THE SELECTIVE DISTRIBUTION OF PASTURE SURFACES SITUATED ON ADMINISTRATIVE TERRITORY OF NADRAG, TIMIS COUNTY

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Abstract: *The background for using the multifunctional system of pastures consist in the integrate management of the vegetal carpet that by pasture usage value, take a new size, connected to the sustainable development. Also, the pastoral multifunctional using degree could lead to a standard degree concerning the Romanian agricultural integration into the European structures. The main objective of this study is made by the Nadrag pastures. The study draws up the complex arrangement of pastures, in order to obtain a proper and efficient benefit ant to also to ensure an ecological balance. The Nadrag village is situated on the South-West part of Romania, in the North-East of the Timis County, at Pades peak ground from the Poiana Rusca Mountains. Due to the mountain location of the area, the village main geomorphology is dominated by hills, having slow slopes just in several cases. The area is also having multiple meadow pastures, up to the mountains altitude, between 168 m (Crivina village) to 1380 (Pades village). The actual stage of research into the area consist in identification ad monitoring on the plans the position of the virtual village pastures on a total surface of 307,8 ha. From which 72.96 into the meadow area. The news of the methods and approaches is relevant by the GIS and Teledetection of the satellites data in order to create a new methodology of pasture inventory. The degree of current novelty is represented by a subsystem dedicated to the way of using the satellites images for identifying, monitoring the evolution and changes along the land fund in order to use the information to determine and update a list of parameters which contribute to the planning and forecast of pastures activities into this zone. The databases sources consist in satellites images (Landsat 7 TM, SPOT, IKONOS); topographic maps 1:25000; cadastral plans 1 : 5 000 ; 1 : 10 000; thematic maps (geological maps, pedological maps etc.) and least but not last field data acquisition. The specific of the paper, shows up a GIS data base in a compatible format with the international profile organizations and other Romanian organizations from the same branch, building the background for using the data base created for a lot of further activities such as forestry fund inventory, soil degradation monitoring etc. The paper importance consist in realizing detailed maps (1:25 000, 1:10 000) that covers the local area and the Banat area in order to execute also other applications.*

Key words**:** *satellite images, GIS, database, remote sensing.*

INTRODUCTION

The Earth and its wealthy represent basic economic values for satisfying the elementary needs; also these is the most important part of national wealth being a safety source for state income taxes. A good qualitative and quantitative knowledge of real estate, is the cadastre and topography objective, that is achieved by inventory, field measurements and plans and maps representation, including soil evaluation and mapping.

Harmonious developing of human habitats, urban and rural, of all national economic branches are strong related with works execution in field of cadastre and territory arrangement.

Local Councils who has lawn administration around the territorial administrative will established as straight responsibility the foreknowledgement contained in pastoral arrangements and in the yearly plans of lawns exploitation approved by the Local Councils. The managements of these surfaces is made by consulting the animal producer, with technical

assistance of Agriculture Department and Rural Development, and County Center for Agriculture Consulting. The lands identified as lawns and being in Local Councils, communities or animals producers are use exclusively for grazing, the hay, fodder plant cultivation for obtaining green mass, hay or seeds, meadow protection curtains, zoo pastoral constructions, land improvement works for raising up the lawn production productivity must be well cadastral bounded and register in the Land Book Register as a propriety proved according to the European Standards imposed by the member states.

These reasons, assigned mainly to topography, cadastre and to land management, important tasks that require a more and more complex activity, organized and lead by people with high professional training and skills.

The personal propriety law, interest not only the owner but the whole society. Taking into consideration these social function, it's logic and also necessary that the owner of the propriety to be stimulated in order to exploiter the propriety very rational, having economically efficient outcomes, preserving carefully the propriety in order to use it in it's personal interest and in the society interest.

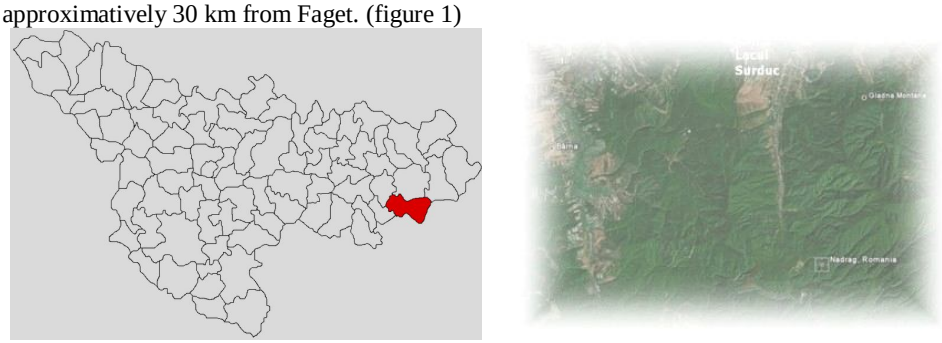
The propriety is a social relation which appear between persons as a result of materials and production means assimilation.

Since 1865, The Romanian Civil Code, define the propriety right taking into consideration, the juridical attributes that confine his juridical content. „Propriety is the right to gratify and decide exclusively and absolutely over a good, within the law". (art.480 Civil Code).

MATERIAL AND METHODS

Developing the work aims to a planimetry and altimetry topographical work of lawns identifications and inventory on Nadrag locality, Timis county.

Nadrag is situated in the South-West part of Romania, in the North-East side of Timis County, at the feet of Pades Peak from Poiana Rusca Mountaines. (Pades Peak 1380 m). Nadrag is also situated at around 30 Km. from Lugoj, 90 Km from Timisoara and approximatively 30 km from Faget. (figure 1)



a. b.

Figure 1 Nădrag Commune site

The settlement is crossed by Pades River, which has as tributary the small water blemish Cornet, near downtown. From the last junction, the Nadrag river is formed and flows into Timis river.

The distance between the locality and Pades Peak (E-V) is around 20 km, but from altimetrical point of view, the highest point of locality is still Pades Peak (1380 m), and the lower site is found on Crivina village, situated between 168 and 170 meters.

Due to the its dark valleys, having as closing point the Pades Peak, Nadrag locality has a hilly landscape, with sharp slopes and only in some places smooth slopes. The soil is generally made from crystalline shale, where very frequent is found granitic infusions, grenodioritical and sometimes calcareous with provide a special attraction. The mountain soil, podzolic, shallow, is made by crystalline and calcareous rocks, around 140 ha gnawed and covered by lawns while the alluvial soil is formed by alluvial materials transported as a result of plant erosion, deposited into the groundwater at 1.5-2m depth. It contains small quantities of humus, in 35 cm layers on a surface of around 72 ha, covered with hay.

The village surface is around 11.706 ha, but only 637 ha has agricultural destination (lawns 309.9 ha, from which forest hay represent 189.6 ha)

Spontaneous natural vegetation comprised around Pades area, we can meet elements belonging to the most various floristically fields such as: specific elements of Central Europe (beech forests), Eastern Europe (steppe with grasses), Mediterranean elements (chestnuts, wild lilac), elements from the Carpathian areas (conifers mostly) and also elements from the Balcanic Peninsula, few species of oaks and flasks.

The lawns boundaries are generally well defined, mostly in the neighborhood areas with forestry found. Ambiguous boundaries appear only in the neighborhood of the private proprieties where often wood vegetation was developed.

For a proper identification and delimitation of lawns surfaces around Nadrag area a consistent material base was necessary, equipped with advanced equipment of high performance in order to allow the access on any place by having straight visibility or less.

Also, one of the most important condition was the existence of the necessary documentation for the interested areas, which consist in cadastral plans, topographical plans and least othophotoplans of the area where the work has take place.

As endowment, considering the topographical equipment a GPS station and a total station LEICA 1600 were provided.

In order to identify the land boundaries, which is the main purpose of the documentation, the topographical survey of the area was made by using the GPS ProMark3 “stop and go” method which made possible the landmark operation for the boundary points by applying the GPS basis.

In this way, a static module was placed onto a point of knowing coordinates, at the output of Lugoj, on the geodesic state network point named “La Cucuiba”, by starting to made readings beginning with 9^{oo} AM until 5^{oo} PM hour.

The second module “stop and go” was moved inside the locality, on the field area, for identification and delimitation.

The operation sequence executed into a station consist in:

a)Prior beginning the work session, the functionality of geotopographic points must be made:

- points recognition;
- providing access and visibility point (clearing bushes around the landmark);

b) After finishing the recognition operation, materialize, point insurance, the working session program with GPS is prepare, and the specific measurements are starting:

- installing the GPS device;
- transport the equipment to the point station; (landmark, etc.);
- installation of the tripod in to the station point;
- installation of the antenna on the tripod;
- tripod installation – antenna on the point;
- installing the receiver ;
- connecting the antenna to the receiver;

- inputting the data into receiver;
- setup the receiver
- starting the work session with the GPS;
- drawing up the measuring files with topographical description;
- closing the work session at the established hour.

It must be mention that as in the classic network in the GPS geodesic network the principle of passing from a superior network range to an inferior network range is applied. In the geodesic application three different surfaces of the Earth are involved. Physics or natural surface of the Earth is approximated by a geometric reference surface or mathematic named ellipsoid and a echipotential surface named geoid.

Comparing with the classic measurements reported to **Krasowski** ellipsoid, the GPS measurements are reported to the **WGS 84** ellipsoid which is a geocentric reference ellipsoid echipotential defined by the following parameters: large semiaxa (a), gravitational constant of the Earth (GM), zonal gravitational coefficient normalized of 2nd degree (C20), angular velocity (ω) of the Earth. In conclusion the GPS network, (international network) was achieved into unitary system (**WGS 84)** made by permanent stations with high accuracy coordinates.

The points used on the national territory, having certain position and data name (fig.2) are part of the national network of 1st range and are named as permanent GPS station. Preliminary the work, the station coordinates were bought.

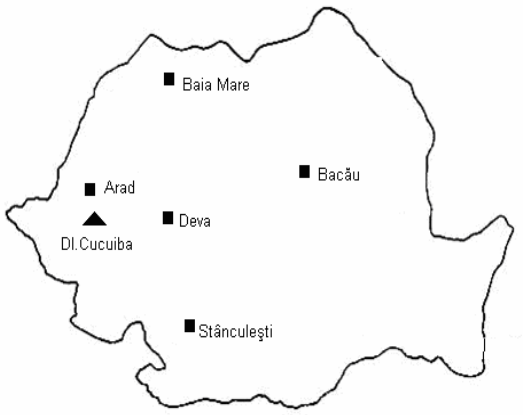


Figure 2. Permanent stations use for points identification and determination

The GPS technique (Global Positioning System) is the most recent procedure of measuring, processing in a flexible and efficient way of the geodesic and topographic network, and also of details point use for cadastre works.

The GPS system is based on a 24 satellite constellation surrounding the Earth on 6 knowing orbits sky high. The heights were the satellites are placed avoid the wave interferences from the soil. The GPS technologies is high accuracy that offer the precise location of the objects on the Earth.

RESULTS AND DISCUSSIONS

Initially data processing was executed by the **GNSS Solutions™** and **Geogenius 2.1.** software for the collecting data process and for the data processing.

The accuracy of data processing is 5cm +/- 2ppm.

The stocky points from the geodesic network were determined by three and four vectors from the permanent stations in Romania

After data processing with **GNSS Solutions™** and **Geogenius 2.1.** software the following deviations were obtain:

- standard deviation of base determination:

dx=1.7 mm,dy=5.3 mm.

- standard deviation of points determination:

dx=2.8 mm,dy=6.0 mm.

The coordinates data processing from the reference system WGS 84 into the Stereographic -70 system was made by **TopoSys 4.4** software having as a result the final coordinates of the lawns boundary (figure 3).

Figure 3. Lawns site on Crivina (cadastral plan scale 1:5 000)

The points checkout was make by the superposition with the orthophotoplan (figure 4) and the correspondence between the limits with the straight satellites image achieved on scale were follow.

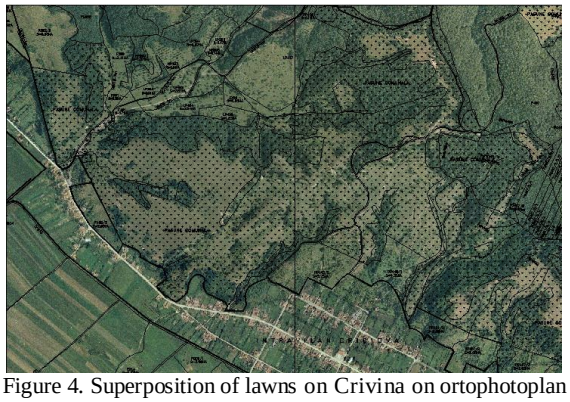


Figure 4. Superposition of lawns on Crivina on ortophotoplan

To achieve the works it is necessary a number of 4-6 points of knowing coordinates situated at 3-10 km distance, to surround the area.

These points has the purpose of ensuring the correspondence between the WGS 84 system and Stereographic-70 system, in order to assure the data processing coordinates from WGS 84 system to Stereographic-70 system. The field measurements are static executed and if we have at least three GPS receivers that provide optimal conditions concerning the relative position as follow:

- Minimum 4 identical receive satellites, receive simultaneously in the points were the receivers are placed;
- The **PDOP** value that provides the satellite geometry must be under 5;
- The Observation time, must be at least 1 hour for stocky network points;
- The observation time must be at least 15 min for photogrammetric marks.

By using AutoCAD the points were joint according to the terrain draft and the following documents were made:

- situation plan, containing the points identification;
- coordinates inventory on stereographic-70 system;
- cadastral plan of Nădrag
- overall plan at 1: 25 000 scale containing the altimetric disposal of lawns (figure 5)
- overall plan of communal lawns overlapped on orthophotoplan (figure 6)

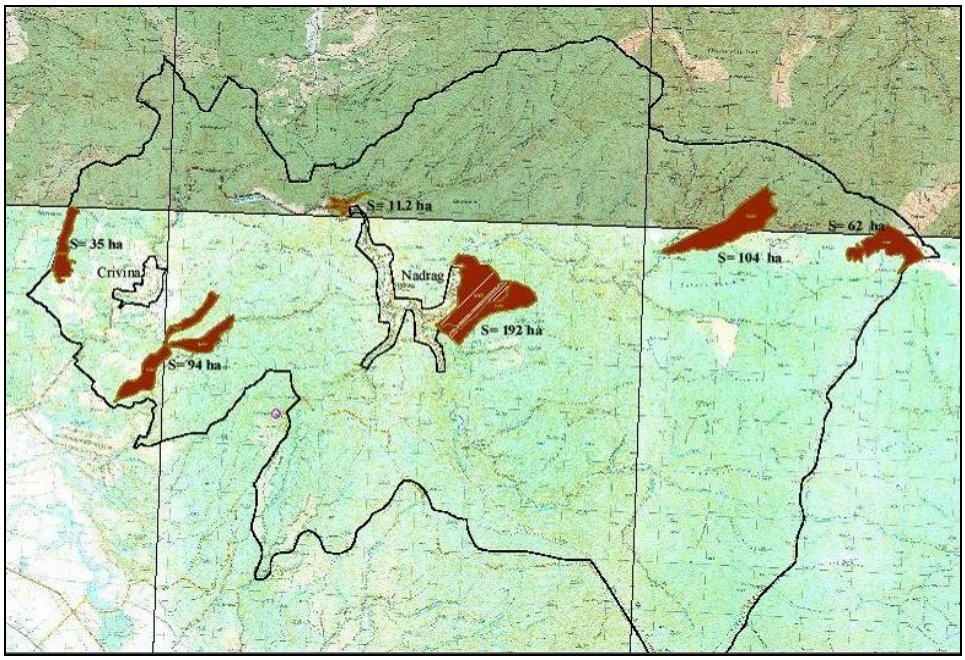


Figure 6. Overall plan at 1: 25 000 scale of Nadrag locality

The lawns limits are generally well defined mostly in the neighborhood areas with the forestry found. Less clear limits appear in the neighborhood areas of private propriety boundaries, were often wood vegetation grows.

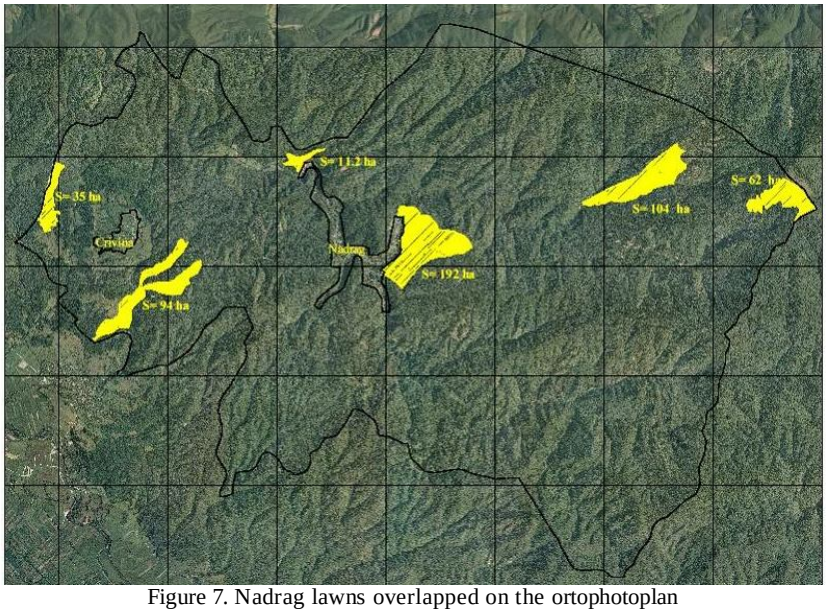


Figure 7. Nadrag lawns overlapped on the ortophotoplan

The total amount of lawns take into consideration is 307,8 ha. It has been confined in two functional groups.

- 1st functional group, for soil protection, having slope larger than 30° erosion soil;
- 2st functional group, with no special problems considering the soil protection.

The soil surface classification was made according to the lawns arrangement normative.

The following types of lawns were identified:

1. *Poa + Chrysopogon* type, generally covering the pastures between 120-250m in hills and lower hills, having enough humidity. The soils are frequently luvic type. The floristically composition is characterized by the population with *Poa pratensis*, *Chrysopogon i.*
2. *Agrostis + Festuca v.*, typical for areas with hills having heights between 250 and 400 m populated with *Agrostis* și *Festuca* species
3. *Nardus stricta*, type spammed in all the forest area, beginning with the beech heights until the upper limit of Spruce

CONCLUSIONS

The GPS topographic determinations use for cadastral works can be make in case o f an existing national GPS network but even in case when no network is available. We refer to the second case due to the fact that the national geodesic network is still in the execution phase.

The needs for cadastral plans achievements require the construction of stocky points of knowing coordinates and especially require photogrammetric determining. In both cases using the GPS is very profitable. The advantages of these lawns identification system consist in:

- no visibility is necessary between the network points and photogrammetric marks;
- no geodesic signalization is necessary;
- almost constant precision for all photogrammetric marks;
- specific technical-economical efficiency;

The final purpose of the paper consist in defining the characteristic points of an object that leads to its shape. If the determination methods with or without contact are diversified from principial point of view, all are based on elementary notions of optics and geometry.

At the same time, putting in the work, connecting with high precisoin demands need the whole existing measure systems to be available together with a complex aparatus.

In any topo-cadastral work, the essential elemant is the basic network, from where the measurements starts, together within the ways of creating the three dimensional basic networks necessary to estabilishe the position of measured land into the existing maps of the zone.

It were defined:

The possibilities to efectuate field measurements; instrument choosing, achieving the necessary number of observations;

-methods of processing the field measurements results.

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