

DYNAMICS OF AGRICULTURAL REAL ESTATE EVOLUTION IN TIMIȘ COUNTY

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***Abstract:** The study represents an analysis of the agricultural real estate evolution tendencies, as well as of the evolution of the agricultural and non-agricultural lands in Timiș County, Romania, in the period of time 1990-2017. The analysis implies the determination and discussion of certain statistic indicators referring to the series of multiannual data, respectively the presentation of some functional models for the evolution of statistic data series.*

***Key words:** agricultural statistics, Timiș County*

INTRODUCTION

The evolution of the agricultural real estate and of the agricultural and non-agricultural lands presents significant modifications in Romania during the period of time 1990-2017. Moreover, the period of time studied has been characterized by multiple political, social and economic changes at global level – aspects that bring with them and explain the high variability of the multiannual series studied. The statistic data on which this study is based are those delivered by the National Institute of Statistics of Romania [9].

The aim of the study is to analyse some aspects of the type presented above, but on a more restricted area, namely in Timiș County, Romania.

MATERIALS AND METHODS

The statistic data based on which this analysis has been carried out, are to be found in the Tempo data base offered by the National Institute of Statistics of Romania [9]. The corresponding calculations and discussions refer to the data presented in this statistic source, with the remark that in some periods of time some indicators were not object of those data basis. The statistic calculations, respectively the functional dependency models have been realized with the help of the application Paste3 [12]. Some tabular calculations have been done by using Microsoft Excel.

RESEARCH RESULTS

The total surface was constant during the period 1990-2014, being of 869665 ha. In table 1 are given the statistic data referring to the agricultural surface, arable land, pasture, grassland, surface dedicated to viticulture, respectively to fruit-growing. Because of the limited space of this paper, the data are presented only truncated [9]. The statistic summary is based on the statistic data consisting in average values, standard deviation, coefficient of variation, slope, minimum and maximum values and percentage change.

To be noticed is the fact that for each category of land the surfaces presented a downward trend (following the “slope” values). The last line in the table, the percentage

change, indicates the difference: $100 \times \left(\frac{V_{2014}}{V_{1990}} - 1 \right)$. This indicates the percentage with which

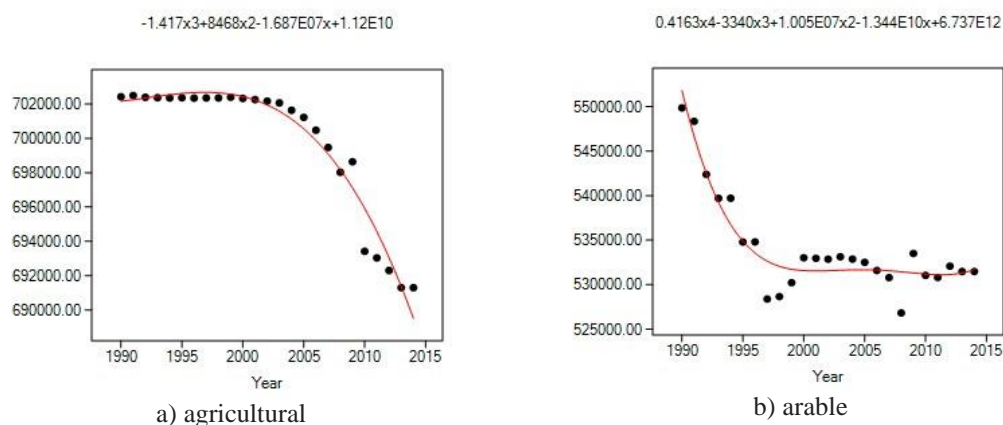
the value corresponding to the year 2014 changes as compared to the one of the year 1990. So, the agricultural surface decreased by 1.6%, the arable surface by 3.3% and the grassland by 3%. The most significant decreases have been noticed for the surface intended for viticulture (28.4%), respectively for fruit-growing (9.5%). The land covered with pasture increased by 9.9% in 2014 as compared to the one registered in the year 1990.

Table 1
Statistical data and summary statistics for the surface area of the Timiș County land fund (hectares)

Year	Agricultural	Arable	Pasture	Grassland	Viticulture	Fruit-growing
1990	702424	549866	108002	29511	5757	9288
...
2000	702326	533018	126149	29505	4313	9341
...
2007	699470	530781	125504	29482	4457	9246
...
2014	691299	531472	118671	28632	4121	8403
Average	699740.9	534150.4	122685.1	29192.9	4567.9	9144.6
Std.dev.	3938.8	5584.6	5647.5	393.1	502.1	368.4
Coeff. of variation	0.6	1.0	4.6	1.3	11.0	4.0
Slope	-455.6	-527.3	210.1	-34.5	-62.1	-41.8
Minimum	691299	526814	108002	28106	3871	8345
Maximum	702497	549866	130394	29511	5757	9696
Percentage change (%)	-1.6	-3.3	9.9	-3.0	-28.4	-9.5

Source: NIS statistical data [9] and our calculation in summary statistics

The evolution tendencies for each category of land are presented in the figures 1 a),b),...,f). In order to do this, a mathematic evolution model based on polynomial function has been determined [6]. The evolution tendencies are clearly decreasing, with the exception of pasture lands which had an increasing tendency at the beginning, reaching a maximal value in the years 1997-1999, but at the present there can be noticed again a surface decreasing tendency.



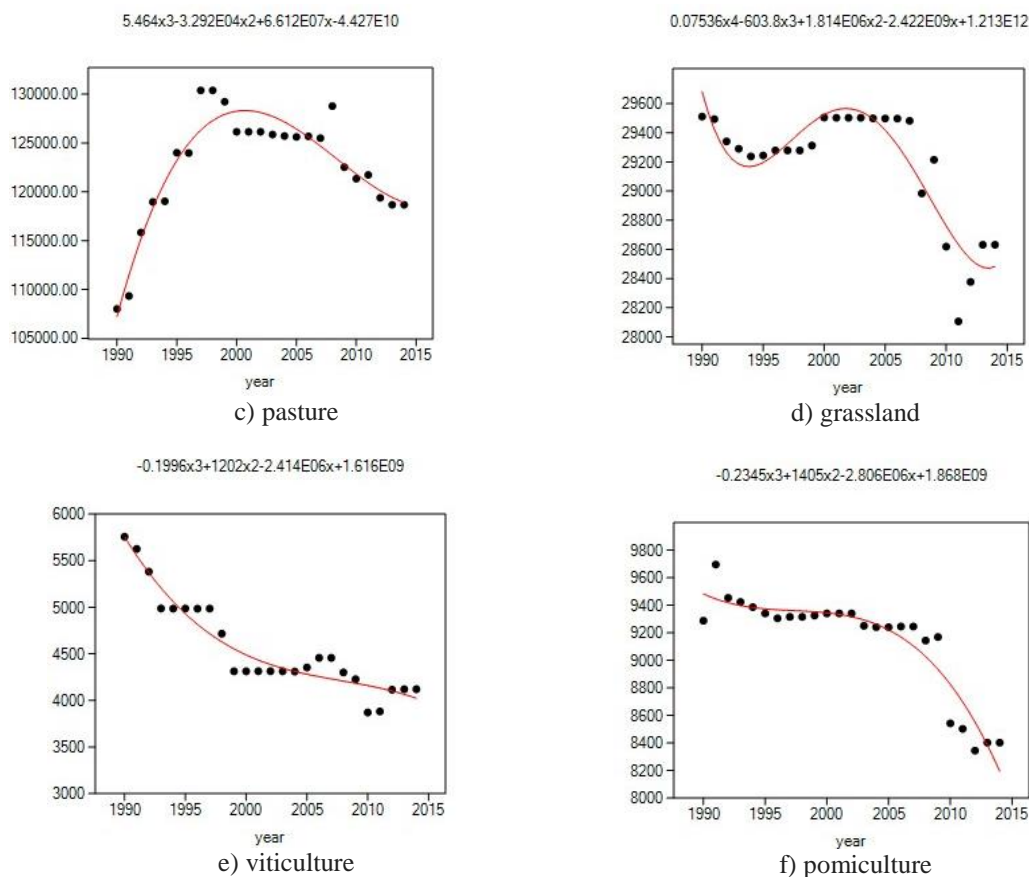


Figure 1. Graphical representation for the surface area of the Timiș County land fund (hectares)

Source: Calculations (Paste3) based on NIS statistical data [9], 2018

The Cluster chart drawn by using the Euclidian distances as similarity is shown in the following figure, starting with the year 1990 (the year having the indicative 1) and until 2014 (the year with the indicative 25). The similarities, according to the annual values of the type series studied, are shown on graphically presented groups (clusters).

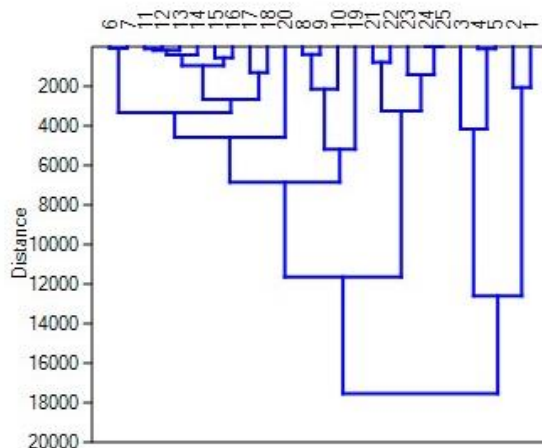


Figure 2. The cluster chart regarding the agricultural surface categories in Timiș County

Source: Calculations (Paste3) based on NIS statistical data [9], 2018

Subsequently, in order to determine where the agricultural, horticultural or zootechnical land losses are, we also analyzed the multiannual series of statistical data [9]

which present the lands covered with: forests, water, constructions, roads and railroads, degraded lands.

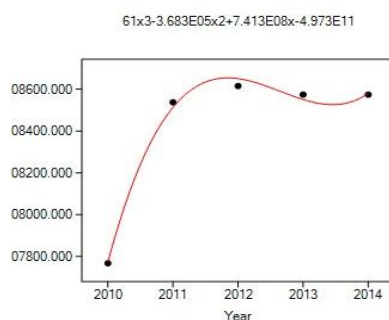
Table 2.
Statistical data and summary statistics for the surface area of the non-agricultural Timiș County land fund (hectares)

Year	Forests and other forest vegetation	Occupied with water	Occupied with construction	Communication ways and railways	Degraded and unproductive lands
2010	107768	15736	28923	18950	4871
...
2014	108574	15275	29908	19382	5227
Average	108413.6	15317.6	29483.0	19131.6	5049.2
Std. dev.	323.7	216.4	427.9	204.7	148.8
Coeff. of var.	0.3	1.4	1.5	1.1	2.9
Slope	164.9	-79.6	285.5	128.2	98.1
Minimum	107768	15149	28923.0	18950.0	4871.0
Maximum	108615	15736	29908.0	19382.0	5227.0
Percentage ch.(%)	0.7	-2.9	3.4	2.3	7.3

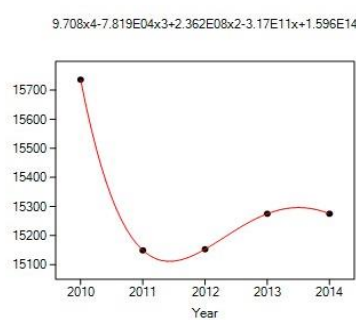
Source: NIS statistical data [9] and our calculation in summary statistics

The statistic data refer to the period 2010-2014. Following the „slope” values, respectively the „percentage change”, with the exception of the fields covered with water which encountered a light decrease (2.9%) in the time period 2010-2014, all the other fields increased in this time interval. The surface covered with fields increased slightly, by 0.7%, the surface covered with buildings increased by 3.4% since 2010 and till 2014, the surface covered with roads also increased by 2.3%. The highest increase rhythm can be noticed for the surface covered with buildings (slope = 285.5). The highest percental increase has been noticed for the degraded lands, for which the increase during the 5 years was by 7.3 %. The polynomial models which describe the surface variation during the time period 2010-2014 are presented in the figures 3 a),...,e).

It is well known the fact that the situation of lands having an irrigation plant accelerated decreased after 1990 at the level of the entire country [3,5,8,11]. Numerous indicators present important modifications [4,7]. Yet the situation tends to become stable in the last years, especially because of the support programs. According to PNDR 2014-2020, important sums of money are to be invested in field irrigation projects [1,2,10,13-15]. At present, the irrigated surface in Romania is of about 619000 hectares of the about 14.8 million hectares agricultural surface, respectively 9.4 million hectares arable land [9,13]. So, as compared to the entire agricultural lands in Romania, about 6.5% can be irrigated at present.



a) forest



b) water

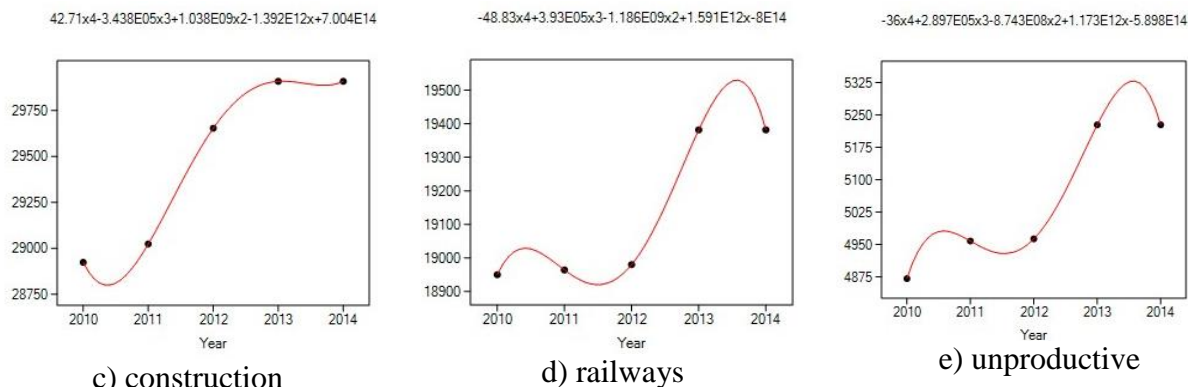


Figure 3. Graphical representation for the non-agricultural surface area of the Timiș County land fund (hectares)

Source: Calculations (Paste3) based on NIS statistical data [9], 2018

In Timiș county, the irrigated surface was of 15870 hectares in the year 1997 and until the year 2003 the tendency remains constant. Till 2008 a decrease tendency appears, only 15510 hectares being irrigated. In 2008 and till 2017 the surfaces having irrigation plants did not change. These details can be noticed in figure 4 too. So, in year 2017 only about 2.2% of the agricultural surfaces in Timiș County are equipped with irrigation systems, this number being inferior to the number valid at national level.

Table 3

Statistical data and summary statistics for the surface of the lands with irrigation works of Timis County (hectares)

Year	Surface (ha)	Year	Surface (ha)
1997	15870	2003	15870
...
2004	15864	2007	15611
...
2010	15510	2017	15510
min	15510	average	15680.9
max	15870	slope	-25.5299
stdev	171.8648	coef.var.	1.096013

Source: NIS statistical data [9] and our calculation in summary statistics

The series of multiannual data is homogenous, the variation coefficient having a reduced value. This is understandable, as no major modifications of the surfaces supplied by the irrigation plants exist from one year to the other.

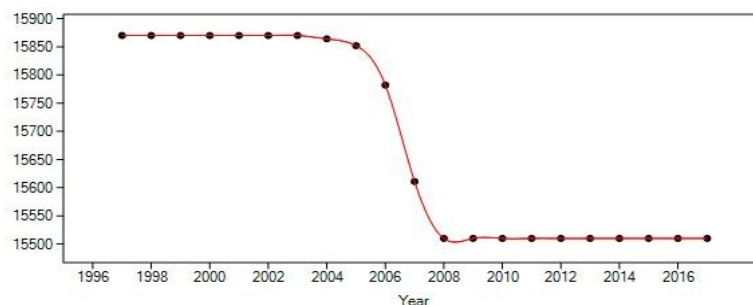


Figure 4. Graphical representation for the surface of the lands with irrigation works of Timis County (hectares)

Source: Calculations (Paste3) based on NIS statistical data [9], 2018

CONCLUSIONS

The statistic data referring to the agricultural land surfaces show a decrease tendency at the level of Timiș County, Romania, in the period of time 1990-2014. In the period of time from 2010 to 2014 we notice an increase of the surfaces covered with woods, of those covered with buildings, with roads and an increase of damaged land surfaces. According to the statistic data, the land surfaces having irrigation plants present a decrease tendency in the period of time 2004-2008, followed by a period of stabilization after this year.

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