DESIGNING AND CREATING A RELATED DATABASE CURRENT ACTIVITIES IN THE FORESTRY SECTOR

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RESEARCH ARTICLE

Abstract

Field data related to current activities in the forestry sector are stored in a relational database, which contains several tables organized by well-defined themes in which the information is recorded and connected to each other through relationships. In order to manage the information in the database, form-type objects are defined for entering data, queries for summarizing and selecting the information of interest and reports for the statistical synthesis of the data and arranging them for printing. Taking into account the facilities offered by modern information gathering and processing technologies, it is necessary to implement IT systems in the management and management structures of the forest fund, regardless of the owner and administrator. It is also necessary to create complex databases relating to all aspects of the managed and managed forest fund, thus having full control over both technical decisions and the results of their application. It is recommended to update the databases whenever various interventions are completed in order to quantify the quantitative and qualitative aspects. This database represents one of the options currently possible. In the future, new tools can be used, and high-performance databases can be created, taking into account the current logistical possibilities, and respectively the upward trend in the IT field.

Keywords: relational database, forms, queries, reports, activities in the forestry sector

INTRODUCTION

The information is stored in an organized manner in a computerized database. The database file is a container that stores objects such as tables, forms, queries and reports. These objects are used to store, classify and manage the information stored in the database (Curilă M. et al, 2019).

A table in a database stores information in rows called records and columns called fields. A record in a table contains information about an item. The record is composed of information elements stored in fields, which follow each other in the same order in each record (Curilă M. et al, 2019).

In order to maximize the flexibility of the database, the information is organized in tables on different themes, well outlined, so that there are no redundancies. In order to share the information divided by themes, the tables are connected to each other by links.

Forms are graphical interfaces used to work with information in a database, to enter, view, or edit data in tables, and often contain command buttons that perform various commands.

For this purpose, forms contain graphic elements called controls, which are associated with fields in database tables or various operations with it. A control is a graphical user interface object, such as a text box, check box, drop-down menu, or command button, that allows the user to control the program. Controls are used to display data or options, perform an action, or make the user interface more pleasant (Curilă M. et al, 2019).

Forms also allow you to control how users interact with the information in the database. Thus, the data is protected and it is ensured that the data is entered correctly.

Queries are questions asked of the database. Their most common function is to retrieve specific data from tables. Usually the data that you want to see is in several tables, and queries allow you to view it in a single data sheet. Additionally, if you don't want to see all the records at once, queries allow you to add criteria to filter the data and display only the records you want.

Queries are divided into two types: selection queries and action queries. A select query retrieves the data and makes it available for use. The results of a query can be viewed, or used as a record source for a form or report. An action query performs an activity with the data. Action queries can be used to create new tables, add data to existing tables, update data, or delete data.

Queries allow you to specify the table fields that appear in the query, as well as sorting and filtering criteria for those fields.
The query can contain fields taken from one or more tables if there are links between them. Also, the query can contain calculated fields whose data source is an expression - a character string that can consist of operators, functions, field references, or constants (Jennings R., 2000).

Thus, when the query is run, the calculations defined by the expression are performed and the results are displayed.

Sorting is the process of ordering a set of records so that an ascending or descending order criterion is respected relative to a certain field. Sorting by more than one field can provide more accurate results.

The filter criteria identify the records that will be included in the query result, limiting the display to only those records that match the invoked conditions. A filter can be seen as a rule that is specified for a field. This identifies the values in the field that will be seen. Such a criterion is treated as an expression.

Reports are used to synthesize and present information from the database in the most readable way possible. A report consists of information extracted from underlying tables or queries called record sources and information stored with the design of the report, such as labels and graphics (Curilă M. et al, 2019).

Additionally, more complex reports contain a hierarchy of grouping and sorting levels or statistical summaries relative to the fields considered for the report.

To display information on its surface, the report uses graphic elements called controls, which are of three types: bound, unbound, and calculated. A control whose data source is a field in a table or query is a bound control. Bound controls are used to display values from database fields. A control that does not have a data source (a field or an expression) is an unbound control. Unbound controls are used to display information, lines, images, etc. A control whose data source is not a field but an expression is a calculated control. You specify the value of the control by defining an expression as the data source for the control (Curilă M. et al, 2019).

An expression is a combination of operators, control names, field names, functions that return a value, and constants. The expression can use data from a field in the table or query underlying the report, or from a control in the report. The functions that can be used in an expression are those provided by the application and allow the calculation of the following statistics: Sum, Arithmetic Mean, Record Count, Value Count, Maximum, Minimum, Standard Deviation and Variance (Habracken J., 2002).

When a calculated control is placed in the group footer, the statistic is calculated from the current group's data and displayed below it. If the calculated control is placed in the footer of the report, the statistic is calculated from the data of the entire report and displayed at the end of the report.

Data collection from the field.Currently, in the forestry sector, the collection of data from the field is carried out by the technical and field staff mostly on analogue media (field records) and later they are sent to the secretariat of the bypass, sometimes through the departments of the forestry units .

The only data that are collected from the field and transmitted electronically are those that are made with the help of the SUMAL 2.0 platform, namely the inventory of wood products, the handing over of parcels (of the areas that have been exploited), the return of the parcels (of the areas that have been exploited), notices electronics related to the wooden material to be transported, minutes of sorting of the exploited wood (Matei L., 2022).

In the case of the inventory of wood products, the procedure is much simpler than the classic one - on analog support, because it makes work more efficient.

A series of changes are still expected for the handing over or taking back of parquets (the surfaces from which the wood products were exploited), aimed at simplifying the work procedure (currently their listing is done only by certain persons, an aspect that needs to be adjusted).

It is necessary that in the future all data from the field be collected and transmitted electronically by various means - applications, electronic forms, platforms, e-mails, etc.

The use of electronic forms is effective for the following reasons:

-allow the centralization of information automatically, in a spreadsheet, from where it can be easily processed;

-data are transmitted quickly without the need to transport documents;

-the data transmitted from the field can be effectively checked by the staff involved (field staff, technical staff, control staff);

-reduction of working time and necessary supplies;

-overall efficiency of field and office activities (Matei L., 2022).

MATERIAL AND METHOD

The case study was carried out in the forestry fund of the Production Unit (U.P.) Ill Căiuți - fig. 1, Caiuți Forest District (O.S.), Bacău County, (Matei L., 2022).

The research and study methods that were used are: documentary information, observation on the itinerary, observation in stationary, experimental, inventory, mathematical modeling, simulation, comparison, photography and digital recording of the objective reality in the field (Crainic G. C. et al, 2020).

To carry out this case study, the following logistical base was used: the forest management related to the Căiuți III production unit, forest plans and maps related to the Căiuți III production unit, cameras, GPS receivers, total station, scanner, programs for harvesting data from the field, programs for data transfer, programs for data processing, programs for archiving data and respectively obtaining and organizing the database, and implicitly the computer system, PCs for data processing, Excel program, peripherals for obtaining final products in analog format (Crainic G. C. et al, 2020; Matei L., 2022).

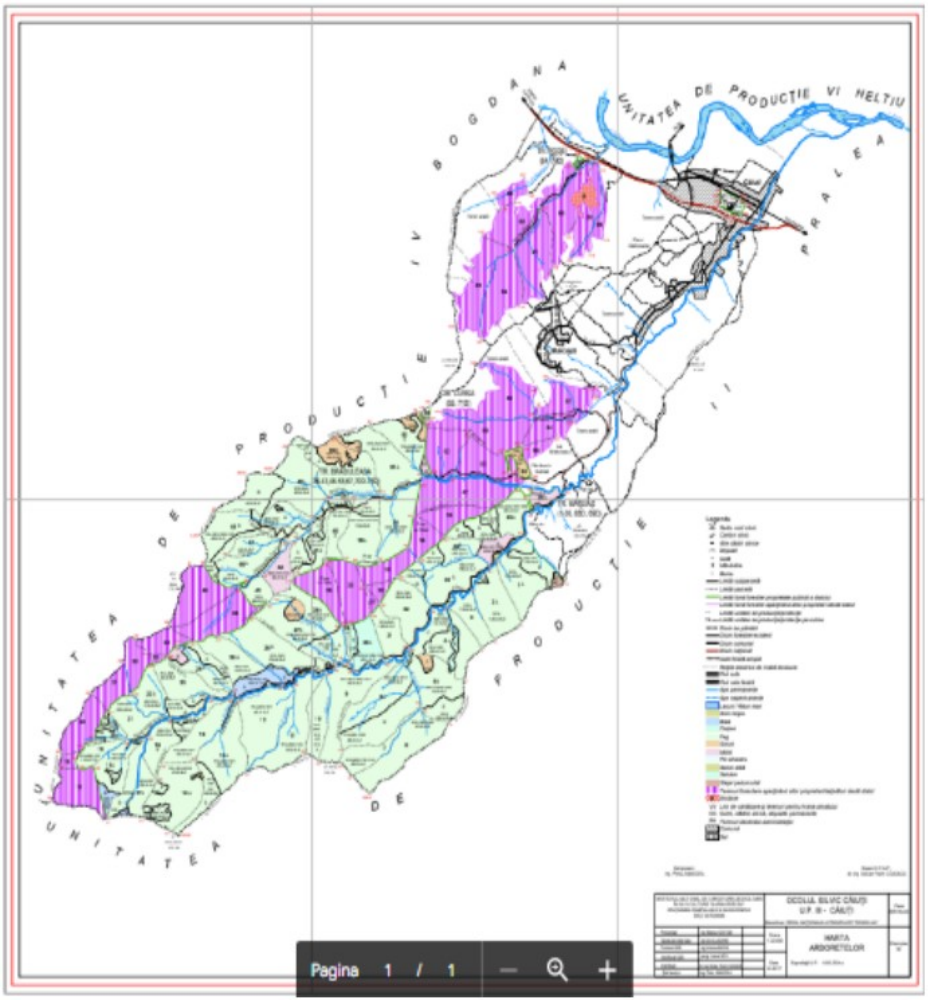

Figure 1-**Location of the study on the forest map used**

RESULTS AND DISCUSSIONS

In the present case, the technical and field personnel who have duties within the UP III Caiuti area (District III Bogdana) only need access to the main platform and then select from the platform menu the ELECTRONIC DOCUMENTS page or the compartment where they want to transmit a certain document - Photo 1, Photo 2.

After selecting the electronic documents (forms) page, we look for the type of document (report, verbal process, report, etc.), next to electronic document filing there is also a button where we find the brief summary.

Photo 1- **QR Code Electronic documents**

Photo 2 - **Electronic documents page**

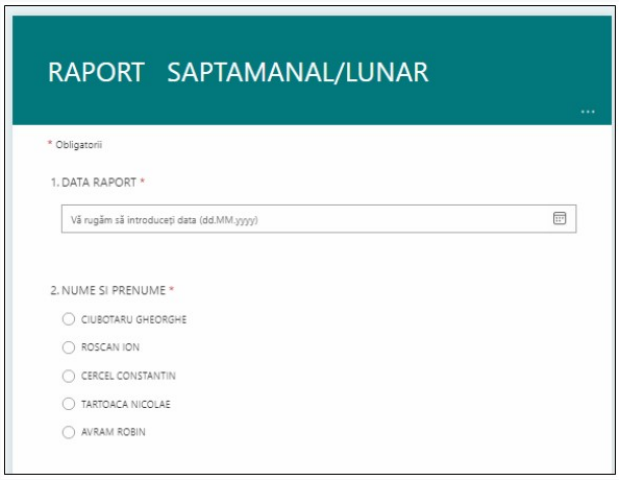

Photo 3-**Weekly report**

Photo 4-**Sheet G OBSERVATIONS DEER**

Photo 5-**Sheet G DEER OBSERVATIONS (continued)**

Photo 6-**Sheet G DEER OBSERVATIONS (continued)**

Weekly/monthly exploitation report.

We open the report (blue button).

We select the date, the name and all the information required by the form. If they are known (prepared), all the information is completed in a maximum of 40 seconds, otherwise it may take even more than a minute. After checking all the information, send it by pressing the green button. When we want to check if the information has been transmitted safely, we go to the blue button where we have a summary of the information transmitted.

Photo 7-**Sheet G DEER OBSERVATIONS - completion of data entry**

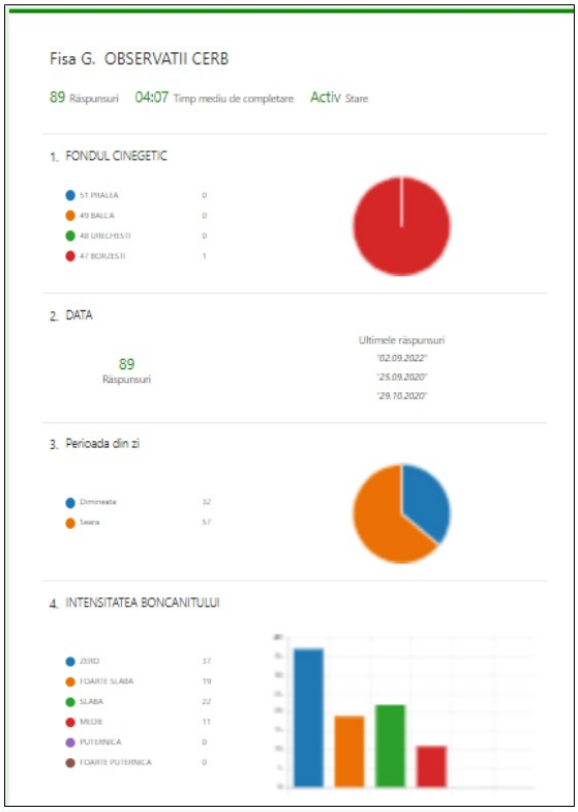

Photo 8-**Sheet G DEER OBSERVATIONS (final report with a synthetic presentation of the results obtained)**

The detailed results in excel format are visible only to the person who deals with data processing, to check all the data before centralization, drawing up some tables, signing them, sending them to the hierarchically superior structures and their superintendence.

Observation sheet Common deer. We open File G, blue button in this case, but it can be opened from many places, hunting platform, district platform, WhatsApp Group, with the help of a QR code, Photo 1, Photo 2, Photo 3-Photo 7.

We select the number and name of the hunting fund, the date, the name, we fill in all the information required by the form.

After checking all the information, it is transmitted (send) by pressing the green button.

If all the information is known (prepared), the form can be completed in a maximum of 90 seconds, otherwise it may take a little longer.

When we want to check if the information has been transmitted safely, we go to the blue button where we have a summary of the type G file (Observe Deer) - Photo 8.

The detailed results in excel format are visible only to the person who deals with the data processing, to check all the information before centralization, drawing up some tables, signing them, sending them to the hierarchical bosses and their supervisors.

Patrol report. We open the Patrol Report, blue button in the present case but it can be opened from many places, hunting platform, district platform, WhatsApp group, with the help of a QR code.

After checking all the information, send it by pressing the green button.

When we want to check if the information has been transmitted safely, we go

to the blue button where we have a summary of the patrol reports.

Data centralization and processing.

Photo 9-**Application interface for the centralization and processing of data recorded in the field, with the Excel program, in the location U.P. III Caiuţi, O.S. Caiuţi, D.S. Bacău**

Photo 10-**Initialization of the process of centralizing and processing data from the field**

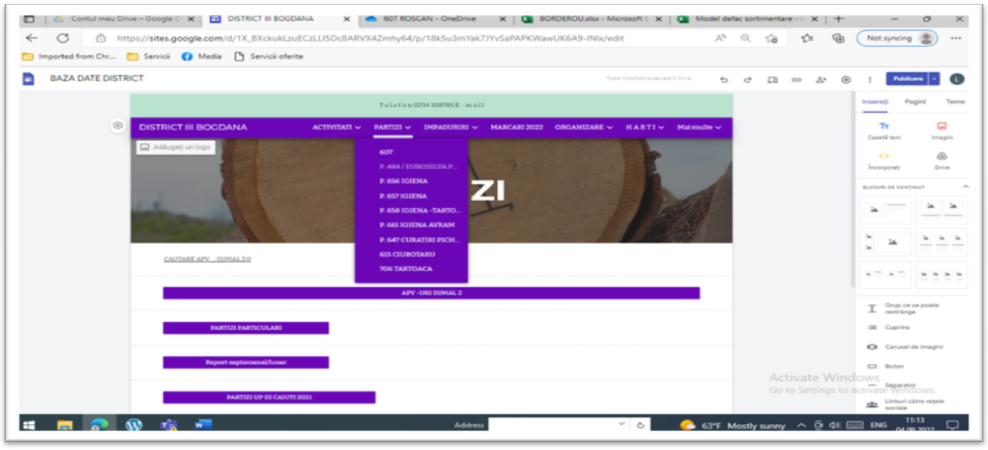

Photo 11-**Visualization and analysis of data and information related to the wood exploitation process, within the U.P. III Caiuţi, O.S. Caiuţi, D.S. Bacau**

In the previous chapter, we mentioned that the use of electronic forms gives us a particular advantage because the results are automatically centralized in an EXCEL where they can be easily retrieved and also in

Excel, all the desired tables for reports and required situations can be loaded automatically.

UP III Caiuti and UP IV Bogdana together form District III Bogdana and all information from the field (for the most part) is first centralized at the district level and then transmitted to the surrounding area.

As the main point of departure, we have the district platform where we find everything about UP III Caiuti.

Data processing and storage at the district level is done in OneDrive for maximum security and the possibility of accessing the information of several people from several places, devices regardless of time, time.

Some examples: Record of exploited wood.

Management of timber exploitation by forestry personnel. Wood evaluation act no. 607.

In the activity of wood exploitation by the forestry staff, the manager of the wood assortments, must always have an up-to-date stock situation (MANAGEMENT BOOK) Using Excel for issuing slips and N.I.Rs, we have at our disposal a double control (the record cross) considering that the current situation can also be listed from the SUMAL 2.0 program. Using the Excel program, we have an electronic management book, with all up-to-date records. (stocks of wood material, notices, prices, types of wood and others).

The link from the district platform to the excel file of a wood exploitation and valorization act, by forestry personnel (act no. 607), N.I.R., document and money deposit slip, record of electronic notices .

Wood exploitation activity by economic agents. The link between the district database platform (with the Excel program) for an act of exploitation and valorization of wood by an economic agent (act no. 484), provides information about the exploitation process, carried out by the economic agent (with all the related particularities).

In the framework of the wood exploitation process by economic agents, the development of the exploitation and valorization process is followed very carefully, on relatively small, delimited areas, from a technical point of view, in order to comply with the forestry rules of exploitation in force, but also from the point of view from a financial point of view (the wood payment is usually made on these delimited surfaces).

CONCLUSIONS

Creating the database itself is useful, but the most important thing is how it is done, with the information received from the field. With the help of electronic forms, the data are entered in real time in an excel that are processed automatically and can create centralizing tables and reports necessary for the preparation of specific works for a certain department.

The use of the database is an effective way of realizing some situations related to the field activity, carried out within a UP, forestry canton, compartment in the center of the bypass.

From the analysis of the results of the present case study, it can be observed that a number of three online platforms have been created, in total with over 200 web pages that can be developed, modified at any time, a number of over 100 folders in OneDrive with content of 7,601 .753 KB. where you can find excel, word, pdf documents, maps, images.

The use of this database means the digitization of the forestry, forestry, hunting domain up to the forester, exploitation foreman, game warden.

This database can be redone, adaptable for other production units, districts, forest areas, hunting associations, exploitation companies...etc.

The database can be queried very simply from anywhere with the help of a personal password. The people who access this atabase can manage, modify, process certain files and documents depending on the permission received from the main administrator, creating a functional system that can be easily developed.

The advantages of collecting digital information is a real advantage because everything is saved in OneDrive and a unit connected to the Internet, we have a double save for safety. If by mistake or on purpose the database in the central unit is destroyed, it can

be restored relatively quickly in conditions of maximum efficiency without losing information.

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*** Forest map of U.P. III Căiuţi, O.S. Caiuţi, D.S. Bacau;

*** Excel program.