LANDSCAPE ASSESSMENT IN THE REGION SOUTH – WEST OLTENIA THROUGH INDICATORS OF HUMAN PRESSURE

Mădălina BORCA

Banat`s University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania", Faculty of Agriculture, Timişoara, Romania
Calea Aradului 119, 300645 Timişoara, Romania, e-mail: mada_iordache@yahoo.com

Abstract. *The purpose of the study was to assess the quality of landscapes in the region South-West Oltenia through several ecological indicators of human pressure (environmental change, human pressure through non-agricultural lands, human pressure through agricultural lands, and human pressure through forests). The information used to calculate the indicators proposed in this study has been provided by the Romanian National Institute of Statistics. The achieved results led to the conclusion that, generally, the landscapes of the South-West Oltenia have a good quality in terms of human impact, being dominated by the natural element, excepting the Mehedinti County whose landscapes are in fragile equilibrium and Olt County whose landscapes are strongly anthropic. Two of five counties (Dolj and Olt) do not reach the optimum area of forest per inhabitant, as recommended by Food and Agriculture Organization of the United States (0,3 ha forest/inhabitant).*

.

Key words: *landscape, quality indicator, human pressure, South-West Oltenia, environmental change, forest, non-agricultural, agricultural.*

INTRODUCTION

At 20 October 2000, in Florence (Italy) was adopted the European Convention of Landscape, aiming to promote the protection, management and design of the European landscapes. This is the first and the singular international treaty exclusively dedicated to the multiple dimensions of the European landscape. The Member States of the European Council signed this convention coming into force on 1 March 2004. The convention take into account not only the landscapes considered as remarkable, but the ordinary landscapes or the degraded landscapes. In Romania, this convention was ratified through the Law No. 45/8 July 2002, published in the Official Monitor of Romania (Monitorul Oficial, part I, no. 536/23 July 2002, highlighting the fact that it is in accordance with article 74, paragraph 2 of the Romanian Constitution. Thanks to this treaty, the landscape acquires new meanings, being defined as "common European heritage" and ,,resource" [PĂTRU-STUPARIU, 2011; CĂLIN AND PĂTRU-STUPARIU, 2011].

Landscapes represent the materialization of the relation human-nature. These are the common result of the natural dynamics and of the human activities, showing through their physiognomy and physiology the state of the territories, the evolution of techniques and the human needs [DUMITRAŞCU, 2006].

MATERIAL AND METHODS

In order to reach the goal of this study, there were used several indicators of landscape assessment.

The indicator of environmental change (I_{ech}) has been calculated as *ratio between natural areas (forests, grasslands, hayfields, aquatic areas) and anthropic areas (arable areas, vineyards, orchards, buildings areas).* The more the natural areas dominate the anthropic areas, the highest value of this indicator is reached. Values lower than 1 indicate a strong anthropic influence. Values over 1 indicate the domination of the natural element. In this last case it must

be made the distinction between values closed to 1 (which indicate a fragile equilibrium) and values significantly higher than 1 (which indicate a net domination of the natural element) [PĂTRU-STUPARIU, 2011].

The human pressure through non-agricultural lands (P_{na}) is given (according to F.A.O. - Food and Agriculture Organization of the United Nations) by the *ratio between non-agricultural area (roads, buildings areas, non-productive lands) and number of inhabitants in the considered area*. The human pressure on environment through non-agricultural lands increases with the increase of surface of non-agricultural lands per inhabitant [PĂTROESCU ET AL., 2000 CITED BY PĂTRU-STUPARIU, 2013].

The human pressure through agricultural lands (P_a) is given by the *ratio between agricultural area and number of inhabitants in the considered area*. In establishing of the human pressure through agricultural lands it is taken into account the limit enounced by F.A.O. to maintain the environmental equilibrium, which is 0,4 ha of arable land/inhabitant, considered optimal in keeping a normal equilibrium between the natural components of the environment [8], but also there are considered the categories of land and landscapes established by F.A.O./UNESCO in "La Carte mondiale des sols" (1964) [NECŞULIU, 2007 CITED BY PĂTRU-STUPARIU, 2011]:

I). Territories *at the limit of relative equilibrium of the natural components of landscape* (< 0,40 ha/inhabitant);

II). Rural landscapes *moderately balanced and very low unbalanced* (0,41-1,00 ha/inhabitant) – characterised through an alternation of cultivated areas and areas with other employments (buildings areas, spots of forests);

III). Rural landscapes *strongly unbalanced* (1,01-2,00 ha/inhabitant) – characterised through exclusivity of agricultural crops, rarely with forest spots;

IV). Rural landscapes *very strong unbalanced* (>2,00 ha/inhabitant) – consisting of areas with intensive agriculture.

The human pressure through agricultural lands increases with the increase of agricultural surface per inhabitant [PĂTRU-STUPARIU, 2013].

The human pressure through forests (P_f) is given by the *ratio between forest area and the number of inhabitants in the considered area*. In establishing of the human pressure through this indicator it is taken into account the limit suggested by F.A.O. to maintain the environmental equilibrium: minimum 0,3 ha of forest/inhabitant [PĂTRU-STUPARIU, 2011].

The assessment of the landscapes in the region South-West Oltenia through the up presented indicators was made for the counties Dolj, Gorj, Mehedinți, Olt and Vâlcea. For calculations there were used the statistical data listed in table 1.

Table 1

Land use categories and population number in the counties of the region South-West Oltenia (2014) [7]

No.	Land use category	Surface (ha)				
		Dolj	Gorj	Mehedinți	Olt	Vâlcea
1	Forests	85308	274056	149884	57404	293915
2	Agricultural	585135	238800	293328	436515	242856
3	Arable	48856	98239	187910	390336	86857
4	Grasslands	69356	87212	81376	33038	106894
5	Hayfields	2976	41685	11388	556	32531
6	Vineyards	16875	4191	5845	7465	3622
7	Orchards	7368	7473	6809	5120	12952
8	Aquatic	20886	4493	18495	17970	12497
9	Buildings	30510	14497	11279	20025	11650
10	Roads	13536	8902	6610	11212	6857
11	Degraded and non-productive lands	6026	19426	13693	6702	8702
12	Number of inhabitants	650548	334819	259011	423352	365630

RESULTS AND DISCUSSION

The calculation of the ecological landscape indicators showed the values presented in table 2, according to which the landscapes of the studied counties were characterised.

Table 2

The values of the ecological indicators used to assess the landscapes of the counties of the region South-West Oltenia

No.	County	Iech	Pna	Pa	Pf	Landscape characteristics
1	Dolj	1,72	0,07	0,89	0,13	Net domination of the natural element; Landscapes *moderately balanced and very low unbalanced* (the limit enounced by F.A.O. to maintain the environmental equilibrium, which is 0,4 ha of arable land/inhabitant, is exceeded); The limit suggested by F.A.O. to maintain the environmental equilibrium – minimum 0,3 ha of forest/inhabitant – is not reached.
2	Gorj	3,27	0,12	0,71	0,81	Net domination of the natural element; Landscapes *moderately balanced and very low unbalanced* (the limit enounced by F.A.O. to maintain the environmental equilibrium, which is 0,4 ha of arable land/inhabitant, is exceeded); The limit suggested by F.A.O. to maintain the environmental equilibrium – minimum 0,3 ha of forest/inhabitant – is reached.
3	Mehedinți	1,23	0,12	1,13	0,57	Landscapes with fragile equilibrium; Landscapes *strongly unbalanced* (the limit enounced by F.A.O. to maintain the environmental equilibrium, which is 0,4 ha of arable land/inhabitant, is exceeded); The limit suggested by F.A.O. to maintain the environmental equilibrium – minimum 0,3 ha of forest/inhabitant – is reached.
4	Olt	0,25	0,08	1,03	0,13	Strong human pressure; Landscapes *strongly unbalanced* (the limit enounced by F.A.O. to maintain the environmental equilibrium, which is 0,4 ha of arable land/inhabitant, is exceeded); The limit suggested by F.A.O. to maintain the environmental equilibrium – minimum 0,3 ha of forest/inhabitant – is not reached.
5	Vâlcea	3,87	0,07	0,66	0,80	Net domination of the natural element; Landscapes *moderately balanced and very low unbalanced* (the limit enounced by F.A.O. to maintain the environmental equilibrium, which is 0,4 ha of arable land/inhabitant, is exceeded); The limit suggested by F.A.O. to maintain the environmental equilibrium – minimum 0,3 ha of forest/inhabitant – is reached.

CONCLUSIONS

The following conclusions have been established through this study:

- Considering the *indicator of environmental changing*, in the region South-West Oltenia the landscapes are net dominated by the natural element, excepting the Mehedinţi County with landscapes with fragile equilibrium, and Olt County with landscapes strongly affected by the human element.
- Considering the *indicator human pressure through non-agricultural lands*, for the landscapes of the region South-West Oltenia there were recorded low values which suggest a low human pressure on the environment from this point of view.
- Considering the *indicator human pressure through agricultural lands*, there was found that three counties (Dolj, Gorj, and Vâlcea) present landscapes moderately balanced and very low unbalanced, and two counties (Mehedinţi and Olt) present landscapes strongly unbalanced.
- Considering the *indicator human pressure through forests*, there was found that the landscapes of the Counties Dolj and Olt are *landscapes with insufficient forest surface*, under the value recommended by F.A.O. (0,3 ha/inhabitant), unlike the landscapes of Counties Gorj, Mehedinţi and Vâlcea.

BIBLIOGRAPHY

1. CĂLIN, IULIA-ELENA, 2011 – *Lacul Babadag şi aria limitrofă - Gestiune, evaluare şi prognoză peisagistică.* Teză de doctorat, Universitatea din Bucureşti, Facultatea de Geografie, Coordonator ştiinţific Prof. Dr. Ileana Pătru-Stupariu (*Lake Babadag – Management, assessment and landscape forecast.* PhD Thesis, University of Bucharest, Faculty of Geography, Scientific coordinator Prof. PhD. Ileana Pătru-Stupariu).
2. DUMITRAŞCU, M., 2006 – *Modificări ale peisajului în Câmpia Olteniei*. Editura Academiei Române, Bucureşti.
3. PĂTRU-STUPARIU, ILEANA, 2011 – *Peisaj şi gestiunea durabilă a teritoriului. Aplicaţii la Culoarul transcarpatic Bran–Rucăr–Dragoslavele*. Editura Universităţii din Bucureşti.
4. PĂTRU-STUPARIU, ILEANA, 2013 – *Modelarea structurală şi funcţională a peisajelor.* Curs universitar. Universitatea din Bucureşti, Facultatea de Geografie, Departamentul de Geografie Regională şi Mediu (*Structural and functional modelling of landscapes.* University Course, University of Bucharest, Faculty of Geography, Department of Regional Geography and Environment).
5. PĂTROESCU, M., TOMA, S., ROZYLOWICZ, L., CENAC MEHEDINŢI, M., 2000 – *Ierahizarea peisajelor rurale din Câmpia Română funcţie de vulnerabilitatea la degradare şi suportabilitate a presiunii umane*. Geographica Timisiensis, VIII–IX: 235-245.
6. NECŞULIU, R., 2007 – *Gestiunea socială a parcurilor naturale din România*. Rezumatul tezei de doctorat. Editura Universităţii Bucureşti (*Social Management of the natural parks of Romania.* Abstract of the PhD Thesis. Publishing House of the Bucharest University).
7. ***Online Database of the National Institute of Statistics, 2014.
8. ***Raport de cercetare Proiect TOGI - Instrumente, Ghiduri şi Indicatori pentru integrarea aspectelor de mediu în politicile agricole, forestiere şi de gestiune a apei în mediul rural: de la abordările top-down la implicarea comunităţilor locale. Institutul Naţional de Cercetare – Dezvoltare pentru Pedologie, Agricultură şi Protecţia Mediului (ICPA) Bucureşti (Research report of the Project TOGI, National Institute of Research – Development for Pedology, Agriculture and Environment Protection – ICPA Bucharest).