

GEO-SYSTEMS AND TYPES OF GEO-FACETS IN THE TRANSYLVANIAN PLAIN – TOOLS FOR DEFINING CULTURAL LANDSCAPES

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Abstract. The research of geo-systems reveals similarities between these specific geographic components and socio-economic and historic heritage cultural landscapes. Geo-systems are strongly related to natural components, but they have small but relevant human (anthropic) elements. (Geo)-facets represent subcomponents of geo-systems analyzed through ecologic perspective. The paper provides an analysis for the evolution and spatio-temporal variation of two climatic parameters (precipitation and evapotranspiration) and one hydrological parameter (the flown water volume) over a common period of time (1970-2007) in Ialomita.

Following several analyses and researches made in the Transylvanian Plain (central part of Transylvania), we reached the following two important conclusions: 1) geographic landscapes' *facets* could be premises of cultural landscapes' elements; 2) both natural and anthropized landscapes constitute the relevant character of the Transylvanian Plain; therefore, we try to point out the importance of (geo)-facets for CL elements defining.

1. *Facets of the palimpsest forest in Southern Transylvanian Plain.* The oak forests form a forest belt over the hills back or upper third of them and watershed (Pădureni – Papiu Ilarian – Grebenișu de Câmpie – Șincai – Bozed – Valea Stejărișului; Fig.1). We used for these forests the term of *palimpsest* because they relieve a cut of the old deforestation activities and the pastoral land use. They appear like a fragmented forest assembly, strongly affected by the nowadays agricultural practices on small patches.

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Fig. 1 - Palimpsest forests and transformation of hills view (N. Baci, 2008)

Following an analysis regarding the correlation between soil and forestry vegetation, the conclusion is that the process of deforestation began two centuries ago and phaeozemic soils preexisted. Such, we have a historic proof of an alternation natural meadows/forest/agricultural – main arable – practices/secondary meadows.

2. *Facets of anti erosion curtains.* The sixties represented a period of major anti erosive works, mostly against steep slopes accelerated erosion. It was a period of implementation of the allochthonous landscapes, anti erosion curtains as the first example. These works involved sunny slopes (South or Southeast exposure) correlated in the Transylvanian Plain with *cuesta* type slopes. The specific land use belonged to natural or secondary meadows, with relevant agro-pastoral activities – flock of sheep or cattle herd – where there were evident threats of release of the slope processes (Resmerita et al., 1968). The benefits of anti erosion works were quickly forgotten due to severe consequences on ecosystems; while most of riparian areas were transformed in arable land and well protected by erosion curtains, several xeric-mezophyte steppe species disappeared and entire slope ecosystems were affected. Nowadays, these curtains suffer strong anthropic interventions, as sheep overgrazing and installation of animal paths. Bushes are dominated by *Corylus avellana*, *Ligustrum vulgare*, *Cornus sanguinea*, *Prunus chamaecerasus*.

3. *Facets of meadows of the sunny hillsides* of the Southern Transylvanian Plain, with partially degraded secondary meadows through overgrazing. Overgrazing, as a negative aspect of the anthropic activities, is a complex phenomena, answering, on one hand, the livelihood economic needs, and being, on

the other hand, a result of the inertial agricultural practices in the Transylvanian Plain (especially in its southern part).

The gradual transition from cattle to sheep grazing after the Second World War caused an accelerated degradation of the secondary meadows, which still preserved steppe associations, especially on the sunny cuesta slopes. The xerophilic associations *Stipetum lessingianae* and *St. Pulcherrimae*, which dominated the upper third of the sunny slopes, were eliminated because of their high sensibility to grazing and they were replaced by *Festuca sulcata* and *Carex humilis*, more resistant to grazing and with bias for eroded or incipient eroded terrains.

An indicator of degradation is the sage brush (*Artemisia campestris*), in association with *Agropyrum intermedium* and *Calamagrostis epigeios*. The grasses are replaced by grazing-resistant legumes, such as *Dorycnium herbaceum*, *Medicago falcata*, and dicotyledons. The sectors dominated by this type of facet are common in the basins of Valea Largă, Frata, Ranta or Pârâul de Câmpie.

4. *Facets of cuesta's back meadows from the Northern Transylvanian Plain* contain associations with a strong mesophilic character, also including relict forest species, which indicate recent deforestations (of the last decades): *Mercurialis ovata*, *Anemone silvestris*, *Campanula persicifolia* etc. (Resmeriță et al., 1968). Other mesophilic associations contain mesophilic and meso-hygrophilic species: *Danthonia calycina* – *Agrostis canina*, found in landslide-microdepressions, including *Poa trivialis*, *Carex distans*, *C. Gracilis*, and *Agrostis alba*. A remarkable landscape transition from the southern to the northern sector of the Plain is made by *Festuca rubra*, a species that appears northward, once the Mureș – Someșul Mare watershed and the phaeozomic – luvisol pedologic border are crossed.

5. *Facets of pseudo-riparian vegetation* are unstable, appropriate for crop rotation (even if this is not a common agricultural practice in the Plain), and exposed to floods. Gleic soils and fluvisols support species of osier and white willow, in the association *Salicetum albae* – *fragilis*, *Agrostis phragmites* (in poorly drained valleys), and *Poa pratense*, *Dactylis glomerata* (in drained valleys), the latter showing superior green mass productivity (18 – 25.000 kg/ha), but with a modest quality.

6. *Facets of protected natural reservations in national patrimony*. The status of reservation in national patrimony permits the maintenance of a superior balance between the ecologic potential and the biologic exploitation. The establishment of these reservations in the Plain (tab. 1) effected the creation of “bastions” of natural vegetation, guiding principles in scientific analyses.

At least as the reservation of Săbed/Bozed is concerned, the condition of its *embryonic biostasis*, obtained after the plantations with scientific character and anti-erosion purpose of 1892, is endangered because of the post-WW2 deforestations, which reduced the number of species from 130 to 40. The rapid

instating of a balance between biologic exploitation and ecologic potential after its inclusion in the category of protected areas, as well as the elimination of any form of anthropic intervention, entitles us to keep for the Săbed/Bozed reservation the *biostatic facet* character.

Tab. 1 - The natural reservations in national patrimony in the Transylvanian Plain (Baci, 2004 after Ielenicz, 2000)

Reservation	Commune	Type	(Area)
Suatu I hayfields	Suatu	Floristic; xeric steppe vegetation (the endemism <i>Astragalus peterfii</i>)	9.2
Suatu II hayfields		Floristic; the xeric gymnosperm <i>Ephedra distachya</i>	
Știucilor (Pikes) Lake	Fizeșu Gherlii	Ornithological	26.0
Legiilor Valley	Geaca	Ornithological	13.5
The rushes of Sic	Sic	Ornithological	2.0
The Peony Reservation (two areas)	Zau de Câmpie	Floristic; preservation of the pratosteppe associations with <i>Paeonia tenuifolia</i>	3.1
The forest of Săbed/Bozed	Ceuașu de Câmpie	Forestry; anti-erosion plantation with 40 species (nowadays)	59.0
The Fărăgău I Lake	Fărăgău	Ornithological	35.0

7. *Facets of scientific reservations.* This category includes the Hădărenilor hillside (*The Butterfly Hill*), situated in the southwestern extremity, administrated by the Romanian Society for Lepidopterology, preserving a butterfly species – *Filatima transsilvanella* – along with species of xeric plants: *Salvia transsilvanica*, *Stipa lessingiana*, and *S. pulcherrima* (Schreiber et al., 2003).

8. *Facets of Pinus nigra and P. silvestris plantation.* Although the preferred species for plantation operations between two wars was *Robinia pseudacacia*, after the World War II, *Pinus nigra*, *P. silvestris*, *P. rubra* were widely used. This initiative created “the illusion” of reforestations through comparison the areas occupied by forest in 1897 – 9.5% and 2003 – 11.9% of the entire Transylvanian Plain territory.

The reason why people planted pine during the sixties – 1433 Ha – is complex: on the one hand, an anti erosion action on the slopes with important areas occupied by erodisoils and on the other hand equilibration of slopes which

protected the arable land in pseudo-riparian areas, that gained space against riparian eco-systems.

Xerophyl, natural meadows specific to sunny slopes are no longer able to reconstitute themselves, but the geo-morphologic equilibrium existent nowadays, the lack of anthropic intervention and the emergence of new cycles of evolution at the eco-systemic level create the image of a biostatic system, in an embryonic state. This geo-facies is common to cuesta slope, often developed in semicircle, and the torrential springs in the Northern and Central sector of the Transylvanian Plain.

9. *Northern orchards facets.* Ciresoia orchards area, with one southern extension to Chiochis, represents a good example of efficient land valorization, long time after changes were made to biologic exploitation. Cherry and apple (associated with plume) orchards offer a landscape distinction for Transylvanian Plain. Though soils are no longer characterized by fertility (luvosols, often gleic, and typical and gleic preluvosols), there is a clear balance between geo-ecologic components.

10. *Cereals facets on pseudo-riparian areas.* These are dominant facets in pseudo - riparian area, due to the process of transformation of riparian areas in arable lands during the '60 (Fig. 2), when a new systemic disequilibrium was created after less than a century, especially in Comlod river basin (a process following the lake drainage).

Agriculture lands are represented by maize (predominant), wheat, barley, rye (secondary), and gleicsoils and fluvisols create the pedologic support.

11. *Facets of agro-terraces.* As a result of agricultural practices or for anti-erosion reasons, agro-terraces subscribe to the category of abandoned lands or derived from their initial scope, of a complex type, summing different utilities, as vineyards or orchards, so they are easily included in the superior systemic category – geo-system. The development of vineyards in the North of the Transylvanian Plain, following the German influences in Lechinta – Teaca sector, or more recently, as a consequence of the “efficient agriculture land use” policies in the central-northern part, have had as associated process the agro-terracing: sunny cuesta slope and erodosols. In addition, bushes plantations in anti-erosion curtains from the middle of 20th century were realized at the same time with terracing works.

12. *Facets of viable lakes.* Facets strongly anthropized, this category is found inside the great rivers' basins of the Transylvanian Plain (Fizes, Paraul de Campie, Sarul or Sesul) and coincides with lacustrine units used for fishery (recreational or economic). It represents an example of man's systemic arbitrage, through lakes management and avoiding the *anastomization* process, quasi-present in the current conditions (climatic, and also due to land use).



Fig. 2 - The agriculture and landscape mixture as result of riparian changes (Comlod river) (Baciu, 2009)



Fig. 3 - The agro-terraces in the central part of Transylvanian Plain as a result of the former orchards fields (Baciu, 2009)

Related to ichtiofauna, we may suppose that a big part of the species are introduced by man, the autochthonous ichtiofauna of the Transylvanian Plain being poor; thus, *Cyprinus carpio*, *Lota lota* and *Ctenopharingodon idellus*, less *Stizostedion lucioperca* are the dominant species. Anthropic management and fish colonization determine the character of unbalanced, rhexistazic facet.

Conclusions

As a result of a long period of researches in the Transylvanian Plain we could conclude that these 12 types of (geo)-facets represent the main categories of CL and their important and relevant elements are the relevant elements of CL in the central part of Transylvania region.

References:

- Baciu, N. (2004)**, *Campia Transilvaniei. Studiu geoecologic*, Presa Universitara Clujeana, Cluj-Napoca.
- Baciu, N., Schuster, E., Stănescu, Carmen (2005)**, *Veränderungen der geografischen Landschaft in verschiedenen historischen Perioden in der SiebenbürgerHeide*, Studii și Cercetări, seria Geologie-Geografie, 10/2005, Muzeul Județean Bistrița-Năsăud, Bistrița.
- Csűrös, I. (1973)**, *Az Erdely – Mezőseg Elővilágarol*, Tudományos Könyvkiado, Bukarest.
- Ielenicz, M. (2000)**, *Geografia României*, Ed. Corint, București.
- Resmeriță, I., Csűrös, St., Spârchez, Z. (1968)**, *Vegetația, ecologia și potențialul productiv pe versanții din Podișul Transilvaniei*, Ed. Academiei, București.
- Schreiber, W. et al. (2003)**, *Analiza peisajelor geografice din partea de vest a Câmpiei Transilvaniei*, Presa Universitară Clujeană, Cluj-Napoca.

