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CARTOGRAPHIC ANALYSIS OF MEADOWS FOR IMPLEMENTATION OF A PASTORAL SETTLEMENT

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Abstract

In order to achieve a pastoral settlement is necessary to do an initial cadastral assessment of all land in the category of use, pastures and meadows which are owned by the public and private property .
The cadastral evaluation of the pastoral arrangement took into account the technical works and the existing installations, indicating the place of disposition in stereographic coordinates 1970 and determining the surface of the meadow or parts of the meadow, with the presentation of the name, area, neighbourhoods and boundaries.
Also, for a good approach to the issue of pastoral arrangements, it was necessary to study all the documentation underlying the property right, including the meadow sketch or the cadastral plan.
The division of meadows into lands and exploitation units has been done using the geographic and topographical aspects of the meadows and depending on the access routes and the natural boundaries imposed by the land.
The analysis of altitude and meadows exposure was done using the Global Mapper application by generating the topographical plan on the layout of grasslands and a level curve plan. There has also been a 3D model of the area where UAs are arranged for viewing meadows locations in a mountainous area.

***Key words**: meadows, topographic plans, 3D model, UAT, global mapper.*

INTRODUCTION

"Pastoral settlement" means the "documentation containing the technical, organizational and economic measures necessary for the improvement and exploitation of the meadows", in accordance with the grassland management objectives stipulated in the "Methodological Norms for the implementation of the Government Emergency Ordinance no. 34/2013 on the organization, management and exploitation of permanent meadows and amending and supplementing the Land Fund Law no. 18/1991 ", (art.1, lit. a of HG no.1064 11/12/2013).
This paper presents a model of pastoral settlement for meadows managed by a Local Council in Caras Severin County, which was built for an area of 275.61 hectares.
The cadastral evaluation of the pastoral arrangement took into account:

- the documentation underlying the property right, including the meadows sketch or the cadastral plan;
- determining the area of the meadow or the parts of the meadow, with the description of the name, surface, neighbourhoods and borders;
- description of the geographical and topographical situation of the meadow or of the various units where the meadow consists of several portions;
- establishing access routes;
- dividing the meadows into exploitation units and landings for different species;
- the technical works and installations which are used and indicating the location (Barliba et al., 2013).

So far, settlement management has been achieved either through renting / concession contracts to users (individual persons or legal entities registered in the National Register of holdings carrying out agricultural activities specific to the settlement utilization category)

or by the management of settlements holders - holders of the right to property. (Ritt, 2002).

MATERIAL AND METHODS

Varadia town is a border village situated in the South-West of Caras-Severin County and is crossed by the county road DJ 573 A which connects the city of Resita with the West side of the county, respectively with Gradinari commune, DN 57 and the town of Oravita (Figure 1).

Figure 1. Varadia locality

The connection to the Varadia commune centre is on the communal road DC 66 and to the village of Mercina on the county road DJ 573 A, which then continues to Iam village.
The village is bordered on the north with Forotic commune, towards the East with Gradinari commune and Oravita town, towards the South is neighbouring the villages Racasdia and Vrani, and towards the West with Serbia. Varadia commune covers an area of 8707 ha, of which 8547 ha represents the agricultural land.
Land balance was made in accordance with the parcel record taken from the Varadia City Hall, drawn up in accordance with the existing topographical basis elaborated for Law 165/2013; the area of permanent meadows under the administration of the Varadia Local Council is 275.61 hectares. This area was also reported to the Caras Severin County Council.
The parcel situation of the meadows included in U.A.T. Varadia for advising on the realization of the pastoral arrangement according (Barliba and Cojocaru, 2010) to the evidence taken from Varadia Town Hall is shown in table 1.

Table 1. The parcel situation of U.A.T. Varadia according to Law 165/2013, Annex 5 (evidence taken from Varadia Town Hall)

No.	No. Cadastre Sector	No. field	Cadastre No.	S -ha-
1	6	Ps 1273	30185	4.71
2	6	Ps 1287	30180	1.42
3	6	Ps 1287	30183	4.82
4	6	Ps 1283	30182	10.19
5	6	Ps 1277	30181	4.77
6	6	Ps 1265	30174	51.08
7	6	Ps 1265	30173	12.00
8	6	Ps 1274	30179	4.87
9	6	Ps 1279	30420	0.08
10	6	Ps 1281	30417	0.03
11	6	Ps 1281	30421	0.21
12	6	Ps 1260	30425	6.89
13	6	Ps 1262	30422	21.35
14	7	Ps 1102	30411	3.07
15	7	Ps 101	30407	0.88
16	7	Ps 101	30408	1.60
17	7	Ps 1102	30400	2.98
18	7	Ps 1108	30399	9.02
19	7	Ps 1107	30401	45.32
20	7	Ps 1221	30430	0.72
21	8	Ps 100	30406	4.06
22	10	Ps 95	30402	5.84
23	10	Ps 93	30403	21.85
24	10	Ps 98	30404	21.27
25	10	Ps 98	30409	1.28
26	10	Ps 95	30405	2.15
27	10	Ps 93	30410	2.18
28	21	Ps 1049	30418	3.87
29	21	Ps 1049	30419	3.36
30	21	Ps 1231	30423	1.44
31	21	Ps 1231	30424	2.05
32	21	Ps 1221	30427	2.64
33	21	Ps 1221	30429	0.56
34	21	Ps 1231	30426	0.32
35	22	Ps 1197	30416	0.11
36	22	Ps 1206	30432	3.57
37	22	Ps 1208	30415	0.54
38	22	Ps 1209	30431	7.90
39	22	Ps 1260	30425	4.61
Total U.A.T. Varadia 275.61 hectars				

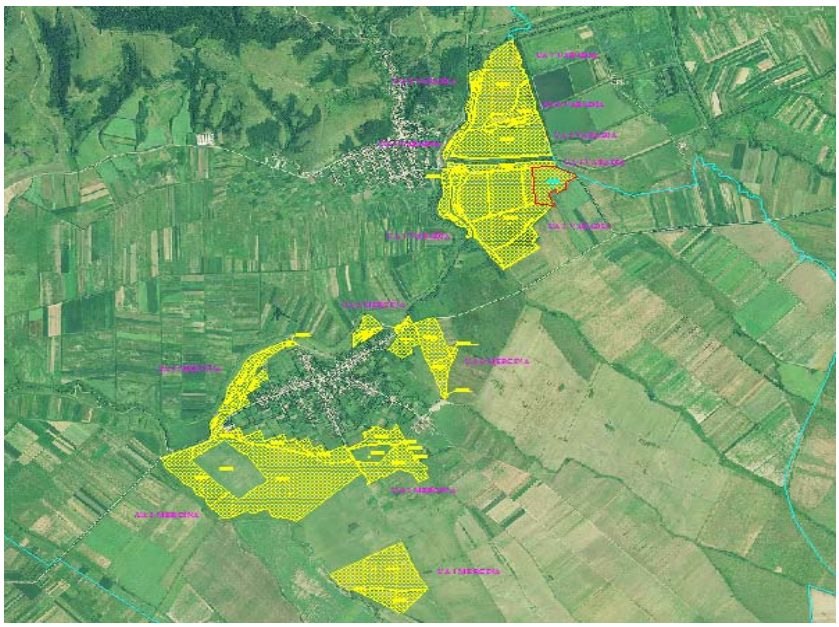

Figure 2. Placing of meadows areas in U.A.T. Varadia, Caras Severin County

The Surface Situation complies with Law No.165 of 16.05.2013 (Annex 5) and has been made available to the working group by Varadia City Hall in DXF format as well as Tabular in Excel format.

As cartographic material for the topographical analysis of the land, cadastral plans from the area and the orthophotomap for U.A.T. were purchased from O.C.P.I. Caras_Severin, respectively the situation of the records made up to the moment of drafting the settlement.

The plans that led to the identification and topographical determination of the meadows are:

- Aero photogrammetric planes of the orthophotomap type edited virtually and updated.
- Topographical and cadastral plans (Leu et al., 2003) and maps purchased from the O.C.P.I. Caras Severin (Figure 2).

The following sections of plans and maps were used on analog and raster support:

- Topographical maps on the scale 1: 50 000: L-34-103-D; L-34-104-C.
- Topographical maps on the scale 1: 25 000: L-34-103-D-b; L-34-103-D-d; L-34-104-C-a; L-34-104-C-c.
- Cadastral plans on a scale 1: 5 000:
- L-34-103-D-b-4-II; L-34-103-D-b-4-IV.
- L-34-103-D-d-2-I; L-34-103-D-d-2-II; L-34-103-D-d-2-III; L-34-103-D-d-2-IV.
- L-34-104-C-a-1-I; L-34-104-C-a-1-II; L-34-104-C-a-1-III; L-34-104-C-a-1-IV.
- L-34-104-C-a-2-III.
- L-34-104-C-a-3-I; L-34-104-C-a-3-II; L-34-104-C-a-3-III; L-34-104-C-a-3-IV.
- L-34-104-C-a-4-I.
- L-34-104-C-c-1-I; L-34-104-C-c-1-II; L-34-104-C-c-1-III; L-34-104-C-c-1-IV.
- L-34-104-C-c-2-I; L-34-104-C-c-2-II; L-34-104-C-c-2-III.
- L-34-104-C-c-3-I; L-34-104-C-c-3-II.
- L-34-104-C-c-4-I.

During the research phase to analyze the U.A.T. Several satellite images processing software was used as well as thematic maps on the studied area, as follows: Global Mapper; ArcGIS, WinGIS;

During the entire process satellite images of the orthophotomap type (with the extension ".tif" and ".sid") made by the Landsat satellite system were used, namely Landsat 5, with a spatial resolution of: 0,8 m panchromatic; 4 m multispectral; 1 m pan-sharp

RESULTS AND DISCUSSIONS

Among the topographic factors, in the study of monitoring the meadow layout units will be recorded the following components:

- **Geographic coordinates** (Latitude / Longitude) determined by GPS, the coordinates being recorded in the WGS84 projection system and converted in the STEREO 70 system (Barliba et al., 2008).

- **shape of relief** - component of the topographic factors, based on the following scale:- plateau.
- **the slope position** of the meadows using the following scale:
- slope base; - the lower third of the slope; - the middle third of the slope;
- the upper third of the slope; - the tip of the slope.
- **the slope shape** influences the climate regime, mainly by changing the thermal and hydric regime. For its quantification, scales were used on five relief forms, namely:
- concave; - concave-straight; - straight;
- convex; - convex-straight
- **slope** was determined by satellites as well as by plans, by specific tilt-determining programs.
- **the altitude** was determined using rectangular coordinates transposed on orthophotomap. Altimetry processing on topographic planes by specific altitude rendering programs was implemented with the AutoCAD program, respectively TopoLT, from three-dimensional coordinates (x, y, z). The values are expressed in meters, shape 0m being determined by the 1970 Black Sea Stereographic projection and being verified on the ground by GPS (Novac, 2011).
- **the exhibition** was determined on processed plans and is expressed in degrees by cardinal points and intermediate cardinal points with a beach of 15 0.

The administrative unit must not exceed 100 ha, except if there is a UA with the same cadastral number of more than 100 ha;

Analysis of altitude and meadows exposure was done using the Global Mapper application. At the same time, using this application, the layout of the meadows was generated on a topographic plane (Figure 3), on a plane with level curves (Figure 4). After elaborating all the necessary plans, a 3D model (Figure 5) of the area has been made where the UAs are arranged for an overview of the meadows with a view to their location in a mountain area.

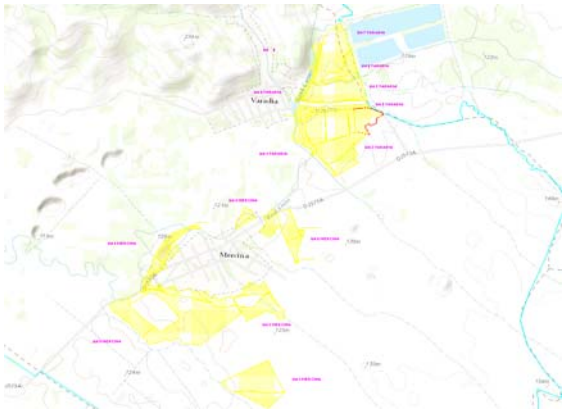

Figure 3. The layout of the meadows on the topographic plane, Varadia locality

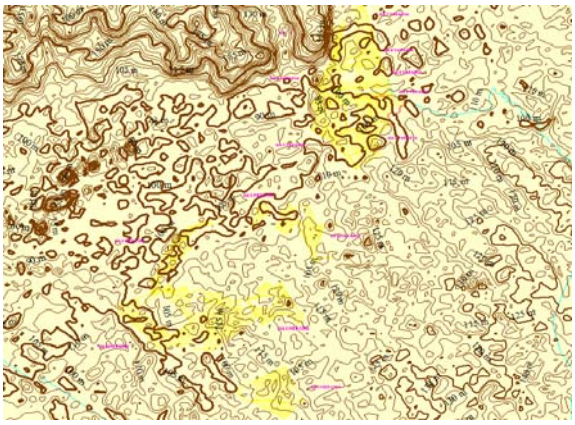

Figure 4. Layout of the U.A.T. Varadia after Level Curves (5 m equidistance)

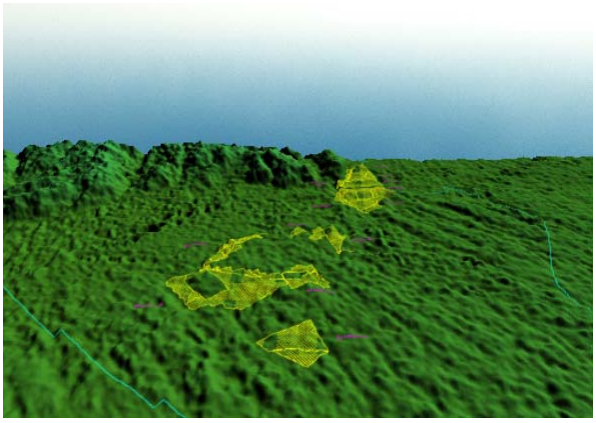

Figure 5. Layout of the U.A.T. Varadia on 3D relief

The parcel composition of the Amenajistic Units (UA-meadows), for Varadia locality is presented. U.A.T. Varadia was made taking into account the natural boundaries of the land and the infrastructure so that each meadow body would be compact. The following table contains (Table 2) the cadastral number, the pasture / meadow area identified by the topographical number and the cadastral sector to which it belongs under Law 165 - Annex 5.

Table 2. Areas centralization of U.A.T. Varadia

No.	Amenajistic Unit (meadow body)	Area hectares
1	UA 1 VARADIA	3.95
2	UA 2 VARADIA	58.92
3	UA 3 VARADIA	4.06
4	UA 4 VARADIA	1.28
5	UA 5 VARADIA	23.42
6	UA 6 VARADIA	5.84
7	UA 7 VARADIA	21.85
8	UA 8 VARADIA	2.18
TOTAL VARADIA LOCALITY 121.50 hectares		
1	UA 1 MERCINA	28.24
2	UA 2 MERCINA	20.15
3	UA 3 MERCINA	74.03
4	UA 4 MERCINA	11.04
5	UA 5 MERCINA	3.92
6	UA 6 MERCINA	16.73
TOTAL MERCINA LOCALITY 154.11 hectares		
TOTAL U.A.T. VARADIA 275.61 hectares		

In this case, a UA1 Varadia meadows block (Figure 6) with an area of 3.95 ha is represented as an example.

In the U.A.T. Varadia, Amenajistic Units (UA) or meadows bodies were numbered with Arabic numerals, downstream upstream, on hydrographical basins and from left to right, in the meadow body constituted according to the following criteria:

- natural limits of land (peaks, valleys), and in the absence of artificial boundaries (roads);
- the maximum permissible surface area of an Amenajistic Meadow Units (UA) is maximum 100 ha. There were no exceeds in our 14 UAs.
- dimensioning of parcels was done only cadastral being taken over after the situation Law 165/2013, Annex 5.

Figure 6. UA 1 **(**meadow body) for VARADIA locality

CONCLUSIONS

The pastoral meadows are compactly arranged, they have been easily identified due to the fact that the land was embanked.

The new assigned cadastral numbers have certain limits in the field, and the field checks made by the survey have shown that the surface of the documents coincides with the real field.

Thus, the realization of this work represents a good management of the pastures in that area which leads to a rational use of the meadows and grazing in the area that will not affect the natural ecosystem. Managing rural activities is a very important factor that contributes to the sustainable development of the area in question and is therefore essential for the city hall and public administration. At the same time, the town hall has a specific situation of the pastures that it owns and can concede pastures to the grazing farmers.

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