

Data Base Organization in Land Evaluation – An Essential Element for Achieving the General Cadastre in Romania

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Key words: survey, evidence system, database and soil.

SUMMARY

The objective of most soil survey investigations is to provide data for the rational planning and adjustment of land use. The data consist basically of georeferenced soil characteristics, which are recorded in the field, determined in the laboratory and extracted from remotely sensed imagery.

They are used to resolve landscape into mappable areas in which the soil is less variable than in the overall landscape.

Systematic field surveys are mostly conducted for non-specified, multipurpose rural land use planning issues.

The diagnostic criteria for this type of survey are often based on pedological soil classification systems as the latter are assumed to allow interpretation for various types of application with acceptable accuracy.

Through general survey on administrative land introduction, have been obtain the primary data base of unitary and necessary technical, qualitative and legal evidence systems of land resources from entire country territory, regardless of use category and landlord.

On the assumption of primary data of general survey regards at area, utilization, landlord have been organize evidence subsystem of special which contain: land with agrarian or forestry destination, waters, city planning, roads, railways.

The quantitative and qualitative knowledge of soil cover from one geographic space with different agrarian and no agrarian use is a primary care of the human being.

From natural and anthropic elements which determine today important lasses of agricultural output could be mentioned: frequently drought, periodical excess of soil moisture, water and wind soil erosion, salinisation, compaction, low very humus reserve, strong and moderate acidity, high alkalinity, low and very low provision in nitrogen and mobile phosphor and potassium, soil pollution and other elements.

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1. INTRODUCTION

To ensure the rational use of land resources within an agricultural ecosystem, it is necessary to bring up-to-date and perform land mapping, evaluation & estimation.

We get this by means of pedological studies which determine soil condition environmental conditions that contribute to calculating estimation marks and establishing agricultural plot favourability of Romania's pedoclimatic areas.

Knowing the landed fund quantitatively and qualitatively within a geographic area and having various agricultural or non-agricultural destinations represents a main topic for the Romanian society.

From data existing in the National Monitoring System of Soil Quality in Romania, there are estimates that on about 12 million ha of agricultural plots, out of which 7.5 million ha arable surfaces, there is a diminution of soil productive capacities under the action of restrictive factors.

The main restrictive factors which affect soil fertility level are: drought, periodic humidity excess, water and wind soil erosion, land slides, excessive skeleton on soil surface, soil salinization, low humus level, strong and moderate acidity, microelement deficiency, soil chemical pollution.

The factors, which led to soil degradation, are determined by a faulty management and are represented by deforestation, overgrazing and agricultural exploitation and over exploitation and other industrial activities.

2. THE GENERAL CADASTRE DIGITAL ORGANIZATION

By introducing the general cadastre on administrative territories we get the primary database of the digital system of technical, economic and juridical record of the land fund all over our country, irrespective of the category of use and the type of property.

Cadastral documents issued by territorial administrative units are made up of graphic and alphanumeric database: cadastral maps and planning, cadastral record book, files with explanatory acts and other information.

The primary database of general cadastre paper work is organized on the principle of integrated informational systems with a view to utilizing them by beneficiaries of various fields of activity and to keeping the cadastral information up-to-date as required by the Technical Norms elaborated by the National Agency of Survey, Cadastre and Cartography.

The graphic database comprises the following components:

- The basic cadastral plan which shows in detail, on a scale of (1:1.000; 1:2.000; 1:5.000; 1:10.000) the position and the cadastral numbers of propriety bodies and of the component plots, land category of use and of permanent buildings. These plans are conceived digitally and analogically, on trapezium to project layout on standard scales based on STEREOGRAPHIC – 1970 and the reference system The Black Sea - 1975.
- The general cadastre plan (the cadastral map) which shows the content elements of the basic cadastral plan which is being drawn out according to the size of the territorial – administrative unit, on a convenient standard scale of (1:10.000; 1:25.000; 1:50.000).

The main compulsory content elements of the general cadastral plan are: the boundaries of administrative-territorial units, the limits and the name of the intratowns, elements of the toponomy, the main linear details and the plot's general categories of use.

- The alpha numerical database comprises the following files:
 - Coordinates inventory (x, y, z) of support points, of frequency and increase points as well;
 - Topography description and mark sketches of old and new support points;
 - Cadastral sketches and property bodies cards;
 - Calculation of surfaces on administrative – cadastral territories;
 - Cadastral record books for administrative – cadastral units.
- The attributes are being attached to graphic entities by the following data:
 - The plot and/or building: cadastral number, category of use, group of description, surface by measurements, land quality category;
 - The owner: name and surname/ name of corporate body, place of residence/ premises, CNP/ cod SIRUES, title of property act, code of property groups, type of property (exclusive or in severalty).

The modern cadastre we try to introduce has, as its major characteristic, the complex and thorough digital processing of all papers and documents required by the introduction and maintenance of the General Cadastre.

In order to achieve this, it is necessary to fulfill several conditions, compulsory as they are:

- The use of digital data in all the phases of cadastral work;
- The creation of a topo-cadastral data base;
- The setting up of a personal processing informational system.

The digital selection and processing is achieved by various means:

- Directly, with GPS systems, total stations, digital photogrammetric devices;
- Indirectly, by digitization and vectorization of present plans contents and of recent photograms.

All data will be introduced into a data bank with similar characteristics.

According to their nature, topo-cadastral data can be:

- Numerical data, the digital plan, included in graphic data base (BDG) which contains, in code, numerically, geometric and thematic information of the various structures on the plot, which can be grouped after logical criteria in layers (plot limits, buildings etc.);

- Descriptive data (attributes), registered in “Textural Data Base” (TDB), specific to the Cadastre, changed into a digital shape.

These two bases are rationally correlated by means of a common attribute, which can be the number of the plot, the house number, the address etc.

3. DIGITAL SYSTEM ORGANIZATIONAL BASIS

In Cadastre Law No. 7/1996 with its further modifications, the constitution of databases within Regional Agencies in a unitary way, which must suit the requirements of the Land Record Book, is a stringent necessity.

At a national level, there is a central database to which regional databases will be connected to.

The General Cadastre digital system will achieve the organization/ management of relational, stratified, graphic and alphanumerical databases for technical, economical and juridical records with reference to real estate and their owners.

4. DATA BASES AND BANKS

These data represent codified information through symbols (letters, digits, signs, words, ordered up in structures (linear, arborescent/ tree like, grill) and grouped in homogeneous files in as far as the domain and processing necessities are concerned.

Cadastral information comprises three general data processing elements, namely:

- The basic entity is the plot (the object of data processing);
- The entity attribute is the plot’s use category;
- The entity value is the surface of the plot.

The database drawn up and archived on magnetic support, accessible to digital processing equipments have an equivalent juridical effect with the classical methods.

Cadastral data banks organized by regional Offices/ Agencies gather together all the information about the digital cadastral plan and about its attributes as well, with reference to the buildings on administrative territories they belong to (cities, towns, villages).

The responsibilities for each information collection, management and updating for the general cadastre are shown in “Regulations concerning the organization, management and maintenance of data processing systems” and they are subdivided as such:

- For the technical component – (the plot, the building, the destination, the category of use, measured surface), the cadastral units – the regional office is responsible;
- For the economical component (data about quality and value of buildings), the pedological and agro chemistry regional laboratories are responsible; the pedological studies elaborated by them are necessary for the rounding up the general cadastre economical part and they are drawn up on basically cadastral administrative territories or on other distinct geographical areas.

To make use of these specialty data, pedological studies must be updated after 10 years, while the agrochemical ones, after 4-5 years.

Pedological maps are drawn at a 1:10.000 or 1:5.000 scales. For the agricultural cadastre data processing system, it is necessary to create a topo-cartographic basis on which soil/ land units (SU/LU) are represented from the plotted area, at a 1:5.000 and 1:2.000 scales.

Based on a pedological and assessment study, we ensure the cartographic inventory of soil units in order to use land resources according to the quality class and to establish taxes on agricultural plots on real bases.

The primary database of the pedological study of a territory under analysis comprises: physical – geographic conditions, lithology, hydrography, hydrogeology, climate, vegetation and soil territorial distribution.

The primary data base of cadastral evaluation of cadastral territory comprises evaluation notes for agricultural plots under natural conditions and it is calculated according to evaluation indicators which characterize each homogeneous ecological territory unit (HET) which has been delimited by the pedological study onto the soil map at 1:10.000 scale. The division of plot into classes of quality is made according to the evaluation notes.

- for the juridical component (information about the owner, his rights over the plots, the obligations these buildings may be under), there is a Land Record Book Office within the National Agency for Cadastre, Geodesy and Cartography.

The organization of cadastre digital system possesses a legal frame while its practical principles and actions are clearly outlined.

The structure of the present cadastre system covers three subsystems:

- “Cadastre” which processes data from the communal, town or municipal administrative territory, having the plot as basic entity and offering data for cadastral record books;
- “Landed Fund Office” which uses data at regional level, having the category of agricultural plot destination as basic entity (agricultural, forestry, waters, transportation, intratowns, special destinations etc) and centralization of the county’s landed fund;
- “MAIA” – processes county landed funds data and issues synthesis report and landed fund balances required by Institutes of Statistics and Prognoses.

5. THE ACHIEVEMENT AND MANAGEMENT OF INTEGRATED DIGITAL SYSTEMS

Integrated digital systems are characterized by the digital processing of a chain of topo-cadastral operations which ensure data collection and processing (hardware) and processing programs (software).

In our country, cadastre regional units are endowed with modern electronic equipment, which perform a unitary system for the general cadastre organization.

The present hardware system performs the following operations:

- Primary data collection and magnetic recording which are obtained by land measurements;
- Graphic method acquisition digitization of plot accounts on existing plan sheets, by using the present cartographic fund;
- Numerical data digital processing;
- Data ordering and systematization for cadastral evidence books and sheet listing as final results;
- Cadastral plan elaboration based on new projections or by updating the old ones;
- The creations of a General Cadastre database to be used by beneficiaries and specialists.

To make these data accessible, a whole set of decisions have been taken:

- Database information is managed at village level and land plotting/ mapping paper within a pedological study;
- The main climatic data are given at a Homogeneous Climatic Area;
- All the other land characteristics are distributed on two levels: SU and HET. At SU level, there are soil characterization data as well as other data which, by their nature, refer to those characteristics which manifest themselves homogeneously, systematically on the same area;
- The structure in complex SUs and three types of complex HETs which allows a better solutions for complex situations;
- A cadastral plot may contain a maximum of nine sub areas – plot.

The surface of cadastral plot from Quantitative Cadastre is used as reference point for calculating the other surfaces under discussion.

At the same time, it is compulsory to preserve the connection with information concerning the owner in order to simplify the application of the database at this level.

- The connection with soil profile database (PROFISOL) is achieved by the profile code in the village where the HET it belongs to, is localized.

6. CONCLUSIONS

1. By introducing the general cadastre digital system we get a database necessary for the technical, economical and juridical record of the buildings, plots of land, structures.
2. The data bases registered on magnetic supports have an equivalent juridical effect to those obtained by “classical” means.
3. The economical value of lands is established according to their use category and it is necessary to help us in evaluating the correct taxes and fees.

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BIBLIOGRAPHICAL NOTES

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