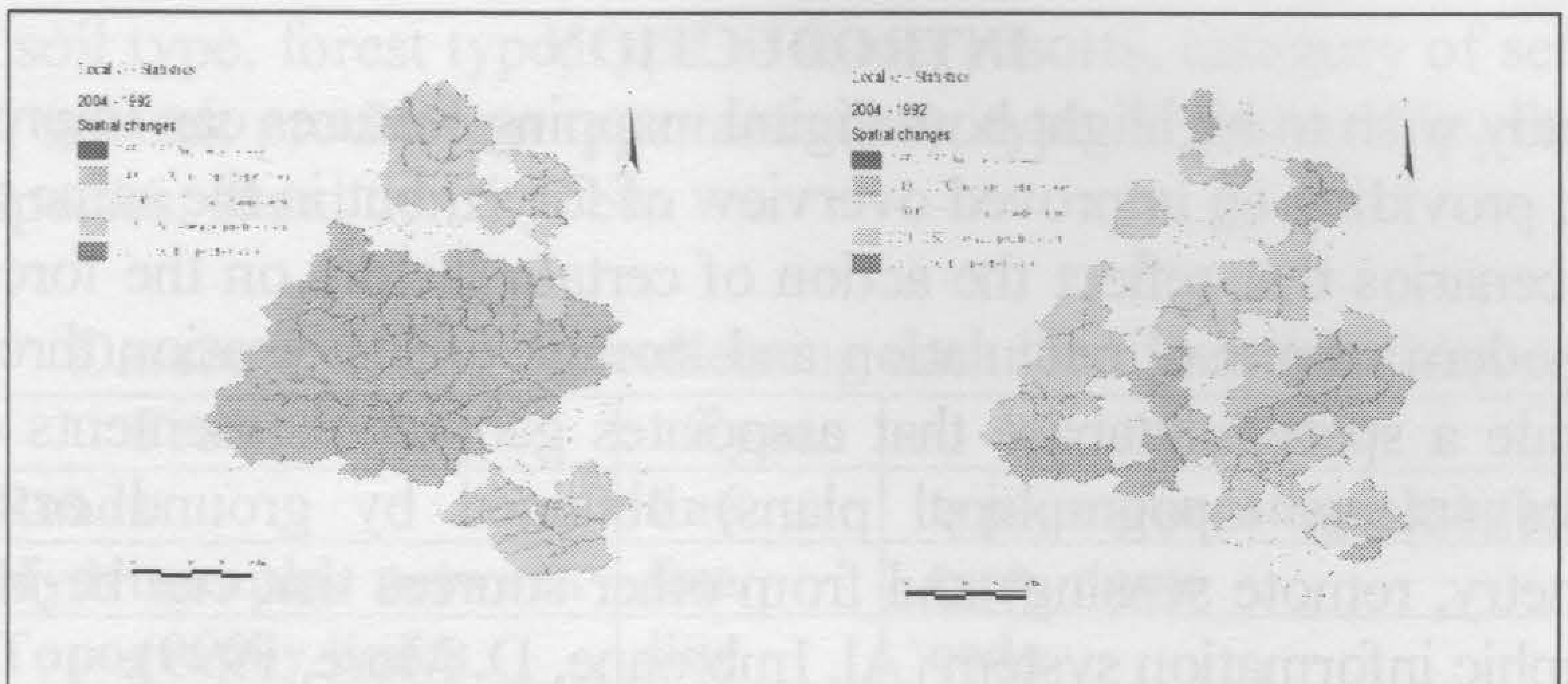


a)Gi for numbers of doctors *b) Gi for number of social asistence employees*

Fig. 5. Difference between 2004 -1992 looking at Gi indices for the studied parameters

Spatial autocorrelation can be a valuable tool to study how spatial patterns change over time. Results of this type of analysis lead to further understanding of how spatial patterns change from the past to present, or to estimations of how spatial patterns will change from the present to the furture (H. Nakhapakorn et al., 2006).

REFERENCES

1. DANLIN Yu, YEHUA Dennis Wei, Spatial data analysis of regional development in Greater Beijing, China, in a GIS environment, Papers in regional Science vol. 87, Malden, 2008, USA.
2. HANCHANA Nakhapakorn, SUPET Jirakajohnkool , Temporal and Spatial Autocorrelation Statistics of Dengue Fever, Dengue Bulletin vol. 30, New Delhi, 2006, India.
3. LEE J., WONG David W. S., Statistical Analysis with ArcView GIS, John Wiley & Sons INC., 2001, pp. 192.
4. MUREŞAN F., DAINA Lucia, The buildings management in the sanitary public system of Bihor district - detailed research, Geographi techinca 1/2008, Cluj-Napoca.
5. ***Ordonanţa nr. 70 din 29 august 2002 privind administrarea unităţilor sanitare publice de interes judeţean şi local.

CZU:630*5

APPLIED GIS FOR DESIGNING THE DATABASE AND MAPPING SPECIFIC TO FORESTRY

I. HAIDU, G. COSTEA

"Babeş-Bolyai" University, Faculty of Geography, Romania

Abstract. Gestionarea pădurilor, în lumea, zilelor de azi, care se schimbă de la zi la zi, a devenit o provocare mult mai complexă şi dificilă. Hărţile, luarea în calcul a diferiţilor factori, precum şi deciziile care se impun pentru valorificarea produselor forestiere, se iau sub o notă de conflict des întâlnită, care totodată are şi o doză de incertitudine. Specific amenajării pădurilor, în ultimul timp s-a dezvoltat o nouă tehnologie de informatizare a cartografiei, integrată într-un sistem informatic geografic (gis) prin care elemente ale spaţiului geografic sunt completate cu informaţii tematice specifice amenajării pădurilor. În acest sistem se realizează modelul digital al terenului, ca expresie a stocării şi prelucrării informaţiei cartografice exprimată prin caracteristicile topografice de planimetrie si nivelment ale suprafeţei terestre.

Key words: Cartography, Forest management, Forest planning, GIS, Maps.

INTRODUCTION

This study wish to highlight how digital mapping features can improve the forest management, providing an improved overview of forest, but in the same time to allow for various scenarios that reflect the action of certain factors on the forest in a given area. With modern means of calculation and storage of information through the GIS we can provide a spatial database that associates geographic elements derived both from graphics (maps, topographical plans) obtained by ground or air methods (photogrammetry, remote sensing) and from other sources that can be integrated into forest geographic information system (Al. Imbroane, D. More, 1999).

Topographic plans and base map, the specific elements for the forest planning, once implemented in digital form is passed to the creation and use of GIS database by connecting logic elements with the digital cartography for the characterization of the forest stands conditions and forest vegetation, resulting the possibility of digital cadastral fund and forest planning, including automatic completion of thematic maps (M. Predescu, 2007, D.J. Wilford, 2007).

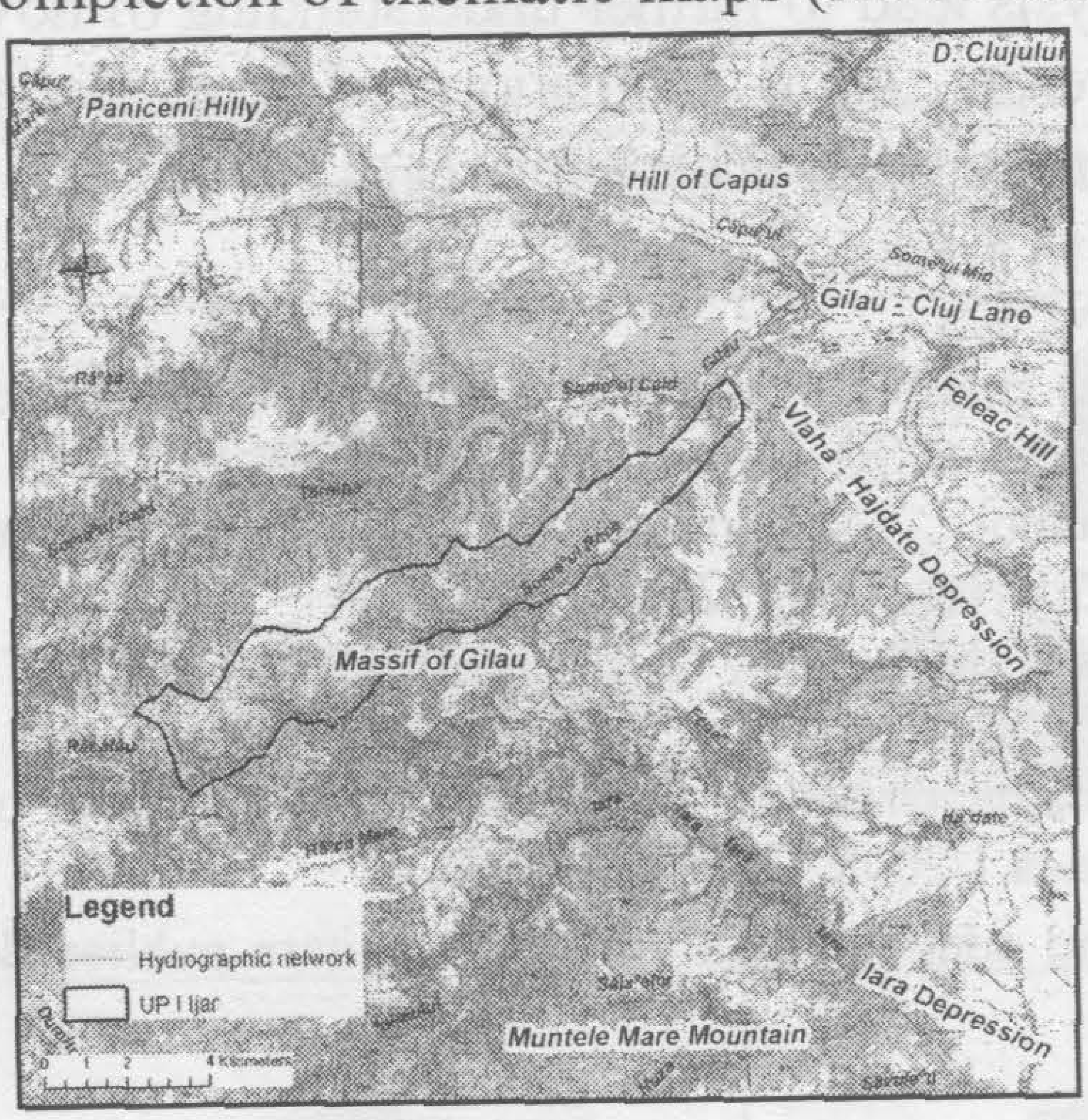


Fig.1. Studied surface location

The area of the study is the surface of an forest unit located in the area of Apuseni mountains (**Fig. 1.**), specifically in the wooded mountain of Gilău in the Someşul Rece catchment area, a tributary of the Someşul Mic river.

MATERIALS AND METHODS

For the data source used to realise the geodatabase we took in consideration the forest paper map of the "I Ijar" forest unit, which is managed by Gilau forest district, the topographic maps for the level of the area and the writed forest inventory for this surface. For the next phase we procced to georeferencing maps, in the Stereo70, projected system, wich is the projection used nationwide.

With this step done we start digitizing data. This step was made using the geodatabase advantages. The geodatabase main advantage is that we can integrate data from source maps in separate feature dataset. Geographic features like roads, rivers, area limits, forest stands and localities has been separated in feature classes. Feature classes has been defined like in the **Table 1**.

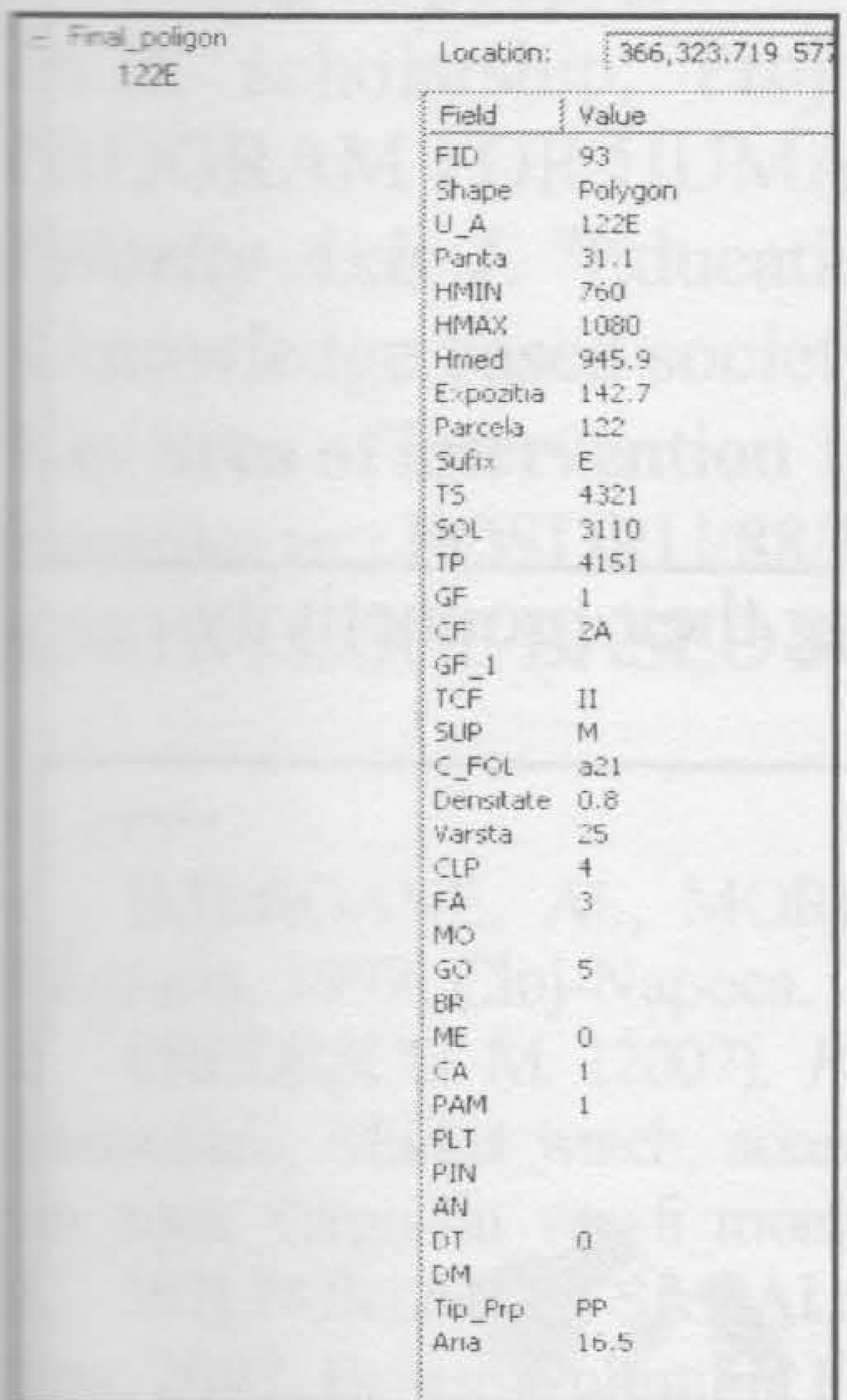
Using a tool from the GIS software (the ArcGIS Desktop software package), by digitizing contours on topographical plans, digital terrain model was obtained which allowed the calcualtion of slopes, exposures and allowed the classification in terms of altitude for the studied surface.

Attribute data, taken from the forest inventory plans have been processed in an Excel document that was added by the Join function to the digitized map. Soo the polygons coresponding to forest stands will contain information such as name of the stand, soil type, forest type, type of forest resorts, category of service, age of forest stands, subunit production type, area (ha), type of ownership, the proportion of different species, stand density, etc.

Table 1

Database desing for collecting data from map sources

Feature class	Type	Attributes
Roads	**line**	**type, name, shape lenght**
Hydrographic network	**line**	**type, name**
Topography limits	**line**	**code**
Localities	**polygon**	**name**
Forest stands	**polygon**	**forest type etc.**


Final_poligon
122E
Location: 366,323.719 57

Field	Value
FID	93
Shape	Polygon
U_A	122E
Panta	31.1
HMIN	760
HMAX	1080
Hmed	945.9
Expozitia	142.7
Parcela	122
Sufix	E
TS	4321
SOL	3110
TP	4151
GF	1
CF	2A
GF_1	
TCF	II
SUP	M
C_FOL	a21
Densitate	0.8
Varsta	25
CLP	4
FA	3
MO	
GO	5
BR	
ME	0
CA	1
PAM	1
PLT	
PIN	
AN	
DT	0
DM	
Tip_Prp	PP
Aria	16.5

Fig. 2. "122E" forest stand attributes

Values thus obtained were integrated in the desigend database, so that each polygon received values that help's in characterization of each forest stand. After these operations the GIS system will display information about forest stands as those in **Fig. 2**. The attributes obtained, like *Hmed* (average altitude of the forest stand), exposure, soil type can make the purpose of an graphic representation, in this case a map. This fields values and representation are important in classifing and gruoping the forest stands.

RESULTS AND DISCUSSIONS

The making of an forest geodatabase, covered by this study, presents great advantages as it allows for querying on a single criterion (attribute value) and on several criteria, or allow a classification on a single criterion or multi. It involves the condition of obtaining a result that can be perceived and analyzed by forest engineers.

A classification involving several criteria should be the one that is grouping the forest stands by their productivity. This involves two factors: the type of stand conditions and the type of forest in the each stand. This is explained by the fact that the type stand conditions gives creditworthiness of the stand and the type of forest is giving us the type of vegetation in each stand. The result of such classification is shown in **Fig. 3**.

The map querying, one of the most popular methods of GIS analysis, but also used by forest engineers on the database so created, can be really useful. It allows obtaining specific thematic maps such as one for forest operations regarding wood harvesting (**Fig. 4**).

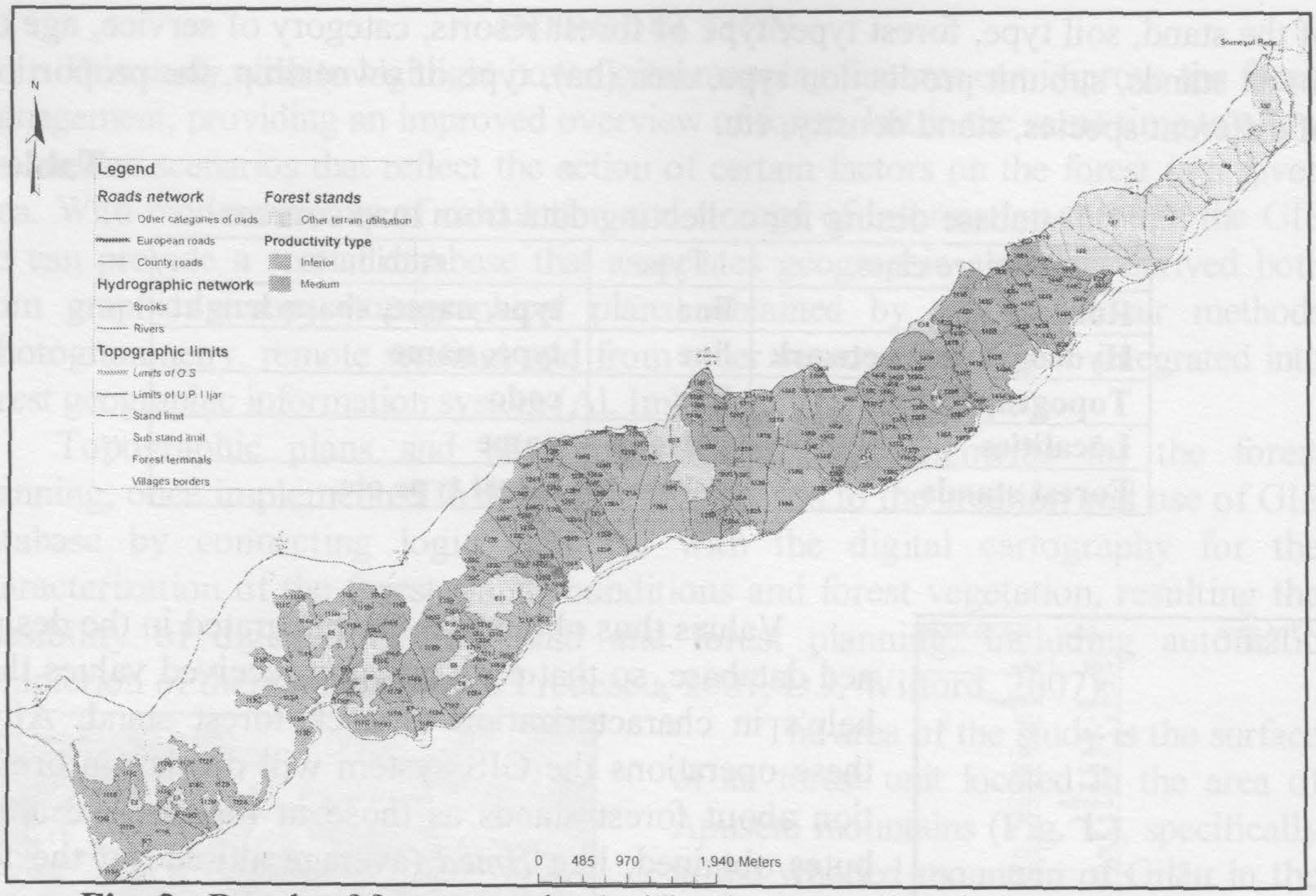


Fig. 3. Result of forest stands clasification regarding their productivity

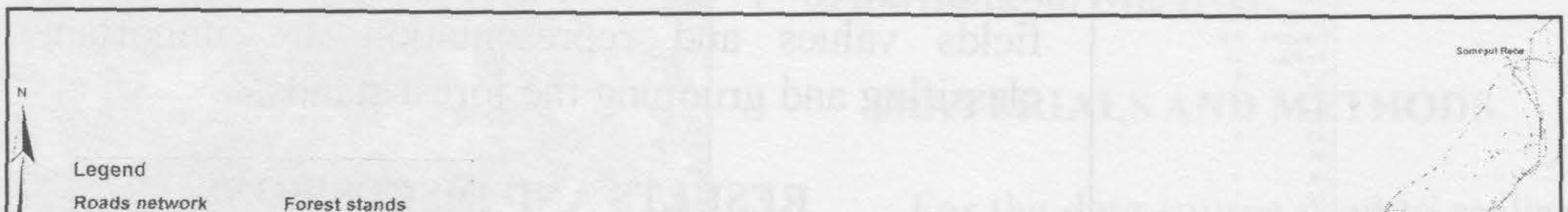


Fig. 4. Results of map interogation regarding wood harvesting

CONCLUSIONS

One of the most important conclusion is that making such database it could be possible to integrate more types of data like tabular and graphic. Also achieving specific spatial database for forest planning for the unit production, like U.P. "I Ijar", and of course the results obtained, are designed to increase speed in making decisions, to allow an overview of forest and to allow analysis and study in different situations. Thematic maps obtained as a result allow full view over the forest, in terms of its functionality. This is more beneficial than tabular data, because now we can better understand how forests interact.

Acknowledgements

We would like to thanks to the Romanian AMPOSDRU team and the Institute of Doctoral Studies of Babe Bolyai University which facilitated the publication of this paper.

Investing in people!

Ph.D. scholarship, Project co-financed by the SECTORAL OPERATIONAL PROGRAM FOR HUMAN RESOURCES DEVELOPMENT 2007 - 2013

Priority Axis 1. "Education and training in support for growth and development of a knowledge based society"

Key area of intervention 1.5: Doctoral and post-doctoral programs in support of research. Contract nr.: POSDRU/88/1.5/S/60185 – "INNOVATIVE DOCTORAL STUDIES IN A KNOWLEDGE BASED SOCIETY", Babeş-Bolyai University, Cluj-Napoca, Romania.

REFERENCES

1. IMBROANE, Al., MORE, D., *Iniţiere în GIS şi teledetecţie* , Editura Presa Universitară Clujeană, 1999, Cluj-Napoca.
2. PREDESCU M. (2007), *Pădurile din zona Târgu-Jiu vor fi monitorizate cu ajutorul unei soluţii geospaţiale*, Market watch, accesat Aprilie 2009, adresa: http://www.marketwatch.ro/articol/2038/Padurile_din_zona_Targu-Jiu_vor_fi_monitorizate_cu_ajutorul_unei_solutii_geospatiale.
3. WILFORD D.J., SAKALS M. E., Forest management for landslide risk reduction on alluvial fans, 2007, British Columbia Forest Service.
4. *Amenajamentul U.P. I Ijar*, Ocolul Silvic Gilău, Direcţia Silvică Cluj, 2008, Cluj-Napoca.
5. ESRI Press, *Using ArcMap: ArcGIS 9*, Redlands, CA, 2000, USA.
6. ESRI Press, *Using ArcCatalog*, Redlands, CA, 2001, USA.
7. ESRI Press, *Using Spatial Analyst*, Redlands, CA, 2001, USA.
8. ESRI Press, *Using ArcGIS 3D Analyst*, Redlands, CA, 2002, USA.

CZU 631.95(478)

MODELAREA REGIMURILOR NATURALE ALE GEOSISTEMELOR DE SILVOSTEPĂ

S. NUNU[1] , V. SOFRONI2

[1]Universitatea Agrară de Stat din Moldova

[2]Universitatea de Stat din Tiraspol

Abstract. The modeling of natural regimes of silvosteppe geosystems in terms of fragmented relief can be done using the agroecological micro-zoning model of the agricultural crop varieties and hybrids.