The greatest climatic variations with effect on the landforms, for the territory of Romania and Europe as well, took place in the Quaternary. The transition between the former Mediterranean climate (characteristic for the Pliocene) and the present temperate climate, was characterized by cooling oscillations, with glacial periods followed by heating periods, by aridization or relatively rainy periods (Cioacă, Dinu, 2002). All these climatic oscillations caused periodical changes of vegetation and fauna, but they also had an effect on the fluviatile dynamics (depth erosion, lateral erosion, accumulation), on moulding of the slopes (mechanical weathering, collapses), land slides, solifluxions etc.), the installation of glaciers on high Carpathian peaks and the development of the periglaciar modelling in the lower areas. The effects of the climatic oscillations can be found in the fossil flora and fauna in Braşov County, in the existence of the glaciar valleys and cirques in the southern part, in the loess deposits, alternation of the fossil soils and other correlation lanes and varied structure in the depression plain area.

4. The impact of neotectonic movements in the configuration of the hydrographic network.

In this period of time, the general lifting that started in the Sarmatian continued, with two clear phases: *valahă* stage and *pasadena* stage. Although most of the mountain area was lifted up, there are some exceptions, especially in the depression areas. As a result of the lifting, the valleys deepened very much, but rhythmically (not continuously), gorges and narrow paths were created towards the mountain areas, and terraces, collapses and land slides, in the hilly space. In the Eastern Carpathians areas, subsident sinking occured in Gheorgheni-Ciuc Depressions and especially in Braşovului Depression, where they are still present today. *The units affected by negative movements* in Braşov County, include mainly the areas that sank at the end of the Quaternary. These cause an intense process of meandering of the Olt river, but especially by a frequent oscillation in the flood plain, as a result of the floods. Therefore, the subsidence induced intense colmatation (their thickness reaches 300-400 m in Braşov Depression) and they caused, in time, large works for correcting the flood plains (Dinu, Cioacă, 1997). Here, the Villafranchian gravels appear of their margins (sometimes at altitudes of

550-600 m, 700-900 m), and inside the depression these are fossilized by newer sediments, their base being situated at about zero meters (absolute altitude) at Feldioara, for example. From this location of the gravels, the subsident process in which they deposited appears very clearly, and this process continues, here and there, even at present (the confluences between the Olt and Negru, Olt and Cormoş etc where the subsidence measures 4 mm/year). Therefore, lacustrine units were only temporary, but their tributaries ensured the connection between them, but the most common form, on large areas of the alluvial-proluvial plain, was represented by swamps.

5. Pedogenetic conditions of land use

The location and association of soils in this region presents a vertical *distribution,* and this configuration is imposed by the presence of a succession of landform steps: depression plains, piedmontan hills, hilly landforms and the Carpathian massifs. On such a background, the soils present varied parental layers, and this causes a mosaic distribution (intrazonale soils cover 1/4 of the area) due to the local landforms, climate and rocks:

- *Molisoils* (silvosteppe environment), covering the central-northern part and *argiluvisoils (*forest environment) are the zonale soils with the largest distribution on the plateaus, especially the brown-luvic soils. In Transylvania Sub-Carpathians *umbrisoils* (andosols) also occur on the volcanic agglomerates (the central-northern part of the county). In the north-west, in the Târnave Plateau, on the marine IVIRI, the *pseudorendzine* and locally *rendzine* were formed;
- *Argiluvisoils* cover the higher areas, until the foot of the mountains. Very seldom, *reddish brown soil, lessive reddish brown soil, and brown luvic* soils appear. *Brown soils* are seldom and discontinuously present as well, immediately next to molisoils. *The brown luvic soils* are the most extended, in large areas of the county. They cover all the Transylvania Sub Carpathians (hills, depressions), Hârtibaciu Plateau, and the neighbouring depressions, Făgăraş and Braşov, partially. *Luvisols* have a discontinuous distribution and it is associated with brown-luvic soils, especially in the south of Făgăraş and Braşov depressions. From the class of umbrisoils, *andosoils* are present on the volcanic agglomerates covering several hills in the Transylvania Sub Carpathians (between the Homoroade).
- *Intrazonal soils* include mainly hydromorphic and undeveloped soils. Within the *hydromorphic soils, the black clinohydromorphic soils* have the greatest extend (slow slopes, fine carbonatic layer and humid climate). On the lower parts of the depressions in the centre of the county, gley and low humic gley

and even marshy soils appear. *The undeveloped soils* include: *alluvial soils, regosols and erodisols,* the last ones being present especially in the Târnave Plateau, on the sandstone IVIRI, on tuffs and conglomerates.

The regional associations of the soil types are in accordance with the landforms (especially from the point of view of altitude, geodeclivity and fragmentation) but with differences induced by the variety of the parental rock and the topoclimatic zonality.

We can conclude that the fields look like a large alluvial-proluvial plain, with flood plains, terraces and piedmont glacis, developed mainly on the left of the Olt river. The transition from the marginal mountain chains, corresponding to the border Carpathian area, to the low landforms of the alluvial plain is represented by several landform steps, with their own features in land use. Both Făgăraş Depression (a sub mountain erosive-accumulative contact depression), and Braşov Depression (a tectonic-erosive-accumulative inter-mountain depression) present favourable, but differentiated, conditions for the setting up of communities with old traditions in land use. On the sub-mountain hills, the piedmonts, glacis piedmonts, the majority of the communities have lands with mixed use: agro-pastoral and forest use. The communities on glacis, terraced glacis and terraces have agricultural differentiated functions (pastoral, orchard, fodder crops, cereals), and in the alluvial plain, the communities are more rare and they are specialized in agricultural crops.

6. Evolution of settlements and land use in Ţara Făgăraşului and Ţara Bârsei

Ţinutul Făgăraşului is documentary attested for the first time as *Terra Blachorum* (Country of the Romanians) in 1222. Only after 150 years, in 1372, the name *Terra Fugaras* (Ţara Făgăraşului) or *Terra Alutus* (Ţara Oltului). *Ţara Bârsei* is documentary attested for the first time in the 13th century. XIII. The name ţară has a historical significance of an entity with local and geographical autonomy (Prodan, 1963).

Many archaeological vestiges prove the beginning of the permanent peopling of these lands in *Neolithic* (ceramic Neolithic fragments were found in **Hălmeag**, in **Făgăraş)**, but the oldest Neolithic archaeological vestiges in the county are those in the Brasov Depression. in **Hărman** (Clupea, 1983). Furthermore, the latter ones are continued by the *bronze* and *iron* epochs, and this is a clear proof of the continuity and permanence of this human community.

The Dacian epoch is well represented in Făgăraş Depression, by **Cuciulata, Comana de Jos, Şercaia, Şinca Veche, Copăceni** settlements (Rotariu, 1979) and in Ţara Bârsei, in **Hărman,** attested by the famous *Dacian cup*

(Clupea, 1983). The archaeological diggings that were done at the foot of Făgăraş Mountains, in **Breaza** site**,** led to the discovery of the remainders belonging to a Dacian fortress, as well as a Dacian coin (exhibited at the History Museum in Făgăraş Fortress). In **Râşnov** shaped stones were discovered, one of them bearing the inscription **Cumidava.**

Fig. 2, The ruins of the Feldioara fortress, among the oldest ones attestation (1211-1225) of the Braşov Depression

The transition period to feudalism is attested by archaeological proofs found in **Hărman** swamp, as well as in the alluvial plain at the confluence of the Olt river with Homorod (Clupea, 1983). The first medieval construction built on the territory of Braşov County is the fortress with ovoid plan from **Feldioara** (1211-1225) situated on the 20 m terrace, at the border of the alluvial flood plain of the Olt river (Fig. 2). Initially it was the headquarters of the Teutonic knights, and with the spreading of the agricultural activities, it become a peasant fortress.

In this period (1235) the first documentary attestation of an urban space in Braşov County dates back: the settlement and fortress called **Corona**, in Braşov, and the following mentions even bear the name of the present city: "**Barasu**" (1252), "**Braso**" (1288). The first documentary mentioning of the rural settlements in the county are those of the villages of **Hărman** (the Roman fortified church, with embattled walls and bulwarks) and of the fishing areas in the neighbourhood as well and **Prejmer** (including the land used for pasture and cereal crops). These first documentary attestation of several villages in Ţara Bârsei are accompanied by lists with the taxes collected from the inhabitants of these communities. This gives

an accurate picture of the peasant occupations and of the size of the land on which they obtained incomes subject to taxation. The agricultural activities, besides the handicraft and carting activities, completed with custom taxes, offer an image of the economic strength of these settlements. Under such conditions, Hărman Fortress becomes, in the 15-16th century the most powerful peasant fortress at the border of Câmpul Frumos, and the lands extending to the Olt flood plains, have an agro-pastoral use.

Starting with the 13th century, the early fortress of **Breaza** was built, on the place of the former Dacian fortress, and, at the foot of **Măgura Codlei**, on the terraced glacis in the vicinity of Vulcănița, a fortified church was built, and, on a hill, another fortress was built (and from here, a large view towards the Braşov Depression was offered (Pietraru, 1976).

The village in Făgăraş are attested for the first time only in the documents of the Wallachian rulers in the 14-15th centuries, and then in the documents of the Principality Transylvanian (**Breaza** is mentioned in 1554; **Pojorta** on the other hand, was attested only in 1630 by Catarina of Brandenburg). Their estates, covering large areas towards the mountains, were also recognized, with agro-silvic use. New villages appear afterwards in the alluvial plain along the Olt, as their name demonstrates: **Comana de Jos, Veneția de Jos, Pârâu, Sâmbăta de Jos, Viştea de Jos, Ucea de Jos, Arpaşu de Jos, Porumbacu de Jos, in** Țara Oltului and **Dumbrăvița, Bod** etc. in Țara Bârsei. The old occupations of the inhabitants in the villages of Ucea de Sus, Lisa, Breaza and Pojorta, were land cultivation, animal breeding, bee-keeping, and they were mentioned in the fiscal documents for the inventory of the activities practiced by the inhabitants in the period 1721-1722 (it was mentioned that the inhabitants paid the tax annually, under the form of grains – rye and oat, leather and honey).

Another aspect of the evolution of the settlements and of land use is represented by the fact that all the villages on the terraces and the flood plain along the Olt river, with agricultural functions, are connected among them by old roads (Ungra, Comana de Jos, Veneția de Jos, Pârâu, Şercaia, Mândra, Beclean, Voila, Sâmbăta de Jos, Vişțea de Jos, Ucea de Jos, Arpaşu de Jos, Scorei, Augustin, Măieruş etc.). In the 18th- 19th centuries the villages „climb up" and more settlements appear on the glacises and piedmonts. These settlements got new functions as compared to the „lowland" settlements (Fig. 3), and therefore, they were followed by new settlements at the foot of the mountains, inhabited by people coming from the former ones (Lupşa, Comana de Sus, Veneția de Sus, Grid, Şercăița, Breaza, Lisa, Berivoi, Sâmbăta de Sus, Drăguş, Ucea de Sus, Crizbav,) which got agro pastoral and agro-silvic functions. The tax documents show the new handicraft occupations here, besides the traditional ones: wooden mills (waterfalls at the contact with the mountain and the raw material offered by the forests here)

and buckets for “vinarsit” (distillation of fruit for obtaining alcohol) connected with orchard and animal breeding on the fields situates on the piedmont (for example, it was mentioned that the inhabitants in Lisa used to pay 5 „creiţari” for each porl, for the acorn they collected from the mountain forests).

Fig. 3. Old agricultural terraces on the Hoghiz piedmont glacis

In the modern epoch these fields situated in the depression geosystems within the Curvature Carpathians or at the foot of Făgăraş Mountains, preserved the traditional structure of land use, even if the industrial activities started to appear as well In the second half of the 19th century, radical changer occurred: due to the collectivization of agriculture the fields cultivated with cereals and potatoes extended, while the natural meadows diminished (Fig. 4).

At the same time, the orchards extended over other areas than the traditional ones, and flax and hemp cultures formed continuous areas on glacises. Forced industrialization had as an effect a diminution and aging of labour force in agriculture, the change of the destination of certain fields (the case of Vitoria on the location of Ucea de Sus locality), or the degrading of large areas in the Olt flood plain, which became ballast-pits and access roads. The industrial activities were accompanied by an intense pollution of the environment in the depression ecosystems.

Fig. 4. Corn crops cover former pastures in Veneția de Jos.

Recent land use changes in Țara Făgăraşului and Țara Bârsei

At the end of the 20th century, the agricultural land use was mainly arable (cultivation of cereals for grains and fodder plants, vegetables and fruit-trees), and then pastures and hay fields. Forest areas in Făgăraş Depression could be added to these ones.

In the last decades, profound changes in the land use in the areas belonging to the rural communities in the depression area in Brasov county, as well as in the whole country. Depending on the natural conditions (especially landforms), about 82% of the agricultural fields were collectivizated, becoming group or state property. The changes in the land use that we referred to were caused by the changes in the property regime after 1990. This process (which is not over yet) had differentiated effects from one community to another.

The abandoning of the orchards (Fig. 5) and fodder crops, the diminishing of the agro pastoral occupations, and, on the other hand, the extension of aquaculture in the Olt flood plain, and also the leaving of the predominantly active population abroad, have caused significant changes in the land use, with impact on the environment factors. Our study points out cases of linear erosion intensification (replacing the area one) on glacis and piedmonts, in those areas where a change or reduction in the structure of flora in the forest areas, took place. In the Olt flood plain, covered periodically with its waters, many swamps with *Vaccinium oxycoccus, Orchys maculata etc.* And several eutrophic swamps (Turzun, Reci etc.)

became basins equipped for aquaculture, accompanied by changes in the hydric regime.

Fig. 5. Ravines replacing former orchards in Lisa

In the same way, as a result of the hydro technical works along the Olt and Râul Negru rivers, completed with the extension of the agricultural lands, the swamps disappeared, and humidity excess was removed by drainage. Locally, facieses with daffodils and forests with oak and common oak which extended on larger areas before, became protected areas (in the meadows in Ţara Făgăraşului and Piemontul Sohodolului) with a modified herbaceous layer, but with the differential species of *Lathyrus halersteinii,* next to *Calluna vulgari,* present on large areas.

7. Impact of the present land use on the environment factors

This geosystem situated within the Curvature Carpathians at the foot of the Făgăraş Mountains, has undertook new pressure as a result of the transition from the agro pastoral and forest use on the sub mountain hills, piedmonts and glacis piedmonts, to the intensive cultures (bilberry bushes) and equipment for aquaculture (trout mainly). In the same way, the erosion on of the soils on the alluvial plain, with fields situated on glacis, terraced glacis, terraces and flood plains has recorded an acceleration due to the transition from differentiated land use (pastoral, orchards, cereal crops, fodder crops) to monocultures.

In general, the changes that have occurred in land use over the last two decades refer to:

- Introduction or extension of certain agricultural crops which require changes in the hydric regime of soils and the alterite formations;
- Intensification of the frequency of mechanical transformation of the fields in which profitable cultures (for the local communities) were introduced (bilberry crops; decorative plants and tree nurseries) is considered to be responsible for the acceleration of the linear erosion processes;
- Abandoning of pastures, and, as a result, the neglecting of protection measurements by channelling of the water courses at the transition between the mountain and the depression space.

The previous analyses on the present geomorphologic processes in the Braşov and Făgăraş Depression (Cioacă, Dinu, 1999, 2003, 2005), showed us that practically, through normal evolution, or associated to the situations mentioned before, the risk of accelerating the geomorphologic processes or of associating more forms of manifestation than in the past occurs. In this way, irreversible degradation of the arable land is produced, in the areas where such processes activate and propagate.

The morphogenetic processes, especially those in the mountain neighbouring space, (frost-defrost alternation which diminishes the stability of the rocks) lead to the detachment of the blocks and their gravitational rolling, and by means of the reduction of the forest area, they lead to the intensification of the formation of the talus cones and the alluvial fans., to the movement on the slope of some materials, and this causes a reduction of the surface of agricultural land. The violent episodes frequently presented my mass media, in which the processes of the rapid transportation of the materials have catastrophic forms very often, would not have effect on the people if they did not have the „anthropic" component of the disaster: the destruction of material goods, even human lives losses.

Mostly affected were the villages which located at the emergence of the valleys from the mountain space, to the neighbouring depressions, where the activities connected with the cultivation of the plain, combined with exploitation of forests and animal breeding in the few clearings. It is obvious that the dynamics of the slopes can bring negative effects to the human activities, even if these are carried out far from the place in which geomorphologic processes with disaster character start. Recently, the high waters on 17th August 2002 formed in Poiana Mărului Mountains, on the little river basin of the Helbuş, accompanied by rapid mud flows, affected a part Vulcan locality, situated in the plain of the depression.

These are not the only examples, as the localities at the periphery of the mountains where changes of the land destination were recorded, were very often affected by rapid geomorphologic processes started inside the mountain area but also as the result of the changes in the techniques of processing of the soils and fields. We can mention the most recent cases: the floods from Măieruş, Apaţa,

Augustin and Hoghiz (2005), Dumbrăvița (2006), the mud flows from Crizbav (1990), Veneția and Comana (1995), the flows associated to land slides from Poiana Mărului (1997), Jimbor (1998) and Lueta (1991).

In this way, the *topographical factors* specific to the short mountain areas; *the geological factors*: mainly the lithological diversity and the rocks behaviours; *the climatic and hydrological factors*: large quantities of precipitation on small basins, thermal alternations and inversions that facilitate the superposing of snow melting with abundant spring precipitations that cause frequent high waters and *the anthropic factors*: surface exploitation of construction rocks facilitates the release of geomorphologic processes with high frequency, and very often with catastrophic character. From these geomorphologic risk factors, *mass movements (collapses, land slides, mud flows*) are those who can transport huge quantities of material during one single event.

The delimitation of the areas, within Făgăraş and Braşov Depressions, affected by collapses, land slides, mud flows, becomes therefore a prime necessity for the inventory, evaluation and mapping of the geomorphologic risk caused by the release of these phenomena, as a result of the changes in the land use (Cioacă, 1996).

The geomorphologic processes in the Olt flood plain have known spatial and temporal changes, as a result of human interference, mostly in terms of bank erosion. Flood plain sedimentation or sedimentation as a result of the exceptional high waters with a specific dynamics, lead to the appearance of new islets or the changing of the existent ones. In the hydrographical convergence sectors frequent floods occurred (one every two or three years) with effects on the flood plain of the Olt river, accompanied by works like: cutting off of channels between the meanders, deepening of the flood plain and the execution of dams made up of the materials resulted from the excavations. At the same time with the cease of these works (1989), an increase of phreatic water infiltration is noticed in the dammed areas. The new lower base level of the Olt river stimulated a new deepening phase of the tributaries which affected, through lateral erosion, the secondary dams.

Our study pointed out areas of specific impact on the environment factors:

- The following areas were declared critical areas from the point of view of water quality**: Bârsa River** (in the section downstream Celohart – Olt confluence); the **Olt River** (in the section downstream Racoş to Voila); **Vulcănița Channel** (in the section downstream SC Colorom –Hamaradia confluence); to these, uses affected by the use of pesticides and fertilizers with effect on the inappropriate quality of running surface waters, were added;
- Critical areas from the point of view of atmospheric pollution (for the chemical pollutants indicator, the most affected areas are the industrial zones: Râşnov-Codlea and Făgăraş-Voila, because of the agents Romacril, Colorom

Codlea and Făgăraş); for the gases resulted from the fuel burning, the following mobile pollution sources are noticed (Cristian, Codlea, Râşnov and Zărneşti) represented by the means of transport, polluting with carbon monoxide, hydrocarbons, nitrogen and sulphur oxides, lead particles;

Fig. 6. New construction material extraction and woodwork activities in Vlădeni (Braşov Depression) are accompanied by the degradation of former pastures.

- Critical areas from the point of view of soil degradation are those in which the pollution sources were represented by industrial residues deposition (Fig. 6) with the largest areas in Făgăraş, Zărneşti, Râşnov and Codlea, by the domestic residues (in Făgăraş, Zărneşti, but also Lisa, Şercaia, Hoghiz, Paloş etc.), by chimization of agriculture and areolar erosion (surface erosion in the localities situated at the foot of the Perşani Mountains (1200 ha); the most important areas with landslides are those in Râşnov, Breaza, Măieruş, at the border of the depression.

The platforms for depositing the residues that are present in the urban and rural localities, do not function according to the European laws and regulations. The pluvial water that fall over them are not cleaned, and eventually, they infiltrate in the soil. The platforms within the rural settlements are also very improper, most of them are functioning on agricultural land.

8. Conclusions

Our study has the character of an impact study, therefore it is an interdisciplinary study, required by the systemic analysis, which must be done by studying the impact and effects on the economic elements, institutional frame, culture, social structure and also on the environment. This study is based on the understanding of the causality relations that appear in the dynamics of the impact process, and therefore, a linear, strictly deterministic approach is not enough, and the evaluation should not include just one perspective, that is a sectorial vision.

In order to succeed an impact study on the environment factors, it is very important to establish the investigation limits, from the point of view of their extension, as well as the depth of the approach, and this will allow the orientation of the effort in such a way that, under the given conditions, significant long term results are obtained. The limitation directions refer to the dimensions of the impact, the duration of the time over which the effects are studies, the geographical area of propagation of the effects and the types of action.

The evaluation report of the ecologic impact of the anthropic activities must include a presentation of the affected environment (the data and analyses are proportional with the importance of the impact for that area and the ecological consequences of the proposed alternatives, with the lowest ecological impact.

Bibliography

CIOACĂ, A (1996), *Cartografierea riscului geomorfologic*, AUO, -Geogr., **VI**, p. 25-31

CIOACĂ, A, DINU, Mihaela (2002), *Pliocene-Quaternary Evolution in the contact area between Brasov Depression and the surrounding mountains,(Romania),* Geografia Fisica e Dinamica Quaternaria. Comitato Glaciologico Italiano, Torino, 24, pp. 3-14, 2 fig, Abstr., Rezumat, Italia.

CIOACĂ, A, **DINU, Mihaela** (2005), *Particularităţile resurselor reliefului din Depresiunea Braşovului şi valorificarea lor în contextul dezvoltării durabile,* Studia Universitatis Babeş-Bolyai, geographia, **1-2**, Cluj-Napoca, p 83 – 67, abstr., 2 fig.;

CLUPEA, Ion (1983) *Mic indreptar geografic*, Editura Vanea, Cluj-Napoca

DINU, Mihaela, CIOACĂ, A., (1997), *Modificarea arealelor de risc geomorfologic şi hidrologic ca efect al lucrărilor de corectare a albiei Oltului în Depresiunea Braşovului,* AUO-Geogr., **VI**, p. 47-52, 3 fig., abstr

PIETRARU, Şt. (1976), *Braşovul medieval* Anuarul Institutului de Istorie din Cluj, **XXVI**

POSEA, Gr. (1981), *Depresiunea Braşovului (Caracterizare geomorfologic*ă), Analele Univ.Bucureşti, seria-Geogr, **XXX**.

PRODAN, D. (1963), *Boieri şi vechili în Ţara Făgăraşului în sec. XVI-XVII*, Anuarul Institutului de Istorie din Cluj, **XII.**

ROTARIU, G. (1979), *Civilizaţia fierului la daci* Anuarul Institutului de Istorie din Cluj, **XXVIII**

SALVAN, Fl. (1996), *Viaţa satelor din Ţara Bârsei în Evul Mediu (sec.XII-XVII)*, Editura Academiei Române

* * * (1967), *Harta geologică a R.S.România, foaia Braşov, L-35-XX, sc. 1:200 000,* Bucureşti

* * * (1968), *Harta geologică a R.S.România, foaia Odorhei, L-35-XIV, sc. 1:200 000,* Bucureşti

* * * (1982), *Harta geomorfologică a R.S.România, foaia Braşov, L-35-XX, sc. 1:200 000,* Inst. Geogr. al Acad. Române (manuscris), Bucureşti.

* * * (1987), *Geografia României*, **III**, Edit. Acad. Române, Bucureşti, p. 211-213.