ASPECTS REGARDING THE ACHIEVING OF A GEOGRAPHIC INFORMATION SYSTEM SPECIFIC FOR REAL ESTATE DOMAIN

Tudor SĂLĂGEAN¹, Teodor RUSU¹, Andra PORUŢIU¹, Jutka DEAK¹, Raluca MANEA², Ana VÎRSTA², Mariana CĂLIN²

¹University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Calea Mănăștur 3-5, 400372, Cluj-Napoca, Romania, Phone: +40264.596.384, Fax: +40264.593.792, Email: tudor.salagean@usamvcluj.ro

²University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Măraști Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: +4021.318.25.67, Email: ralucamanea20@yahoo.com

Abstract

Considering the development and computerization of cadastre in Europe and the importance they have land registers and real estate records in Romania, which is a member country of the European Union, and in the future will have to develop the information society and cadastre will be the main territorial database. This paper, regarding the informational system specific for real estate domain of Sârmașu, Mureș County, is a step toward developing computerized urban and rural localities in Romania. Spatial data are taken from the cadastral plan of the city. Creating a database is to determine: the study area, the coordinate system used, the layers necessary for studying the elements (geographical objects) included in each layer, the attributes necessary for the description of each item type, the method of coding and organizing the attributes. The creation of the database was performed in three steps: i) identifying graphical objects and their attributes and organize layers; ii) defining attributes; iii) ensuring records coordinates between layers. The advantages of using a Geographic Information System over traditional methods are numerous: improving service quality, optimizing circuit information between organizations, producing interactive maps, the ability to produce standardized maps, avoiding duplicate data maintenance banks.

Key words: cadastre, GIS, real estate, Romania.

INTRODUCTION: cadastre, GIS, real estate, Romania.

The real estate cadastre is a speciality cadastre through which is achieved the records and systematic inventory, in terms of quantity, quality and legal of all real estate properties in the territory of each locality. One of the main priorities in the strategic plans of the Agency for Geodesy, Cartography and Cadastre and the Registry Agency is the development and use of integrated information system that includes the cadastral map, cadastral registry and land registry (Cosmina, 2015).

Modern land administration systems must fulfill the emerging need for a faster and more efficient processing of real estate transactions. In order to achieve such a goal, one way to go can be to outsource a larger segment of the cadastral geometry updating process to the actors external to the organization maintaining the data (Vranic et al., 2015). The programs for the systematic planning of urban-rural localities rises to a higher level the complexity of this particular cadastre, of the need to know, in detail, in terms of quantitative and qualitative elements of territorial balance, with all components of the surface structure and infrastructure (Van Diepen, 1991).

Achieving the real estate cadastre work for an administrative territory respectively a locality, involves the administrative stages of this work. Starting of this work is the responsibility of the City Hall as a Chief Authorising Officer and the organizer of procedures for awarding the work to be executed (Ienciu et al., 2015).

Problems that must solve the real estate cadastre are: i) indication of the extent, configuration and position of the various categories of uses, buildings or technical and urban facilities; ii) evaluating and recording...
qualitative and economic data relating to land and buildings; iii) setting the legal status of real estate and real rights over their inclusion in the registers and cadastral records. The purpose of the information system specific real estate domain, through the data and information they make available to local government not only provides records for the estate fund and utilities and property registration, but have an important role in determining a fair system of taxes in real estate market development, environmental protection, urban planning etc., with the possibility of accessing them by citizens, with important role in information, transparency and reduce bureaucracy (Dumitru et al., 2010; Toderaș, 2007; Imbroane and Moore, 1999). The introduction land cadastre, due to the high density of objectives, plans are made on a scale of 1:2000; 1:1000, and even 1:500; stipulating areas in hectares and square meters, while performing inventory and registration of all land and buildings by use, building owners and building blocks. Are established separate records of the buildings and stipulating the possible premature wear and tear (to determine insurance rates).

MATERIALS AND METHODS

Sărmașu (Figure 1) is a town in Mures County, is situated geographically in the center of the country. With the acquisition of the title of city in 2003, Sărmașu and localities go through a period of continuous development of social and economic.

Figure 1. Civic center of Sărmașu

The purpose of the program for implementing the information system specific for real estate domain and of urban data banks in cities, towns and villages are:

- urban and rural infrastructure development;
- creating the conditions for free movement of land and construction;
- attracting international capital;
- development and consolidation of mortgage credit;
- determining the value of real estate necessary for a fair system of taxes;
- formulating policies on sustainable development in the towns and regions;
- reform of public administration by implementing an effective information management by providing cadastral plans of settlements in digital format and the constitution of urban data banks.

In this regard, the information system specific for real estate cadastre and urban data banks, as a legal, economic and technical institutional instrument, contributes to efficient and sustainable decisions for the benefit of all (Sălăgean et al., 2012). GIS is an information technology capable of displaying and analyzing all forms of geographically referenced information when used as a management tool (Boz et al., 2014). The information system specific for the real estate domain and urban data banks is achieved on categories of works, as follows:

I. Geodetic works:
   - The planimetric network of the village;
   - The altimetry network of the village.

II. Topographical works

III. Mapping works for real estate:
   - cadastral numbering of properties;
   - calculation of properties surfaces;
   - obtaining the real estate sheet;
   - preparing the cadastral plan;
   - preparation of cadastral records:
     - the cadastral register of land plots;
     - cadastral register of owners;
     - alphabetic index of owners;
     - real estate register.

IV. Inventory works for utility networks
   - drafting the technical plans;
   - preparation of reports and topographical descriptions manholes;
   - drawing up the scheme sections on types of networks.

V. Urban databank:
   - textual database;
   - graphical database.
RESULTS AND DISCUSSIONS

The objective taken into study in this paper is represented by the cadastral sector no. 15 from town Sârmașu. The sector has an area of approximately 15 hectares and includes 17 plots (Figure 2).

For graphical data collection can be used sources such as: cartographic materials (maps, topographical plans etc.), photographic images (aerial or satellite photogrammes), digital satellite images (obtained through various satellite techniques), files with data obtained from field measurements with total stations, global positioning data files obtained in the field with GPS devices, databases made with various CAD techniques etc.

Through the cartographical method, the graphical data are collected either from the original plans or directly from the printed maps and other cartographic materials, using the scanning technique or the vectorial digitizing technique and are inserted into the database graphics in vector format (Toderaș and Răducanu, 2002).

Spatial data are taken from the cadastral plan of the city. Creating a database is to determine: the study area, the coordinate system used, the layers necessary for studying the elements (geographical objects) included in each layer, the attributes necessary for the description of each item type, the method of coding and organizing the attributes.

![Figure 2. The delimitation of the studied area](image)

For Sârmașu database in the project were proposed the following layers:

- **Buildings:** Topology is made polygonal.
- **Plots:** Topology is realized polygonal.
- **Subplots:** Topology is made polygonal.
- **Streets:** Topology is realized in the form of line.
- **Electric network:** Topology is realized in the form of point.

- **Gas network:** Topology is realized in the form of point.

The creation of the database was performed in three steps: i) identifying graphical objects and their attributes and organize layers; ii) defining attributes; iii) ensuring records coordinates between layers.

In the created database are added the previously proposed layers by using the tool “feature class”. There are added data classes that allow us to add fields in the attribute table, defining the field name and type.
Also, for each feature class in part must be defined the coordinate system (Figure 3).

After conducting the operations performed in ArcCatalog on creating the database, the data classes and the fields, will open the ArcMap

where after setting the work coordinate system necessary for this work, we import the plan that is under “.dwg” extension and includes vector data (Figure 4).

Georeferencing this plan is not necessary because ArcMap application, when adding a CAD file type, takes its coordinate system too.
For the verification of the plan and the georeferencing, we can add a raster image with TIFF extension, which is also automatically georeferenced and the overlay of the plan over the image must match the details of land and buildings. For digitizing the polygon and line entities introduced in ArcMap, editing session will start for each of the layers (Figure 5).

Attribute data editing is done in the light of each entity drawn and it automatically receives in ArcMap application an identification code on the drawing. Assigned to each field in the database will achieve the attribute data tables with data obtained from the descriptive documents (Figure 6).
After making the final plan, digitized and filled in with all the details needed to continue this project (Figure 7), it can be exported from ArcMap application under more extensions. This can be done in order to introduce the project, whether it is public on websites or simply in the computer memory.

CONCLUSIONS

Real estate cadastre becomes the catalyst of socio-economic development of the country and boosts the growth through: promoting the security of property; facilitating civil housing market and mortgage lending market; supporting urban planning; encouraging private sector development; implementation of the tax system; efficient management of land resources.

The advantages of using a GIS over traditional methods are numerous: improving service quality, optimizing circuit information between organizations, producing interactive maps, the ability to produce standardized maps, avoiding duplicate data maintenance banks.

REFERENCES


