QUANTITATIVE AND QUALITATIVE ASSESSMENT OF SOIL RESOURCES IN THE ARANCA PLAIN

L. NIȚĂ [1], K. LAȚO [1], Simona NIȚĂ [1], Alina LAȚO [1], Casiana MIHUȚ [1], Anișoara DUMA COPCEA [1]

Banat`s University of Agricultural Science Timișoara, Faculty of Agriculture, str. Calea Aradului, no. 119, zip code: 300645,Timișoara, tel.:0040256277015, fax: 0040256200296
Corresponding author: Niță Lucian, e-mail: lucian_nt@yahoo.com

Abstract: *Evaluation of soil resources requires detailed study of all the factors that contributed to their formation and realization that although these seem to be inexhaustible, they are limited in terms of quantity and quality. This paper aims soil resources inventory and classification of Plain Aranca a very important area in terms of overall economic and agricultural especially so based on accumulated scientific support can be carried strategy and sustainable development of the projects. The studied territory has a single unit of relief, the plain, in the form of a large alluvial area of subsidence and ramble, on which there are many abandoned streambeds, representing the old courses of the Aranca River and its tributaries. The influence and action in time of the pedogenetic factors (relief, rock, climate, hydrology), as well as the human intervention through the important hydro ameliorative works that started more than two hundred years ago, determined the existence of a soil cover with a sharp complexity and diversity.*

Key words**:** *soil resources, evaluation, quantity, quality, Aranca Plain*

INTRODUCTION:

The studied territory has a single unit of relief, the plain, in the form of a large alluvial area of subsidence and ramble, on which there are many abandoned streambeds representing the old courses of the Aranca River and its tributaries.

The impact in the end of pedogenetic factors (relief, rock, climate, and hydrology) as well as human intervention through hydro-ameliorative works started over two hundred years ago has resulted in a soil cover of high complexity and diversity.

MATERIAL AND METHODS

The low plains covered by fluvial lacustrine deposits are the lowest sector of the Banat area. They are relatively recent, drained by a series of rivers with permanent regime. The very mild slope and local or general subsidence have caused the coverage of the loessoid deposits and of older alluvia with recent ones or with very finely textured deposits of lacustrine origin (Figure 1).

Until the 18th century, the rivers had no fixed riverbeds, and the plain functioned as a wide marsh area with rare sand banks.

In this paper we aim at presenting a panorama of the soil cover in the Aranca Plain, its yielding potential, fertility limiting factors, and the main problems arisen by the valorising of the soil resources in the area we studied.

Interpreting data, characterising the natural frame, analysing fertility-limiting factors, as well as upraising agricultural lands were carried out according to the “Methodology of Soil Study Development” (vol. 1, 2, and 3) and to the “Romanian System of Soil Taxonomy” developed by the I. C. P. A. Bucharest in 2012.

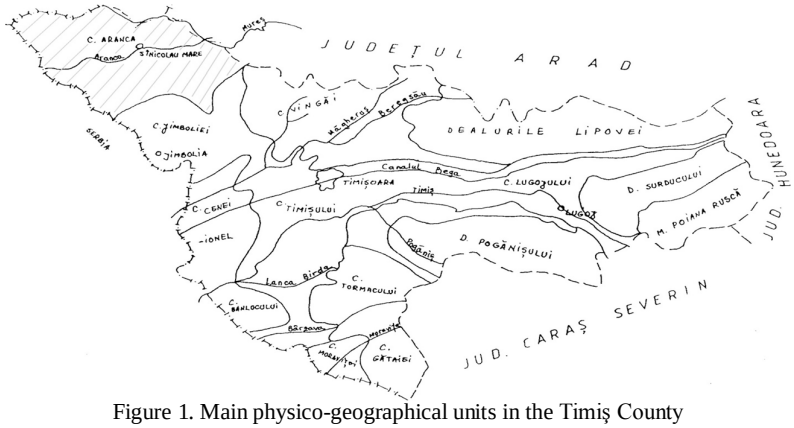

Figure 1. Main physico-geographical units in the Timiş County

RESULTS AND DISCUSSIONS

1. Soil Inventory (Soil Classes and Types)

Most information concerning the soils in the Aranca Plain can be found in the soil studies of the O. S. P. A. Timişoara (partially published) as well as in the field notes and measurements of the research team of the Banat's University of Agricultural Science and Veterinary Medicine of Timişoara, Romania. Since these studies and observations were made over several years, when there were several soil taxonomic systems, the names of soil units and classes in this paper corresponds to the SRTS 2012. After synthesising data, we could present them as tables related to the studied area.

The range of the soil classes and types is varied and it is determined by soil development factors, as follows:

Alluviosoils, identified in the Mureş River and Aranca Canal (an ex-branch of the Mureş River) flooded meadows, cover 15.69% (Table 1) of the total agricultural land: they are young soils in evolution (table 1).

Chernozems have an important share, representing almost 26% of the total agricultural lands: they are very fertile evolved soils with a medium-fine texture, with a high content of humus and of other nutrients.

Table 1

Soil classes and types in the Aranca Plain

Soil class	Soil type	Aranca Plain	
		Area	
		ha	%
Protisoils	Alluviosoil	8,961	13.42
Chernisoils	Chernozem	16,998	25.46
	Phaeozem	1,314	1.97
Cambisoils	Eutricambosoil	2,916	4.38
Vertisoils	Vertosoil	17,662	26.46
Hydric soils	Gleyosoil	3,355	5.03
	Stagnosoil	1,842	2.75
Salsodisoils	Solonetz	1,061	1.59
Soil associations		12,639	18,94
	TOTAL	**66,748**	**100**

Cambisoils are represented by a single type of soil, eutricambosoil, which covers 2,916 ha of the administrative territory of the Commune Dudeştii Vechi and of the town Sânnicolau Mare.

Hydric soils cover 5197 ha, i.e. 7.78% of the total of agricultural lands: they cover plane areas of the Aranca Plain and the flooding meadows of the Mureş River and of the Aranca Canal.

Solonetz cover almost 2% of the agricultural lands we analysed (Table 1).

2. Soil Quality

To characterise the quality of the lands in the Aranca Plain, we needed to analyse the mat the level of each administrative territory: we could thus point out the features of the soil genesis processes. Since the use category ***arable*** is the most ***valuable***, we treat below only the soils in this category.

The analysis of the data at the level of administrative units points out the following:

- In the commune of Beba Veche, located in the Aranca Plain, a small percentage of the soils qualify in the 1st quality class (9.37%); the largest areas classify as 2nd and 3rd quality classes, i.e. a total of 4,473 ha;
- In the commune of Cenad, the distribution almost equals that of the commune of Beba Veche from the point of view of soil quality;
- The commune of Dudeştii Vechi, which includes the commune of Valcani (ex-village of the commune of Dudeştii Vechi), has soils that qualify as 3rd and 4th quality classes because of the vertosoils and tine-texture soils;
- In the town of Sânnicolau Mare, the distribution of the soils depending on their quality is relatively even, the largest areas qualifying as 2nd and 3rd quality classes.

Table 2

Classification of arable lands into quality classes per administrative territories (ha)

Administrative territory	Arable lands (ha)	1st class (81-100 pts.)	2nd class (61-80 pts.)	3rd class (41-60 pts.)	4th class (21-40 pts.)	5th class (0-20 pts.)
Beba Veche	7,793	725	1,987	2,486	2,509	86
Cenad	6,504	351	2,100	1,971	1,984	98
Dudeştii Vechi (including Valcani)	16,257	1,431	1,609	6,096	6,454	667
Sânnicolau Mare	10,668	416	5,288	3,754	917	293
Sânpetru Mare (including Saravale)	15,539	2,859	5,268	4,522	1,694	1,196
ha	56,761	5,782	16,252	18,829	13,558	2,340
%	100	10.18	28.64	33.17	23.89	4.12

3. Situation of the Land Fund

In the Aranca Plain, the structure of the land fund is determined first by the natural landscape and then by the degree of social and economic development. To analyse the situation of the studied area, we used data from each commune. The situation of the land fund of the five administrative territories was taken from the Timiş Office for Cadastre and Real Estate Publicity for the year 2006.

Table 3

Classification of arable lands into use categories per administrative territories (ha)

Locality	Arable lands	Grasslands	Haymaking field	Vineyards	Orchards	Total agricultural lands	Total non-agricultural land	Total
Beba Veche	7793	976	3	16	30	8818	587	9405
Cenad	6504	728	43	4	104	7383	1108	8491
Dudeştii Vechi (including Valcani)	16257	2715	36	40	14	19062	1502	20564
Sânnicolau Mare	10668	1607	47	12	355	12689	1214	13903
Sânpetru Mare (including Saravale)	15539	3084	154	8	11	18796	1610	20406
ha	56761	9110	283	80	514	66748	6021	72769
% of agricultural land	85,04	13,65	0,42	0,12	0,77	100	-	-
% of total lands	78,00	12,52	0,39	0,11	0,71	-	8,27	100

*Source: O. C. P. I. Timiş

CONCLUSIONS

Text After we carried out our study of the Aranca River Plain, we can draw the following conclusions concerning the natural frame of formation and evolution of this area:

- morphologically, the relief is represented by a succession of depressions formed by constitution subsidence after physical maturation of argyle deposits;

- the area studied is located in the hydrographical basin of the Aranca River, i.e. in the Aranca River drainage system.

The varied natural conditions produced a wide range of soils grouped into 6 taxonomic groups with 9 types of soil showing the multitude of pedogenesis processes in the studied area. Of the total area under study, about 25% are covered by soils from the chernosoil class (chernozem and phaeozem) and 26.46% are covered by vertosoil, which points to the impact of vertic processes.

The qualitative analysis points out small differences in the studied area. Most arable lands qualify for the 2nd (28.64%) and 3rd (33.17%) quality classes, while the smallest shares belong to the 1st and 4th quality classes.

The structure of the land fund per agricultural use show that the largest share belongs to agricultural lands 78%, followed by grasslands 12.52%. The other use categories total 9.48%.

BIBLIOGRAPHY

1. L. NIŢĂ, V. D. MIRCOV, CASIANA MIHUŢ, SIMONA NIŢĂ, L. DANCEA - The soil cover Aranca Plain in relation with the environmental and anthropic factors - Research Journal of Agricultural Science vol. 42 (3) Agroprint Editorial Timişoara, ISSN 2066-1843 pag. 265; 2010;
2. MUNTEANU I. – On some problems of soil-Soil Science studies, vol XXIV, no. 1, p. 19-32; 2000;
3. FLOREA N., MUNTEANU I. – Sistemul Român de Taxonomie a Solurilor (SRTS 2012), Ed. Sintech Craiova 2012;
4.ŢĂRĂU D., LUCA M. – Panoptic al comunelor bănăţene din perspectivă pedologică, Ed. Marineasa Timişoara, 2002;
5. * * * - Arhiva OSPA Timişoara
6. * * * - Arhiva OCPI Timişoara
7. * * * - Methodology development including soil studies, vol I, II and III, ICPA, 1987, Bucharest