THE ROLE OF CADASTRAL INFORMATION IN THE MANAGEMENT AND LAND USE FROM TIMIS COUNTY

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Abstract: *In the context of the current financial crisis from Romania that affected and continue to affect the agricultural sector and taking into account the importance of livestock and their access to available pasture areas (OU 34/2013), in both the public sector domain and private sector of the administrative-territorial units, the cadastral information has a major role in the National Register of Holdings (RNE), according to the Order of the President of the National Sanitary Veterinary and Food Safety Authority no. 40/2010. Through its economic function, cadastre is an important tool in achieving the Romanian Constitution that the State shall ensure exploitation of natural resources in accordance with national interests, protection and recovery of environment and maintaining ecological balance, creating natural conditions for quality of life. The research theme aims to highlight the role of cadastral and soil information in achieving informational system for agriculture and forestry (HG 695/2006) which would constitute the most appropriate technical and scientific ways of managing the economic potential of lands, to conclude partnerships, substantiation of projects to ensure sustainable development of rural areas.*
The studied area is about 869 665 ha of which 693 417 ha is agricultural land (29 535 ha grassland and 124 461 ha pastures). For complete and systematic knowledge of the lands and carrying out a unified system of technical, economic and legal evidence, it must be known all the details about quality.
The research of the ecopedologic conditions was made according to "The methodology of elaborating of pedological studies", vol. I, II and III elaborated by the ICPA Bucharest in 1987, completed with specific elements from the Romanian System of Taxonomy of Soils (SRSTS-2012).
Representing a well-defined condition with a high variability in space but relatively stable over time, pedological factors, through the major components, are essential in characterizing certain areas of land.
Certainly, knowledge of natural conditions and the ecological potential of land from specific area for various utilities and some cultures, have an economic and social importance for both large and small farm producers, but especially for central and local government for the programs PNDR and PNDL at territorial administrative units level.
Key words: *informations, land, assessment, ecological, soils, cadastre map*

INTRODUCTION

Traditional activity and branch of the national economy, agriculture is the main supplier of food so that can ensure food security of the nation, and raw materials for light and food industry and an important generator of new landscapes.

On the other hand, the development of agricultural economy is influenced or caused by a complex of natural, socio-demographic and economic factors that will influence how agricultural use of land, the geographical distribution of agricultural production and the regional structures of agricultural landscapes.

Through its role and functions, agriculture is a major user of natural resources, with disproportionate impact on the environment, which for its long-term stability depends on sustainable resource base.

Agriculture depends primarily by agricultural land and, to some extent, the productive capacity of the land depends on how agriculture use the land, soils, respectively. The use of

agricultural land by incorrect or incomplete technology seriously affects, both quantitatively and qualitatively, not only productions but especially soil resources.

The soil is studied in the complexity of natural conditions (climate, relief, vegetation, rock, groundwater, age) plus human productive activity.

Given these considerations, the present work tries to present some aspects regarding the use of information in making quality cadastre (economic), information gained in pedological studies and deposited in the archives of OSPA Timisoara, most of them on classic support, based on SPED information system (used at OSPA Timisoara since 1988) and BDUST-B system implemented by ICPA Bucharest.

MATERIALS AND METHODS

The area of researched space is about 869 665 ha of which 697143 ha is agricultural land (29 535 ha grassland and 124 461 ha pastures), in the public and the private domain of territorial administrative units (ATU) in Timis County (table 1).

Table 1

Surfaces structure for the main usage categories

Specification	Arable	Pasture	Hayfield	Vineyard	Orchard	Agricultural	Forest	Other	Total
Timiş (ha)	529 242	124 552	29 535	4 695	9 119	697143*	109 057	63 465	869 665
%	60,85	14,33	3,40	0,54	1,05	80,17	12,53	7,30	100,00
%	75,91	17,86	4,24	0,68	1,31	100,00	-	-	-

*Ord.MADR 278/2011 the achievement of national and county for soil-land system monitoring in agriculture

These samples were investigated in relation to environmental factors, natural or man-made change, which makes the existence, together forming units of homogeneous ecological area (TEO) with the specific suitability or different technological requirements.

The research of ecopedological conditions was made according to "Soil Survey Elaboration Methodology" (Vol. I, II, III) developed by ICPA Bucharest in 1987, supplemented by specific elements of Romanian System of Soil Taxonomy (SRTS - 2012).

Analyzes and other determinations were carried out in the research laboratories of the ,,OSPA-USAMVB,, from Timişoara, 119 Calea Aradului Street, LI 1001/11.25.2013, certified laboratory RENAR, according with National Standards and Rules approved by the Romanian Standardization Association.

Certainly, the timeliness and accuracy of pedological information for the foundation of soil weighted average grades for classification of land in quality classes and to substantiate the situation at the county level of soils affected by different natural processes and / or anthropogenic or degraded, depend in good measure by the new soil studies available, the following situations are distinguished:

- Appropriate studies performed after 2002, for a total of 15 local government units (ATU) in the area of 147 123ha, or 21.10%;
- Studies conducted between 1988-2001, a total of 46 local government units (ATU) in the area of 396 078 ha, or 56.82%;
- Studies conducted between 1980 - 1987 (age range 23-30 years), a number of 21 local government units (ATU) in the area of 153 942 ha, or 22.08% of the agricultural area.

RESULTS AND DISCUSSIONS

Situated in the western part of Romania, between the coordinates 20˚16' (Beba Veche) and 22 ˚ 23' (Poieni) east longitude, 45˚ 11' (Lăţunaş) and 46˚ 11' (Cenad) north latitude, Timiş County have an area of 869 665 ha is one of the largest counties (representing 3.6% of the

country area) and is also the county with the longest course and the highest percentage channeled surfaces drained and drained.

The territory is crossed from east to south - west by the Bega, Timis and Beregsău rivers and its tributaries: Timişiana, Pogăniş and Bârzava. In the north its course from east to west the arm Aranca, the old course of the Mures.

Timis county landscape is characterized by a great diversity of landforms, generally related to the genesis and evolution of the entire Carpathian-Danubian relief.

The morphology of Timis county can see three distinct areas (Fig. 1):

- The eastern, the highest consisting of the northern branches of the Poiana Rusca Mountains,
- central sector, consisting of hills and piedmont plains,
- the west sector, the lowest altitude plains formed by subsidence and meadows.

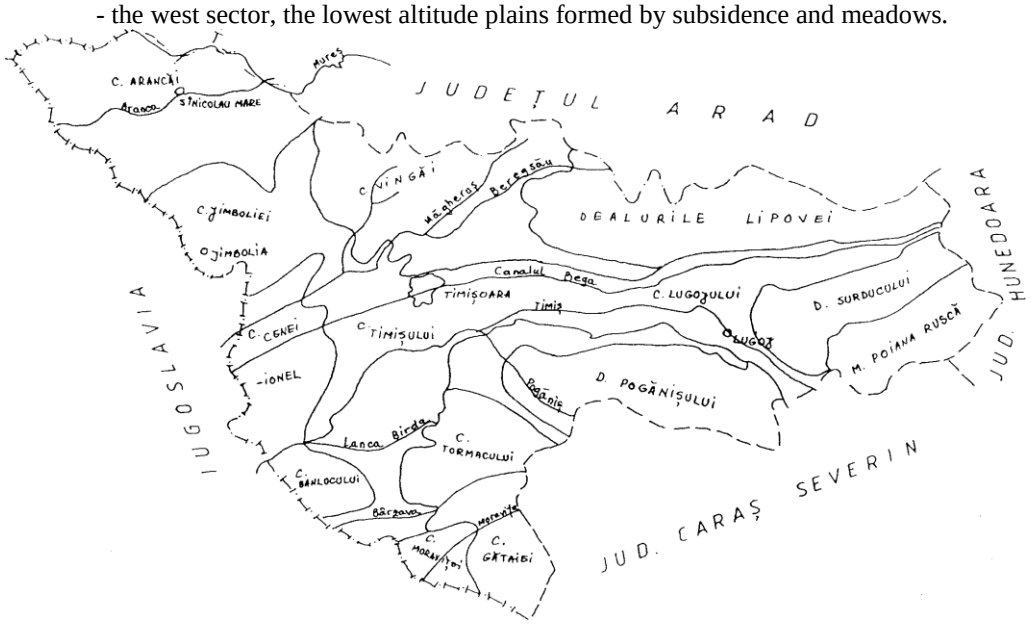

Figure 1. The main physico-geographical units of Timis county

Due to its geographical position, the considered area have a great diversity of landforms: the meadows and ancient deltas (with numerous relict courses and altitudes of about 86 m), the plains drained (large overlapping spreading cones placed on a complex subsidence with altitudes of 80-100 m), piedmont plains (with alluvial or wind deposits), plains and foothills, high hills, in and intermountain depressions and elevations slightly lower mountains up to 1374m (Pades peak).

As a result of interaction of pedo-genetical factors, resulted in a large population of soils (Fig. 2) with specific characteristics evolving with agricultural land productivity that varies from place to place, the distances.

This diversity determines both the major features of climate and its local nuances, this first character specifics of an area of interference with the oceanic and continental influences Mediterranean.

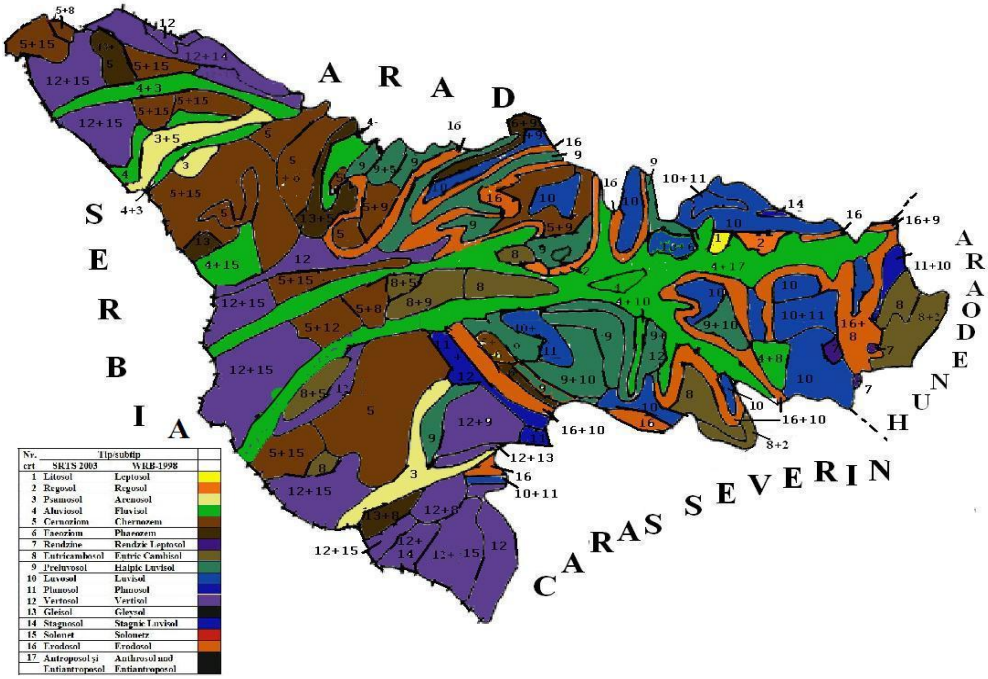

Figure 2. The main types of soil associations in Timis County

According to the Romanian System of Soil Taxonomy (SRTS 2012) in the investigated area, designated agricultural and forest land have been identified 8 soil classes, 18 types (Tab. 2.) with separation of 107 subtypes and 300 ground units and units of numerous details, which differ distinctly in their properties productive capacity and measures to preserve and enhance fertility.

Each of the soil units identified were characterized under the current methodology of the soil studies using the 23 indicators of evaluation (3C–medium temperature, 4C-yearly precipitation, 14-gleysation degree, 15-stagno-gleysation degree, 16-salty degree, 17-alkalization, 23A-texture in worked layer, 23B- texture in first 200 cm, 29-soil pollution, 33-terrain slope, 34-land exhibition, 38-land slope, 39-pedofreatic water level, 40-land inundability, 44-classes of total porosity, bulk density and compaction degree, 50- permeability classes, 61-$CaCO_3$ content, 63-soil reaction, 69-classes of base saturation, 133-Volume edaphic classes, 144-humus reserve classes, 181-surface moisture excess, 271-land improvement), indicators which represent character and traits most important, more significant, specific and measurable, which is usually found in pedological mapping work, prepared after 1987 by territorial OSPA, under methodological guidance of ICPA Bucharest.

In the presented context, land productivity as a result of the diversity of physico-geographical conditions and intrinsic characteristics of soil and anthropogenic interventions occurred over time is much different in time and space.

Table 2

The main types of soil in Timis County
(ha and % of agricultural land, forest respectively)

Nr crt	*SRTS 2012*	*WRB-SR 1998*	Agricultural		Forest		Total	
			ha	%	ha	%	ha	%
1	Litosoluri	Leptosol	9834	1,40	44	0,04	9878	1,22
2	Regosoluri	Regosols	22477	3,22	44	0,04	22521	2,80
3	Psamosoluri	Arenosol	211	0,03	00	0,00	211	0,03
4	Aluviosoluri	Fluvisols	28895	4,15	4328	3,97	33223	4,12
	P r o t i s o l u r i		**61417**	**8,80**	**4416**	**4,05**	**65833**	**8,17**
5	Cernoziomuri	Chernozems	184189	26,42	00	0,00	184189	22,84
6	Faeoziomuri	Phaeozems	24724	3,54	00	0,00	24724	3,06
7	Rendzine	Rendzinic- Leptosol	141	0,02	00	0,00	141	0,02
	C e r n i s o l u r i		**209054**	**29,98**	**00**	**0,00**	**209054**	**25,92**
8	Eutricambosoluri Districambosoluri	Eutric Cambisols + Dystric Cambisols	86994	12,48	34700 11748	31,82 10,77	121694 11748	15,10 1,45
	C a m b i s o l u r i		**86994**	**12,48**	**46448**	**42,59**	**133442**	**16,55**
9	Preluvosoluri	Chromic Luvisols Haplic Luvisols Vertic Luvisols	85131	12,21	7489	6,87	92620	11,48
10	Luvosoluri	Luvisols (pp), Albeluvisols (pp)	76561	10,99	49712	45,58	126273	15,66
11	Planosoluri	Planosol	4214	0,60	00	0,00	4214	0,53
	L u v i s o l u r i		**165906**	**23,80**	**57201**	**52,45**	**223107**	**27,67**
12	Vertosol	subunităţi vertice	71223	10,22	218	0,20	71441	8,86
	V e r t i s o l u r i		**71223**	**10,22**	**218**	**0,20**	**71441**	**8,86**
13	Gleisoluri	Gleysols	43127	6,20	447	0,41	43574	5,40
14	Stagnosol	Stagnic luvisols	7375	1,05	327	0,30	7702	0,96
	H i d r i s o l u r i		**50502**	**7,25**	**774**	**0,71**	**51276**	**6,36**
15	Soloneţuri	Solonetz	42495	6,10	00		42495	5,28
	S a l s o d i s o l u r i		**42495**	**6,10**	**00**	**00,00**	**42495**	**5,28**
16	Antrosoluri		5619	0,81	00	0,00	5619	0,70
17	Tehnosoluri		3933	0,56	00	0,00	3933	0,49
	A n t r i s o l u r i	Anthrosol	**9552**	**1,37**	**00**	**0,00**	**9552**	**1,19**
	T O T A L		**697143**	**100,00**	**109057**	**100,00**	**806200**	**100,00**

To highlight this fact, each of the soil units identified were characterized under the current methodology of the soil studies using the 23 indicators of evaluation and technological characterization, indicators that represent character and traits most important, more meaningful, more accurate and easily measurable, which are usually found in pedological mapping work, developed since 1987 by OSPA territorial, under methodological guidance of ICPA Bucharest.

Thus, based on data extracted from soil and agrochemical studies from OSPA Timisoara archive and processed according to the methodology of the Soil Survey (ICPA Bucureşti 1987) and other regulations MAAP updated by Order 223/2002, respectively MARD Order 278/2011, the agricultural land area, about 697 143 ha were classified into quality classes (fertility) with the situation as follows (Table 3).

Table 3

Quality (fertility) classes of agricultural land

Use	Class I		Class II		Class III		Class IV		Class V		Total
	%	Ha	%	Ha	%	Ha	%	Ha	%	Ha	Ha
Arable	10,48	73061	27,93	194712	34,21	238493	19,88	138592	7,50	52285	697 143
Pasture	13,88	96763	29,72	207191	35,63	248392	15,64	109033	5,13	35764	697 143
Hayfield	7.06	49218	20,19	140753	32,84	228942	27,96	194921	11,95	83309	697 143
Wineyard	17,80	124091	21,10	147097	28,83	200986	20,46	142636	11,81	82333	697 143
Orchard	18,21	126950	20,25	141171	20,50	142914	28,48	198546	12,56	87562	697 143

Given the provisions of the new EU policy on that conversion program for vineyards will continue after 1 January 2014, in addition to the request by the new policy will have a similar project in Romania with the conversion for orchards for which the present research work is not limited to the current use categories (Table 4), being studied around the agricultural area of the space concerned in order to establish their vocation for best use.

Table 4

Land quality (fertility) classes for current use

Use	Class I		Class II		Class III		Class IV		Class V		Total Ha
	%	Ha	%	Ha	%		%	Ha	%	Ha	
Arable	11,87	62 782	28,92	153 054	34,18	180895	19,61	103 821	5,42	28 690	529 242
Pasture	10,95	13 633	26,34	32 796	38,75	48270	16,22	20 200	7,74	9 653	124 552
Hayfield	3,63	1 070	17,35	5 127	32,06	9468	31,06	9 172	15,90	4 698	29 535
Wineyard	7,42	348	20,41	958	41,53	1950	20,37	956	10,27	482	4 695
Orchard	0,69	63	19,25	1 755	30,51	2783	37,51	3 420	12,04	1 098	9 119

In fact, landscape features and climatic conditions allowed, with some exceptions (land affected by alkalization or the hazard of erosion and landslides) as arable land to hold a significant share, 60.85% of the total area of Timis county.

The intensity of land use that are close to the maximum parameters of the land, 75.91% of agricultural land is used for specific activities in agriculture, is due in large part, the first wetlands reclamation works and settlement of the main rivers such as Bega, Timis, Bârzava etc., started more than 250 years ago and continued with other hydro-ameliorative work up close today.

In the upper watershed of these rivers have been taken comprehensive measures to prevent and combat soil erosion, and hilly areas were planted extensive vineyards and orchards.

After December 1989, those activities and units have seen failures caused by the endless socio-economic transition towards a market economy, a phenomenon that led to the reduction of forms of activity, in a time when we are witnessing a unprecedented aggression on the environment in general and soil in particular.

These actions took place both lowland and hilly area were large surfaces areas are invaded by anthills, thistles, nettles and other herbaceous vegetation, with no nutritional value, leaving to dispel one of the most important gifts heavenly "solar energy" that only "green plant" can capitalize.

CONCLUSIONS

Although the studied area is located in not too different bioclimatic conditions, however, due to changes in lithology and hydrological conditions, the soil formation processes differ from one place to another, causing increased variability of telurico-edaphic factors that contribute to achieving environmental which plants grow and yield crops.

Knowledge of the natural conditions and especially ecological potential of land (defined as MESP-ICPA Bucharest, 1987) for major crops have an importance in the completion of the zoning, justifying the need and timeliness of activity mapping and land evaluation.

The timeliness of mapping activity and land evaluation follows from the fact that the earth, in addition to the attributes of the natural history body is the most important means of production in agriculture and forestry and a good that is subject to ownership and thus market exchange object with a certain amount of use.

Systematic mapping of soil and agrochemical soil studies conducted by the Office of Pedological and Agrochemical Studies from our country provides valuable data on the state of soil quality, establish and implement differentiated culture technologies, land suitability for different crops and establishment, substantiation of land improvement works and improvement of technologies, organization and systematization of planning, etc.

Considering that the main parameter for estimating future production action, eco-pedological value as shown by notes of evaluation, it can be used for zoning, micro-zoning and agro profiling so that each community to strengthen its presence in both traditional markets and in other markets of the world (not only the community) through quality products innocuous.

The Romanian school of soil science concept of sustainable development on the integration of the vegetable and livestock processing and marketing of agricultural products on the basis of active movement, in which nothing is lost, everything is transformed could be a clean and efficient solution for the future.

Specific climatic conditions allow the development of space research took some sectors (vegetable, fruit growing, fishing) to be complementary and not competitive EU, which requires:

-the use of farming practices that reduce soil depletion phenomena (expansion of organic farming practices, regulating the consumption of pesticides and fertilizers, etc.)

- increase soil fertility by reducing erosion and other degradation processes and making full use of organic fertilizers, practicing proper rotation of crops, expanding areas under pulses, conservation, improvement, expansion and modernization of fruit-growing plantations application of agro-forestry schemes, etc..

BIBIOGRAPHY

1. BORZA I., ŢĂRĂU D., ŢĂRĂU IRINA, 2002, Limitation Factors and terrain yield inclosing measures in Vinga high plain, Scientifical papers, Faculty of Agriculture, XXXXIV, Ed. Oriz. Univ., pg. 69-76,
2. DUMITRU M., ŞTEFĂNESCU S.L., 2000, Scheme agroambientale în contextul dezvoltării rurale, Ştiinţa solului nr. 2, vol. XXXIV, Ed. Signata, Timişoara, pg. 121-126,
3. FLOREA N., BĂLĂCEANU V., RĂUŢĂ C., CANARACHE A., 1987, Metodologia elaborării studiilor pedologice, vol. I, II şi III, Redacţia de propagandă agricolă, Bucureşti,
4. FLOREA N., MUNTEANU I., 2000, Sistemul român de taxonomie a solurilor-SRTS-2000, Ed. Univ. „Al. I. Cuza'', Iaşi.
5. MUNTEANU I., 2000, Despre unele aspecte privind relaţiile dintre secetă, pedogeneză şi degradarea terenurilor (deşertificare), Ştiinţa solului XXXIV, nr. 2, 127-141,
6. ŢĂRĂU D., ROGOBETE GH., BORZA I., PUŞCĂ I., FOMITESCU GH., 2002, Evaluation of the natural ecopedological conditions insouth-west Romania regarding the production capacities, Ştiinţa solului, vol. XXXXVI, 2002, Ed. Signata Timişoara, pg. 188-194,
7. ŢĂRĂU D., MARTON GH., RACOVICEANU M., TRETA D., 2005, Impactul tehnologiilor informatice asupra activităţilor de cartare, actualizare şi modernizare a studiilor pedologice, Ştiinţa Solului, vol.XXXIX, nr.1-2, Ed. Signata Timişoara,
8. VLAD V., 2000, O schiţă de sistematizare a domeniului evaluării terenurilor, Ştiinţa Solului, vol.XXXIV, nr.2, Ed. Signata Timişoara.