

## CONTRIBUTIONS TO IMPROVEMENT OF IMMOVABLE MANAGEMENT IN RURAL LOCALITIES USING THE ARCGIS PLATFORM

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**Abstract:** *In the inventory process of real estate we use programs such as: Autodesk Autocad, ArcMap 10.2, Microsoft Office Excel, online platform ArcGIS, DDAPT aplication etc. This paper presents a way to develop a database needed for land inventory in the county Vaslui, town Murgeni, village Floreni. For the area of study, so far, has been made a series of queries through which we highlighted lands that has not received title deeds from the total of the existing ones. The operation is efficient and with high efficiency. The desired results were also achieved by developing thematic maps representing the cadastral plan of the studied area on cadastral sectors, categories of land use, construction destinations and tax on land value ranges. The work consisted of drawing the digital cadastral plan in Autocad, and afterwards the plan was imported into ArcMap, where the graphical database was correlated with the alpha-numeric one. Subsequent, was created an account on the ArcGIS-online platform to import, display, and use the database. This method can be further develop by including other items of interest, such as public utility networks (water - sewerage, heating, electrical, telephone, gas, roads).*

**Keywords:** *ArcMap, database, GIS, thematic maps, title deeds*

### 1. Introduction

The objective of the study is to improve the real estate management by creating a necessary database for the land inventory as well as the implementation of a GIS system within the local administration institution, useful in the territorial planning.

The purpose of the study is to introduce a type of real estate management that will improve the property registration system.

The research stage at this time indicates the existence of a non-automated, deficient properties record in real estate registers. Querying such registers is a heavy method and has a low yield. In Romania, especially in rural areas, it requires an improvement in real estate evidence. At the international level the implementation of geographical information systems have a dominant role in the developement of complex databases, efficient and easy to use. Hundreds of thousands of organizations in almost all fields uses GIS to create maps that communicate, perfoms analyzes, distribute information and solve complex problems that appear in the world.[6]

The GIS models are also a great application in utility networks (water supply, sewerage system, district heating, electricity, roads, etc.) and provides thematic maps, reports and mathematical models for design and exposure within a relatively short time.[1]

## 2. Material and research method

The material used consist of data on real estate and agricultural register of Floreni village, Murgeni town.

The necessary pieces for the study are:

- The plan sheets that compose the cadastral map of the village at a scale of 1:10000, purchased by local council Murgeni;
- Orthophotomap and map that corresponds to the trapeze at scale 1:5 000, procured from the Office of Cadastre and Land Registry Barlad;
- Title deeds which have been extracted from DDAPT application;

The research method consists of:

- Collection of data, cadastral identifiers (field and parcel), presented on paper in registers and title deeds;
- Analysis of the current technical, economic and legal evidence of real estate by drawing up manual cadastral registers, but also by using non-updated maps and cadastral plans;
- Developing a real estate management model that uses modern techniques for creating databases and digital maps;
- Developing a database update methods;

## 3. Results – Case study

The study area shown in fig. 1 is Floreni village from Murgeni town, located in the south-east of Vaslui county.



Fig. 1. Location of study area, Floreni village, Murgeni town, Vaslui county  
 a - Location of study area on the map of Romania; b - Location of study area on the map of Vaslui county

The city of Murgeni is neighboring with other five city and is located at the border with Galati county and at the same time at the border of Romania with the republic of Moldova.

The study area is located in the north-west of Administrative Territorial Unit Murgeni (UAT Murgeni).

UAT Murgeni has under its control six village: Cîrja, Floreni, Latesti, Raiu, Sarateni and Schineni (fig. 2).

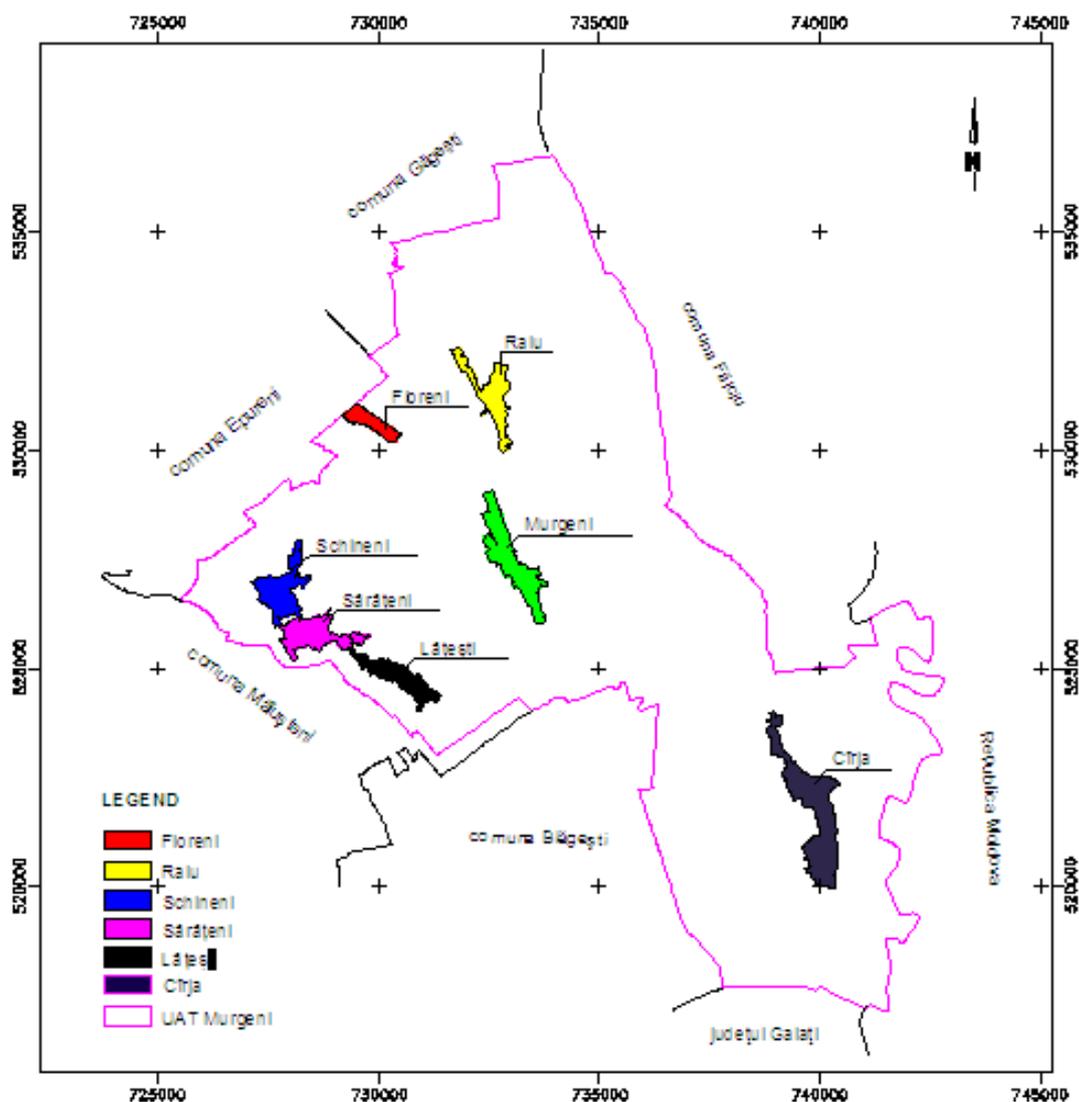


Fig. 2. Location of study area (village Floreni) within UAT Murgeni

Currently, within the local council Murgeni, the way of recording the real estate is a classic one, heavier and involves a long duration of achievement and the impossibility of recovering data in case of total damage.

The present paper proposes a real estate management model of the current technical level, which uses technologies such as Geographic Information Systems.

Spatial analysis and simulation models are linked to GIS databases, representing current research areas. These spatial information and decision support systems help optimize

land management but also other elements of interest such as public utility networks (water, sewerage, district heating, electrical, telephone, gas, roads).

The study was conducted in the Floreni village, Murgeni town, Vaslui county. It was highlighted the importance of using GIS technology in territorial development, in making local services more efficient in a disadvantaged area from many points of view: unfavorable location, poorly developed infrastructure, an area that is not of interest to the business environment or to foreign investors.

The studied area has a high potential for agricultural development, benefiting from fertile soils. It is important to implement a smart database to ensure the smooth operation of land inventory operations.

The proper execution of the database involved the following steps:

- Drawing up the digital plan by digitizing the studied area (fig. 3);
- Eliminate possible drawing errors;

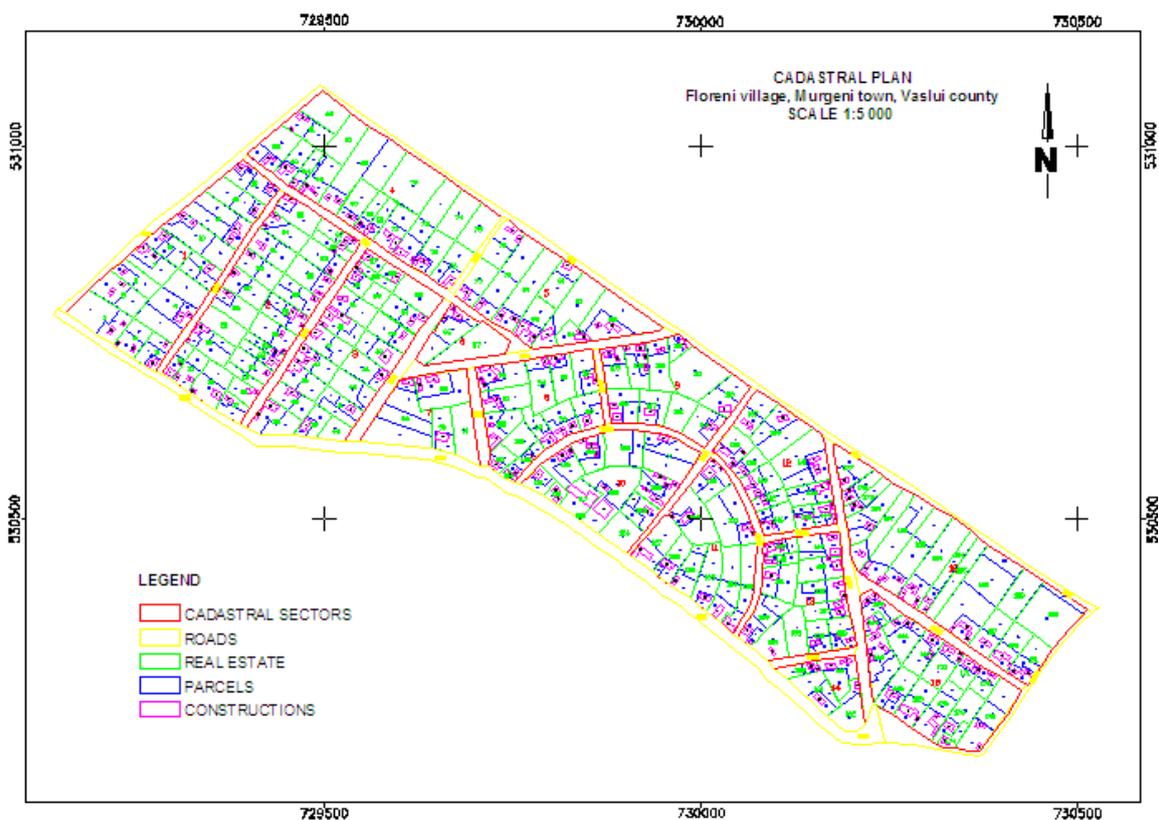


Fig. 3. Digital cadastral plan resulting from the process of digitizing and automatically eliminating errors

- Importing the digital plan into the ArcMap application;
- The calculation of the real estate tax in an excel document, according to the provisions of the current tax cod;
- Editing the alphanumeric database;
- Correlation of graphical database with textual one;
- Analyzing and interpreting the results;

The studied area has a high potential for agricultural development, benefiting from fertile soils. It is important to implement a smart database to ensure the smooth operation of land inventory operations.

A very important step in building the database is working on layers to have an properly yield.

For study zone the delimitation procedure was georeferencing the cadastral plans, adapting them to zone corresponding orthophotomap this way we combined the graphical representation through digitalization of contours and cadastral measurements. [Lateș I., Crenganiș L., 2016]

To build the database, Autocad Map 3D workflow files, in which the digital plan was created, were saved with dxf extension. Subsequently, to import these files into ArcMap application it was necessary to transform them into a shapefile data format. Shapefile store attribute type data in a separate table type file with dbf extension.

As a result of importing the shapefile spatial data into ArcMap, each layer has been associated with a native tabular format of dBase type.

Finally we fixed and edited the tables with data collected from the title deeds and with information from the database of BCPI Barlad and the local council of Murgeni town (fig. 4).

In a GIS application the data is of primary importance and the resulting products depend on their existence, accuracy and homogeneity. [Lateș I., Crenganiș L., 2016]

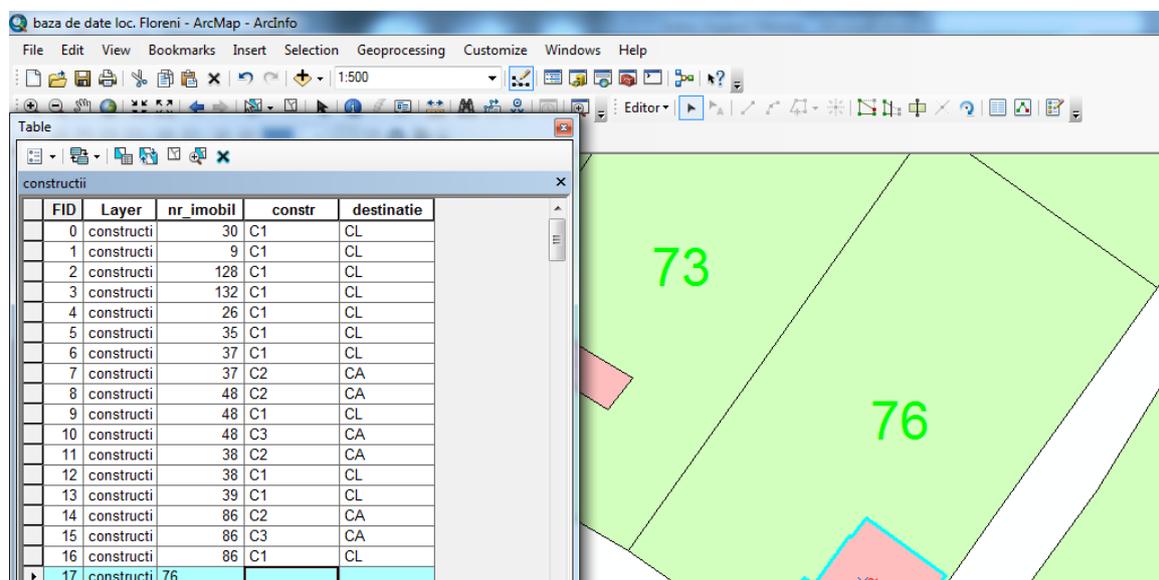


Fig. 4. Completing the real estate database

The digital database provides the opportunity to update and explore information in a short time. Also, data can be stored efficiently on external hard drives (hard disk) and accessed whenever is required.

Following the processing of the database were made representations of the queries and thematic maps (fig. 5, 6, 7, 8, 9).



Fig. 5. Representation of search results for querying real estate for which title deeds have not issued

Thematic digital maps have a main purpose to represent the data according on what you want to analyse.

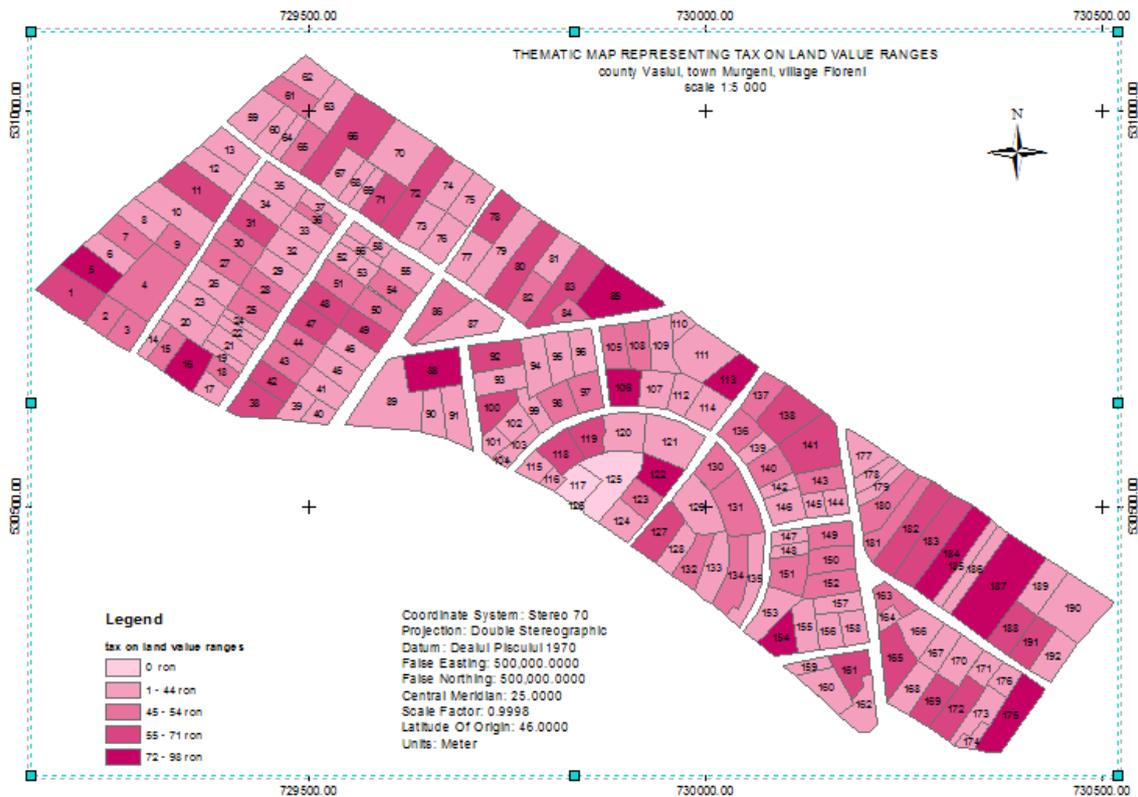


Fig. 6. Elaboration of thematic map representing tax on land value ranges in Floreni village

The tax was calculated in accordance with the provisions of the Fiscal code, law 571, article 466.

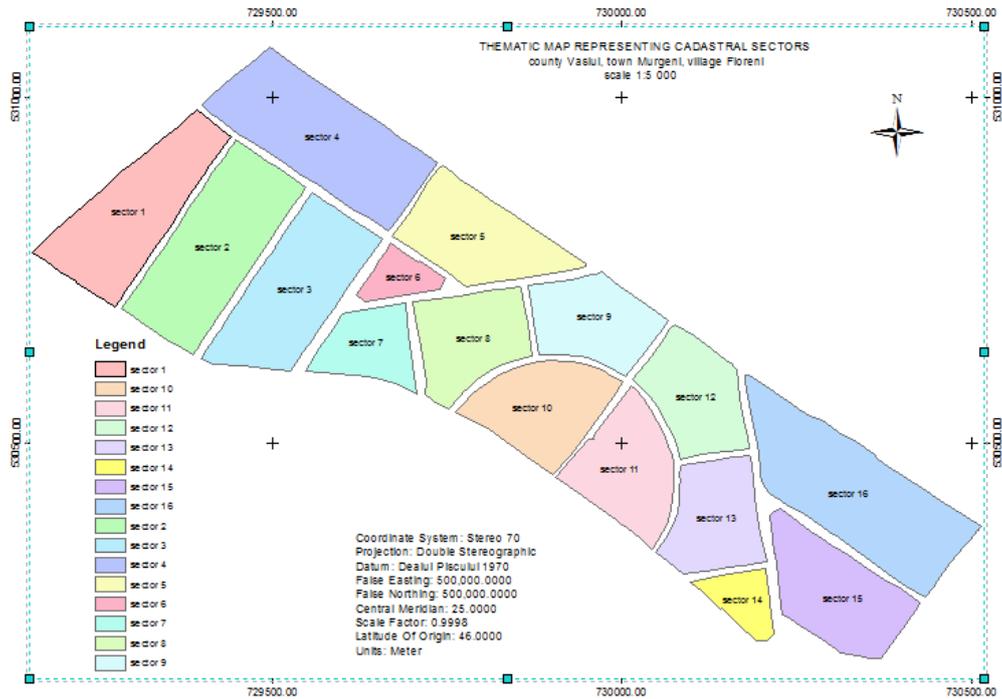


Fig. 7. Thematic map representing cadastral sectors in Floreni village



Fig. 8. Elaboration of thematic map representing categories of land use

Within the land use thematic map we can see the predominance of arable land in the perimeter of the study area.

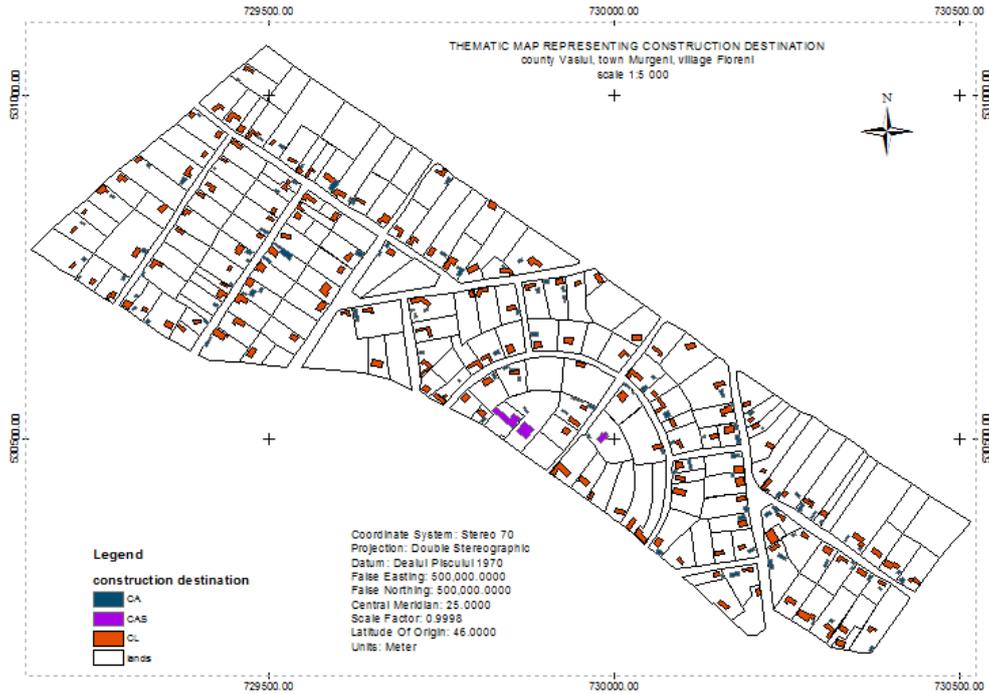


Fig. 9. Elaboration of thematic map representing construction destination

The highlighting constructions by destination allows the exact tax to be determined. Reports and graphs are other ways of viewing user requirements.

In the present paper a report and a chart were generated which highlighted the first five real estate with the largest areas (fig. 10, 11).

**Report**

Judet	UAT	Localitate	Den_sector	Nr_imobil	Proprietar	Supraf_dig
VASLUI	Murgeni	Floreni		16	187 Vlasie Marioara	7211.5098
VASLUI	Murgeni	Floreni		4	66 Pintilie Toader	5658.6699
VASLUI	Murgeni	Floreni		7	89 Enache Ion	5496.3198
VASLUI	Murgeni	Floreni		1	4 Nita Alexandru si Golumba Sabin	5065.3398
VASLUI	Murgeni	Floreni		16	190 Mocanu Ion	4461.5601

Fig. 10. The visualization of report

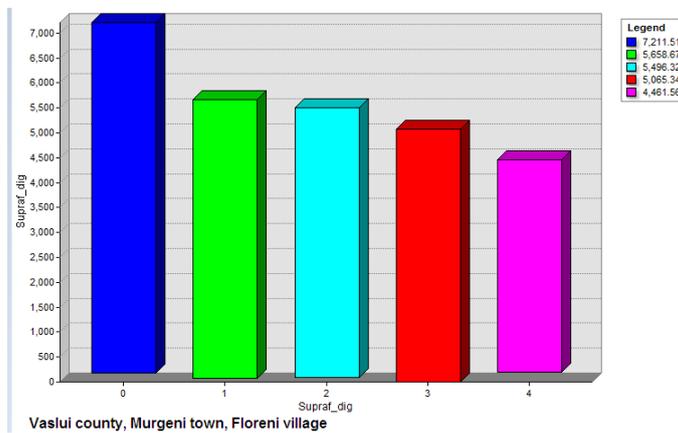


Fig. 11. The visualization of graph

Database created for Floreni village was introduced on the ArcGIS online platform (fig. 12).

This was possible by creating a user account at [www.arcgis.com](http://www.arcgis.com) and then importing the database.

ArcGIS online is an application mapping and management platform consisting of applications and templates for creating interactive maps.

ArcGIS online platform users are mainly GIS professionals who publish online geographic data, which is then used by other web developers.

Organizations that are subscribed to ArcGIS Online can manage their entire geographic content in a safe ESRI environment.

Members of these organisations can use maps to explore data or create and distribute information in the form of maps and applications.

An easier way to access ArcGIS online platform is through a public account. This account is not associated with an organisation and offers a limited set of features such as: use, create and share maps.

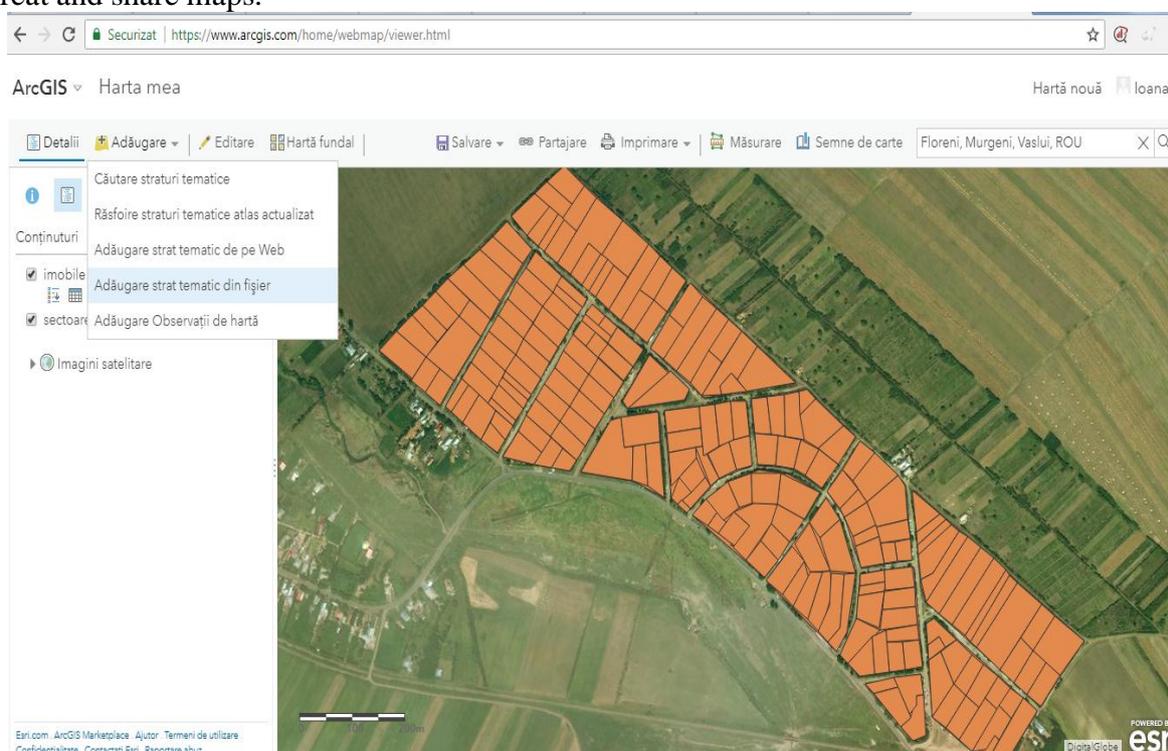


Fig. 12. Mod of importing thematic layers on the ArcGIS online platform

#### 4. Conclusions

The current data indexing system in rural areas is technically outdated, heavy and requires a lot of time to making cadastral evidence.

The modern geographical information system, by indexing into data files and digital plans, has the advantage of fast storage and makes it easy to update information.

The ArcMap platform presents the benefits of creating and updating a database in a efficient and interactive way.

Possibility of accessing and managing the database in the online environment offers the chance for people to use, create, share, query maps, view reports using tools available for web, smartphones and tablets.

## 5. Bibliography

1. *Lateş I., Luca M., Monitoring water supply systems from Romania through the GIS models, Bul. Inst. Politehnic, Iaşi, vol. 63 (67), nr. 3-4, pp. 63-70, ed. Politehniun, secția Hidrotehnică, 2017.*
2. *Lateş I., Crenganiş L., Seismic hazard maps of the buildings with 3D modelling in GIS application, RevCAD, no.20, pp. 74, 2016.*
3. *Bofu C., Chirilă C., Sisteme informaționale geografice. Cartografierea și editarea hărților, ed. Tehnopress, Iași, 2007.*
4. *Aybet J., The object oriented approach: What does it mean to GIS users, vol I, II, GIS Europe, 1994.*
5. *Bernhardsen T., Geographical information system, Viak IT, Arendal, Norway, 1997.*
6. <https://www.esri.ro/ro-ro/what-is-gis/overvie>.
7. <https://doc.arcgis.com/en/arcgis-online/get-started>.