CADASTRAL IDENTIFICATION OF FARMLAND AND FOREST FOR REAL ESTATE VALUATION

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Abstract

It is known that agricultural and forest land have not yet been clearly identified or in some cases completely missing in this paper we propose to identify a farmland and forest cadastre in order to assess them and to obtaining real information as necessary for the taxation of thereof. To show the difficulties encountered in the process identification and evaluation of these lands also present a case study. Even if the first identified area is the same area of the property documents being a happy case we can say that there are many other cases where are significant differences between these surfaces and sometimes duplication. A recent example is the superposition of lands in Cluj-Napoca terminal airport with future highway (the actual ring road).

Key words: cadastre, Global Positioning System – GPS and Global Navigation Satellite System - GNSS , farmland and forest

Exercising ownership of real estate, farmland and forestry found is essential supports of life and led over time to the needs of measurement and real land registration and property evidence, which should be preserved and guaranteed individual property right to own goods of everyone abuses to any property. Also administrations have based financial taxes levied on the owners of real property including the most important asset is the farmland. The state is interested to have a correct and accurate evidence of real estate – farmland and buildings - both in terms of the actual area owned and identity rightful owners of these buildings, because the laws system or normative acts sizing exactly correct and direct taxes strictly necessary for financing budgetary institutions. The role of cadastral identification of agricultural fund is to provide technical and economic data on farmland, systematically updated with all the changes that occur constantly in its structure due to dynamic movement of private property. These elements of the cadastral identification of agricultural fund are valued in the substantiation of action priorities for restructuring, modernization and development of agricultural infrastructure. Romania's land area is 23.839 million ha. Romania holds 0.18% of the world and 17 ranks and 4.81% of the Europe and 12 ranks. The land designated for agriculture - TDA is 14741214 ha (Table 1).

Taking into account the that not all land was registered due to the large number of existing farmland and forestry properties that passed from the state property to private property through restitution were made and the economic aspect of these works, registration works and diversity documents that does not exist forever and measuring errors and control almost inexistent these measurements leading to the need for elaborating some minimum requirements to be met in order to reduce the final error. Figure 1 shows the different types of agricultural land designated for agriculture relative farmland area or the total area of agricultural fund.

This can include the steps required to be completed to identify and maintain forestry and agricultural cadastre:

1. general or agricultural cadastre documentation works, cartographic materials (topographic, cadastral maps etc.)
2. territorial administrative boundaries land identification
3. boundaries field identification and materialization of agricultural and forest units
4. topographic necessary measurements to delimit, knows the position and determination the land extension using cartographic network projection system "Stereo70"

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Table 1

Land designated for agriculture - TDA

Subcategory	Symbol	ha	% - of TDA	% - of total area
Farmland	A	9420205	63.90%	39.29%
Pastures	P	3364041	22.82%	14.03%
Meadows	F	1514645	10.27%	6.32%
Viticulture	V	224082	1.52%	0.93%
Orchards	L	218241	1.48%	0.91%
Total		14741214	1	61.48

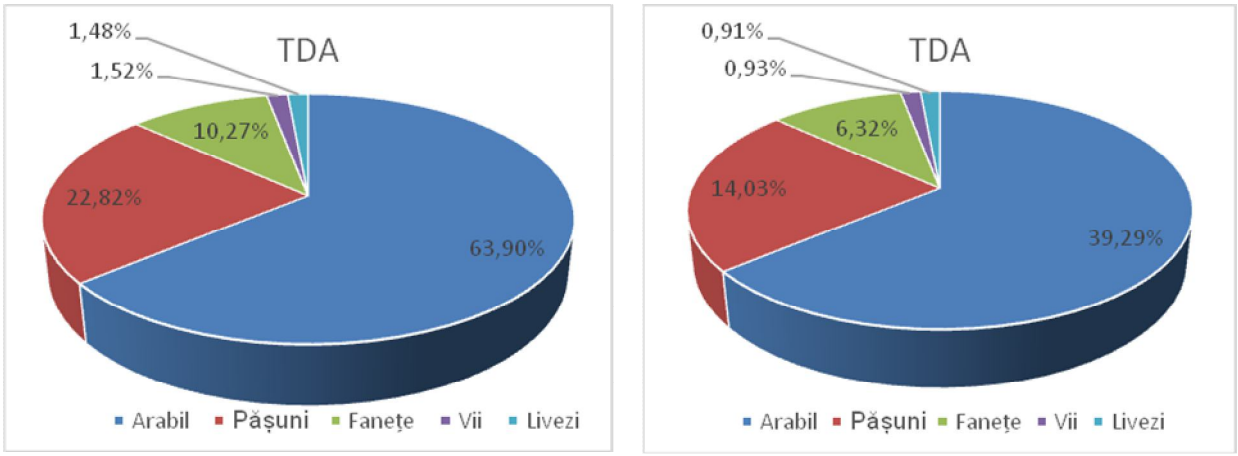

Figure 1. **Land designated for agriculture – TDA**
a - reported on farmland area b – reported on total area of the land

5. preparation or correction of cadastral plans at the envisaged scale, content and accuracy of the established norms
6. cadastral territorial units numbering determined with respect and preservation of the general cadastre numbering
7. calculation of land areas is made by the methods and tolerances specific to these types of measurements
8. preparation of specific property records
9. land classification according to quality classes to categories and subcategories of use

At the European level and based on the results of the repport *European requirements for cadastral surveyor activities* it can say that, the most common activities of cadastral surveyors were identified:

1. cadastral (technical) field measurements
2. marking of parcel corners
3. advises / consultancy for the landowner
4. validation - getting approval on cadastral plans from relevant authorities
5. land price valuation
6. registration of updated cadastral data to Cadastral database
7. defining restrictions on land use
8. preparation (correction) of territorial planning documents

Forest lands are 6.6 milion ha area that is 27% from total country area and contribute greatly to regulate microclimates and reduce soil erosion. Specific information that supplements the general cadastre forestry survey covers:

1. land area covered by forest
2. lands serving the needs of forest production
3. lands that are needed for plantations
4. lands serving to forest administration
5. land affected for afforestation
6. unproductive land such as rocks, slopes, gravels, etc.
7. land temporarily removed from the forest fund

This information is the basis forest cadastre and is required for a correct identification of these areas.

MATERIAL AND METHOD

Identification of agricultural and forest land cadastre is a problem that requires expensive logistical means that for much of recorded land cadastre works have either not been performed or were made with serious measurement errors or lack of documentary evidence. In the land cadastre process identification should be used modern means of measurement - GPS or GNSS, PDA (Personal Digital Assistant) Stations with GPS antenna depending on the desired measurement

accuracy (Table 2). Recognizing the potential of the determination techniques using GPS technology in order to achieve a modern and precise reference, were considered useful to determine the spatial coordinates of these points with its. GPS technology is a technology of high performance and high precision depending on the following requirements in the recognition and identification land (*Table 3*).

Table 2

Operational characteristics measurement tools cadastral identification

Tools	Precision - mm		Operational temperature
	Horizontal	Vertical	C
System GPS South S82T	3-10	5-20	-25 , +60
Receptor GNSS - GPS South S82-T	3-20	5-10	-25 , +60
Total stations Pentax R 400VN	3-5	3-5	-20 , +50

Table 3

Minimal requirements to farmland and forest identification

Check the satellites visibility from the station points	Obstacles absence Interference souce's absence
Check the reference point's if using total station	Ground materialization of the points Its stability
Setting-up the logistic devices	Traveling manner Acces and travelling time Special equipment (if it is required)

The errors that may occurs using GPS system in order to determine the spatial coordinates of a point are:

1. Number and integrity of orbital satellites (functional);
2. Delays in atmospheric layers and signal reflection;
3. Errors due to receiver clock and orbital errors;
4. The number of visible satellites, their position at a certain time and their selective availability (type of information access - free or secure).

CASE STUDY DESCRIPTION

For example we present an agricultural area (Figure 3 –Location plan area) identified by the coordinates shows in Table 4.

This is a farmland located in the Sarata town, Bacau (Figure 2). In order to achieve measurements was used Leica TC307 total station with angular precision of 7 seconds. Data processing was performed using TopoSys program and for coordinates conversion was used TransDatRo v 4.04 program. The surface area calculation obtained by measurements (1947 mp) is identical to existing surface in property documents. This is a happy event, but we can say with conviction that there are enough cases in these areas are different from those in documentation and sometimes difficult to control the risk duplication and regularized. A recent example is the lands superposition in Cluj-Napoca (very expensive error) terminal airport (Figure 4) with future highway (the actual ring road).

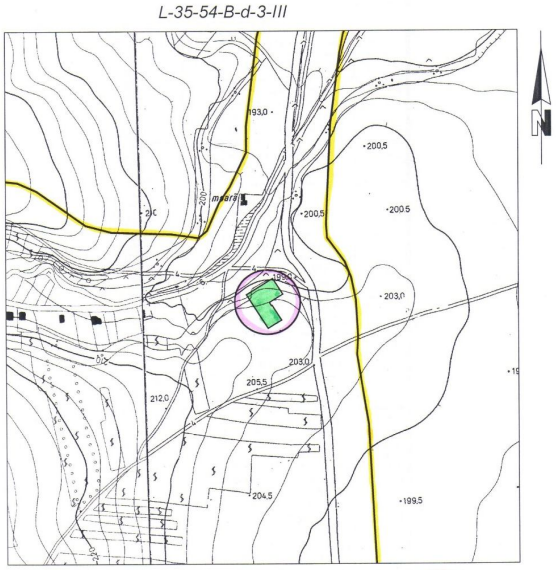

Figure 2 **Location plan area**

CONCLUSIONS

The main problems related to the identification of farmland and forests for real estate valuation are the following:

1. Excessive costs on registration of property rights
2. Existence of different registration procedures (sometimes contradictory)
3. Partial registration of real estate.
4. The lack of complete information concerning the total number and surface property.
5. Inconsistency and incompatible legal norms that regulate modality to registration of real estate.

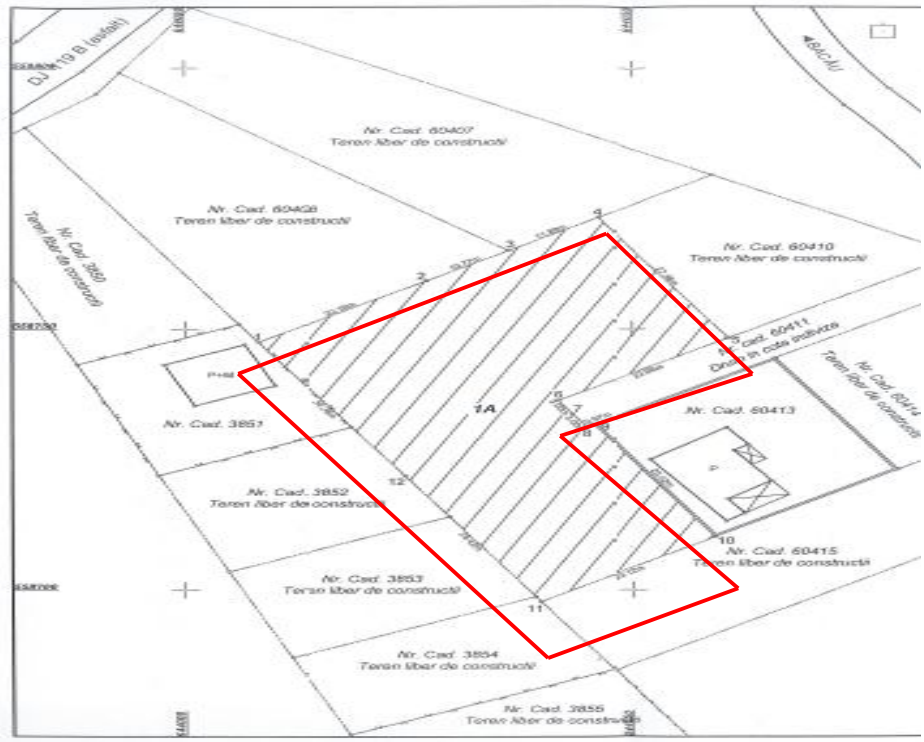

Figure 3 **Location plan and boundary land**

Table 4

Inventory coordinated land

Nr crt.	Rectangular coordinate - Stereo70		European Terrestrial Reference System 1989 - ETRS89	
	X	y	φ	λ
1	644008.25	558747.489	47°17'34.25168"N,	25°46'30.67035"E,
2	644026.985	558759.317	47°17'34.85460"N,	25°46'31.24207"E
3	644036.091	558765.066	47°17'35.14765"N,	25°46'31.51996"E
4	644046.144	558771.414	47°17'35.47117"N,	25°46'31.82681
5	644060.752	558748.278	47°17'35.95158"N,	25°46'30.73244"E
6	644041.592	558736.181	47°17'35.33497"N,	25°46'30.14771"E
7	644043.193	558733.644	47°17'35.38762"N,	25°46'30.02771"E
8	644044.795	558731.107	47°17'35.44031"N,	25°46'29.90771"E
9	644045.614	558731.625	47°17'35.46666"N,	25°46'29.93275"E,
10	644059.187	558710.127	47°17'35.91303"N,	25°46'28.91586"E
11	644039.633	558697.782	47°17'35.28374"N,	25°46'28.31915"E,
12	644024.459	558721.816	47°17'34.78473"N,	25°46'29.45599"E

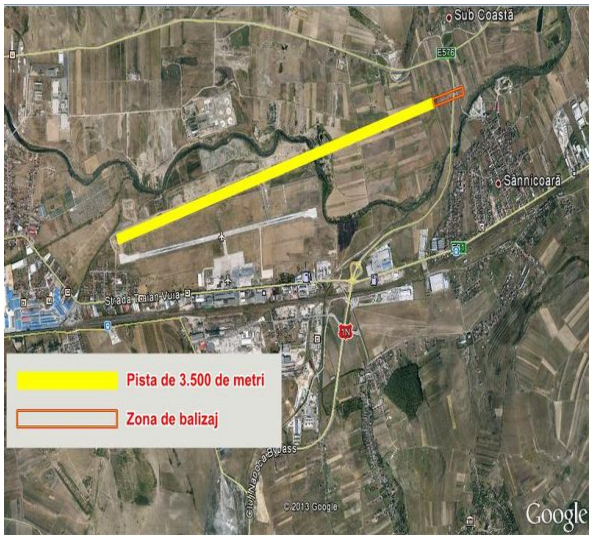

Figure 4 **Superposition of land in Cluj-Napoca**

6. Registration with errors information in the agricultural registers.

The most common errors found in the process record data are:

a. Superposition (Figure 4) land due to measurement error can be fully corrected only by additional measurements, which involve additional expenses

b. Absence of information about registration of property rights on these lands

c. Land registration without of supporting documents.

d. Land registration without indicating the property information

e. Land registration was conducted without coordination with adjacent land owners.

REFERENCES

Technical Report - European requirements for cadastral surveyor activities – available at address - www.eurogeographics.org

Cosmin Mușat, Cadastru de specialitate – curs disponibil la adresa http://www.ct.upt.ro/users/CosminMusat

Bene Irina Ana-Maria, Evaluarea terenului. Aplicaţii, pag 5-23, ISBN 978-606-92195-0-8, editura IROVAL Bucureşti, 2009.

N. Boş, O. Iacobescu - Topografie modernă, ed. C.H. Beck, Bucureşti, 2007

Navstar GPS System Surveying for Civil Engineering, Topography and Construction, Wexford College Press, ISBN: 9781934939178

Bene Irina Ana-Maria,– Conferinţa organizată de ANEVAR/ IROVAL - Evaluarea pentru garantarea împrumuturilor - Cercetări în evaluare „Modalităţi de identificare şi verificare cadastrală a proprietăţilor imobiliare în cadrul procesului de evaluare”

Navtech Seminars and GPS Supply, GPS/GNSS newsletter, May 17, 2001.

Johnson, N. L., .GLONASS Spacecraft,. GPS World, Vol. 5, No. 11, November 1994, pp. 51.58.

http://www.cadsolutions.ro/