ISSUES RELATING TO THE REALISATION OF GEOGRAPHIC INFORMATION SYSTEM GIS IN THE FORESTRY FUND FROM THE U.P. II ZÎMBRU, O.S. GURAHONȚ, D.S. ARAD

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Abstract

The design of geographical information system represents nowadays an issue for a series of sectors of practical application fields where some geographical data linked to the activities deployed are being used. As a consequence, in the case of forestry sector, the implementation of the information sector is imperiously required taking into account the specificity of the deployed activities.
The study case carried out within the U.P.II Zîmbru., the Forest District Gurahonț, Arad County Forest Administration. For the study case was used the MapSys 8.0 programme.
The data were collected from the ortho-photographic plan; some completions of these data being made within the parcels where forestry works were performed starting from the ortho- photographic plan design and up to present.
The geographical information systems are very useful products for forestry sector, being characterised by a high technical resilience, and providing useful information for different managerial, technical solutions etc., necessary to be adopted.

Key words: Geographical Information Systems, informations, date, database, forest fund, silviculture operations

INTRODUCTION

The computer system is a complex technical and organizational people, equipment, rules (rules) and methods (algorithms) with the main functions the collection, validation, storage, display and data processing to obtain information.

There are several similar concepts:

-information system - a system in which processing is done manually or by mechanical means;

-data-processing system (data processing system) is the group of components of a system, only specialized processing;

-information system (borrowed from French: Information + automatique = informatique) is reserved to describe a system in which processing is done automatically, based on software, using electronic computer;

The term computer system means a system in which the collection, validation, storage, processing and displaying data and information is achieved mainly or even exclusively, using electronic computer.

Data and information

Generally, in informatic system is distinguishing the meanings of "data" and "information".

Date is called a sign, a number, a string, an image representing the value of certain features of some entity. Data is filed (stored or memored) on a support in order to retrieve some.

Information represent a data wich has assigned a specific meaning, is assigned the caracteristic wich represent her, and the entity that owns that feature. Usually, information is the result of processing (correlation) more data and not just one single.

A date has meaning only if it can be found. This means that the date should have ensured a certain duration of life, at least since its registration until first use. Durability data means there is a suitable medium for preserving it (a tally that is a sign, a book in which notes a phone number, a magnetic disk that are registered with a data file, where there is a catalog notes students, etc.).

The organization also is required to specify the data could be recorded on a common support and could find you whenever you need.

Basically, information is the result of a process of data processing carried out in a computer system. Schematically, a computer system is in the form of the figure. As you can see, like any system, the computer system is in relation with the external environment through inputs and outputs. At entry, the system receives data that it processes through its components (E1, E2, E3, ...). and the output provides information system.

The structure of a computer system

As follows from the definition presented earlier in this chapter, and the scheme in Figure 1, an information system (SI) consists of the following main elements:

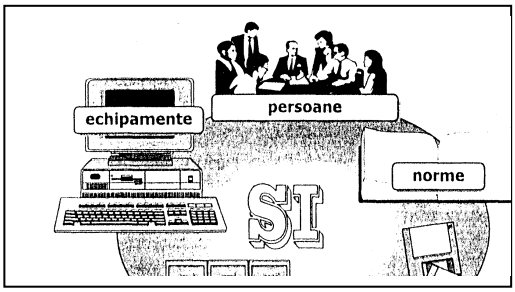

Fig. 1. The structure of a information system

People. One can distinguish several categories of people involved in various phases of the existence of an information system:

-Beneficiaries or users are those who are for information provided in the form of reports from processing data;

-Makers (managers of the system) are those who organize, coordinate and conduct the business of a system;

-Operators are those who, under the leadership responsible, provide operation and maintenance of computer system, their activity is mainly linked to its communication with the environment (gathering and recording data and extracting reports);

-Developers are the people directly involved in the design and implementation information system. One can distinguish three subcategories of developers and implementers:

-system-analyst is a person who cooperates with users to understand how the organization of which they belong, to determine its requirements in relation to issues that have to deal with the computer system and to establish information (reports) required

-designer of the system is the specialist in charge of designing the system or changes to be made in efficiency and its functionality, so that they meet user requirements, based on information provided by analysts,

-programmer, using a development environment (including a programming language) to codify the operations of the algorithms adopted for solving the automatic data processing functions in accordance with specifications set by the project;

Of course, depending on the size and complexity of the system approached the positions listed above can be separated and held by many people, or not, all these tasks could be carried by one person.

Equipment. The main equipment essential to the structure of any computer system is the electronic computer. Besides computer there must be a number of equipment related to it, needed to:

-collection and data entry (Digitizer, scanner, video capture, etc.);

-data storage (magnetic discs, optical discs, magnetic tapes, etc.);

-visualization and data mining (printer, plotter, audio speakers, etc.).

Databases. By definition, a computer system for processing. They are stored (stored) in electronic and computer accessible collections organized by specific principles.

Programs. Provides automatic data processing algorithms according to specific areas where the system used.

Procedures and rules. They consist of instructions, manuals, norms, rules, etc.. which are explained and covered the various operations necessary to use (or operation) system and maintain it in working order (maintenance system).

Fields of application of GIS: cadastre, land use, buildings, population, environment, agriculture, silviculture, forest exploitation, establishment of optimal locations for cutting, cuttings monitoring, determining optimal locations for plantions, hunting records and monitoring, records, fire monitoring and prediction.

MATERIAL AND METHODS

This case study was realised in the management unit II Zîmbru, Gurahonț Forest District, Arad County Forest Administration.

Research and study methods were used are: documentary information, observation on the itinerary, stationary observation, inventory, modelling, simulation, comparisons, SWOT analysis.

To achieve this case study were used following the logistics: forestry management plans, arrangement plans and maps, cameras, GPS receivers, total stations, scanners, software for field data collection, data transfer programs, programs for processing data, software for archiving data and that organization and the default database of the computer system, PC - s for data processing, peripheral to obtain final products in analog format.

Software used

Mapsys 8.0. The volume of information received by any man of today is growing, thanks to almost limitless possibilities for managing and operating the preservation of the information provided in digital form in relational databases. One can appreciate that a percentage of 85 percent in circulation databases contain one or more components related to the geographical location of items inventoried. If cadastral database can affirm that all information is related in any way the property's geographical position defined by geographical boundaries of the cadastral base unit.

Mapsys focuses powerful features but easy to use and recovery plan generation digital geo-referenced features and management of spatial reference information. Effective exploitation of geo-data Mapsys created or imported from other systems is provided by standard GIS functions such as those of georeferenced, collection attributes, topological overlay layers, creating user queries or generating buffer zone, but also by specific features of topography by cadastral Search overlap or address. Defining the right of access to

program functions and data, and cataloging operations made possible, allowing a better protection and tracking data consistency.

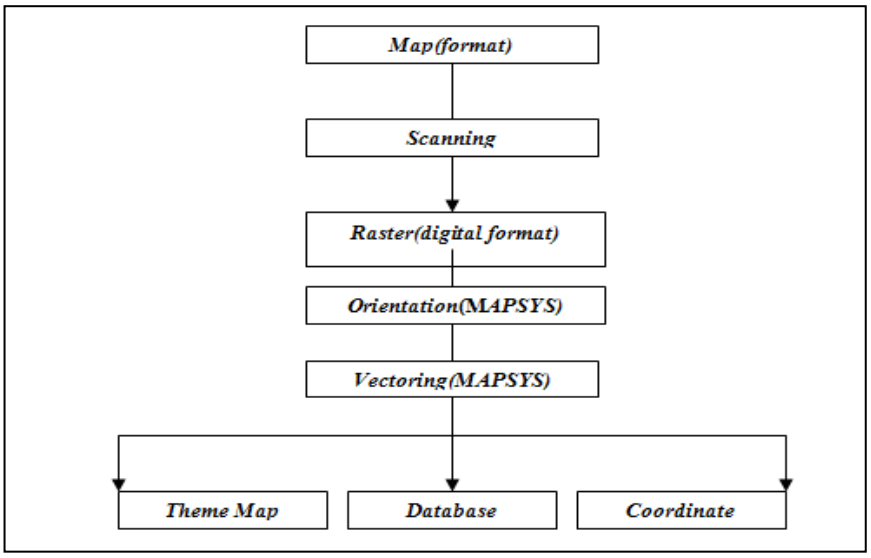

Fig. 2. Block diagram to obtain GIS related products – using the program's Mapsys 8.0

Procedure

To realise the case study was used management plans and arrangement map of management unit (UP) II Zîmbru, Gurahonț Forest District, Arad County Forest Administration.

Technological flow covers the following stages:

-scanning map;
-raster unification (if applicable);
-raster geo-references;
-raster-getting;
- raster vectoring;
-obtain those vectors and polygons;

RESULTS AND DISCUSSION

After processing graphic data related database was obtained textual database can be accessed in various formats. For the presented case study database to export to Excel file being imported into the worksheet in Word - Table 1.

Attributes considered are the compartments - that forest stands, old forest stands and the proposed operations.

Table 1

Database afferent UP Zîmbru (extras)

No.	Ident.	S(ha)	P(m)	Compartment	Operations	Age
0	*1*	*2*	*3*	*5*	*6*	*7*
1	122	413847,49	3934,84	53A	Group shelterwood system	130
2	128	171063,85	1910,013	54B	Group shelterwood system	110
3	127	100378,23	1416,58	54A	Thinnings	30
4	1	4391885,30	14345,32	Pasture and agriculture land	Cleanings	15
5	3	138828,23	1918,92	Pasture and agriculture land	Agricultural operations	Absence
6	2	902247,35	4363,06	Pasture and agriculture land	Agricultural operations	Absence
7	79	1675910,91	5577,32	Pasture and agriculture land	Agricultural operations	Absence
8	80	142454,60	3058,42	Pasture and agriculture land	Agricultural operations	85
10	79	21123,57	682,06	89B	Hygiene cuttings	40
11	8	24619,56	1369,12	Pasture and agriculture land	Agricultural operations	Absence
12	7	17435,91	762,68	Pasture and agriculture land	Agricultural operations	Absence
13	4	385072,25	3524,87	83B	Thinnings	55
14	6	76590,67	1280,30	Pasture and agriculture land	Agricultural operations	Absence
15	5	107778,79	1472,34	83C	Thinnings	40
16	13	168986,83	2235,68	82A	Thinnings	55
17	10	13017,88	499,65	83D	Hygiene cuttings	110
18	9	13366,83	482,86	83A	Thinnings	40
19	12	12264,05	481,30	82C	Hygiene cuttings	30
20	11	8138,53	357,64	82B	Group shelterwood system	90
21	16	281345,01	2523,22	81C	Cleanings	15
22	17	42400,76	876,87	81C	Clear cuttings	90
23	20	26948,45	1063,67	80E	Group shelterwood system	120
24	22	92458,72	1852,37	80C	Thinnings	20
25	23	120252,36	1689,71	79	Hygiene cuttings	90
26	25	226239,34	2232,09	78B	Thinnings	25
27	26	150276,20	1881,81	77A	Group shelterwood system	120
28	41	493278,64	4736,84	49A	Group shelterwood system	120
29	36	21635,93	811,20	48B	Hygiene cuttings	100
30	42	268662,13	3014,68	48A	Hygiene cuttings	100
31	34	27291,24	756,14	78A	Group shelterwood system	140
32	35	9423,84	491,54	78C	Hygiene cuttings	90
33	31	156924,88	1992,67	86A	Thinnings	25
34	30	71206,54	1218,54	86B	Thinnings	20
35	27	117234,60	1612,83	77B	Releases	5
36	29	137108,65	2198,41	87A	Hygiene cuttings	85
37	28	191979,15	2099,85	77C	Group shelterwood system	120
38	43	165277,68	1991,45	76A	Group shelterwood system	120
39	47	725576,87	4399,18	Pasture and agriculture land	Agricultural operations	Absence
40	72	274350,63	3184,62	95A	Group shelterwood system	120
41	71	249689,32	3344,62	96B	Hygiene cuttings	110
42	94	303075,45	2382,52	101	Hygiene cuttings	100
43	165	108888,67	1825,28	105B	Hygiene cuttings	20
44	164	72101,97	1772,06	104C	Thinnings	25
45	169	61561,86	1269,02	105A	Hygiene cuttings	100
46	168	10421,07	702,97	105C	Hygiene cuttings	100
47	166	238814,96	2463,10	106A	Hygiene cuttings	25
48	167	18461,65	603,16	106C	Thinnings	25
49	171	263979,02	2470,81	107B	Hygiene cuttings	25
50	180	271648,09	3883,31	109A	Thinnings	35

Methodological considerations presented only an extract from the database, for exemplification workflow.

Based on information gathered from the charts were obtained geo-referenced raster thematic maps related attributes analyzed, respectively thematic maps of forest works and age of the forest stands studied management unit II Zîmbru.

Figure 3 is presented in thematic maps of forest operations, corresponding production unit II Zîmbru, for a period of 10 years, in accordance with forestry management plan.

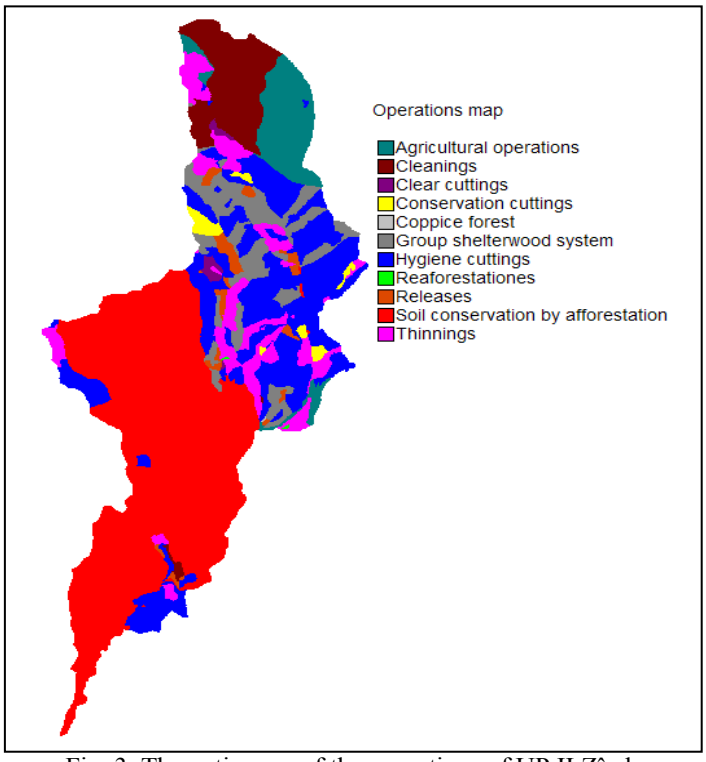

Fig. 3. Thematic map of the operations of UP II Zîmbru

To get a complete picture of the area studied, areas that are not part of the forest fund were considered appropriate, their associated attributes (by use and operations) is directly correlated to the objective reality on the ground.

CONCLUSIONS

The database will be organized so that to satisfy all needs to be taken, considering the relevant information that will be the entries in the database.

Following are listed in the database a number of issues as follows:

-analysed forest-units;

-area occupied by the different stands;

-forest-area analysed perimeter;

-aged forest stands;

-proposed operations.

Database gathers this information made in tabular form, which can be managed as required, in various forms of work related calculation systems.

Thematic maps offer a range of information on the details analyzed the case study, displaying a high degree of interactivity.

Geographical information systems are characterized by a higher technical efficiency, presenting a great flexibility in terms of updating and archiving of data and information.

It recommends implementation of geographic information systems unequivocal in the forest management related activities.

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