PEDOLOGICAL FACTORS, COMPONENT OF ARAD COUNTY RURAL AREA

FACTORII PEDOLOGICI COMPONENTĂ A SPAȚIULUI RURAL DIN JUDEȚUL ARAD

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Abstract: *Vegetation growing conditions (with hard impact on terrain production), together with environmental factors soil characteristics, represent a majour component with multiple manifestations due not only to its own proprieties but also to its depositing capacities for other environement factors influence. As agroecosystems element, the soil may favour productivity through a range of defined specific properties, such as: quantity, quality, equilibrium of nutritive elements, thermic and hydric regime, mineralogic composition, etc. These factors cognition present a considerable practical and theoretical importance. Approached issues refer to a 775.409 ha area of which 511.520 ha of agricultural terrains. The paper presents data referring to soil quality status in our considered area, as basic elements in ecological and technical functions definition of rural area pedological factors.*

Rezumat : *Între factorii de mediu şi condiţiile de vegetaţie determinante ale capacităţii de producţie a terenurilor, condiţiile de sol reprezintă o componentă majoră cu manifestări multiple, atât în ceea ce priveşte însuşirile proprii, cât şi cele de depozitor al influenţei celorlalte condiţii de mediu, înregistrate la un moment dat într-un anumit loc. Ca element al agroecositemelor solul poate favoriza productivitatea acestora printr-o seamă de însuşiri specifice definite şi studiate în decursul timpului, precum : cantitatea, calitatea şi echilibrul elementelor nutritive, regimul aerohidric şi termic, compoziţia mineralogică, etc, a căror cunoaştere prezintă o deosebită importanţă teoretică şi practică. Problematica abordată se referă la o suprafaţă de 775.409 ha din care 511.520 ha este reprezentată de către terenurile agricole. În lucrare sunt prezentate o serie de date referitoare la starea de calitate a solurilor dincadrul spaţiului luat în considerare, ca elemente de bază în definirea funcţiilor ecologice şi tehnice ale factorilor pedologici ai spaţiului rural.*

Key words: *factor, composition element, area, agroecosystem, rural*
Cuvinte cheie: *factor, componentă, spaţiu, agroecosistem, rural*

INTRODUCTION

Representing a well defined environment condition, having a wide variability in space, but being relatively stable in time, pedological factors, through their major components have on essential role in land quality characterization.

In time, conception upon soil and their function evoluate, displaying various modifications.

Now a day it is widely accepted the fundamental role of soil through its functions in biodiversity and climatic modifications, in environmental protection, economic and social development.

Based on these considerations the authors try to present supported by pedological and agrochemical studies data detained by OSPA Arad archive, some aspects that refer to

pedological factors as components of rural area.

MATERIALS AND RESEARCH METHODS

Approach issues refer to a 775.409 ha area of which 511.520 ha of agricultural terrain.

Ecopedological conditions research, data organizations and processing were made accordingly to ,, Pedological studies Ellaboration Methodology'', issued by ICPA Bucuresti in 1987, copleted by ,,Romanian Soil Taxonomic System (SRTS 2003)

RESULTS AND DISCUTIONS

Situated in the western part of Romania, Arad county lays from Apuseni Montains core to the subsidence and plain generated by Mures, Crisul Alb and Crisul Negru.

Arad county relief in a general view is characterized by the existence of relief forms variable proportional, set in steps starting from west to east and represented by : old deltas and flood plains (altitudes 80-85 m) semidrained plains (85-100m), foothills plains, plateaus and foothills, high hills, sub and intramountaineos depressions, as well as mountains reaching altitudes up to 1486 m (Vf. Gaina of Bihor Mountains) with specific geological and paleogeographical structures, linked to western Romania evolution in time and space (fig. 1).

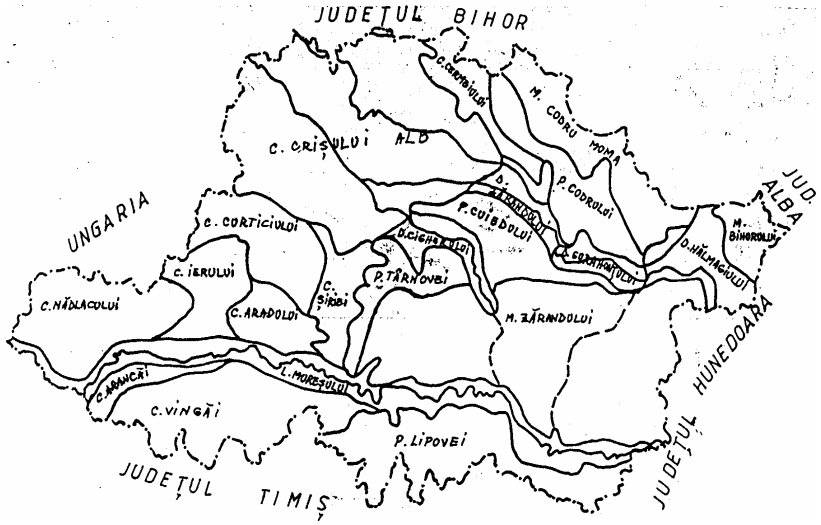

Figure 1. Main physical and geographical unities in arad County

Dominated in east and south-east by mountaineos units, of Codru Moma, Bihorului, Zarandului Mountains, our area is confined in the southem part by Lipovei Plateau, the mountaineos zone passing toward plain through a chain of peripheral hills, this plain advancing in a gulf-like shape toward mountain base (Zarand, Gurahont, Beliu depressions, etc). To already mentioned depressions we have to add a well defined corridor in the south (Mures corridor). This short descriptions shows a wide diversity of hydrogeographical, geological and geomorphological conditions.

Hydrographic net, represented by rivers, lakes, a complex system of canals (channels) for irrigation or drainage organizes its basins on both southern and northern banks of Mures

river and belongs to Danube basin.

Most important rivers are: Crisul Negru, Crisul Alb, Teuzul, Cigherul, Muresul and their tributaries. This hydrographic system that crosses our surveyed area is east-west oriented determined by relief configuration beeing (genetically) contemporary to this. The genesis of this perimeter complex took place in pliocen-cuaternar by Pannonic lake withdrawal and land rais.

Climatic (solar radiation, radiative balance, air circulation, precipitations), genetic factors in strong correlation to geographical position, altitude, active area character determine a moderate continental temperate climate with oceanic influences in Arad county, having sectorial characteristics situated between banatic and somesan climate.

Floristic particularities are emphasized by endemic elements, mediterranean termophile species widely represented, conferring a mosaic aspect to this area, that's why county's flora is classified in East Carpathian province (dacic) Codru-Zarand-Trascau district, and West Plain county.

The vegetation is characterized by silvosteppe and highly antropic modified forest, formation predominance (associated on small area with even steppe).

As a consequence of relief and pedoclimatic conditions arable area gathers 68,14% of total agricultural acreage, respectively 44,9 %, of total county acreage (775.409 ha, see tab.1).

Table 1

Use cathegory distribution in main relief forms

Relief	Arable		Pastures and hayfilds		Vignards and orchards		Agriculture		Forest		Other		Total	
meadow and low plains	ha	251701	ha	59689	ha	300	ha	311410	ha	30178	ha	13707	ha	355295
	%	72.3	%	38.9	%	3.1	%	60.8	%	14.3	%	26.5	%	45.8
high plains and terraces	ha	61455	ha	11978	ha	600	ha	74033	ha	9647	ha	12000	ha	95680
	%	17.7	%	7.8	%	6.1	%	14.7	%	4.5	%	23.2	%	12.3
hills and teraces	ha	33953	ha	45646	ha	8580	ha	88459	ha	77928	ha	10000	ha	176387
	%	9.8	%	29.8	%	87.5	%	17.2	%	36.7	%	19.4	%	22.7
mountains and depressions	ha	1215	ha	36082	ha	321	ha	37618	ha	94429	ha	16000	ha	148047
	%	0.3	%	23.5	%	3.3	%	7.3	%	44.5	%	30.9	%	19.2
Total	ha	348324	ha	153395	ha	9801	ha	511520	ha	212182	ha	51707	ha	775409
%		100		100		100		100		100		100		100
%		44.93		19.78		1.26		65.97		27.36		6.67		100
%		68.10		29.99		1.91		100		-		-		-

Pasture (lawn) acreage covers 29.9% of total agricultural area, distributed on main relief formations as follows: 38.9 % in flood, and low plains 7.8 % in high plains, 29.8% on hills, 23.5 % in mountains and mountainous depressions.

Orchards and vineyards cover only 1.9 % of total agricultural area.

Forest fund is relatively well represented covering an area of 27.4% of total County surface. Their distribution on relief formations is as it follows: 14.3 % in flood and low plains, 4.5% in high plains, 36.4 % on hills and 44.5 % in mountainous zones.

Most large forest acreage is met in Codru Moma Mountains, which is quite totally covered with forests (His name tells it all). This region exhibits its specific and very few modified mountaneos forest landscape. This is the reason why in this region was constituted as Nature Reservation of Moneasa. This reserve covers an area of 6273 ha and represents one of very few European forest covered carsts (a relic that asks action to protect and preserve it).

Terrain use intensity reach almost maximum land resources parameter values. Agricultural terrains cover 66% of total surface of which 68.1% is implied various activities specific to cereal, technical plants growing. This percentage is due to improvement works developed at the and of the XVIII th century when water courses (of Crisul Alb, Crisul Negru,

Teuz, Cigher rivers and their tributaries) were regularized diminishing drasticly marshes area (which was broadly spread) and reclaiming arable land.

As a consequence, soil cover fundamental geographical characteristics in our research area follows the same step distribution as relief or climate. Pedogenetic factors interaction generate a numerous soil population with evolving specific characteristic.

Accordingly to Romanian Soil Taxonomy System (SRTS 2003) we identified in our area 18 classes and 23 Soil Types (table 2 and 3) in which we discriminate numerous detailed cathegories.

Table 2

Main types and soil associations in Arad County,
(hectares and percentage of agricultural terrain)

Nr. crt.	FAO/UNESCO 1988	ARAD	
		Ha	%
1	Leptosol	6650	1,30
2	Regosol	23581	4,61
3	Arenosol	2353	0,46
4	Fluvisol	43684	8,54
5	Chernozem	121857	23,82
6	Phaeozem	33938	6,63
7	Rendzic Leptosol	409	0,08
8	Humic Cambisol	1637	0,32
9	Dystric-Humic Cambisol	205	0,04
10	Eutric Cambisol	27212	5,32
11	Dystric Cambisol	7570	1,48
12	Haplic Luvosol Chromic	53581	10,48
13	Luvisols	68443	13,38
14	Planosol	6394	1,25
15	Cambic Podzol	153	0,03
16	Haplic Podzol	205	0,04
17	Vertisol	60462	11,82
18	Gleysol	12328	2,41
19	Stagnic Luvisol	4041	0,79
20	Solonetz	23416	4,58
21	Histosol fără Folic Histosol	205	0,04
22	Strongly eroded phases	10588	2,07
23	Anthrosol	2608	0,51
	Total	**511520**	**100**

Of total agricultural acreage in surveyed area, we find 30.53 % Kernozems, 25.11 % Luvisoils, 14.91 %, Protisoils, 11.82 % Pelisoils, 6.80 % Cambisoils, 4.58 % Salsodisoils, 3.20% Hidrisoils, 2.58% Andisoils, 0.30 % Umbrisoils, 0.07 % Spodisoils and 0.04 % Histisoils.

Of total forest acreage in surveyed area, we find 47,79 % Luvisoils, 46,68 % Cambisoils, 2,39 % Protisoils, 1,46 % Hidrisoils, 1,41 % Kernozems, 0,15 % Spodisoils , 0,10 % Pelisoils and 0,02 % Umbrisoils.

Table 3

Main types and soil associations in Arad County,
(hectares and percentage of forests)

Nr. crt.	FAO/UNESCO 1988	ARAD	
		Ha	%
1	Leptosol	1273	0,25
2	Regosol	170	0,03
3	Arenosol	-	-
4	Fluvisol	3628	0,71
5	Chernozem	743	0,14
6	Phaeozem	1443	0,68
7	Rendzic Leptosol	806	0,38
8	Humic Cambisol	42	0,02
9	Dystric-Humic Cambisol	-	-
10	Eutric Cambisol	87907	41,43
11	Dystric Cambisol	11140	5,25
12	Haplic Luvosol Chromic	12116	5,71
13	Luvisols	89286	42,08
14	Planosol	-	-
15	Cambic Podzol	-	-
16	Haplic Podzol	318	0,15
17	Vertisol	213	0,10
18	Gleysol	2864	1,35
19	Stagnic Luvisol	233	0,11
20	Solonetz	-	-
21	Histosol fără Folic Histosol	-	-
22	Strongly eroded phases	-	-
23	Anthrosol	-	-
	Total	**212182**	**100**

As a result of this huge physical, geographical, soil embedded characteristics diversity, as well as of anthropic interventions developed in time, soil productivity present a large variability in space and time.

Based on excepted pedological and agrochemical studies data from OSPA Arad archive and processed accordingly to Pedological Studies Elaboration Methodology (ICPA Buc 1987) and to other updated standards by MAAP 223/2002 Order, agricultural terrain in mentioned area were distributed in the following pretability classes in "Arable" land use category as it follows:

1. No restriction or limitations terrains (land evaluation works between 81-100 points). These terrains or represented by Kernozems and cambic Kernozems (tipical, freatic-wet, moderate and low gleyic). This terrains require only correct soil preparation (agrotehnic) adapted to crop assortment and relief characteristics.

2. Low restriction and limitation strains (land evaluation works between 61-80 points). Due to sandy low texture, low alkaline acid reaction, periodically humidity excess (38.70% of considered area respectively 197.958 ha).

3. Average limitations and restrictions terrains (41-60 points) representing 36.46 % or

186.10501 ha in area. It is Represented by low or moderate acid reaction, with periodically stagnant water regim of precipitations origin, low or moderats erosion affected.

4. High restrictions and limitations terrains (marks: 21-40 points).This cathegory covers 70%, respectively 39387 ha and includes halohidro and hydromorphic soils with unfavorable phyisical, hydrophyisical and chemical-physical properties.

5. Severe limitations and restrictions terrains (works 1-20 points) Gathers soils with taff and excessive erosion , with landslides, excess of stagnant humidity, representing 3-5 % respectively 17.903 ha in checked area.

6. Very severe limitation and restriction terrains (not fit to agriculture). In this case we encounter excessive and strong eroded terrains with deep erosion formations, with bare hard rock, situated on highly inclined slopes, representing 2.64 % respectively 13.504 ha.

CONCLUSIONS

Specific physical and geographycal conditions met in surveyed area determined extremely diverse soil cathegories formation; from sandy to loamy , from alkaline to highly acid, from low humic and nutritive elements constant, to equilibrate content soils.

Despite an apparently good natural ecological potential we quality soil quality general situation as unsatisfactory : most of acreage is affected by one or more limitative a restrictive factors.

Generally land use distribution is consistent to pedoclimatic conditions nature presenting balanced structure on most area. However not all time land exploitation fit to durable land resources management.

Applied technological systems had a vigorous impact on soil compactuess progression and soil profile limitation due to very a compact soil layer (20-35,45 cm) creation .

Their presence, even on most fertile soils, leads to productivity decrease and costs raise.

Research area, component of South-West Development Region, is a county with solid rural development potential and resources. It is connected to important projects and programs in rural amenity and development sustained both by EU and Romanian Government , through governmental institutions or agencies which contribute to infrastructural development in various activity range of mentioned area.

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