GEOGRAPHIC INFORMATION SYSTEMS, ALTERNATIVE FOR THE „SYSTEMATIC" INVENTORY OF LANDS USED AS GRASSLANDS

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Abstract. *The systematic inventory and registration of immobile assets may be considered as one of the most ample actions of systematization performed at national level, with very important economic, judicial and social implications. The complexity of this process involves the utilization of some work techniques and methods that would generate a high degree precision and accuracy, during each of its steps, since the errors that may occur by various reasons may exert negative repercussions on persons and on the institutions involved, as well. Starting from this issue, although used on large scale, the topographic techniques may be completed and/or replaced by the methods specific to Geographic Information Systems (GIS); due to their complexity, these are qualified for the utilization as alternative in the process of systematic registration of land (also known as „General cadastre" in practice). Thus, with the help of this study, we will emphasize the possibilities of utilization and the advantages of the partial or total „replacement" of the „topographic" methods with GIS methodologies and techniques. The study is carried out on land areas used as grasslands, in an administrative-territorial unit, and the results may represent starting points or support for other research themes. The utilization of GIS applications presents several advantages, the most important being: the possibility of association between graphic information with non-graphic data and information (descriptive data bases), the generation of high-accuracy graphic and cartographic representations, complex visualisation and analysis of maps, possibility of integration and utilization of spatial data from various sources and formats. The idea of systematic registration with GIS techniques is also supported by the fact that this work environment is applied in other specialty institutions and structures that provide spatial data, too; this would avoid the operations of conversion and completion of data bases, leading to a significant reduction of work time and staff, considering the huge data volume that is generated successive to the systematic registration of land.*

Key words: *systematization, innovation, comparison, representation, immobile asset***.**

INTRODUCTION

The systematic inventory and registration of immobile assets, one of the most ample actions of systematization performed at national level, with very important economic, judicial and social implications, represents a point of interest for different specialty institutions and also for persons, directly affected by such actions.

The systematic registration of mobile assets may be defined as „*the process of translation of the real situation of all the immobile assets localized on the Romania's territory into a unitary information system, having as objective the efficient administration of the information related to this*" (NOVAC GH., 2005, http://www.docfoc.com/cap-iv-rare-sistematica-ti).

The Law no. 7/1996, re-edited, modified and completed at art. 1 align. 1, on the real estate cadastre and promotion, defines the *cadastre* and the *Land Registry* as being „*a unitary and compulsory system of economic, technical and judicial evidence, of national importance, of all the immobile assets from the whole territory of the country*".

Also related to cadastre activities, we may mention the Law no. 18/1991 – Law of Land Fund, the Law no. 1/2000 – Law for the recostruction of property right on agricultural and forest lands, the Order of the Ministry of Internal Affairs no. 415/2009 for the completion of the Regulation on the content and making of cadastral documentations for registration in Land Registry, approved by the Order of the general manager of the National Agency for Cadastre and Land Registration (NACLR) no. 634/2006, etc.

The National Program for Cadastre and Land Registry 2015 - 2023 (P.N.C.C.F.) was approved by the Governmental Decision no. 294/2015 and has as objective the registration of immobile assets in the integrated system of cadastre and free Land Registry, releasing of land book extracts of possesors as owners, creating a unitary and complete data base of immobile assets at national level (POPESCU C., 2015).

„*Only with the help of cadastre we may analyze at every moment the availability of resources, their status in time, the way they are used, with respect for requirements and conditions imposed by the process of durable development, and also the way the written and unwritten laws of environmental protection are applied*" (MIHĂILĂ M. ET AL., 1995, http://www.cadastru.ugal.ro/cadastru.htm).

With the help of this study, we will emphasize the possibilities of utilization and the advantages of the partial or total „replacement" of the „topographic" methods with GIS methodologies and techniques, in the systematic immobile asset registration.

MATERIALS AND METHODS

In order to carry out this study, we used topo-cadastral data obtained by measurements in field and by processing of cartographic materials (topographic maps, cadastral maps).

To highlight the utility of Geographic Information System for the systematic land registration, we selected some grassland areas as case study.

The processing of data and scientific information was performed with „typical" softwares, like AutoCAD, and also with GIS softwares, the methods and means used being presented comparatively.

RESULTS AND DISCUSSIONS

There are a series of steps in the systematic land registration (general cadastre), according to the NACIA Order no. 1340/2015 on the modification and completion of the Regulation for authorization, reception and registration in the cadastre registry and land book, approved by ODG no. 700/2014; these steps are briefly described in the following:

1. Data taking from the Office of Cadastre and Land Registration and its evaluation, respectively: plans of emplacement and delimitation, the geometry of the already tabulated immobiles, the land books in .pdf format and other documentations that are important and necessary.

2. Land recognition, a step that is absolutely necessary to make a plan for topographic survey.

3. Making of the preliminary report, which presents the work execution plan and also the land distribution into sectors, according to the technical specifications.

4. The local promotion campaign, is a very important step which involves the printing and distribution of advertising materials, and also some meetings with the owners and the OCLR representatives, in order to inform them on the beginning of general cadastre activities.

Another very important activity in this step is represented by the collection of documents from the owners of the land focused on.

5. Carrying out of measurements in field, meaning the topographic surveys, for unincorporated area (roads, channels, forests, surrounded land, other important real estates), and also for the urban area (street fronts and fences behind gardens, roads, channels, other zones of interest). In the second case, we draw sketches for all the constructions and fill interviews for each immobile asset.

6. Data processing and sectors' division into parcels supposes the making of .dxf folders that contain the geometry of each immobile asset.

During this step, the „classic" softwares belonging to the „CAD family" may be replaced by GIS softwares, which can perform the same operations.

One of the main advantages confered by the utilization of GIS systems is the possibility of association between graphic data and non-graphic, descriptive data. For each graphic entity, a number of *n* characteristics comprised within the afferent data base may be associated (Figure 1).

To support the previous information, we selected a sector covered by grasslands. Each parcel is symbolized in concordance with its cadastral number, so that its delimitation and emplacement among the other entities would be more visible (Figure 1).

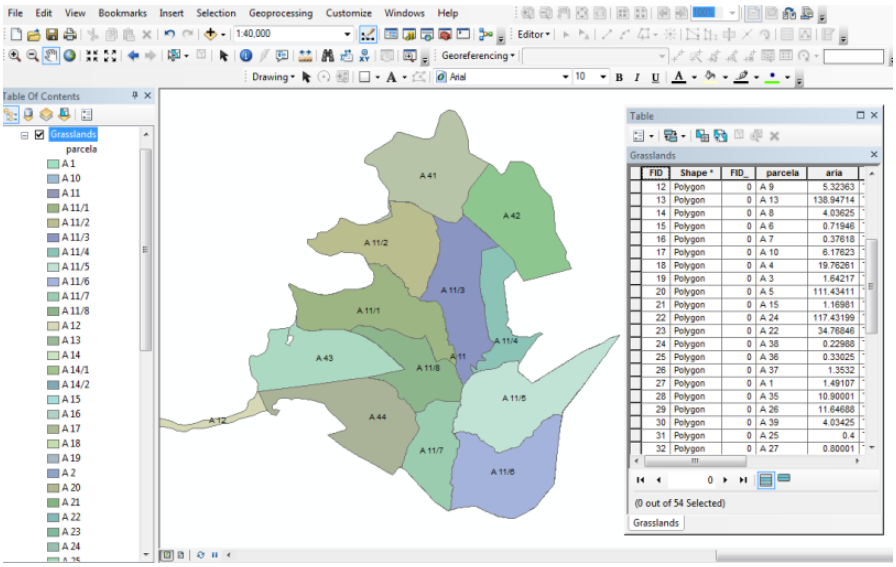

Figure 1 Data representation in GIS system

Compared with the CAD softwares, the GIS environment may determine immediately some parameters, so that the surface, perimeter etc. from an administrative-territorial unit may

be simultaneously calculated. Also, we may inserate calculation formula or algorhythms in order to determine various variable – density, useful surface, etc. (Figure 2).

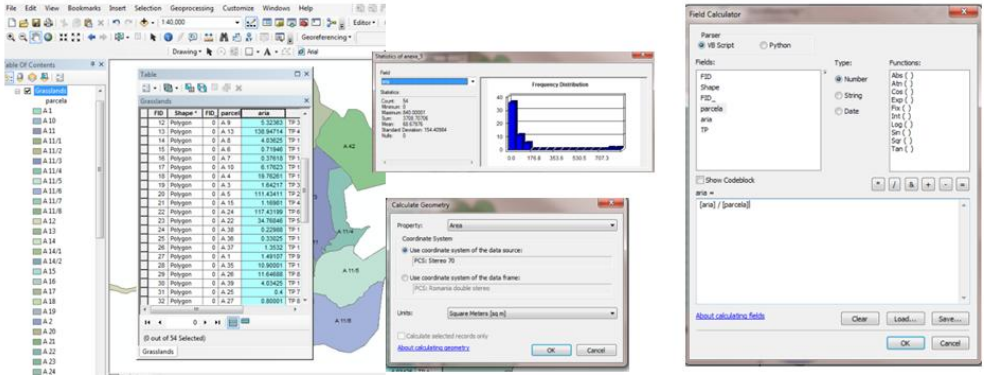

Figure 2 Operations with graphic and descriptive data

The graphic and descriptive data may be visualized, analyzed and statistically interpreted in concordance with the objective of the activity, being possible to extract technical and/or scientific data and information, directly or indirectly, regarding the immobile assets that are graphically represented, and also about owners or other elements included in the data base.

For the multilayer analysis, we may import different formats, like .dxf, .dwg, .tiff, .jpg, etc., which include informations on the inventory immobile assets. Also, the data export from GIS softwares may be performed in various formats, including .dxf or .dwg, formats used in the „classic" topographic or cadastre systems (Figure 3).

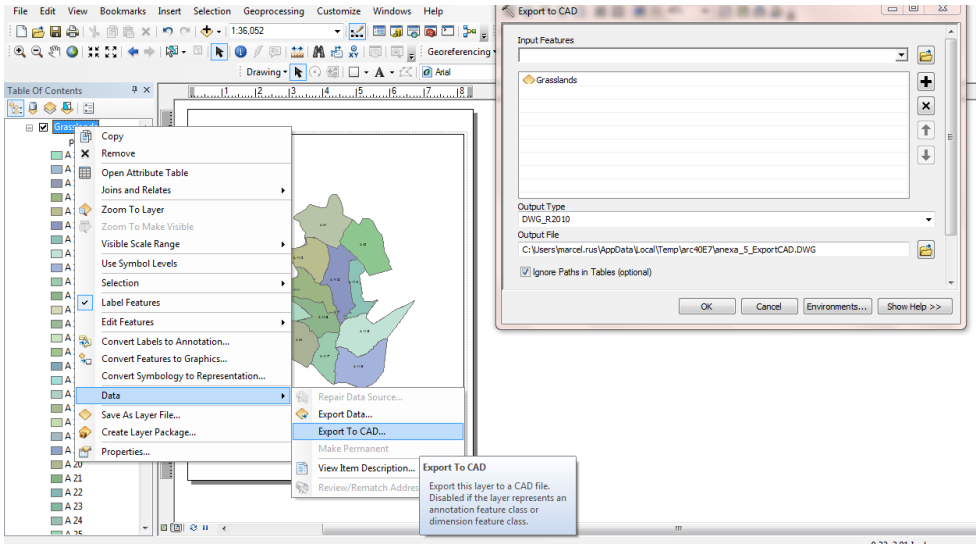

Figure 3 Data export from GIS systems

The possibility of integration of topo-cadastral data with other types of data provided by various specialty institutions represents a plus in the utilization of GIS systems in the making of general cadastre tasks, since the data may be reused in other structures and objectives.

7. The making of cgxml folders, which include all the information from a land book.

8. The delivery to OCIA of all folders

9. Publication of the technical documents of general cadastre is represented by an advertising campaign in which the owners are announced about the period of display, programme, displaying location, etc.

10. Updating of technical documents successive to the settlement of appeals

11. The delivery to OCIA of the immobiles contested.

CONCLUSIONS

The alignment to the European Community standards, as observed in the implementation of the programme of land systematic registration, with direct consequences on owners and properties, means the collection, processing and „return" of an impressive volume of graphic and textual data. Under such circumstances, the utilization of Geographic Information Systems, compared with the „topo-cadastral" methods and means, offers several advantages, among which: the automatic and simultaneous calculation of shape parameters (surface, perimeter, etc.), the correlation of the graphic information with descriptive and textual data and information managed with the help of a data base, the possibility of analysis and processing of the data introduced, etc.

The idea of systematic registration with GIS techniques is also supported by the fact that this work environment is applied in other specialty institutions and structures that provide spatial data, too; this would avoid the operations of conversion and completion of data bases, leading to a significant reduction of work time and staff, considering the huge data volume that is generated successive to the systematic registration of immobile assets. This provides the inter-operability of data, which could be used for several purposes and modalities of theoretical, practical, technical or scientific approach.

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