STUDIES ON THE RECTIFICATION OF BOUNDARIES BETWEEN DIFFERENT ADMINISTRATIVE BORDERS

Pop N., M. Ortelecan, G. Badescu, T. Salagean,
Rodica Joldiş (căs. Bădescu), Diana Ficior
University of Agricultural Sciences and Veterinary Medicine, Faculty of Horticulture,
3-5 Manastur Street, 400372 Cluj-Napoca, Romania; email: popnicolae@gmail.com

Abstract. *Broken boundaries rectification or straightening operations have a technical and legal aspect but sometimes it happen to have an economic character when changing between adjoining surfaces are made on the basis of equivalence of agricultural land in accordance with Annex 21 of the "Land Law no. 18/1991 ". In this paper it is noted that both the parity rectification and equivalent rectification two stages of work must be done, calculate a point on a line and to determine the coordinates of the intersection of two lines. On the plans and cadastral plans the area are represented by conventional signs specific to each point. The cadastral maps and plans of the frontier conventional signs represent different field alignments were adjusted as follows:*

State Border ……

County boundary ……

Municipal boundary…….

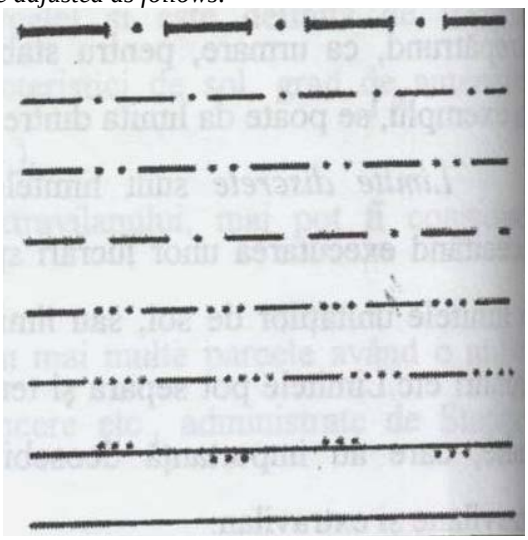
Border town ……

Common border ……

Economic units and agricultural associations limit ……

Cadastral boundaries of sectors …

Inside Limits ……



Keywords: rectification, parity, equivalence, boundary.

INTRODUCTION

The land rectification is a correction of the boundary sinuous and broken lines in order to be used more rational for land fund. The corrections of the boundaries can be done by parity when it is conserved the lands unit of the two lands or changing the land equivalence using coefficients for calculation of conventional production units (CPU). The land rectification can be done for the correction of lands which are divisions the property has a single use and a single owner or may be owned by more owner without dividing it.

The boundary lines resulted from the rectification can be verified by counting the coordinates of the points, the surfaces of the two adjoining lands, divided by the new boundary, in the case of parity verification will be equal with initial areas. On the land, the boundary points are materialized by concrete border stones.

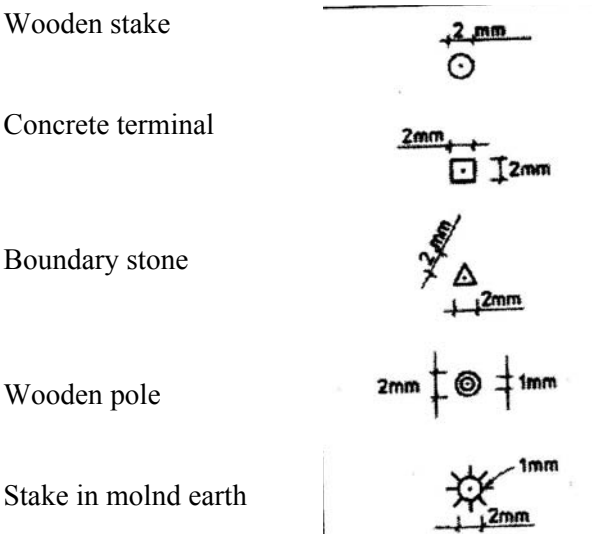


Fig. 1. Conventional signs – boundary points

MATERIAL AND METHOD

The limits of an administrative territory is marked by the line of demarcation of the land.

This paper presents the realization method of the boundary rectification between two administrative territories where we are using equivalent coefficients.

Modifications and rectification of the boundaries are technical and legal operations in most cases, but can also have economic aspects when land borders are not affected by correction of the same quality.

RESULTS AND DISCUSSION

As is known from the literature, straightening operation of the boundaries usually follow-up work of regional planning projects. Technical aspect of the operation consists of rectifying establishment of topographic features on which it will apply the new border.

Legal aspect relates to the preparation of documents for the exchange of land between owners affected by border correction. The economic concerns the calculation of equivalent surface area to calculate conventional production units.

When rectifying a broken border with a straight line passing through a point of the old border we specify the first case when land is at parity change.

Table 1

Nr.	Crop group	MU	Equivalence ratio from 1 ha experimental field crops
1	Field crops	1 ha	1
2	Potatoes, sugar beets, melons	1 ha	2
3	Rice	1 ha	8
4	Tobacco	1 ha	6
5	Fodder	1 ha	1,5
6	Flax, hemp, castor, sunflower, technical plants	1 ha	4
7	seeds	1 ha	7
8	Herbs and spices	1 ha	6
9	Field vegetables	1 ha	12
10	Vineyard harvest – the usual	1 ha	6
11	Vineyard harvest – intensive	1 ha	8
12	Young vineyards	1 ha	4
13	Young vineyards - intensive	1 ha	6
14	Grapevines nurseries	1 ha	15
15	Fruit Bushes	1 ha	3
16	Hop	1 ha	5
17	Strawberry fields	1 ha	4

Consider two auxiliary points M and N, the first first located on common land A and the second on B common ground B (Fig. 2) and the broken border between two administrative units which is straightened so that the given area be equal to that received.

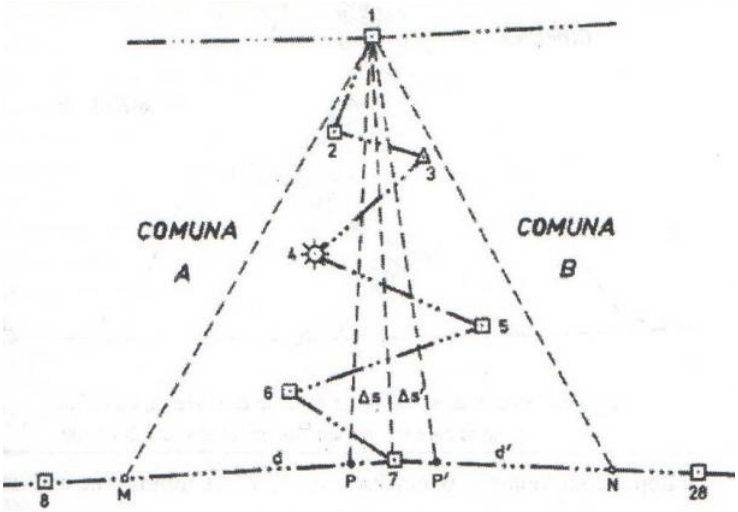


Fig. 2. Parity rectification of a broken boundary

If M and N are boundary points, their coordinates will be calculated using d and d' as polar coordinates and the orientation θ_{7-8} respective θ_{7-28} of the sides of the borders. There were determined the coordinates of other points using the Leica TCR 805 total station and finally reach the analytical calculation of the two surfaces formed S1 = M-1-2-3-4-5-6-7 and S2 = N-7-6 -5-4-3-2-1.

Comparing the areas of the two lands we can find three situations:

a) If S_1 (M -1-2-3-4-5-6-7) = S (M-1-7) – the line joining the points 1 and 7 will be the new boundary

b) If $S_1 < S$, cut off the area ΔS from triangle M-1-7 by determining the coordinates of point P located on the alignment 7-M, using

$$X_p = X_7 + \rho(X_M - X_7)$$
$$Y_p = Y_7 + \rho(Y_M - Y_7)$$

where

$$\rho = \frac{d_7 - p}{D_7 - M} = \frac{\Delta s}{S_{M-1-7}}$$

c) If $S_1 > S$ – cut off area ΔS' from triangle N-7-1 and the coordinates of point p' are:

$$X_{p'} = X_7 + \rho(X_N - X_7)$$
$$Y_{p'} = Y_7 + \rho(Y_N - Y_7)$$

where

$$\rho = \frac{d_7^{'} - p'}{D_7^{'} - M}$$

The correct determination of the new boundary line is done by analytical calculation of the surface of the two communities using new coordinate values obtained in relation

$$S_3 = S_{M-1-P} \text{ or } S_4 = S_{P-1-N-7}$$

For the second case when the correct boundary between the two communities will be the equivalent, considering the value of the land transferred or received (see Table 1) we proceed in the first stage as in the previous case getting border line 1 - P (fig.3)

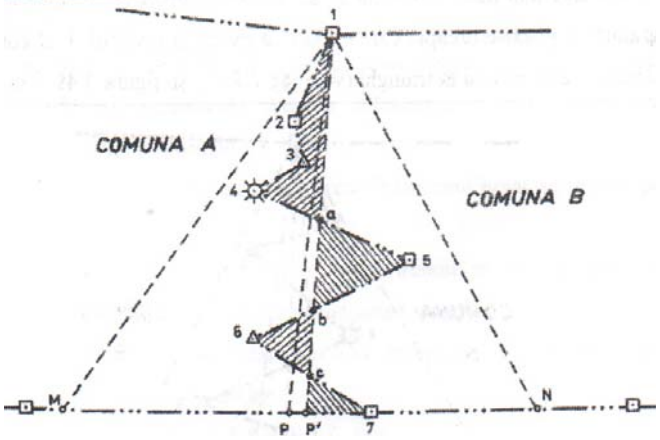


Fig. 3. Equivalent rectification of a broken boundary

The next step is to determine the coordinates of the points of intersection between the new and the old boundary line and ceded areas and communities A and B received by applying the method of calculating the coordinates of the intersection of two lines as follows:

$$X_a = X_p + \rho(X_1 - X_p)$$
$$Y_a = Y_p + \rho(Y_1 - Y_p)$$

where

$$\rho = \frac{s_{p-2-3}}{S_{1-2-p-3}}$$

$$X_c = X_p + \rho(X_1 - X_p)$$
$$Y_c = Y_p + \rho(Y_1 - Y_p)$$

where

$$\rho = \frac{s_{p-2-3}}{S_{p-6-1-7}}$$

To obtain equivalent boundary corrections we are using coefficients from Table 1 again will calculated the new surface to be ceded by a common or the other, using the relationships:

$$S_A^{'} = (S_A + S_B) \cdot \frac{C_a}{C_a + C_b}$$

$$S_B^{'} = (S_A + S_B) \cdot \frac{C_b}{C_a + C_b}$$

where: C_a – sum of coefficient of equivalence for commune A

C_b – sum of coefficient of equivalence for commune B.

The line segment *joining* the *points* P' and 1 is the final boundary line.

To obtain the P' point, which will be joined with point 1 and it is the final boundary line, will make the difference between S_A si S'_A. If the result is positive detachment will be made from the village with the lowest equivalent ratio and vice versa.

Checking the location of the new boundary lines will be as if the parity rectification, specifying that they will take into account the value of the coefficient of equivalence

$$S_A^{'} \cdot C_b = S_B^{'} \cdot C_a$$

CONCLUSIONS

1. The rectification of the boundaries is required to exchange of lands that requires studies on the structure of interest in land sites, the natural conditions on soil, climate, groundwater level, slope, exhibition, fertility and economic conditions (distance, network traffic , etc.).

2. Making straight alignments in future investments in land reclamation, orchards, vineyards and building a benefit for making production with maximum economy.

3. In the case of equivalence corrections if a route is required rectification is mandatory compensation between the parties for the land transferred or received.

REFERENCES

1. Luca, E., V. Budiu and Leontina Kovacs (2001). Organizarea teritoriului. Ed. Alma Mater, Cluj-Napoca.

2. Pop, N. (2010). Topography and engineering plotting. Ed. Risoprint, Cluj-Napoca.

3. Tamaioaga, Gh. and Daniela Tamaioaga (2005). Cadastrul general si cadastrele de specialitate. Ed. Matrix Rom, Bucuresti.