WAYS TO ACHIEVING A SPATIAL INFORMATION SYSTEM (SIS) FOR THE FORESTRY SECTOR BY USING OF MAPSYS 8.0 PROGRAMME

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Abstract: *The design of spatial information system represents nowadays an issue for a series of sectors of practical application fields where some spatial 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. Modern positioning technologies of different characteristic points as well as the cartographic products in digital format provides for a complex and differentiated exploiting of the data collected in this manner. The use of ortho-photographic plan in forestry sector represents a mean of collecting data (the so-called raster data) which are very important for the characteristics of deployed activities. Moreover, the forestry maps and forest arrangements can provide important information as regards the stand (forests) specificity required in growing stock's careful management activities. The design of a complex database requires that field data be accurate and mirrors the objective reality on the ground. Achieving this goal supposes input data checking within the IT system, on the ground, while the potential shortcomings will be adjusted accordingly. Data processing in order to complete the design of the information systems require the use of some very specialised and dedicated software which will accomplish the specific points' spatial positioning and reporting, as well as the data base completion. The study case carried out within the Siniob U.P.I., Sacuieni Forest Range Canton, Bihor County Forestry Directorate. 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. Some particular issues were identified when the growing stock limits were set, especially for the areas where vegetation lives outside the growing stock while the separation of the above-mentioned parcels raise some problems. The solving of these problems involves visits paid on the spot and the stands' separation; in this later case the limit points being set previously by the combined use of GNSS-TS technology. Following to the data accurate processing, digital products are generated, namely the thematic maps and alphanumeric data in tabular format out of which they can be exported to different working formats, if necessary. The spatial 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, silviculture register.*

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:

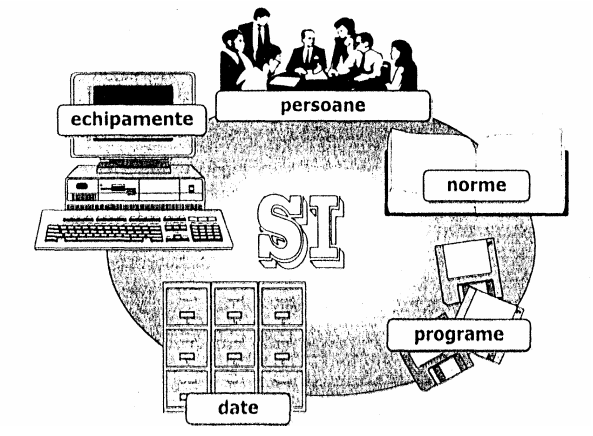

Figura 1: The structure of a information system

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 I Sîniob, Săcuieni Forest District, Bihor 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.

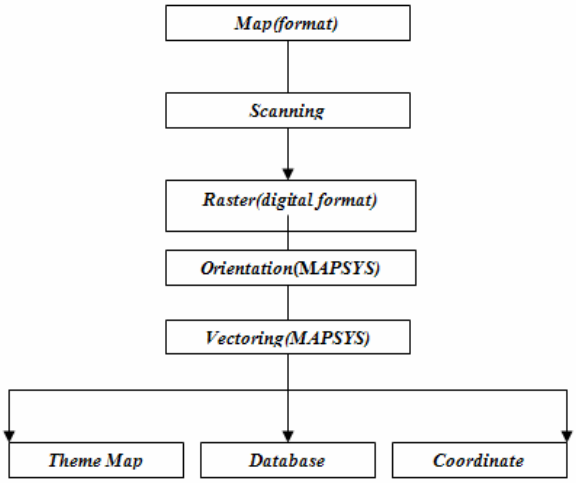

Figura 2: Block diagram to obtain GIS related products – using the program's Mapsys 8.0

Procedure

To realise the case study was used management plans and arrangement map of management unit (UP) I Sîniob, Săcuieni Forest District, Bihor 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 DISCUSSIONS

After processing graphic data related database was obtained textual database can be accessed in various formats. *Table 1*

Database afferent UP I Sîniob (extras)

No.	Ident.	S(ha)	P(m)	Compartment	Operations	Age
0	*1*	*2*	*3*	*5*	*6*	*7*
1	123	149242,67	1558,14	29A	Group shelterwood system	80
2	125	41908,92	904,25	27C	Hygiene cuttings	65
3	115	133430,07	1542,45	31	Hygiene cuttings	60
4	114	117619,83	1467,16	33	Hygiene cuttings	65
5	108	9605,21	435,91	42E	Thinnings	50
6	107	23050,27	605,33	42B	Hygiene cuttings	70
7	104	77373,65	1289,31	42A	Hygiene cuttings	50
8	109	61427,31	1137,79	38B	Coppice forest	25
10	110	63175,95	1240,28	38A	Thinnings	50
11	124	65299,86	1279,94	27B	Cleanings	15
12	132	10637,77	429,77	27A	Thinnings	50
13	131	6319,09	360,86	26B	Hygiene cuttings	50
14	133	45286,68	1214,54	26A	Hygiene cuttings	40
15	130	9746,22	511,31	26F	Thinnings	40
16	134	3658,18	268,07	V2	Release	V2
17	127	11283,39	520,45	26C	Hygiene cuttings	60
18	128	8504,08	386,92	V3	Release	V3
19	129	10071,65	536,97	26E	Hygiene cuttings	40
20	126	23899,46	709,36	26D	Thinnings	20
21	122	17147,38	913,91	V6	Release	V6
22	121	57132,31	1079,59	28B	Group shelterwood system	80
23	116	101459,60	1294,23	30	Thinnings	40
24	117	88276,60	1408,37	32B	Hygiene cuttings	60
25	113	82086,29	2377,74	35A	Hygiene cuttings	50
26	102	151307,09	1600,01	37	Hygiene cuttings	50
27	100	104586,64	1317,27	34	Hygiene cuttings	55
28	106	12054,55	499,52	42C	Thinnings	50
29	101	185870,22	2387,05	41A	Thinnings	35
30	103	26739,51	760,96	41B	Cleanings	20
31	105	27707,43	892,96	42D	Cleanings	20
32	96	106996,03	2110,42	40B	Hygiene cuttings	70
33	80	112382,04	1894,37	47A	Hygiene cuttings	45
34	78	9253,01	425,61	50A	Hygiene cuttings	50
35	76	15647,57	640,17	50C	Thinnings	20
36	77	16602,96	538,09	50B	Group shelterwood system	75
37	60	95578,14	2062,43	49A	Hygiene cuttings	70
38	71	81926,94	1330,87	51A	Cleanings	65
39	70	13770,79	694,34	51D	Coppice forest	30
40	69	46056,24	850,52	51B	Thinnings	40
41	64	11375,23	434,33	56A	Hygiene cuttings	60
42	61	102818,90	1693,47	55	Thinnings	20
43	65	42752,83	1275,01	51C	Hygiene cuttings	65
44	68	84723,66	1278,44	56C	Hygiene cuttings	60
45	75	14924,14	524,37	57A	Hygiene cuttings	70
46	72	31593,57	926,02	56D	Thinnings	30
47	66	98696,78	1440,72	56E	Thinnings	30
48	63	23305,73	678,23	56B	Hygiene cuttings	50
49	79	26915,83	803,68	47B	Release	55
50	85	3628,60	268,14	47C	Release	40

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.

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 I Sîniob.

Figure 3 is presented in thematic map of forest operations, corresponding management unit I Sîniob, for a period of 10 years, in accordance with forestry management plan.

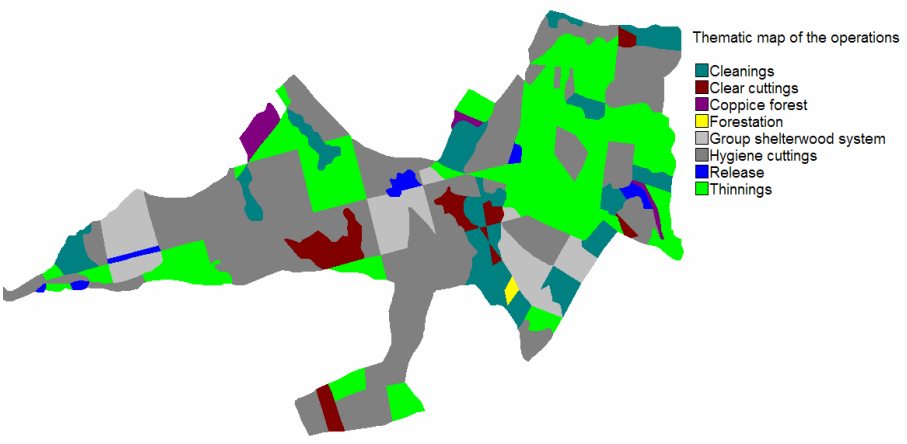

Figura 3: Thematic map of the operations of UP I Sîniob

Figura 3: Thematic map of age of UP I Sîniob

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 field.

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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